Nuvu Developments Ltd

Former Jacksons Brickworks, Ten Acres Lane
Ground Stabilisation Works Plan

Rev A

August 2024

Vertase FLI

Contaminated Land, Brownfield & Environmental Contracting

REPORT TITLE:	**Ground Stabilisation Works Plan**
REPORT NUMBER:	**Rev A**
CLIENT NAME:	**Nuvu Developments Ltd**

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1.0 Introduction

1.1 Appointments

1.1.1 Vertase FLI Ltd (VertaseFLI) was employed by Nuvu Investments Ltd ('the Client') to undertake pre-contract services to address the requirements of outstanding pre-commencement planning conditions associated with proposed land remediation works at the former Jackson's Brickworks, off Ten Acres Lane, Newton Heath, Manchester ('the Site'). Wardell Armstrong LLP (WA) has been retained by the Client as independent environmental consultant.

1.2 Legal Context

1.2.1 Permission to undertake the proposed land remediation works was granted by Manchester City Council (MCC) (MCC application number 129197/FO/2021) subject to conditions.

1.2.2 The planning permission for the proposed land remediation works is intended to enable redevelopment of the site for a mixed residential and commercial end use, which has also been granted permission by MCC (MCC application number 133700/FO/2022).

1.3 Document Purpose/Planning Conditions

1.3.1 The purpose of this document is to provide sufficient information to satisfy Condition 8 of Planning Permission 129197/FO/2021 granted by MCC. The wording of this condition is reproduced in paragraph 1.3.2 below:

1.3.2 8) Prior to the commencement of on-site works, a Ground Stabilisation Works Plan shall be developed, submitted to, and approved in writing by the Local Planning Authority. The Ground Stabilisation works plan should include details (per phase where relevant), as to how identified ground hazards (such as underground structures and boreholes) are to be addressed and decommissioned. Any changes to plan will require the written consent of the local planning authority. The plan shall be implemented as approved.

Reason - To ensure the protection of the development from underground hazards, pursuant to policies EN17 and EN18 of the Manchester Core Strategy (2012).

2.0 Site Context

2.1 Background

2.1.1 The Ten Acres Lane site is a brownfield site, which is a former landfill in part. The site lies currently derelict but has the benefit of planning permission for Remediation and Redevelopment.

2.1.2 VertaseFLI will be responsible for delivering the remediation and earthworks in accordance with this document and other documents submitted and approved during the planning process.

2.2 Site Location

2.2.1 The Site is roughly rectangular in shape and comprises approximately 19 Ha of derelict land which falls gently from the northeast (approximately 85m Above Ordnance Datum - AOD) to the southwest (approximately 75m AOD). It is located approximately 4km to the northeast of Manchester city centre at National Grid Reference 387599, 400309.

2.2.2 Formerly, the eastern two thirds of the Site were densely vegetated / overgrown with mature trees and shrubs. In comparison the western section of the Site comprised rough grassland with thickets of semi-mature trees. Tree clearance has been undertaken at the Site although, at the time of writing, tree stumps and large stands of Japanese knotweed remain.

2.2.3 An area of concrete hardstanding is situated within the eastern section of the Site adjacent to the eastern boundary.

2.2.4 The Site location is shown on Drawing D1932_20 Site Location Plan attached in Appendix A.

2.3 Site Overview

2.3.1 The Site is commonly referred to as a former landfill. This is not technically accurate as whilst some landfilling has occurred in historic brick pits this is relatively restricted to certain areas of the site where extensive clay extraction had historically taken place. In broad terms the Site can be split into three sections as described below.

1) Landfilled Section to the middle of the site which contains the former deeper brick pits and hence the majority of the historically placed HRM (High Risk Materials) and LRM C&D (Low Risk Materials Construction and Demolition Waste).

2) The made ground section to the Ten Acres Lane end which has been upfilled (much like many off the sites in major cities with a variety of made ground soils). This is the LRM (Low Risk materials).

3) The Coal Measures Overburden area. To the East of the site the site has been raised by the placement of predominantly reused natural materials from the coal measure strata. This is also termed LRM (Low Risk Materials).

2.3.2 The sections of the Site as outlined above are shown on Drawing D4744_17 Indicative material types/filling history attached in Appendix A.

2.4 Proven Ground Conditions

2.4.1 A significant number of investigations have been undertaken across the Site dating back to 2001.

2.4.2 Ground conditions beneath the site are variable and comprise significant thicknesses of Made Ground to depths of between 0.3m up to 14.8mbgl, underlain by Glacial Till ranging in thickness from 35m to 45m, which in turn is underlain by solid geology comprising weathered sandstone of the Collyhurst Sandstone Formation and Chester Formation.

2.4.3 A summary of proven ground conditions beneath the Site is provided in Table 1-1.

Table 1-1 Summary of proven ground conditions

Strata	Description (taken from WA reports)
Made Ground	Comprises various types of Made Ground which include general granular soils, general cohesive soils, suspected combustion waste, suspected colliery spoil, construction and demolition waste and household waste
Glacial Till	Firm to stiff, fissured, brown, slightly sandy to sandy, gravelly clay with occasional lenses of predominantly medium dense, brown/grey gravelly clayey sand. The Glacial Till is identified to be a Secondary (Undifferentiated) Aquifer based on the BGS Aquifer Designation Map (Superficial Drift).
Weathered Sandstone of the Collyhurst Sandstone Formation	Extremely weak to weak, laminated, reddish brown, fine to coarse grained sandstone with well-rounded "millet seed" grains. The sandstone is identified to be a Principal Aquifer based on the BGS Aquifer Designation Map (Bedrock).
Weathered Sandstone of the Chester Formation	Reddish brown, fine to medium sand with black, red, white and green grains and rare angular, fine black gravel. The sandstone is identified to be a Principal Aquifer based on the BGS Aquifer Designation Map (Bedrock)

3.0 Potential Ground Hazards Risk Assessment

3.1 Introduction

3.1.1 As the Ground and Stabilisation Works Plan is designed to address ground hazards it is first necessary to identify the potential ground hazards. Each of the identified ground hazards, outlined below, has been evaluated to determine the level of risk they pose to the development and/or the environment. The risk assessment process follows the standard methodology of identifying the hazard, determining the probability that the hazard exists or will occur, the severity of the consequences of that hazard existing or occurring and, finally, assigning the risk classification.

3.1.2 The risk classifications assigned to each hazard are based on the terminology for consequence and probability outlined in CIRIA C552, with a summary of the resultant risk classifications summarised in Table 3-1.

Table 3-1: Summary of Risk Classification

		Consequence			
		Severe	Medium	Mild	Minor
Probability	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

3.1.3 A summary table is shown as Table 5-1 in Section 5.

3.2 Underground Structures

3.2.1 The vast majority of the site was subject to clay extraction and subsequent infilling, these areas are assumed to be free from underground structures and intrusive investigation works have confirmed this.

3.2.2 Areas to the west, adjacent to Ten Acres Lane, and east, adjacent to Mitchell Street contained areas of industrial buildings associated with

the brickworks that were on site. There is a possibility that underground structures in the form of relict foundations or basements are present in these areas. However, given the geology beneath the site, competent Glacial Till near surface (in areas of the site that had not previously been disturbed), it is unlikely that these underground structures extend to significant depths beneath current ground levels.

3.2.3 The probability that significant underground structures are present on site that will potentially cause a hazard for the development is low. However, were underground structures present the potential consequences would be considered to be mild. Therefore, the overall risk from underground structures is considered to be Low and mitigation is unlikely to be required.

3.3 Voids in Fill

3.3.1 As described in Section 2 large areas of the site are characterised as areas of landfill. In loose tipped landfills such as that at Ten Acres Lane it is possible that voids may be present within the deposited waste. These voids have the potential to collapse and migrate to surface.

3.3.2 Although it is not thought that the landfill beneath Ten Acres Lane was engineered, boreholes drilled as part of the numerous phases of site investigation have not recorded voids. In addition, the Ten Acres Lane site ceased accepting waste approximately 40 years ago and, in this time, there have been no reports and there is no evidence of significant settlement on the site.

3.3.3 The probability that voids, as yet unidentified, are present within the fill beneath the site is unlikely. It is also considered unlikely that, were voids present in the fill, they would migrate to cause significant damage at the site surface. However, in the unlikely event that unidentified voids are present, and they do migrate to surface the potential consequences would be considered to be mild. Therefore, the overall risk from voids in the fill is considered to be Very Low and further work to mitigate against voids in the fill is not required.

3.4 Decomposition/Degradation of Waste

3.4.1 Decomposition and/or degradation of putrescible waste in household landfills has the potential to cause instability and surface settlement as well as being a significant source of ground gas.

3.4.2 The waste beneath the Ten Acres Lane site has been well characterised and, although small areas of the waste mass have been observed to contain household type wastes there is little or no putrescible type wastes that have the potential to cause significant surface settlement issues. Therefore, the probability of the presence of significant deposits of decomposing or degrading wastes that may cause ground stability issues is unlikely but the probability for ground gas generation that may be a risk to human health is likely.

3.4.3 Should such waste have gone unidentified the potential consequences from the decomposition and/or degradation would be considered to be mild in terms of ground stability but, potentially, medium for human health due to the generation of ground gases. Therefore, the overall risk from decomposition/degradation of the fill is Very Low for ground stability but Moderate for human health from ground gas indicating that mitigation for ground stability is unlikely to be required but some mitigation for human health may be required.

3.4.4 The assessment of the risk from ground gases and the recommended remediation, monitoring and mitigation to address this have been outlined in the Vertase FLI Risk Assessment and Options Appraisal and Remediation Strategy reports.

3.5 Boreholes

3.5.1 A large number of boreholes have been drilled across the site as part of various phases of site investigation. A number of these boreholes represent a ground hazard in that they are potentially preferential pathways for contamination contained within the shallow perched aquifer migrate off-site and/or enter the deeper sandstone aquifer.

3.5.2 Given the nature of the ground and contamination present in soils and the shallow aquifer it is likely that the boreholes may present a ground hazard and the consequences of this would be considered medium.

Therefore, the overall risk from boreholes at the site is moderate and mitigation will be required to address this risk.

3.6 Natural Ground Stability Hazards

3.6.1 The British Geological Survey (BGS) identified a moderate potential for compressible ground stability hazards on the site. This is related to the presence of clay within the Glacial Till. The BGS designation of moderate is not directly comparable to the risk classifications used in this document, however, it does indicate that there is the potential for compressible ground to be present on site and, therefore, the probability of a hazard occurring due to compressible ground is likely. The consequences of compressible ground being present are likely to be no more severe than minor damage to buildings or services meaning that the overall risk from compressible ground is low.

3.6.2 Any risk from compressible ground will be mitigated during the foundation design process and no mitigation is required during remediation.

4.0 Mitigation Measures

4.1 Introduction

4.1.1 Each of the identified ground hazards outlined in Section 3 has been evaluated to determine the level of risk they pose to the development and/or the environment. Based on this risk rating mitigation measures may be necessary to address and, where necessary, decommission the hazards and these measures are outlined below. A summary is outlined in Table 5-1 in Section 5.

4.2 Underground Structures

4.2.1 The risk posed to the site from underground structures has been classified as low with specific mitigation measures unlikely to be required. However, as part of the proposed site turnover across the entire site, particularly in areas where underground structures may be present, any underground structures will be removed to a depth of 2m bgl. Any underground structures or obstructions observed to extend beyond 2m will be recorded and a revised assessment of the risk posed will be carried out.

4.3 Voids in the Fill

4.3.1 The risk from voids in the fill is considered to be Very Low and further work to mitigate against voids in the fill is not required.

4.4 Decomposition/Degradation of Waste

4.4.1 The overall risk from decomposition/degradation of the fill is Very Low for ground stability but Moderate for human health from ground gas indicating that mitigation for ground stability is unlikely to be required but some mitigation for human health may be required.

4.4.2 Although not required to address ground stability risks, by way of mitigation during the proposed remediation any identified putrescible waste will be removed and segregated for off-site disposal rather than re-use.

4.4.3 The assessment of the risk from ground gases and the recommended remediation, monitoring and mitigation to address this have been

outlined in the Vertase FLI Risk Assessment and Options Appraisal and Remediation Strategy reports.

4.5 Boreholes

4.5.1 The overall risk from boreholes at the site is moderate and mitigation will be required to address this risk. The mitigation measures proposed are to appropriately decommission the boreholes as and when they are deemed to no longer be needed.

4.5.2 Boreholes will be decommissioned in line with best practice and the EA guidance *Good practice for decommissioning redundant boreholes and wells* dated October 2012.

4.6 Natural Ground Stability Hazards

4.6.1 The overall risk from compressible ground is low. Any risk from compressible ground will be mitigated during the foundation design process and no mitigation is required during remediation.

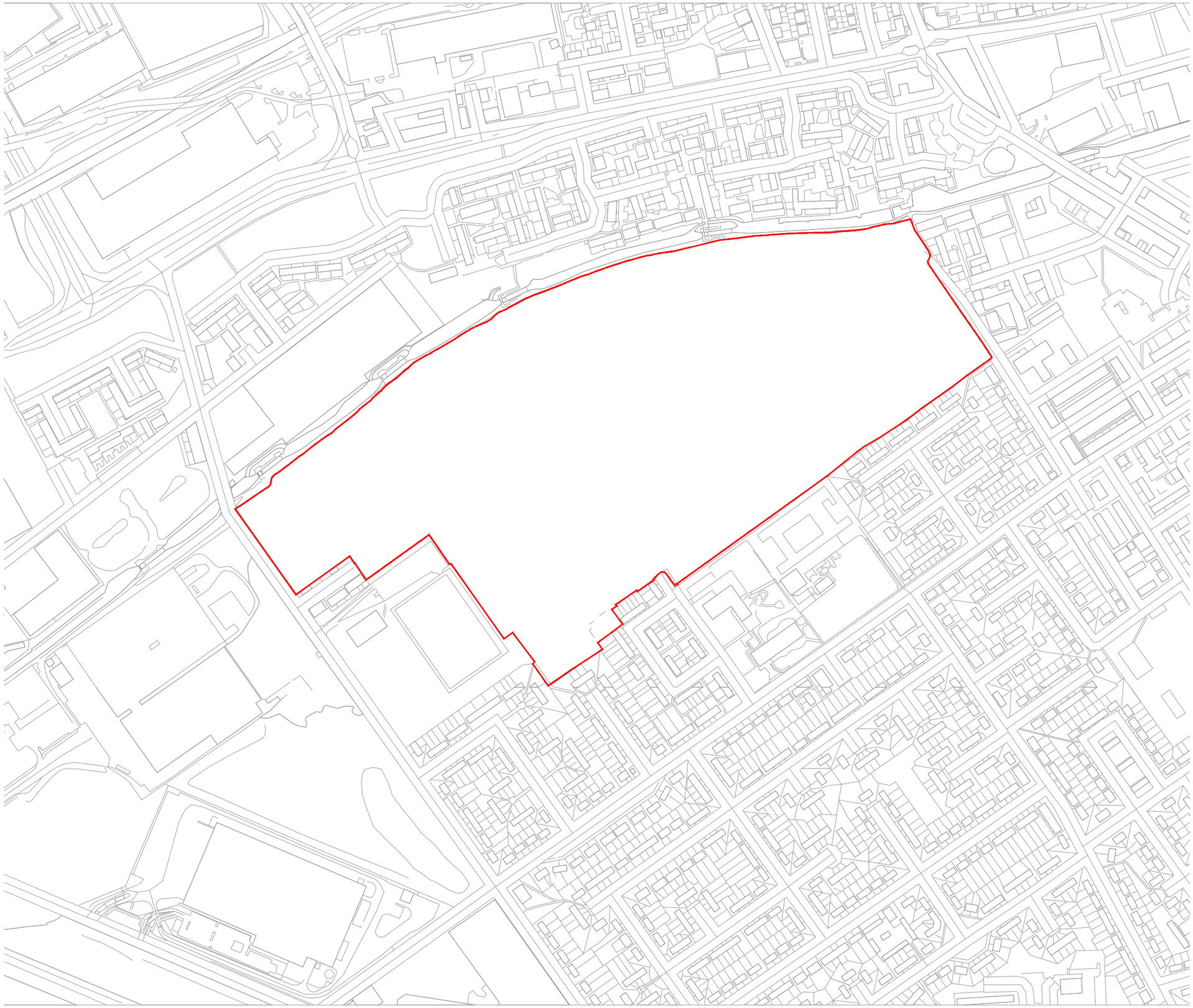
5.0 Summary

Table 5-1: Risk Summary Table

Hazard	Description	Probability	Consequence	Risk Classification	Mitigation
Underground Structures	Underground structures associated with the sites former industrial use may be present.	Low likelihood	Mild	Low	Removal during site turnover to 2mbgl.
Voids in Fill	Voids in landfill created by loose tipping of material potentially causing surface instability.	Unlikely	Mild	Very Low	None required.
Decomposition/Degradation	Decomposing/degrading waste causing settlement within the fill.	Unlikely	Mild	Very Low	None required. Segregation and disposal off-site if encountered.
	Decomposing/degrading waste within the fill generating ground gas.	Likely	Medium	Moderate	Outlined in VFLI Risk Assessment and Remediation Strategy likely to include gas protection measures in buildings.
Boreholes	Site investigation boreholes acting as a preferential pathway for contaminants.	Likely	Medium	Moderate	Decommissioning of boreholes in line with EA guidance.
Natural Ground Stability Hazards	Compressible ground.	Likely	Minor	Low	None required during remediation.

Appendix A

Drawings



Key:

Site Boundary

A3

Rev.	Description	Revised By	Date
	FIRST ISSUE		11-08-2023

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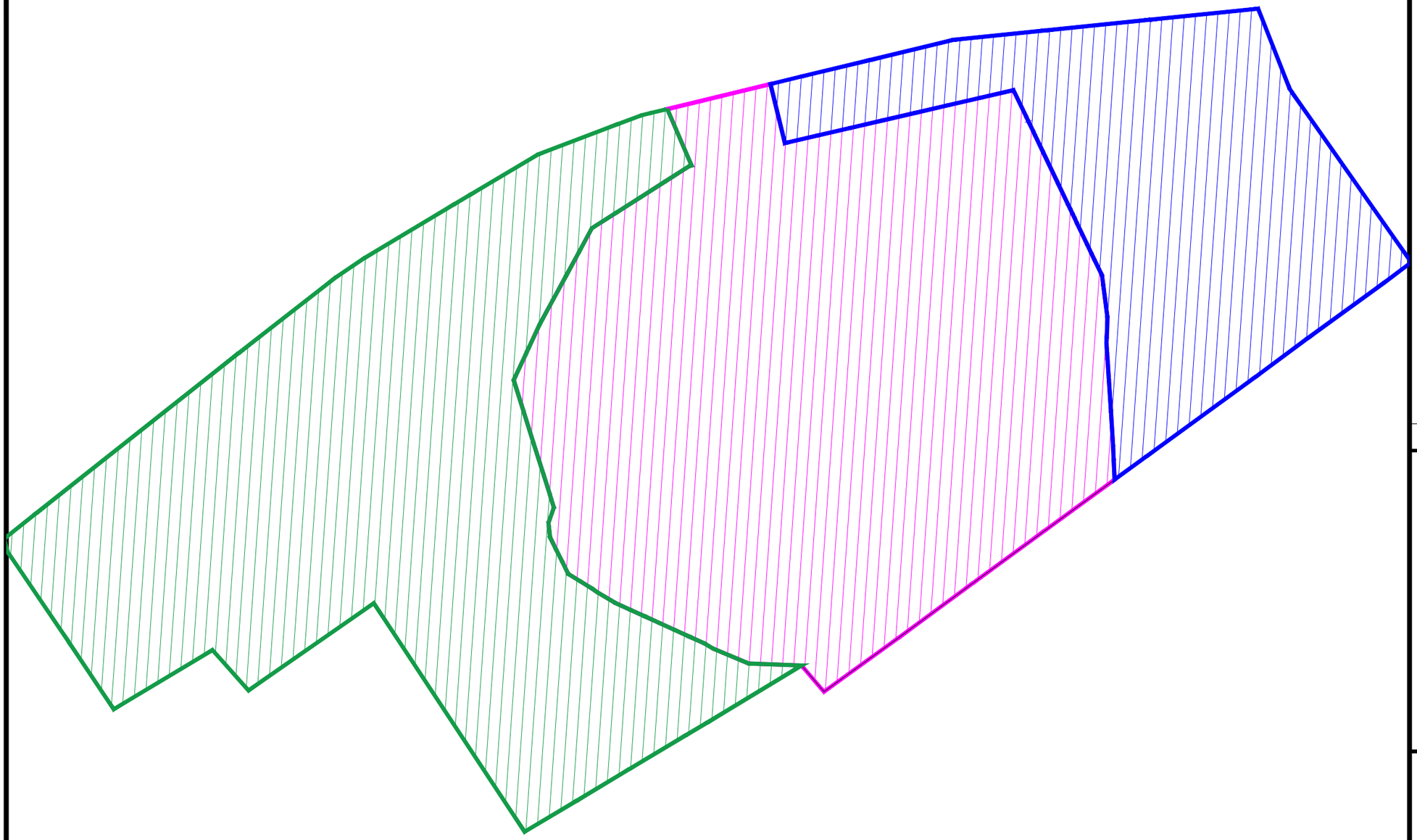
Ten Acres Lane
Manchester
M40 2SP

Title: Site Location Plan

Client: Your Housing Group Ltd

Drawn: JGL	Checked: RW	Approved: RW
Dwg: D1932_20	Contract: 1932YOU	Scale: 1:4000

A3



Key

- Predominantly Coal Measures Overburden
- Predominantly Landfill
- Predominantly Made Ground

Rev.	Description	Revised By	Date
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Ten Acres Lane
Manchester
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Title: Indicative Material Types/ Filling History

Client: Your Housing Group Ltd

Drawn: JGL	Checked: SE	Approved: AR
Dwg: D4744_17	Contract: 4744YOU	Scale: 1:2500

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