



**Former Ducie Arms
424 Stockport Road
Longsight
Manchester**

**Quantitative Ground Contamination
Risk Assessment Report**

Report Beneficiary:
Shellco 148 Ltd
Tameside business park
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Project Reference: P15726

Report Reference: R15737

Document Control			
Issue No.	Status	Issue Date	Notes
1	Final	11 th October 2022	
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EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

It is proposed to redevelop the site of the Ducie Arms located at 424 Stockport Road, Longsight, Manchester. The development proposals are understood to comprise the demolition of the existing public house and construction of a three storey mixed use development comprising a medical centre on the ground floor with residential units above.

A Phase 1 Contaminated Land Assessment, undertaken by others, identified potential pollutant linkages associated with the likely presence of made ground and the potential for elevated concentrations of ground gases from coal mining beneath the site.

Reference to geological datasets indicates that the site is expected to be underlain by the Till deposits overlying the Manchester Marls Formation or Chester Formation. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying Till deposits.

The Till deposits are classed as a Secondary Undifferentiated Aquifer. The Manchester Marls Formation and Chester Formation are classed as a Secondary B Aquifer and Principal Aquifer, respectively. The site does not lie within an Environment Agency Source Protection Zone with regard to the protection of the quality of groundwater that is abstracted for potable supply. Groundwater was recorded at the base (2m) of one of the gas and groundwater monitoring standpipes.

Samples of the made ground recorded concentrations of lead and PAH compounds above published SSV.

Remedial measures are considered to be required in all proposed soft landscaped areas and the grasscrete car parking areas.

Ground gas monitoring standpipes were installed with response zones within the made ground and Till deposits. Very low concentrations of ground gases were recorded in the standpipes during the monitoring period and the calculated gas screening value for the development categorised the site as "Characteristic Situation 1", with no gas protection measures considered to be required.

The details of the remediation measures for the site, including the depth of the cover system, should be set out within a remediation strategy, once regulatory feedback has been received on the risk assessment.

It is recommended that this report is submitted to the Local Authority in relation to the partial discharge of Condition 22. The conclusions drawn and recommendations made within this report should be considered as provisional until such time as they have been approved by Local Authority and the relevant planning condition has been discharged.

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1. INTRODUCTION

It is proposed to redevelop the site of the Ducie Arms located at 424 Stockport Road, Longsight, Manchester. The development proposals are understood to comprise the demolition of the existing public house and the construction of a three storey mixed use development comprising a medical centre on the ground floor with residential units above.

Small decorative areas of planting are proposed along the eastern, southern and western boundaries of the site, along with grasscrete car parking areas. A copy of the proposed development layout is presented in Appendix A.

GeoSmart Information Ltd. has previously undertaken a Phase 1 Contaminated Land Assessment¹ for the site. The assessment identified potential pollutant linkages associated with the likely presence of made ground and the potential for elevated concentrations of ground gases from coal mining beneath the site.

Ashdown Site Investigation Ltd. was requested to undertake a ground investigation and to provide a quantitative risk assessment to assist with the discharge of planning conditions for the proposed development.²

The specific objectives of the works were to:

- a) Investigate the shallow ground and groundwater conditions prevailing at the site;
- b) Test for the presence of contaminants identified by the preliminary conceptual model; and
- c) Develop a quantitative conceptual model of the site identifying pollutant linkages relating to end users of the proposed development works, to controlled waters beneath and in the vicinity of the site, or to other off-site sensitive receptors, if identified.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q12052, dated 21st June 2022. The instruction to proceed was received from Howard & Seddon Partnership, on behalf of the client.

This report should be read in conjunction with the previous report prepared for the site by Geosmart Information Ltd.

¹ EnviroSmart Plus, Report Ref:94579R1, dated August 2021

² Manchester City Council, Planning Application No. 128987/FO/2020, Condition 22

R15371

2. SITE CONTEXT

2.1 Site Description

The site comprises a roughly triangular plot of land located to the south west of Stockport Road and between Plymouth Grove and Hayley Street in Longsight, Manchester. It is centred on the approximate Ordnance Survey national grid reference 386472 395932. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

At the time of the ground investigation the Ducie Arms, a former public house between one and three storeys in height and with a partial basement, was located in the northern part of the site. There was no access to the building at the time of the ground investigation.

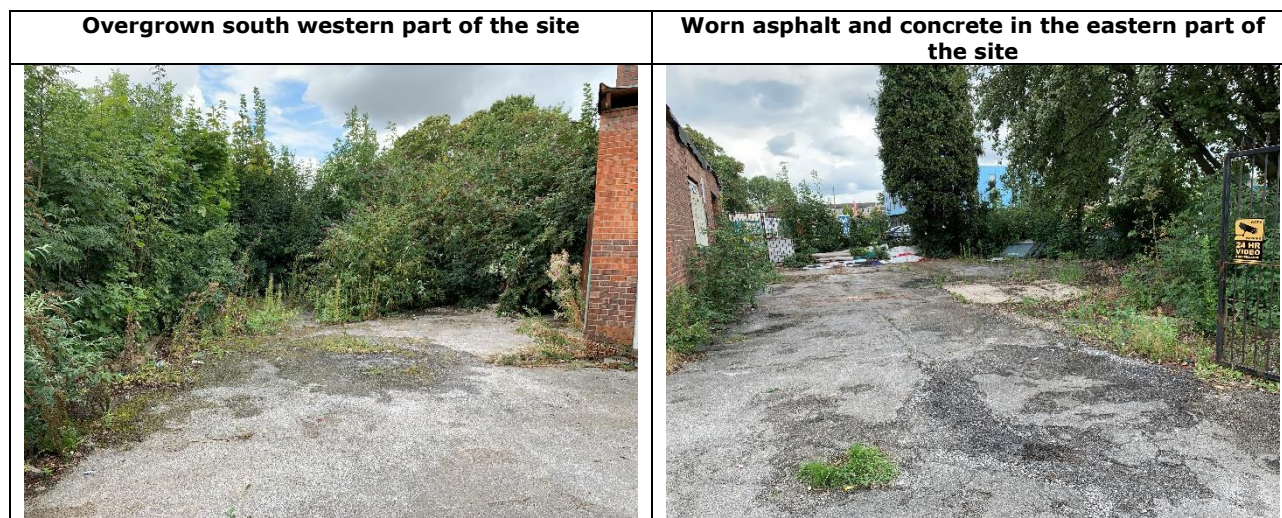
The remainder of the site was largely given over to an asphalt surfaced car park, with narrow soft landscaped areas along the boundaries of the site, including a number of mature trees. The south western part of the site was overgrown.

A large sewer runs beneath the site with an easement of 6.5m either side. Due to this no drilling could be undertaken within the easement, the extent of which is shown on Figure 2.

The site is located within a largely residential area. Plymouth Grove is located to the south of the site, with a demolished building beyond. Haley Street is located to the western side of the site, with residential houses, a construction site and a former public hall beyond. Stockport Road is located to the north east of the site, with houses and a medical centre beyond.

A petrol station is located around 75m south east of the site, on the north eastern side of Stockport Road.





2.2 Geological and Hydrogeological Data

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	Till, Devensian	Secondary Undifferentiated Aquifer
Bedrock	Manchester Marls Formation – Mudstone Chester Formation – Sandstone	Secondary B Aquifer Principal Aquifer

Till are superficial deposits formed up to 2 million years ago in the Quaternary Period and are sedimentary deposits that are glaciogenic in origin.

The Manchester Marls Formation – Mudstone is shown to underlie the majority of the site. It comprises red marl (calcareous mudstone and siltstone) with thin beds of fossiliferous marine limestone and dolomite, and maybe locally green and sandy in places in the top part of the formation.

The Chester Formation – Sandstone consists of red-brown, yellow, or yellow-mottled, very fine- to coarse-grained sandstones that are commonly cross-bedded, locally micaceous, silty or argillaceous, pebbly or conglomeratic.

2.2.2 Radon

Table 2. Radon

Section	Risk Assessment
Radon Affected Areas	The site is reported to be within an area where less than 1% of properties are at or above the action level requiring radon gas protection measures to be installed in new buildings.
Radon Protection Measures	No radon protection measures are reported by the British Geological Survey to be necessary in the construction of new dwellings or extensions.

2.2.3 Groundwater and Surface Water Abstractions

No groundwater or surface water abstractions are identified to be located within 1km of the site.

2.2.4 Groundwater Source Protection Zones

The site does not lie within an Environment Agency Source Protection Zone.

2.2.5 Surface Water Features

No significant surface water features are located within 250m of the site.

3. GROUND INVESTIGATION

3.1 Introduction

The ground investigation comprised the excavation of a series of dynamic sampler boreholes together with a hand dug trial pit and a hand augered borehole. The intrusive work was carried out on 8th September 2022. The exploratory hole locations are shown on Figure 2.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix B, together with notes to assist in their interpretation.

3.2 Exploratory Holes

3.2.1 *Dynamic Sampler Boreholes*

Three boreholes, designated WS01 to WS03, were drilled to depths of between 2.00m and 3.00m below ground level.

The boreholes were formed by a series of 1.0m long, open ended, hollow steel tubes of up to 100mm diameter, each containing a removable plastic liner. The tubes, progressively reducing in diameter, were driven into the ground by means of a track-mounted drop weight. Each tube was extracted from the ground using a hydraulically operated jack and the enclosed sample was recovered in its plastic liner.

The system enables sub-samples to be taken for detailed examination and laboratory testing.

3.2.2 *Trial Pit*

A single trial pit, designated TP01, was dug using hand tools to a depth of 0.50m below ground level. The pit was abandoned at this depth due to the presence of a service run.

3.2.3 *Hand Auger Borehole*

A borehole, designated HA01, was bored to a depth of 0.30m below ground level within an area of existing soft landscaping inside the sewer easement zone. The hand auger enables disturbed soil samples to be taken using a cutting tool twisted into the soil by hand.

3.3 Sampling

Disturbed samples of soil were taken at the depths shown in the exploratory hole records and were collected in plastic tubs or amber jars fitted with gas tight lids.

On collection the amber jars were stored in cool boxes with cooling blocks to maintain temperatures below 4°C until transferred to refrigerators upon return to the office and subsequently forwarded to the external accredited chemical testing laboratory.

3.4 Installations

Gas and groundwater monitoring standpipes were installed to depth of 2.00m in each of the boreholes. Descriptions of the installations are shown on the exploratory hole records in Appendix B.

The concentrations of gases and depths to groundwater were recorded within the standpipes on three occasions between 16th September 2022 and 30th September 2022. The readings are presented in Appendix B.

3.5 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd. Results from the laboratory tests are provided in Appendix C.

Chemical (contamination) testing of selected samples was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 Surface Covering

With the exception of HA01, each of the exploratory holes was excavated through a surface cover of asphalt some 50mm in thickness.

Borehole HA01 was excavated through topsoil which extended to the full depth (0.3m) of the borehole. The topsoil was recorded to contain gravel of tile and brick.

4.1.2 Made Ground

Made ground, initially comprising a sandy gravel or a gravelly sand was recorded to depths of between 0.30m and 0.60m below ground level, and to the full depth of TP01 (0.50m). The gravel fraction comprised variable quantities of brick, concrete, limestone, clinker-like material, plastic, sandstone, glass, ceramic and tile.

A layer of tile and laminate over a 50mm layer of concrete was encountered at a depth of 0.30m in WS01.

Underlying this layer of made ground in WS01 and WS02 was a second layer of made ground comprising slightly gravelly slightly sandy clay, recorded to a depth of 0.80m. The gravel fraction comprised variable quantities of brick, concrete and clinker-like material.

In WS03, underlying the sandy gravel was a second layer of made ground comprising a clayey sandy gravel of brick and concrete which extended to a depth of 1.80m.

A lead pipe was encountered in TP01 within the made ground soils and the trial pit was abandoned at a depth of 0.50m.

4.1.3 Till

Underlying the made ground, where penetrated, the investigation progressed into undisturbed slightly gravelly slightly sandy clay deposits, occasionally interbedded with clayey sands. These soils are considered to represent Till deposits indicated on the published geological map. Organic odours were noted in the Till deposits in WS02.

4.2 Stability

Instability was recorded locally within the made ground soils.

4.3 Groundwater Conditions

Each of the exploratory holes remained dry during the short duration of the ground investigation works. Groundwater was encountered at the base of the standpipe in WS02 during each of the monitoring visits. It should be noted that water levels within the boreholes may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

5. QUANTITATIVE CONTAMINATION ASSESSMENT

5.1 Assessment Strategy

The design of the ground investigation considered the potential contaminant sources identified by the preliminary ground contamination risk assessment. A copy of the preliminary conceptual model for the proposed development is presented in Appendix D.

The exploratory holes were located, where possible given the limitations caused by the sewer easement and existing buildings, to provide spatial coverage of the site. Samples of shallow made ground were tested for a range of commonly occurring contaminants: heavy metals and polycyclic aromatic hydrocarbon (PAH) compounds. The samples were also screened for asbestos. The sample of topsoil from the existing landscaped area was also tested for concentrations of heavy metals and PAH compounds, and screened for asbestos.

A sample of the Till deposits, where organic odours were noted, was also tested for concentrations of petroleum hydrocarbons.

5.2 Analysis of Contamination Test Results

Comparison of the results of the laboratory testing has been made against the 'Suitable For Use Levels' (S4UL)³ or, in lieu of an S4UL being developed for lead, the Category 4 Screening Level (C4SL)⁴. These are collectively referred to as soil screening values (SSV).

In view of the development proposal, the SSV utilised in this assessment are those calculated for the generic "Residential" land use⁵, but without the pathways associated with ingestion of site grown vegetables and ingestion of soil attached to vegetables, as residential units are proposed above the medical centre. The critical receptor for this land use is considered to be a young female child resident on site from birth to age 6. Exposure routes that are considered include the potential for direct ingestion of the soil, the outdoor and indoor ingestion of dust and the potential inhalation of dust and vapours.

For the assessment of risk to controlled waters a qualitative assessment has been undertaken based upon the concentrations of contaminants recorded within the soil samples and the information obtained about the sensitivity of the underlying strata or nearby surface water receptors.

³ Nathanail, C.P, et al., The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015, Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3071.

⁴ SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report, published by DEFRA, 2014.

⁵ As defined within Science Report SC050021/SR3, January 2009, with the amendments discussed in the LQM/CIEH report.

5.2.1 Heavy Metals

The following table summarises the SSV along with the maximum and minimum concentrations of the heavy metals tested for.

Table 3. Summary of Test Results for Heavy Metals

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Arsenic	40	4	8.2	24.9	1	0
Cadmium	85	4	<LOD	1.5	0.5	0
Chromium	910	4	13.5	24.6	5	0
Copper	7100	4	15.8	82.7	5	0
Lead	310	4	182	1500	5	3
Mercury	56	4	<LOD	0.8	0.5	0
Nickel	180	4	8.9	28.7	5	0
Selenium	430	4	<LOD	<LOD	1	0
Zinc	40000	4	54.8	311	5	0
Hexavalent Chromium	6	4	<LOD	<LOD	0.8	0
Water Soluble Boron	11000	4	<LOD	0.9	0.5	0

Three of the four samples of made ground tested recorded concentrations of lead above its SSV.

The concentrations of lead within the made ground are considered to pose an unacceptable risk to the proposed end users of the site, where such soils may remain in areas of proposed soft landscaping without remediation.

The sample of topsoil from HA01 did not record concentrations of any heavy metals above their respective SSV.

At the concentrations recorded, heavy metals still would be expected to be relatively immobile within the underlying soils. In view of this and the sensitivity of the underlying Secondary Undifferentiated Aquifer, the concentrations of heavy metals are not considered to pose an unacceptable risk to controlled waters.

5.2.2 Asbestos

No suspected asbestos materials were noted within any of the exploratory holes undertaken at the site.

Four samples of the made ground and a sample of the topsoil were screened for the presence of asbestos. None of the samples recorded the presence of any asbestos materials.

There is not considered to be an unacceptable risk to end users from asbestos materials within soils. However, due to the heterogeneity of made ground, there will always remain the potential for localised asbestos materials to be encountered during construction works, though the likelihood of this is considered to be very low. All workers at the site should be made aware of what actions to take in the event that suspected asbestos materials are identified at any time during the development works.

An asbestos survey of existing structures and infrastructure⁶ was beyond the scope of this investigation. The potential for asbestos containing materials to be present within the fabric of buildings or infrastructure located on the site cannot be dismissed by reference to the soil test results contained within this report. It is recommended that relevant asbestos registers be inspected prior to commencing any demolition works at the site. Where asbestos is identified to be present within buildings or infrastructure, these materials should be appropriately removed by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition to avoid contaminating soils at the site.

5.2.3 Polycyclic Aromatic Hydrocarbon (PAH) Compounds

The following table summarises the soil screening values, maximum and minimum concentrations for the PAH compounds tested for.

Table 4. Summary of Test Results for PAH Compounds

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Naphthalene	2.3	4	<LOD	0.2	0.1	0
Acenaphthylene	2900	4	<LOD	0.4	0.1	0
Acenaphthene	3000	4	<LOD	0.4	0.1	0
Fluorene	2800	4	<LOD	0.4	0.1	0
Phenanthrene	1300	4	0.1	6.1	0.1	0
Anthracene	31000	4	<LOD	1.7	0.1	0
Fluoranthene	1500	4	0.6	10.9	0.1	0
Pyrene	3700	4	0.7	10.9	0.1	0
Benz(a)anthracene	11	4	0.6	6.3	0.1	0
Chrysene	30	4	0.7	7.8	0.1	0
Benzo(b)fluoranthene	3.9	4	0.8	5.6	0.1	2
Benzo(k)fluoranthene	110	4	0.7	5.6	0.1	0
Benzo(a)pyrene	3.2	4	0.9	6.8	0.1	2
Indeno(123-cd)pyrene	45	4	0.6	4.4	0.1	0
Dibenz(ah)anthracene	0.31	4	0.2	1.1	0.1	2
Benzo(ghi)perylene	360	4	0.5	3.9	0.1	0

Two of the four samples of made ground tested recorded concentrations of at least one PAH compound above its respective SSV.

The concentrations of PAH compounds within the made ground are considered to pose an unacceptable risk to the proposed end users of the site, where such soils may remain in areas of proposed soft landscaping without remediation.

The sample of topsoil from HA01 did not record concentrations of any PAH compounds above their respective SSV.

PAH compounds have extremely low solubilities and are therefore relatively immobile within soils. In view of this and the sensitivity of the underlying Secondary Undifferentiated Aquifer, the concentrations of PAH compounds present are not considered to pose an unacceptable risk to controlled waters.

⁶ As defined under Section 5(a) of the Control of Asbestos Regulations, 2012.

5.2.4 Petroleum Hydrocarbons

The following table lists the SSV for petroleum hydrocarbon equivalent carbon weight fractions calculated for 1% organic content.

Table 5. SSV for petroleum hydrocarbon equivalent carbon weight fractions

Petroleum Hydrocarbon Fraction	SSV (mg/kg)	Petroleum Hydrocarbon Fraction	SSV (mg/kg)
Aliphatic EC 5-6	42	Aromatic EC 5-7	370
Aliphatic EC >6-8	100	Aromatic EC >7-8	560
Aliphatic EC >8-10	27	Aromatic EC >8-10	47
Aliphatic EC >10-12	130	Aromatic EC >10-12	250
Aliphatic EC >12-16	1100	Aromatic EC >12-16	1800
Aliphatic EC >16-35	65000	Aromatic EC >16-21	1900
Aliphatic EC >35-44	65000	Aromatic EC >21-35	1900
		Aromatic EC >35-44	1900

Whilst full speciation of the concentrations of petroleum hydrocarbons by aromatic and aliphatic fractions was not undertaken, the results of the testing undertaken can still be compared with the more stringent of the screening values for the respective equivalent carbon weight fraction and, where the concentration recorded is found to be lower, it can be reasonably concluded that no significant risk is present.

No visual olfactory evidence of petroleum hydrocarbon contamination was encountered in the made ground soils at the site. None of the samples recorded concentrations of any fractions above the more conservative SSV.

The sample of the Till deposits from WS02, where organic odours were noted, did not record any concentrations of petroleum hydrocarbons above the limit of detection of the test.

The Phase 1 report suggests that discussions are held with the owners of the petrol filling station to the south east of the site in regards to whether any potential issues with the tanks have been recorded. However, in view of the findings of the investigation works and the significant distance of the filling station from the site, this is considered to be an unnecessary and unreasonable measure.

Any known leakage from the tanks would be reported as a pollution incident and would therefore be contained within the "Pollution Incidents to Controlled Waters" section of the Landmark data contained within the Phase 1 report. No such incidents are recorded within the immediate vicinity of the site.

There is not considered to be an unacceptable risk to end users or controlled waters from petroleum hydrocarbon contamination beneath the site.

The concentrations of petroleum hydrocarbons have been compared to the threshold values for the use of PE water supply pipework as published by United Utilities⁷. The concentrations recorded do not exceed the threshold value.

⁷ Supplementary guidance for the selection of water pipes in land potentially affected by contamination, Former Ducie Arms, 424 Stockport Road, Longsight, Manchester

However, it is noted that a detailed assessment of the risk to water supply pipework was beyond the scope of the assessment and the testing was not undertaken at the likely depth or route of water supply pipework. Therefore, it is strongly recommended that designers consult with the proposed water supply company to ascertain whether they require further laboratory testing and assessment specific to proposed routes of services or whether they require the selection of any specific water supply pipe material.

5.3 Analysis of Ground Gas Monitoring Results

5.3.1 Summary of Monitoring Works

The preliminary conceptual model noted that the site is located within a "Development Low Risk Area", and mention is made of Coal Authority guidance stating that "whilst coal mining has taken place in this area, it was at such depth not to pose a public safety or ground stability risk to new development".

Overall, a "Moderate/Low" Risk was assigned by the preliminary conceptual model based on a consequence of "Severe" but a probability of "Unlikely". The assessment states "Based on the prevailing conceptual understanding an appreciable gas source is considered unlikely."

To validate the conclusion and to confirm the absence of any risk posed by ground gases, three standpipes were installed at the site.

Monitoring of the standpipes was undertaken on three occasions at weekly intervals.

5.3.2 Summary of Monitoring Results

Peak concentrations of carbon dioxide of up to 2.6% were recorded during the monitoring period. No detectable concentrations of methane and no detectable gas flows were recorded within any borehole during any monitoring visit.

Atmospheric pressures varied between 993mb and 1014mb during the monitoring period. Monitoring was carried out during periods of falling atmospheric pressure.

5.3.3 Calculation of Gas Screening Values

Assessment of the results of the monitoring has been carried out in general accordance with the CIRIA guidance.

The guidance provides a methodology for assessing the risk from ground gases by the calculation of site-specific gas screening values (GSV) for each key asphyxiating or explosive gas (carbon dioxide and methane). These are calculated by multiplying the concentration (percentage/volume) of a gas by a gas flow rate (l/hr).

An assessment has been carried out by calculating the GSV using the highest consistent flow rate recorded multiplied by the highest gas concentration recorded.

In the case of methane, where no gas concentrations were recorded, the GSV has been calculated assuming values equal to the limit of detection of the instrument are present.

The following table summarises the calculated GSV:

Table 6. Calculated GSV for Carbon Dioxide and Methane

Gas	GSV
Carbon Dioxide	$0.026 \times 0.1 = 0.0026$
Methane	$0.001 \times 0.1 = 0.0001$

5.3.4 Assessment of Risk from Ground Gases

CIRIA C665 identifies two types of development, "Situation A" and "Situation B". Situation B is low rise housing, with a ventilated underfloor void of a minimum of 150mm. Situation A is for all other housing types that are not Situation B. It is considered that the site would not meet the criteria for Situation B and is therefore considered to be a "Situation A" type of development.

For housing types other than Situation B, assessment is undertaken by calculating GSV for both methane and carbon dioxide. The appropriate characteristic situation for the site can then be determined by comparing the highest GSV (for either gas) with the threshold value detailed within Table 8.5 of CIRIA C665, which is partially reproduced below.

Table 7. Reproduction of elements of Table 8.5 of C665

Characteristic Situation	Risk Classification	GSV (CH ₄ or CO ₂) Threshold (l/hr)	Additional Factors	Typical Source of Generation
1	Very low risk	<0.07	Typical methane of 1% and/or carbon dioxide of 5%. Otherwise consider increase to characteristic situation 2.	Natural soils with low organic content. "Typical" made ground.
2	Low risk	<0.7	Borehole air flow not to exceed 70l/hr. Otherwise consider increase to characteristic situation 3.	Natural soils with high peat/organic content. "Typical" made ground.

5.3.5 Assessment of Calculated GSV

For the calculated GSV, the development would be characterised as "Characteristic Situation 1" for those developments in Situation A.

For Situation A Developments, Both CIRIA C665 and BS8485⁸ set out advice on the design of gas protection measures.

Table 8.6 of CIRIA C665 provides the typical scope of gas protective measures, and is partially reproduced below.

⁸ BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

Table 8. Reproduction of elements of Table 8.6 of C665

Characteristic Situation	Residential Buildings (not those which belong to Situation B)		Office/commercial/industrial development	
(From Table 8.5)	Number of levels of protection	Typical scope of protective measures	Number of levels of protection	Typical scope of protective measures
1	None	No special precautions	None	No special precautions

Under BS8485, it is also necessary to consider the building type which buildings in the development fall into. Table 3 of BS8485 defines the building types with a "Type A building" being those buildings in private ownership, which applies to this development site.

Table 4 of BS8485 identifies the score required for different characteristic situations for different "building types".

Table 9. Reproduction of elements of Table 4 of BS8485

Characteristic Situation	Minimum Gas Protection Score (points)			
	High Risk		Medium Risk	Low Risk
	Type A	Type B	Type C	Type D
1	0	0	0	0

5.3.6 Conclusions

No definitive potential source of ground gases was identified by the Phase 1 assessment, with a potential risk of ground gases identified from the site being within a Coal Authority "Development Low Risk Area". Although localised deep made ground was encountered by the ground investigation, this was mainly comprised of brick and concrete, with no notable amounts of organic materials and is therefore not a viable source of ground gas generation.

Very low concentrations of ground gases have been encountered by the monitoring period in both the standpipes within the Till deposits and the standpipe within the made ground, which has been undertaken in favourable atmospheric conditions at times of falling and low pressure.

The analysis of the monitoring results and the GSV calculated for the site indicate that the development should be considered as "Characteristic Situation 1". Neither CIRIA C665 nor BS8485 recommend any specific gas protection measures for the respective classifications.

In addition, the site is reported to be within an area where less than 1% of properties are at or above the action level requiring radon gas protection measures to be installed in new buildings.

It is therefore considered that remedial action is not warranted with respect to ground gases at the site and no gas protection measures are required.

5.4 Quantitative Contamination Risk Assessment

The risk assessment for the site considers the sources of contamination identified, the receptors that may be present in view of the development proposals and the contaminant pathways by which these may be linked.

A complete pollutant linkage is only deemed to exist where all three are present and a site is considered suitable for use where no complete pollutant linkages are identified.

Where a complete pollutant linkage is considered to be present, an assessment of the level of risk associated with the pollutant linkage has been carried out in line with published guidance⁹.

The level of risk is determined using the risk matrix presented in the following table. Classifications of probability, consequence and risk are presented in Appendix E.

Table 10. Risk Assessment Matrix

		Probability			
		Very Low	Low	Moderate	High
Consequence	Very Minor	Negligible	Very Low	Low	Low/Moderate
	Minor	Very Low	Low	Low/Moderate	Moderate
	Moderate	Low	Low/Moderate	Moderate	High
	Severe	Low/Moderate	Moderate	High	Very High

5.4.1 Basis of Assessment

The development is to comprise a new mixed-use development, including residential units. Small areas of decorative soft landscaping will be provided around the boundary of the site where end users could potentially come into contact with the underlying soils and where soil derived dusts may be generated.

It is considered that such areas would not permit the growing of any significant volumes of fruit or vegetables, given they would not be privately owned and that they would surround the car park for a medical centre.

The proposed development layout is presented in Appendix A. Should the proposed development plans be altered, a revised risk assessment may be required.

⁹ Contaminated Land Risk Assessment: A guide to good practice, CIRIA C552, 2001.

5.4.2 Contamination Sources Identified

The following source of contamination has been identified by the quantitative contamination risk assessment:

- Made ground soils containing elevated concentrations of lead and PAH compounds.

5.4.3 Quantitative Conceptual Model

The quantitative conceptual model for the proposed development is presented in Appendix F.

5.5 Risks to Other Potential Receptors

All construction workers must undertake their own risk assessment, based upon the works to be carried out and the proposed method by which this will be achieved, in accordance with current health and safety legislation. Their assessment should take into account all available information about the site, including that present within this report.

Appropriate working procedures and PPE should be adopted to ensure the health and safety of the site operatives. Instruction should be given in the recognition of potentially hazardous materials. All site personnel should be appropriately briefed on the discovery strategy, presented below, and what actions they must take in the event that further evidence of contamination is identified or suspected.

5.6 Recommendations

An Arboricultural Report¹⁰ provided for the site indicates that it is not proposed to retain any of the existing trees.

Although the sample of the topsoil in the south eastern corner of the site did not record concentrations of the potential contaminants above SSV, there is uncertainty as to the extent of made ground beneath these soils. As such, it should be assumed that remedial measures will be required within all proposed areas of soft landscaping on the site.

Given the depth of made ground encountered, remedial measures are likely to need to comprise the provision of a cover system of a suitable depth of verified "clean" topsoil and/or subsoil, or the provision of a suitable depth of verified asbestos free crushed stone beneath the grasscrete car parking areas.

The depth of the cover system and the nature of the remediation works ultimately adopted should be detailed within a remediation strategy, along with a verification plan. This should be produced once this risk assessment report has been reviewed and approved by the relevant regulator.

¹⁰ Murray Tree Consultancy, PM/BS/07/04/21, dated April 2021
Former Ducie Arms, 424 Stockport Road, Longsight, Manchester

5.7 Discovery Strategy

In addition to the recommendations above, if, during the course of the site clearance and development works, any materials not previously identified by the investigation that are suspected of being 'contaminants' are encountered, then the following procedure should apply:

- All works in that area should cease and the site manager should be informed.
- Advice should be sought from suitably qualified and experienced personnel as to whether any further site inspection, sampling, testing and/or assessment is deemed necessary.
- If required, the conclusions of any assessment and any proposed remedial works (if required) should be agreed by the local authority.
- If necessary, full details of any remedial works should be included in the verification report for the site.

Suspected 'contamination' may take the following form, though it is noted that this list is not exhaustive and site operatives should ask if they are at all unsure of any findings:

- Soil or water looks oily and/or has an oily odour
- Soil or water has a solvent type of odour
- Significant quantities of man-made materials within fill such as paint cans, car parts, glass fragments
- Suspected asbestos containing materials (insulating boards, cement, loose fibres etc.)
- Significant volumes of clinker like or ashy material
- Sand bags, and/or subsurface concrete structures
- Animal carcasses or evidence of animal burial pits

5.8 Regulatory Approval

It is recommended that this report is submitted to the Local Authority in relation to the partial discharge of Condition 22. The condition cannot be discharged in full until such time as a remediation strategy is produced for the site, but we strongly recommended that Local Authority feedback is obtained on the risk assessment included within this report prior to producing a remediation strategy for the site.

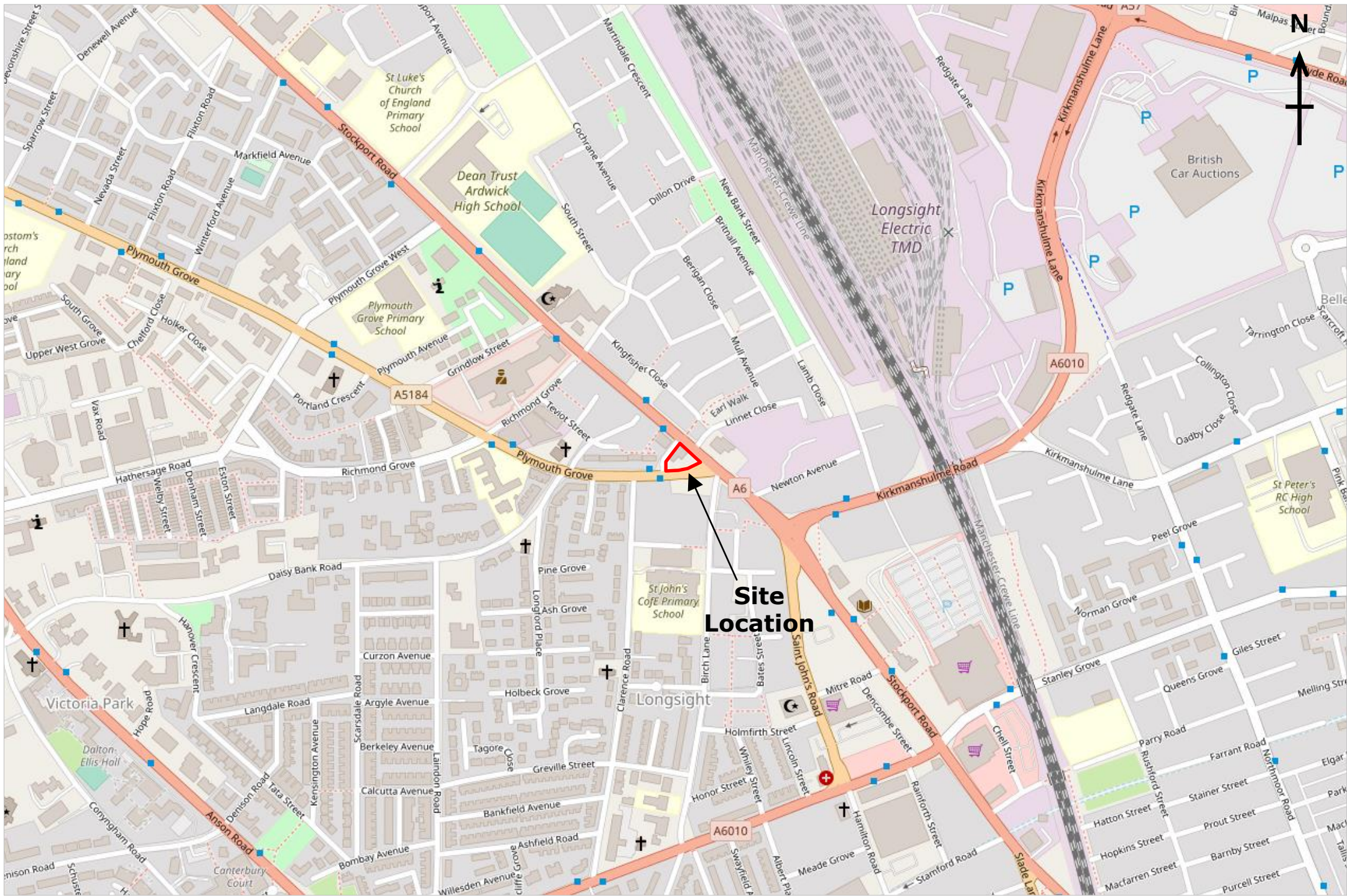
The conclusions drawn and recommendations made within this report should be considered as provisional until such time as they have been approved by Local Authority and the relevant planning condition has been discharged.

Ashdown Site Investigation Ltd.

FIGURES

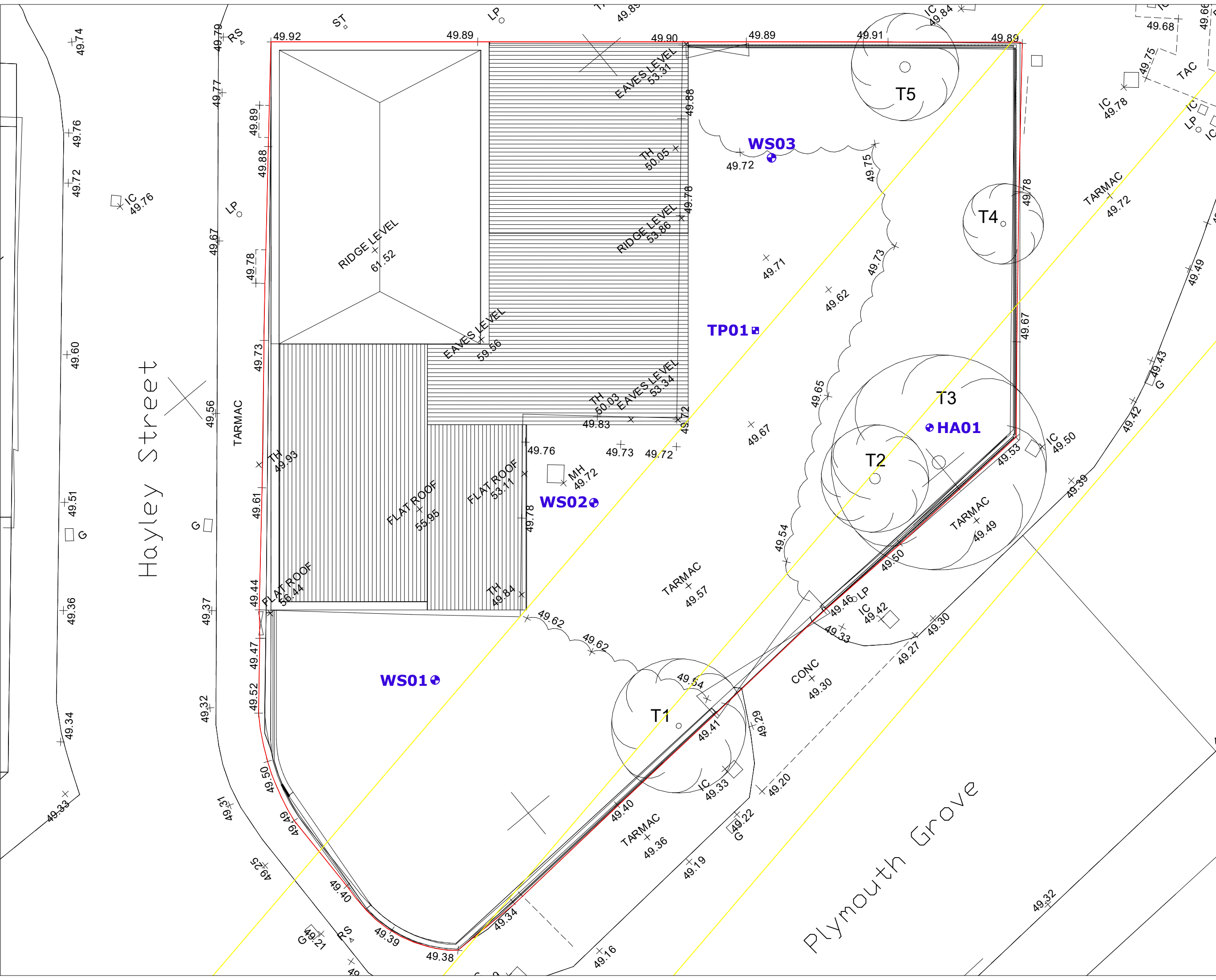
Figure 1 Site Location Plan

Figure 2 Site Plan



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ASHDOWN SITE INVESTIGATION L.I.M.I.T.E.D	Site Location Plan	Site Name	Figure No.	Project Reference
		Former Ducie Arms, 424 Stockport Road, Longsight, Manchester	1	P15726



ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
West Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:
Former Ducie Arms, 424 Stockport Road Longsight Manchester
Project Ref:
P15726
Figure No.
2
Drawing Title
Site Plan
Scale
1:125

APPENDIX A

Proposed Development Layout

SCHEDULE

Gross Internal Areas

RESIDENTIAL UNITS

1	1B/1P	42 SQM
2	2B/3P	68 SQM
3	2B/3P	64 SQM
4	1B/2P	58 SQM
5	1B/1P	42 SQM
6	2B/3P	64 SQM
7	1B/2P	58 SQM
8	2B/4P	73 SQM

TOTAL 469 SQM

Total Units 8

COMMERICAL UNITS

MEDICAL

Ground Floor	144 SQM
First Floor	73 SQM

Total 217 SQMT

Total Car Parking 14

Total Bicycle racks 26

Cover

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
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E	FIRST ISSUE	EJG/VK	10/02/21
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C	FIRST ISSUE	EJG	3 Sept 20
B	FIRST ISSUE	EJG	30 Jul 20
A	FIRST ISSUE	EJG	2 Jul 20
Rev	DESCRIPTION	By	Date



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 E-MAIL : ADMIN@HOWARDANDEDSON.CO.UK

Project
 Proposed development
 DUCIE ARMS 424 STOCKPORT ROAD
 MANCHESTER M12 4EX

Client
 Dr Noman Ehsan

Title

Cover

Drawn
 EJG/II

Date
 02/11/21

Scale
 1:x(A3)

DRG no.

14,273

I03

Amendment
 L

PROGRESS DRAWING

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Roof - site Plan as proposed Scale 1:200

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 MANCHESTER M12 4EX
 Client
 Dr Noman Ehsan

Title
 Roof - Site
 Plan as proposed

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	I04
Scale 1:200(A3)	Amendment L

SCHEDULE

Gross Internal Areas
First floor

RESIDENTIAL UNITS

LEVEL 3

5	1B/1P	42 SQM
6	2B/3P	64 SQM
7	2B/4P	73 SQM
8	1B/2P	58 SQM

Level 3 Plan as proposed Scale 1:200

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
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Rev	DESCRIPTION	By	Date



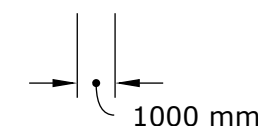
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 MANCHESTER M12 4EX

Client
 Dr Noman Ehsan

Title
 Level 3
 Plan as proposed

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	105
Scale 1:200(A3)	Amendment L



SCHEDULE

Gross Internal Areas
Second floor

RESIDENTIAL UNITS

LEVEL 2

1	1B/1P	42 SQM
2	2B/3P	68 SQM
3	2B/3P	64 SQM
4	1B/2P	58 SQM



Level 2 Plan as proposed Scale 1:200

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Proposed development
DUCIE ARMS 424 STOCKPORT ROAD
MANCHESTER M12 4EX

Client
Dr Noman Ehsan

Title
**Level 2
Plan as proposed**

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	I06
Scale 1:200(A3)	Amendment L



SCHEDULE

Gross Internal Areas

COMMERICAL UNITS

MEDICAL

Ground Floor 144 SQM

First Floor 73 SQM

Level 1 Plan as proposed Scale 1:200

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H	FIRST ISSUE				EJG/II	07/06/21				
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Client
 Dr Noman Ehsan

Title
 Level 1
 Plan as proposed

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	107
Scale 1:200(A3)	Amendment L



SCHEDULE

Gross Internal Areas

COMMERICAL UNITS

MEDICAL

Ground Floor 144 SQM

First Floor 73 SQM

Level 1 Plan as proposed Scale 1:200

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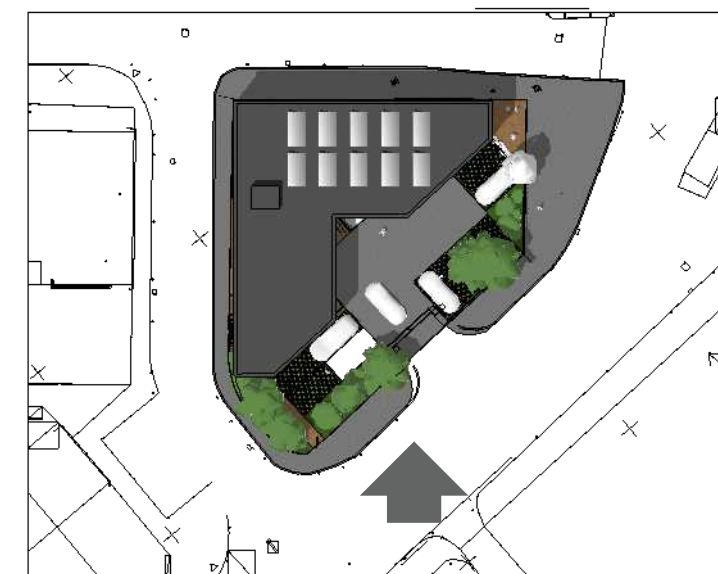
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Title
Level 1
Plan as proposed

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	I07b
Scale 1:200(A3)	Amendment L



Solar Panels



Elevation 1 as proposed Scale 1:100

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Elevation1 as proposed

Drawn
 EJG/II

Date
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Scale
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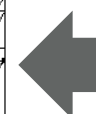
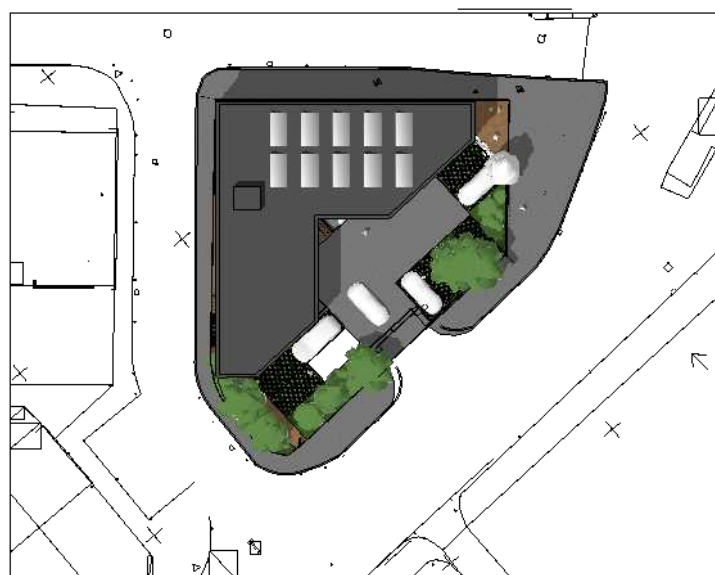
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14,273

108

Amendment

L



Elevation 2 as proposed Scale 1:100

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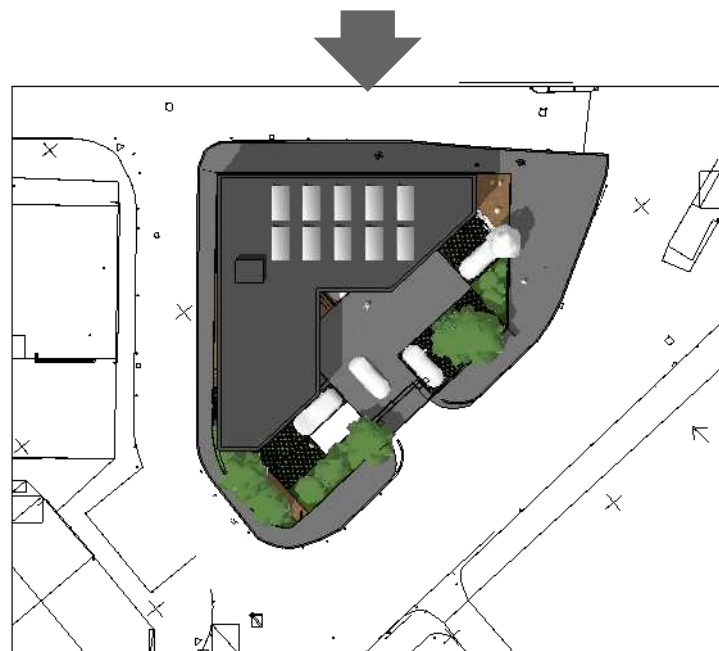
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Scale 1:100(A3)	Amendment L



Elevation 3 as proposed Scale 1:100

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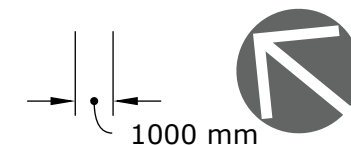
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Title
 Elevation3 as proposed

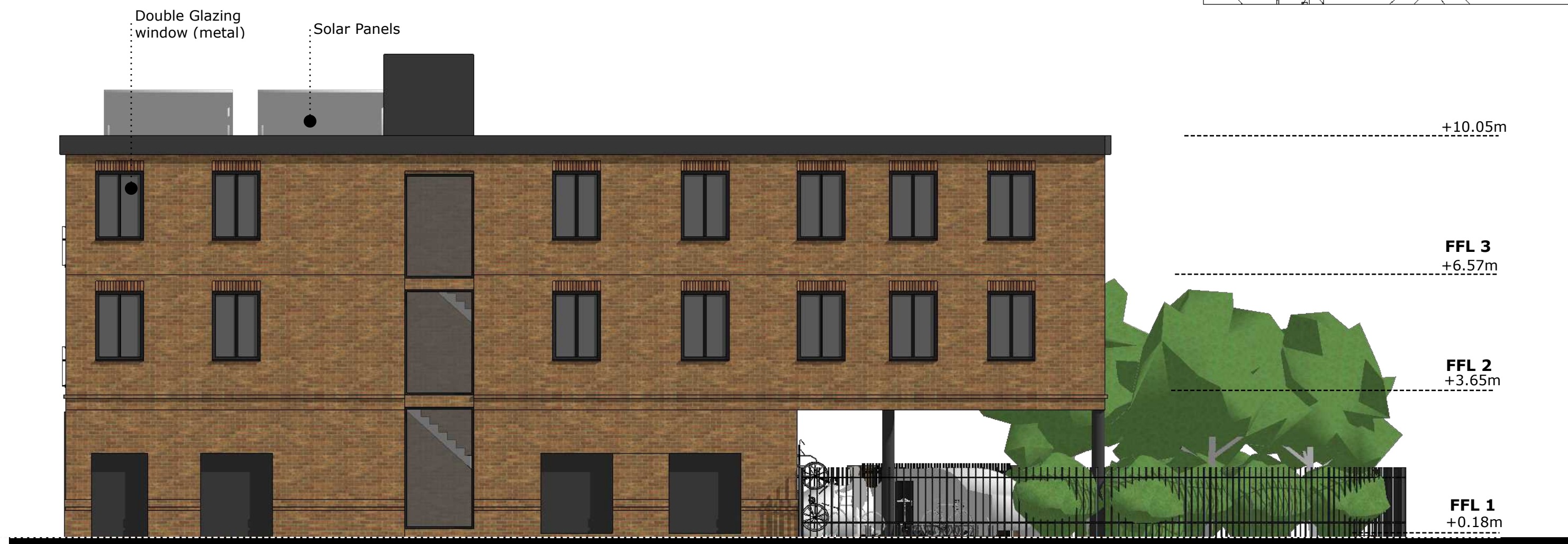
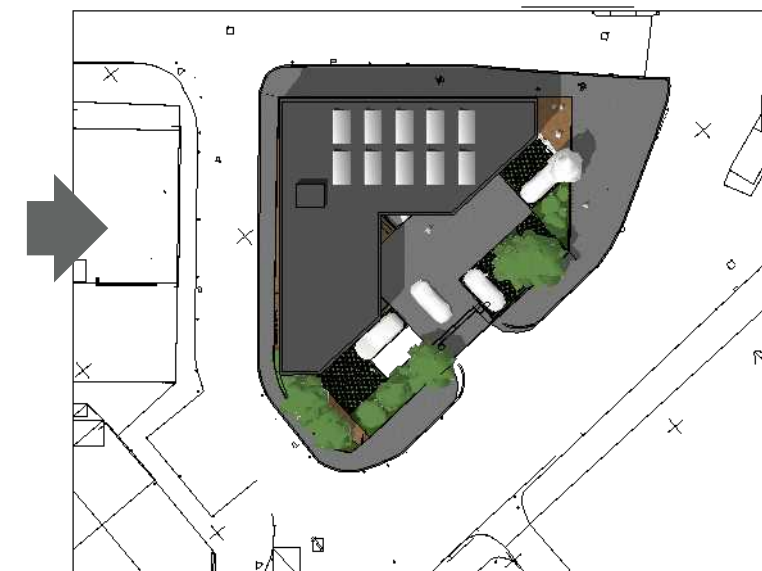
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Elevation 4 as proposed Scale 1:100

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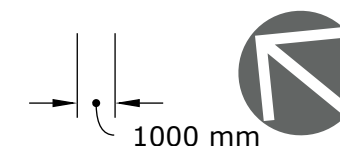
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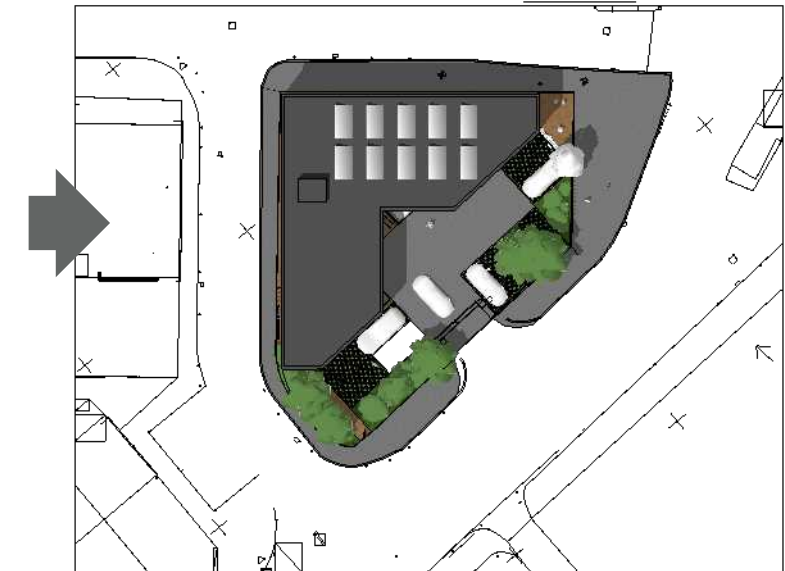
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Client
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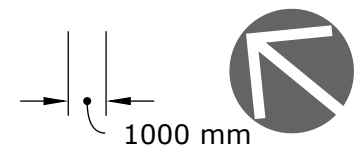
Title
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Date 02/11/21	I11
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Street scene as proposed Scale 1:200



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	Proposed development DUCIE ARMS 424 STOCKPORT ROAD MANCHESTER M12 4EX	Elevation4 as proposed	EJG/II	14,273
Client	Dr Noman Ehsan		Date	I12
			Scale	Amendment
			1:200(A3)	L



Views as proposed

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Scale (A3)	Amendment L



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Client
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 as proposed

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Date 02/11/21	I14
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21		
H	FIRST ISSUE				EJG/II	07/06/21						
G	FIRST ISSUE				EJG/II	24/03/21						
E	FIRST ISSUE				EJG/VK	10/02/21	 HOWARD & SEDDON A.R.I.B.A. CHARTERED ARCHITECTS 64 WASHWAY ROAD SALE, CHESHIRE, M33 7RE TEL NO. 0161 - 973 8296 FAX NO. 0161 - 962 3485 E-MAIL : ADMIN@HOWARDANDEDSON.CO.UK	Project Proposed development DUCIE ARMS 424 STOCKPORT ROAD MANCHESTER M12 4EX		Title Views as proposed	Drawn EJG	DRG no. 14,273
D	FIRST ISSUE				EJG/VK	3 Nov 20					Date 02/11/21	I15
C	FIRST ISSUE				EJG	3 Sept 20						
B	FIRST ISSUE				EJG	30 Jul 20						
A	FIRST ISSUE				EJG	2 Jul 20						
Rev	DESCRIPTION				Bv	Date	Client Dr Noman Ehsan			Scale (A3)	Amendment L	



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
D	FIRST ISSUE	EJG/VK	3 Nov 20
C	FIRST ISSUE	EJG	3 Sept 20
B	FIRST ISSUE	EJG	30 Jul 20
A	FIRST ISSUE	EJG	2 Jul 20
Rev	DESCRIPTION	By	Date



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**Views
 as proposed**

Drawn EJG	DRG no. 14,273
Date 02/11/21	I16
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
D	FIRST ISSUE	EJG/VK	3 Nov 20
C	FIRST ISSUE	EJG	3 Sept 20
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Rev	DESCRIPTION	By	Date



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 Dr Noman Ehsan

Title
 Views
 as proposed

Drawn EJG	DRG no. 14,273
Date 02/11/21	I17
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21		
H	FIRST ISSUE				EJG/II	07/06/21						
G	FIRST ISSUE				EJG/II	24/03/21						
E	FIRST ISSUE				EJG/VK	10/02/21	 HOWARD & SEDDON A.R.I.B.A. CHARTERED ARCHITECTS 64 WASHWAY ROAD SALE, CHESHIRE, M33 7RE TEL NO. 0161 - 973 8296 FAX NO. 0161 - 962 3485 E-MAIL : ADMIN@HOWARDANDEDSON.CO.UK	Project Proposed development DUCIE ARMS 424 STOCKPORT ROAD MANCHESTER M12 4EX		Title Views as proposed	Drawn EJG	DRG no. 14,273 I18
D	FIRST ISSUE				EJG/VK	3 Nov 20		Date 02/11/21				
C	FIRST ISSUE				EJG	3 Sept 20		Scale (A3)	Amendment L			
B	FIRST ISSUE				EJG	30 Jul 20						
A	FIRST ISSUE				EJG	2 Jul 20						
Rev	DESCRIPTION				Bv	Date	Client Dr Noman Ehsan					



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
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C	FIRST ISSUE	EJG	3 Sept 20
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Rev	DESCRIPTION	By	Date



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**Views
 as proposed**

Drawn EJG	DRG no. 14,273
Date 02/11/21	I19
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
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Rev	DESCRIPTION	By	Date



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 Views
 as proposed

Drawn EJG	DRG no. 14,273
Date 02/11/21	120
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
D	FIRST ISSUE	EJG/VK	3 Nov 20
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A	FIRST ISSUE	EJG	2 Jul 20
Rev	DESCRIPTION	By	Date



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Project
 Proposed development
 DUCIE ARMS 424 STOCKPORT ROAD
 MANCHESTER M12 4EX

Client
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Title
 Views
 as proposed

Drawn EJG	DRG no. 14,273
Date 02/11/21	121
Scale (A3)	Amendment L



Views as proposed

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

E	FIRST ISSUE	EJG/VK	10/02/21
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A	FIRST ISSUE	EJG	2 Jul 20
Rev	DESCRIPTION	By	Date



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 E-MAIL : ADMIN@HOWARDANDEDSON.CO.UK

Project
 Proposed development
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 MANCHESTER M12 4EX

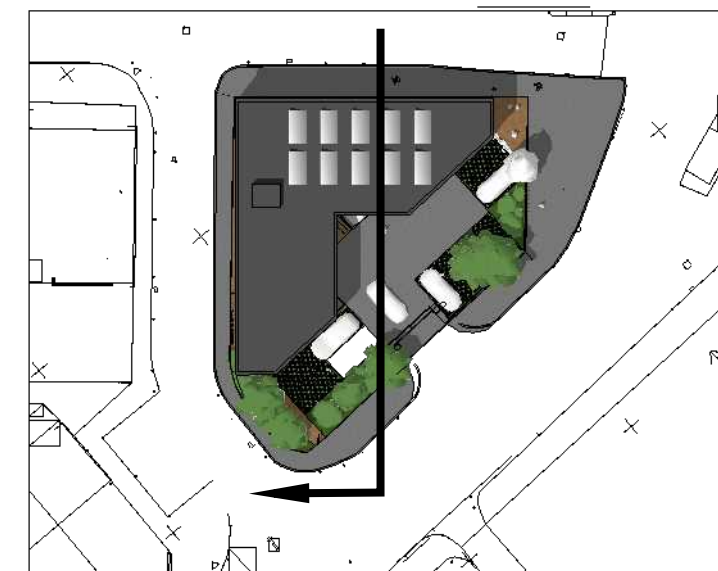
Client
 Dr Noman Ehsan

Title
 Views
 as proposed

Drawn EJG	DRG no. 14,273
Date 02/11/21	122
Scale (A3)	Amendment L

PROGRESS DRAWING

This drawing is not intended to be used for contract pricing or fabrication purposes. All content is subject to change



Solar Panels



Section as proposed Scale 1:100

I	FIRST ISSUE	Second Issue	Third Issue	fourth	EJG/II	27/07/21	09/08/21	10/08/21	20/10/21	02/11/21
H	FIRST ISSUE				EJG/II	07/06/21				
G	FIRST ISSUE				EJG/II	24/03/21				

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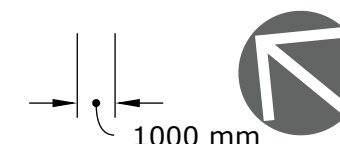
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Project
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 MANCHESTER M12 4EX

Client
 Dr Noman Ehsan

Title
 Section as proposed

Drawn EJG/II	DRG no. 14,273
Date 02/11/21	123
Scale 1:100(A3)	Amendment L



APPENDIX B

Exploratory Hole Notes

Exploratory Hole Records

Gas Concentration and Groundwater Monitoring Results

NOTES FOR THE INTERPRETATION OF EXPLORATORY HOLE RECORDS

1 Symbols and abbreviations

Samples

U	'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
U _o	Sample not obtained
U*	Full penetration of sample not obtained
Pi	Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
D	Disturbed Sample
R	Root Sample
B	Bulk Disturbed Sample
W	Water Sample
J	Jar Sample (sample taken in amber glass jar fitted with gas tight lid)
T	Tub Sample
Vi	Vial Sample

In situ Testing

S	Standard penetration test (SPT): Using the split spoon sampler.
C	Standard Penetration Test (SPT): using a solid cone instead of the sampler - conducted usually in coarse grained soils or weak rocks.
V	Shear Vane Test: Undrained shear strength (cohesion) (kN/m ²) shown within the Vane/Pen Test and N Value column.
H	Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m ²) shown within the Vane/Pen Test and N Value column.
P	Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

CP	Cable Percussion Borehole
WLS	Dynamic Sampler Borehole using windowless sampler tubes
WS	Dynamic Sampler Borehole using window sampler tubes
TP	Trial Pit excavated using mechanic excavator
HDP	Trial Pit excavated using hand tools

2 Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

3 Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

4 Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

Site Name: Former Ducie Arms, 424 Stockport Road, Longsight, Manchester

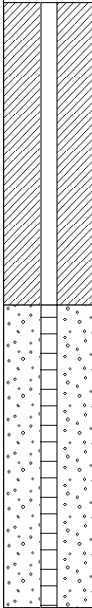
Job Number: P15726

Start Date: 08/09/2022

End Date: 08/09/2022

Borehole Number: **WS01**

Sheet 1 of 1

Samples and In Situ Testing						Stratum Description	
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth	
	J T	0.60				0.00	Asphalt.
						0.05	MADE GROUND: Dark grey gravelly sand. Gravel is subangular to subrounded fine to coarse brick and concrete. tile and laminate over concrete (50mm) at 0.30m depth.
						0.50	MADE GROUND: Dark brown gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse brick, concrete and clinker-like material.
						0.80	Grey brown and orange brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded sandstone and mudstone. (Till)
						1.10	Red brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse sandstone. (Till)
						1.40	Yellow orange and red slightly clayey SAND. (Till)
						1.60	Brown and red brown mottled grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse sandstone and mudstone. (Till)
						2.00	End of borehole at 2.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole unstable in made ground soils.

Notes: Standpipe installed to 2.00m depth; 2.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.

Excavation Method: WLS

Borehole Diameter:	Various
---------------------------	---------

Made By: SC

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119	Site Name: Former Ducie Arms, 424 Stockport Road, Longsight, Manchester						
	Job Number: P15726						
	Start Date: 08/09/2022				Borehole Number: WS02		
	End Date: 08/09/2022						
Sheet 1 of 1							
Samples and In Situ Testing							
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth	Stratum Description
	J T	0.50				0.00	Asphalt.
						0.05	MADE GROUND: Dark grey brown gravelly sand. Gravel is subangular to subrounded fine to coarse concrete, brick and limestone.
	J T	1.20				0.40	MADE GROUND: Brown grey sandy subangular to subrounded fine to coarse gravel of brick, concrete, clinker-like material, plastic and sandstone.
						0.60	MADE GROUND: Brown slightly gravelly slightly sandy clay. Gravel is subangular to subrounded fine to coarse brick.
						0.80	Brown mottled orange and grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse flint. (Till)
						1.00	Dark grey slightly gravelly slightly sandy CLAY with an organic odour. Gravel is subangular to subrounded fine to coarse mudstone. (Till)
						1.50	Light grey slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse mudstone and organic matter. (Till)
						2.10	Red brown slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse mudstone. (Till)
						3.00	End of borehole at 3.00m
Remarks							
Groundwater: Borehole dry on completion.							Excavation Method: WLS
Stability: Borehole unstable in made ground soils.							Borehole Diameter: Various
Notes: Standpipe installed to 2.00m depth; bentonite seal between 3.00m and 2.00m; 2.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.							Made By: SC

End Date: 08/09/2022

Sheet 1 of 1

Remarks Groundwater: Borehole dry on completion. Stability: Borehole unstable in made ground soils. Notes: Standpipe installed to 2.00m depth; bentonite seal between 2.50m and 2.00m; 2.00m to 1.00m slotted pipe with gravel surround; 1.00m to ground level plain pipe with bentonite seal; completed with gas tap and security cover concreted flush with ground surface.	Excavation Method: WLS
	Borehole Diameter: Various
	Made By: SC

Site Name: Former Ducie Arms, 424 Stockport Road, Longsight, Manchester

Job Number: P15726

Start Date: 08/09/2022

End Date: 08/09/2022

Trial Pit Number: **TP01**

Sheet 1 of 1

Samples and In Situ Testing				Stratum Description	
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level
J T	0.40				0.00
					0.05
					0.30
					0.50
					Asphalt.
					MADE GROUND: Grey brown sandy subangular to subrounded fine to coarse gravel of limestone.
					MADE GROUND: Dark brown gravelly sand. Gravel is subangular to subrounded fine to coarse brick, ceramic, glass, limestone, clinker-like material and tile.
					lead pipe encountered at 0.40m depth
					End of trial pit at 0.50m

Remarks	
---------	--

Groundwater: Borehole dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: SC

Gas Concentrations and Groundwater Monitoring Results

Site Name:				Former Ducie Arms, 424 Stockport Road, Longsight, Manchester																				
Project Ref:				P15726																				
Position	Date	Time	Dynamic Pressure (pa)	Atmospheric Pressure (mbar)	Atmospheric Trend	Standing Water Depth (m bgl)	Flow Rate (l/hr)				Methane (%)				Carbon Dioxide (%)				Oxygen (%)				CO (ppm)	H2S (ppm)
							Seconds				Seconds				Seconds				Seconds					
							15	30	45	60	15	30	45	60	15	30	45	60	15	30	45	60		
WS01	16/09/2022	13:54	0	1014	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.7	1.7	1.7	19.2	18.8	18.7	18.7	0	0
WS02	16/09/2022	14:05	0	1014	Falling	1.98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.6	2.6	2.6	18.8	18.1	18.1	18.1	0	0
WS03	16/09/2022	14:13	0	1013	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	0.5	0.5	20.1	20.3	20.4	20.4	0	0
WS01	23/09/2022	13:30	0	1008	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	1.5	1.5	19.1	19.0	19.0	19.0	0	0
WS02	23/09/2022	13:38	0	1009	Falling	1.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.1	2.2	2.2	19.8	19.9	18.8	18.8	0	0
WS03	23/09/2022	13:58	0	1009	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.4	0.4	20.4	20.4	20.5	20.5	0	0
WS01	30/09/2022	11:25	0	994	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.7	1.8	1.8	18.6	18.3	18.3	18.3	0	0
WS02	30/09/2022	11:32	0	993	Falling	1.95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.5	0.4	0.2	18.7	19.5	19.9	20.1	0	0
WS03	30/09/2022	11:40	0	993	Falling	Dry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	20.2	20.2	20.2	20.2	0	0

APPENDIX C

Contamination Laboratory Test Results



Unit A2
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Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone: (01424) 718618

cs@elab-uk.co.uk
info@elab-uk.co.uk

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 22-43196

Issue: 1

Date of Issue: 20/09/2022

Contact: Lab Results

Customer Details: Ashdown Site Investigation Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex BN6 8SG

Quotation No: Q22-02645

Order No: 10592

Customer Reference: P15726_1100

Date Received: 12/09/2022

Date Approved: 20/09/2022

Details: Former Ducie Arms, 424 Stopckport Road, Longshight, Manches

Approved by:

Tim Reeve, Quality Officer

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

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Sample Summary

Report No.: 22-43196, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
293115	WS01 0.60	08/09/2022	12/09/2022	Sandy silty loam	
293116	WS02 0.50	08/09/2022	12/09/2022	Loamy sand	
293117	WS02 1.20	08/09/2022	12/09/2022	Silty clayey loam	
293118	WS03 0.50	08/09/2022	12/09/2022	Loamy sand + Brick	
293119	TP01 0.40	08/09/2022	12/09/2022	Loamy sand	
293120	HA01 0.15	08/09/2022	12/09/2022	Sandy silty loam	



Results Summary

2683

Report No.: 22-43196, issue number 1

				ELAB Reference	293115	293116	293117	293118	293119	293120
				Customer Reference						
				Sample ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sample Location	WS01	WS02	WS02	WS03	TP01	HA01
				Sample Depth (m)	0.60	0.50	1.20	0.50	0.40	0.15
				Sampling Date	08/09/2022	08/09/2022	08/09/2022	08/09/2022	08/09/2022	08/09/2022
Determinand		Codes	Units	LOD						
Soil sample preparation parameters										
Moisture Content		N	%	0.1	12.9	12.1	n/t	11.1	8.9	9.5
Material removed		N	%	0.1	10.4	7.7	n/t	6.6	10.1	10.2
Description of Inert material removed		N		0	Stones/Clinker	Stones/Brick	n/t	Stones/Brick	Stones/Brick/Glass	Stones/Wood
Metals										
Arsenic		M	mg/kg	1	20.4	24.9	n/t	^ 8.2	24.1	15.6
Cadmium		M	mg/kg	0.5	< 0.5	0.7	n/t	^ < 0.5	1.5	< 0.5
Chromium		M	mg/kg	5	24.6	18.6	n/t	^ 13.5	23.6	22.0
Copper		M	mg/kg	5	40.0	65.9	n/t	^ 15.8	82.7	41.4
Lead		M	mg/kg	5	624	1500	n/t	^ 182	834	201
Mercury		M	mg/kg	0.5	0.8	0.8	n/t	^ < 0.5	0.8	< 0.5
Nickel		M	mg/kg	5	24.5	17.5	n/t	^ 8.9	28.7	19.4
Selenium		M	mg/kg	1	< 1.0	< 1.0	n/t	^ < 1.0	< 1.0	< 1.0
Zinc		M	mg/kg	5	64.7	311	n/t	^ 54.8	292	120
Inorganics										
Hexavalent Chromium		N	mg/kg	0.8	< 0.8	< 0.8	n/t	< 0.8	< 0.8	< 0.8
Water Soluble Boron		N	mg/kg	0.5	0.9	< 0.5	n/t	< 0.5	< 0.5	1.2
Miscellaneous										
pH		M	pH units	0.1	8.6	9.7	n/t	^ 9.2	9.2	8.5
Soil Organic Matter		U	%	0.1	3.4	2.1	n/t	0.8	1.4	5.1



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Results Summary

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ELAB Reference	293115	293116	293117	293118	293119	293120
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS01	WS02	WS02	WS03	TP01	HA01
Sample Depth (m)	0.60	0.50	1.20	0.50	0.40	0.15
Sampling Date	08/09/2022	08/09/2022	08/09/2022	08/09/2022	08/09/2022	08/09/2022

Determinand	Codes	Units	LOD						
Organics									
>C8-C10 BCB (EH_1D_Total)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C10-C12 BCB (EH_1D_Total)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	n/t
>C12-C16 BCB (EH_1D_Total)	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	1.1	n/t
>C16-C21 BCB (EH_1D_Total)	N	mg/kg	1	< 1.0	4.9	< 1.0	< 1.0	8.0	n/t
>C21-C35 BCB (EH_1D_Total)	N	mg/kg	1	12.0	41.8	< 1.0	4.2	240	n/t
>C35-C40 BCB (EH_1D_Total)	N	mg/kg	1	1.1	3.6	< 1.0	< 1.0	70.8	n/t
Total (>C8-C40) BCB (EH_1D_Total)	N	mg/kg	1	13.0	50.3	< 1.0	4.2	320	n/t
Polyaromatic hydrocarbons									
Naphthalene	M	mg/kg	0.1	0.2	< 0.1	n/t	^ < 0.1	0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	0.4	< 0.1	n/t	^ < 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	0.4	< 0.1	n/t	^ < 0.1	0.2	< 0.1
Fluorene	M	mg/kg	0.1	0.4	< 0.1	n/t	^ < 0.1	0.2	< 0.1
Phenanthrene	M	mg/kg	0.1	6.1	1.6	n/t	^ 0.1	2.3	0.6
Anthracene	M	mg/kg	0.1	1.7	0.4	n/t	^ < 0.1	0.7	0.2
Fluoranthene	M	mg/kg	0.1	10.9	4.2	n/t	^ 0.6	10.1	1.8
Pyrene	M	mg/kg	0.1	10.9	3.6	n/t	^ 0.7	9.8	1.7
Benzo(a)anthracene	M	mg/kg	0.1	6.3	2.0	n/t	^ 0.6	5.0	1.1
Chrysene	M	mg/kg	0.1	7.8	2.3	n/t	^ 0.7	6.1	1.4
Benzo(b)fluoranthene	M	mg/kg	0.1	5.2	1.8	n/t	^ 0.8	5.6	1.3
Benzo(k)fluoranthene	M	mg/kg	0.1	5.6	1.8	n/t	^ 0.7	5.5	1.5
Benzo(a)pyrene	M	mg/kg	0.1	6.8	2.1	n/t	^ 0.9	6.7	1.4
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	3.6	1.3	n/t	^ 0.6	4.4	1.2
Dibenzo(a,h)anthracene	M	mg/kg	0.1	1.0	0.3	n/t	^ 0.2	1.1	0.3
Benzo[g,h,i]perylene	M	mg/kg	0.1	3.5	1.2	n/t	^ 0.5	3.9	1.0
Total PAH(16)	M	mg/kg	0.4	70.8	22.7	n/t	^ 6.5	61.9	13.7



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Results Summary

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Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos Identification	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
293115	0.60	WS01	Brown Soil, Stones, Clinker, Brick	No asbestos detected	n/t	n/t	n/t	n/t
293116	0.50	WS02	Brown Soil, Stones, Clinker, Brick, Concrete, Slate	No asbestos detected	n/t	n/t	n/t	n/t
293118	0.50	WS03	Brown Soil, Stones, Clinker, Brick, Concrete	No asbestos detected	n/t	n/t	n/t	n/t
293119	0.40	TP01	Brown Soil, Stones, Clinker, Brick, Concrete, Slate, Glass	No asbestos detected	n/t	n/t	n/t	n/t
293120	0.15	HA01	Brown Soil, Stones, Clinker, Concrete, Organics, China	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

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Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	13/09/2022	110	Colorimetry
pH	M	Air dried sample	13/09/2022	113	Electromeric
Aqua regia extractable metals	M	Air dried sample	13/09/2022	118	ICPMS
PAH (GC-FID)	M	As submitted sample	13/09/2022	133	GC-FID
Water soluble boron	N	Air dried sample	13/09/2022	202	Colorimetry
Basic carbon banding in soil	N	As submitted sample	13/09/2022	218	GC-FID
Asbestos identification	U	Air dried sample	20/09/2022	280	Microscopy
Soil organic matter	U	Air dried sample	13/09/2022	BS1377:P3	Titrimetry

Tests marked N are not UKAS accredited

Report Information

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Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"
LOD	LOD refers to limit of detection, except in the case of pH soils and pH waters where it means limit of discrimination. Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed. ELAB are unable to provide an interpretation or opinion on the content of this report. The results relate only to the sample received. PCB congener results may include any coeluting PCBs Uncertainty of measurement for the determinands tested are available upon request Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

a	No date of sampling supplied
b	No time of sampling supplied (Waters Only)
c	Sample not received in appropriate containers
d	Sample not received in cooled condition
e	The container has been incorrectly filled
f	Sample age exceeds stability time (sampling to receipt)
g	Sample age exceeds stability time (sampling to analysis)

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month
 All water samples will be retained for 7 days following the date of the test report
 Charges may apply to extended sample storage

TPH Classification - HWOL Acronym System

HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
2D	GC-GC - Double coil gas chromatography
#1	EH_Total but with humics mathematically subtracted
#2	EH_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

APPENDIX D

Preliminary Conceptual Model

2.5 Preliminary Risk Assessment

Nr	Sources	Pathways	TYPE	Receptors	Consequence	Probability	Risk classification	Comments
7	Potential for volatile organic contaminants to be present within the subsurface soils	Dermal contact, ingestion & inhalation of soils & soil dust	HH	Future Site occupants	MEDIUM	UNLIKELY	LOW RISK	The risk classification reflects the likely absence of any significant sources of volatile organic contamination.
8		Ingress into water supply pipework and subsequent water ingestion	HH		MEDIUM	UNLIKELY	LOW RISK	
9		Migration of vapours to surface; inhalation indoors	HH		MEDIUM	UNLIKELY	LOW RISK	
10		Migration of vapours to surface; inhalation outdoors	HH		MEDIUM	UNLIKELY	LOW RISK	
11		Building materials in direct contact with aggressive ground	PROP	Future Site buildings	MILD	UNLIKELY	VERY LOW RISK	Aggressive ground conditions are not anticipated to be present.
12		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Till, Devensian (a Secondary (undifferentiated) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	The risk classification reflects the likely absence of any significant sources of volatile organic contamination.
13		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Manchester Marls Formation (95% of the Site) (a Secondary (B) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
14		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Chester Formation (eastern 5% of the Site) (a Principal Aquifer)	MEDIUM	UNLIKELY	LOW RISK	

2.5 Preliminary Risk Assessment

Nr	Sources	Pathways	TYPE	Receptors	Consequence	Probability	Risk classification	Comments
15	Potential for asbestos containing materials within the subsurface soils	Liberation of sub surface ACMs and inhalation of asbestos fibres	HH	Future Site occupants	MEDIUM	LOW LIKELIHOOD	MODERATE/LOW RISK	Given the age of the existing building structures asbestos-containing material may be present within the building fabric and surrounding subsoils.
16	Potential for dissolved phase contaminants to be present within shallow groundwater	Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Till, Devensian (a Secondary (undifferentiated) Aquifer)	MEDIUM	LOW LIKELIHOOD	MODERATE/LOW RISK	The superficial geology is likely to offer some protection to the underlying groundwater from surface based contaminants.
17		Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Manchester Marls Formation (95% of the Site) (a Secondary (B) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
18		Lateral and vertical groundwater movement via natural or artificial flow paths	CW	Chester Formation (eastern 5% of the Site) (a Principal Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
19	Potential for elevated methane to be present within the sub-surface soils	Lateral and vertical migration into on-Site buildings; potential to cause an explosion	HH	On-Site properties and their occupants	SEVERE	UNLIKELY	MODERATE/LOW RISK	Based on the prevailing conceptual understanding an appreciable on-Site gas source is considered unlikely. However, because the Site is located within a coal mining area, there is potential for there to be a gas risk which could impact future Site users, but according to Coal Authority mapping the Site is within a 'Development Low Risk Area' of the defined coalfield; whilst coal mining has taken place in this area, it was at such depth not to pose a public safety or ground stability risk to new development according to Coal Authority guidance. The risk classification is a reflection of the severity of consequences rather than the likelihood of occurrence.
20		Lateral migration towards off-Site buildings; potential to cause an explosion	HH	Off-Site properties and their occupants	SEVERE	UNLIKELY	MODERATE/LOW RISK	
21	Potential for elevated carbon dioxide to be present within the subsurface soils	Lateral and vertical migration into on-Site buildings; potential to cause asphyxiation	HH	Occupants of on-Site buildings	SEVERE	UNLIKELY	MODERATE/LOW RISK	
22		Lateral migration towards off-Site buildings; potential to cause asphyxiation	HH	Occupants of off-Site buildings	SEVERE	UNLIKELY	MODERATE/LOW RISK	
23	Potential for radon within the subsurface	Lateral migration towards on-Site buildings; potential to cause long term health effects	HH	Occupants of on-Site buildings	MEDIUM	UNLIKELY	LOW RISK	
	OVERALL RISK RATING						MODERATE/LOW RISK	

2.5 Preliminary Risk Assessment

Nr	Sources	Pathways	TYPE	Receptors	Consequence	Probability	Risk classification	Comments
Off-Site sources - Depot c. 15 m south (1972 - 1991), Warehouse c. 30 north (1951 - 1972), Garage c. 30 m north (1972 - 1979), Works c. 35 m north east (1951 - present), Factory c. 55 m north west (1951 - 1972), Warehouse c. 55 m north west (1972 - 1979), Builders Yard c. 70 m south (1972 - 1991), Contractors Yard c. 85 m south west (1972 - 1979), works c. 100 m north east (1891 - 1951), Warehouse c. 110 m south (1972 - present), Works c. 140 m north west (1951 - 1972) and Warehouse c. 140 m north west (1972 - present).								
24	Potential for both inorganic and volatile organic contaminants to be present within the subsurface soils	Dermal contact, ingestion & inhalation of soils & soil dust	HH	Future Site occupants	MEDIUM	UNLIKELY	LOW RISK	Given the likely low permeability of the underlying superficial geology beneath the entire of the Site (Till) and bedrock geology beneath 95% of the Site (Manchester Marl), it is considered unlikely that migration onto Site of any contaminants from off-Site sources will have occurred.
25		Consumption of home grown produce	HH		MEDIUM	UNLIKELY	LOW RISK	
26		Ingress into water supply pipework and subsequent water ingestion	HH		MEDIUM	UNLIKELY	LOW RISK	
27		Migration of vapours to surface; inhalation indoors	HH		MEDIUM	UNLIKELY	LOW RISK	Despite the presence of assorted former industrial land uses within the local area, which could in theory have given rise to a vapour source, given the absence of any such activities within the immediate proximity of the Site and also reflecting the age of these former land uses, the residual vapour risks are likely to be low.
28		Migration of vapours to surface; inhalation outdoors	HH		MEDIUM	UNLIKELY	LOW RISK	
29		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Till, Devensian (a Secondary (undifferentiated) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	The risks posed by impacted groundwater quality migrating below the Site are considered to be low.
30		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Manchester Marls Formation (95% of the Site) (a Secondary (B) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
31		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Chester Formation (eastern 5% of the Site) (a Principal Aquifer)	MEDIUM	UNLIKELY	LOW RISK	

2.5 Preliminary Risk Assessment

Nr	Sources	Pathways	TYPE	Receptors	Consequence	Probability	Risk classification	Comments
Off-Site sources - Petrol station c. 75 m east								
32	Potential for both inorganic and volatile organic contaminants to be present within the subsurface soils	Dermal contact, ingestion & inhalation of soils & soil dust	HH	Future Site occupants	MEDIUM	UNLIKELY	LOW RISK	There is a possibility that any contamination associated with the nearby petrol station could have migrated onto Site, through groundwater movement in the permeable bedrock. However, given there is likely to be a significant thickness of low permeability Till beneath the Site, the likelihood of this impacting the Site is considered to be low. Also, as the filling station is still operational it is reasonable to assume that had there been any significant leaks or spills these would have been remediated and that there is proactive environmental management in place. It is therefore reasonable to assume the probability of contamination from the filling station affecting the Site is unlikely.
33		Consumption of home grown produce	HH		MEDIUM	UNLIKELY	LOW RISK	
34		Ingress into water supply pipework and subsequent water ingestion	HH		MEDIUM	UNLIKELY	LOW RISK	
35		Migration of vapours to surface; inhalation indoors	HH		MEDIUM	UNLIKELY	LOW RISK	
36		Migration of vapours to surface; inhalation outdoors	HH		MEDIUM	UNLIKELY	LOW RISK	
37		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Till, Devensian (a Secondary (undifferentiated) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
38		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Manchester Marls Formation (95% of the Site) (a Secondary (B) Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
39		Dissolution into pore water/shallow groundwater and subsequent migration	CW	Chester Formation (eastern 5% of the Site) (a Principal Aquifer)	MEDIUM	UNLIKELY	LOW RISK	
	OVERALL RISK RATING						LOW RISK	

2.6 Next Steps

✓	Observe a watching brief Appropriate investigation and removal of asbestos containing material, prior to development works Importation and verification of clean topsoil for use in amenity areas Confirmation of any known issues associated with nearby petrol filling station		Given the known history of the Site, with several phases of construction and demolition, it is considered probable that Made Ground is present beneath the Site. Given the mixed use of the proposed development (medical practice on the ground floor with residential above), with a small amenity area in the south west of the Site, it is recommended that an appropriate thickness of 'clean' topsoil is imported to Site and validated after installation for use in the amenity area. It is also recommended that the inclusion of asbestos material in the existing building is investigated prior to demolition and removed from Site using appropriate methods / contractors. Due to the presence of the petrol filling station c. 75 m east, it is recommended that the owners of the petrol station are approached in order to confirm whether there are any known issues (e.g. any significant leaks or spills associated with their operations and whether there is any confirmatory ground investigation data available (borehole drilling and environmental monitoring)). It is noted that whilst a limited intrusive site investigation (including appropriate laboratory testing of soil samples) could be adopted in order to validate the preliminary risk assessment conclusions, a watching brief during all proposed redevelopment activities will likely be sufficient. The watching brief should be maintained throughout the entire development phase of works and any possible evidence of contamination encountered during the redevelopment works should be alerted to the Local Authority. Appropriate actions would then be required to further inspect, sample and analyse any suspect materials, and formulate an appropriate remediation plan, as necessary.
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2.7 Other recommendations

✓	Consider Coal Mining Risk		As the Site is not located within a Coal Authority Development High Risk Area there is no specific requirement to submit any coal mining information with a planning application and the Coal Authority will not be consulted by the local planning authority (LPA). The LPA are likely to include the Coal Authority Standing Advice as an informative note with the decision notice. Consideration should however be given to further investigation of the coal mining risk.
✓	Provide a copy of this report to ground workers		It is recommended that a copy of this report and any further information is kept on file and provided to redevelopment / ground workers so that they are able to produce appropriate method statements and risk assessments to mitigate the potential risk from ground contamination, including potential windblown dust/asbestos fibres. As a minimum this is likely to include appropriate PPE and good hygiene practices to prevent exposure. Also given the potential for contaminants to be present beneath the Site this should be taken into consideration during any geotechnical/foundation design/construction phase to avoid creating a potential pathway, if piled foundations are to be used.

APPENDIX E

Classification of Probability, Consequence and Risk

Probability of risk being realised	
Classification	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Moderate	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Very Low	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Consequence of risk being realised		
Classification	Category	Definition
Severe	Human Health	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA.
	Controlled Waters	Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource.
	Property	Catastrophic damage to buildings/property.
	Ecological Systems	A short term risk to a particular ecosystem or organisation forming part of such ecosystem.
Moderate	Human Health	Chronic damage to Human Health.
	Controlled Waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution).
	Ecological System	A significant change in a particular ecosystem or organism forming part of such ecosystem.
Minor	Controlled Waters	Pollution of non-sensitive water resources.
	Property	Significant damage to crops, buildings, structures and services.
	Ecological Systems	Damage to sensitive buildings/structures/services or the environment.
Very Minor	Human Health	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc).
	Property	Easily repairable effects of damage to buildings, structures and services.
	Project	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve.

Risk classification definitions	
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX F

Quantitative Conceptual Model

Former Ducie Arms, 424 Stockport Road, Longsight, Manchester				Quantitative Conceptual Model		P15726	
Source	Receptor	Contaminants	Pathway	Complete Linkage Present?	Probability	Consequence	Risk
Made ground soils containing elevated concentrations of lead and PAH compounds	End Users	Lead and PAH Compounds	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Ingestion of soil and indoor dust	Yes	P1: Very Low	C3: Moderate	Low
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Inhalation of soil vapours	Identified contaminants do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	No contaminants present above screening criteria			N/A
	Groundwater		Migration to groundwater	No contaminants present at concentrations posing risk to groundwater			N/A

