







2 Heyrod Street

Piling Risk Assessment

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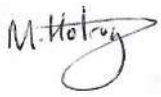
M Holroyd BSc (Hons), MSc Geo-Environmental Engineer		20 July 2021

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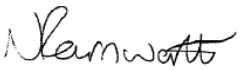
N Farnworth BSc (Hons) MCIWEM Senior Geo-Environmental Engineer		20 July 2021

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1.0 Introduction

Piled foundations are proposed for the development at 2 Heyrod Street, also known as “The Castings”, in Manchester, M1 2WW.

The proposed development on site comprises the construction of a 25 storey, part 21 storey, part 14 storey, part 7 storey residential apartment block, including 352 No. build-to-rent apartments with associated amenities, ground floor commercial units, ancillary indoor and outdoor amenity space, car and bicycle parking spaces and small areas of soft landscaping. The proposed development plans are included within *Appendix A* of this report.

The geology underlying the site corresponds with a Principal Aquifer classification, and as such a piling risk assessment (PRA) has been produced in order to identify the risks associated with a piled foundation solution.

The assessment of risk presented by a piled foundation solution has been identified in the previous Curtins Phase 2 Ground Investigation Report (Ref. 1) as a recommendation to be undertaken prior to commencement of construction activities on site. It is likely that a PRA will be required to satisfy environmental health pre-commencement planning conditions.

This report has been written to address this recommendation and likely pre-commencement planning condition requirement.

It is understood that current development proposals include the use of Continuous Flight Auger (CFA) Piles or rotary bored piles to a maximum depth of circa 30 m bgl.

1.1 Scope

This piling risk assessment provides an overview of the site’s ground and groundwater conditions and considers the potential risks associated with the adoption of Continuous Flight Auger (CFA) or rotary bored piles to groundwater.

The report also identifies appropriate risk management and monitoring protocols that can be adopted to ensure any residual risk is brought within adequate and practicable limits.

1.2 References

In preparation of this report reference has been made to the following key guidance document:

- Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73 (EA Report 2001). (Ref. 2)

Reference is also made to the following geo-environmental reports undertaken for the site:

- Curtins (2020) 2 Heyrod Street, Manchester, Phase 1 Preliminary Risk Assessment, Ref. 075424-CUR-00-XX-RP-GE-001-P01 (Ref. 3)
- Curtins (2021) 2 Heyrod Street, Phase 2 Ground Investigation Report, Ref. 075424-CUR-00-XX-RP-GE-002 V02. (Ref. 1)
- Curtins (2021) 2 Heyrod Street, Manchester, Remediation Strategy, Ref. 075424-CUR-00-XX-RP-GE-003 V02. (Ref. 4)

It is assumed that the client is in receipt of these reports and that they will also be submitted to and accepted by Manchester City Council to discharge relevant planning conditions.

2.0 The Site

This section of the report summarises the site setting, history, geology, hydrogeology, hydrology, environmental conditions and remediation measures recommended at the site with reference to the geo-environmental reports referenced previously. It is not the intention of this report to duplicate these reports, with the information below providing the background information to support the piling risk assessment and recommendations. For further background information the full reports should be consulted.

2.1 The Site Setting

The site is centred at the approximate national grid reference SJ 852 980, and is 0.22ha in area. It can be accessed from Heyrod Street to the south. A site location plan is presented in *Figure 2.1*.

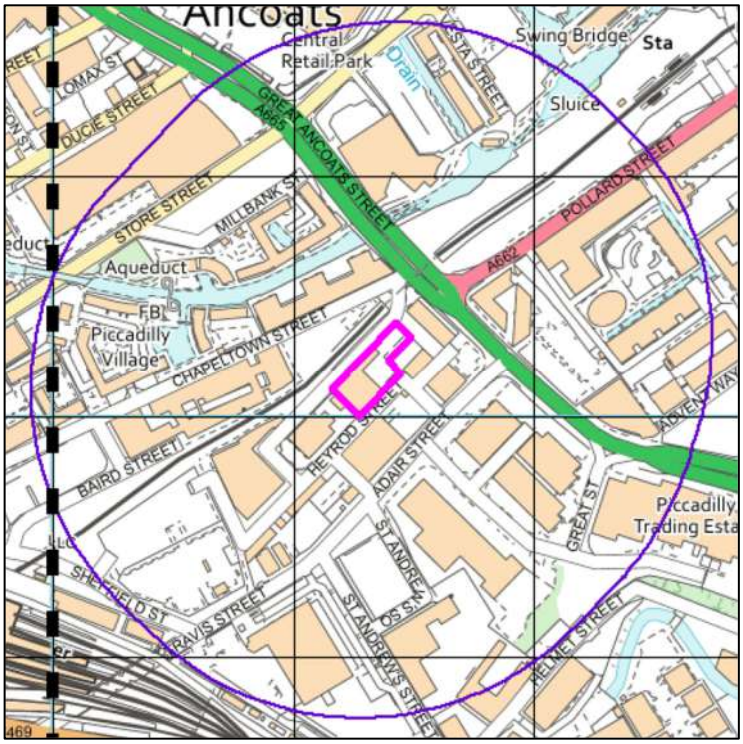

Figure 2.1 *– Site Location Plan (site boundary shown in pink. 250m buffer in purple). Crown Copyright. License Number 100022432.*

The south western part of the site is currently occupied by a warehouse, while the remainder of the site is occupied by areas of hardstanding, used for car parking and storage, predominantly covered by concrete and asphalt.

The site generally slopes slightly, with a maximum approximate elevation of 47m AOD in the north east and a minimum of 45m AOD in the south west. Internal floor levels within the warehouse are relatively even.

2.2 Site History

The earliest mapping (1848) shows that the majority of the site was occupied by terraced housing, with Norton Street and "No. 1 Court" running through the site. The eastern edge of the site boundary included a portion of an adjacent timber yard. The site's surroundings included an iron foundry 40m to the north west and three cotton mills within 75m.

1891 mapping shows that the on-site timber yard structures had been demolished by that time. No major changes occurred on-site prior to 1933 mapping, which shows that some of the housing in the south eastern portion of the site had been demolished.

The remaining residential structures were demolished prior to 1978. Mapping from this period shows a "Works" structure was present adjacent to the site's south eastern boundary. The warehouse structures currently present on site had been constructed by 1981, with an extension being constructed by 1991. The adjacent "Works" structure was no longer marked as of 1991. No further changes occurred on site between 1991 and the present.

2.3 Hydrogeology and Hydrology

The site, corresponding with the underlying solid geology, is underlain by a Principal Aquifer within the bedrock (Chester Formation, Sandstone) described as:

> L*ayers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, Principal aquifers are aquifers previously designated as a major aquifer.*

The site is not situated within a Source Protection Zone (SPZ). No potable groundwater abstractions are identified within 1km of the site. The nearest non-potable abstraction point is 461m south, from general cooling of rubber operated by Moseley Rubber Co. Ltd.

The BGS recorded superficial Glacial Till, overlying the Chester Formation. Soils are noted to comprise sandy silty clay with gravel.

Made Ground, although not recorded on BGS mapping, is likely to be encountered accounting for the current site setting historic development on site.

The nearest surface water feature is the Ashton Canal, 77m to the north, noted to be River Quality C.

2.4 Ground Model

The following sections present a summary of the ground conditions identified during the Curtins 2021 intrusive investigation. The exploratory hole logs are presented in *Appendix B*.

2.4.1 Made Ground

Made Ground was encountered in all exploratory holes undertaken in Curtins ground investigation, from ground level, generally ranging between 1.27m and 2.20m in thickness. The greatest thickness was recorded in WS02 where site levels were slightly elevated with respect to other exploratory hole locations.

In external areas, Made Ground soils comprise:

- Surface covering of tarmacadam or concrete overlying a granular sub-base of gravelly sand. The gravel fraction comprises fine to coarse angular to subangular sandstone and concrete.
- WS01 recorded brown gravelly fine to coarse sand beneath the sub-base, including fragments of brick, concrete, ceramic fragments, rare ash, and coal, with occasional cobbles of brick, from 0.16m to 1.60m bgl.
- WS02 recorded brown sandy gravelly clay and clayey gravelly fine to coarse sand. The gravel fraction comprised fine to coarse angular to subangular brick, concrete, slate, sandstone, and coal, with rare to occasional cobbles of brick and concrete. These soils were underlain by very soft brown sandy gravelly clay and very loose black slightly clayey slightly gravelly fine and medium sand. *A strong hydrocarbon odour was recorded in this material.* Gravels comprise fine to coarse angular to subangular sandstone, brick, timber, and coal.
- WS03 recorded brown sandy cobbles of brick and concrete below the granular sub-base, underlain by dark brown and dark greyish brown gravelly fine to coarse sand. The gravel fraction comprises fine to coarse angular to subangular brick, concrete, ash, wood fragments and rare coal. A slight organic odour was noted in these soils. Made Ground soils were recorded to 2.00m bgl.

In internal areas, Made Ground soils comprise:

- Concrete ground floor slabs ranging between 0.15m and 0.20m in thickness
- Soils in WS04 include a thin layer of light brown gravelly fine to coarse sand. The gravel fraction comprises fine to coarse angular to subangular sandstone and concrete. This overlies brown slightly clayey gravelly fine to coarse sand, with fragments of brick, concrete, and sandstone, with cobbles of brick, and loose brown clayey slightly gravelly fine and medium sand, with fragments of sandstone, brick, and coal.
- In WS05, soils comprise brown gravelly fine to coarse sand with fragments of brick, concrete, and ceramic piping, with frequent brick cobbles, and loose dark greyish dark brown slightly clayey slightly silty fine and medium sand.

- In WS06, a granular sub-base is underlain by brown slightly clayey gravelly fine to coarse sand with fragments, and cobbles, of brick and concrete, and loose brown clayey slightly gravelly fine and medium sand, with fragments of sandstone brick and coal.

2.4.2 Natural Deposits

Superficial Soils

Glacial Till was encountered beneath Made Ground in all exploratory holes. Soils comprise stiff brown, with rare grey mottling, slightly sandy slightly gravelly clay. Soils were slightly silty in BH01. The gravel fraction comprises fine to coarse subangular to rounded sandstone, mudstone, and rare coal.

The base of the clay was only proven in BH01 to a depth of 10.60m bgl (36.71m bgl).

Residual Soils

Deposits indicative of heavily weathered bedrock were encountered in BH01, underlying the cohesive Glacial Till from 10.60m bgl (36.71m AOD).

Deposits comprise very dense light orange medium and coarse sand with pockets of reddish brown sandy clay.

The base of these soils was identified at 12.80m bgl (34.51m AOD), overlying the Chester Formation.

Bedrock (Chester Formation)

Solid geology of the Chester Formation was only encountered in BH01, from 12.80m bgl (34.51m AOD). Bedrock comprises extremely weak to medium strong fine to coarse grained sandstone. Fractures are extremely closely spaced to closely spaced, generally 0-10 degrees, planar, rough, clean, however stepped and undulating fractures were also recorded. On occasion, steeper fractures angled at 30 – 45 degrees and 90 degrees (vertical fractures) were also recorded. Clay infill was recorded on rare occasions.

Where bedrock was recorded to be non-intact, deposits comprise very dense light brown gravelly fine to coarse sand. The gravel fraction typically comprises fine and medium angular to subangular sandstone.

From 25.00m bgl (22.30m AOD) rock was described as very weak, occasionally extremely weak (where non-intact) and medium strong, fine and medium grained sandstone with rare coarse clasts of sandstone and mudstone. Rare bands of weak reddish brown medium and coarse

grained sandstone were recorded at 27.41m to 27.48m bgl. Fractures are very closely spaced to medium spaced, 0-10 degrees, planar, rough, clean. Rare sand infilling was recorded.

Where bedrock was recorded as non-intact, deposits were recorded as light brown medium and coarse sand (24.45m to 25.49m bgl) and as brown sandy clay (29.05m to 29.90m bgl).

From 29.22m bgl (18.08m AOD), bedrock was recovered as very weak, locally extremely weak (where non-intact), weak and medium strong, light brown medium and coarse grained sandstone. Rare bands of fine to coarse grained sandstone, and very weak and extremely weak reddish brown mudstone were also recorded. Non-intact rock was recorded at 29.90m to 30.00m bgl and recovered as medium and coarse sand, at 35.07m to 35.13m bgl recovered as gravelly medium and coarse sand and at 37.98m to 38.12m bgl recovered as sandy gravel of sandstone.

Fractures are very closely spaced to medium spaced 0-10 degrees, planar, rough and clean. Rare undulating fractures were also recorded. One fracture was recorded at 33.50m bgl at 60 degrees.

From 38.12m bgl bedrock was recorded as weak reddish brown fine to coarse grained sandstone, with rare bands of reddish brown mudstone. Fractures are typically extremely closely spaced to closely spaced, 0-20 degrees, planar, rough and clean, although rare sand infill was recorded. A stepped fracture was recorded at 45.30m bgl. Non-intact rock was encountered at 39.32m to 39.40m bgl, recovered as gravelly fine to coarse sand. No rock core was recovered between 41.16m and 44.00m bgl, and non-intact rock, recovered as fine to coarse sand was identified to 44.14m bgl. Non-intact rock was recovered as reddish brown sandy gravel from 44.31m to 44.65m bgl.

2.4.3 Groundwater

No groundwater strikes were recorded during the investigation.

Due to the use of water flush during the progression of the Geobore-S borehole, it was not possible to determine any water strikes during progression of BH01 through deeper Glacial Till, Residual Soils, or the Chester Formation.

A summary of post investigation groundwater level monitoring is presented in *Table 2.4.3*.

Table 2.4.3 – *Groundwater Monitoring Results*

Borehole Ref.	Installation Strata	Response Zone m bgl	Depth, m bgl (m AOD)				
			18/05/21	24/05/21	10/06/21	17/06/21	25/06/21
WS01	Glacial Till	2.00 – 5.00	1.42	3.12	2.83	2.73	2.56

Borehole Ref.	Installation Strata	Response Zone m bgl	Depth, m bgl (m AOD)				
			18/05/21	24/05/21	10/06/21	17/06/21	25/06/21
			(46.28)	(44.58)	(44.87)	(44.97)	(45.14)
WS02	Granular Made Ground.	1.60 – 2.00	1.46 (47.13)	1.58 (47.01)	1.76 (46.83)	1.81 (46.78)	1.92 (46.67)
WS05	Glacial Till	2.00 – 5.00	4.96	4.61	4.60	4.44	4.44
WS06	Granular Made Ground.	0.50 – 1.00	Dry	Dry	Dry	Dry	Dry
BH01	Sandstone (Chester Formation)	18.00 – 35.00	20.64 (26.67)	20.60 (26.71)	20.67 (26.64)	20.65 (26.66)	20.67 (26.64)

Based upon groundwater elevations and the underlying geology, the following considerations are given to the underlying groundwater regime:

- Although no groundwater strikes were recorded within the exploratory borehole logs, perched water is likely to be encountered in shallow Made Ground deposits, resting above the cohesive Glacial Till.
- The hydrostatic head level within the Chester Formation is in the region of 20.60m to 20.67m bgl (26.71m to 26.64m AOD).

2.5 Contamination Risk Assessments and Remediation

A programme of environmental chemistry testing was undertaken on soil samples obtained of the Made Ground (9 no.) and natural soils (1 no.) and groundwater analysis on one sample obtained from BH01. One Made Ground sample was obtained from soils which exhibited a hydrocarbon odour (WS02 at 1.80m bgl). The natural sample (WS02 at 2.30m bgl) was obtained from soils beneath Made Ground soils which exhibited a hydrocarbon odour.

Samples were tested for a broad suite of contamination as identified in the Phase 2 report. Contamination risk assessments and recommendations undertaken by Curtins are summarised below.

2.5.1 Soils

The environmental chemistry results were compared with Generic Assessment Criteria for soils with respect to human health for a '*Commercial'* end use for a conservative 6% SOM for Made Ground soils, and 1% SOM for natural soils. No exceedances were identified.

No asbestos containing materials (ACMs) were identified during the investigation works, however one samples, WS05 (0.50m bgl) identified loose fibres of chrysotile at concentrations <0.001% $^{w}/_{w}$.

A **Moderate/Low** risk rating is identified to construction workers, from soils and dust from inhalation and ingestion at this stage, as a result of identification of loose fibres of chrysotile, albeit at concentrations <0.001% $^{w}/_{w}$. Exploratory hole location WS05 is situated under a proposed hardstanding car parking area so the potential pollutant linkage between these soils and the end user will be broken. It is however recommended that asbestos contaminated soils are suitably managed by contractors undertaking excavations to manage the risk to construction workers and adjacent residents.

2.5.2 Controlled Waters

The nearest surface water feature is the Ashton Canal, 77m north of the site. Given the presence of relatively impermeable shallow superficial soils, it is considered that the likelihood of shallow groundwater migrating to the canal is unlikely. The canal is identified as having Grade C water quality, indicating water quality is impaired. On this basis, the risk to surface water features is **Very Low**.

One groundwater sample was obtained from BH01 (20.70m bgl). Due to the presence of a Principal Aquifer beneath the site, and likely piled foundation solution to be adopted, the results of laboratory analysis of groundwater have been assessed against EU Drinking Water Standards. In the absence of WFD EQSs, WHO Water Standards have been utilised.

With respect to the EU DWS, one marginal exceedance of selenium concentrations was recorded at 14µg/l, compared with UK DWS thresholds of 10µg/l. There is, however, no indication that the elevated concentrations recorded are a result of high concentrations in soils leaching to the underlying aquifer, particularly given the presence of a substantial thickness of low permeability cohesive soil between Made Ground and the underlying aquifer. The marginally elevated concentrations are attributed background concentrations within the sandstone bedrock. On this basis, the risk to groundwater features is **Low**.

2.5.3 Ground Gas

Six monitoring visits have been completed between 14th May 2021 and 25th June 2021.

The '*borehole'* Q_{hg} for the development site was derived, recording a maximum Q_{hg} of 0.1440 l/hr for carbon dioxide, using a maximum steady state air flow rate of -3.6 l/hr and carbon dioxide concentrations of 4.0% v/v (BH01, second visit), corresponding with a Characteristic Situation 2 (CS-2) ground gas regime.

The '*worst case*' Q_{hg} for the development site was derived, recorded a maximum Q_{hg} of 0.5868l/hr for carbon dioxide where maximum steady state air flow rate of -3.6 l/hr was recorded on the second monitoring visit, and maximum gas concentrations of 16.3% $^{v}/_{v}$ on the fifth

monitoring visit. This also corresponds with a Characteristic Situation 2 (CS-2) ground gas regime.

Gas protection measures were therefore considered necessary.

2.5.4 Aggressive Ground Conditions

The site has been classified in accordance with BRE Special Digest 1. Based on the laboratory test results it was considered that a Design Sulphate Class may be taken as DS-2 with an ACEC class of AC-2 within Made Ground, and Design Sulphate Classes and ACEC classes of DS-1 AC-1 being appropriate for the Superficial deposits, Residual Soils, and the Chester Formation.

3.0 Piling Risk Assessment

At the current design stage, the adoption of CFA piles or rotary bored piles at least c.30m bgl socketed into sandstone bedrock is considered to be the preferred piling solution. This method has been selected with consideration of minimal ground vibration, as well as groundwater protection aspects.

CFA and rotary bored piles essentially involve driving a large auger into the ground, with soils within the radius of the auger brought to surface and replaced with concrete on withdrawal of the auger. The displacement of the surrounding ground is governed by the speed of rotation of the auger relative to the speed of vertical penetration. Theoretically, it is possible to adjust the speeds so that the volume of soils displaced laterally and removed as arisings is equal to the volume of concrete placed.

Within the EA Report (2001), the six Source-Pathway-Receptor scenarios are identified as:

1. *Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer;*
2. *Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas or contaminant vapours to the surface;*
3. *Direct contact of site workers and others with contaminated soil arising which have been brought to the surface;*
4. *Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration);*
5. *The driving of solid contaminants down into an aquifer during pile driving; and*
6. *Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.*

This piling risk assessment tabulated overleaf address aspects 1, 4, 5 and 6 above only, in keeping with the objectives of this report (assessing the risk to groundwater). Other aspects should be appropriately dealt with through engineering design and suitable on-site management. The risk assessment methodology follows that presented in *Appendix C.*

TABULATED RISK ASSESSSMENT: CFA/Rotary Bored Piles

Aspect	Potential Consequence	Potential Probability	Potential Risk	Risk Management Options Available	Resultant Risk
1. Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer.	**Medium** Pollution of sensitive water resources in groundwater. Site overlies a Principal aquifer associated with the Chester Formation.	**Unlikely** • Limited Made Ground contamination identified with respect to nominated screening criteria; • One marginal exceedance of selenium identified in one groundwater sample from within the Chester Formation. Exceedance attributed to background concentrations within the aquifer; • Risk to groundwater considered to be Low. • CFA piling method essentially self-sealing with concrete and therefore no resultant pathway. • Rotary bored piles to remove soils in a similar way to CFA. Concrete poured once desired depth obtained.	**Low**	Not required.	**Low**
4. Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration).		**Low Likelihood** • Soluble sulphate concentrations in soils generally meet a Design Sulphate class of DS2 AC-2 for Made Ground soils and DS1 AC-1 for natural soils/bedrock.	**Moderate / Low**	Use of suitably sulphate resistant concrete for all substructures.	**Low**
5. The driving of solid contaminants down into an aquifer during pile driving.		**Low Likelihood** Above considerations, plus: • Low likelihood as arisings brought to surface in CFA or rotary bored methods, with speed of auger rotation to be matched with downward force to avoid driving soils down.	**Moderate / Low**	Speed of auger rotation needs to be matched with downward force to avoid driving soils down.	**Low**
6.Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.		**Low Likelihood** Above considerations.	**Moderate / Low**	Cement content of the concrete will need to be closely monitored so that this in itself does not 'bleed' into groundwater.	**Low**

4.0 Summary and Recommendations

The risk assessment presented herein has concluded that there is a low risk to contamination of groundwater beneath the site from the use of CFA piling or rotary bored piles, providing that the following risk management measures are put in place:

- *Speed of auger rotation needs to be matched with downward force to avoid driving soils down; and*
- *Cement content of the concrete will need to be closely monitored so that this in itself does not 'bleed' into groundwater.*
- *Suitable sulphate resistant concrete should be used for all substructures to remain in contact with Made Ground soils meeting a DS-2 DS class and AC-2 ACEC class in accordance with BRE Special Digest 1:2005 Concrete in Aggressive Ground guidance.*

The following considerations should also be taken into account:

- *The piling contractor should prepare and submit relevant method statements for approval prior to piling works commencing;*
- *Where arisings are generated, they should be classified, handled and disposed of in compliance with relevant best practice and regulatory requirements;*
- *The piling contractor should make allowance for the provision of appropriate PPE based on chemical analysis results within the Phase 2 Ground Investigation Report; and*
- *In the event of uncovering any areas of unexpected contamination during the piling works, including odorous or stained soils, works should be ceased with the advice of the appointed environmental consultant sought immediately.*

This document should be forwarded to the Planning Authority for discharge of the relevant planning condition before piling works commence to disclose that there is a low risk to groundwater from the proposed use of CFA piling or rotary bored piling on site.

Appendix A – Drawings

- Development Plans
- Curtins Exploratory Hole Location Plan

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Appendix B – Exploratory Hole Logs

- Exploratory Hole Logs

Appendix C – Risk Assessment Rationale

The qualitative risk assessment of environmental harm is designed to establish connecting links between a hazardous source to a potential receptor via an exposure pathway.

The qualitative risk assessment corresponds with the proposed piling operations on site.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of hazard on a site does not necessarily mean there is a risk.

By considering where a viable pathway exists which connects a source with a receptor the risk assessment in Section 3.0 and Table A4.1 identifies where pollutant linkage exists. If there is no pollutant linkage there is no risk and only where a pollutant linkage is established does the risk assessment, consider the level of risk.

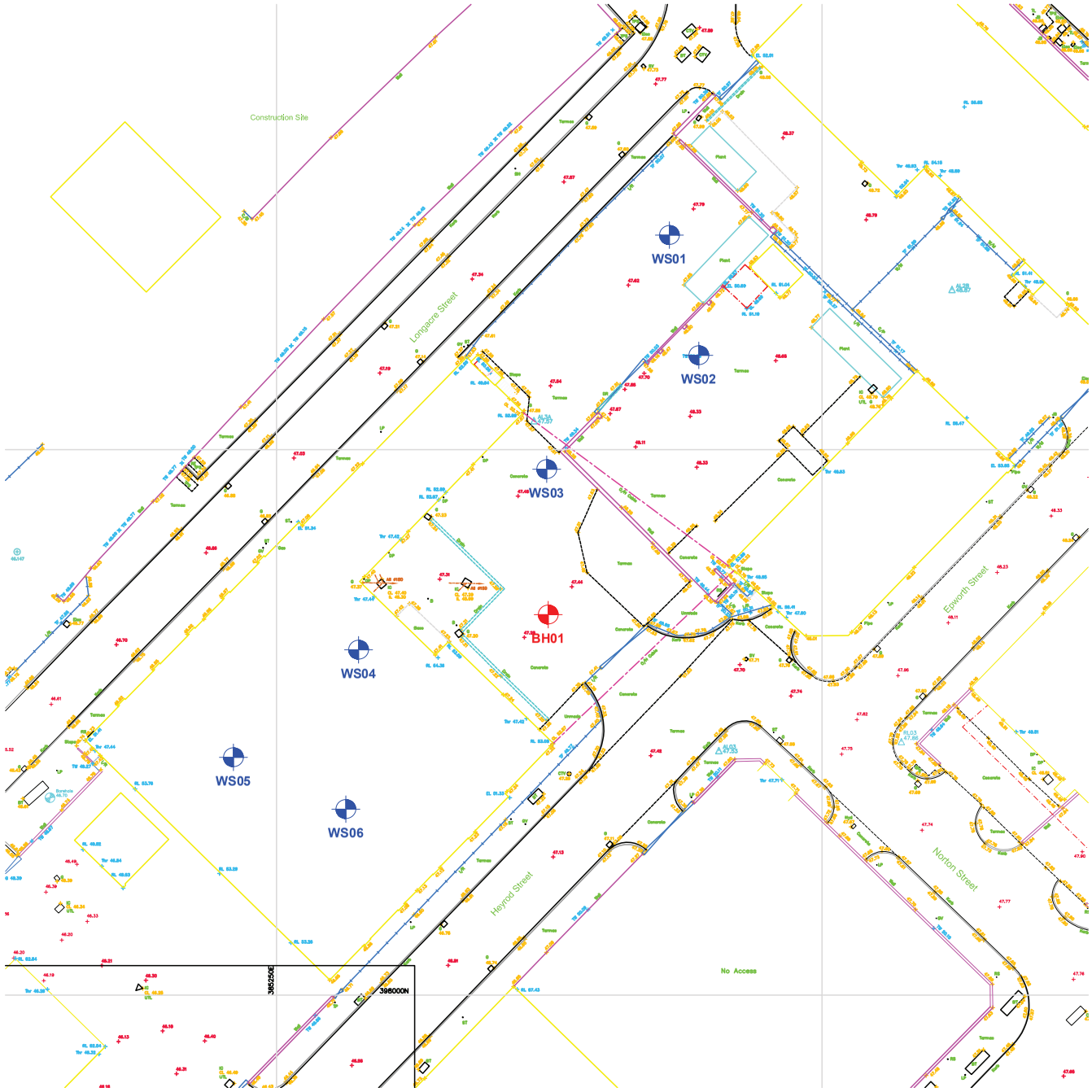
The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the hazard and receptor and the integrity of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability (Likelihood)	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.



GEOBORE S ROTARY BOREHOLE LOCATION

WINDOW SAMPLE BOREHOLE LOCATION

Rev:	Description:	Date:	By:	Chkd:

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Status:

INFORMATION

Project:

HEYROD STREET

Drg Title:

EXPLORATORY HOLE LOCATION PLAN

Scale:	Size:	First Issue:	Drawn:	Checked:
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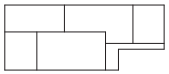
REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN



PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 02 - 06 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	**058-190002**
SCALE @ A1 :	**1 : 200**
DATE DRAWN :	**03/27/20**
SUITAB. CODE:	
DRAWN BY:	**JO**
REVISION:	**1**
CHECKED BY:	**MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	02	DR	A	12-004

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28/09/2020 20:24:30



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SCALE 1:200 m

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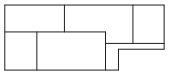
REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN



PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 01 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	**058-190002**	SCALE @ A1 :	**1 : 200**
		DATE DRAWN :	**08/22/19**
SUITAB. CODE:		DRAWN BY:	**JO**
REVISION:	**1**	CHECKED BY:	**MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	- CRL	- ZZ	- 01	- DR	- A	- 12-003

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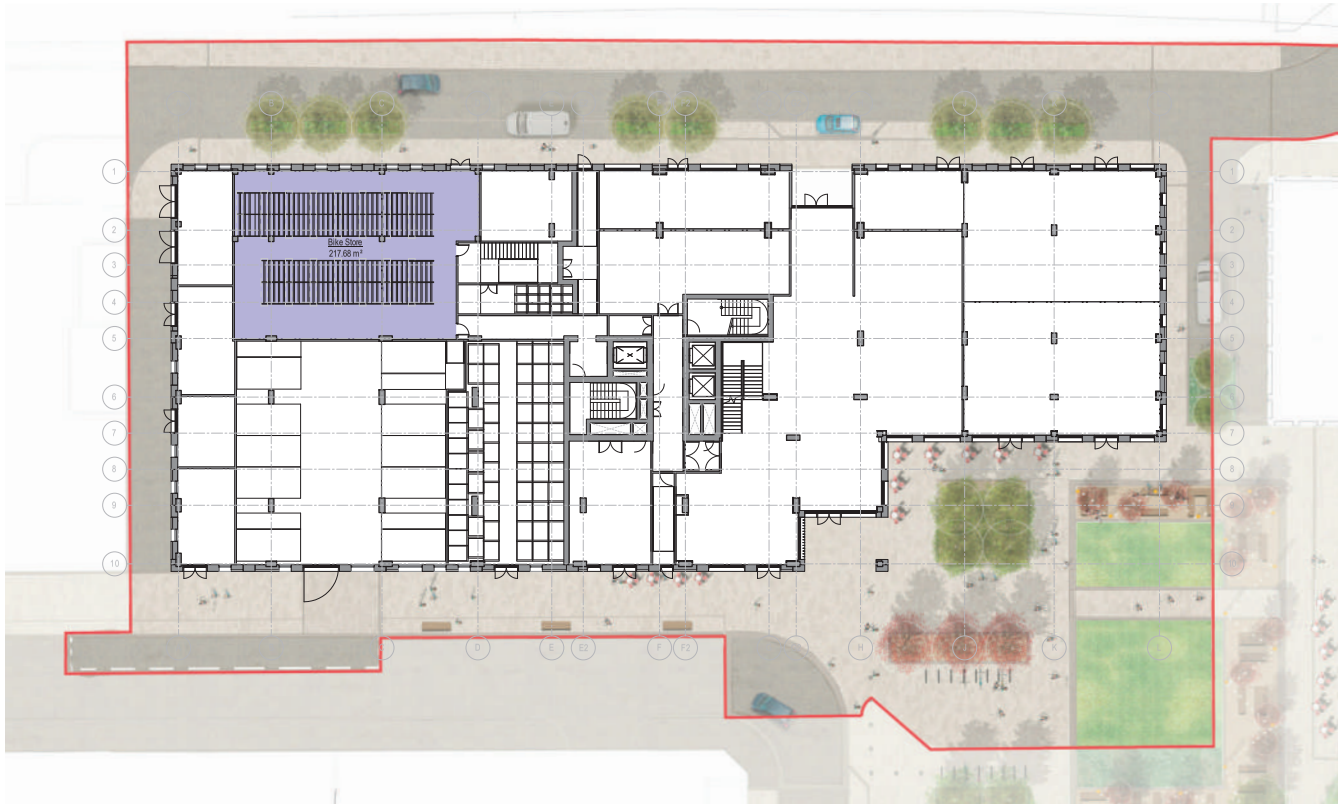

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SCALE 1:200 m

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Mezzanine GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	03/25/20
SUITAB. CODE:		DRAWN BY:	JO
REVISION:	1	CHECKED BY:	MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	- CRL	- ZZ	- 0B	- DR	- A	- 12-002

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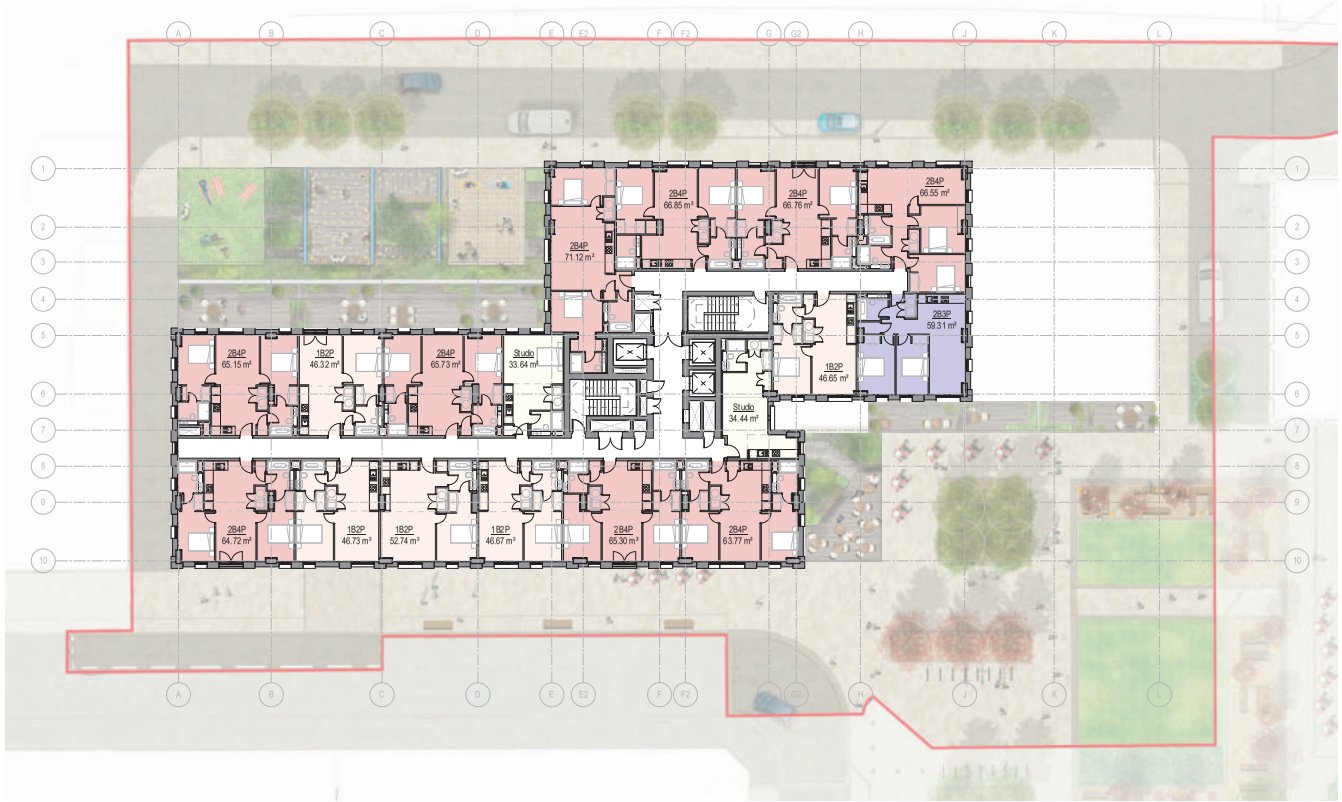
28/09/2020 15:45:20



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SCALE 1:200 m

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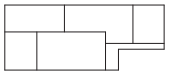
REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN



PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 10 - 13 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER
058-190002

SCALE @ A1 : **1 : 200**

DATE DRAWN : **02/25/20**

SUITAB. CODE:

DRAWN BY: **JO**

REVISION: **1**

CHECKED BY: **MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	10	DR	A	12-007

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 14 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER **058-190002**

SCALE @ A1: **1 : 200**

DATE DRAWN: **07/16/19**

SUITAB. CODE:

DRAWN BY: **JO**

REVISION: **1**

CHECKED BY: **MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	14	DR	A	12-008

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SCALE 1:200

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING

Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 07 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER: 058-190002	SCALE @ A1: 1 : 200
	DATE DRAWN: 12/02/2019
SUITAB. CODE:	DRAWN BY: JO
REVISION: 1	CHECKED BY: MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	07	DR	A	12-005

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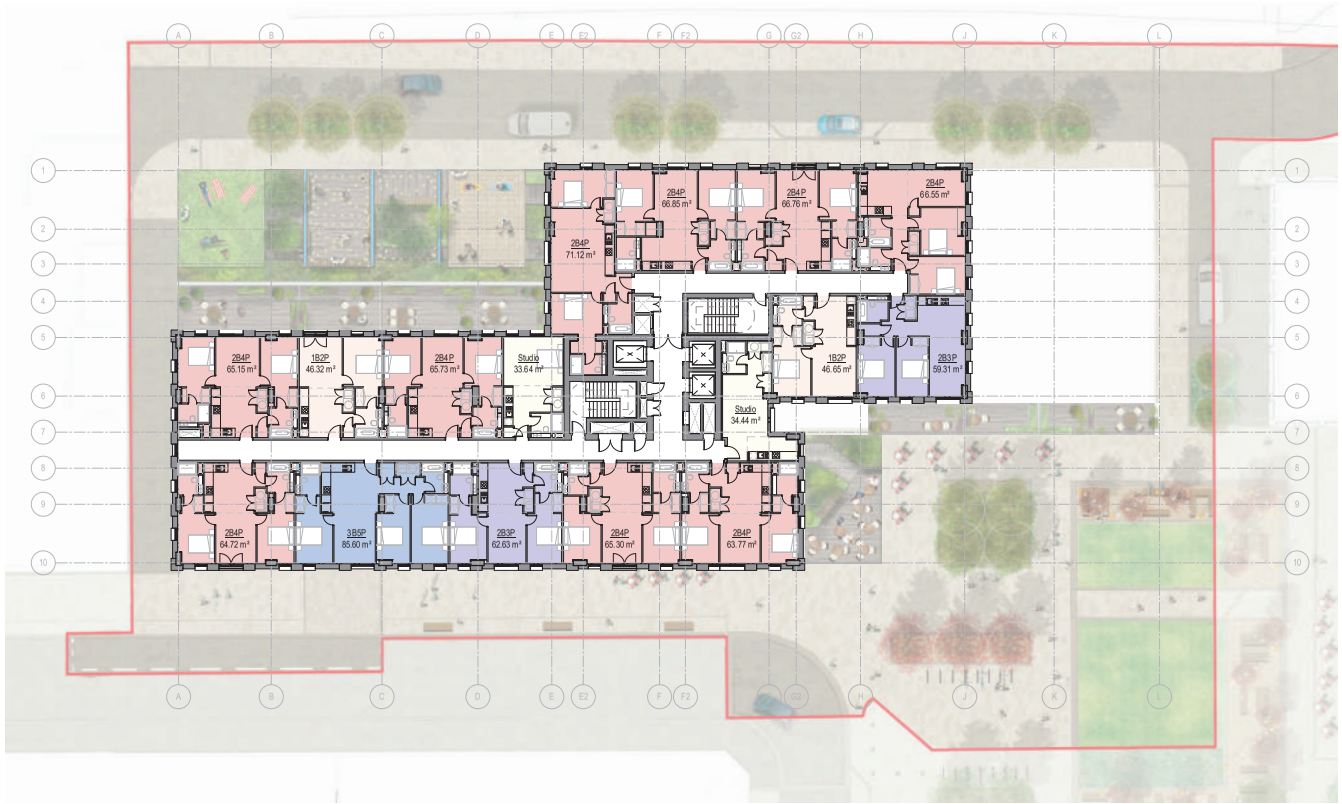

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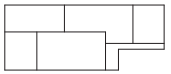
REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN



PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 08 - 09 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	07/16/19
SUITAB. CODE :		DRAWN BY :	JO
REVISION :	1	CHECKED BY :	MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	08	DR	A	12-006

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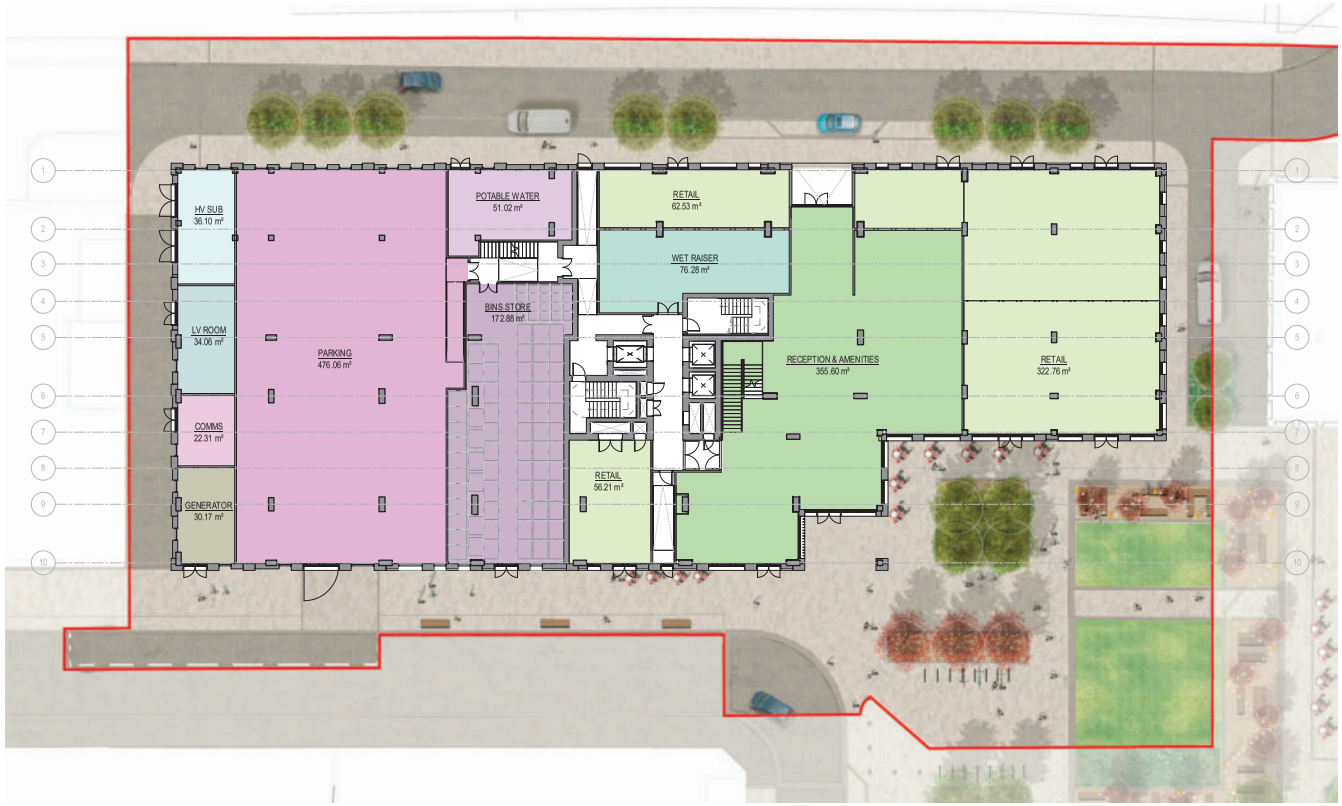

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SCALE 1:200 m

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Ground Floor GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	05/08/15
SUITAB. CODE :		DRAWN BY :	JO
REVISION :	1	CHECKED BY :	MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	00	DR	A	12-001

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SCALE 1:200 m

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 15 - 20 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	02/12/20
SUITAB. CODE:		DRAWN BY:	JO
REVISION:	1	CHECKED BY:	MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	15	DR	A	12-009

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Area Apartment		
Name	Area	Count
ZZ_01		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	463.07 m²	7
3B5P	85.60 m²	1
Studio	33.64 m²	1
	1008.02 m²	17
ZZ_02		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.43 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.82 m²	20
ZZ_03		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_04		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_05		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_06		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_07		
1B2P	93.11 m²	2
2B3P	181.24 m²	3
2B4P	529.50 m²	8
3B5P	85.60 m²	1
Studio	68.08 m²	2
	957.53 m²	16
ZZ_08		
1B2P	92.97 m²	2
2B3P	121.93 m²	2
2B4P	595.96 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	964.54 m²	16
ZZ_09		
1B2P	92.97 m²	2
2B3P	121.93 m²	2
2B4P	595.96 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	964.54 m²	16
ZZ_10		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_11		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17

Area Apartment		
Name	Area	Count
ZZ_12		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_13		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_14		
1B2P	146.00 m²	3
2B3P	59.31 m²	1
2B4P	467.52 m²	7
Studio	68.08 m²	2
	740.91 m²	13
ZZ_15		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_16		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_17		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_18		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_19		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_20		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_21		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_22		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_23		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_24		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
Grand total: 352	20424.53 m²	352



Mix Aparment		
Name	Area	Count
1B2P	3619.74 m²	77
2B3P	3100.82 m²	52
2B4P	11606.50 m²	175
3B5P	770.38 m²	9
Studio	1327.09 m²	39
Grand total: 352	20424.53 m²	352

2 0 2 4 6 8 10
SCALE 1:200 m

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 21 - 24 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER
058-190002

SCALE @ A1 : **1 : 200**

DATE DRAWN : **12/02/2019**

SUITAB. CODE:

DRAWN BY: **JO**

REVISION: **1**

CHECKED BY: **MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	21	DR	A	12-010

28/09/2020 20:42:32

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Appendix B – Exploratory Hole Logs

- Exploratory Hole Logs

Rotary Core Log

Borehole No. **BH01**

Sheet 1 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							1.27	46.04		MADE GROUND: Brown gravelly fine to coarse sand. Occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subangular brick, concrete and rare clinker.
										Stiff brown with rare grey mottling slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded sandstone and mudstone.
										Continued on next sheet

1 2 3 4 5 6

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Rotary Core Log

Borehole No. **BH01**

Sheet 2 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							10.60	36.70		Very dense light orange medium and coarse SAND. Pockets of reddish brown sandy clay.

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 3 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							12.80	34.51		
		12.80 - 14.00	14.2	93	91	43				Extremely weak light brown fine to coarse grained SANDSTONE. *12.80m to 14.00m Fractures extremely closely spaced to closely spaced 0-10 degrees planar, rough, sand infill on fracture surfaces.* *13.05m Brown clay infill on fracture surface.* *13.28m 1 No. Fracture, 0-10 degrees, undulating, rough, clean.* *13.74m 1 No. Fracture, 0-10 degrees, stepped, rough, clean.*
		14.00 - 15.50	NI 15.2 NI	100	58	33				*14.00m to 14.05m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.* *14.05m to 15.00m Fractures extremely closely spaced to medium spaced 0-10 degrees planar, rough, clean.* *14.30m 1 No. Fracture 30 degrees, planar, rough, clean.* *15.00m to 16.00m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.*
		15.50 - 17.00	13	100	64	54	16.24	31.06		*16.00m to 16.55m Fractures 0-10 degrees, very closely spaced to closely spaced, planar, rough, clean.* *16.15m 1 No. Fracture, 90 degrees, 7 cm length planar, rough, clean.* Very weak light brown fine to coarse grained SANDSTONE. *16.55m to 17.62m Fractures extremely closely spaced to closely spaced 30 to 45 degrees, planar, rough, clean.* *16.73m 1 No. Fracture 0-10 degrees, planar, rough, clean.* *17.00m to 17.24m Extremely weak.*
		17.00 - 18.50	NI 7.9	100	91	53				*17.62m to 17.67m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.* *17.67m to 18.30m Fractures very closely spaced to closely spaced, planar, rough, sand infill on fracture surfaces.*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 4 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
			NI							*18.15m to 18.37m Extremely weak.*
		18.50 - 20.00	14	100	95	49				*18.3m to 18.35m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.* *18.35m to 21.84m Fractures extremely closely spaced to medium spaced,0-10 degrees, planar, rough, clean.* *19.30m to 19.33m Extremely weak.* *19.55m to 19.60m Extremely weak.*
		20.00 - 21.50		100	100	40				*20.15m 1 No. Fracture undulating, rough, clean.* *20.46m 2 No. Fractures, 30 degrees, cross-cutting, planar rough, clean.* *20.98m 1 No. Fracture, 90 degrees, planar, rough, clean.* *21.42m 1 No. Fracture, 30 degrees, planar, rough, clean.*
		21.50 - 23.00	NI 6.7 NI	100	85	50				*21.60m to 22.00m Extremely weak.* *21.84m to 21.91m Non-intact. Recovered as light brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.* *21.91m to 22.80m Fractures 0-10 degrees closely spaced, planar, rough, clean.* *22.80m to 22.95m Non-intact. Recovered as light brown medium and coarse gravel and cobbles of fine to coarse grained sandstone.* *22.95m to 23.60m Extremely weak.* *22.95m to 24.87m Fractures 0-10 degrees extremely closely spaced to closely spaced, planar, rough, clean.*
		23.00 - 24.50	19.3	100	100	13				

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 5 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										24.19m to 24.84m Extremely weak.
		24.50 - 26.00	NI 5.8 NI	100	93	75	25.00	22.30		*24.87m to 24.93m Non-intact. Recovered as light brown medium ang coarse angular to subangular gravel of fine to coarse grained sandstone.* *24.93m to 25.45m Fractures 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces.* Weak light brown fine and medium grained SANDSTONE. Rare coarse clasts of sandstone and mudstone. *25.45m to 25.49m Non-intact. Recovered as light brown medium and coarse sand.* *25.49m to 29.05m Fractures 0-10 degrees very closely spaced to medium spaced planar, rough, clean.*
		26.00 - 27.50	6.2	100	100	82				*26.00m to 27.37m Medium strong.* *26.20m Sand infill on fracture surface.*
		27.50 - 29.00		93	93	85				*27.41m to 27.48m Weak reddish brown medium and coarse grained sandstone. Fresh.*
		29.00 - 30.50	NI 8.8 NI	100	82	50	29.22	18.08		*29.05m to 29.22m Non-intact. Recovered as brown sandy clay.* Very weak light brown medium and coarse grained SANDSTONE. Generally fresh. *29.22m to 29.90m Fracture set 1: 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces. Fracture set 2: 0-30 degrees, closely spaced, planar, rough, clean, sand infill on fracture surfaces.* *29.90m to 30.00m Non-intact. Recovered as medium and*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 6 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										coarse sand.
										30.00m to 35.07m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.
										30.04m to 30.48m Closely spaced thinly bedded weak fine and medium grained sandstone.
		30.50 - 32.00		100	100	79				*31.00m to 31.50m Weak fine to coarse grained sandstone.*
										31.50m to 31.60m Very weak reddish brown mudstone.
										31.90m 1 No. Fracture, undulating, rough, clean.
		32.00 - 33.50	6.5	100	100	67				*32.10m to 32.64m Weak light brown fine to coarse sandstone. Fresh.*
										32.52m to 32.55m Extremely weak reddish brown mudstone.
										33.50m 1 No. Fracture 60 degrees, planar, rough, clean.
		33.50 - 35.00		100	100	71				*33.50m to 33.90m Medium strong*
										33.90m to 35.00m Weak.
										35.00m to 35.50m Extremely weak.
			NI							*35.07m to 35.13m Non-intact. Recovered as gravelly medium and coarse sand. Gravel is medium and coarse angular to subangular sandstone.*
		35.00 - 36.50	7.3	100	91	73				*35.13m to 36.50m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.*

31 32 33 34 35 36

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 1	**Date:** 30/04/2021 to 04/05/2021	**Description:** BH01 Logging Photographs 0.40m to 8.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 2	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 8.00m to 14.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 3	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 4	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 5	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name:	Project Name:	Project No:
Packaged Living	Heyrod Street	B075424

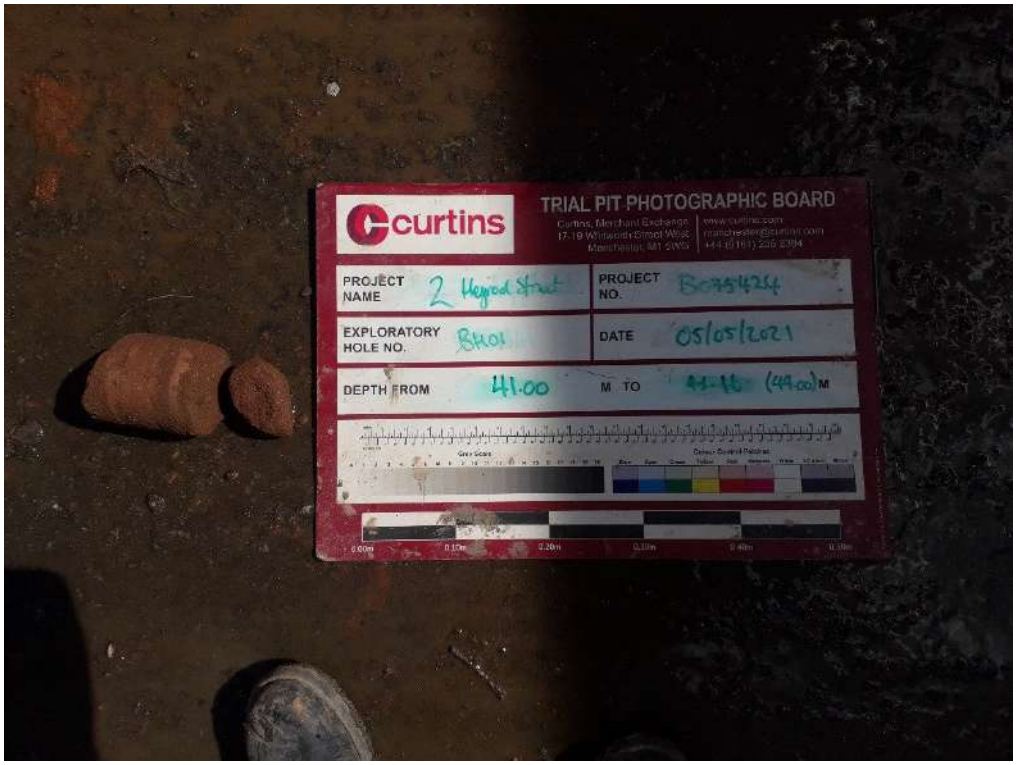
No.	Date:	Description:
6	05/05/2021	BH01 Logging Photographs 32.00m to 38.00m bgl.





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 7	**Date:** 05/05/2021	**Description:** BH01 Logging Photographs 38.00m to 41.16m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 7	**Date:** 05/05/2021	**Description:** BH01 Logging Photographs 44.00m to 45.50m bgl.	



Rotary Core Log

Borehole No. **BH01**

Sheet 7 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		36.50 - 38.00	NI 3.1	87	87	85				*36.50m to 36.70m No recovery.* *36.70m to 37.98m Fractures 0-10 degrees, medium spaced, planar, rough, clean.*
		38.00 - 39.50	NI 12.1 >25 12.5 NI	93	65	47	38.12	9.18		*37.98m to 38.12m Non-intact. Recovered as sandy gravel. Gravel is fine to coarse angular to subangular sandstone.* Weak reddish brown fine to coarse grained SANDSTONE. Fresh. *38.12m to 38.78m Fractures 0-10 degrees, very closely spaced to closely spaced planar, rough, clean.* *38.48m 1 No. Fracture 20 degrees, planar, rough, clean.* *38.78m to 39.00m Fractures extremely closely spaced to very closely spaced 0-10 degrees, rough, sand infill.* *38.78m to 39.00m Very weak.* *39.00m to 39.32m Fractures 0-10 degrees very closely spaced to closely spaced planar, rough, clean.* *39.30m to 39.32m Reddish brown mudstone.* *39.32m to 39.40m Non-intact. Recovered as gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.* *39.40m to 41.16m Fractures 0-10 degrees extremely closely spaced to medium spaced planar, rough, clean,*
		39.50 - 41.00	5.7	100	96	83				
		41.00 - 42.50		11	11	7				*41.16m to 44.00m No recovery.*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 8 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		42.50 - 44.00	NR	0	0	0				
		44.00 - 45.50	NI 5.9 NI 8.2	100	67	59				*44.00m SPT recovered as light brown medium and coarse sand.* *44.00m to 44.14m Non-intact. Recovered as reddish brown fine to coarse sand.* *44.14m to 44.31m 1 No. Fracture, 0-10 degrees, planar, clean, rough.* *44.31m to 44.65m Non-intact. Recovered as reddish brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.* *44.65m to 45.50m Fractures 0-10 degrees, very closely spaced to closely spaced, undulating, rough, clean* *45.30m 1 No. Fracture 0-10 degrees, stepped, rough, clean.*
							45.50	1.80		End of borehole at 45.50 m

43 44 45 46 47 48

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 1 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Brown gravelly fine to coarse sand. Occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subangular brick, concrete and rare clinker.
					1.27	46.04		Stiff brown with rare grey mottling slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded sandstone and mudstone.
		2.00		N=20 (1,3/4,4,5,7)				
		3.50		N=31 (5,8/7,7,7,10)				
		5.00		N=26 (1,2/4,6,8,8)				

1 2 3 4 5 6

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 2 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		8.00		50 (8,14/50 for 125mm)				
					10.60	36.70		Very dense light orange medium and coarse SAND. Pockets of reddish brown sandy clay.
		11.00		50 (25 for 120mm/50 for 95mm)				

7 8 9 10 11 12

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 3 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		12.50		50 (25 for 90mm/50 for 80mm)	12.80	34.51		Extremely weak light brown fine to coarse grained SANDSTONE.
								12.80m to 14.00m Fractures extremely closely spaced to closely spaced 0-10 degrees planar, rough, sand infill on fracture surfaces.
								13.05m Brown clay infill on fracture surface.
								13.28m 1 No. Fracture, 0-10 degrees, undulating, rough, clean.
								13.74m 1 No. Fracture, 0-10 degrees, stepped, rough, clean.
								14.00m to 14.05m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.
								14.05m to 15.00m Fractures extremely closely spaced to medium spaced 0-10 degrees planar, rough, clean.
								14.30m 1 No. Fracture 30 degrees, planar, rough, clean.
								15.00m to 16.00m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								16.00m to 16.55m Fractures 0-10 degrees, very closely spaced to closely spaced, planar, rough, clean.
					16.24	31.06		*16.15m 1 No. Fracture, 90 degrees, 7 cm length planar, rough, clean.*
								Very weak light brown fine to coarse grained SANDSTONE.
								16.55m to 17.62m Fractures extremely closely spaced to closely spaced 30 to 45 degrees, planar, rough, clean.
								16.73m 1 No. Fracture 0-10 degrees, planar, rough, clean.
								17.00m to 17.24m Extremely weak.
								17.62m to 17.67m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								17.67m to 18.30m Fractures very closely spaced to closely spaced, planar, rough, sand infill on fracture surfaces.

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 4 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								18.15m to 18.37m Extremely weak.
								18.3m to 18.35m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								18.35m to 21.84m Fractures extremely closely spaced to medium spaced,0-10 degrees, planar, rough, clean.
								19.30m to 19.33m Extremely weak.
								19.55m to 19.60m Extremely weak.
								20.15m 1 No. Fracture undulating, rough, clean.
								20.46m 2 No. Fractures, 30 degrees, cross-cutting, planar rough, clean.
								20.98m 1 No. Fracture, 90 degrees, planar, rough, clean.
								21.42m 1 No. Fracture, 30 degrees, planar, rough, clean.
								21.60m to 22.00m Extremely weak.
								21.84m to 21.91m Non-intact. Recovered as light brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.
								21.91m to 22.80m Fractures 0-10 degrees closely spaced, planar, rough, clean.
								22.80m to 22.95m Non-intact. Recovered as light brown medium and coarse gravel and cobbles of fine to coarse grained sandstone.
								22.95m to 23.60m Extremely weak.
								22.95m to 24.87m Fractures 0-10 degrees extremely closely spaced to closely spaced, planar, rough, clean.
								19
								20
								21
								22
								23
								24

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 5 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					25.00	22.30		*24.19m to 24.84m Extremely weak.*
								24.87m to 24.93m Non-intact. Recovered as light brown medium ang coarse angular to subangular gravel of fine to coarse grained sandstone.
								24.93m to 25.45m Fractures 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces.
								Weak light brown fine and medium grained SANDSTONE. Rare coarse clasts of sandstone and mudstone.
								25.45m to 25.49m Non-intact. Recovered as light brown medium and coarse sand.
								25.49m to 29.05m Fractures 0-10 degrees very closely spaced to medium spaced planar, rough, clean.
								26.00m to 27.37m Medium strong.
								26.20m Sand infill on fracture surface.
								27.41m to 27.48m Weak reddish brown medium and coarse grained sandstone. Fresh.
								29.05m to 29.22m Non-intact. Recovered as brown sandy clay.
					29.22	18.08		Very weak light brown medium and coarse grained SANDSTONE. Generally fresh.
								29.22m to 29.90m Fracture set 1: 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces. Fracture set 2: 0-30 degrees, closely spaced, planar, rough, clean, sand infill on fracture surfaces.
								29.90m to 30.00m Non-intact. Recovered as medium and

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 6 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								coarse sand.
								30.00m to 35.07m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.
								30.04m to 30.48m Closely spaced thinly bedded weak fine and medium grained sandstone.
								31.00m to 31.50m Weak fine to coarse grained sandstone.
								31.50m to 31.60m Very weak reddish brown mudstone.
								31.90m 1 No. Fracture, undulating, rough, clean.
								32.10m to 32.64m Weak light brown fine to coarse sandstone. Fresh.
								32.52m to 32.55m Extremely weak reddish brown mudstone.
								33.50m 1 No. Fracture 60 degrees, planar, rough, clean.
								33.50m to 33.90m Medium strong
								33.90m to 35.00m Weak.
								35.00m to 35.50m Extremely weak.
								35.07m to 35.13m Non-intact. Recovered as gravelly medium and coarse sand. Gravel is medium and coarse angular to subangular sandstone.
								35.13m to 36.50m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.

31 32 33 34 35 36

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 7 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								36.50m to 36.70m No recovery.
								36.70m to 37.98m Fractures 0-10 degrees, medium spaced, planar, rough, clean.
								37.98m to 38.12m Non-intact. Recovered as sandy gravel. Gravel is fine to coarse angular to subangular sandstone.
					38.12	9.18		Weak reddish brown fine to coarse grained SANDSTONE. Fresh.
								38.12m to 38.78m Fractures 0-10 degrees, very closely spaced to closely spaced planar, rough, clean.
								38.48m 1 No. Fracture 20 degrees, planar, rough, clean.
								38.78m to 39.00m Fractures extremely closely spaced to very closely spaced 0-10 degrees, rough, sand infill.
								38.78m to 39.00m Very weak.
								39.00m to 39.32m Fractures 0-10 degrees very closely spaced to closely spaced planar, rough, clean.
								39.30m to 39.32m Reddish brown mudstone.
								39.32m to 39.40m Non-intact. Recovered as gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.
								39.40m to 41.16m Fractures 0-10 degrees extremely closely spaced to medium spaced planar, rough, clean,
								41.16m to 44.00m No recovery.

37 38 39 40 41 42

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 8 of 8

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385271.30 - 398034.90	Hole Type RC
Location:	Heyrod Street, Manchester		Level:	47.31	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		44.00		50 (25 for 50mm/50 for 40mm)				*44.00m SPT recovered as light brown medium and coarse sand.*
								44.00m to 44.14m Non-intact. Recovered as reddish brown fine to coarse sand.
								44.14m to 44.31m 1 No. Fracture, 0-10 degrees, planar, clean, rough.
								44.31m to 44.65m Non-intact. Recovered as reddish brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.
								44.65m to 45.50m Fractures 0-10 degrees, very closely spaced to closely spaced, undulating, rough, clean
								45.30m 1 No. Fracture 0-10 degrees, stepped, rough, clean.
					45.50	1.80		End of borehole at 45.50 m

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48

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name:	Heyrod Street	Project No. B075424	Co-ords:	385285.40 - 398066.80	Hole Type WS
Location:	Heyrod Street, Manchester		Level:	47.70	Scale 1:30
Client:	Packaged Living (FREOF V Heyrod) LLP		Dates:	04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	47.65		MADE GROUND: Black tarmacadam.
					0.16	47.54		MADE GROUND: Light brown gravelly medium and coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
		1.20		N=4 (1,1/1,1,1,1)				MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, ceramic fragments, rare ash, and coal. Occasional cobbles of brick.
					1.60	46.10		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=18 (2,3/4,6,4,4)				
		3.00		N=28 (5,5/6,6,7,9)				
		4.00		N=27 (4,6/5,5,7,10)				
		5.00		N=26 (5,7/5,8,6,7)				
					5.45	42.25		End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385288.10 - 398059.20	Hole Type WS
Location: Heyrod Street, Manchester		Level: 48.59	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	48.49		MADE GROUND: Black tarmacadam.
					0.30	48.29		MADE GROUND: Light brown gravelly medium and coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
								MADE GROUND: Brown sandy gravelly clay and clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, slate, sandstone and coal. Rare to occasional cobbles of brick and concrete.
		1.20		N=4 (1,1/1,1,1,1)	1.20	47.39		MADE GROUND: Very soft brown sandy gravelly clay. Gravel is fine and medium angular to subangular sandstone and rare brick.
					1.60	46.99		MADE GROUND: Very loose black slightly clayey slightly gravelly fine and medium sand. Gravel is fine to coarse angular to subangular timber, sandstone, coal and brick. Strong hydrocarbon odour.
		2.00		N=6 (1,2/1,2,2,1)				
					2.20	46.39		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		3.00		N=27 (4,4/6,7,7,7)				
		4.00		N=30 (5,6/6,7,7,10)				
		5.00		N=32 (4,6/6,7,8,11)				
					5.45	43.14		End of borehole at 5.45 m

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385276.10 - 398047.30	Hole Type WS
Location: Heyrod Street, Manchester		Level: 47.61	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16	47.45		MADE GROUND: Concrete.
					0.28	47.33		MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
								MADE GROUND: Brown sandy cobbles of brick and concrete.
					0.67	46.94		MADE GROUND: Dark brown and dark greyish brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, ash, wood fragments and rare coal. Slight organic odour.
		1.20		N=4 (1,1/1,1,1,1)				
		2.00		N=19 (3,3/5,4,4,6)	2.00	45.61		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		3.00		N=23 (3,4/4,5,7,7)				
		4.00		N=28 (4,6/6,7,7,9)				
		5.00		N=21 (5,5/4,6,5,6)				
					5.45	42.16		End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 05/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Concrete.
					0.30			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
					0.80			MADE GROUND: Brown slightly clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete and sandstone. Frequent cobbles of brick.
		1.20		N=7 (1,2/1,2,2,2)				MADE GROUND: Loose brown clayey slightly gravelly fine and medium sand. Gravel is fine and medium angular to subrounded sandstone, brick and coal.
					1.50			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=20 (3,4/4,4,5,7)				
		3.00		N=20 (4,3/4,5,7,4)				
		4.00		N=23 (3,4/5,5,5,8)				
		5.00		N=20 (3,5/4,4,7,5)				
					5.45			End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

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Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Concrete.
								MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete and ceramic pipe fragments. Frequent brick cobbles.
					1.05			MADE GROUND: Loose dark greyish dark brown slightly clayey slightly silty fine and medium sand.
		1.20		N=17 (5,5/4,2,6,5)				
					1.40			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=23 (4,5/5,6,6,6)				
		3.00		N=25 (6,6/6,7,7,5)				
		4.00		N=31 (5,6/6,8,9,8)				
		5.00		N=29 (5,5/4,7,9,9)				
					5.45			End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

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Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 05/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Concrete.
					0.22			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
					0.70			MADE GROUND: Brown slightly clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick and concrete. Occasional cobbles of brick and concrete.
		1.20		N=3 (1,1/1,1,0,1)				MADE GROUND: Loose brown clayey slightly gravelly fine and medium sand. Gravel is fine and medium angular to subrounded sandstone, brick and coal.
					1.50			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=20 (4,4/5,4,6,5)				
		3.00		N=25 (4,4/6,6,6,7)				
		4.00		N=27 (5,4/4,6,7,10)				
		5.00		N=25 (6,6/4,4,8,9)				
					5.45			End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Appendix C – Risk Assessment Rationale

The qualitative risk assessment of environmental harm is designed to establish connecting links between a hazardous source to a potential receptor via an exposure pathway.

The qualitative risk assessment corresponds with the proposed piling operations on site.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore, the presence of hazard on a site does not necessarily mean there is a risk.

By considering where a viable pathway exists which connects a source with a receptor the risk assessment in Section 3.0 and Table A4.1 identifies where pollutant linkage exists. If there is no pollutant linkage there is no risk and only where a pollutant linkage is established does the risk assessment, consider the level of risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the hazard and receptor and the integrity of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability (Likelihood)	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	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.
Likely	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 Likelihood	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.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a *high probability* that *severe harm* could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	*Harm* is *likely to arise* to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	*It is possible* that without appropriate further action *harm could arise* to a designated receptor. It is relatively *unlikely* that any such harm would be *severe,* and if any harm were to occur it is *more likely* that such harm would be *relatively mild.*
Low Risk	*It is possible* that *harm could arise* to a designated receptor from an identified hazard. It is *likely* that, at worst, if any harm was realised any effects would be *mild.*
Very Low Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term ‘risk’ in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation or risk management operations.

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