GROUNDTECH
CONSULTING

Job title: Didsbury Point

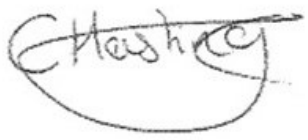
Report type: Remedial Specification

Prepared for: Civic Engineers

Date: December 2022

GROUNDTECH
CONSULTING

Document Control Form	
PROJECT	*DIDSBURY POINT*
REPORT NAME	*REMEDIAL SPECIFICATION*
REPORT REFERENCE	*GRO-20064-4035*
STATUS	*FINAL*
ISSUE DATE	*02 December 2022*
REVISION	
CLIENT	*CIVIC ENGINEERS*
CLIENT CONTACT	*IAN BRYNING*

For and Behalf of Groundtech Consulting	
SIGNATURE	
AUTHOR	Connor Hastings BSc (Hons)
SIGNATURE	
CHECKED	Callum Holden BSc (Hons) FGS
SIGNATURE	
REVIEWED	James Doyle BSc (Hons) CGeol FGS

GROUNDTECH
CONSULTING

CONTENTS

1.0 INTRODUCTION 1

1.1 Background 1
1.2 Proposed Works 1
1.3 Objectives 1
1.4 Remediation Specification Scope 1
1.5 Sources of Information 2

2.0 CONCEPTUAL SITE MODEL 3

2.1 Site Details 3
2.2 Site History and Consultations 3
2.3 Geology and Hydrogeology 3
2.4 Preliminary Conceptual Site Model 3
2.5 Scope of Works 4
2.6 Ground Model 4
2.6 Geo-Environmental Testing Results 6
2.7 Ground Gas 6
2.8 Remedial Strategy 6
2.9 Geotechnical 6
2.10 EOD Contracts UXO Risk Assessment 7

3.0 POLLUTION LINKAGE ASSESSMENT REVIEW 8

3.1 Human Health 8
3.2 Controlled Waters 8
3.3 Groundworkers 8

4.0 REMEDIATION PROPOSALS AND APPRAISAL 9

4.1 Outline Remediation Proposals 9
4.2 Enabling Works Phase 10
4.3 Construction Phase 10
4.4 Project Setup and Management 10
4.5 Phasing of Works 11

5.0 IMPLEMENTATION OF SITE REMEDIATION PROCESSES 12

5.1 General 12
5.2 Enabling Phase Implementation 12
5.3 Construction Phase Implementation 15

6.0 EARTHWORKS 19

6.1 General 19
6.2 Site Won Material and Suitability Testing 19
6.3 Validation Testing 19

7.0 SUPERVISION, VERIFICATION AND REPORTING 20

7.1 Site Supervision 20
7.2 Collection of Samples 20
7.3 Verification Report 20
7.4 Construction Phase Works Verification 21
7.5 Ground Gas Verification 21
7.6 Cover System 21

8.0 REUSE OF SOILS AND MATERIALS MANAGEMENT 22

8.1 Waste Management Background 22

8.2 CERTAINTY OF USE AND QUANTITY OF MATERIAL 22
8.3 ON SITE MATERIAL MANAGEMENT 23

9.0 CONTINGENCY PLAN AND AREAS OF UNEXPECTED CONTAMINATION 24

APPENDIX 1 - PLANS
APPENDIX 2 - GENERAL REQUIREMENTS
APPENDIX 3 - REMEDIATION OPTIONS APPRAISAL
APPENDIX 4 - REMEDIAL TARGET VALUES
APPENDIX 5 - LIMITATIONS

Plans		
Plan Reference	*Revision*	*Title*
GRO-20064-P01	-	*Project Location Plan*
8845-BA-Z1-GF-DR-A-(04)010-P2	-	*Planning Layout*

1.0 INTRODUCTION

1.1 Background

This Remedial Specification has been produced on behalf of Civic Engineers and relates to the remediation of a site at Didsbury Point in Didsbury.

The site was most recently comprised of unused land which was historically occupied by a hospital that has since been demolished. A stockpile of soil is present in the centre of the site. A temporary storage unit is located in the south western area of the site and an electricity substation is located in the northern area.

A summary of the findings of the investigations are outlined in Section 2.0.

1.2 Proposed Works

Remediation will be undertaken at the site to prepare it for development of the multi-storey residential building up to nine storeys in height, with associated hard surfacing and soft landscaping on the ground level as shown on the 'Planning Layout' 8845-BA-Z1-GF-DR-A-(04)010-P2.

Civic Engineers have submitted a planning application which is currently pending decision by Manchester City Council referenced 135235/FO/2022. This Remedial Specification has been commissioned to facilitate the discharge of any pre-commencement planning conditions that are likely to be enforced with regard to land contamination.

This Remedial Specification has been commissioned to facilitate the discharge of any pre-commencement planning conditions that are likely to be enforced with regard to land contamination.

1.3 Objectives

The objective of this Remedial Specification is to present details of the remedial objectives, how the remediation of the site will be implemented and to outline how the works will be validated. This Remedial Specification details how the works will be permitted under the current regulatory regime.

The remediation will ensure that upon completion of the residential development, it can be demonstrated that the ground and groundwater conditions at the site are appropriate for its intended use and risks to identified receptors have been reduced to an acceptable level.

The following Remedial Specification includes the protection measures required during the enabling works phase and to be installed in the construction phase of the redevelopment for a residential end use with plant uptake.

This is a dynamic document that may require updating at certain stages of the process, the revisions should be undertaken in agreement with the relevant regulatory bodies. In addition, this Remedial Specification is subject to the approval of the regulators pre-commencement.

1.4 Remediation Specification Scope

The scope of the Remedial Specification is in accordance with LCRM is as follows:

- *Summary of the Conceptual Site Model.*
- *Summary of the Pollution Linkage Risk Assessment.*

- *Remediation Options Appraisal including detailed assessment of preferred options.*
- *Implementation of preferred remedial solution.*
- *Specification for the remediation works.*

1.5 Sources of Information

In preparing the Remedial Specification the following documents were reviewed and should be read in conjunction with this report:

- *Clancy Consulting Geo-Environmental Appraisal referenced; 20/0867/001 and dated April 2016.*
- *Groundtech Consulting Geo-Environmental Appraisal referenced; GRO-20064-2216 and dated 10th May 2021.*
- *Groundtech Consulting Ground Gas Risk Assessment referenced; GRO-20064-2788 and dated 20th September 2021.*

2.0 CONCEPTUAL SITE MODEL

The following information has been summarised from the Clancey Report and Groundtech Consulting Geo-Environmental Appraisal.

2.1 Site Details

The site is located circa 3.54 miles south of Manchester City Centre and is approximately centred on National Grid Reference 383534, 392594.

The topography of the site is generally level and occupied by an area of vegetation with part of the southern area covered in a degraded tarmac surfacing. There are two buildings on site one is associated with an electrical substation and the other is a temporary building owned by the local council and used for the storage of gardening equipment.

The site is generally surrounded by residential properties with some commercial developments and a primary school adjacent.

2.2 Site History and Consultations

The site was located in an area of open undeveloped land until 1922/23 where the hospital located adjacent had expanded onto the eastern side of the site, this was then demolished in 1934. Withington Hospital was developed in the 1970s and occupied most of the east and west areas of the site. This was finally demolished in 2006 where the site remained as undeveloped land.

2.3 Geology and Hydrogeology

The 1:50,000 British Geological Survey (BGS) map for the area (Sheet 98, Stockport) indicates that superficial deposits are present beneath the site comprising a Glacio Fluvial Sheet Deposits (sand and gravel) of the Devensian period. Solid strata comprise sandstone of the Triassic Wilmslow Sandstone Formation.

Sub Soil Surveys drilled one cable percussion borehole (BH8) on the site, the results of which show that Made Ground soils of around 4.0m bgl, overlay firm to stiff clays with occasional sand horizons to depths approaching 22.0m bgl, where very dense sands grade into weathered sandstone at approximately 23.3m bgl.

According to the Environmental Agency Groundwater Vulnerability Map (Sheet 17 Manchester) the Sandstone bedrock is classified as a Principal Aquifer, and the overlying superficial deposits are a Secondary A Aquifer.

The site is not indicated to be within a Groundwater Source Protection Zone.

There are no recorded groundwater abstraction points or any recorded groundwater pollution incidents within 500km of the site

2.4 Preliminary Conceptual Site Model

The following risks were determined by Clancy Consulting:

Receptor	Level of Risk
Aquifers	*Very Low to Moderate*
Surface Waters	*High*
Site End Users from contaminated soils	*Very Low*

Site End Users from vapours	*Low*
Site End Users from ground gas	*Very Low*

2.5 Scope of Works

The following scope of works was carried out by Clancy Consulting.

- 9 No. Windowless Sample Boreholes (WS1 to WS7A) were advanced to depths of between 0.15m and 4.0m bgl.

The following scope of works was undertaken by Groundtech Consulting:

- *Five cable percussive boreholes (BH01 to BH05) were advanced to depths of between 5.0m bgl and 27.5m bgl. Rotary coring was followed on for 6.0m within the two deeper cable percussive boreholes (BH01 and BH02) to depths of 33.0m and 28.0m bgl respectively.*
- *Four trial pits (TP02 to TP05) were excavated to depths of between 2.1m and 2.7m bgl.*
- *Two soil percolation tests (TP03 and IP3) were conducted at depths of 1.5m and 0.9m bgl respectively.*
- *Six plate load tests (PLT01 to PLT06) were carried out at depths of 0.35m bgl within the trial pit locations prior to deeper excavation.*
- *Two foundation pits (TP01 and TP06) were excavated to depths of between 0.16m and 0.55m bgl.*

2.6 Ground Model

During the Ground Investigation completed by Clancey Consulting the following was encountered:

Ground Model

Made Ground was encountered across the site within all locations to a maximum depth of 4.0m bgl. None of these boreholes succeeded in reaching natural strata. Made Ground was generally granular in nature consisting of slightly silty gravelly fine to coarse sand and gravel of brick, sandstone, concrete with wood fragments, metal, plastic and glass. This was underlain with dark grey medium to coarse sand with occasional fine to medium subrounded gravel of quartzite and sandstone with occasional coal and brick fragments.

Foundations

A piled foundation solution was recommended with the possibility of a ground improvement or a vibro-pile solution as 4.0m of granular Made Ground had been encountered.

Contamination

Chemical testing undertaken at the site did not identify any elevated inorganic or organic contaminants when comparted to SSV's for a commercial end use.

In addition, no asbestos was detected in any of the samples tested.

Ground Gas

Previous investigations undertaken by GRM Development Solutions on an adjacent site in September 2010 encountered methane concentrations up to 0.5% v/v, and carbon dioxide concentrations of up to 5.1% v/v, with maximum flow rates of 0.9l/hr. The gas concentrations would be borderline CS1 to CS2 conditions and some form of gas protection may be required.

During the Groundtech Consulting Ground Investigation the following was encountered:

Made Ground was encountered across the entire site to a maximum depth of 3.5m bgl.

Hardstanding consisting of a degraded tarmac was encountered within TP02 from ground level to a maximum depth of 0.2m bgl. Brown sandy gravelly clayey topsoil was present in all locations excluding TP02 and BH04 from ground level to a maximum depth of 0.2m bgl.

Three main Made Ground populations were encountered during the investigation and are described below:

- *Orange brown sandy cobbly gravel was observed in all trial pit locations from 0.15m bgl to a maximum depth of 0.8m bgl.*

- *Grey brown cobbly sandy gravel was present in all trial pit locations excluding TP03 from 0.7m to a maximum depth of 2.1m bgl.*

- *Brown grey slightly clayey gravelly sand was observed in all borehole locations and TP03 from 0.6m to a maximum depth of 3.5m bgl.*

Former foundations were encountered within TP04 in the northern part of the site. Concrete slabs and bricks were encountered at circa 1.5m bgl and beneath this was plastic and metal piping, presumably the services for the former hospital building.

Three main natural stratification encountered during the investigation and are described below:

- *Medium dense to very dense grey brown and orange brown gravelly Sand was encountered within BH01, TP02, TP03 and TP05 to a maximum depth of 4.0m bgl.*

- *Firm to stiff sandy gravelly Clay was encountered in BH01 and BH02 from 4.0m to a maximum depth of 19.5m bgl.*

- *Gravel and sand bands were encountered within BH01 and BH02 - between depths of 11.0m to 12.0m bgl and 17.0m to 19.2m bgl within BH01 and between depths of 2.0m to 4.0m within BH02.*

2.6 Geo-Environmental Testing Results

A summary of the soil testing results is provided below:

Determinant	Samples	Contamination Encountered
Heavy Metals	-	-
	Asbestos not detected	
Speciated PAHs	*2 Samples* *2 Samples* *2 Samples*	*Benzo(b)fluoranthene associated with former site usage.* *Benzo(a)pyrene associated with former site usage.* *Dibenzo(ghi)anthracene associated with former site usage.*
	No Elevated TPH CWG	
	No Elevated VOCs	
Strata		
Made Ground Topsoil		*No Elevated concentrations.*
Hard surfacing/Subbase Material		*No Elevated concentrations*
Made Ground Sand		*Elevated speciated PAH Concentrations.*
Made Ground Gravel		*No Elevated concentrations.*

2.7 Ground Gas

A maximum Carbon dioxide concentrations of 3.8%v/v was recorded at the site. No methane concentrations or positive flow rates were recorded. Associated oxygen concentrations of a minimum 9.5% v/v.

The site has been classified as CS1 based on the GSV assessment, no gas protection measures are required within the proposed developments.

No radon precautions are required at the site.

2.8 Remedial Strategy

Based on the results of the investigation a cover system should be placed in soft landscaped areas to mitigate the risk from contaminated soils on site, elevated levels of concentration have been observed within two locations across the site (BH2 and BH4) in the form of Polycyclic Aromatic Hydrocarbons. The clean cover layer system should comprise 600mm of clean topsoil material underlain with 100mm of hard dig subsoil material.

The depth and chemical suitability of the cover system should be validated after placement.

Testing of onsite topsoil is recommended to confirm suitability for reuse as part of the proposed development. If soils are to be imported, they should be tested at source and on arrival on site to confirm it is the same material.

No remediation required with respect to groundwater.

Preliminary ground gas results place the site within CS1 at present and gas protection measures will not be required. This will be confirmed or otherwise on completion of the gas monitoring. Radon protective measures are not required within the proposed development.

2.9 Geotechnical

Piled foundations constructed within the Sandstone deposits at a depth of 25.5m below existing ground levels are proposed based upon variable Made Ground and natural soils present at the site and competent bedrock below.

SuDS drainage is not considered feasible.

Based on the testing results, DS-1 concrete was recommended.

Made Ground is likely to be encountered at formation level for highway design, All results have achieved the required design value of 5% excluding TP06 which achieved a CBR value of 3.9%. As a minimum, the subgrade should be proof rolled prior to construction.

2.10 EOD Contracts UXO Risk Assessment

A UXO Risk Assessment was obtained for the site. This was commissioned in October 2021 and the findings are summarised below.

The Risk Level is 'Medium'- mainly from Air Delivered Ordinance, Anti-Aircraft Ammunition and Military Usage.

The recommended mitigation measures during intrusive works for all previously undisturbed ground was the following:

1. *Operational UXO Emergency Response Plan.*
2. *UXO Safety and Awareness Briefings.*
3. *Excavations – Non-intrusive UXO Survey and EOD Banksman Support.*
4. *Piling – Intrusive UXO Survey e.g. Magnetometer.*

3.0 POLLUTION LINKAGE ASSESSMENT REVIEW

The following section summarises the revised pollution linkage assessment undertaken in the Groundtech Consulting Geo-Environmental Appraisal.

3.1 Human Health

Receptor	Level of Risk	Comments
Site End Users	*Moderate*	*PAH contamination encountered at the site.*
Site End Users (Asbestos)	*Low*	*No asbestos identified during investigation.*
Site End Users (Vapours)	*Low*	*No sources identified during investigation.*
Site End Users (Ground Gas)	*Low*	*Site falls into CS1, no radon protection measures.*
Adjacent Residents	*Low*	-

3.2 Controlled Waters

Receptor	Level of Risk	Comments
Aquifers	*Low*	*Not a resource and no significant contamination recorded.*
River Mersey	*Low*	*No mobile contamination identified.*

3.3 Groundworkers

The following risks were revised by Groundtech Consulting:

Receptor	Level of Risk	Comments
Contractors	*Moderate to Low*	*During remediation phase from PAHs.*

4.0 REMEDIATION PROPOSALS AND APPRAISAL

Remediation will be undertaken to ensure the site is suitable for its proposed multi storey residential end use which comprises the construction of an apartment building up to nine storeys with hardsurfacing and ground floor soft landscaping.

The required level of remediation, to the satisfaction of the relevant regulators and discharge planning conditions, will be accomplished through a combination of techniques as outlined in the subsequent sections.

The implementation of the remediation proposals will be in accordance with the following documented quality assurance procedures:

1. ***Detailed Remediation Specification*** which outlines the requirements to demonstrate the effectiveness of the remediation in order to meet the remediation objectives. These are detailed in the following sections of this report.

2. ***Final Verification Report*** which will provide a complete record of the remediation activities undertaken during the enabling phase and construction phase as part of the verification plan to support compliance with remediation objectives and criteria. The report will also contain descriptions of the works including photographic evidence and details of any unexpected conditions encountered during the remedial works and how they were dealt with. Cover system validation reports will be issued as addendums.

3. ***Cover System Validation Report*** *will validate the suitability and depth of cover system in garden and Public Open Space areas.*

In addition to the above, the preferred contractor will be required to secure all necessary permits and licences to allow remediation to be undertaken and prepare appropriate health and safety risk assessments and method statements in accordance with CDM Regulations 2015 and other relevant legislation. All roles and responsibilities should be agreed/delegated at a pre-start meeting.

4.1 Outline Remediation Proposals

Based upon the findings of the Ground Investigations, risk assessment and the remediation options appraisal in accordance with LCRM, the following remediation processes will be carried out to produce a site which is suitable for its proposed residential end use and adhere with the General Requirements set out in *Appendix 2*.

Remediation works will need to be completed in accordance with the 'CL:AIRE Definition of Waste Development Industry Code of Practice, 2nd Edition', where relevant. The contractor will need to write an appropriate materials management plan (MMP) and provide a 'Qualified Person' (QP) declaration. The remediation works will aim to maximise the reuse of soils on site and minimise off-site disposal.

The following phased remediation works will be undertaken to deliver the site suitable for the defined residential end use, the phases are divided into:

- *Enabling Works Phase.*
- *Construction Phase.*

The following remediation activities have been selected based on the Remedial Options Appraisal presented in *Appendix 3*:

- *Removal of stockpiled material.*
- *Cut and fill earthworks exercise.*
- *Removal of substructure.*
- *Installation of a cover system in areas of soft landscaping.*
- *Disposal of excess or unsuitable soils.*
- *Materials management comprising excavation, screening and reuse of suitable material.*
- *Further testing of topsoil.*
- *Import/ reuse crushed 6F2 material for piling mat and capping layer.*

4.2 Enabling Works Phase

The following works are considered necessary during the enabling works phase:

- *Vegetation clearance and topsoil strip.*
- *Break out of all hardsurfacing and below ground obstructions and processing for reuse.*
- *Watching brief for asbestos containing materials (ACM).*
- *Removal of stockpiled soils.*
- *Testing of topsoil.*
- *Cut site to required earthworks profile.*
- *Placement of piling mat and capping to carriageways.*
- *Reuse of appropriate soils and materials management of soils, including topsoil strip.*
- *Off-site disposal of unsuitable or excess material.*
- *Validation during the enabling works.*
- *Maintain watching brief.*

All works need to be undertaken in accordance with the Remedial Specification and an approved MMP. All remediation works are to be overseen by the supervising consultant under a site watching brief.

4.3 Construction Phase

It is anticipated that the construction phase of works will be undertaken by a separate contractor, referred to as the ground works contractor, who shall undertake the following:

- *Excavations for foundations.*
- *Excavations for service runs and drainage.*
- *Installation of correct level potable water supply pipe.*
- *Placement of clean validated subsoil/topsoil in areas of gardens and soft landscaping.*

All works need to be undertaken in accordance with the Remedial Specification and an approved MMP. Following completion of the Construction Phase Validation Works, a final verification report completed by the supervising consultant will be required to be submitted to the regulators for approval.

4.4 Project Setup and Management

Prior to commencement of site activities, detailed planning of the project shall be undertaken including liaison with the client, supervising consultant, contractors and regulators. The Remedial Specification should be submitted to the relevant regulators for approval prior to commencement.

The project is to be operated under the Construction, Design and Management (CDM) Regulations, (2015).

Under the CDM regulations, the Client should appoint a Principal Designer, who will provide the Pre-construction Information Report and a Principal Contractor who would provide a comprehensive Construction Phase Health and Safety Plan (CPHASP) prior to works commencing. If the client does not appoint a Principal Designer, they will assume the role.

The Principal Designer will review the CPHASP and notify the local office of the Health and Safety Executive (HSE) of the works prior to commencing (via form F10), if necessary. The client is to nominate the Principal Contractor for each phase of works.

The appointed contractors will need to have suitable experience working in a similar setting, with similar ground conditions and with the contaminants of concern present at the site. It is the responsibility of the contractors to have read and understood the requirements of the Remedial Specification. Any queries should be clarified prior to the activity being undertaken.

4.5 Phasing of Works

Phasing of the works will be discussed and agreed between the contractors, supervising consultant and the client. The contractor is to liaise with the client to ensure the details of each phase are clearly understood. The activities attributed to each phase are discussed in the following section.

5.0 IMPLEMENTATION OF SITE REMEDIATION PROCESSES

5.1 General

The following remedial works are required to break pollution linkages, to reduce risks to an acceptable level and make the site suitable for the proposed residential end-use.

5.2 Enabling Phase Implementation

Activity E1 – Pre-Start and Site Clearance including topsoil strip

The enabling works contractor shall be responsible for the true and proper setting-out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour.

The enabling works contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting out the works.

Should the enabling works contractor find any discrepancies on the drawings, he is to refer the matter to the client for verification before proceeding with the part of the works affected.

Before starting the site demolition and clearance works, the enabling works contractor shall verify with the client and/or architect which existing fences, gates, walls, roads, paved areas, trees, shrubs, etc., are to be removed and undertake dilapidation survey of all adjacent features/construction including but not limited to boundary walls/fences, adjacent footpaths and road constructions etc. The enabling works contractor shall be responsible for all costs associated with rectification of damage to adjacent features/construction including but not limited to boundary walls/fences, adjacent footpaths and road constructions etc. resulting from the enabling works. The existing electricity substation is to be retained as part of the development.

The enabling works contractor shall investigate the features of the structures, ascertain if shock or vibration could damage surrounding property or equipment therein or buried utilities and check the existence of toxic or flammable substances.

Statutory service records are for information only. The enabling works contractor is to ensure that the records are current and complete through discussion with all appropriate statutory bodies and is responsible for all disconnection, diversion, sealing or removing of existing services as necessary (unless otherwise advised by the client). Particular attention should be paid to the electricity substation in the north west of the site.

Trees, boundaries and other features of interest, which are to be retained, shall be clearly identified and protected by a robust fence to avoid accidental impact damage and prevent excavation within the root zone of influence of foundations. All works shall be undertaken in accordance with BS 5387: 1991 ‘Trees in relation to Construction’. All other trees and shrubs shall be grubbed up and disposed of appropriately off site.

Prior to any works, the site shall be cleared of rubbish, debris and approved vegetation. Surface vegetation shall be stripped from all areas prior to trafficking with heavy plant and the surface vegetation is to be chipped and stockpiled. Topsoil should be stripped and stockpiled as defined under the MMP, Made Ground including, gravel and sub base should be stockpiled separately for reuse beneath hardsurfacing or at depth – Speciated PAH contamination has been recorded in these Made Ground Populations.

Topsoil should then be stripped and stockpiled in accordance with the with the Contaminated Land: Applications In Real Environments (CL:AIRE) document: 'The Definition of Waste: Development Industry Code of Practice' (Version 2) (CoP), dated March 2011. Testing of the topsoil is required to determine if it is suitable for use.

Stockpiled soils are present in approximately the centre of the site and these should be disposed to a suitably licenced facility. Testing will be required prior to disposal to determine the correct route for disposal.

All unsuitable material, as defined in the Remedial Specification, shall be disposed of by the enabling works contractor to appropriately licensed off-site facilities unless otherwise described in the contract or unless it is intended to reuse these materials in accordance with the MMP.

The enabling works contractor shall maintain records detailing the approximate location of any unsuitable material disposed, including a brief description.

All movement of materials shall be recorded and records shall be kept detailing the nature and quantity of materials, haulier details, final destination and any other relevant information.

Water or liquids shall not be pumped or emptied into the existing sewers/drainage system without the appropriate treatment and written permission of the relevant authority. If mobile tankers/bowsers are to be used, then disposal shall be at suitably licensed facilities in accordance with current legislation.

Documentation/certification of all materials disposed of are to be included in the H&S file prepared by the enabling works contractor.

Activity E2 - Break out of Hardstanding and Below Ground Obstructions and Processing for Reuse

The enabling works contractor shall demolish, break up and remove all below ground structures including foundations from former buildings on site. These include, but are not limited to slabs, drains, hardsurfacing, foundations, relic structures, utility ducts, etc. Care should be taken in the vicinity of the electricity substation which is to be retained.

All broken up materials shall be segregated and stockpiled within the approved working area of the site. Material shall be stockpiled at locations to be agreed with the Client and after submission of the detailed method statements.

The enabling works contractor shall inform the consultant after each area is exposed so that they may attend and witness the excavation. The enabling works contractor shall survey to Ordnance Survey Grid the base and sides of all excavations and will provide a composite base of excavation drawing for reference during the works, and as built records.

During the excavation of slabs etc, the enabling works contractor will undertake additional visual investigation, with any additional plausible source-pathway receptor linkages identified to be added to the remedial requirements.

The enabling works contractor shall provide adequate protection against collapse of the excavations and suitable groundwater control measures shall be put in place until the voids are backfilled to a suitable geotechnical specification.

The enabling works contractor shall ensure that, where structures or services cross the site boundary and are to remain, the risk of any future contamination entering or leaving the site area through these pollution linkages is negligible. The enabling works contractor shall state his methodology for ensuring this requirement.

All unsuitable materials are to be removed from site to a suitably licensed facility.

The EOD UXO Risk Assessment should be referred to, a Medium risk has been applied to the site developed since WWII, and UXO supervision should be in place for all excavation works.

Activity E3 – Watching Brief

A watching brief should be maintained for the duration of the enabling works for visual or olfactory evidence of contamination and also any potential ACMs. If identified, work should cease in that area and Groundtech Consulting consulted for advice and to revise this Remedial Specification, if required.

Activity E4 - Reuse of Soils and Materials Management of Soils

Reuse of soils is allowed and will need to be undertaken in accordance with the Contaminated Land: Applications In Real Environments (CL:AIRE) document: 'The Definition of Waste: Development Industry Code of Practice' (Version 2) (CoP), dated March 2011.

The enabling works contractor is responsible for producing a MMP signed off by a QP. For further details with regards to materials management, please refer to Section 8. As part of the MMP, the enabling works contractor should produce a cut/fill balance plan and movement of soils schematic plan to define the movement of the following soils:

1. *Cut of soils to achieve earthworks profile.*
2. *Reuse of suitable/acceptable soils.*
3. *Reuse of crushed 6F2 soils.*
4. *Final trimming to form finished remediation profile across development areas.*

Geotechnical testing of soils prior to placement is required. Made Ground soils have recorded elevated speciated PAH concentrations. Testing of the topsoil across the site is required to determine it is suitable for the proposed development. If the topsoil is not deemed suitable it should be stockpiled separately and removed off site to a suitably licenced waste facility.

If, in the opinion of the Consultant, the material is not suitable for use, the enabling works contractor is to remove and dispose of it in accordance with the Remedial Specification, at the enabling works contractor's cost.

Activity E5 - Off-Site Disposal of Unsuitable or Surplus Material

Any material excavated on site may be classified as waste and it is the responsibility of the holder of a material form their own view on whether or not it is waste. This includes determining when waste has been treated in some way it can cease to be classed as waste for a particular purpose. All arisings should be regarded as contaminated unless proven otherwise. Any soils to be removed from site are to be removed to a licensed waste management facility. The waste is to be taken by a registered waste carrier in accordance with applicable Waste Management Regulations.

Any soils to be removed from site are to be removed to a licensed waste management facility and the waste is to be transported by a registered waste carrier in accordance with applicable Waste Management Regulations.

All testing to allow disposal of waste is to be undertaken by the enabling works contractor at the enabling works contractors cost.

Waste consignment/transfer notices will be required and are to be retained by the enabling works contractor. Copies of all waste consignment/transfer notices are to be provided to Groundtech Consulting for inclusion in a validation report.

Activity E5 - Validation Criteria During Enabling Works

The following sections detail validation criteria to be used during the enabling works.

Testing

The granular Made Ground soils have been tested during the Ground Investigation. However, the topsoil and has not been tested during the investigation and this is required prior to placement to determine it is suitable. Any unsuitable materials shall be removed from site in accordance with this Remedial Specification.

All testing during the enabling works shall be undertaken by the enabling works contractor and all sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2015 'Code of Practice for Site Investigations' and BS 10175:2011+A1:2013 'Investigation of Potentially Contaminated Sites – Code of Practice'. The enabling works contractor shall undertake all testing at a laboratory which holds UKAS and MCERTS accreditation for the specific tests. Where it is not possible to obtain the testing of a material for a specific property to a UKAS or MCERTS accredited method, the enabling works contractor shall obtain permission from the Consultant for the test to be completed at the proposed laboratory, before the test is undertaken.

The results of all testing undertaken (and a copy of the test certificates), shall be submitted to the Consultant as soon as they are reported. The enabling works contractor shall advise the Consultant of any delay or deviations that they are aware of regarding the completion of any tests. The Consultant shall be given sufficient time to review the content of the testing and the associated test results.

Topsoil Testing

The topsoil from across the site has not been tested. Testing should be undertaken to determine if the material is suitable for use at the residential development.

General Reuse

Soils proposed for general reuse should be compared to the following guidelines:

- *No visual contamination (oil staining etc.).*
- *Minimal deleterious material (organics, wood, metal etc.).*
- *No visible Asbestos Containing material (ACM).*

The visual requirements are to be confirmed by the watching brief by a suitably qualified geo-environmental engineer.

5.3 Construction Phase Implementation

The construction phase of works will be undertaken by a separate Contractor, referred to as the ground works contractor.

It is the responsibility of the contractor to have read and understood the requirements of the Remedial Specification and any geotechnical specification documents. If there are any queries, please contact Groundtech Consulting for clarification.

The following will be undertaken during the construction phase of works by the ground works contractor. The ground works contractor shall undertake:

- *Excavations for foundations.*
- *Excavations for service runs and drainage.*
- *Installation of correct level potable water supply pipe.*
- *Placement of clean validated subsoil/topsoil in areas of gardens and soft landscaping.*

Activity C1 - Installation of Correct level of Potable Water Supply Pipe

The correct potable water pipework is to be installed for all plots by the ground works contractor in accordance with local water company risk assessment. The works are to be validated by the ground works contractor, who is to provide to Groundtech Consulting:

- *Provision of delivery tickets showing correct potable supply pipework has been delivered to site.*
- *Photographic proof that correct potable supply pipework has been installed.*

Activity 2 - Appropriate Materials Handling and Stockpiling to Allow Reuse of Excavated Soils

The contractor is to undertake a watching brief for materials which may potentially be contaminated during excavations of foundations and drainage. If suspect materials are encountered, the soils are to be stockpiled separately and Groundtech Consulting contacted immediately.

Any imported materials are to be tested by the contractor in accordance with this Remedial Specification to demonstrate they are suitable from a geotechnical and geo-environmental engineering perspective.

Reuse of soils excavated by the contractor will need to be undertaken in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice, i.e. in accordance with an MMP approved by a QP.

Activity C3: Installation of the Cover System in areas of Soft Landscaping

A clean cover system is required in soft landscaped areas to reduce the risk to an acceptable level. The cover system installation by the ground works contractor should be undertaken in the following steps:

1. *Undertake geo-environmental testing and assessment of all soils to establish they are suitable for use. Groundtech Consulting should be provided with the testing certificates if material is to be imported.*
2. *In areas where trees are planned as part of the landscaping the cover system should be increased to allow for the root ball. The dimensions of the tree pit (if required) are to be specified by a qualified arboriculturist.*
3. *Install drainage and other services and storing excavated clean soils appropriately for re-use in soft landscaped areas.*
4. *Validation of the cover system to be undertaken by Groundtech Consulting.*

The cover system requirements are set out below based on the specific use:

Specific Use	Requirements
Soft Landscaped Areas	*600mm of clean topsoil material underlain with 100mm of hard dig subsoil material or demarcation warning membrane.*

Sourcing of Material for the Cover System

The current topsoil has not been tested during the Ground Investigation. Testing of the topsoil should be undertaken to determine if it is chemically suitable for the proposed residential end use (without plant uptake).

If the topsoil is not found to be suitable, it should be stockpiled on an impermeable membrane and disposed off site to a suitably licenced waste facility.

Topsoil may require importing depending on the results of the additional topsoil testin.

Any imported soils should be from a source not expected to be contaminated and meet both physical and geo-environmental criteria, as detailed in this Remedial Specification.

Prior to importation of topsoil, subsoil or granular material from a commercial supplier, certification should be obtained from the supplier detailing the source site, its previous and current land use and relevant test results. A copy of this should also be forwarded to Groundtech Consulting for review and comparison against the import criteria.

If the proposed source is not from a commercial supplier, Groundtech Consulting recommend that the source is tested to confirm it is appropriate for use prior to import.

Physical Requirements of Cover System Soils

Topsoil should be as agreed with the client and where possible should conform to BS 3882:2015. It should be noted that clay soils are not recommended as they are likely to become waterlogged during handling and placement.

The material is to be confirmed by visual inspection of the material by the consultant. Topsoil and subsoil should be free from:

- *Asbestos, metal, plastic, wood, glass, tarmac, brick, paper, concrete or other potentially hazardous foreign material which could cause injury.*
- *Aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth.*

Geo-Environmental Requirements of Cover System Soils

Additional geo-environmental testing is required for the topsoil proposed to be reused, this should be undertaken prior to the enabling works.

1. *For material from a natural source, testing should be undertaken at a rate of one test per 250m^3, with a minimum of three tests to be undertaken on any individual source material.*
2. *If the source of the material is not natural, geo-environmental testing should be undertaken at a rate of one test per 100m^3, with a minimum of five tests to be undertaken on any individual source material.*

With regards to imported soils, the results of geo-environmental testing are to be compared with the criteria presented in *Appendix 4.* If any of these thresholds are exceeded, the material shall be considered to be unsuitable unless treatment, further testing and risk assessment shows it to be satisfactory.

Testing should be carried out for the following general suite of contaminants:

- *As, Cd, Cr (total), Cr (VI), Cu, Hg, Ni, Pb, S (elemental), Se, Zn, and pH.*
- *Speciated Polycyclic Aromatic Hydrocarbons and organic matter.*
- *Asbestos screening.*

Requirements of Imported Soils

With regards to imported granular soils (Type 1/6F2 etc.), the results of geo-environmental testing are to be compared with the criteria presented in *Appendix 4.* If any of these thresholds are exceeded the material shall be considered to be unsuitable unless treatment, further testing and risk assessment shows it to be satisfactory.

Imported soil should be free from materials outlined above.

6.0 EARTHWORKS

6.1 General

The topography of the site is generally level and an earthworks programme in the form of cut and fill is unlikely to be required.

If earthworks are required, the most economical solution will be to balance the cut and fill from the site so that there is no net import and no excess material.

6.2 Site Won Material and Suitability Testing

To inform the earthworks design as part of the Remedial Specification it would be prudent to undertake some additional testing as part of the supplementary Ground Investigation.

The material generated from the cutting exercise would comprise granular Made Ground and natural Sand. Different material types should be kept in separate stockpiles.

Initially, the materials generated should be classified using the Specification for Highways works. Earthworks testing should be scheduled on representative samples to classify the material, and determine the:

- *Strength/Density.*
- *Actual Water Content.*
- *Optimum Moisture Content.*

Actual moisture content values should be within the allowable range of 95% MDD and less than 5% air voids to be suitable for compaction.

In addition, the Moisture Condition Value provides a numerical value for the least amount of compactive effort to achieve near full compaction at a given moisture content. This enables a comparison with the actual moisture content during the earthworks process and can be used for determination of the moisture content in the field.

6.3 Validation Testing

Below is a general outline of the requirements at this stage until the required additional information is available.

Prior to placement of soils, the existing subgrade should be proof rolled using suitable methods outlined in the HASHW Series 600. Proof rolling will identify any soft spots present which should be dealt with using good site practice and procedures outlined in the specification.

At each upfill layer testing should be carried out to confirm the properties of the filled soils including whether specified maximum dry density has been achieved. Testing should include sand replacement tests and plate load testing. These tests should be carried out at varying depths as the fill materials are placed to ensure they have been compacted sufficiently.

A comprehensive surveying programme should be in place during the earthworks so levels of tests and finished levels are accurate. The earthworks specification will set out the testing to ensure the engineered fill meets the criteria set out in the specification, consideration of the long term performance will be required.

7.0 SUPERVISION, VERIFICATION AND REPORTING

Necessary changes to the agreed Implementation Plan, arising during the course of the works, are to be agreed in writing with the Local Authority and Environment Agency prior to being undertaken on site.

It is recommended that details of the environmental works undertaken, the rationale and design for the implementation of this strategy and verification details of the works undertaken are appended to the deeds for the property to ensure the site is sold with full knowledge of the works undertaken and the ground conditions present.

7.1 Site Supervision

The contractor is to provide appropriate engineer supervision during excavation and validation works. Supervision should be undertaken by an appropriate, experienced person who has read and understand the requirements of this Remedial Specification. Remediation works are to be undertaken with a part time site watching brief by Groundtech Consulting (The Consultant) as outlined below:

- *Supervision for additional testing of topsoil.*

7.2 Collection of Samples

All sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2015 'Code of Practice for Site Investigations' and BS 10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

Soils for inorganic analysis will be sealed in air-tight polythene tubs, and soils for organic analysis will be sealed in amber glass jars with the minimal practicable headspace.

All samples shall be scheduled on chain of custody forms prior to being dispatched to the UKAS accredited laboratory for analysis.

The contractor shall undertake all testing at a laboratory which holds UKAS and MCERTS accreditation for the specific tests.

The results of all testing undertaken (and a copy of the test certificates), shall be submitted to the consultant as soon as they are reported.

7.3 Verification Report

On receipt of the records from the contractor, to demonstrate that all of the works have been undertaken in accordance with the Remedial Specification, Groundtech Consulting will provide a Verification Report. This shall specifically include supporting information as summarised below:

- *Details of methodology and programme.*
- *Decision records covering agreements with regulators.*
- *Records of works undertaken, and associated validation/monitoring records obtained from the contractor as detailed above.*
- *As built drawings.*
- *Final status of remediation and confirmation of remedial objectives to satisfy the planning conditions.*
- *Additional risk assessments/reactive works undertaken.*
- *Site stripping and clearance activities undertaken during remediation.*

- *Records of excavations, including:*
  - *Ordnance Datum survey of extents and depth (including a final composite base of excavation drawing).*
  - *Ordnance Datum survey of extents and depth of any residual features.*
  - *Record of decisions for over-excavation.*
  - *Photographic record of each excavation.*
- *Records of laboratory analytical and in-situ field test results, including:*
  - *Laboratory results and location plan for each analytical test.*
  - *Laboratory measurements of accuracy and precision.*
  - *Calibration data for field measurement equipment in accord with manufacturers guidance.*
  - *Copies of the certificates for geo-environmental testing.*
- *Approximate quantities for all materials removed from the site.*
- *Waste classification and management documentation, including copies of all consignment notes, in particular those relating to the hazardous waste regulations, details of waste facilities where materials were disposed of.*
- *Final as-built survey of the site (dwg format).*

Information associated with regulatory health and safety, control of noise, nuisance, dust, and waste will be excluded from the technical verification reporting and will be submitted to the Client as separate documentation.

7.4 Construction Phase Works Verification

Potable Water Supply Pipe Installation
It is the responsibility of the ground works contractor to record photographic evidence of the installation of pipework. This photographic evidence is to be provided to Groundtech Consulting for inclusion in the Verification Report

7.5 Ground Gas Verification

No gas protective measures are required within the proposed developments.

7.6 Cover System

Verification of cover system thickness is required. Testing of soils will be required in accordance with this Remedial Specification. Groundtech Consulting should be notified when the cover system has been placed and will undertake a visual inspection and random spot check excavations.

If the cover system is deemed to be inadequate, the site manager will be informed and advised on remedial measures. Verification of the cover system will only be carried out where the cover system has been completed.

The cover system validation report will include:

- *Confirmation of the source of material.*
- *Confirmation of the physical suitability of the material.*
- *Confirmation that the geo-environmental test results pass when compared to the appended criteria.*

The topsoil onsite requires further testing to confirm it is suitable for reuse at the development.

Validation of the cover layer will be undertaken in general accordance with Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) Guidance - Verification Requirements for Cover Systems Version 3.4 dated November 2017.

8.0 REUSE OF SOILS AND MATERIALS MANAGEMENT

8.1 Waste Management Background

As the site is brownfield, any material excavated on site will be classified as waste as soon as it is excavated, unless there is a clear plan in place for the reuse of soils at the site. This should be achieved as set out in the Contaminated Land: Applications In Real Environments (CL:AIRE) document: 'The Definition of Waste: Development Industry Code of Practice' (Version 2) (CoP), dated March 2011.

The handling, reuse or disposal of waste is regulated by the Environment Agency. The Agency will take into account the use of the CoP in deciding whether to regulate materials as waste.

If materials are dealt with in accordance with the CoP, the Environment Agency considers that those materials are unlikely to be waste at the point when they are to be used for the purpose of land development. This is because the materials were never discarded in the first place, or because they have been submitted to a recovery operation and have been completely recovered so that they have ceased to be waste.

For the enabling works, the enabling works contractor is responsible for writing and ensuring all works are undertaken in accordance with an MMP. The contractor is responsible for providing records to obtain QP sign off.

8.2 Certainty of Use and Quantity of Material

There will be an opportunity to reuse soils at the site following excavation, processing and treatment. Any excess or unsuitable soils will be disposed of.

The following excavation, treatment and placement is proposed during the enabling works:

- *Excavate hardsurfacing/subsurface obstructions - crush to create a Class 6F2 material for reuse in the works.*
- *Placement of soils as set out in this Remedial Specification.*

The following excavation and placement is proposed during the construction works:

- *Excavation of foundations.*
- *Excavation of drainage runs.*
- *Placement of clean natural soils for use as Subsoil and Topsoil in soft landscaped areas..*
- *Placement of 6F2 as a piling mat and in roads and pavements.*

Only materials deemed suitable for use by an appropriately qualified person will be utilised on site. Any out of specification material (geo-environmental and geotechnical) obtained from the site, which is not deemed suitable for use, will be classified as waste and will be disposed of or recovered in accordance with waste legislation.

Material reused or imported to site will be subject to the necessary testing/review and comparison to this Remedial Specification prior to delivery to site to minimise the risk of the importation of unsuitable material. Any material deemed unsuitable upon arrival at the site will be rejected.

Only sufficient material required on site for the purposes of raising levels in accordance with the pre-determined proposals (planning conditions and drainage strategy) will be imported or reused on site. Any surplus material or material which does not meet the required specification will be disposed of off-site. It is the responsibility of the

contractor at each stage of the works to have checked all volume calculations and have allowed for disposal of unsuitable or excess materials.

8.3 On Site Material Management

Stockpiles
Site won material for potential reuse will be stored on site in stockpiles. The stockpiles are to be managed by the enabling works and ground works contractors during the relevant phases of work and will be subject to operational constraints at the time of stockpiling.

Stockpile locations will be clearly marked and documented on working drawings maintained in the site office.

The contractor for each phase of works is to take appropriate mitigation measures and environmental precautions as considered necessary at storage locations. However, as a minimum, stockpiles should be compacted to prevent dust and they should be kept wet in periods of dry weather.

Stockpiles of contaminated or suspected contaminated material should be placed on an impermeable membrane to prevent leaching of contaminants.

Confirmatory Testing for Material for On Site Reuse – Excavated Material
The majority of Made Ground soils have been tested during the investigation. Testing of the topsoil on site is still required if it is to be reused.

Materials found to be out of specification are to remain on site in segregated stockpiles until such time that they can be disposed to a suitably licenced waste disposal facility.

At each phase of works a record should be maintained by the contractor of the movement of the stockpiled material and the area within the excavation into which it is placed.

Confirmatory Testing for Material for Off-Site Disposal
Any material requiring disposal during any phase of works shall be disposed of by the contractor. They shall ensure adequate and appropriate disposal, including testing to satisfy the proposed waste facility.

Records of the removal of stockpiles off site should be maintained by the contractor including details of the disposal or treatment site to which they have been taken. These details are to be passed to Groundtech Consulting to form part of the validation report.

Appropriate precautions should be taken by the contractor to ensure that the stockpiled material does not result in risks to neighbouring land users.

Confirmatory Testing for Imported Material
Imported soil will be tested to determine it is suitable for use.

The contractor importing the material is to provide laboratory testing results to Groundtech Consulting to prove the suitability of the material to be brought on to site in line with the requirements specified in this Remedial Specification. When the soils are present on site, additional testing will be undertaken.

9.0 CONTINGENCY PLAN AND AREAS OF UNEXPECTED CONTAMINATION

There is potential for areas of unexpected contamination to be present, due to the former use of the site. The strategy for unexpected contamination must be relayed to all site personnel during the enabling works phase and outline a clear allocation of responsibility for reporting and dealing with contamination.

Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the requirement to report this to the client and Groundtech Consulting.

A report will be prepared by Groundtech Consulting and submitted to the regulatory parties, the Local Authority and the Environment Agency where groundwater may potentially have been impacted.

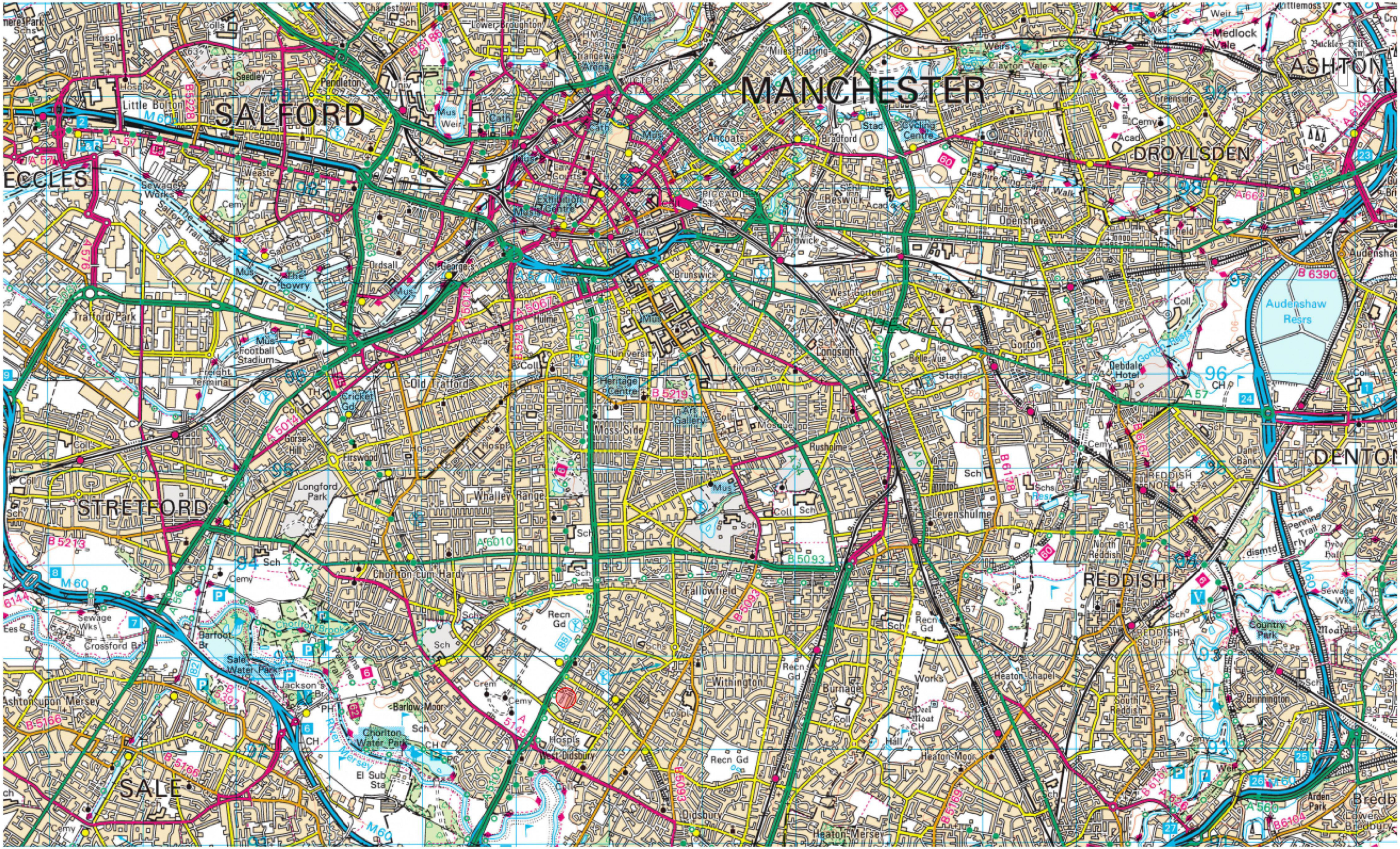
As it is proposed to excavate, screen, sort, treat and where appropriate reuse the soils on site during a separate enabling works phase, the strategy will be less relevant to the construction phase of works.

If additional materials are identified, these materials will be subject to the procedures stated in this Remedial Specification.

GROUNDTECH
CONSULTING

APPENDIX 1 - Plans

REMEDIAL SPECIFICATION
GRO-20064-4035
DIDSBURY POINT


MANCHESTER
SALFORD
ECCLES
STRETFORD
SALE
DROYLSDEN
ASHTON
REDDISH
DENTON
Trafford Park
Old Trafford
Moss Side
Longsight
Gorton
Audenshaw Resrs
Levenshulme
Withington
Fallowfield
Didsbury
Heaton Mersey
Chorlton cum Hardy
Barlow Moor
Sale Water Park
Chorlton Water Park
Ashton upon Mersey
Little Bolton
Pendleton
Ordsall
Hulme
Whalley Range
Rusholme
Belle Vue
Debdale Hotel
Fairfield
Medlock Vale
Clayton Vale
Greenside
Beswick
Openshaw
Ardwick
Brunswick
West Gorton
Abbey Hey
Heaton Chapel
Heaton Moor
Burnage
Levenshulme
Country Park
Arden Park
Bredbury
Lower Bredbury
Crossford Br
Barfoot Br
Jackson's Br
Seedley
Lower Broughton
Miles Platting
Ancoats
Bradford
Cycling Centre
Piccadilly Sta
Exhibition Centre
Manchester Metropolitan University
Salford Quays
The Lowry
Football Stadium
Freight Terminal
Cricket Gd
Heritage Centre
Art Gallery
Mosque
Longsight
Stadia
Firswood
Gorse Hill
Sewage Works
Recn Gd
Cemy
Hospl
Sch
Coll
Mus
Weir
Weirs
Cath
Univ
Acad
Colls
Stad
Fire Sta
Police Sta
Library
Baths
Pk
Gdns
Ind Est
Retail Pk
Trans Pennine Trail
Fairfield Path
Cheshire Ring Canal Walk
Tameside
Irwell Valley Way
Mersey Valley
Mersey Way
Chorlton Brook Path
Salford Trail
Bridgewater Canal
Manchester Ship Canal
M60
M602
A57
A56
A6
A5103
A5145
A6010
A560
A6017
A6104
A6140
A662
B5213
B5228
B5214
B5219
B5093
B5166
B5392
B6186
B6167
B6169
B6390
B6187
B6178
B6167
B6393
B6214
B6167
B6167
B6167

Ground Floor Plan

1 : 200

2 0 2 4 6 8 10 m

SCALE 1:200

N

Accommodation Schedule (NIA) Ground Floor	
Name	Area
2B4P	71.72 m²
2B4P	71.72 m²
2B4P	72.27 m²
2B4P	72.27 m²
2B4P	72.27 m²
2B4P	72.27 m²
2B4P	70.08 m²
2B4P	70.08 m²
Bike Store	69.44 m²
Bin Store	33.42 m²
Commercial Bin Store	6.85 m²
Commercial Unit	171.42 m²
Comms	8.51 m²
Corridor	39.44 m²
Corridor	35.33 m²
Entrance	41.77 m²
Existing Sub Station	7.5 m²
Firefighting Lift	5.7 m²
Lift	5.7 m²
Lobby	23.95 m²
Riser	1.38 m²
Riser	0.6 m²
Riser	0.77 m²
Stair	11.88 m²
Stair	11.89 m²
Stair	10.88 m²
Store	6.09 m²
Water tank (MEP to confirm)	51.47 m²
00 Ground Floor Plan	1116.66 m²

Area Schedule (GIA)	
Name	Area
Ground Floor	1182.36 m²
First Floor	1205.02 m²
Second Floor	1205.02 m²
Third Floor	1205.02 m²
Fourth Floor	1157.67 m²
Fifth Floor	1144.46 m²
Sixth Floor	346.91 m²
Seventh Floor	346.91 m²
Eighth Floor	346.91 m²

1B2P		
Name	Count	Level
1B2P	1	01 First Floor Plan
1B2P	1	02 Second Floor Plan
1B2P	1	03 Third Floor Plan
1B2P	1	04 Fourth Floor Plan
1B2P	1	05 Fifth Floor Plan
1B2P	1	06 Sixth Floor Plan
1B2P	1	07 Seventh Floor Plan
1B2P	1	08 Eighth Floor Plan

Grand total: 8

2B4P		
Name	Count	Level
2B4P	8	00 Ground Floor Plan
2B4P	13	01 First Floor Plan
2B4P	13	02 Second Floor Plan
2B4P	13	03 Third Floor Plan
2B4P	9	04 Fourth Floor Plan
2B4P	9	05 Fifth Floor Plan
2B4P	3	06 Sixth Floor Plan
2B4P	3	07 Seventh Floor Plan
2B4P	3	08 Eighth Floor Plan

Grand total: 74

2B4P Duplex		
Name	Count	Level
2B4P Duplex	6	04 Fourth Floor Plan

Grand total: 6

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

8845 Didsbury Point

- 2B4P
- Bike Store
- Bin Store
- Commercial Bin Store
- Commercial Unit
- Comms
- Corridor
- Entrance
- Existing Sub Station
- Firefighting Lift
- Lift
- Lobby
- Riser
- Stair
- Store
- Water tank (MEP to confirm)

NOTE:

Areas are appropriate to the current design stage and are liable to change as a result of design development, particularly following appointment of MEP, Fire and Acoustic Consultants.

Internal apartment layouts are indicative and subject to further review

Rev	Date	Intls	Details
P2	14/02/20	AP	Preliminary Issue
P1	05/05/20	AP	For review and comment

© The moral rights of the author are hereby asserted.
This drawing and design is the sole property of Buttress Ltd and must not be reproduced without permission.
Buttress Ltd is Registered in England and Wales: 5363573

Buttress

41 Bengal Street
Manchester
M4 6AF

T 0161 236 3303
E contact@buttress.net
Wwww.buttress.net

Project Title Didsbury Point
Client Southway Housing
Location West Didsbury, Manchester

Drawing ref Ground Floor GA

Date 14/02/2020 12:25:49 **Scale** 1 : 200
Checker Checker **Orig Paper Size** A2

Job No: 8845 **Status** PRELIMINARY

Project: Origin: Zone: Level: Type: Disc: Number: Rev:

8845-BA-Z1-GF-DR-A- (04)010- P2

GROUNDTECH
CONSULTING

APPENDIX 2 - General Requirements

REMEDIAL SPECIFICATION
GRO-20064-4035
DIDSBURY POINT

1. Compliance with Legislation and Standards

The works are to be undertaken in compliance with all relevant British Standards, codes of practice, regulations, guidance and legislation. Whilst not an exhaustive list, works shall be in compliance with the latest revision of all relevant legislation, HSE Guidelines and good working practice including, but not be limited to, the following:

- *The Health and Safety at Work etc. Act 1974.*
- *Construction Health Safety and Welfare Regulations 1996.*
- *Health and Safety Executive 'Protection of Workers and the General Public during Redevelopment of Contaminated Land' HS (G) 66, HMSO 1991.*
- *The Construction, Design and Management Regulations 2007.*
- *The Control of Substances Hazardous to Health Regulations 2002 (COSHH Regulations).*
- *The Control of Asbestos Regulations, 2012.*

The Contractor is responsible for obtaining all necessary approvals, licences, consents and permits from regulatory bodies and third parties prior to commencement.

2. Licences, Permits and Consents

Any conditions associated planning permission should be addressed prior to carrying out the works.

It will be a requirement of the Contractor to obtain any of the necessary permits and undertake the appropriate notifications and assessments.

The Contractor should only expect approvals have been sought by others where explicitly provided to the Contractor or advised in writing.

Reuse of soils will need to be undertaken in accordance with the "Definition of Waste: Development Industry Code of Practice - Definition of Waste. Development Industry Code of Practice", Version 2 2011 i.e. in accordance with an approved Materials Management Plan and Qualified Person Declaration.

3. Health and Safety Requirements

The Principal Contractor must manage the risks in accordance with their legal requirements and all works are to be undertaken in compliance with all relevant regulations, guidance and legislation. A Construction Phase Health and Safety Plan (CPHASP) will be required to be submitted to the CDM co-ordinator, the Client and the LPA in advance of mobilisation to site. The CPHASP will be passed to the Site Manager who will implement all Health and Safety measures on site. The Site Manager will fully induct the Site Operatives prior to commencement of any works. The CPHASP will be kept as an open document and will be adapted as required to during the project. As a minimum this will include:

- *Welfare arrangements, storage and security.*
- *Air monitoring requirements (and action levels).*
- *Traffic management plan.*
- *Segregation of working areas and site welfare (and decontamination units if required).*
- *Site inductions, daily safety briefings and toolbox talks.*
- *Activity specific risk assessments.*
- *Method statement briefings.*
- *Daily inspection records.*
- *Permits to work.*

During the works it will be necessary to protect the health and safety of the site personnel.

General guidance on these matters is given in the Health and Safety Executive (HSE) document 'Protection of Workers and the General Public during the Redevelopment of Contaminated Land' HS (G) 66. In summary, the following measures are suggested to provide a minimum level of protection:

- *All ground workers should be issued with protective clothing (including high visibility clothing), hard hats, footwear and gloves, personnel instructed as to how it should be used.*
- *All personnel shall wear hard hats, high visibility clothing and protective footwear at all times.*
- *Ensure that everyone on site complies with the health and safety plan.*
- *Take reasonable steps to ensure that only authorised persons are allowed on site.*
- *Display, where they can be easily read, any notification that has been sent to the Health and Safety Executive.*
- *Hand washing and boot cleaning facilities shall be provided.*
- *No smoking except in designated areas.*
- *Good practices relating to personal hygiene shall be adopted.*
- *Prepare method statements for construction operations as required by the Principal Designer.*
- *Provide the CDM Co-ordinator with any other relevant information.*

Before site operations are commenced, the necessary COSHH Assessments, Method Statements and Health and Safety Plans should be completed, approved to the Principal Designers satisfaction and issued in accordance with the CDM Regulations.

The Construction Phase Health and Safety Plan (CPHASP) should pay particular attention to the following hazards which may be encountered:

- *Potentially hazardous or contaminated materials used or encountered on site.*
- *Deep excavations.*
- *The potential for ground gases and risks on confined spaced entry.*
- *Working in the vicinity of existing underground or overhead services.*
- *Working in confined spaces.*
- *Working on, or in the vicinity of highways.*
- *Working with materials which have the potential to contain asbestos and the risk of inhalation of asbestos fibres.*
- *Manual handling.*
- *The potential for fire.*
- *Working with electrical apparatus in the vicinity of mobile plant and the potential presence of water.*
- *Poor lighting.*
- *The potential for falling/slipping/tripping and sustaining injury.*
- *The possibility for biological agents to be present, including, but not limited to: psittacosis, leptospirosis (Weill's disease), tetanus, legionella, human waste.*
- *Working in the vicinity of voids and openings.*

The Contractor shall take all necessary safety precautions throughout the ground treatment operations and shall comply with the Health and Safety at Work Act 1974 or any subsequent re-enactment thereof.

The Contractor shall submit for approval all necessary method statements to the Client prior to commencing the works.

The Contractor shall provide details of emergency procedures. Emergency services shall be informed of the site operations prior to commencement.

All statutory records to be kept in the site manager's office and these may include (not an exhaustive list and note not all may be required):

- *ASB NNLW1 – Notification of non-licensed asbestos work if the work is deemed not be requiring a licence (if required).*
- *Appropriate licence with regards to CAR 1012 if the work is deemed to require a licence.*
- *HSE Notification F10.*
- *Construction Phase Health and Safety Plan.*
- *Method Statements and Risk Assessments; Environmental Permit deployment form and associated paperwork.*
- *Discharge Consents for disposal of groundwater.*
- *Competence records (including asbestos awareness training and face-fit test records).*
- *Utility records.*
- *Plant and machinery maintenance records.*
- *Duty of Care paperwork.*

In addition, it is recommended that:

- *Asbestos Awareness training/briefing to be given to all staff.*
- *Background and ongoing air dust monitoring to be undertaken to check for presence of asbestos fibres during the works.*
- *Licensed asbestos contractors are employed to manage the licensed asbestos controlled areas, all other operatives involved in the operations must have appropriate training to satisfy the requirements of the Control of Asbestos Regulations 2012.*

4. Site Establishment and Security

Prior to the commencement of any works, the contractor, in conjunction with the Client and the Supervising Engineer, shall establish the boundaries of the site and working areas.

The Contractor shall make adequate provision to secure the site boundary and prevent unauthorised access onto the site during the course of the works.

Prior to the commencement of any works, the contractor, shall undertake a dilapidation survey of all adjacent features/construction including but not limited to boundary walls/ fences, adjacent footpath and road constructions etc. The survey is to be agreed with the Client or their representative prior to commencing any work on site.

The Contractor shall be responsible for all costs associated with rectification of damage to adjacent features/construction including but not limited to properties, boundary walls/ fences, adjacent footpath and road constructions etc. resulting from the demolition works.

The Contractor is to provide surveying capability as set out in this document facilitate the above. Prior to the completion of the works the Contractor is to discuss the continuation of the site security, including the fences, with the client and acceptable arrangements for continued security are to be agreed prior to the removal of the contractor's security provision.

5. Traffic Safety and Management

The Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affected the public highway and/or private roads forming the highway access to/from the site. The Enabling Works Contractor shall obtain all necessary consents from the Local Highway Authority for works on the public highway.

On-site access and haul routes should be provided and maintained by the Enabling Works Contractor in such a manner so as not to endanger either the user, those working in the vicinity of such accesses/haul routes and or the Works. Access to the site will be agreed with the Clients prior to commencement.

Suitable precautions shall be taken to prevent the spread of mud and debris on the public highways. Regular inspections of the public highway adjacent to the site shall be carried out. If deemed necessary by the Contractor, the Client or the Supervising Engineer, the highway shall be swept regularly to remove any mud, slurry or dust deposited by vehicles entering or departing the site. If the Supervising Engineer considers that significant amounts of any detritus have been deposited on the public highway then operations shall be temporarily suspended until appropriate cleaning operations have been undertaken.

The Contractor is to co-operate with other Contractors if they are present during the works. The proposed works will generate a number of vehicle movements associated with the removal of soils and delivery to site of materials. Consideration should be given to the route and the timing of these vehicle movements, to minimise risk and disturbance to sensitive locations (such as schools, residential areas).

Risks associated with the transport of soils that are potentially containing contaminated, such as dust emission, should be appropriately managed.

6. Welfare Facilities

Site cabins and welfare facilities will be established at a location to be agreed with the Supervising Engineer.

The Contractor is deemed to have made provision and arrangements for all temporary utilities associated with the welfare facilities.

7. Working Hours

Noisy operations such as the use of hydraulic breakers shall be restricted to operating times as specified by the Client and by the Planning Permission. It is understood that these are 8:30 am to 5:30 pm, or other hours agreed with the Local Authority, Monday to Friday and 9.00 am to 1.00pm on Saturday. No working shall take place on Sunday or Bank Holidays.

Prior to commencement the Contractor is to make contact with the Local Authority to establish if any further restrictions apply.

8. Mobile Plant

Mobiles plant shall be operated by suitably trained and qualified operators experienced for each item of plant. When not in use all plant shall be locked to prevent all plant shall be locked to prevent unauthorised operation.

All traffic entering or working on site shall comply with a maximum 10 mph speed limit.

Fuelling of any plant shall be undertaken in a designated area and all above ground fuel storage tanks shall comply with the requirements of the Pollution Prevention Guidelines PPG2. Specifically, any storage tanks used should:

- *Be sited within an oil-tight secondary containment system such as an impermeable bund.*
- *The secondary containment must provide storage for at least 110% of the tanks maximum capacity.*
- *Be located within a secure area.*
- *All taps and valves should be fitted with a lock and kept locked shut when not in use. Maintenance of mobile plant should be undertaken in a designated area, unless absolutely necessary.*

Waste oil, hydraulic fluid etc. should not be tipped directly or discharged on to site. Such materials shall be stored separately, in a secure bunded area, for off-site disposal. Waste oil may be a special waste and disposal shall be undertaken by a registered carrier in accordance with the Duty of Care Regulations.

A spill kit shall be kept on site in an accessible place adjacent to the designated refuelling area.

9. Unexploded Ordnance (UXO)

The site is in an area which is considered to be at a medium risk with regards to UXO. Mitigation measures will be required prior to and during breaking of ground in accordance with CIRIA C681.

10. Surveying

The Contractor shall provide full time surveying personnel and equipment to undertake the following activities and any other requirement for topographical information relating to the project that arises through the duration of the enabling works contract. The survey personnel and equipment should be capable of providing accurate levels and co-ordinates in relation to the national grid and topographical survey provided within 1 day of request.

The following key activities are covered by the requirements for surveying:

- *Confirmation of topographical survey on possession of the site, and setting out of the site boundary.*
- *Confirmation of positions of existing utilities and site features.*
- *Surveying the base and extent of all excavations and remaining obstructions prior to backfilling.*
- *All setting out and levelling relating to delivery of the enabling works.*
- *The location of sub-structures removed.*
- *Interim surveys to be undertaken during the infilling works to provide information on issues such as depth of excavation, progress of earthwork, quantities of materials, testing depths and locations etc.*
- *The location and elevation of test samples and locations.*
- *As built survey information.*

The Contractor is required to undertake all necessary topographical survey works to verify these levels before the commencement of the contract. Should the Contractor find any discrepancies on the drawings they are to refer the matter to the Engineer for verification before proceeding with the part of the works affected.

The Contractor shall undertake a topographical survey following completion of the enabling works.

All topographical surveys shall include levels at maximum 10m spacing and details of any features, changes in slope, structures, services and any other features of interest.

All of the above features shall be surveyed for line and level at the site boundary and marked on a plan. Levels shall be to Ordnance Datum and locations to National Grid. The survey shall be calibrated against existing site surveys and benchmarks in the vicinity of the site.

11. Testing

The Contractor shall be responsible for undertaking all testing necessary to satisfy the Supervising Engineer that the works have been carried out in accordance with, and comply with this Remedial Specification and the Earthworks specification.

All soils and geo-environmental testing shall be carried out by a UKAS and MCERTS accredited laboratory, with accreditation for the specific analysis, to the approval of the Supervising Engineer.

The Enabling works Contractor is to make available on site at all times a file containing all test certificates in addition to the testing summary, for inspection by the Consultant.

Test results are to be summarised in a single master spreadsheet (which contains all data) and is to be in a format agreed with the Consultant. Data that does not meet the specification shall be highlighted and include details of what works were undertaken to address the non-compliance. The master spreadsheet, results of testing and drawings shall be maintained and kept up to date.

12. Offsite Disposal

Materials for offsite disposal shall be sampled and analysed, by the contractor, at rates sufficient to allow the material to be adequately classified by assessment.

WAC testing should be undertaken on material exported from site to landfill, or other appropriately licensed facility. Material shall be hauled by a registered waste carrier in accordance with the requirements of the Duty of Care Regulations, 1991, Environmental Permitting (England and Wales) Regulations 2016 and where appropriate the Special Waste Regulations, 1996 and Hazardous Waste (England and Wales) Regulations 2005. A transfer note shall be completed, signed and retained by all parties involved. The transfer note shall state the volume of waste, the nature of the material and statement to the chemical composition. The waste transfer notes shall be kept by the Contractor for a period of at least 2 years.

13. Contamination

Contractors should be made aware of the possibility of encountering contaminants within soils or groundwater at the site (including asbestos, tin slag, Galligu) through 'toolbox' talks.

Safe working procedures should be implemented in accordance with CIRIA132 and good standards of personal hygiene should be observed and appropriate levels of PPE provided and utilised.

Eating, drinking and smoking should be strictly prohibited in the development site other than in designated mess areas.

14. The Control of Noise, Vibration and Dust Nuisance

The Contractor shall comply with the recommendations for practical measures to reduce noise and vibration set out in BS5228-1:2009 and BS5228-2:2009 and with any specific Principal Contractor requirements.

The Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, etc.

If necessary working methods will be altered in order to ensure that the level of noise generated from the works is within published tolerable limits.

The requirements of the LPA are to be sought and undertaken.

General

No fires shall be permitted on site.

Dust Mitigation

Appropriate measures shall be implemented at all times during the demolition and enabling works to minimise any dust emissions.

Any main temporary haul roads shall, where practical to do so, be constructed of crushed hardcore products. The haul roads shall be maintained for the duration of their use to minimise any build-up of loose spoil etc.

Traffic both entering and working on site shall obey a maximum speed limit of 10 mph. Wagons that are to be used for the haulage of any contaminated material from site shall be appropriately sealed or sheeted to prevent the release of fugitive dust.

Mobile water bowsers and sprayers shall be available on site at all times to water unpaved haul roads and working areas. The water spray may include chemical dust suppressants or wetting agents to improve dust control. An adequate supply of water shall be maintained on site at all times to allow for dust suppression activities to be carried out at short notice.

Where mobile water bowsers are not effective in suppressing dust then vapour masts shall be used. Such vapour masts shall be deployed at 20m centres on the downwind side of haul roads or excavations giving rise to significant dust or emissions of odour.

Air quality and dust monitoring stations will be set up and monitored by the Contractor to record the dust concentrations during the works.

With regards to stockpiles:

- *Stockpiles should be kept to a minimum to reduce 'wind whip' causing potentially hazardous material to be blown from the pile.*
- *Stockpiles should be placed on a suitable polythene membrane in a bunded area to prevent any cross contamination and care should be taken not to pierce the sheeting when placing the bulky elements of the material.*
- *Stockpiles should be dampened down or covered to prevent dust, whilst the final choice should be made by the Contractor based on site constraints, but the options include covering with plastic/polythene membrane, or by a layer of clean soil material.*
- *The drop distance from excavator bucket to stockpile will be kept as short as reasonably practicable to reduce dust.*

Odour

In general terms the excavation works are not considered likely to give rise to any significant odour problems.

If highly odorous materials are encountered, which may give rise to nuisance to neighbouring properties, appropriate vapour masts shall be deployed to provide suitable odour control. Any odorous materials shall be covered at the end of each working day and any stockpiles will be located away from any sensitive areas.

Plant and machinery shall be serviced regularly to ensure that exhaust fumes are compliant with best practice and relevant regulations.

Noise

The requirements of the Local Planning Authority and BS 5228: 1997 'Noise and vibration control on construction sites' shall be adhered to at all times.

All machinery shall be fitted with effective silencers and shall be serviced at regular intervals. No items of plant shall be operated with engine covers raised.

The location of any crushing plant shall take into consideration the location of neighbouring properties and other noise sensitive receptors and shall be located away from these areas and located adjacent to proposed stockpile locations where possible.

15. Asbestos in Soils

The 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.

The remediation works are designed to break the pollution linkage with regards to contaminants within the soil. Whilst appropriate measures are required for all contaminants present, the Contractor should note the additional details provided below with regards to asbestos in the soils:

- *Asbestos is a hazard to Human Health when airborne fibres are inhaled. Asbestos containing material (ACM) that is in a bound form (such as asbestos cement tiles) is not hazardous where the asbestos fibres cannot become airborne. However, if lagging is present or the ACM is broken or crumbled in a dry condition the asbestos fibres could become airborne and could then be inhaled. When soil with asbestos is covered by hardstanding, buildings or a cover of clean soil or when the soil is kept damp, the asbestos fibres are less likely to become airborne and the risk is greatly reduced.*
- *The Health and Safety at Work Act 1974 forms the basis of health and safety legislation in in the UK. In addition, the Control of Asbestos Regulations 2012 (CAR 2012) applies throughout the UK. CAR 2012 applies if land has significant asbestos content and is relevant to any work conducted on asbestos contaminated land.*
- *CAR 2012 defines a "control limit" of 0.1 fibres per cubic centimetre of air averaged over a continuous period of 4 hours. This limit is not risk based and may be much higher than the levels for control of environmental pollution.*
- *CAR 2012 applies even where exposure to asbestos of employees is sporadic and of low intensity and where exposure to asbestos of any employee will not exceed the control limit. The work must be of short non-continuous activities where non-friable materials are handled, or removal without deterioration of non-degraded materials in which asbestos fibres are firmly linked in a matrix.*
- *Lagging, broken fragments of asbestos and loose fibres have the potential to release airborne fibres in dry conditions. In addition, as the ACM and asbestos fibres have been contained in the soil for many years, the likelihood is that they would be degraded to some extent. However, the asbestos fibres detected at the site are within a soil matrix and if this is kept damp, this should assist in minimising the risk of the release of airborne fibres.*
- *The contractor should determine whether the works being undertaken would be exempt from CAR 2012 licensing requirements.*

It should be noted that information presented in this document is provided to assist in managing the soil at the site which contains asbestos. It is the responsibility of the contractor how the control measures associated with these risks are implemented and recommend that an appropriate asbestos specialist assist with both the preparation of documents and licences and site supervision.

Task specific risk assessments and method statements should be in place, and risks and required mitigation measures communicated to all relevant personnel prior to the works commencing. Appropriate PPE and if required RPE should be provided and utilised.

Visible fragments of suspected asbestos containing materials on the site surface shall be handpicked. Hand picking needs to be undertaken in accordance with an Environmental Permit and ACM shall be placed in a dedicated covered and lockable skip pending off-site disposal to a suitably licensed facility. Such remediation measures will be undertaken by suitably qualified contractors and in accordance with CAR 2012.

16. Water Quality Controls

The Contractor shall provide for such measures as may be necessary to ensure that water, whether groundwater, from precipitation or any other source does not accumulate in excavations or on sub-grades.

Adequate drainage sumps will be installed during works and cut off trenches/dewatering measures will be used as required to manage surface water run-off, to prevent any water from entering watercourses, either directly as surface water run-off, or indirectly via the surface water drainage systems; If materials escape, appropriate the Contractor is to undertake (at their cost) appropriate remedial action as soon as possible.

17. Utilities

Utility records are to be provided by the Client for information purposes within the enabling works documentation. However, the Contractor shall be responsible for liaison with the statutory utility providers to ensure all service records are current and correct. The Contractor is also responsible for the safe disconnection of existing utilities entering the site, except those which are to remain operational.

Prior to site work commencing, the position of all utilities indicated as on site or offsite but close to the site boundary shall be determined and clearly identified where on site. The locations should be confirmed on site by appropriate investigation, observations and survey. Any discrepancies between the anticipated positions and confirmed locations are to be reported to the Supervising Engineer.

All retained manholes should be located and clearly identified on site to prevent damage. The location, depth, diameter and invert level of each manhole and the size and depth of all stream connections shall be recorded. Where drains or sewers are to be grubbed up the downstream ends should be plugged prior to commencement to prevent offsite systems becoming blocked or contaminated.

Where existing drains or sewers are to remain, CCTV surveys are to be provided by the contractor. These surveys must be undertaken on commencement prior to any physical work and on completion to demonstrate no damage has occurred.

Where damage has occurred, any remedial work must be agreed with the Supervising Engineer and relevant authority/owner prior to repairs commencing. The repair costs will be borne by the contractor.

All utilities on site that are to be retained through the works are to be positively located on site, reliance shall not be placed on existing records. Utilities are to be visibly marked and protected for the duration of the works. Appropriate methods are to be put in place to ensure all site staff working in the vicinity of retained utilities are fully briefed.

The Contractor is responsible for ensuring that all hydrant covers, stop tap boxes manhole covers and the like are raised or lowered to suit the finished levels associated with the proposed enabling works plateaus and future construction thicknesses.

Following the completion of the works, a survey plan of the location of terminated services is to be provided.

18. Damage to Property

All works are to be undertaken in accordance with the Party Wall etc Act 1996. The Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the Works and shall be responsible for same in the event that any damage should arise from his failure to exercise due care.

Any adjacent structures, services and the like shall be inspected prior to commencement of the Works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried out by the contractor, with the agreement of the Client and/or the Supervising Engineer, prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of the said structure, service or apparatus has occurred as a result of the Works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

The Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

All fences, trees, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected by the Contractor from spillage and damage caused by site operations and upon completion of the works they shall be handed over in an undamaged and proper state to the satisfaction of the Engineer.

Refer to landscape architect drawings and specifications that define the areas that require protection. The Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Engineer.

19. Drawings and Supplied Information

Whilst efforts have been made to ensure that the information provided to the Contractor is correct and current, the Contractor is responsible for corroborating the existing information with the benefit of their site presence and to report any discrepancies encountered or anticipated to the Supervising Engineer immediately.

Where cutting and filling operations are to be carried out the Contractor is to undertake comparative assessments with the benefit of existing information, additional survey and their anticipated sequence of work to ensure sufficient and suitable material is available to undertake the works as proposed. Any anticipated shortfall or surplus is to be report immediately.

20. Photographs

A detailed dilapidation survey shall be undertaken of the site and adjacent properties including joint site boundaries, in conjunction with adjacent land owners. Such survey shall include roads, footpaths, street lighting and road signs. A copy of the survey, including record photographs shall be provided to the Client within seven days of commencement of site works.

The Contractor is to provide on-site a digital camera and e-mail facilities to enable electronic transfer of site photographs and other information for the full duration of the contract. Progress photographs are to be taken at least weekly across all parts of the site for inclusion within the contractor's report. Photographs are to be made available to the Engineer/Client in electronic format should they be requested during the contract. Record photographs should be provided as part of the validation information

GROUNDTECH
CONSULTING

APPENDIX 3 - Remediation Options Appraisal

REMEDIAL SPECIFICATION
GRO-20064-4035
DIDSBURY POINT

Introduction

This Options Appraisal has been undertaken in general accordance with Chapter 3 (Options Appraisal) of CLR11 'Model Procedures for Management of Land Contamination'. There are four main stages to this appraisal:

1. Identifying Key Risk Drivers.
2. Identifying viable remediation options for each relevant pollutant linkage.
3. Carrying out a detailed evaluation of viable remediation options to identify the most appropriate option for each pollution linkage.
4. Producing a remediation strategy that reduces all relevant pollutant linkages to an acceptable level.

Key Risk Drivers for Remedial Action

The Site Investigation has identified that the key risk drivers requiring remediation are:

- *PAH contamination within the Made Ground.*
- *Reuse of site won material.*
- *Import of soils.*
- *Existing untested topsoil.*

The following sections of this report are intended to identify suitable and practical remedial techniques which can be applied in order to achieve a site which is suitable for the proposed residential development.

Ground gas risks and potable water pipelines are not discussed in the Remediation Options Assessment as they are mitigated by measures outlined British Standards and by good practice.

Remediation Options and Evaluation of Feasibility

Preliminary Assessment of Remediation Options

Investigation and risk assessment has concluded that the requires remediation to reduce the risk to receptors to an acceptable level.

The objectives of the remediation are to remove one or more elements of each of the *source-pathway-receptor* linkages.

The initial screening process considers the available remedial techniques based on following key criteria:

- *Effectiveness* - *the strategy must work within the context of the site and be effective in the removal of contamination linkages.*
- *Practicality* - *the strategy has to have been successfully used in similar situations on other sites and readily available within the UK market. Novel solutions or those still in the research stage are not considered here.*
- *Durability* - *the strategy needs to be durable and not reliant on ongoing maintenance to continue being effective.*
- *Relative Cost* - *the strategy must not be excessive cost.*
- *Relative Operational Time* - *the strategy should work in a feasible and realistic time scale.*
- *Sustainability* - *more sustainable options are preferred.*

The table below summarises all of the accepted remedial techniques readily available and assess each against the six key parameters listed above.

In the first instance, the feasibility of each of the listed remedial option is assessed in terms of effectiveness at treating the contamination, which is broken down into; effective (Y), partially effective (P) or ineffective (N).

The techniques are then assessed in terms of relative cost ranging from negligible cost (£) through moderately expensive (££) to prohibitively expensive (£££+).

The timescale the remedial technique is operational has been generally assessed in units of weeks, months, years and decades. The longevity of the technique should be for the duration of the development to be effective.

The main reasons for rejection of a remedial option are generally the ongoing operational constraints, the cost and the ineffectiveness to mitigate the risk from all contaminants present. In some situations, several treatment options may be applicable and will therefore be considered as part of the appraisal.

Viable Remedial Options

As described above, certain technologies were rejected based on the above reasons. The short-list of options presented below represents those technologies which were not rejected at the pre-screening process and as such, are taken forward to the options appraisal process:

- *Installation of a cover system in garden areas and POS.*
- *Materials management, comprising excavation, screening, and reuse of suitable material.*
- *Disposal of surplus or unsuitable soils.*

Cover System

A cover systems is a proven technology for mitigating the risk from numerous contaminants. The process comprises the placement of a cover system to form a barrier between the contaminated Made Ground and site users breaking the pollution linkage.

This option is technically simple and represents a low-cost strategy that can be implemented rapidly, subject to favourable site levels to accommodate the cover system.

The timescale for installing a barrier is relatively quick allowing for rapid completion of the remediation objectives and this remediation solution could be designed and implemented within a matter of weeks/months.

Materials Management (Excavation and Reuse of Suitable Material)

Excavation and reuse of suitable materials has been widely used in the UK for managing risks. The method involves the excavation of soils and replacement as part of an earthworks programme.

The exercise is an earthworks exercise, the timescales are relatively short allowing for rapid completion and implemented within a matter of months.

Disposal of excess or unsuitable soils

Disposal involves the removal of contaminated soils and disposal at an appropriately licensed waste management facility or surplus material potentially to a recycling facility. The benefits of excavation and disposal are is short term implementation and the soils can be removed with a high degree of certainty by meeting proposed RTVs.

The cost of the method however can be significant depending on the classification and end disposal route, particularly in comparison to a cover system. The option will also take up valuable landfill space and present a significant carbon footprint in terms of vehicle movements.

The technique can be combined with other remedial options i.e. removal offsite of hotspots and reuse and/or treatment of general Made Ground.

Applicability of Remediation Options and Initial Assessment – Soils

Remedial Activity	Effective on asbestos	Effective on metals	Effective on PAHs	Effective on ground gases	Relative Cost	Relative Operational Time	Comments (Practicality/Sustainability/Durability)	Feasibility (Y / N)
Cover System	*n/a*	*n/a*	*Y*	*n/a*	*£*	*Weeks*	*Will break the pollution linkage between future site users and contaminants in the Made Ground.*	*Y – in conjunction with other technologies.*
Excavation and Disposal of buried chamber and surrounding soils	*n/a*	*n/a*	*Y*	*n/a*	*£££+*	*Weeks*	*Will effectively remove the source of the contamination.* *Disposal to be minimised as much as possible by reuse of appropriate soils, disposal of hotspots an option.*	*Y – in conjunction with other technologies.*
Materials Management (Reuse)	*n/a*	*n/a*	*Y*	*n/a*	*££*	*Weeks to months*	*Undertaken in association with Material Management Plan (MMP).*	*Y – in conjunction with other technologies.*

GROUNDTECH
CONSULTING

APPENDIX 4 - Remedial Target Values

Generic Assessment Criteria (GAC)								
Proposed End Use	**Unit**	**Residential with Plant Uptake**			**Commercial**			**Source**
SOM	%	1	2.5	6	1	2.5	6	
Arsenic	*mg/kg*	*32*	*32*	*32*	*640*	*640*	*640*	*SGVs*
Beryllium	*mg/kg*	*1.7*	*1.7*	*1.7*	*12*	*12*	*12*	*LQM S4ULs*
Boron (water soluble)	*mg/kg*	*290*	*290*	*290*	*240000*	*240000*	*240000*	*LQM S4ULs*
Cadmium	*mg/kg*	*10*	*10*	*10*	*230*	*230*	*230*	*SGVs*
Chromium (Total)	*mg/kg*	*910*	*910*	*910*	*8600*	*8600*	*8600*	*LQM S4ULs*
Chromium (VI)	*mg/kg*	*21*	*21*	*21*	*49*	*49*	*49*	*DEFRA C4SLs*
Copper	*mg/kg*	*2400*	*2400*	*2400*	*68000*	*68000*	*68000*	*LQM S4ULs*
Lead	*mg/kg*	*200*	*200*	*200*	*2300*	*2300*	*2300*	*DEFRA C4SLs*
Organic Mercury	*mg/kg*	*1.2*	*1.2*	*1.2*	*26*	*26*	*26*	*LQM S4ULs*
Nickel	*mg/kg*	*130*	*130*	*130*	*980*	*980*	*980*	*LQM S4ULs*
Selenium	*mg/kg*	*350*	*350*	*350*	*13000*	*13000*	*13000*	*SGVs*
Vanadium	*mg/kg*	*410*	*410*	*410*	*9000*	*9000*	*9000*	*LQM S4ULs*
Zinc	*mg/kg*	*3700*	*3700*	*3700*	*730000*	*730000*	*730000*	*LQM S4ULs*
Aliphatic EC 5 - 6	*mg/kg*	*42*	*78*	*160*	*3200 (304) sol*	*5900 (558) sol*	*12000 (1150) sol*	*LQM S4ULs*
Aliphatic EC 6 - 8	*mg/kg*	*100*	*230*	*530*	*7800 (144) sol*	*17000 (322) sol*	*40000 (736) sol*	*LQM S4ULs*
Aliphatic EC 8 - 10	*mg/kg*	*27*	*65*	*150*	*2000 (78) sol*	*4800 (190) sol*	*11000 (451) vap*	*LQM S4ULs*
Aliphatic EC 10 - 12	*mg/kg*	*130 (48) vap*	*330 (118) vap*	*760 (283) vap*	*9700 (48) sol*	*23000 (118) vap*	*47000 (283) vap*	*LQM S4ULs*
Aliphatic EC 12 - 16	*mg/kg*	*1100 (24) sol*	*2400 (59) sol*	*4300 (142) sol*	*59000 (24) sol*	*82000 (59) sol*	*90000 (142) sol*	*LQM S4ULs*
Aliphatic EC 16 - 35	*mg/kg*	*65000 (8.48) f,sol*	*92000 (21) f,sol*	*110000 f*	*1600000 f*	*1700000 f*	*1800000 f*	*LQM S4ULs*
Aliphatic EC 35 - 44	*mg/kg*	*65000 (8.48) f,sol*	*92000 (21) f,sol*	*110000 f*	*1600000 f*	*1700000 f*	*1800000 f*	*LQM S4ULs*
Aromatic EC 5 - 7	*mg/kg*	*70*	*140*	*300*	*26000 (1220) sol*	*46000 (2260) sol*	*86000 (4710) sol*	*LQM S4ULs*
Aromatic EC 7 - 8	*mg/kg*	*130*	*290*	*660*	*56000 (869) vap*	*110000 (1920)*	*180000 (4360)*	*LQM S4ULs*
Aromatic EC 8 - 10	*mg/kg*	*34*	*83*	*190*	*3500 (613) vap*	*8100 (1500) vap*	*17000 (3580)*	*LQM S4ULs*
Aromatic EC 10 - 12	*mg/kg*	*74*	*180*	*380*	*16000 (364) sol*	*28000 (899) sol*	*34000 (2150) sol*	*LQM S4ULs*
Aromatic EC 12 -16	*mg/kg*	*140*	*330*	*660*	*36000 (169) sol*	*37000*	*38000*	*LQM S4ULs*
Aromatic EC 16 - 21	*mg/kg*	*260 f*	*540 f*	*930 f*	*28000 f*	*28000 f*	*28000 f*	*LQM S4ULs*
Aromatic EC 21 - 35	*mg/kg*	*1100 f*	*1500 f*	*1700 f*	*28000 f*	*28000 f*	*28000 f*	*LQM S4ULs*
Aromatic EC 35 - 44	*mg/kg*	*1100 f*	*1500 f*	*1700 f*	*28000 f*	*28000 f*	*28000 f*	*LQM S4ULs*
Benzene	*mg/kg*	*0.33*	*0.33*	*0.33*	*95*	*95*	*95*	*SGVs*
Toluene	*mg/kg*	*610*	*610*	*610*	*4400*	*4400*	*4400*	*SGVs*
Ethyl Benzene	*mg/kg*	*350*	*350*	*350*	*2800*	*2800*	*2800*	*SGVs*
Xylene - o	*mg/kg*	*250*	*250*	*250*	*2600*	*2600*	*2600*	*SGVs*
Xylene - m	*mg/kg*	*240*	*240*	*240*	*3500*	*3500*	*3500*	*SGVs*
Xylene - p	*mg/kg*	*230*	*230*	*230*	*3200*	*3200*	*3200*	*SGVs*
MTBE (methyl tert-butyl ether)	*mg/kg*	*49*	*84*	*160*	*7900*	*13000*	*24000*	*CL:AIRE 2010*
Acenaphthene	*mg/kg*	*210*	*510*	*1100*	*84000 (57) sol*	*97000 (141) sol*	*100000*	*LQM SAULs*
Acenaphthylene	*mg/kg*	*170*	*420*	*920*	*83000 (86.1) sol*	*97000 (212) sol*	*100000*	*LQM S4ULs*
Anthracene	*mg/kg*	*2400*	*5400*	*11000*	*520000*	*540000*	*540000*	*LQM S4ULs*
Benz(a)anthracene	*mg/kg*	*7.2*	*11*	*13*	*170*	*170*	*180*	*LQM S4ULs*
Benzo(a)pyrene	*mg/kg*	*2.2*	*2.7*	*5**	*35*	*35*	*77**	*DEFRA C4SL*/LQM*
Benzo(b)fluoranthene	*mg/kg*	*2.6*	*3.3*	*3.7*	*44*	*44*	*45*	*LQM S4ULs*
Benzo(ghi)perylene	*mg/kg*	*320*	*340*	*350*	*3900*	*4000*	*4000*	*LQM S4ULs*
Benzo(k)fluoranthene	*mg/kg*	*77*	*93*	*100*	*1200*	*1200*	*1200*	*LQM S4ULs*
Chrysene	*mg/kg*	*15*	*22*	*27*	*350*	*350*	*350*	*LQM S4ULs*
Dibenz(ah)anthracene	*mg/kg*	*0.24*	*0.28*	*0.3*	*3.5*	*3.6*	*3.6*	*LQM S4ULs*
Fluoranthene	*mg/kg*	*280*	*560*	*890*	*23000*	*23000*	*23000*	*LQM S4ULs*
Fluorene	*mg/kg*	*170*	*400*	*860*	*63000 (30.9) sol*	*68000*	*71000*	*LQM S4ULs*
Indeno(123-cd)pyrene	*mg/kg*	*27*	*36*	*41*	*500*	*510*	*510*	*LQM S4ULs*
Naphthalene	*mg/kg*	*2.3 f*	*5.6 f*	*13 f*	*190 f (76.4) sol*	*460 f (183) sol*	*1100 f (432) sol*	*LQM S4ULs*
Phenanthrene	*mg/kg*	*95*	*220*	*440*	*22000*	*22000*	*23000*	*LQM S4ULs*
Pyrene	*mg/kg*	*620*	*1200*	*2000*	*54000*	*54000*	*54000*	*LQM S4ULs*

Generic Assessment Criteria (GAC)								
Proposed End Use	**Unit**	**Residential with Plant Uptake**			**Commercial**			**Source**
SOM	%	1	2.5	6	1	2.5	6	
Phenol	*mg/kg*	*420*	*420*	*420*	*3200*	*3200*	*3200*	*SGVs*
Chlorophenols	*mg/kg*	*0.87* [g]	*2*	*4.5*	*3500*	*4000*	*4300*	*LQM S4ULs*
Pentachlorophenol	*mg/kg*	*0.22*	*0.52*	*1.2*	*400*	*400*	*400*	*LQM S4ULs*
Carbon disulphide	*mg/kg*	*0.14*	*0.29*	*0.62*	*11*	*22*	*47*	*LQM S4ULs*
Hexachlorobutadiene	*mg/kg*	*0.29*	*0.7*	*1.6*	*31*	*66*	*120*	*LQM S4ULs*
1,1,1,2 Tetrachloroethane	*mg/kg*	*1.6*	*3.4*	*7.5*	*270*	*550*	*1100*	*LQM S4ULs*
1,1,1 Trichloroethane	*mg/kg*	*8.8*	*18*	*39*	*660*	*1300*	*3000*	*LQM S4ULs*
Trichloroethene	*mg/kg*	*0.016*	*0.034*	*0.075*	*1.2*	*2.6*	*5.7*	*LQM S4ULs*
Tetrachoromethane (Carbon Tetrachloride)	*mg/kg*	*0.026*	*0.056*	*0.13*	*2.9*	*6.3*	*14*	*LQM S4ULs*
1,2-Dichloroethane	*mg/kg*	*0.0071*	*0.011*	*0.019*	*0.67*	*0.97*	*1.7*	*LQM S4ULs*
Chloroethene (Vinyl chloride)	*mg/kg*	*0.00064*	*0.00087*	*0.0014*	*0.059*	*0.077*	*0.12*	*LQM S4ULs*
Trichloromethane (Chloroform)	*mg/kg*	*0.91*	*1.7*	*3.4*	*99*	*170*	*350*	*LQM S4ULs*
Tetrachloroethene	*mg/kg*	*0.18*	*0.39*	*0.9*	*19*	*42*	*95*	*LQM S4ULs*
Hexachlorobenzene	*mg/kg*	*1.8 (0.2)* [vap]	*3.3 (0.5)* [vap]	*4.9*	*110 (0.2)* [vap]	*120*	*120*	*LQM S4ULs*
Pentachlorobenzene	*mg/kg*	*5.8*	*12*	*22*	*640 (43)* [sol]	*770 (107)* [sol]	*830*	*LQM S4ULs*
1,2,4,5-Tetrachlorobenzene	*mg/kg*	*0.33*	*0.77*	*1.6*	*42 (19.7)* [sol]	*72 (49.1)* [sol]	*96*	*LQM S4ULs*
1,2,3,5-Tetrachlorobenzene	*mg/kg*	*0.66*	*1.69*	*3.7*	*49 (39.4)* [vap]	*120 (98.1)* [vap]	*240 (235)* [vap]	*LQM S4ULs*
1,2,3,4-Tetrachlorobenzene	*mg/kg*	*15*	*36*	*78*	*1700 (122)* [vap]	*3080 (304)* [vap]	*4400 (728)* [vap]	*LQM S4ULs*
1,3,5-Trichlorobenzene	*mg/kg*	*0.33*	*0.81*	*1.9*	*23*	*55*	*130*	*LQM S4ULs*
1,2,4-Trichlorobenzene	*mg/kg*	*2.6*	*6.4*	*15*	*220*	*530*	*1300*	*LQM S4ULs*
1,2,3-Trichlorobenzene	*mg/kg*	*1.5*	*3.6*	*8.6*	*102*	*250*	*590*	*LQM S4ULs*
1,4-dichlorobenzene	*mg/kg*	*61* [f]	*150* [f]	*350* [f]	*4400* [f] *(224)* [vap]	*10000* [f] *(540)*	*25000* [f] *(1280)*	*LQM S4ULs*
1,3-dichlorobenzene	*mg/kg*	*0.4*	*1*	*2.3*	*30*	*73*	*170*	*LQM S4ULs*
1,2-Dichlorobenzene	*mg/kg*	*23*	*55*	*130*	*2000 (571)* [sol]	*4800 (1370)* [sol]	*11000 (3240)* [sol]	*LQM S4ULs*
Chlorobenzene	*mg/kg*	*0.46*	*1*	*2.4*	*56*	*130*	*290*	*LQM S4ULs*
Gamma-Hexachlorocyclohexane	*mg/kg*	*0.06*	*0.14*	*0.33*	*67*	*69*	*70*	*LQM S4ULs*
Beta-Hexachlorocyclohexane	*mg/kg*	*0.085*	*0.2*	*0.46*	*65*	*65*	*65*	*LQM S4ULs*
Alpha -Hexachlorocyclohexane	*mg/kg*	*0.23*	*0.55*	*1.2*	*170*	*180*	*180*	*LQM S4ULs*
Beta -Endosulfan	*mg/kg*	*7*	*17*	*39*	*6300 (0.00007)*	*7800 (0.0002)*	*8700*	*LQM S4ULs*
Alpha-Endosulfan	*mg/kg*	*7.4*	*18*	*41*	*5600 (0.003)* [vap]	*7400 (0.007)* [vap]	*8400 (0.016)* [vap]	*LQM S4ULs*
Dichlorvos	*mg/kg*	*0.032*	*0.066*	*0.14*	*140*	*140*	*140*	*LQM S4ULs*
Atrazine	*mg/kg*	*3.3*	*7.6*	*17.4*	*9300*	*9400*	*9400*	*LQM S4ULs*
Dieldrin	*mg/kg*	*0.97*	*2*	*3.5*	*170*	*170*	*170*	*LQM S4ULs*
Aldrin	*mg/kg*	*5.7*	*6.6*	*7.1*	*170*	*170*	*170*	*LQM S4ULs*
HMX	*mg/kg*	*5.7*	*13*	*26*	*110000*	*110000*	*110000*	*LQM S4ULs*
2,4,6-Trinitrotoulene	*mg/kg*	*1.6*	*3.7*	*8.1*	*1000*	*1000*	*1000*	*LQM S4ULs*
RDX	*mg/kg*	*120*	*250*	*540*	*210000*	*210000*	*210000*	*LQM S4ULs*
[sol] S4UL exceeds the solubility saturation limit (which is presented in brackets)								
[vap] S4ULS presented exceeds the vapour saturation limit, which is presented in brackets								
[f] For naphthalene, the S4UL is based on a comparison of inhalation exposure with the TDI_{inhal} for localised affects								
[f] S4UL based on comparison of inhalation exposure with inhalation TDI for localised effects								
[dir] S4ULs based on a threshold protecive direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustation only								

APPENDIX 5 - Limitations

Limitations

This contract was completed by Groundtech Consulting on the basis of a defined programme and scope of works and terms and conditions agreed with the client. This report was compiled with due skill and care, taking into consideration the project brief provided, project objectives, agreed scope of works, prevailing site conditions and budget allocation.

Other than that defined in the paragraph above, Groundtech Consulting provides no other accountability or warranty whether express or implied, is made in relation to the services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted industry practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of Groundtech Consulting. A third party who relies on this report, does so at their own and sole risk and no liability to such parties is provided by Groundtech Consulting.

It is the understanding of Groundtech Consulting that this report is to be used for the intended purpose as set out in the introduction. The purpose was instrumental in determining the scope and level of the services provided. Should the purpose of the report or the proposed end use of the site change, this report will no longer be directly applicable, and its validity readdressed. No reliance upon the report in the revised situation should be assumed by the client without the permission of Groundtech Consulting.

The report was written in 2022, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change and should be investigated if there is any significant delay in acting on the findings of this report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions in this report should not be relied upon in the future without the written confirmation from Groundtech Consulting that it is safe to do so.

The observations and conclusions outlined in this report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting.

Groundtech Consulting are not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The services provided are based upon Groundtech Consulting observations of existing physical conditions at the site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and Groundtech Consulting assume the information to be correct.

No responsibility can be accepted for errors for third party information presented in this report. Groundtech Consulting were not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the services. Groundtech Consulting are not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable due to its heterogeneous properties and as investigation exploratory locations only allow examination of the ground at discrete

locations. The potential exists for ground conditions to be encountered which are different to those considered in this report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. Geo-Environmental testing was carried out for a limited number of parameters [as stipulated in the contract] based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawings provided in this report are not meant to be an accurate base plan, but are preliminary and used to present the general relative locations of features on, and surrounding, the site.