



Client:

Airshack Projects Ltd
Progress House
396 Wilmslow Road
Manchester
M20 3BN

Architect/Consultant

Remediation Strategy & Deployment Plan

Land to rear of 25 Ladybarn Road, Fallowfield, Manchester

May 2021

Site Ref: 6070/VMF-RSDP v1.00

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1. Introduction.....	4
2. Description of the Site	5
3. Review Of Previous Reports	5
4. Conceptual Model	6
5. Remediation Strategy	7
5.1 Objectives	7
5.2 Details of Proposed Works	8
5.3 Details of Type and Form of Contamination to be Remediated	9
6. Site Management Procedures.....	10
6.1 Details of Consents & Licenses	10
6.2 Site Waste Management Plan	10
6.3 Watching Brief.....	11
6.4 Variations/Deviations from the Deployment Plan.....	11
7. Validation & Verification of Remedial Measures	12
7.1 Objectives	12
7.2 Sampling Strategy & Lines of Evidence	12
7.3 Post Remediation Analysis and Targets	12
7.4 Verification Report	15

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Appendices

- A1. Site Plan & Exploratory Hole Locations
- A2. Proposed Remediation Plan Extents

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Remediation Strategy and Deployment Plan

1. Introduction

This report contains the details of the Remediation Strategy and Deployment Plan to be undertaken at the development site on Land to rear of 25 Ladybarn Road, Fallowfield, Manchester. The work was commissioned following acceptance of the quotation and an instruction to proceed issued by the Client.

The purpose of this report is to provide adequate detail to ensure that the Site is remediated to an appropriate level for the intended land use following the conclusions of a Phase II Contaminated Land Risk Assessment referenced 6070/VMF CLRA v1.00 and dated May 2021.

The approximate grid reference for the centre of the site is 385832, 393909 and the total area of the site is approximately 250m². The approximate area of the Site is outlined with a solid red line on the Site plan in Appendix A1. The positions of exploratory holes are also indicated on the plan.

2. Description of the Site

2.1 Present

The site is located directly off Moseley Road, Fallowfield, Manchester.

The site forms a roughly rectangular shape, and the topography of the site is relatively flat with the surrounding area.

The site consists of open ground, which had been largely cleared with the exception of some undergrowth and cutback trees. At the time of the site visit there were no structures on site. A 1st generation limestone access track was noted along the eastern boundary line of the site.

The site is bound by residential property to the east, south and west, Moseley Road bounds the site to the North over which lies Residential accommodation.

Apart from some obvious surface (litter) no visual or olfactory observations of contaminants were noted during the site walkover.

2.2 Proposed

It is understood that the proposed development comprises 2 number semi detached residential dwelling houses with associated off road car parking, soft landscaping and residential gardens.

3. Review Of Previous Reports

The following site investigation reports and advice notes are known to have been produced for this site and have been referenced where considered appropriate. A brief description of the information contained within is also provided.

Author	Date	Ref	Title / description
Enviro Smart	Dec 2020	74124.01R1	Phase I Preliminary Contaminated Land Risk Assessment & Desk Based Study
GeoAssist Ltd	May 2021	6070/VMF CLRA v1.00	Phase II Contaminated Land Risk Assessment.

4. Conceptual Model

The conceptual model as originally presented within the GeoAssist Ltd Phase II Report Referenced 6063/VMH CLRA v1.00 and dated March 2021 is presented in table 1.0 below:

Table 1.0 Conceptual Site Model.

Potential Source /Hazard	Nature of Hazard (Risk Level to site given a Residential end use)	Contaminants Associated with Source	Potential Pathway	Potential Receptor
<i>Previous ON SITE Land uses:</i>				
1. Shallow Made Ground on site	Ground contamination Moderate Risk	Arsenic Lead Mercury BaP	Dermal Contact Ingestion Inhalation	Site Users Construction workers
	Gas from in-filled ground Low Risk	None	Vertical and Lateral Migration	Site Users Future Buildings & Services

5. Remediation Strategy

5.1 Objectives

The Phase II Contaminated Land Risk Assessment identified potentially unacceptable risks to human health associated with Elevated levels of Arsenic, Lead, Mercury and Benzo(a)Pyrene found to be present within the made ground at the site.

The risks were identified using the C4SLs “minimum or tolerable” risk generic assessment criteria approach for residential with home grown produce with plant uptake. Where samples were found to exceed the assessment criteria and a potential pollutant linkage identified, a decision to manage the risk through appropriate remedial measures has been taken.

The objective of the proposed remediation strategy is to ensure that unacceptable risks associated with the identified elevated contaminants are mitigated to a negligible level or managed to an acceptable level post development. The type and nature of the contamination can thus be summarized as follows;

Occurrence of elevated levels of Arsenic, Lead, Mercury and elevated levels of PAH compounds exceeding the Assessment Criteria for Residential with home grown produce uptake within the made ground across the site.

5.2 Details of Proposed Works

The site specific remediation methodology selected for this site is based on the most effective, practicable and durable solution available not entailing excessive cost and also takes account of the proposed construction program for the site. The remediation methodology to be used is one of a simple engineered approach by restricting access to the source of the contaminants of concern by utilizing a clean capping layer. This will be achieved through the groundworks phase of the construction as a simple controlled earthworks operation and will remove the top 600mm of made ground, or the depth of made ground where its is less than 600mm in thickness, from the soft landscaped areas of the gardens of affected areas of the site. This approach will also prevent end user access to the contaminants of concern by means of removal of the source and by capping with a suitable clean inert material in areas where made ground exceeds 600mm depth and will remain beneath the capping. The clean soils for soft landscaped areas can be a combination of 1st generation aggregate used as a capillary break layer topped with a suitably clean subsoil and capped with a topsoil growth medium. The proposed remediation treatment needs to be applied to the landscaped areas of the site highlighted in pink in the plan which forms appendix A2 to this report. It should be noted that if the proposed plans for the site significantly change then the remediation proposals will need to be reviewed to confirm that they are still applicable. The area of the site covered by the proposed remedial treatment is approximately 105m² and covers the Landscaped areas at the front to the north and at the rear to the south of the site. Remediation will be achieved using standard 360 backhoe excavation plant. Deposits will be excavated, stockpiled and loaded into 8 wheel tippers with dust covers and taken off site to a suitable materials handling facility. Foundation arisings in made ground will be treated in the same manner as the earthworks for remediation and should not be reused on site. The disposal operation will be conducted under a subcontract with a registered waste carrier. The enabling works will be undertaken by the developer.

It is not yet known when site preparation works will begin.

5.3 Details of Type and Form of Contamination to be Remediated

The elevated levels of contamination identified were found to be present in the shallow made ground strata. The type and nature of the contamination can thus be summarized as such;

Table 5.0 Summary of Type and form of contamination to be remediated.

Determinand	GAC (mg/kg) Residential	Total tests / No. of tests in impacted strata (Made Ground)	No. of samples exceeding SGV/GAC/ C4SL	Max Value (mg/kg)	Impacted Strata	Further action required
Arsenic	27	3/4	3	120	Made Ground	Remove made ground or 600mm of made ground & Replace with suitable clean inert material
Lead	200	3/4	3	600	Made Ground	Remove made ground or 600mm of made ground & Replace with suitable clean inert material
Mercury (elemental)	1.2	2/4	2	3.4	Made Ground	Remove made ground or 600mm of made ground & Replace with suitable clean inert material
B[a]P	1.2	1/4	1	8.9	Made Ground	Remove made ground or 600mm of made ground & Replace with suitable clean inert material

Full details of the present ground conditions on the site are provided in the exploratory hole logs within the Phase II risk assessment as referenced in section 3.0 of this report.

6. Site Management Procedures

6.1 Details of Consents & Licenses

All contractors engaged by client in relation to remediation will have appropriate licenses in place where required.

At present the following contracts have been let:

WASTE PRODUCER			WASTE CARRIER			DISPOSAL SITE		
Contractor	Waste Stream (Generated)	(Permitted) EWC Code (s)	Name	Registration No.	Registration Expiry Date	Disposer Name	Licence No.	Disposal Facility (Transfer / Recycling / Landfill / Exempt Site)
Principal Contractor	<u>General Waste</u>	15 01 06/17 01 07/	TBC	TBC	TBC	TBC	TBC	TBC
	<u>Skip</u>	17 02 01/17 02 02/						
	(Mixed	17 02 03/17 04 07/						
	Construction	17 05 04/17 06 04/						
	Waste)	17 08 02/17 09 04/						
Principal Contractor	<u>General Waste</u>	17 02 01/17 02 02/	TBC	TBC	TBC	TBC	TBC	TBC
	<u>Soils</u>	17 02 03/17 04 07/						
		17 05 04/17 06 04/						
		17 08 02/17 09 04/						

6.2 Site Waste Management Plan

A range of measures will be adhered to during the construction process to mitigate against commonly encountered risks on construction sites. These mitigation measures centre on the standard requirements for construction contractors with regard to the protection of site operatives, the general public and wider environment when developing sites.

A single source (made ground) of potential contamination has been identified by the ground investigation that could have an impact on human receptors. Impacts are likely to be restricted to direct contact only with a low risk to the wider environment and off site receptors as a consequence of the limited volume of the identified source material, the marginal nature of the exceedances and the limited mobility of the contaminants identified.

The development proposal for the Site includes off road carparking and standard measures, which are typically applied on construction sites, will be employed during construction to prevent and minimise the release of potentially contaminated materials into the environment from their original source location.

Such measures will include the following:

- The use of personal protective equipment and respiratory protective equipment for construction workers where necessary.
- Dust suppression measures where necessary, in order to prevent the generation of dust on, and migration of dust off, site. This is likely to take the form of damping down using road sweeping plant or hoses.
- Bunded containment of fuel for construction plant if on site and appropriately controlled refuelling areas with drip mats / trays where applicable
- The provision of emergency spill kits for fuel and oils

- The provision of environmental awareness training for site workers including awareness of the findings of the Phase II ground investigation and this remediation strategy, in the form of “tool box talks”

6.3 Watching Brief

Careful observations should be made during foundation and landscaping works and the developer must keep a photographic record as the site progresses to confirm the current assessment of site conditions. Any evidence of additional contamination not previously identified and reported will be brought to the attention of the LPA as soon as is practicably possible.

6.4 Variations/Deviations from the Deployment Plan

Any variation from the approved remediation strategy shall be reported in writing to the LPA as soon as is practicably possible, by an appropriately qualified person detailing what, if any, actions have been taken along with a justification for the decisions taken. Where actions have not yet been taken a method to deal with the variation will be provided. Where appropriate, photographic and or written evidence supporting such decisions should be provided within the verification report

7. Validation & Verification of Remedial Measures

7.1 Objectives

To provide evidence to demonstrate that the remediation deployment plan has been implemented as per the methods of the remediation strategy and deployment plan and thereby the remediation has been successful, and the risks managed to the desired level or mitigated in the whole.

7.2 Sampling Strategy & Lines of Evidence

In this instance, a soil sampling strategy will be required to demonstrate that the objectives of the remediation strategy have been met and that soils remaining on site are suitable for use. Waste Transfer Notes for all soils waste leaving site will be included within the verification report and will be retained in accordance with the law. Elsewhere the use of site notes and photographs from the site engineer and watching brief site visits during the earthworks and foundation installation will be utilised where appropriate.

7.3 Post Remediation Analysis and Targets

Across the affected areas of the site, areas of landscaping will need to conform to the specification indicated in Figure 7.0.

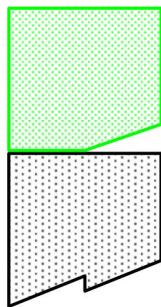
Imported none 1st generation materials must be tested at a rate of not less than 1 sample per 50m³, a minimum of 3 samples will be tested to ensure they meet assessment criteria provided in Table 7.0.

For the most part the “Clean Up” criteria is based on EA Soil Guideline Values (SGVs), The Category 4 Screening Levels (C4SL) and Suitable For Use (S4U) assessment criteria published by Land Quality Management. These are considered to be appropriately protective of human health for the residential land use with home grown produce. Where LQM criteria are not available other equally health protective criteria derived using the UK methodology have been utilised from sources as indicated within Table 7.0.

Formation Material Specifications



Formation Level Required Remediation Specification for Soft Landscaped Areas



Made Ground Removed

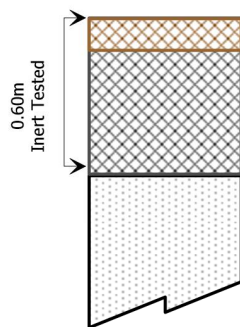
Made Ground removed to natural drift deposits or 600mm depth. Removed materials will need to be replaced with a suitable inert material

Natural Ground / Made Ground

Material Import Specifications



Specification For Landscaped Areas



0.10m Topsoil (minimum)

Rate of Testing: 1 test result per 50m³ imported (minimum 3 tests)

0.50m Suitable 1st Gen (untested) or Recycle Agg (tested)

Rate of Testing: 1 test result per 50m³ imported (minimum 3 tests)

Natural Ground / Made Ground

Figure 7.0 Material Import Specifications

Delivery notes for imported soil materials must be retained and incorporated into the verification and validation report. Photographic evidence of the insitu soils must also be provided clearly showing the depth of removal and depth of placement of imported materials.

Table 7.0 Material Import "Clean Up" Criteria

SAL Reference Customer Sample Ref:	RES HGP C4SL / S4UL SOM 6% GAC LQM II
Determinand	
Arsenic	37
Boron (water-soluble)	290
Cadmium	22
Chromium*	910
Chromium VI	21
Copper	2400
Cyanide(Total)	-
Cyanide(free)**	34
Lead	200
Mercury	1.2
Nickel	130
pH	-
Phenols(Mono)	1100
Selenium	250
SO4(Total)	-
Sulphide	-
Sulphur(Free)	-
Thiocyanate	-
Zinc	3700
Acenaphthene	1100
Acenaphthylene	920
Anthracene	11000
Benzo(a)Anthracene	-
Benzo(a)Pyrene SM	5
Benzo(b/k)Fluoranthene	-
Benzo(ghi)Perylene	-
Chrysene	-
Dibenzo(ah)Anthracene	-
Fluoranthene	890
Fluorene	860
Indeno(123-cd)Pyrene	-
Naphthalene	13
Phenanthrene	440
Pyrene	2000
PAH(total)	500
Asbestos id	ND
All Units mg/kg unless otherwise stated	Indicates Exceedance of Applicable Level
*Criteria Assumes Chromium III	
**Criteria is derived considering acute effects on 1-2yo Female Receptor ingesting a single dose of 3g of soil	
**Criteria is derived considering Total TPH (C10 to C35) is formed entirely of a 50:50 Aliphatic and Aromatic Split C8-C10 range	
Basis of Assessment Criteria:	EA 2005 WAC (Human Health Value)
	C4SL
	LQM S4UL
	Atrisk 06

7.4 Verification Report

Upon substantial completion of the project a verification report containing the lines of evidence and test results discussed in Section 7.2 and 7.3 herein, shall be submitted to the LPA along with a completion statement confirming that the development has been subjected to the remediation strategy detailed herein and has met the stated objectives. It is the duty of the developer to maintain adequate lines of evidence that work has been completed in accordance with this remediation strategy and failure to provide the necessary evidential information such as waste transfer notes, photographs, delivery notes for imported soils will lead to planning delays and cost increases in the final completion stages of the development for which the developer will be responsible.



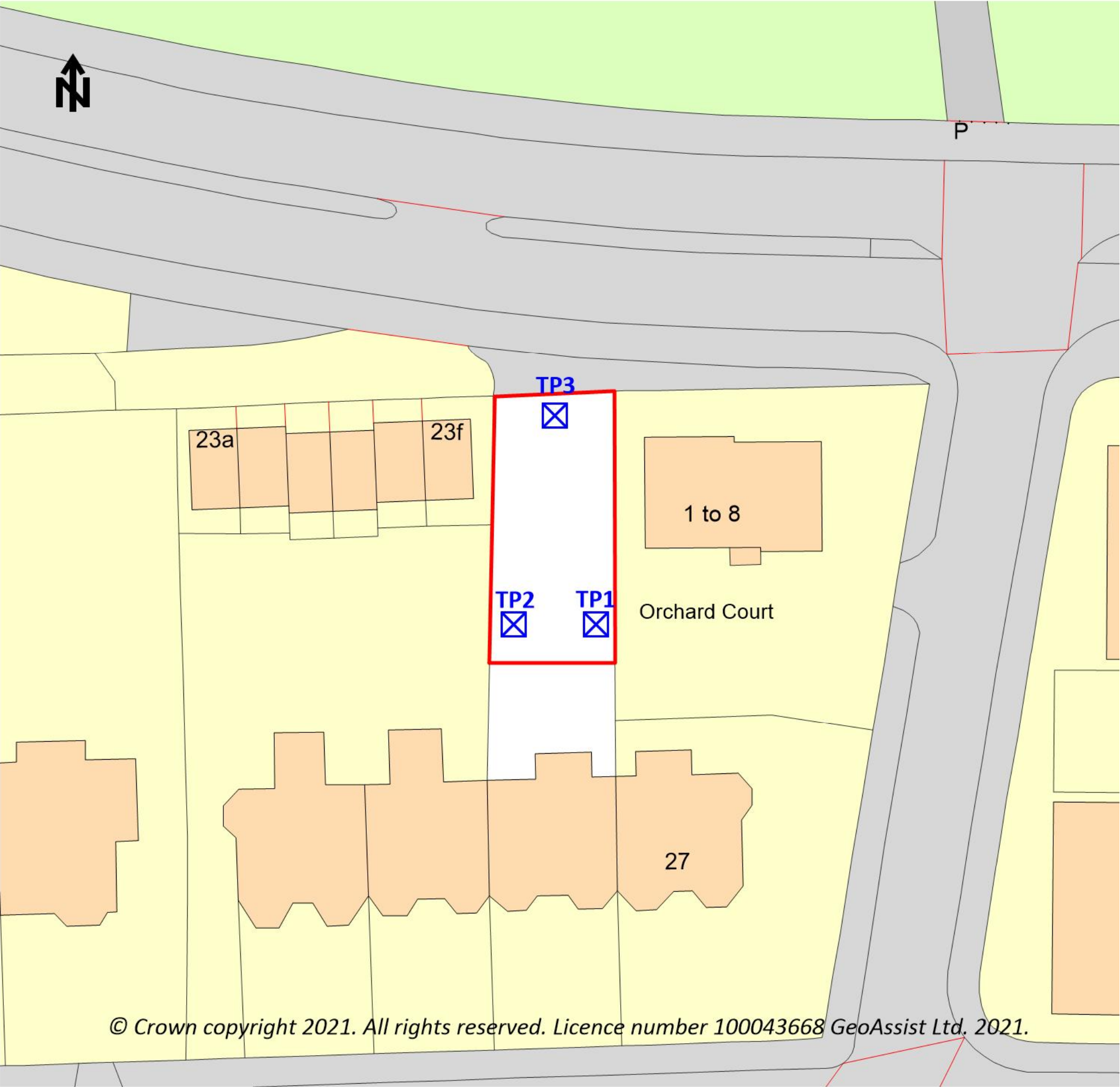
Matthew Benson MSc GMICE
Geotechnical/Environmental Engineer



Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the Site. Therefore the potential exists for ground conditions to be encountered which are different to those considered in this report. Chemical analysis was conducted for a number of parameters based on an expert understanding of the historical and operational data available at the time and it should not be inferred or otherwise, that other chemical species are not present.

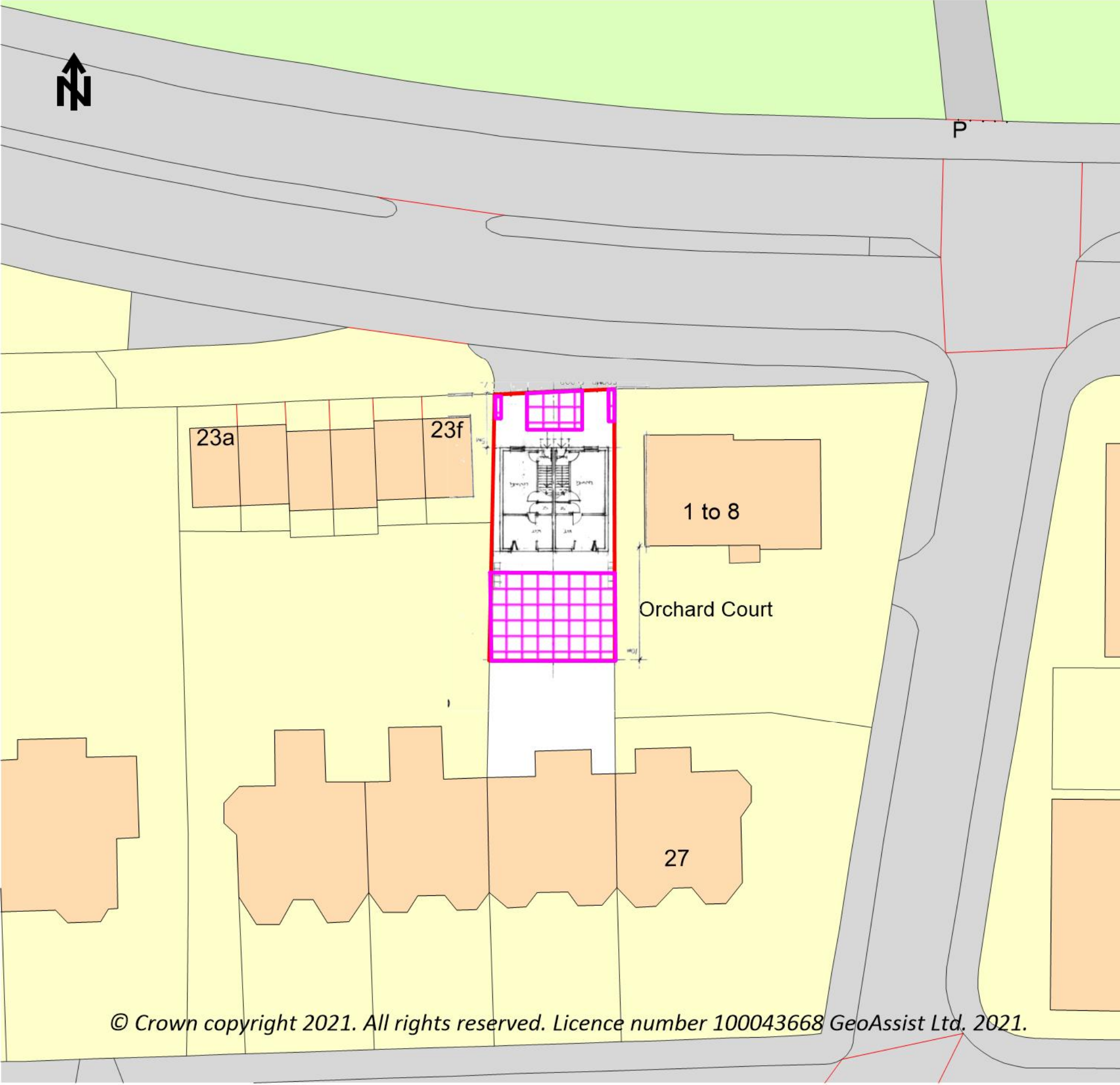
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A1 Site Plan

Site Name	Land to rear of 25 Ladybarn Road
Location	Fallowfield, Manchester
GeoAssist Ref	6070VMF
Client	Airshack Projects Ltd
	396 Wilmsow Road Manchester M20 3BN
Planning Consultant	
NGR (centre of site)	385832,393909
Production Date	May 2021
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36



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A2 Remediation Plan

Site Name	Land to rear of 25 Ladybarn Road
Location	Fallowfield, Manchester
GeoAssist Ref	6070VMF
Client	Airshack Projects Ltd
	396 Wilmsow Road Manchester M20 3BN
Planning Consultant	
NGR (centre of site)	385832,393909
Production Date	May 2021
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

Do Not Scale

Pink cross hatch denotes extent of areas requiring remediation.

