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REMEDiation STRATEGY REPORT

**FOR
9 CHATSWORTH AVENUE,
PRESTWICH,
MANCHESTER,
M25 1LZ**

**PREPARED FOR
TURNKEY INDEPENDENT
PROPERTY SERVICES LIMITED**

**REPORT NO. 7832D
JULY 2024**

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**REMEDIAL STRATEGY REPORT FOR 9 CHATSWORTH AVENUE,
PRESTWICH, MANCHESTER, M25 1LZ**

CLIENT: CLIENT: TURNKEY INDEPENDENT PROPERTY SERVICES LIMITED

1. INTRODUCTION

Our brief is to provide a Phase III Remediation Strategy Report in accordance with the Planning Application Ref. 70104 dated September 2023 for submission to the Local Planning Authority (Bury Council).

We have prepared this Remediation Strategy Report following receipt of an email, dated 9th June 2024, from the Client.

The following reports have previously been issued for the site which should be read in conjunction with this report:

- Phase I: Walkover Survey and Desk Study Report, ref. 7832 and dated October 2023
- Phase II: Ground Investigation Report, ref. 7832A and dated January 2024
- Phase II: Ground Investigation Report, ref. 7832B and dated March 2024
- SuDS Drainage Strategy Report, ref. 7832C and dated May 2024

The above reports should be read in conjunction with this report and summaries are given in Section 2.2 below.

This Phase III Remediation Strategy Report has been prepared in general accordance with the Environment Agency's Land Contamination Risk Management (LCRM) guidance (October 2020, updated July 2023) and also meets the criteria for a Remediation Statement, as defined in Section 78H of Part 2A of the Environmental Protection Act 1990.

1.1 Site Location and Description

The site is located at 9 Chatsworth Avenue, Prestwich, Manchester, M25 1LZ, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is 381820E, 403981N.

As shown on Figure 2, the about 0.03 hectare rectangular shaped site which comprises a party constructed residential property following the demolition of the previous building on site. It is bound by Chatsworth Avenue to the north, 7 Chatsworth Avenue to the east, the rear garden of 1 Oaklands Drive to the south, and 11 Chatsworth Avenue to the west.

1.2 Proposed Development

We understand that it is proposed to construct two storey side and rear extensions to produce a larger two storey semi-detached residential building on the site with the creation of a new vehicular access to the northwest, as shown on Figure 3.

1.3 Contact Details of Involved Parties

TABLE 1 INVOLVED PARTIES

Developer	Agent
Turnkey Independent Property Services Limited 7 Neptune Court, Hallam Way, Whitehills Business Park, Blackpool, FY4 5LZ Tel: 01253 763370 Email: sflaherty453@gmail.com	Northside Plans Limited 116 Simister Lane, Prestwich, Manchester, M25 2SB Email: n.tams@northsideplans.com

2. SITE ASSESSMENT

2.1 Current Status

The site currently comprises of a partly constructed residential building following the demolition of the previous building on site.

2.2 Summary of Previous Reports

2.2.1 Phase I ref. 7832 dated October 2023

At the time of the Phase I Desk Study, the site could be accessed off Chatsworth Avenue to the north and comprised a flat ground surface of stone and concrete with the new residential property on site partly constructed. The boundary of the site is shown to be lined with heras fencing to the north, wooden fencing to the south and east, and a residential property to the west. There are three manhole covers adjacent to the east of the residential building. An old drum was noted in the rear garden used for burning, with some ash and scorch marks in its surrounding area.

The historical appraisal starting from the earliest survey in 1848 found that the site was initially occupied by undeveloped fields, until 1907-1909 where a pond is shown along the west of the site (infilled by 1922). By 1951-1952, 9 Chatsworth Avenue is shown with a smaller building/ garage adjacent to the southeast. As of October 2023, both buildings on site were demolished and a larger partly constructed residential building is within the site.

The Phase I Desk Study indicated that no Made Ground was anticipated to be present within the site, however as there is a backfilled pond on the site and the site has been developed, some will be present.

The superficial geology underlying the site was indicated to be Hummocky (moundy) Glacial Deposits of the Devensian Period, generally comprising sand and gravel. The bedrock underlying the majority of the site was indicated to be sandstone of the Worsley Delf Rock of the Bosovian Sub-age, and in the north of the site the bedrock was anticipated to be mudstone, siltstone and sandstone, belonging the Pennine Upper Coal Measures Formation of the Westphalian D Sub-age to Bolsavian Sub-age. The superficial deposits and bedrock are anticipated to be a Secondary A aquifer.

The preliminary conceptual site model identified potential sources of contamination from:

- General contaminants including asbestos in Made Ground (if present) and past and present contaminative processes undertaken on and adjacent to the site including earthworks, construction and demolition, the refuse heap previously on-site and the infilled pond on-site.
- Hydrocarbon contamination from on-site spillage and leakage of oils and fuels associated with the vehicles parked on site.
- Migrating ground gases from the infilled pond on site.

These potential sources result in potential pollutant linkages to site operatives, end users of the site, vegetation, controlled waters and adjacent properties.

The report recommended an intrusive ground investigation was required to assess the ground conditions and obtain soil samples for contamination analysis and asbestos detection. In addition due to the infilled pond on site and beneath the proposed development it was recommended that gas standpipes should be installed and monitored over an extended period of time to allow for an assessment to be made.

2.2.2 Phase II ref. 7832A dated January 2024

The Phase II Ground Investigation ref. 7832A and dated January 2024 comprised of three mini boreholes taken down to a depth of 4.00m and two hand dug trial pits taken down to a depth of 1.20m. The positions of the exploratory holes are given on Figure 2.

M1, M2 and M3 encountered made ground to depths of 1.00m, >4.00m and 2.50m respectively. M1 comprised dark brown gravelly silty sand with occasional rootlets to 1.00m. M2 comprised dark brown ashy gravelly silty sand to 2.35m, dark brown sandy silty gravel to 2.65m, soft dark brown ashy slightly gravelly sandy silty clay to 3.60m and dark grey slightly gravelly slightly sandy silty clay with occasional rootlets to 4.00m. M3 and HD2 comprised dark brown ashy gravelly silty sand with occasional rootlets to 2.50m and 1.20m respectively. HD1 comprised dark brown ashy gravelly sand to 0.50m, underlain by dark brown gravelly silty sand with occasional rootlets.

Gravel sized fragments within made ground consisted of fine to coarse stone, brick, glass, tile and clinker.

Cohesive deposits were found underlying the Made Ground in M1 and M3. In M1 these comprised soft orangish brown and brown mottled slightly gravelly sandy silty clay to a depth of 1.20m, overlying firm orangish brown slightly gravelly sandy silty clay with occasional pockets of sand to a depth of 1.65m, overlying firm medium strength brown slightly gravelly slightly sandy silty clay to a depth of 3.35m and between 3.55 and 4.00 metres. In M3 the cohesive deposits comprised soft to firm slightly gravelly slightly sandy silty clay with occasional pockets of sand.

Granular deposits were found in M1 and comprised a thin band of brown clayey silty fine to medium sand between the depths 3.35 and 3.55 metres.

Gravel within the natural strata consisted of subangular to subrounded fine to medium sandstone, siltstone, quartz and coal.

Groundwater inflows were recorded in M2 and M3 at depths of 2.00m and 1.50m depths respectively within the old pond area. It should be noted that they were only left open for a short period of time and groundwater levels and rates of inflow may be subject to seasonal and/ or climatic variations.

In the initial Phase II Ground Investigation, four soil samples were taken from the exploratory holes and were analysed for a suite of determinants comprising a range of common contaminants. The result of the soil sample chemical analysis were compared with the guideline values for a standard land use of residential with plant uptake (with homegrown produce).

The contamination analysis determined elevated levels of a number of contaminants with varying distribution, as tabulated below:

TABLE 2 ASSESSMENT OF SOIL CONTAMINATION

Determinant	Expl. Hole No.	Depth (m)	Recorded Level (mg/kg)	Published Guideline Value (mg/kg)
Arsenic	HD1	0.00-0.50	85	37
	HD2	0.00-0.50	42	37
	M2	0.00-0.50	71	37
	M2	2.00-3.00	91	37
Lead	HD1	0.00-0.50	940	200
	HD2	0.00-0.50	510	200
	M2	0.00-0.50	610	200
	M2	2.00-3.00	1700	200
TPH C10-C24	HD2	0.00-0.50	820	380 #
Benzo(a)anthracene	HD2	0.00-0.50	25	13
Benzo(b)fluoranthene	HD2	0.00-0.50	15	3.7
Benzo(a)pyrene	HD2	0.00-0.50	21	3.0
Dibenzo(ah)anthracene	HD1	0.00-0.50	0.5	0.3
	HD2	0.00-0.50	2.7	0.3
	M2	0.00-0.50	0.5	0.3
	M2	2.00-3.00	0.5	0.3

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Based on aromatic TPHs in this range.

Guideline values for the assessment can be supplied directly to the Regulator, if requested.

An asbestos screen was undertaken on four soil samples and no asbestos was detected.

Two samples of groundwater taken from the standpipes installed in M1 and M2 on 2nd January 2024 have been analysed for a suite of determinants in accordance with the Conceptual Ground Model and the results are appended.

To assess the risk to surface water bodies the results have been compared with the Environmental Quality Standards (EQS) for annual allowable concentrations, published in the Department of Environment Food and Rural Affairs (DEFRA) Water Framework Directive Directions 2015, or the best equivalent (e.g. the Dangerous Substance Directive List II Substances).

To assess the risk to groundwater resources the results have been compared with the United Kingdom Drinking Water Standards (UK DWS), published in the Water Supply (Water Quality) Regulations 2016. Where no UK DWS is available the World Health Organisation (WHO) Drinking Water Guidelines have been adopted.

The bioavailability of copper, nickel and zinc has been estimated using the Water Framework Directive UKTAG Metal Biodiversity Assessment Tools (M-BAT).

We have listed the samples where the levels of contamination have exceeded the EQS, UK DWS and/ or WHO, as follows:

TABLE 3 ASSESSMENT OF GROUNDWATER CONTAMINATION

Determinant	Expl. Hole	Depth	Recorded Level	EQS	UK DWS	WHO
	No	(m)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
Cadmium (dissolved)	M1	1.60	0.21	0.08	5	3
Nickel (dissolved)	M1	1.60	4.46*	4	20	70
Selenium (dissolved)	M1	1.60	11	-	10	40
Zinc (dissolved)	M1	1.60	64.90*	10.9	5000	-
	M2	1.30	94.40*	10.9	5000	-
TPH C10-C24	M1	1.60	390	-	10	-
	M2	1.30	87	-	10	-
TPH C24-C40	M1	1.60	190	-	10	-
	M2	1.30	56	-	10	-
Fluoranthene	M1	1.60	0.09	0.0063	-	-
	M2	1.30	0.07	0.0063	-	-

* Bioavailable concentration

The results of the groundwater analysis indicate that elevated levels of cadmium (dissolved), nickel (dissolved), selenium (dissolved), zinc (dissolved), TPH C10-C24, TPH C24-C40 and fluoranthene are present.

It should be noted that the EQS values for nickel and zinc are based on the bioavailable component. The groundwater analyses report total concentrations of metal ions rather than bioavailable concentrations and consequently may indicate a false exceedance of the EQS.

Our assessment, based on four soil samples, indicates elevated levels of arsenic, lead, total petroleum hydrocarbons (TPH), and a number of poly aromatic hydrocarbons (PAHs) including benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene are present in the near surface Made Ground/ soils (source). The pathway from the source to site operatives during earthworks, the end users of the development and any proposed planting (receptors) will need to be removed by precautions and/ or remedial measures.

HD2 was found to have an elevated level of TPHs in the C10-C24 range which may produce hydrocarbon vapours. The area of HD2 is therefore considered to be a “hot spot” of contamination. We recommended that the area affected was defined by further sampling and contamination analysis to speciate the TPHs into the aliphatic or aromatic split, in order that the material could be assessed in greater detail for vapour risk, or, removed to a licensed waste disposal facility.

We recommended a 600mm blanket of clean topsoil/ subsoil (equivalent to two spade depths) is provided in back gardens and a 450mm blanket of imported clean topsoil/ subsoil is provided in front and side gardens and other open spaces. In addition deeper rooted bushes and trees should be pit planted on and in clean topsoil.

Contaminants were also identified in the groundwater samples. The Phase I Desk Study (ref. 7832) recorded the site to be underlain by Secondary A aquifers in the drift deposits and the bedrock. There are no watercourses within 250m of the site boundary, no groundwater or surface abstraction licences within 1km of the site boundary and no potable water abstraction licences within 2km of the site boundary. Given the above, as the site is within an area of low sensitivity, in our opinion, the risk to controlled waters is likely to be very low and no further precautions and/ or remedial measures are likely to be required. Due to the moderately elevated levels of TPH C10-C24 and TPH C24-C40 encountered in M1, we recommended an extra round of sampling for TPH CWG to confirm the risk assessment.

2.2.2 Phase II ref. 7832B dated March 2024

Following recommendations provided in the initial report, an additional Phase II Ground Investigation was undertaken, ref. 7832B and dated March 2024, and comprised three hand dug trial pits excavated to a depth of 1.00m. The positions of the exploratory holes are given on Figure 2.

In HD2A, HD3 and HD4, the made ground comprised grey sandy silty clayey fine to coarse gravel sized fragments of stone, brick and concrete to depths of 0.25m, 0.20m and 0.30m respectively. This was underlain by brown ashy sandy silty very clayey fine to coarse gravel sized fragments of brick, glass, ceramic and clinker to 1.00m in HD2A, by brown gravelly silty very clayey fine to coarse sand to 0.80m and light brown slightly gravelly silty clayey fine to coarse sand to 1.00m in HD3, and by brown ashy sandy silty clayey fine to medium gravel sized fragments of clinker, brick, concrete and coal to 0.75m and brownish orange sandy silty clayey fine to medium gravel sized fragments of ash and clinker to 1.00m in HD4.

The initial contamination analysis results indicated elevated levels of TPH C10-C24 in the near surface/ made ground in HD2 which could produce hydrocarbon vapours. Additional sampling (HD2A, HD3 and HD4) was carried out to determine the extent of the TPH contamination found in HD2. If delineated and found to be a localised hotspot, the contaminated material could be excavated out and removed from the site. Furthermore, the initial contamination analysis results indicated elevated levels of TPH C10-C24 and C24-C40 in water samples from M1 and M2 at depths of 1.60 and 1.30 metres respectively. Three soil samples and three water samples were subject to a TPH CWG suite to speciate the TPHs into further bands of aromatic and aliphatic split to determine whether a vapour membrane would be required in the extensions to the property.

The additional testing found no elevated levels from the TPH CWG in all of the soil and water samples, therefore a vapour membrane is not required.

An asbestos screen was undertaken on one cement sheet sample from 0.40m in HD2A, and determined that white (chrysotile) asbestos was present. It was recommended that a geotextile membrane should be provided at the base of the cover layer to prevent any upward migration of the asbestos fibres and a watching brief maintained on site for any additional asbestos.

Ground gas monitoring was undertaken on six scheduled occasions with a summary of the results shown on Table 4. The results found no elevated levels of methane or gas flows to be detected. However, elevated levels of carbon dioxide and depleted levels of associated oxygen were detected in M1, M2 and M3.

TABLE 4 GROUND GAS CONCENTRATIONS AND FLOW RATE

Methane (% vol. in air)	Carbon Dioxide (% vol. in air)	Oxygen (% vol. in air)	Gas Flow Rate (litres/ hour)
0.0	0.1-1.4	18.7-20.6	<0.1

Based on the full programme of six monitoring visits, BS.8485:2015+A1:2019, Table 2, indicates that the site falls into Characteristic Situation 1 (CS1) (very low hazard potential). BS.8485:2015+A1:2019, Table 4, indicates that for a CS1 and the type of development proposed a score of zero gives no protection and remedial measures required.

2.3 Environmental Setting

2.3.1 Topography

The area of investigation and the immediate surroundings are flat.

2.3.2 Potentially Contaminative Land Use

Historical potentially contaminative industrial land uses are recorded by the Ordnance Survey. Within the site there is one potentially contaminative industrial land use identified which is a refuse heap. In addition, there are seventeen potentially contaminative industrial land uses identified within 250m of the site boundary. The nearest being unspecified ground workings 12m to the northeast and 55m to the northwest, railway sidings 94m to the south, and an unspecified heap 157m to the south.

There are currently four potentially contaminative industrial land uses identified within 250m of the site boundary. These include a vehicle cleaning service 160m to the south, an electricity substation 176m to the southeast and 210m to the north, and an industrial sign business 210m to the southeast.

2.3.3 Geology & Aquifer Designation

The superficial deposit beneath the site were anticipated to be Hummocky (moundy) Glacial Deposits of the Devensian Period, generally comprising sand and gravel, and have been designated by the Environment Agency as a Secondary A aquifer, this designation is assigned in cases where permeable layers capable of supporting water supplies at a local scale and in some cases forming an important source of base flow to rivers.

The bedrock beneath the site is anticipated to comprise sandstone, and has also been designated as a Secondary A aquifer

2.3.4 Abstractions

British Geological Survey and Environment Agency data indicates that the site is not within a 1km grid where solution features are present that will enable rapid movement of a pollutant to groundwater.

Environment Agency data indicates that the site is not in an area where additional local information indicates that groundwater is vulnerable to pollution.

According to data provided by the Environment Agency and Natural Resources Wales, there are no groundwater abstraction licences or surface water abstraction licences within 1km of the site boundary, and no potable water abstraction licences within 2km of the site boundary.

There are no Source Protection Zones, set up to protect a water source within 500m of the site of boundary, present according to the Environment Agency and Natural Resources Wales.

2.3.5 Surface Water

The Ordnance Survey indicate that there are no watercourses (river, stream or canal) or surface water features (ponds or lakes) within 250m of the site boundary.

The Water Framework Directive (WFD) indicates that the site is within the Irwell (Croal to Irk) catchment, this watercourse being 1811m to the south and the groundwater body is known as the Northern Manchester Carboniferous Aquifers.

2.4 Source Pathway Receptor Linkages

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

2.4.1 Sources

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

1. Operation of construction plant, machinery and vehicles during the construction process.
2. Arsenic, lead, total petroleum hydrocarbons (TPH), and a number of polynuclear aromatic hydrocarbons (PAH) including Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(a)pyrene and Dibenzo(ah)anthracene in the near surface Made Ground/ soils.
3. Chrysotile asbestos in one cement sheet sample in HD2A at 0.40m.

2.4.2 Pathways

Potential pathways between sources and receptors for the proposed development are:

1. Direct contact with and ingestion of contaminated soil.
2. Inhalation of dust.
3. Lateral migration of contaminants offsite.
4. Vertical migration of contaminants to the underlying aquifer.
5. Environmental deposition of airborne pollutants.
6. Consumption of contaminated fruit and vegetables grown in garden areas.
7. Uptake of contaminated groundwater by plants grown in the garden and landscaped areas.

2.4.3 Receptors

Potential receptors for the proposed development are:

Construction Phase

1. Site workers during any demolition and construction phases
2. Adjacent properties and local residents

Post Development Phase

1. The residents who will be the end users of the site with children being the most sensitive.
2. Adjacent properties and local residents.
3. The building structures and buried services including water supply pipes.
4. Controlled waters including the underlying aquifer.
5. Fruit and vegetables grown in the gardens for consumption.
6. Any vegetation, bushes and trees planted as part of the development of the site.

2.4.4 Potential Pollutant Linkages

Construction Phase

- Direct contact with and ingestion of contaminated soil and inhalation of dust by site workers during construction
- Inhalation by local residents of dust generated during construction.
- Handling of asbestos containing materials during excavations and development.

Post Development Phase

- Inhalation by local residents of airborne dust arising from exposed soil in any soft landscaping
- Direct contact with and ingestion of contaminated soil and inhalation of dust arising from exposed soil in any soft landscaping by the residents who will be the end users of the site.
- Consumption of homegrown produce grown in any soft landscaping by the residents who will be the end users of the site.

2.5 Updated Conceptual Ground Model

The conceptual ground model of a site has been updated with regards to contamination sources, pathways and receptors, following the ground investigation, as follows:

TABLE 5 CONCEPTUAL GROUND MODEL

Potential Source	Nature of Hazard	Contaminants Associated with the Source	Pathway	Receptor	Mitigation Action
Made Ground Past refuse heap on-site Infilled pond	Contaminants in Made Ground	<u>General Contaminants</u> Arsenic Lead Polynuclear Aromatic Hydrocarbons (PAH) Total Petroleum Hydrocarbons (TPH)	Ingestion of soil	Site Operatives	Limit contact with soil by wearing adequate clothing and PPE.
			Ingestion of dust		
			Ingestion of contaminated vegetable produce	End Users	Provide clean blanket of topsoil/ subsoil.
			Dermal contact		
			Inhalation of dust		
			Inhalation of vapours	Vegetation	Provide clean blanket of topsoil/ subsoil.
			Uptake via contaminated groundwater		
			Vertical and lateral movement of mobile contaminants to surface water and groundwater	Controlled Waters	Very low risk to controlled waters, no mitigation action required.
			Direct contact	Structures and Services	Provide buried concrete in line with classification.

Asbestos on/ in ground	Asbestos fibres	Asbestos fibres	Inhalation of fibres		Limit contact with soil by wearing adequate clothing and PPE.
					Provide clean blanket of topsoil/ subsoil with a geotextile membrane at the base. Maintain a watching brief, if any significant asbestos is encountered work to cease and further assessment made.
Machinery/ Vehicles	Fuel/ oil spillage and/or leakage from machinery, fuel/oil tanks and/or vehicles	Total Petroleum Hydrocarbons (TPH)	Ingestion of soil	Site Operatives	Limit contact with soil by wearing adequate clothing and PPE.
			Ingestion of dust		
			Ingestion of contaminated vegetable produce		
			Dermal contact	End Users	Provide clean blanket of topsoil/ subsoil.
			Inhalation of dust		
			Inhalation of vapours		
			Uptake via contaminated groundwater	Vegetation	Provide clean blanket of topsoil/ subsoil.
			Vertical and lateral movement of mobile contaminants to surface water and groundwater	Controlled Waters	Very low risk to controlled waters, no mitigation action required.

3. OPTIONS APPRAISAL

After careful consideration of the risks and benefits, timeframes, costs and sustainability of the available remedial options the Client has decided to adopt the following remedial measures:

- Topsoil/ Subsoil Cover System with a geotextile membrane at the base.

4. SOIL CONTAMINATION REMEDIATION & VERIFICATION STRATEGY

4.1 Remediation Objectives

Elevated concentrations of arsenic, lead, total petroleum hydrocarbons (TPH) and polynuclear aromatic hydrocarbons (PAH) have been determined in the Made Ground and remedial measures are therefore required to break the source-receptor pathways where the impacted soil is not covered by buildings or permanent hard surfacing.

The aims of the remediation strategy are:

- To provide a remediated site that is safe and suitable for the proposed end use (residential with plant uptake (with homegrown produce)).
- To ensure the remediation is undertaken in a sustainable manner in compliance with current guidelines and with a suitably robust verification plan.
- To satisfy the requirements of the Local Planning Authority (Bury Council)

4.2 Preparatory Works

Preparations for remedial works need to address issues of health and safety, pollution and nuisance in relation to site operatives, visitors to the site and associated plant, surrounding residents and the general public who may be affected by on-site works.

The site area should be made secure to prevent unauthorised access during site remediation works when contaminated materials are to be exposed. Access to site should be regulated by the site manager with records kept of on-site personnel and visitors, lorry movements, materials imported and exported from the site etc. This information should be made available for the Phase IV Validation Report.

4.3 Soil Contamination Remediation: Engineered Cover System

4.3.1 Cover System Methodology

In order to break the pathway from the contaminated soils (source) to the end users of the development (receptors) the following measures are to be adopted:

- A 600mm capping layer of clean topsoil or topsoil and subsoil will be placed in all soft landscaping in the proposed development.
- Geotextile membrane placed at the base of the capping layer.
- Deeper rooted bushes and trees should be pit planted on and in clean topsoil/subsoil.

The above depths have been determined on the basis that in the landscaped areas the soil is unlikely to be dug to a depth greater than two spade depths (approximately 600mm). The proposed depth also allow for some degree of bioturbation, which normally occurs in the upper 300mm (according to BRE Report BR465 'Cover Systems for Land Regeneration').

It should be noted that the only soft landscaping is to the rear of the property, the front is proposed to be hard landscaping (permeable surfacing).

4.3.2 Verification Plan

An appropriately qualified and experienced person should have a "watching brief" during the remediation and the observations of this person should be made available for the Phase IV Validation Report.

In order to demonstrate that the imported material used in the cover system is suitable for the intended use chemical analyses should be undertaken. The analyses should be carried out after materials have been imported to site, though it would be advisable to undertake some screening prior to import in order to reduce the risk of the imported material being rejected.

A number of soil samples should be tested for a range of common contaminants and include hydrocarbons and asbestos and the testing should be carried out at an MCERTS and UKAS accredited laboratory. The testing results should be assessed against up to date generic assessment criteria for a residential development with plant uptake.

The sampling frequency should be set as a minimum of six samples or one per 100m³ (whichever is greater) for a brownfield source, or a minimum of three samples or one sample per 250m³ (whichever is greater) for a greenfield source, in line with the guidance given in the Yorkshire and Lincolnshire Pollution Advisory Group guidance document 'Technical Guidance for Developers, Landowners and Consultants' Version 4.1 (2021).

The testing suite should include the following contaminants as a minimum:

Arsenic	Nickel
Asbestos	pH
Boron	Phenols
Cadmium	Polynuclear Aromatic Hydrocarbons (16 EPA PAH)
Chromium	Selenium
Copper	Sulphide
Cyanide	Sulphate
Lead	Total Petroleum Hydrocarbons (3-BAND SPECIATION)
Mercury	Zinc

An appropriately qualified and experienced person should assess the results of the contamination analysis which should be compared with up to date UK based generic assessment criteria (GACs) for a residential with homegrown produce end use, to determine whether it is suitable for use in the cover system.

We recommended that the imported clean material is stockpiled and protected/covered until the analyses is received and assessed.

Transfer documentation for each load of imported clean topsoil/ subsoil should be made available for the Phase IV Validation Report.

The site will be visited by a suitably qualified person to inspect the cover system. The thickness of clean cover system will be checked either by comparison of before and after topographical surveys or by taking out an appropriate number of hand dug trial pits. A photographic record will be made during placement of the cover system or during the trial pitting. The above information will form part of the Phase IV Verification Report.

5. RISKS TO SITE OPERATIVES

Measures need to be put in place to prevent site operatives coming into direct contact with contaminated materials either by skin contact or by breathing in dust or vapours due to the elevated concentrations of arsenic, lead, TPH and PAH.

Site personnel involved in earthworks and excavations should be made aware of the hazards of working with contaminated materials found on site. Strict personal hygiene should be observed and gloves, overalls, boots and FFP3 asbestos grade dust masks should be worn. In addition smoking should be prohibited to minimise the potential for transfer of contaminants from hand to mouth.

6. ENVIRONMENTAL MITIGATION MEASURES & WASTE MANAGEMENT

6.1 Earthworks

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and dust masks made available to site operatives. In addition stockpiled materials should be sheeted over to prevent excessive airborne dust being formed which could potentially migrate off site.

If groundwater is to be pumped out of excavations, then contamination analyses should be undertaken for groundwater to be disposed of, and the results submitted to the appropriate authority or a waste disposal operator to determine the most cost effective method of disposal. Groundwater should not be discharged to a sewer without firstly obtaining a discharge consent from the appropriate authority.

6.2 Controlled Waters

The results of the groundwater analysis indicate that groundwater resources may be at a low risk from Total Petroleum Hydrocarbon (TPH) (C10-C24) and (C24-C40) and fluoranthene contamination. The Phase I report indicated that the underlying superficial deposits and bedrock is a Secondary A aquifer with high vulnerability to pollution. In addition there are no groundwater abstraction licenses and no Source Protection Zones within 500m of the site.

The proposed remedial measures will not significantly alter the groundwater regime on site and in our opinion the risks to controlled waters do not warrant any further consideration.

6.3 Waste Soil Management

If it is necessary to reduce levels to accommodate the proposed remediation scheme, then classification of the waste soil arisings should be undertaken prior to removing it to a licensed waste disposal facility.

All vehicles carrying contaminated material should be securely sheeted and the wheels and undercarriages cleaned before leaving site to ensure that hazardous materials are not dropped onto public roads.

Transfer documentation for each load of contaminated material exported from the site will be obtained and made available for the Phase IV Validation Report.

7. CAVEATS, ASSUMPTIONS AND CONTINGENCY PLAN

It should be appreciated that only a small proportion of the area to be developed has been sampled and consequently the recommendations made and opinions expressed in our reports can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given. For the purposes of this remediation strategy it is assumed that the findings of the Phase I and Phase II investigations are representative of the site conditions, however with any site it is possible that unrecorded potentially contaminative activities may have taken place, or that zones of contamination exist which have not been encountered by the intrusive investigation.

7832D – Prestwich

We recommend that a contingency plan is put in place to deal with unforeseen contaminated ground being found. In this regard a "watching brief" should be employed during earthworks and the following procedure followed if unforeseen ground conditions are encountered:

- Cease earthworks.
- Liaise with the Client and/ or Regulator.
- Agree revised course of action with the Client and/ or Regulator.
- Revise Remediation Statement, if necessary.

8. VERIFICATION REPORT

On completion of the remedial works a Phase IV Verification Report should be produced by the independent suitably qualified person. The report should include records of on-site observations together with contamination analysis certificates, transfer notes, discharge consents, specifications etc.

9. GENERAL

This Remediation Statement should be submitted to the Regulator, for approval in writing, prior to commencement. On completion of the actions set out in the Phase III Remediation Statement and receipt of an instruction, we would be happy to validate the remedial works and prepare a Phase IV Validation Report.

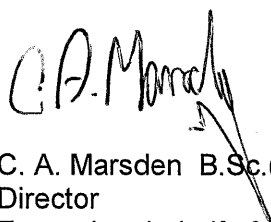
Should the proposed development of the site be undertaken in stages, we would be happy to provide a Phase IV Validation Report at each stage of the development.

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr David Marsden at our Preston office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. 7832D
JULY 2024

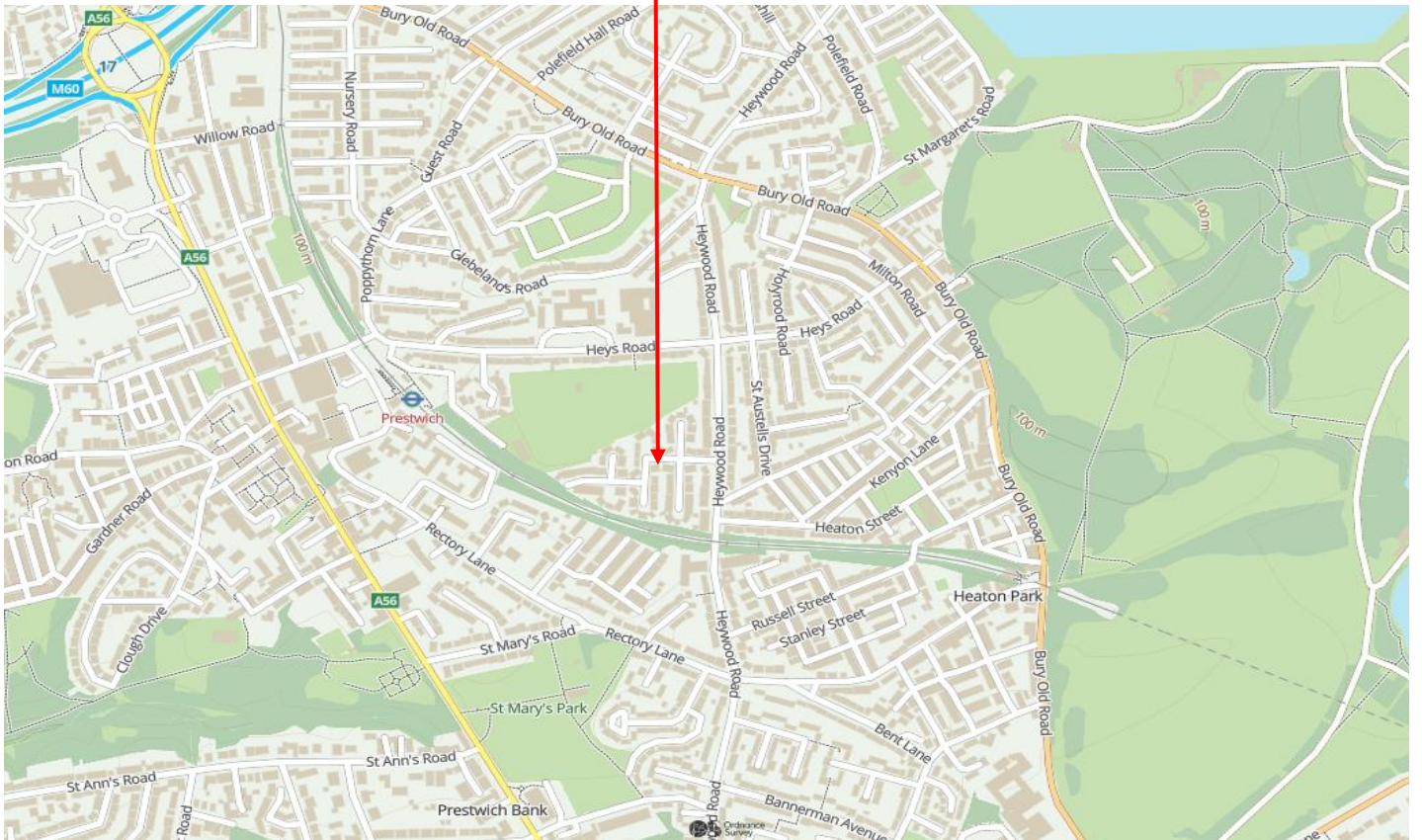
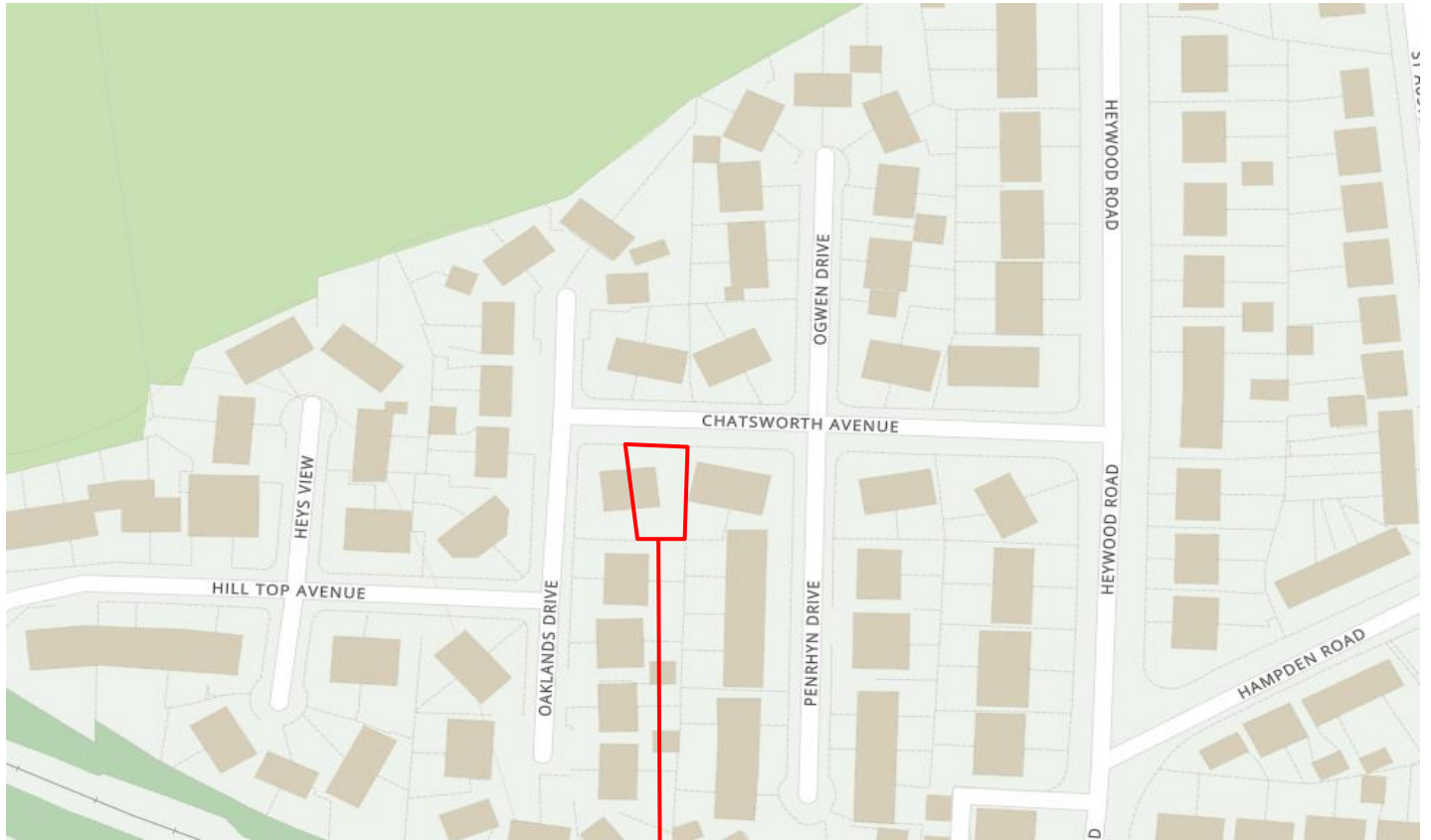


S. Solanki B.Sc.(Hons.)
Geotechnical Engineer
For and on behalf of
Sub Surface Consultants Limited



C. A. Marsden B.Sc.(Hons.), C.Eng., M.I.C.E.
Director
For and on behalf of
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FIGURES



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SS SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907	Site Location Plan				
	Site:	Date Drawn:	Date Checked:	Orientation:	Job Number:
	9 CHATSWORTH AVENUE, PRESTWICH, MANCHESTER, M25 1LZ	10-Jul-24	—		7832D
	Client:	Drawn By:	Checked By:	Scale:	Figure Number:
TURNKEY INDEPENDENT PROPERTY SERVICES LIMITED	SS	—	—	1	

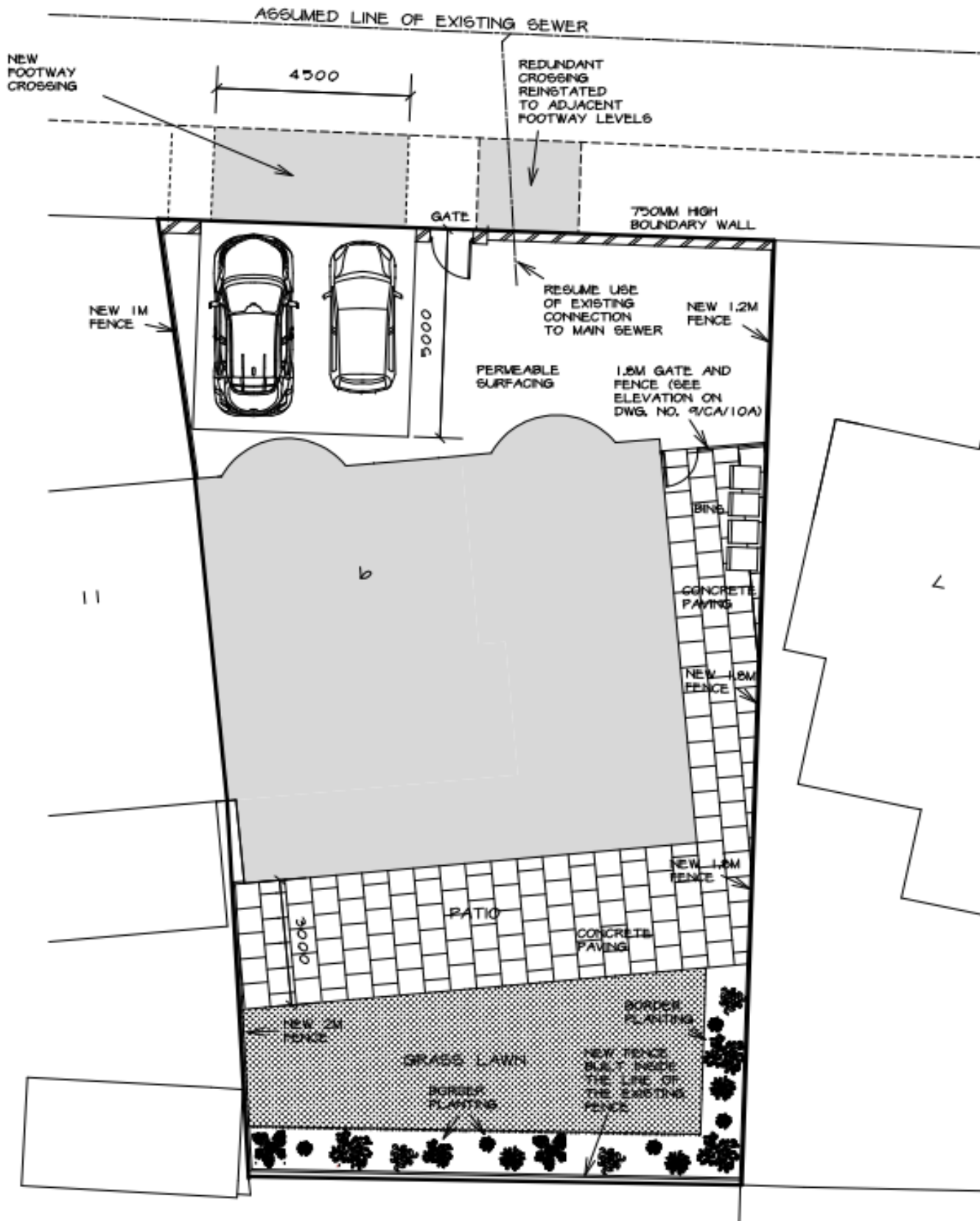


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SS SUB SURFACE SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907		Existing Site Plan and Exploratory Hole Locations			
Site: 9 CHATSWORTH AVENUE, PRESTWICH, MANCHESTER, M25 1LZ		Date Drawn: 10-Jul-24	Date Checked: —	Orientation: 	Job Number: 7832D
Client: TURNKEY INDEPENDENT PROPERTY SERVICES LIMITED		Drawn By: SS	Checked By: —	Scale: —	Figure Number: 2

CHATSWORTH AVENUE



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SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907

Site:
9 CHATSWORTH AVENUE, PRESTWICH, MANCHESTER, M25 1LZ

Client:
TURNKEY INDEPENDENT PROPERTY SERVICES LIMITED

Proposed Development

Date Drawn: 10-Jul-24	Date Checked: —	Orientation: 	Job Number: 7832D
Drawn By: SS	Checked By: —	Scale: —	Figure Number: 3