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Ardwick Green, Manchester

Report Type

Drainage Strategy

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Step Places

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Drainage Strategy

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1. Introduction

Civic Engineers has been commissioned by Step Places to provide Civil and Structural engineering consultancy for a proposed residential scheme on a brownfield site located adjacent to Ardwick Green.

The development is to include 2 blocks of 8 back-to-back, three-storey houses (16 in total), supported by 16no car parking spaces complete with electric car charging points, and communal refuse facilities. The development is part of the Neighbourhood Development Framework for Ardwick.

An extract of the proposed site plan by Coda Architects is extracted below in Figure 1 and is presented in Appendix A.

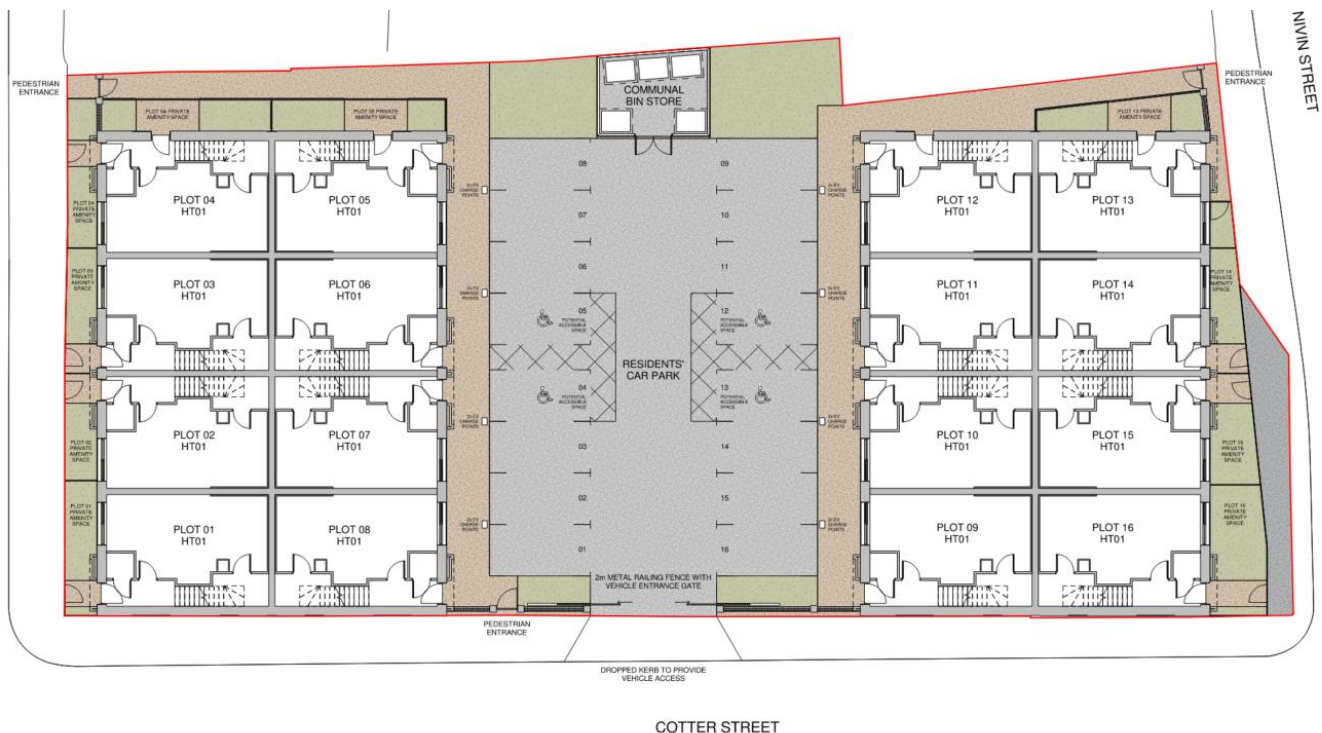


Figure 1 - Proposed THP Site Plan

This report details the existing drainage characteristics of the site, outlines the drainage strategy for the proposed development and summarises the mitigation of any adverse impacts of the development to the surrounding area.

This report is prepared for the exclusive use of Civic Engineers and the Step Places client team. All comments and conclusions in this report are based upon the assumption that the sourced data is reliable. Civic Engineers accepts no liability for any inaccurate conclusions or assumptions resulting from inaccurate information.

2. Site Details

2.1 Location

The site is approximately centred around National Grid Reference 385211, 397296 and the nearest post code is M12 6PQ. The site is currently vacant brownfield land in the ownership of Step Places, following the demolition of a two-storey house and garden that was located in the north-west corner of the site.

The scheme is situated south of the Manchester ring road and will be located at the junction of Ardwick Green North and Cotter Street, Manchester,

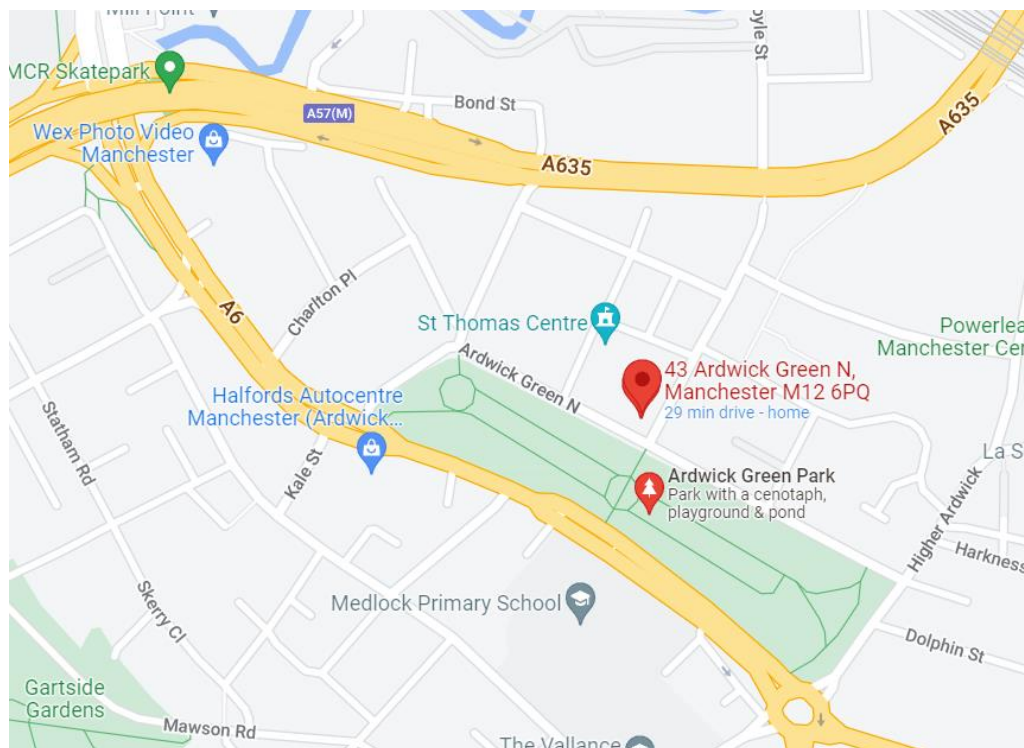


Figure 2 - Location of the Ardwick Green Residential Site

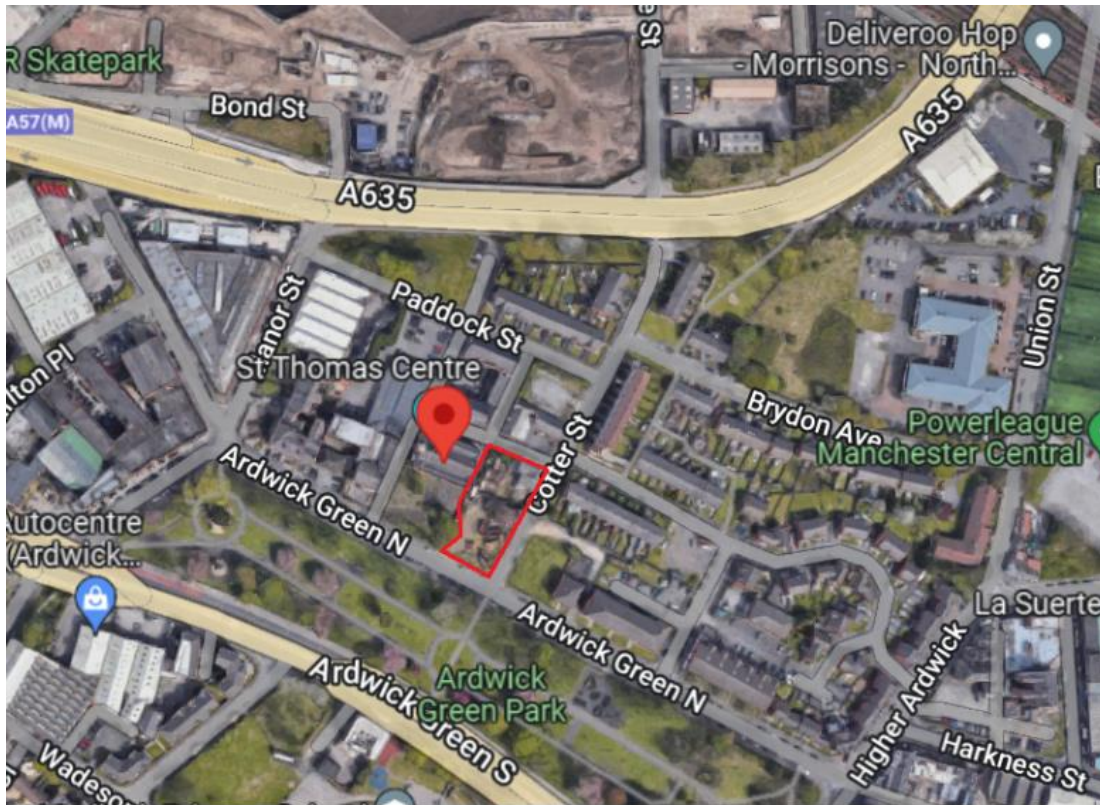


Figure 3 - Location of the Ardwick Green Planned Residential Site Red Line Boundary

2.2 Site Description

The site is predominately bound by residential houses and private use buildings with a small park area to the south.

Ground cover comprises of 50% tarmacadam and concrete on the west of the site, 30% crushed demolition rubble and 20% grassed area. Tarmacadam and concrete are in fair condition. Tree trunks observed on the east boundary line.

The site is sloping south with a level change of around 0.86m (approximate high spot of 42.11mAOD and an approximate low spot of 41.21mAOD).

The entirety of the site is located within Flood Zone 1 and is therefore at low risk of flooding from the Rivers and Sea.

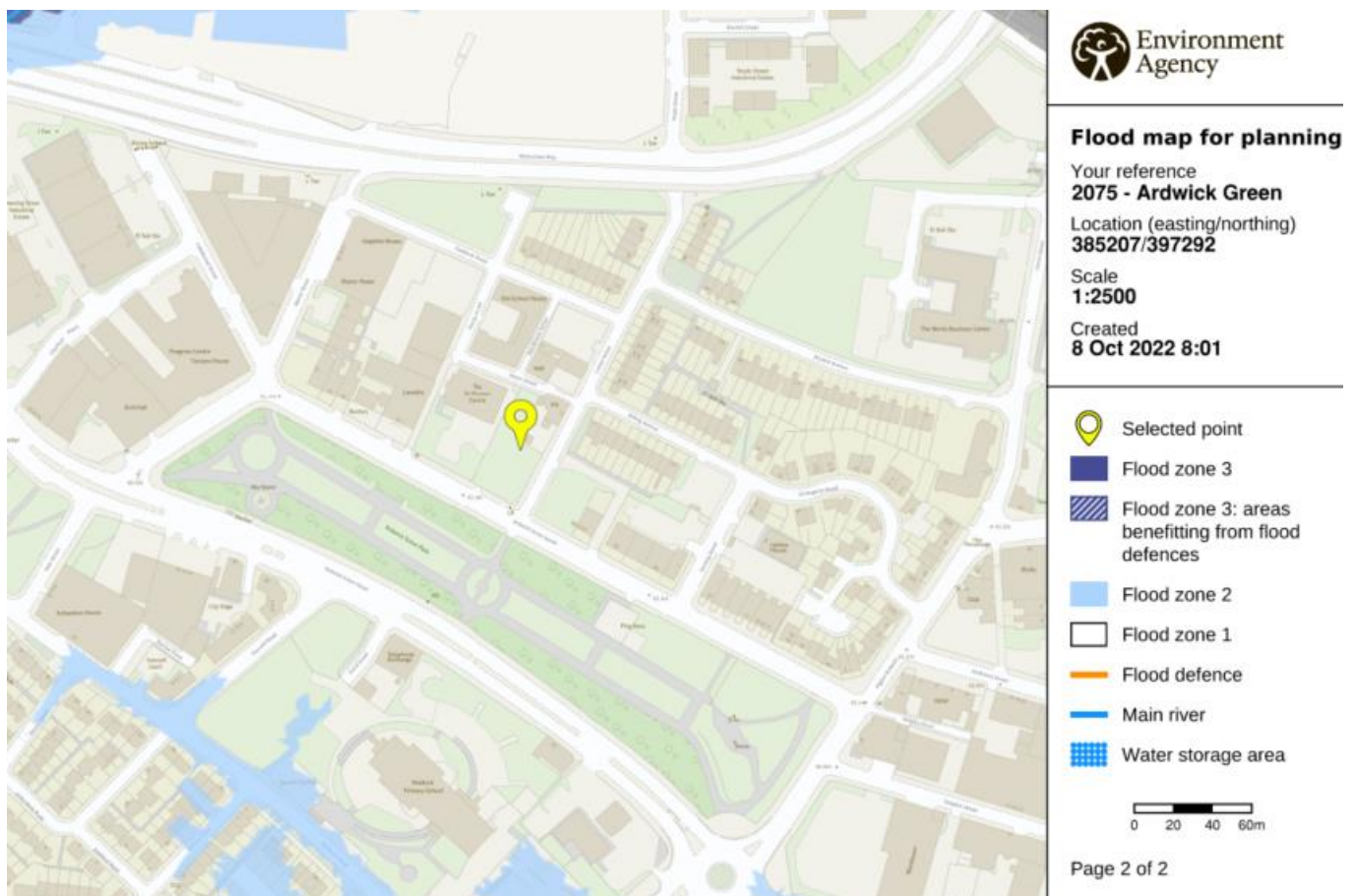


Figure 4 - Flood Map for Planning, EA

2.3 Existing Topography

A topographical survey has been provided by CODA Architects which was carried out in May 2018. An updated topographical survey has been procured which is included in Appendix B. The current survey shows that the site consists of overgrown vegetation with areas of tarmac. The site is predominantly flat, with a gradual slope to the south with an approximate high spot of 42.11m AOD and low of 41.21m AOD. Tree trunks have been observed on the east boundary line. Utilities including electric and gas are present just outside site boundary. Utilities maps are included in Appendix B.

2.4 Existing Geology

Geology

Review of the BGS Infiltration Report (included in Appendix C) indicates that the below ground strata of the site consist of:

- **Superficial Deposits:** Till (Diamicton – Poorly sorted sediment suspended in an unconsolidated matrix of mud or sand)
- **Bedrock:** Sandstone

There is no borehole log information available for the proposed site. The closest borehole is located 150m northwest of the site. The data shows the area is underlain by 1.8m of gravel followed by clay then sandstone beneath.

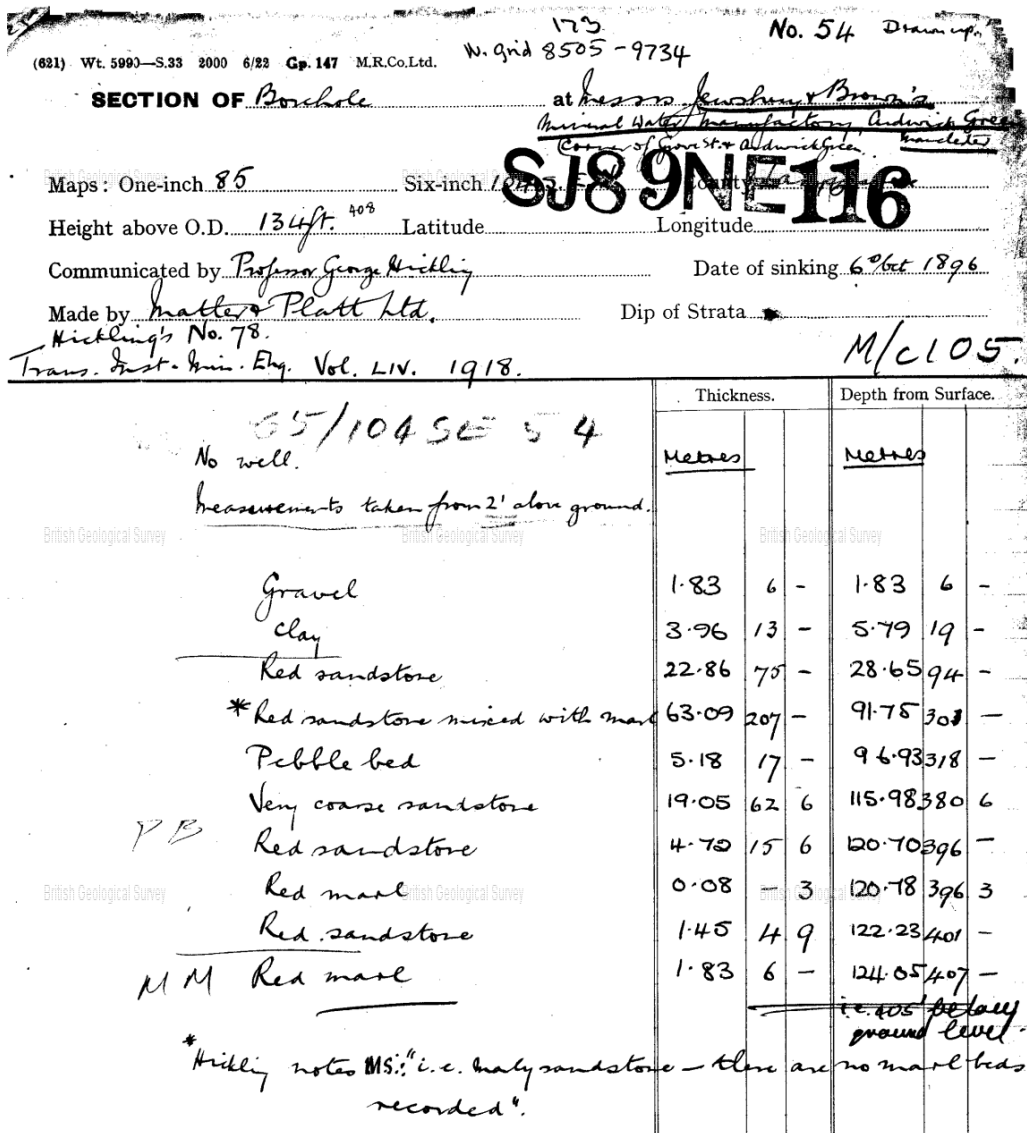


Figure 5 – Borehole scan located northwest of proposed site

Slope stability risk has been highlighted within the report, but increased infiltration is unlikely to cause instability. Increased infiltration is also unlikely to cause shrink-swell ground movement from the swelling of clay.

Groundwater

The site does not lie within a groundwater source protection zone. However, groundwater contamination is a risk from water percolating through the unsaturated zone to the groundwater through the fractures, a process which has little potential for contamination removal and breakdown.

However, from review of the EA magic map, the groundwater in the area is classed as medium to low risk of groundwater vulnerability (vulnerability of groundwater to pollutants discharged at ground level based on hydrogeological and soil properties).

A Phase 2 intrusive ground investigation will be required during the next design stage to confirm assumptions and develop proposals.

2.5 Existing Drainage

2.5.1 Sewers



Figure 6 - United Utilities map showing combined sewers and clean water

An asset map provided in December 2021 by United Utilities – the local sewer company – is enclosed in Appendix D. United Utilities records indicate the adjacent public infrastructure to be a combined sewer main running east to west along the site's southern boundary. There is also a combined sewer main running north to south on Cotter Street which starts to the north of the site and doesn't run alongside it. There are no public surface water sewers within the vicinity of the site.

2.5.2 Watercourses

There are no Environment Agency (EA) main rivers within the immediate vicinity of the development. The closest Identified main river is the river Medlock, located approximately 230m North of the site.

3. Proposed Surface Water Management Strategy

The proposed site is a brownfield site. There are no public or private sewers recorded within the site boundary.

A brownfield calculation has been completed using Micro Drainage and indicated the runoff rate to be 17L/s. A 30% betterment on the Brownfield rate gives a value of 11.9L/s. A PDE was submitted to UU on the 8th of October 2022.

A response from UU was received on the 20th of October confirming a rate of 3.5L/s. A later response from the LLFA was received on the 24th of October requesting a restricted rate of 5L/s to minimise the risk of blockages.

Runoff from the site will be managed in accordance with the H3 building requirements and will follow the preferred SUDS hierarchy.

Infiltration

The BGS infiltration report suggests that the below ground strata is made up of till, the LK Group Phase 1 Report found clay presence beneath the site, therefore indicating infiltration would not be feasible. Soakaway testing to BRE365 Standard will be required to confirm if infiltration is feasible.

Watercourse

The closest identified main river is the river Medlock, located approximately 230m North of the site. Due to distance and crossing number of 3rd party boundaries, connection to the river will not be feasible.

Sewer connection

UU Sewer records were provided by Drain alert, along with the CCTV survey on the 20th of October 2022.

The records show a combined network within Ardwick Green North to the south of the site and another combined manhole located within Cotter Street to the Northeast of the site.

Following consultation with UU and the LLFA, it has been agreed to discharge surface water to the manhole located within Ardwick Green North. Following examination of the site and the limited space available within the red line boundary, a connection upstream of the manhole located within Ardwick Green North has been proposed. This will require approval from UU.

UU agreed a rate of 3.5L/s and the LLFA have requested to increase this to 5L/s to avoid the risk of blockages.

The proposed surface water system will be designed to accommodate a 1 in 100-year storm plus 45% climate change event with no flooding.

The surface water strategy is detailed in the following sections. For the entire proposed development, the required attenuation for the proposed buildings will be achieved by utilising a suitable void ratio within the sub-base of permeable paving and the remaining attenuation will be provided from within the network.

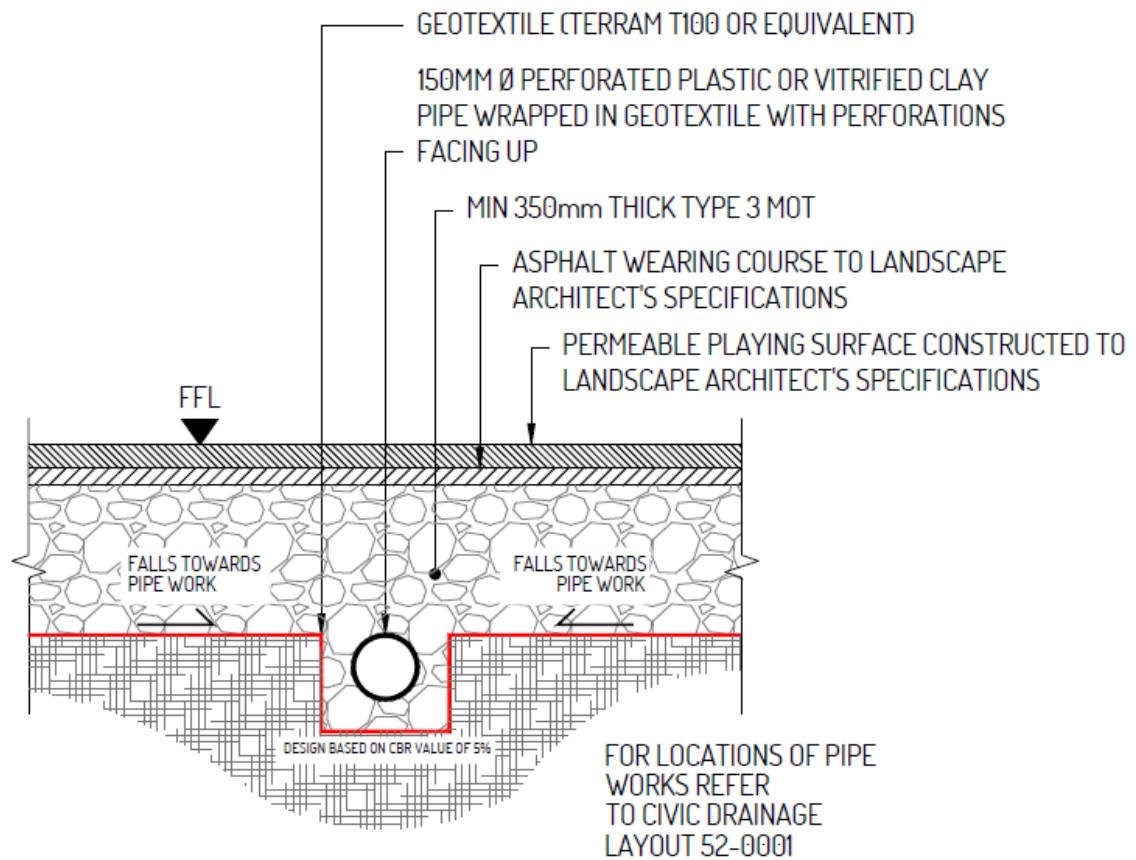
As the proposed terrain is generally flat, the current strategy has been designed with minimal gradients and cover to achieve a gravity network.

The drainage models have been developed for stage 2 and initial results indicate the model based on a 1 in 100+45% climate change, runs a functional system based on adequately sized pipes working in conjunction with permeable paving.

These models are currently a work in progress at time of issue and subject to change as layout develops.

The proposed surface water drainage strategy is presented in Appendix E. An extract is presented below in Figure 8. The drainage will be conveyed via a traditional pipe system to a combined

demarcation chamber shown in red. This will then be piped to the existing combined network within Ardwick Green North. This point of connection will require approval from UU.



PERMEABLE SURFACE AREA WITH PERFORATED DRAIN

Figure 7 – Permeable Paving Detail

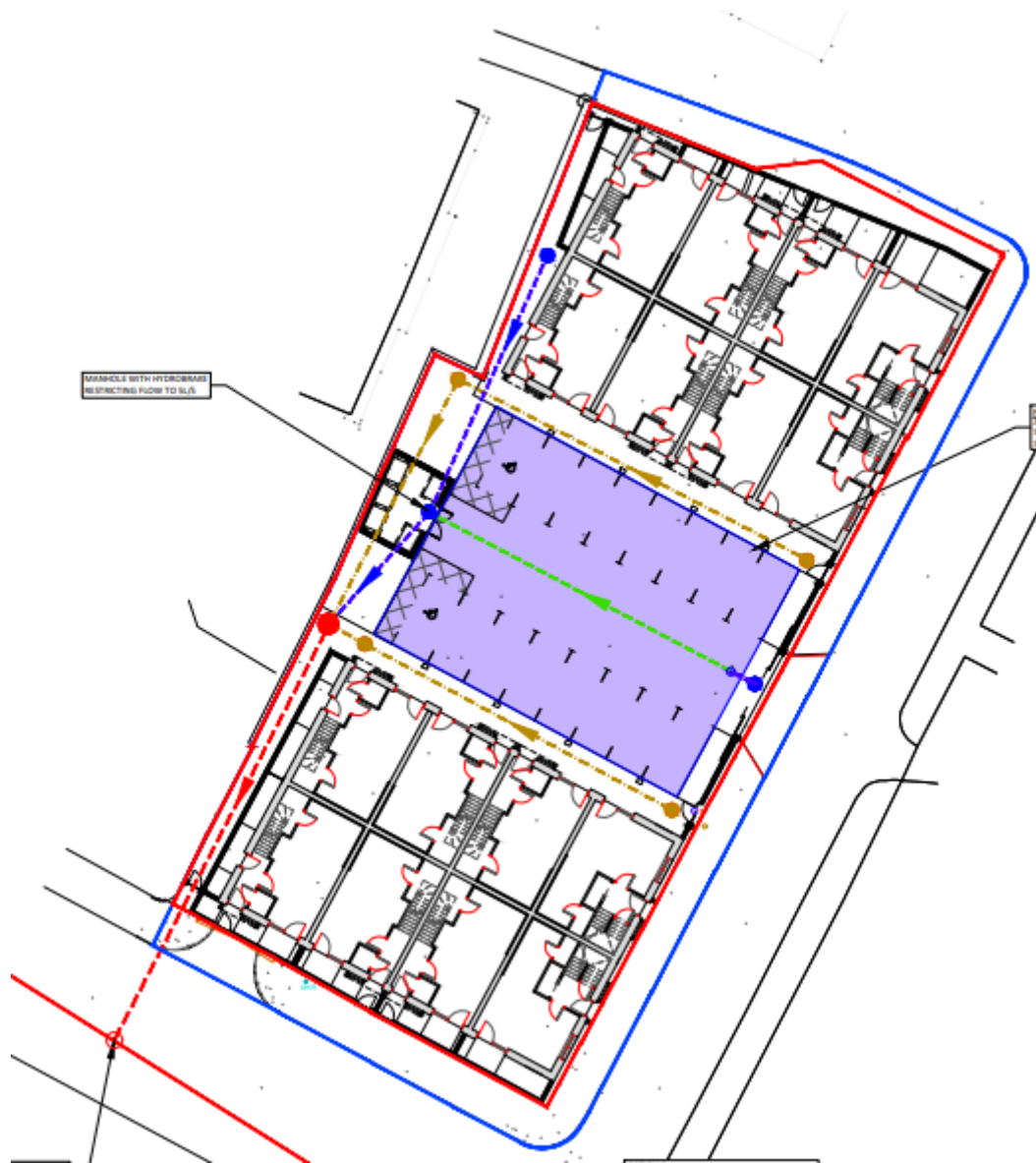


Figure 8 – Proposed Drainage Strategy Option

The current surface water drainage strategy is presented in Appendix E.

3.1 Foul Water Drainage Strategy

The Foul drainage will be conveyed via a traditional pipe system to a combined demarcation chamber shown in red. This will then be piped to the existing combined network within Ardwick Green North. This point of connection will require approval from UU.

The proposed foul network can be found along with the surface network in Figure 8 and in Appendix E.

4. Conclusions

Civic Engineers has been commissioned by Step Places to provide Civil and Structural engineering consultancy for a proposed residential scheme on a brownfield site located adjacent to Ardwick Green.

The development is to include 2 blocks of 8 back-to-back, three-storey houses (16 in total), supported by 16no car parking spaces complete with electric car charging points, and communal refuse facilities. The development is part of the Neighbourhood Development Framework for Ardwick.

The site is predominately bound by residential houses and private use buildings with a small park area to the south. The site is currently a brownfield site, formerly occupied by residential properties and public houses and there are no public or private sewers recorded within the site boundary. The proposed site red line boundary has an area of 0.15ha.

Following consultation with UU and the LLFA, it has been agreed to discharge surface water to the manhole located within Ardwick Green North. Following examination of the site and the limited space available within the red line boundary, a connection upstream of the manhole located within Ardwick Green North has been proposed. This will require approval from UU.

UU agreed a rate of 3.5l/s and the LLFA have requested to increase this to 5l/s to avoid the risk of blockages.

The proposed surface water system will be designed to accommodate a 1 in 100-year storm plus 45% climate change event with no flooding.

The attenuation required to accommodate the proposed site's impermeable area for the critical 1 in 100 year return period plus 40% climate change is 49.8m³.

Current SuDS proposals comprise the following:

- Permeable paving and associated sub-base storage

Runoff from the site shall be managed in accordance with the H3 building requirements and will follow the preferred SUDS hierarchy. Surface water discharge via infiltration is not considered feasible due to local BGS borehole data suggesting clay strata.

The current surface water discharge proposal is to connect to the existing combined sewer main on Ardwick Green North with a new manhole connection.

It is proposed that foul water drainage will be conveyed via a traditional pipe system to a combined demarcation chamber shown in red. This will then be piped to the existing combined network within Ardwick Green North. This point of connection will require approval from UU.

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