

CCG-C-20-11894

**PHASE III REMEDIATION STRATEGY REPORT
FOR LAND AT TRENCHARD DRIVE
WOODHOUSE PARK
MANCHESTER
M22 5NA
OCTOBER 2020**

Prepared for:

KEY WORKER HOMES LIMITED

Via

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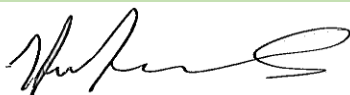
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REMEDIATION STRATEGY DOCUMENT

Document No: CCG-C-20-11894

Site: Land at Trenchard Drive, Woodhouse Park, Manchester, M22 5NA

Nature of Development:

It is proposed that the site be redeveloped for residential use by the construction of 15nr 2-storey dwellings comprising 6nr pairs of semi-detached dwelling, 3nr detached dwellings, each constructed of traditional brick elevations under pitched roofing materials, together with associated newly created hard paved access road, off road car parking facilities front and rear private gardens.

The proposed layout of the scheme are as annotated on **IDP Architects** Drawing No. 2000-P-01-Rev' 4 contained herein.

The proposed development falls within the administrative jurisdiction of **MANCHESTER CITY COUNCIL** administered under Planning Application Reference No. 106943/FO/2014/S2.

PREVIOUS REPORT REFERENCE(S):

DATE:

Phase II Geoenvironmental Report for land Land at Trenchard Drive (prepared by **REC** under Report Reference No. 103580p1rO)

January 2019

Phase III Remediation Strategy Repprt for land at Trenchard Drive (prepared by **REC** under Report Reference No. 103580p2r1)

June 2019

1. Soil Contamination Assessment / Garden Remediation

That above referenced report dated January 2019 confirmed the presence of elevated concentrations in soils of:

- Lead at 3nr borehole positions (WS104, WS105 and WS109)

Given the localised presence of elevated Lead contaminants within the central section of the overall site, to further assess the spatial distribution of this contaminant, a supplementary scope of works was undertaken by **REC** in April 2019. The scope of works comprising the manual excavation of 6nr shallow trial pits around each of boreholes WS104, WS105 and WS109 with soil arisings (18nr) being analysed for the presence of Lead contaminants.

In summary, supplementary testing confirmed that 9nr of the 18nr samples analysed contained elevated concentrations of Lead, 4nr around borehole WS4, 3nr around borehole WS5 and 2nr around borehole WS9. Hence a potential risk to human health is indicated.

Exposure risks associated with these contaminants arise via the ingestion and dermal pathways and as such remedial design features and specific site management activities will be required to mitigate these risks.

Notwithstanding the above, given the absence of contamination around boreholes WS102, WS6/6a, WS108 and WS110, it is recommended that site remedial works comprise the following:

1. Site levels at Plots 6 – 11 be reduced by 600mm with site levels being reconstructed by the placement of 600mm of clean imported topsoil, placed under a strict validation regime as discussed in the Detailed Remediation Strategy presented hereunder
2. Site levels at Plots 1 – 5, and 12 – 15 be reduced by 300mm to allow for the placement of 300mm of clean imported topsoil, placed under a strict validation regime as discussed in the Detailed Remediation Strategy presented hereunder.

An annotated drawing showing the definition of remedial works is presented in Appendix A.

2. Gas Risk Assessment

A gas monitoring programme confirmed a gas screening value (GSV) of 0.0084l/hrs for CO₂. Using this GSV value, the risk to the proposed development was assessed in line with Situation B as defined in CIRIA C665, and on this basis the site complies with Characteristic Situation 1. Under Characteristic Situation 1, gas protective measures are not required.

3. Unanticipated Contamination

Notwithstanding the recommendations discussed in the detailed remediation strategy presented hereunder, as with all developments, disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination insofar as the exposed conditions may have the potential to impact on receptors including *inter alia* humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon **CCG** to site to determine the nature of the exposure and to determine an appropriate course of action. Any such incidents will be fully documented in the site Validation Report.

Detailed Remediation Strategy		
Recommendation (see above)	Governing Standard Operating Procedure	Site Specific Additions to Standard Operating Procedure
1 & 4	Standard Operating Procedures 2 & 6	<u>GARDEN REMEDIATION WORKS</u> It is recommended that surface levels in proposed front and rear garden areas at Plots 6 – 11 as shown on REC Drawing No.002 be reduced by 600mm with site levels being reconstructed by the placement of 600mm of clean imported topsoil, placed under a strict validation regime. As an alternative, garden reconstruction may comprise the placement of 400mm of clean imported sub-soil with 200mm clean topsoil capping layer, both placed under a strict validation regime. Where made ground remaining in place beyond 600mm, imported sub-soil / topsoil is to be placed on a suitable geotextile fabric such as 'Terram 1000', or similar. It is further proposed that site levels at Plots 1 – 5, and 12 – 15 as shown on REC Drawing No.002 be reduced by 300mm to allow for the placement of 300mm of clean imported topsoil, placed under a strict validation regime. Where made ground remaining in place beyond 600mm, imported sub-soil / topsoil is to be placed on a suitable geotextile fabric such as 'Terram 1000', or similar. An annotated drawing showing the definition of remedial works is presented in Appendix A. All imported soils for gardens are to be non-recycled of greenfield source. The proposed frequency of sampling / analysis for imported materials is one sample per 50m³ of material, with a minimum of 4nr samples being analysed per source material. Test suite and compliance thresholds for imported clean subsoil / topsoil are presented on the enclosed series of tables 'Cover System – Validation Analysis Test Suite and Threshold Assessment Criteria, Imported materials. Where possible imported soils should be sourced from a single supplier and be visually inspected prior to transportation to site to ensure soil is free from detritus and deleterious materials. It is proposed that all soil sampling for contamination (validation) analyses is to be undertaken at the development site, either from stockpiled soils or following deposition on to designated garden areas. <u>VALIDATION</u> The removal of surplus soils generated in the garden level reduction will be documented by Waste Transfer Notes, to be retained by the Contractor and made available to CCG for inclusion in the Validation Report. Site reduction works within newly created garden areas are to be independently validated and photographed by CCG to ensure that the correct depth (600mm) has been achieved and to record the placement of geotextile barrier before garden reconstruction works commence. These records will be incorporated in the Validation Report. Test suite and compliance thresholds for imported clean sub-soil and topsoil are presented on the enclosed tabulation Summary of LQM GAC Thresholds and Proposed Acceptance Criteria for Imported Soils' in Appendix C. The suite of testing will comprise metals, non-metals, asbestos, BTEX compounds, speciated PAH's, and hydrocarbons to the TPHCWG methodology. Analysis of soils for demonstration of compliance will be undertaken at a frequency of 1 analysis per 100m³ Results of analyses will be collated in a Validation Report. Dockets for imported subsoil / topsoil to be retained by the Contractor and provided to CCG for inclusion in the Validation Report. The Contractor will keep photographic records during garden preparation works and provide these to CCG for inclusion in the Validation Report CCG will independently validate the specified thickness of garden cover by excavation of inspection pits/photography following completion of works. These records will be incorporated in the Validation Report. Where phased completions are required, then a series of Validation Reports may be issued.

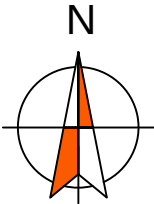
The Standard Operating Procedures referred to above are attached in Appendix B

APPENDIX A

DRAWINGS

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all dimensions to be checked on site and architect notified of any discrepancies prior to commencement.
do not scale.



- KEY
- Existing trees
 - Site Boundary
 - Indicative landscaping
 - 2.4m high screen wall to match with facing brickwork on houses
 - 2.4m high close boarded fence
 - area to be demolished

rev4	20/01/15	The removal of two plots	NH	NI
rev3	04/12/14	As of planners comments	NH	NI
rev 2	26/11/14	As of planners comments	NH	NI
rev 1	10/07/2014	Planning Issue	SN	MB
rev:	date:	comment(s):	name:	check:



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status: PLANNING ISSUE

client: IEM Developments

job: Trenchard Drive, Manchester

title: Proposed Site Plan

drawn: MBu date: September 2014 scale @ a3: 1:500

job no: 2000 drg no: P-01 Rev 4

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Job Title:

Land off Trenchard
Drive

Client:

PLP Construction Ltd

Drawing No:

002

Drawn By:

AR

Approved by:

PH

Notes:

N.T.S

Drawing Title:

Proposed Development
Plan

APPENDIX B

STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURES REMEDIATION AND VALIDATION



Subject: REMOVAL OF CONTAMINATED SOILS

Approval:

Doc. No: CCG SOP 1.0

Revision: 1

Effective Date:

10/10/07

Page: 1 of 2

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with site remediation involving excavation of contaminated soils to a level where soils of acceptable contamination status remain in place

2.0 SCOPE

The methods described within this procedure are applicable to the mechanical/hand removal of site soils impacted by contamination.

3.0 RESPONSIBILITIES

CC GEOTECHNICAL (CCG) – Responsible for delineating the lateral extent and notional vertical extent of soil removal, and for on site monitoring of the excavation works. In some cases, the lateral extent will not require delineation by CCG as the whole site will fall under the same remediation regime.

Site Management - The site manager is to ensure that the instructed excavations are undertaken as detailed by CCG. It is the site manager`s responsibility to accurately transfer dimensions of all areas to be remediated from drawings to site markers.

Precautions should be taken to ensure that the foundations of adjacent structures are not undermined by excavation activities. Similarly, care should be taken to prevent the collapse of excavations.

Spoil to be disposed, is to be transported off-site as soon as practicable. Only licensed waste transfer operators are to be employed for spoil removal offsite. Where possible, excavated spoil is to be loaded directly on to a waiting wagon ready for transportation to the accepting landfill. Wagons must be sheeted.

Where stockpiling of waste spoil is to take place, preventative action should be undertaken to ensure mixing of contaminated and clean soils does not occur. Measures are to include placement of stockpile on an impermeable membrane.

The site manager is to ensure that any stockpiles of spoil are homogenous.

4.0 PROCEDURE

Soils identified for removal are to be excavated by mechanical / hand dug methods. Where the depth of contamination and hence depth of required excavation is known, this should be adhered to.

Where a specific impacted stratum is to be removed e.g. where the objective is to remove all made ground, excavations are likely to be undertaken to varying depths – following the profile of the underlying strata.

There may be incidences where general oversight validation testing or localised validation testing is required at the base of remedial excavations. Such circumstances will be proposed in the Remediation Strategy, which will propose a frequency of testing and validation criteria against which the results will be assessed.

Where the results of testing indicate that the soils at the base of excavations fail the criteria, then further excavation and disposal of impacted soils will be undertaken.

Once the desired depth of excavation/site strip has been achieved photographic records of the nature of the reduced subgrade level will be obtained. Where agreed remedial action is that soils are to be removed to a specified depth, photographic records supported by survey levels will be collated.

STANDARD OPERATING PROCEDURES REMEDIATION AND VALIDATION



Subject: REMOVAL OF CONTAMINATED SOILS

Approval:

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Revision: 1

Effective Date:

10/10/07

Page: 2 of 2

5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

1. Drawing showing lateral extent of excavation
2. Drawing showing post excavation depths of dig
3. Photographs of reduced dig including levelling staff
4. Analyses for base of remediation excavations at a rate of 1 per 100m²
5. Transfer notes for all loads of spoil carted offsite

6.0 SITE SPECIFIC REQUIREMENTS

Site specific requirements over and above the provision of this SOP must be proposed and agreed in the Remediation Strategy

STANDARD OPERATING PROCEDURES REMEDICATION AND VALIDATION



Subject: INSTALLATION OF CLEAN SOIL COVER SYSTEMS

Approval:

Doc. No: CCG SOP 2.0

Revision: 1

Effective Date:

10/10/07

Page: 1 of 2

1.0 PURPOSE

The purpose of this procedure is to identify the methodology, sequence of events, responsibilities, and reporting requirements required in connection with site remediation involving placement of clean imported soils to specified finished levels and/or thickness

2.0 SCOPE

The methods described within this procedure are applicable to the mechanical/manual placement of clean imported soils.

3.0 RESPONSIBILITIES

CC GEOTECHNICAL – Responsible for delineating the lateral extent and vertical extent of soil placement, the relative thickness of subsoil and topsoil (where appropriate), and for on site monitoring of the placement works. Responsible for sampling the soils at the frequency agreed with the Local Authority, procuring laboratory analyses, and reporting on the conformance of the soils in relation to the agreed criteria.

SITE MANAGEMENT - The site manager is to ensure that the instructed placements are undertaken as delineated by CC GEOTECHNICAL in terms of lateral and vertical dimensional control. It is the site managers responsibility to accurately transfer dimensions of all areas to be remediated from drawings to site markers.

Soil to be imported to site, is to be transported in sheeted wagons.

Where temporary stockpiling of imported soil is to take place, preventative action should be undertaken to ensure mixing of underlying ground and imported soils does not occur. Measures are to include placement of stockpile on an impermeable membrane.

4.0 PROCEDURE

Soils are to be spread in layers by mechanical / manual methods.

Where soils are placed under cultivated areas then they must be of suitable physical properties to promote root establishment and healthy plant growth

The imported soils may be sampled in stockpiles on the development site at a frequency proposed in the Remediation Strategy and approved by the Local Authority.

The imported soils will be sampled insitu at a frequency proposed in the Remediation Strategy and approved by the Local Authority.

Where a geotextile separation layer is to be placed beneath the remediated area, then it shall be to a specification proposed in the Remediation Strategy and approved by the Local Authority

Where a sample fails to meet the threshold criteria, then the specific plot at which the sample was taken will be excavated and the soil replaced. Other individual plots represented by the sample will be sampled and the sample analysed, to conform whether each individual plot fails the criteria, and if so the soil on the affected plots will be replaced.

Once the desired depth of subsoil placement has been achieved, the works will be halted and photographic records made of the remaining depth to finished level.

Once the desired finished placement level of topsoil has been achieved, photographic records will be made of the finished remediation.

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: INSTALLATION OF CLEAN SOIL COVER SYSTEMS

Approval:

Doc. No: CCG SOP 2.0

Revision: 1

Effective Date:

10/10/07

Page: 2 of 2

Photographs records are to include as a minimum the following:

1. Spatial panoramic and individual stills of both the development and the areas of soft landscaping
2. Photographs taken of and within excavations showing all layering of soils with clearly shown depths of the strata. The excavations will additionally be photographed to show their spatial position within the site.
3. All photographs are to be taken in good light, with all aspects to be shown on the photograph clear and unobscured by shadow.
4. All photographs are to remain untouched as original exposures. No modification using photographic editing software is to be undertaken whatsoever.
5. Photograph locations are to be noted, and a plan demonstrating this constructed.
6. All photographs are to be fully and adequately described.
7. Once completed photographs of the landscaping are to be taken demonstrating extent of bare ground, planting volume and quality of workmanship.

5.0 REPORTING DELIVERABLES

The following will be reported in the Validation Report:

1. Drawing showing lateral extent of placement
2. Drawing showing total thickness of cover and division of subsoil / topsoil thickness
3. Photographs of subsoil completion including location / date / levelling staff
4. Photographs of completed restoration to top of topsoil including location / date / levelling staff
5. Analyses of subsoil and topsoil
6. Details of the source origin of cover materials
7. Delivery dockets for each consignment

6.0 SITE SPECIFIC REQUIREMENTS

Site specific requirements over and above the provision of this SOP must be proposed and agreed in the Remediation Strategy

STANDARD OPERATING PROCEDURES REMEDATION AND VALIDATION



Subject: SOIL SAMPLING

Approval:

Doc. No: CCG SOP 3.0

Revision: 1

Effective Date: 10/10/07

Page: 1 of 1

1.0 PURPOSE

The purpose of this procedure is to identify the equipment, sequence of events, and appropriate methods necessary to obtain soil samples during validation sampling activities.

2.0 SCOPE

The methods described within this procedure are applicable while collecting soil samples at the base of excavations and from stockpiled materials.

3.0 RESPONSIBILITIES

Site Manager - The site manager is to ensure that site soils are accessible to the environmental project manager for the purpose of extracting samples. Where soils are identified as contaminated, preventative action should be undertaken to ensure mixing of contaminated and clean soils does not occur.

The site manager is to ensure that all stockpiles are homogenous.

CC GEOTECHNICAL appointed Project Manager – The environmental project manager is responsible for the design and implementation of the sampling strategy.

4.0 PROCEDURES

Samples to be taken from the base of excavations are to be taken from within the top 0.1m of exposed ground.

Samples to be taken from stockpiled materials are to be sampled from varying positions throughout the stockpile, penetrating it as far as practical. Sample positions to be identified by photographic means where possible.

Samples may be extracted by hand using a stainless steel trowel or spade. Such tools shall be decontaminated by means of rinsing with clean water prior to obtaining each and every sample.

Samples shall be immediately deposited to suitable tubs/jars, labelled, packaged in cool boxes and accompanied by a chain-of-custody record ready for transportation to the laboratory.

The positions/frequency at which samples are extracted will be as detailed in the remediation statement, any variation from this is to be accurately documented and the relevant local authority is to be notified.

5.0 EQUIPMENT

Disposable gloves, stainless steel spade, stainless steel hand trowel, sample containers, cool boxes, labels, logbook.

APPENDIX C

SOIL CONTAMINANT ACCEPTANCE CRITERIA



SOIL ASSESSMENT CRITERIA FOR RESIDENTIAL LAND USE (WITH HOME GROWN PRODUCE)

Contaminant	Assessment Criteria for Residential at 1% SOM (mg/kg)	Assessment Criteria for Residential at 2.5% SOM (mg/kg)	Assessment Criteria for Residential at 6% SOM (mg/kg)
<u>Metals</u>			
Arsenic	37	37	37
Boron	290	290	290
Cadmium	11	11	11
Chromium III	910	910	910
Chromium VI	6	6	6
Copper	240	240	240
*Lead	200	200	200
Mercury	1.2	1.2	1.2
Nickel	180	180	180
Selenium	250	250	250
Vanadium	410	410	410
Zinc	3700	3700	3700
<u>Non-Metals</u>			
Phenol	280	550	1100
<u>Polyaromatic Hydrocarbons (PAH)</u>			
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Anthracene	2400	5400	11000
Benz[a]anthracene	7.2	11	13
Benzo[a]pyrene	2.2	2.7	3.0
Benzo[b]fluoranthene	2.6	3.3	3.7
Benzo[ghi]perylene	320	340	350
Benzo[k]fluoranthene	77	93	100
Chrysene	15	22	27
Dibenz[ah]anthracene	0.24	0.28	0.3
Fluoranthene	280	560	890
Fluorene	170	400	860
Indeno[123-cd]pyrene	27	36	41
Naphthalene	2.3	5.6	13
Phenanthrene	95	220	440
Pyrene	620	1200	2000
Coal Tar [Bap as surrogate marker]	0.79	0.98	1.1
<u>Petroleum Hydrocarbons</u>			
Aliphatic EC 5-6	42	78	160
Aliphatic EC >6-8	100	230	530
Aliphatic EC >8-10	27	65	150
Aliphatic EC >10-12	130	330	760
Aliphatic EC >12-16	1100	2400	4300
Aliphatic EC >16-35	65000	92000	110000
Aliphatic EC >35-44	65000	92000	110000
Aromatic EC 5-7 (Benzene)	70	140	300
Aromatic EC >7-8 (Toluene)	130	290	660
Aromatic EC >8-10	34	83	190
Aromatic EC >10-12	74	180	380
Aromatic EC >12-16	140	330	660
Aromatic EC >16-21	260	540	930
Aromatic EC >21-35	1100	1500	1700
Aromatic EC >35-44	1100	1500	1700
Aliphatic – Aromatic EC >44-70	1600	1800	1900

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The above is based on criteria contained in publication LQM/CIEH S4UL's for Human Health Risk Assessment (2015) (CCG Licence No. S4UL3233), applicable to the "Residential" land use (with home grown produce) scenario for soil organic matter (SOM) content of 1% - 6%.

*This document does not provide criteria for Lead, for which the results were compared to the C4SL published by DEFRA SP1010 Development of Category 4 Screening Levels.