2 SEYMOUR ROAD
MANCHESTER

SUSTAINABLE DRAINAGE STRATEGY

Job Number: FRA 23 1091
Date: February 2024
Client: Minhaj-ul-Quran International



INCREASING LAND VALUE

LK GROUP

LK Consult Document Verification			
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Report Title	Sustainable Drainage Strategy		
Job Number	FRA 23 1091	**Document Ref.**	FRA 23 1091 - SUD - R0
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Prepared By	Ella Mcleod Jenna Lowe	**Reviewed By**	Colin Crompton

Revision Record			
Revision No.	**Date**	**Nature of Revision**	**Approved By**

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EXECUTIVE SUMMARY

Scope and Background

This Sustainable Drainage (SuDS) Strategy has been undertaken by LK Consult Ltd (LKC) to support a planning application for the development of 2 Seymour Road, Manchester. The development comprises a mixed-use religious and education facility.

LKC has prepared this SuDS Strategy in line with the NPPF and Technical Guidance where appropriate.

Consultations

Manchester City Council and United Utilities have been contacted during preparation of this report.

The Environment Agency (EA) website has been utilised to assess if there are any limitations that may affect the form of SuDS that may be appropriate to this site. The records show that the site is within Flood Zone 1.

Drainage Strategy

The ground conditions beneath the site are recorded as Glaciofluvial Sheet superficial deposits that mainly consist of very silty Sand over Manchester Marls Formation bedrock which have been confirmed by British Geological Survey (BGS) borehole records.

The site is sloping down from the south towards the north west.

The outline drainage strategy considers the use of an infiltration-based SuDS not to be feasible. It is assumed that surface water runoff arising from the development will discharge into the combined sewer on the northern boundary of the site.

The most effective strategy, in line with the SuDS management train, would be to have a detention facility at the northern boundary.

The estimated volume to be retained on site for the 1 in 30-year storm event including an allowance for climate change is **19.0m^3.**

The estimated volume to be retained on site for the 1 in 100-year storm event including an allowance for climate change is **40.1m^3.**

The flows from the site should be restricted to an acceptable level to the Lead Local Flood Authority and UU.

The proposed development will not change the proportion of the site covered by impermeable surfaces and will therefore generate similar runoff. However, attenuation will be required to formalise the drainage and limit the flow off site to the existing sewer system as the entire site consists of impermeable surface.

The estimated volume can be stored within the site boundary.

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1 Introduction

1.1 Background

LK Consult Ltd (LKC) were commissioned by Minhaj-ul-Quran International to carry out a Sustainable Drainage Strategy for 2 Seymour Road, Manchester. The report was undertaken in support of a future planning application to redevelop the site for a mixed-use religious and education centre.

The report will consider the impact of the development on surface water runoff accounting for climate change. The sustainable drainage assessment in Section 4 will provide an overview of the SuDS techniques which could be considered on the site.

This preliminary SuDS assessment complies with the principles presented in the Draft National Standards for Sustainable Drainage Systems (Defra, 2015)[1] and the Planning Practice Guidance (PPG) March 2014[2]. The sustainable drainage assessment is presented with reference to the hydrological and hydrogeological context of the development.

The report findings are based upon professional judgement and are summarised below. The report includes baseline data from the Environment Agency (EA), rainfall data from the Wallingford Studies and Hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

Drainage on the site has been assessed by considering the following key constraints:

- Topography of the site.
- Local water features and hydrological context.
- Underlying geology, soil types and permeability.
- Layout and geometry of the proposed development.

[1] Non-statutory Technical Standards for Sustainable Drainage Systems – DEFRA March 2015
[2] Planning Practice Guidance – Department for Communities and Local Government July 2021

1.2 Site Details

A summary of the general site details is presented in Table 1-1. Plans, Drawings and Figures are provided in Appendix A. Figure 1 indicates the site location and boundary.

Site Details	
Location	To the south of Seymour Road and to the east of Bury Old Road, Manchester, M8 5BG. Centred at approximate National Grid Reference 383778E 402037N.
Area	Approximately 1,360m^2.
Topography	c. 78.98 metres above ordnance datum (AOD) in the northwest of the site and c. 80.84mAOD in the south. Site is sloping down from the south towards the north west.
Current Land Use	Site Car garage with yard. Parts of building in disrepair. Surrounding Area/ Boundary Treatment North: Seymour Road and school beyond. East: Commercial building, soft landscaping and car park. South: Commercial buildings. West: Commercial buildings.
Proposed Development	Mixed-use religious and education centre. Access will be from Seymour Road.

Table 1-1: Summary of site details.

2 Site Setting

2.1 Environmental Setting

LKC has undertaken a review of public domain information including British Geological Survey data, Environment Agency data, historical mapping, and aerial photography to provide a summary of the environmental setting of the site. This is summarised in Table 2-1 below.

Summary of the Environmental Setting			
Geology	Superficial		Glaciofluvial Sheet Deposits (sand and gravel).
	Bedrock		Manchester Marls Formation (mudstone).
	BGS Boreholes		BH Ref: SD80SW475, 190m SW: made ground to 0.6m, loose sand to 4.3m, compact silty sand to 8.7m, loose silty sand to 12.2m, very silty sand (running) to 15.2m.
	Defra Soilscape Mapping		Type 10: freely draining slightly acid sandy soils.
Hydrogeology	Aquifer Designation	Superficial	Secondary A Aquifer.
		Bedrock	Secondary B Aquifer.
	Source Protection Zone (SPZ)		Site not within an SPZ.
Flood Zone (EA)	The site is within Fluvial Flood Zone 1. Flood Zone 1: Very Low risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000).		
Hydrology	All adjacent and internal surface water		None.
Site History			1844-45 mapping – rear gardens of terraced houses located within site boundary. Gardens to the east and residential properties surrounding site. 1890 until 1938 mapping – site lies within landscaped gardens with outbuildings present. Cemetery to the south-east. 1949-1952 mapping – unreferenced building on site and residential land use surrounding. Cemetery to the south-east. 1951-1967 – schools to the north. Cemetery to the south-east. Former ponds / watercourses not identified on historical mapping.

Table 2-1: Summary of the Environmental Setting.

2.2 Site Levels

A topographic survey of the site was not provided, therefore opensource LiDAR levels have been extracted to OS GPS datum, and information is included on the drawings in Appendix B. The site falls gently down to the north over a length of approximately 53m. The final site levels and ground floor levels of the building have not yet been determined. The proposed access would join Seymour Road at around 78.76m AOD.

3 Consultation

Information from consultees is summarised in Table 3-1 below.

Relevant correspondence is provided in Appendix C.

Source	Details	
Manchester City Council (LLFA)	LKC contacted Manchester City Council however no information has been provided at the time of writing. The site is located within a Critical Drainage Area. In line with statutory for Brownfield sites surface water discharge should be limited to greenfield run-off rates. Where this is not achievable the surface water discharge rate should be in line with the Manchester, Salford, and Trafford SFRA User Guide which states: "Developments should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100-year storm event, considering climate change". Foul drainage from developments should be in line with Approved Document H of the Building Regulations.	
United Utilities (UU)	Sewer Map	There is a 300mm diameter public combined sewer to the north of site flowing in a east to west direction. There is a 150mm diameter public combined water sewer to the west of site flowing in a west to east direction and terminating at a manhole.
	Likely conditions for connecting into their sewerage system	United Utilities would request conditions for a separate system with only foul draining to foul / combined sewers and surface water draining to soakaway/SuDS, watercourse or surface water sewer. All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80 of the National Planning Practice Guidance. Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible. If not feasible, UU will consider a connection to the 300mm diameter public combined sewer located in Seymour Road at a pass forward flow to be agreed by the Lead Local Flood Authority. UU request that any agreed rate does not exceed 5l/s. Foul flow from this site will be allowed to drain into the public combined sewer system. UU's preferred point of discharge would be to the 300mm diameter public combined sewer within Seymour Road at an unrestricted rate. United Utilities confirmed that they did not have any record of internal or external sewer flooding of properties in the vicinity of the site as a result of overloaded sewers.

Table 3-1: Summary of Consultee Information.

4 Sustainable Drainage Strategy

4.1 Introduction

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development worsening the flood risk. The effective disposal of surface water from development is a material planning consideration in determining proposals for the development and use of land.

The accepted principles are that surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

The Building Regulations Requirement H3[3] stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

- an adequate soakaway or other adequate infiltration system,
- a watercourse or, where that is not practicable,
- a sewer.

The concept of a sustainable drainage system has been incorporated into the outline drainage strategy for the study area in order to comply with the Flood and Water Management Act 2010[4].

Suitability of different SuDS will be governed by prevailing site conditions, such as the type and scale of development, topography, ground conditions (soil permeability, ground stability, depth to water table), local hydrogeology and risk of groundwater contamination (presence of sensitive aquifers and source protection zones) etc.

4.2 Sustainable Drainage Hierarchy

4.2.1 Infiltration

The Groundwater Source Protection Zone mapping from the EA website shows that the site is not within any identified protection zones. A summary of the BGS superficial and bedrock aquifer descriptions and classifications supplemented by local records is shown in Table 4-1 below:

Classification	Description	Recorded Water Table Depth	Soakaway Potential
Glaciofluvial Sheet Deposits	Very silty sand	N/A	Moderate
Manchester Marls Formation Bedrock	Mudstone	N/A	Limited

Table 4-1: Geological and Hydrogeological Setting.

[3] Building Regulations part H3 2010: Approved Document, Drainage and Waste Disposal.
[4] Flood and Water Management Act 2010: UK Government.

Infiltration methods such as soakaways are unlikely to be feasible given the proximity of residential and commercial properties in relation to the site, but this may be investigated further at the detailed design stage, if required.

4.2.2 Watercourses

There are no observable watercourses within or near the boundary of the site. Currently surface water from the site runs overland to the north west.

4.2.3 Public Sewer

There is a 300mm diameter public combined sewer to the north of site.

There is a 150mm diameter public combined sewer to the west of site.

4.3 Surface Water Drainage Strategy

Following the assessment of the site settings and existing constraints to the development. The drainage options relating to the final discharge of surface water for this section of the site are listed in Table 4-2 in order of priority within the NPPF:

Option No:	Drainage Solution	Most feasible solution	Reasoning
a	Soakaway/Infiltration	2	Not likely to be feasible as the site is constrained by the proximity of the adjacent properties and roads.
b	Connection to Watercourse	N/A	Not feasible as there are no known watercourses within or adjacent to the site.
c	Discharge into a sewer	1	A connection into the 300mm diameter combined sewer in Seymour Road would be possible – subject to approval from LLFA and connection consent from UU.

Table 4-2: Drainage options.

Table 4-3 provides a summary of the SuDS options appraisal with consideration of CIRIA C753 (The SUDS Manual)[5] for the development:

SuDS Option	Appropriate to Development	Comments	Benefits	Description
Infiltration				
Soakaways	X	Due to the nature of the ground conditions, the use of infiltration systems may not be feasible.	Water quantity Water quality	Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.
Infiltration basin	X	Depressions that store and dispose of water via infiltration. May not be appropriate given the ground conditions.	Water quantity Water quality Biodiversity Amenity	Infiltration basin reduces the volume of runoff from a drainage area, can be very effective at pollutant removal via filtering through the soils, contributes to groundwater recharge and baseflow augmentation. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.
Infiltration trench	X	Infiltration trenches are shallow excavations with rubble or stone.	Water quantity Water quality Amenity	An Infiltration trench can create temporary subsurface storage of stormwater runoff, thereby enhancing the natural capacity of the ground to store and drain water. Infiltration trenches allow water to dissipate into the surrounding soils from the bottom and sides of the trench where runoff is treated by physical filtration, adsorption and biochemical reactions involving micro-organisms growing in the soil. Infiltration trenches are easy to integrate into a site. They are ideal for use around playing fields, recreational areas, or public open space.
Rain gardens	*	Rain gardens are relatively small depressions in the ground that are planted up with native vegetation. Most likely to be implemented on private property close to buildings on relatively flat areas.	Amenity Biodiversity Water quality Water quantity	Attractive features that can help to improve open space. Can be planned as landscaping features. Flexible layout to fit into landscape. Runoff can be treated by physical filtration to remove solids, by absorption and removal by biochemical reactions involving micro-organisms growing on the soil. They can reduce rate of run off and provide some volume reduction.
Filtration				
Filter drain / trench	X	Linear trenches filled with a permeable granular material, often with a perforated pipe in the base of the trench.	Water quantity Water quality	Filter trenches create temporary subsurface storage of stormwater runoff and provide stormwater treatment. These trenches can be used to filter and convey stormwater to downstream SuDS components.
Filter strip	X	Engineered filters that use vegetation to remove and treat runoff. The filter strip is sloped to allow sheet flow across the vegetated strip. May not be appropriate given the site topography.	Water quality Amenity Biodiversity	A filter strip offers no storage and is used solely to remove pollutants from surface water. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. A filter strip features medium amenity potential. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat.

Table 4-3: Summary of the SuDS options appraisal.

[5] CIRIA C753 - The SUDS Manual. London 2015.

SuDS Option	Appropriate to Development	Comments	Benefits	Description
Retention & Detention				
Detention basin	X	Dry depressions designed to hold water for a specific retention time. Basins tend to be found towards the end of the SuDS management train, so are used if extended treatment of the runoff is required or if they are required for wildlife or landscape reasons.	Water quantity Water quality Biodiversity Amenity	Detention basins provide flow control through attenuation of stormwater runoff for a wide range of rainfall events. Basins treat runoff in a variety of ways: settlement of solids in still or slow moving water, adsorption by the soil, biological activity. Basins offer many opportunities for the landscape designer. Basins should not be built on but can be used for sports and recreation. Basins can be part of public open space.
Attenuation Ponds	X	Attenuation ponds can be used to offset the increase in surface water flows attributable to increased area of hard standing, in order to minimise the risk of flooding to and from the proposed development.	Water quantity Water quality Biodiversity Amenity	Ponds will attenuate the surface water flow prior to discharging to the public surface water sewers. The storage volume afforded by these features should not include any permanent water in the pond. Ponds treat runoff in a variety of ways: settlement of solids in still water (having plants in the water enhances calm conditions and promotes settlement), adsorption by aquatic vegetation, biological activity. Permanently wet ponds can be used to store water for reuse and offer excellent opportunities for the provision of wildlife habitats. Ponds can be part of public open space.
Geo-cellular storage systems	✓	Modular block systems can be used to provide an underground storage facility. Any geo-cellular storage systems should be lined with a geo-membrane to provide attenuation storage.	Water quantity	Geo-cellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. Geo-cellular storage systems provide high storage volume capacity High void ratios (up to 96%). Capable of managing high flow events.
Oversized Pipes	✓	Oversizing the pipes that make up the on-site drainage network is a cost-effective method for providing attenuation storage within the network. Such systems could be considered on the parts of the development where gradients are relatively flat.	Water quantity	Oversized pipes can reduce rate of run off and provide some volume reduction.
Tanks	✓	Prefabricated underground tanks could be considered at the detailed design stage in order to provide storage to attenuate surface water runoff.	Water quantity	Storage tanks can be used to control and manage rainwater surface water runoff providing high storage volume capacity. Tanks are capable of managing high flow events.

Table 4-3 (continued): Summary of the SuDS options appraisal.

SuDS Option	Appropriate to Development	Comments	Benefits	Description
Swales & conveyance channels				
Swales	X	Swales are shallow grass-lined channels that provide capacity for conveying flows at a controlled rate into ponds and watercourses.	Water quality Biodiversity Amenity Water quantity	Swales are effective at removing polluting suspended solids through filtration and sedimentation. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. Swales are often integrated into the surrounding land use. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat. Swales are usually designed as conveyance systems but can also be designed with check dams to increase attenuation and, where applicable, infiltration.
Channels & rills	X	Channels and rills are open surface water channels with hard edges.	Water quality Amenity Water quantity Biodiversity	Effective in water & pollution treatment. Can act as pre-treatment to remove silt before water is conveyed into further SuDS features. Can be visually appealing in urban landscapes. Amenity value for the local community and biodiversity value (design dependant).
Control structures				
Flow control devices	✓	Flow control devices e.g. hydro-brake style flow control systems, and restricted orifices enable the discharge to be restricted to a constant rate from the development.	Water quantity	Control the peak flow. Complex controls can reduce upstream storage requirements.
Inlets, outlets and controls	X	There are many different designs and variations, including landscaped pipes, perforated pipes, weirs.	Water quality Amenity	Inlets, outlets and other control structures are key elements of well-designed SuDS. Inlet and outlet features allow water to flow into and out of features and also limit the rate at which water flows along and out of the system. There are many different approaches and products available and they can be easily designed to add interest to the urban landscape. Can provide accurate flow control from one SuDS feature to another.
Source control				
Green roofs	*	Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover/landscaping.	Water quality Water quantity Amenity Biodiversity	Green roof installations can help to reduce surface water runoff from roof areas depending on the system specified. Good removal capability of atmospherically deposited urban pollutants. Ecological, aesthetic and amenity benefits.
Blue roofs	*	A blue roof is a roof design that is explicitly intended to store water, typically rainfall.	Water quantity Amenity Biodiversity	Blue roofs are designed to attenuate and manage stormwater on a flat roof in urban areas where options for ground-based attenuation systems are limited, and in particular, where construction is being carried out within flood sensitive areas. Amenity value for the local community

Table 4-3 (continued): Summary of the SuDS options appraisal.

SuDS Option	Appropriate to Development	Comments	Benefits	Description
Rainwater harvesting	*	Rainwater harvesting collects the rain which falls onto roofs, then stores it in a tank until required for a non-potable use.	Water quantity	In the process, a volume of water is kept out of the storm-water management system, thereby helping to reduce flooding risks. When required, the water is pumped to the point of use, thus displacing what would otherwise be a demand for mains-water. Reduces demand on mains water.
Permeable Pavements – with granular and geo-cellular storage systems	✓	Permeable pavements allow inflow of rainwater into underlying construction. Any geo-cellular storage systems would have to be lined with an impermeable membrane to provide storage rather than infiltration for runoff from highways.	Water quality Water quantity	Reduced peak flows to watercourses, reducing the risk of flooding downstream. Reduced effects of pollution in runoff on the environment.
Other SuDS				
Wetlands	X	These comprise of shallow ponds and marshy areas, covered almost entirely in aquatic vegetation.	Water quality Water quantity Amenity Biodiversity	Wetlands provide both stormwater attenuation and treatment. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminates by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.

Table 4-3 (continued): Summary of the SuDS options appraisal.

Notes

✓ Suitable for use given the nature and scale of the development

* Possibly suitable for use – not included in the client and architect design proposal at present

X Not suitable

4.4 Surface Water Attenuation Requirements

In accordance with the non-statutory guidance, the flow from this development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites as the site is located within a Critical Drainage Area, with an aim of reducing runoff to Greenfield rates up to a 1 in 100-year storm event, considering climate change.

It is estimated from the supplied plan (see Appendix A) that the site will have the following designated areas (Table 4-4).

Designated Areas	Plot Area
Total area (m^2)	1360
Existing Impermeable Area (m^2)	1360
Green Infrastructure (m^2)	0
Contributing Catchment	
Developable Area (m^2)	1360
Impermeable Area (m^2)	1360
Permeable Area (m^2)	0

Table 4-4: Assumed plot areas.

It can be seen that there is no change in impermeable area from the existing usage to the proposed. This is likely to require attenuation to reduce the existing flow off site to a level which is acceptable to the LLFA and to UU.

4.4.1 Attenuation Estimate

Surface water storage and greenfield runoff estimations based on the HR Wallingford procedure have been undertaken for the development and the output report is presented in Appendix E.

For the contributing catchment an estimate has been produced assuming a developable area of 1360m^2 from the plot. This gives the following runoff rates and attenuation requirements for this section based on the Wallingford method:

- Q_{bar}: 0.910 l/s
- 1 in 1-year greenfield runoff rate: 0.771 l/s
- 1 in 30-year greenfield runoff rate: 1.524 l/s
- 1 in 100-year greenfield runoff rate: 1.904 l/s

- Q_{bar}: 17.40 l/s
- 1 in 1-year peak runoff rate: 12.20 l/s
- 1 in 30-year peak runoff rate: 30.70 l/s
- 1 in 100-year peak runoff rate: 38.80 l/s

This reduced by 50% would give the following rates:

- Q_{bar}: 8.70 l/s
- 1 in 1-year peak runoff rate: 6.10 l/s
- 1 in 30-year peak runoff rate: 15.35 l/s
- 1 in 100-year peak runoff rate: 19.40 l/s

4.4.2 Discharge Rate

Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g., the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply.

Peak flow control

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Volume control

S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

UU has specified an allowable discharge rate of 5l/s to their adjacent combined water sewer.

The following attenuation has been estimated for the development using 5l/s runoff rates and utilises the FSR methodology[6] as:

- Attenuation storage volume: **19.0 m³** (1 in 30 year event + 35% Climate Change)
- Retention on site volume: **40.1 m³** (1 in 100 year + 45% Climate Change)

Attenuation storage aims to limit the peak rate of runoff from the development to the 5l/s runoff for a range of annual flow rate probabilities before discharging into a sewer. As the flow from the development would be restricted there should be little change in the flows that enter the public sewer and thus the risk of flooding as a result from the development should be negligible.

The attenuation required for a 1 in 30-year storm event, requires a storage volume of **19.0 m³**. For the 1 in 100-year event, a storage capacity of **40.1 m³** will be required from on-site storage as well as SuDS systems. All volumes can be stored within the site boundary and discharges will be limited by flow control devices to the adjacent sewer.

4.5 Site Specific SuDS

The use of attenuation SuDS are deemed to be the most feasible and practical option for the development. The attenuation tank or similar will provide the required storage volume to limit peak runoff arising from the development.

[6] Flood Studies Report Wallingford NERC 1975.

Utilisation of a flow control device at the end of the system will control the peak flow rates.

The use of permeable paving may be viable dependant on the detailed design of the proposed development. If this drainage technique is considered to be feasible then it will reduce the requirement for attenuation as it will reduce the contributing impermeable area. The permeable paving will also provide some level of water treatment reducing effects of pollution in runoff on the environment.

Assuming that the outline drainage strategy is acceptable to the Local Authority, a more detailed design can be presented and agreed with the appropriate regulatory bodies during the detailed design phase.

4.6 Foul Drainage

The potential foul drainage strategy is considered elsewhere.

5 Conclusion

The site is currently a car garage with yard. The proposal is a mixed-use religious and educational centre.

An assessment of the site settings and existing constraints in conjunction with the development proposals have resulted in the following recommendations for the safe development of the site:

- The site is considered to be too constrained due to the existing topography and proximity of the adjacent properties for the use of soakaway.
- Giving the existing ground conditions on site, which have been confirmed by the Ground Investigation, the use of infiltration SuDS for surface water disposal will not be practical.
- The attenuation required for a 1 in 30 year event, requires a storage volume of **19.0 m^3** and for the 1 in 100-year event, a storage capacity of **40.1 m^3** will be required from on-site storage as well as SuDS systems.
- The suitability and depth of a potential connection into the adjacent sewer should be confirmed on site.
- There is no existing connection of the site to the adjacent public sewers. A pre-development advice enquiry received from United Utilities considered that a flow rate of 5l/s would be acceptable if infiltration proved to be impractical.
- All proposed outflow connections from the development should be agreed with the Lead Local Planning Authority and United Utilities.

APPENDIX A

FIGURES, PLANS AND DRAWINGS



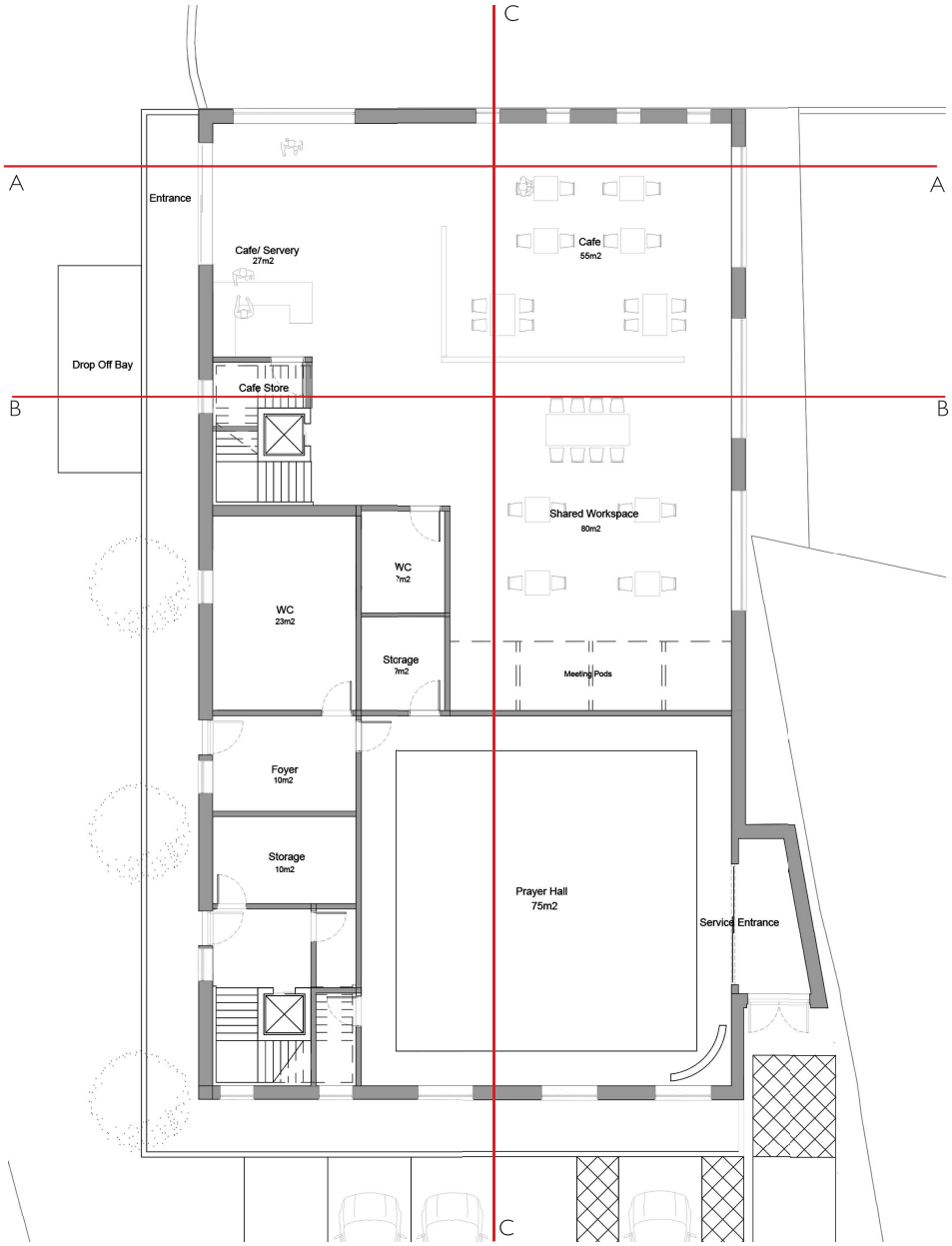


Client: Minhaj-ul-Quran International		Title: Site Location & Boundary Plan	
Site: 2 Seymour Road, Manchester		Scale (see scale bar): 1:15,000 & 1:750 @ A4	Figure: 1
Job No.: FRA 23 1091	Drawn By: JL	Checked By: CC	Drawn: Jan 2024

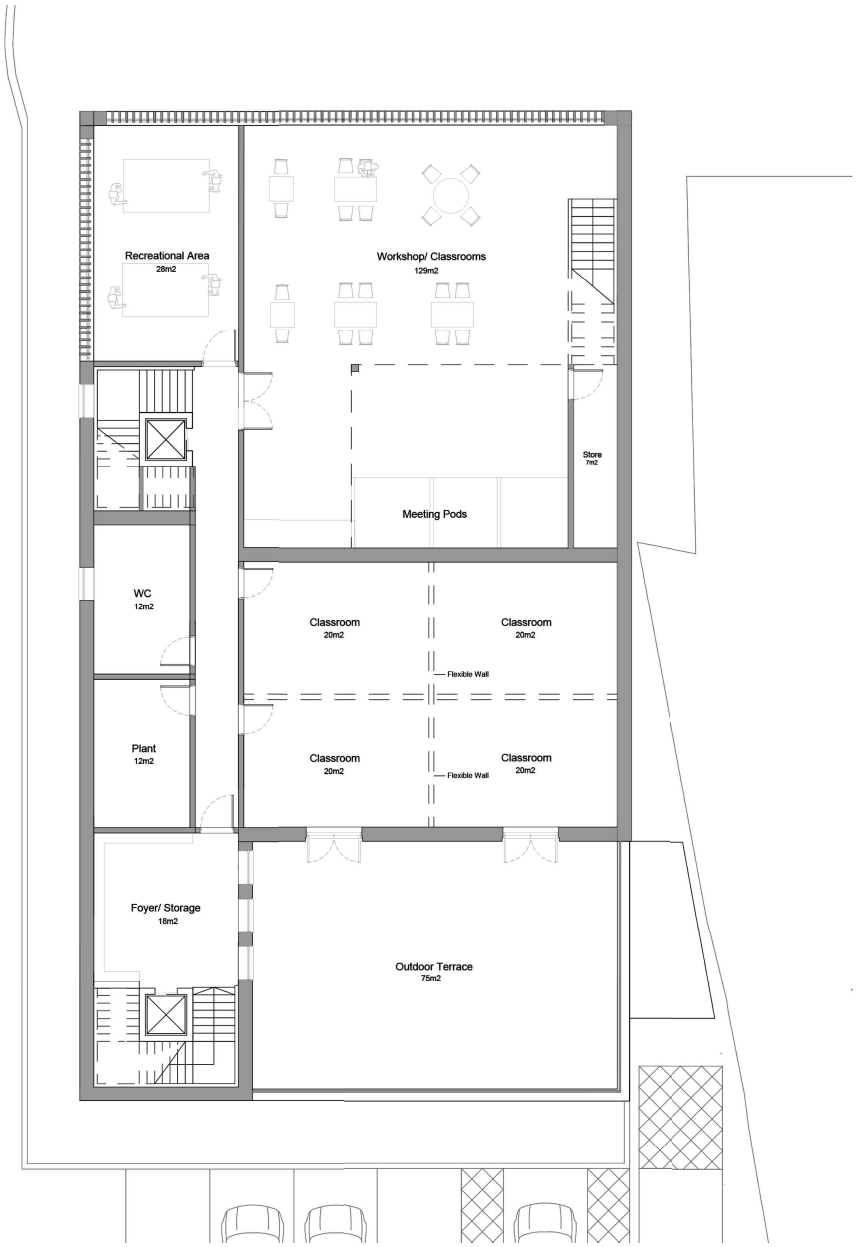
Revision:

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5.5 Plans



Ground Floor Plan

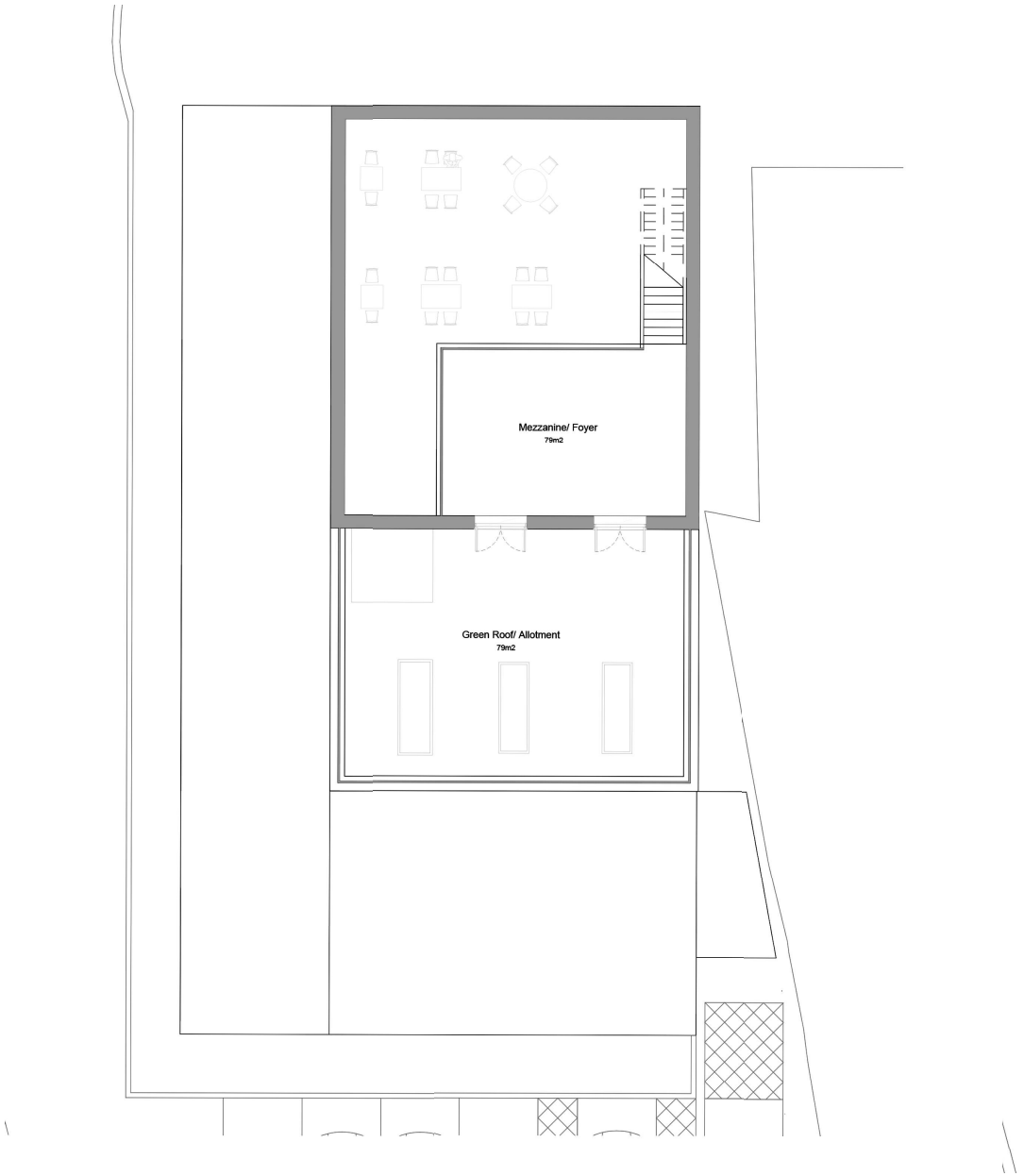


First Floor Plan

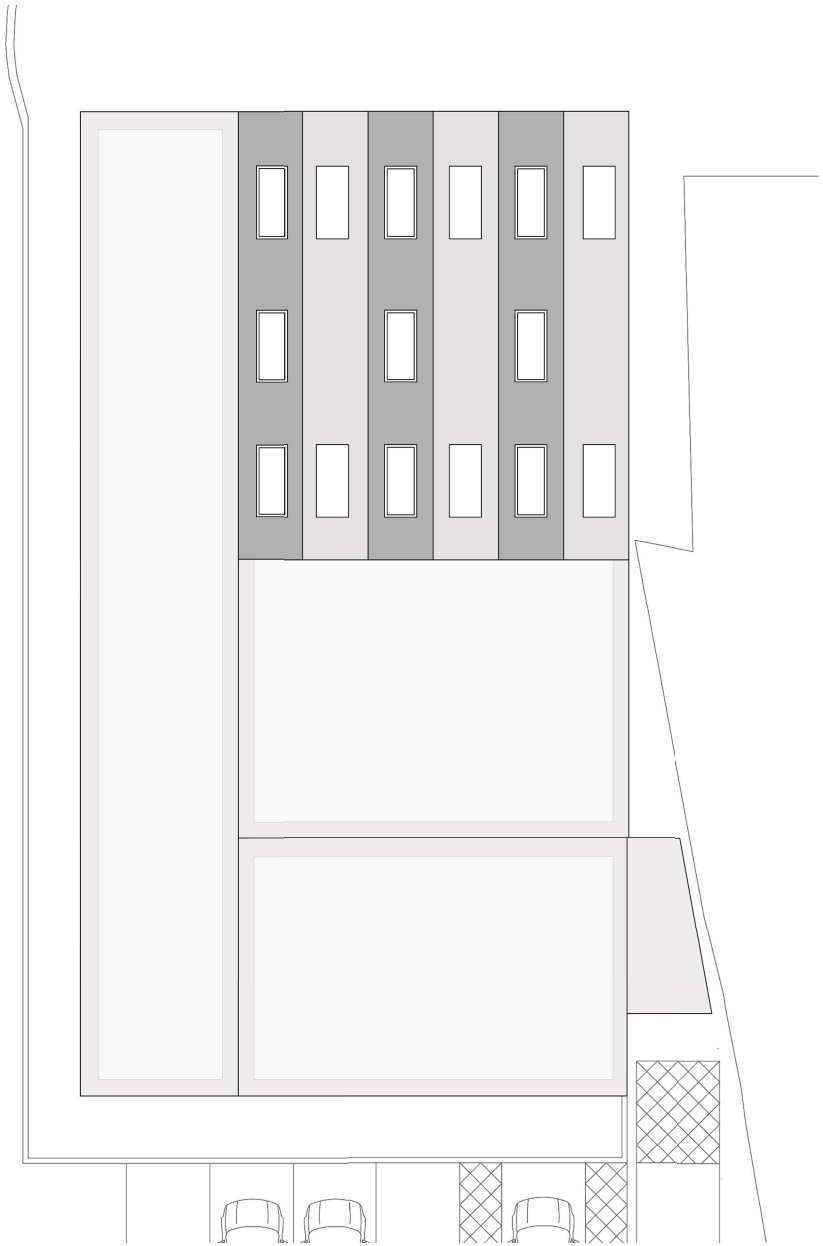
APPENDIX B

SITE INFORMATION

5.5 Plans

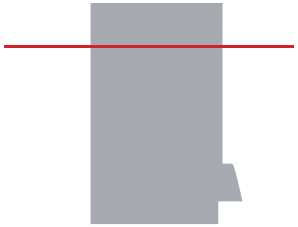


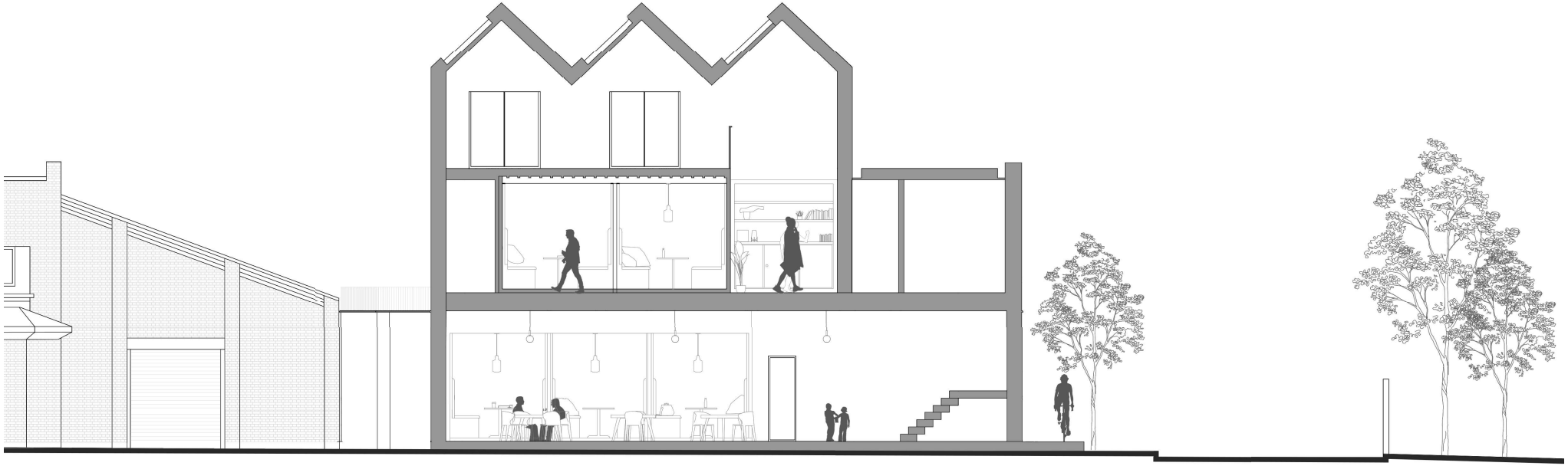
Mezzanine Plan



Roof Plan

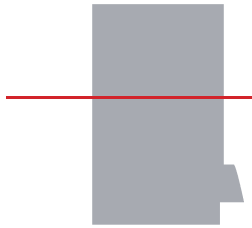
5.6 Sections

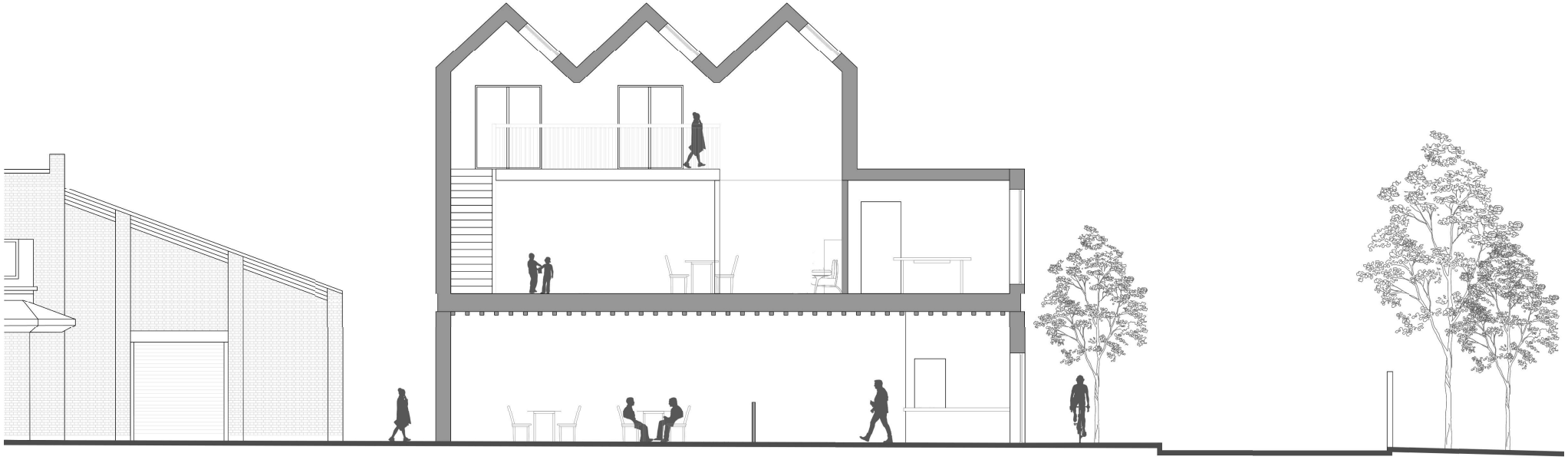




Section A-A

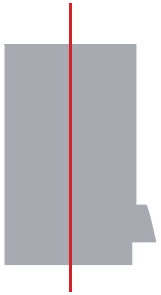
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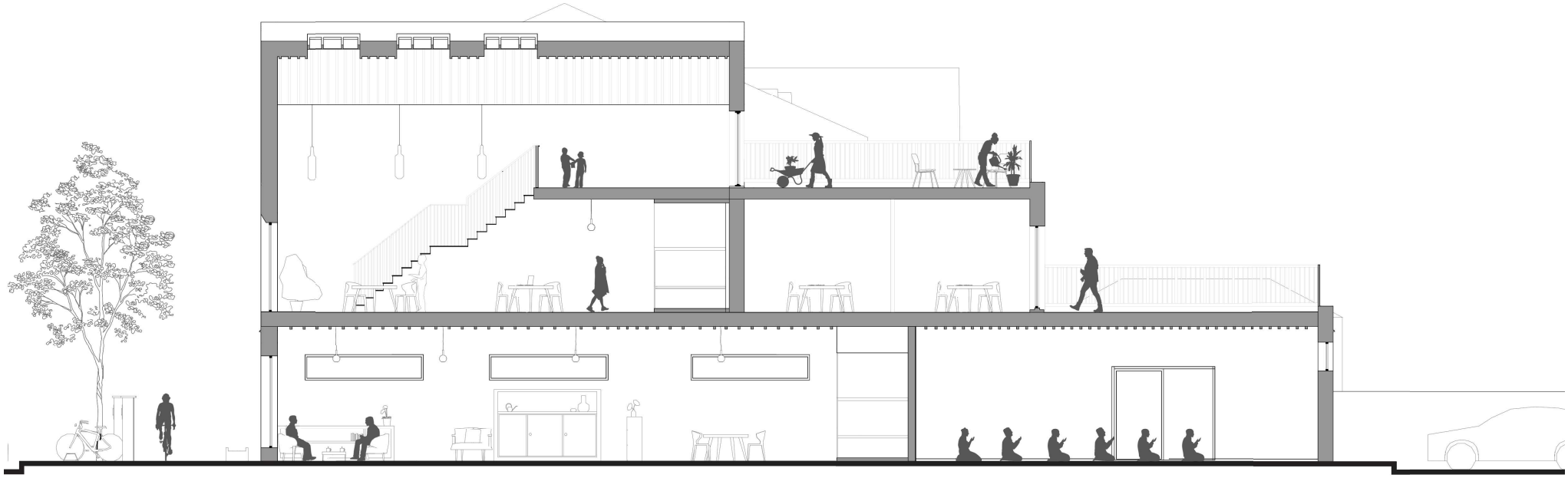




Section B-B

5.7 Sections





Section C-C

5.7 Elevations

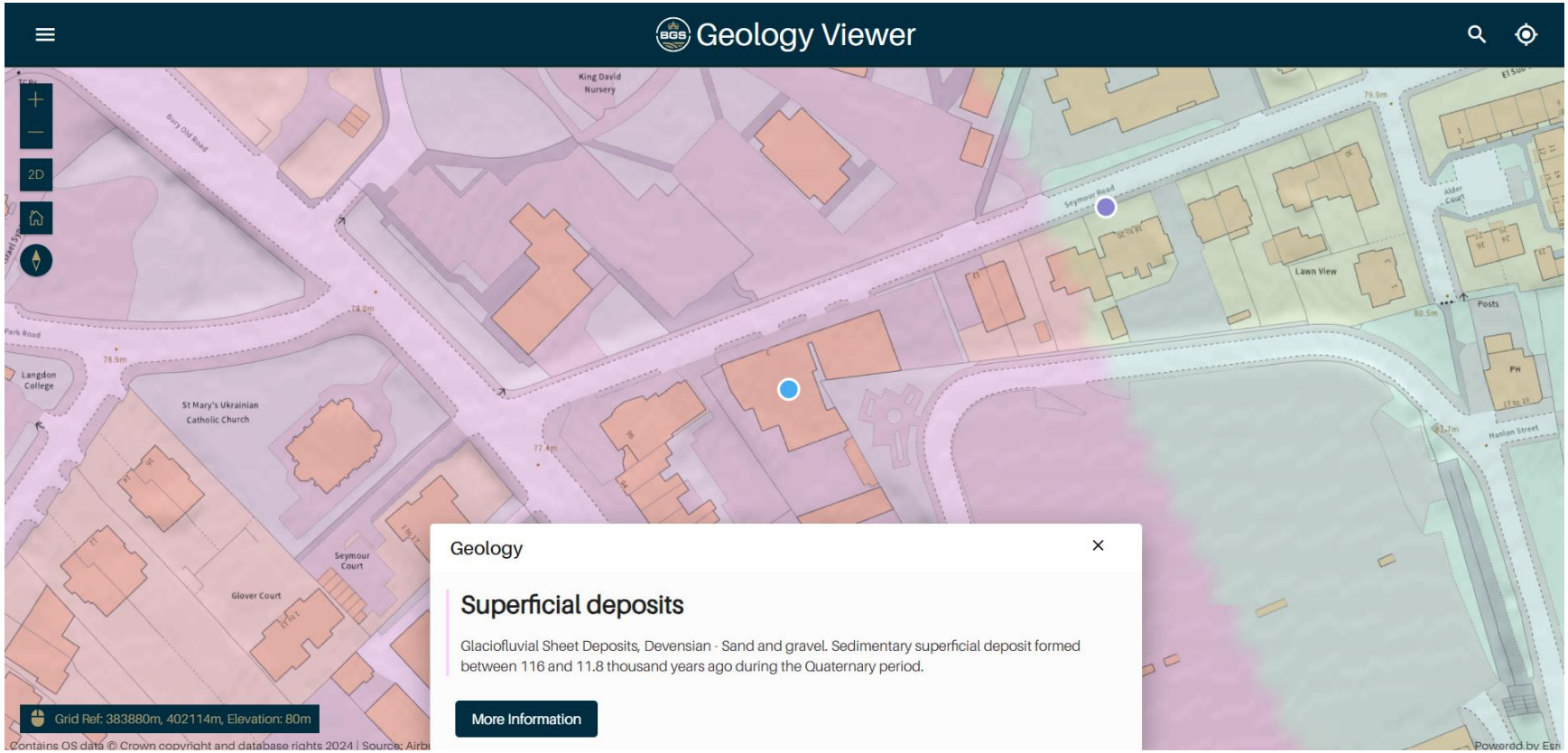


5.7 Elevations

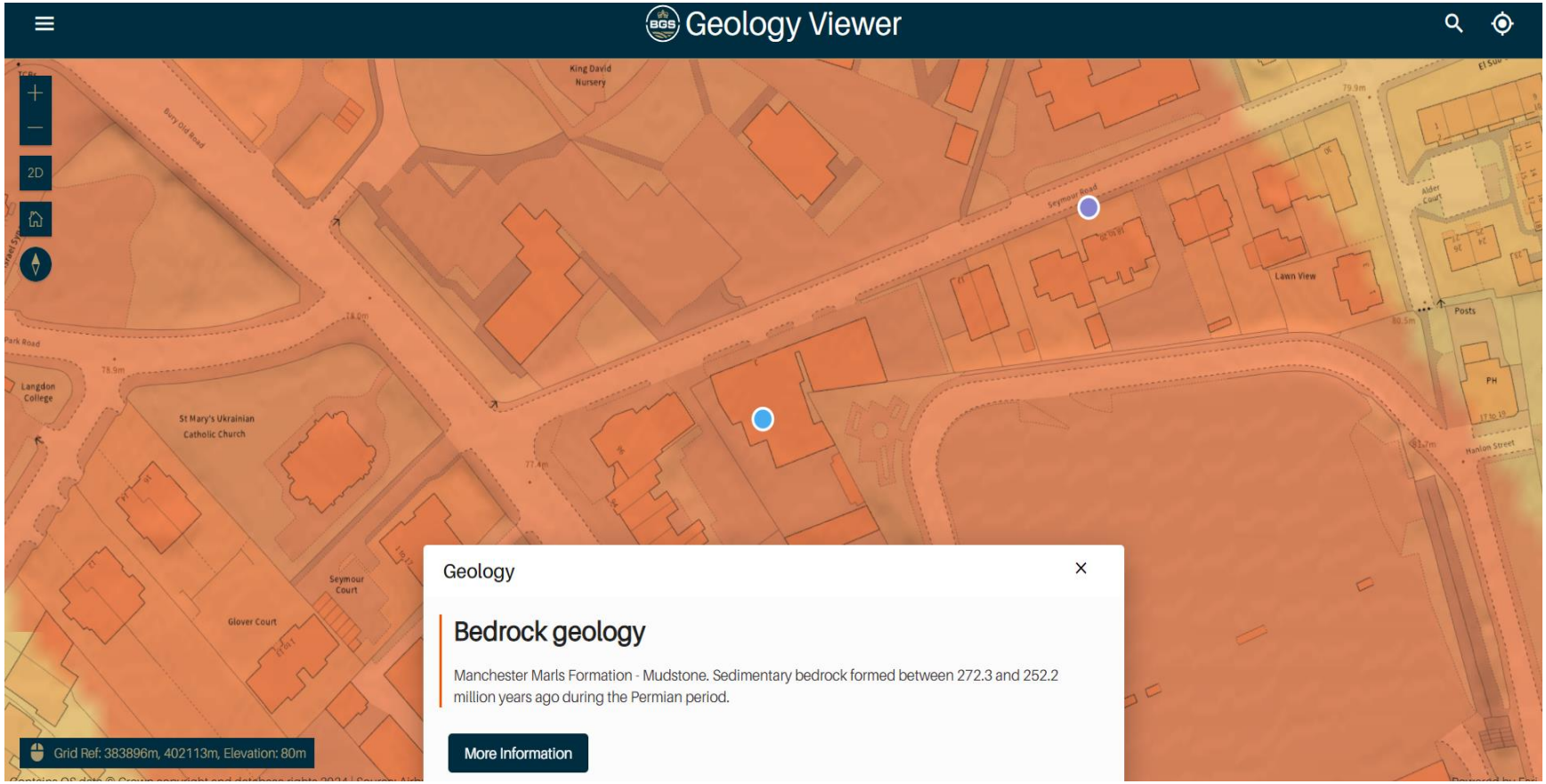




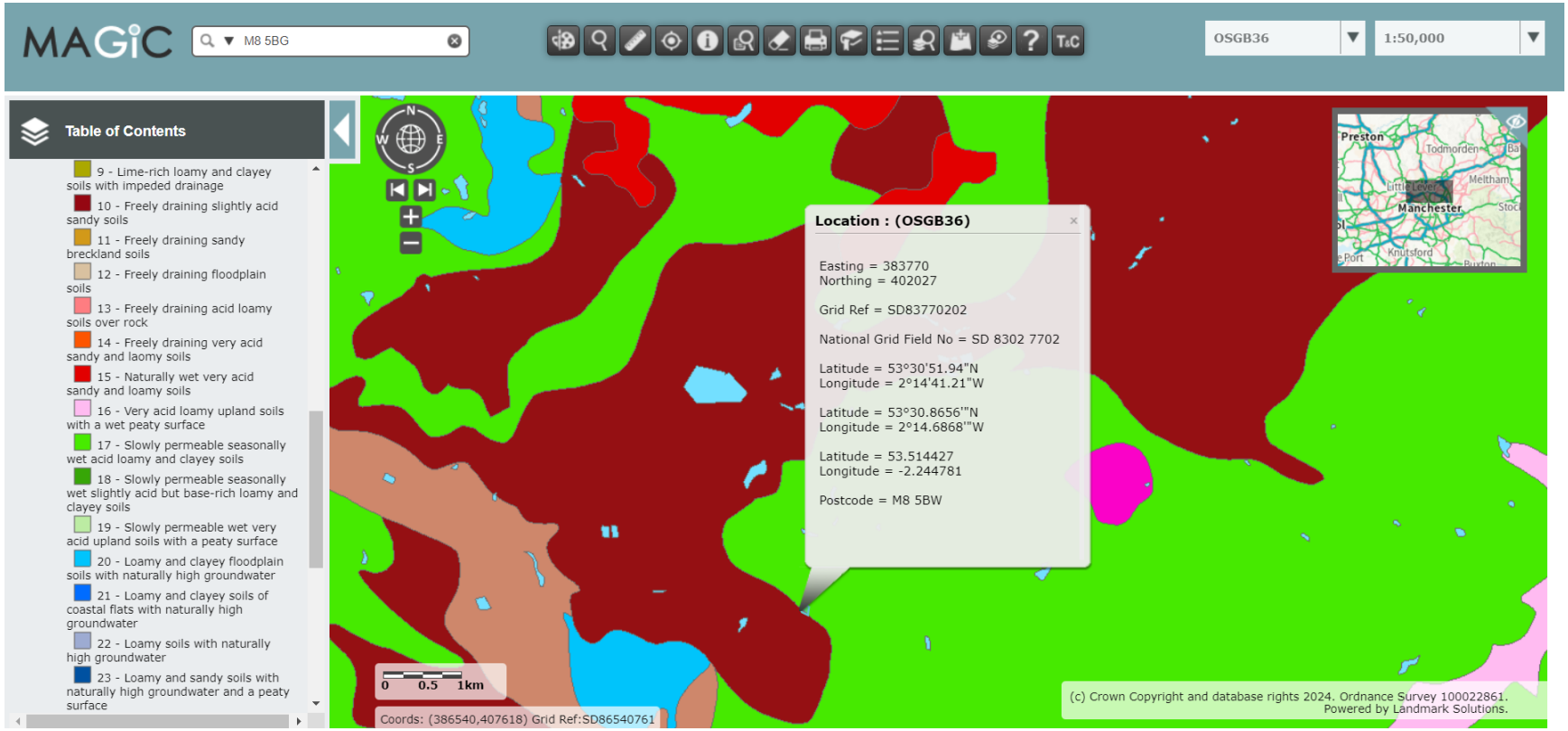




BGS Superficial Geology - Contains British Geological Survey Materials © UKRI 2024



BGS Bedrock Geology – Contains British Geological Survey Materials © UKRI 2024



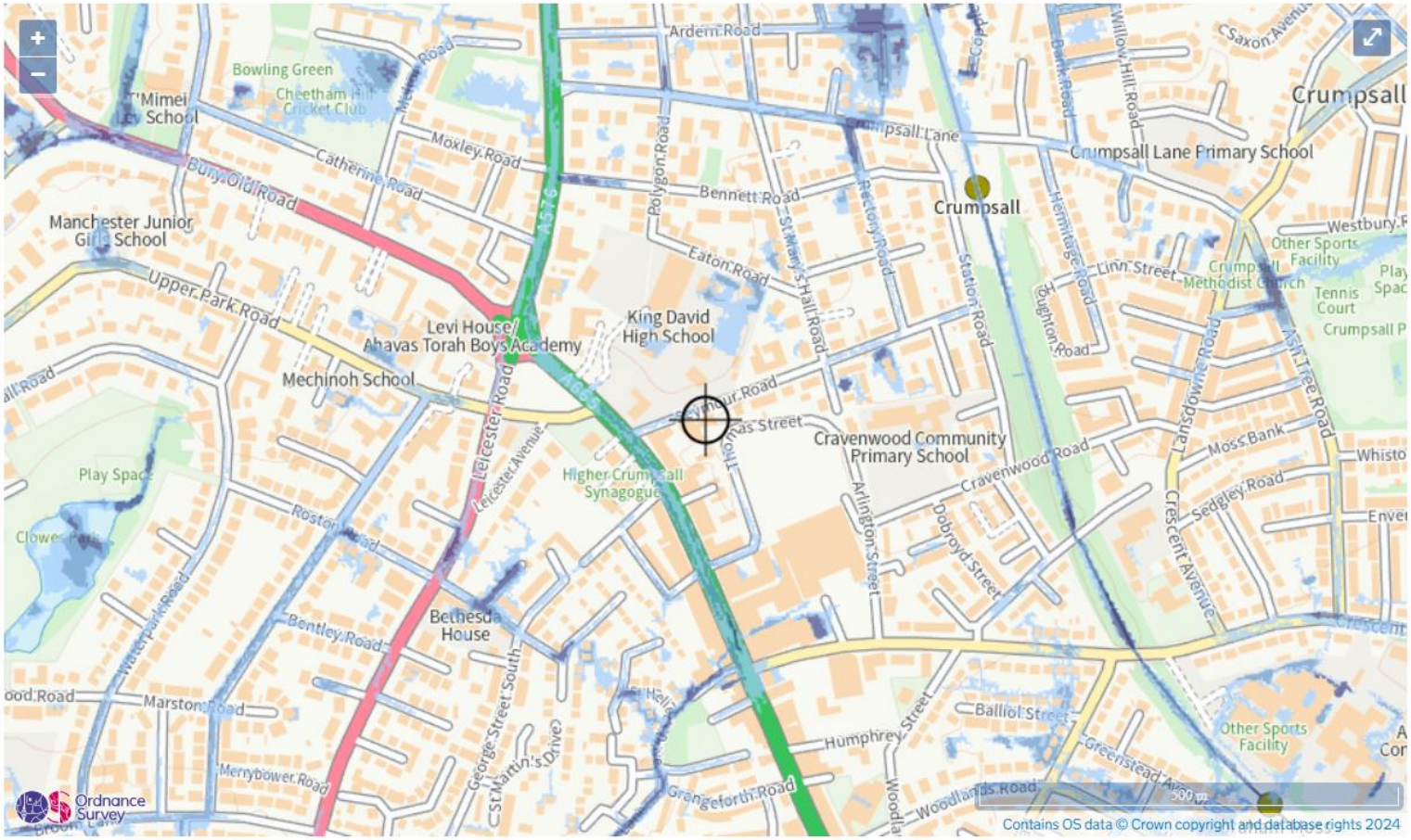
Defra Soilscape Mapping - (c) Crown Copyright and database rights 2024. Ordnance Survey 100022861

Flood risk

Extent of flooding

Location

M8 5BG



Extent of flooding from surface water

High Medium Low Very low Location you selected

Surface Water Risk of Flooding - © Crown copyright and database rights 2024 OS 100024198.

APPENDIX C

CONSULTEE CORRESPONDENCE

Jenna Lowe

From: Jenna Lowe
Sent: 08 January 2024 09:36
To: floodriskmanagement@manchester.gov.uk
Subject: SuDS QUERY - FRA 23 1091 - 2 Seymour Road, Manchester
Attachments: FRA 23 1091 Figure 1 Boundary and Location.pdf

Dear Sir/Madam,

LK Consult Ltd. has been commissioned to undertake a Sustainable Drainage Systems (SuDS) Strategy, for a site located at 2 Seymour Road, Manchester, M8 5BG, centred at approximate National Grid Reference 383778E , 402037N.

The area of interest appears to be within Flood Zone 1.

BGS data indicates that the site is within an area underlain by Glaciofluvial Sheet Deposits, Devensian - Sand and gravel superficial deposits and Manchester Marls Formation - Mudstone bedrock.

The site location is attached to this email.

To complete the SuDS Strategy, we would be grateful if you could supply us with the following, if available, for the vicinity of the site:

- Details of any flood defences in the immediate area, including their extent, crest levels (and datum), assumed level of standard, construction and maintenance regime, as well as any other structures which may influence the local hydraulics.
- Records of any historic flood events and potential sources of flooding from rivers, land drainage, groundwater, foul and surface water sewers on site and in the area.
- Any restrictions applied to ordinary watercourses and sewers in the area.
- Highway drainage restrictions and records.
- Indications if the site is within the Critical Drainage Area.
- Policies that may relate to Sustainable Drainage Systems (SuDS).

If you have any queries, please do not hesitate to get in touch.

We are, of course, happy to pay your reasonable charge for this service. Please let me know by return what information is available, what the charge will be, and we will pay the relevant fees by debit card as soon as possible.

Any advice or recommendations you may have regarding the potential discharges from the development of this site would also be appreciated.

We will be in contact with all other relevant authorities to get a more complete understanding of the issues in the area.

Regards
Jenna

Jenna Lowe MSc, BSc. (Hons)
Flood Risk Engineer
0161 763 7200 | 07467 957756
Manchester | London | Swindon | Liverpool | Glasgow
www.thelkgroup.com

United Utilities
Water for the North West

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

LKGroup

Unit 29 Eton Business Park
Unit 29, Eton Business Park,
Radcliffe, Greater Manchester
M26 2ZS

FAO:

Your Ref: FRA 23 1091
Our Ref: UUPS-ORD-541032
Date: 09/01/2024

Dear Sirs

Location: FLAT 1 12 SEYMOUR ROAD, MANCHESTER, M8 5BG

I acknowledge with thanks your request dated 08/01/2024 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

Karen McCormack
Property Searches Manager

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

Water for the North West

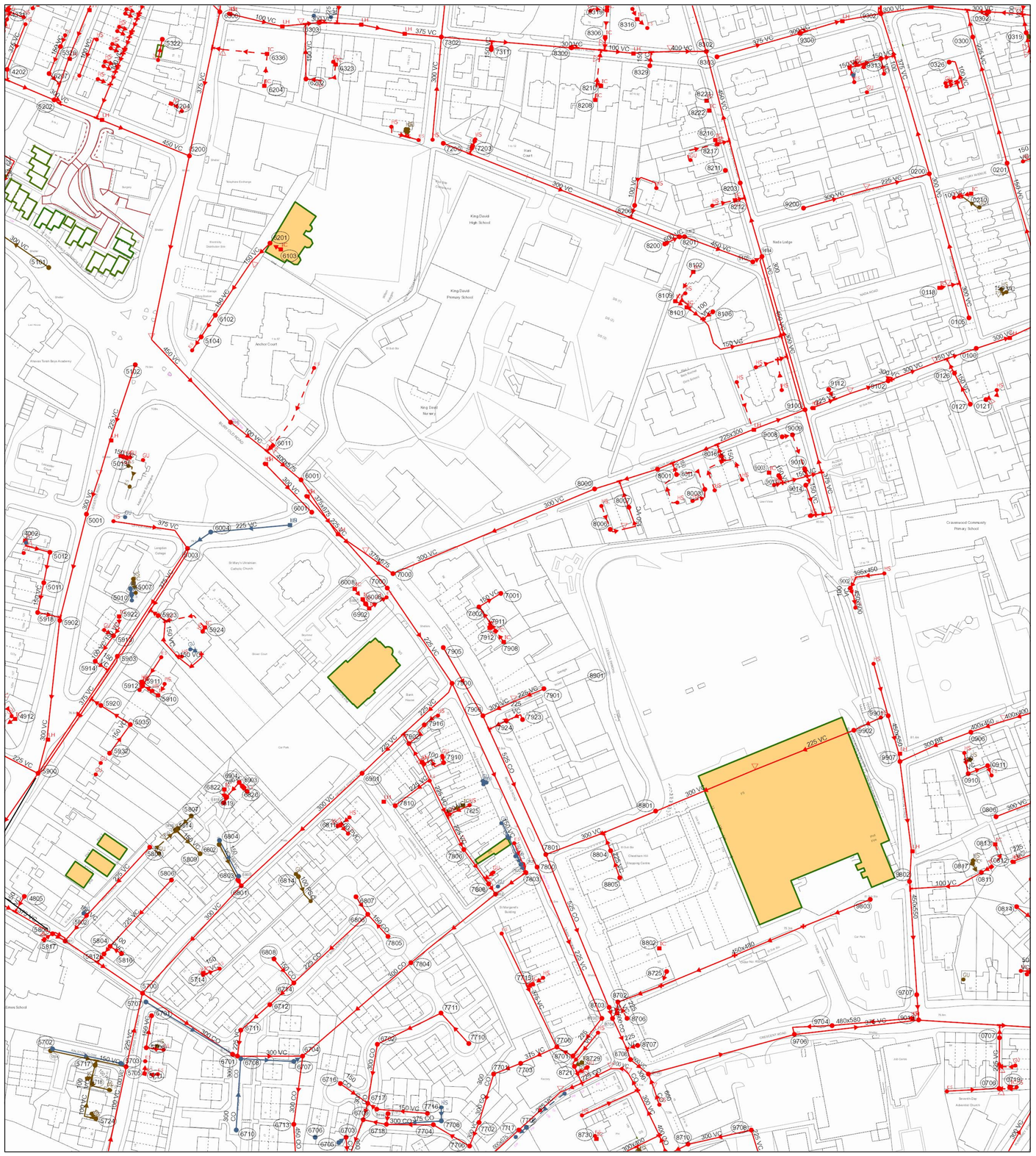
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
8001	79.87	CO	77.65	300			VC	36.68787	1 in 127
5920		CO		150			VC	6.563026	
0302	76.07	CO	73.65	300			VC	6.023092	
9200	79.24	CO	76.09	300			VC	36.40055	1 in 101
8000	79.78	CO	77.34	300			VC	121.4619	1 in 56
9300	77.3	CO	75.67	300			VC	3.162278	
8203	79.13	CO	75.71	450			VC	75.43209	1 in 151
9708	76.42	CO	73.45	300			VC	35.90265	1 in 50
7901	78.92	CO	77.35	225			VC	18.42253	1 in 9
7002		CO		150			VC	14.26132	
0319		CO		100			VC	10.44596	
8702	74.4	CO	71.1	600			CO	9.688313	1 in 108
9002		CO	0	100			VC	5.385165	
6803		CO	0	150			VC	3.856616	
6807	75.08	CO	73.18	150			CO	11.8468	1 in 34
9013		CO	0	150			VC	4.597599	
9302	75.99	CO	74.45	300			VC	3	
9013		CO	68.83	375			VC	95.18929	1 in 53
6707		SW	0	300			CO	5.830952	
8706	74.35	CO	71.98	225			VC	10.29563	1 in 0.14990725
5807		FO		100			VC	10.06606	
9803	76.8	CO	74.38	450			CO	39.92493	
5803	74.76	CO	73.04	225			VC	51.66236	1 in 51
5808		FO		100			VC	1.390048	
8003		CO		0			UN	22.741	1 in
5207		CO		150			VC	8.187197	
7000	77.46	CO	0	225			VC	64.07027	
9100	79.81	CO	76.87	450			VC	89.83075	1 in 117
6705		SW	0	300			CO	5	
7716		CO		150			VC	28.29198	
7707		CO	0	225			VC	6.080428	
9104	79.47	CO	76.08	450			VC	42.72002	1 in 122
8200	79.5	CO	76.85	300			VC	4.472136	1 in 19
9313		CO		150			VC	7.643815	
7710	73.7	CO	69.47	300			CO	22.92336	1 in 109
5329		CO		150			VC	16.43257	
8805	76.02	CO	74.52	225			VC	15.81139	1 in 264
7910		CO		100			VC	15.74527	
0906	82.21	CO	77.99	300			BR	42.73044	1 in 126
9100	79.81	CO	78.16	300			VC	88.32327	
6805		SW	0	150			VC	2.000154	
5814		FO		100			CO	0.5006686	
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9902	81.38	CO	77.84	225			VC	59.23681	1 in 31
8106		CO	0	100			VC	6.947604	
7820		CO		150			VC	4.84469	
0200	77.35	CO	74.42	300			VC	46.84015	1 in 82
6712	73.38	CO	71.32	225			CO	21.47382	1 in 67
8703	74.28	CO	71.55	400			CO	6.324555	1 in 12
6711	73.28	CO	71	225			VC	14.51893	1 in 9
5902	76.6	CO	73.59	300			VC	86.01706	1 in 84
6719		CO		150			VC	5.985568	
0910		CO		100			VC	11.63636	
6811		CO		100			PVC	6.368651	
0127		CO		150			VC	19.32736	
5700	75.11	CO	70.28	375			VC	60.46677	1 in 85
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5913		CO		100			VC	17.49359	
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5932		CO		150			VC	19.77382	
5001	79.08	CO	76.06	300			VC	60.87693	1 in 25
0806		CO	0	300			VC	44.01136	
6814		FO		100			PSC	15.75905	
6718	71.63	CO	68.7	375			CO	13.33594	1 in 103
6903		CO		100			VC	2.975167	
9901	81.94	CO	77.6	450			VC	26.28701	
6201		CO		150			VC	14.36253	
5900	76.2	CO	72.38	375			VC	63.24555	1 in 99
7822		SW		150			VC	5.327281	
7924		CO		225			VC	10.71499	
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6819		CO		100			VC	3.58288	
6713		CO	0	450			CO	38.40299	
8206		CO	0	100			VC	7.058118	
7703	73.49	CO	70.06	375			VC	16.15549	1 in 45
6303	81.35	CO	79.46	300			VC	3	
6004	79.19	SW	76.27	225			VC	15.81139	1 in 69
6100	79.04	CO	75.33	300			CO	25.2371	1 in 12
0814		CO		100			VC	16.76018	
7801	75.31	CO	72.48	525			CO	91.92388	1 in 99
6704	72.97	CO	0	300			CO	38.32754	
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7803		CO	0	300			CO	20.7811	
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5812		CO		225			VC	5.914597	
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7701	73.07	CO	69.66	300			CO	28.1516	
6801		CO	0	300			VC	80.93549	
5707		SW	0	300			CO	61.26741	
6808	74.11	CO	72.47	150			CO	17.18787	1 in 21
6001	78.32	CO	75.67	375			VC	58.472	1 in 163
7704	72.01	CO	69.07	300			CO	26.05069	1 in 70
8708	74.02	CO	70.69	600			VC	12.80625	1 in 47
7203		CO	0	100			VC	4.590047	
6102		CO		150			VC	14.38046	
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5003	78.91	CO	0	375			VC	71.56116	
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8721		CO		225			VC	10.29484	
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6820		CO		100			VC	1.119809	
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0706		CO		225			VC	28.00836	
4805		CO		150			VC	10.10765	
5816		CO		100			PVC	7.477596	
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5003	78.91	CO	73.6	375			VC	72.36978	1 in 121
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6716	72.46	CO	71.06	150			CO	18.65414	1 in 8
5200	80.86	CO	76.28	450			VC	104.1393	
5935		CO		150			VC	19.37304	
0126		CO		150			VC	9.078828	
5104		CO		150			VC	8.860535	
9706	76.22	CO	69.02	375			VC	69.46222	1 in 366
8804	76.18	CO	74.48	225			CO	10.77033	
7711	73.87	CO	69.26	300			CO	39.36541	1 in 104
6303	81.35	CO	77.49	375			VC	70.80458	1 in 169
6701	73.36	CO	69.44	300			VC	36.25606	
8725	74.64	CO	72.94	0			UN	8.556868	1 in
4202	81.5	CO	0	375			VC	34.22116	
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5806		CO	0	225			VC	50.10759	
9802	77.95	CO	75.24	450			VC	63.12689	1 in 91
6715	73.37	CO	69.67	300			VC	2.953655	1 in 23
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9907		CO	0	450			VC	67.03452	
0105	78.74	CO	75.45	300			VC	82.96987	1 in 81
8705	74.16	CO	70.92	225			VC	26.40076	
6710		SW	0	300			CO	39.63506	
0100	79.03	CO	76.61	300			VC	35.52661	1 in 323
7200	81.55	CO	78.71	300			VC	140.9433	1 in 65
5802	74.56	CO	72.02	225			VC	18.43909	1 in 18
8302	79.25	CO	75.19	450			VC	109.2289	1 in 144
5011		CO		150			VC	16.74041	
6709	71.81	CO	68.57	375			CO	23.91139	1 in 114
8016		CO	0	150			VC	6.806657	
8801	77.26	CO	73.95	300			VC	65.56072	1 in 45
5923		CO		150			VC	5.11074	
6714	73.62	CO	71.66	225			CO	17.93539	1 in 53
5703		SW	0	225			VC	3.605551	
5800	74.64	CO	71.14	375			VC	9.584498	1 in 80
5804	74.84	CO	72.04	225			VC	5.487157	
6702	73.06	CO	68.88	300			CO	33.21557	1 in 302
5801	74.65	CO	70.83	375			VC	51.86574	1 in 98
8707	74.14	CO	72.02	225			VC	6.324555	1 in
7905	77.09	CO	73.76	525			CO	43.909	1 in 107
6708	73.38	SW	0	300			CO	29.46086	
5914		CO		150			VC	8.56732	
8303	79.11	CO	75.18	375			VC	47.80167	1 in 42
6806	74.93	CO	72.83	225			CO	56.07071	1 in 48
9103	79.49	CO	76.11	450			VC	5.830952	1 in 292
5012		CO		150			VC	17.35818	
8701		CO	0	375			VC	10.29563	
7923		CO		225			VC	11.58053	
5903	77.19	CO	72.96	375			VC	78.49203	1 in 99
7906	76.8	CO	73.35	525			CO	84.58132	1 in 97
0300	76.63	CO	74.99	225			VC	15.29706	
9707	77.18	CO	74.55	0			VC	14.03567	
7706	72.16	CO	69.18	300			CO	23.21608	1 in 211
0707		CO		225			VC	7.079281	
9704	76.63	CO	73.45	480			VC	26.14582	1 in 6
0302	76.07	CO	74.84	300			VC	4	
5918		CO		150			VC	12.82739	
7800	75.16	CO	73.19	225			VC	91.38927	1 in 40
7311		CO		150			VC	4.722171	
8710	74.42	CO	72.73	300			VC	13.41641	
6201	79.78	CO	76.32	450			VC	3	1 in 60
7806		CO		225			VC	23.48415	
6703		CO	0	300			CO	12.80892	
7808		CO		225			VC	6.817475	
7702	72.7	CO	0	300			VC	14.09056	
7700	73.98	CO	70.44	375			VC	21.93171	1 in 61
9302	75.99	CO	73.27	375			VC	70.49868	1 in 271
5903	77.19	CO	73.45	300			VC	79.13478	1 in 77
5705	76.34	CO	73.89	225			VC	41.97618	1 in 13
7805	74.84	CO	73.33	150			CO	16.44351	1 in 33
9300	77.3	CO	73.99	375			VC	49.01157	1 in 73
8011		CO	0	150			VC	6.93633	
5724		FO		100			VC	25.83024	
9008		CO	0	300			UN	5.861616	1 in
8300	81.1	CO	76.44	100			VC	57.43338	1 in 45
4331		CO		150			VC	1.230246	
9112		CO		0			UN	6.356245	
6901		CO	0	300			VC	91.72776	
7900	76.68	CO	0	225			VC	39.35574	
6300	81.46	CO	77.91	375			VC	81.78636	1 in 51
7902		CO		225			VC	37.98766	
8329		CO		150			VC	7.578344	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5013		CO		150			VC	1.476392	
7718		SW		225			VC	7.90659	
5717		FO		100			PVC	2.750346	
9702	76.87	SW	74.86	225			VC	38.83298	
8006		CO		0			UN	8.318542	1 in
9010		CO		0			UN	4.23516	1 in
9009		CO		0			UN	20.04691	1 in
5101	81.58	FO	80.05	300			VC	44.98711	
5704	76.92	FO	75	150			VC	42.95346	1 in 42

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

FLAT 1 12 SEYMOUR ROAD,
MANCHESTER,
M8 5BG

Scale: 1:1250 **Date:** 09/01/2024

Sheet: 1 of 1

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Jenna Lowe

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 08 January 2024 13:05
To: Jenna Lowe
Subject: RE: PDE CA28, 2 Seymour Road, Manchester, M8 5BG - 05139437

Good afternoon Jenna,
Pre Development Enquiry for: 2 Seymour Road, M8 5BG UU Reference Number : 05139437

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.
If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:
https://www.unitedutilities.com/builders-developers/working-near-our-assets/

Foul Water
Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.
Our preferred point of discharge would be to the 300mm diameter public combined sewer within Seymour Road located to the North of your proposed development at an unrestricted rate.
If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.
In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water
All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.
Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.
This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.
The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).
The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

https://www.gov.uk/government/publications/groundwater-protection-position-statements

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 300mm diameter public combined sewer within Seymour Road located North of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the pubic sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link

below:
https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/

Connection Application
Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:
https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/
We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.
If we can be of any further assistance please don't hesitate to contact us further.

I can confirm that we have no current record of sewer flooding on our DG5 register within the vicinity of the proposed development. The DG5 register is a register of properties that have flooded as a result of hydraulic inadequacy of the public sewer network.
Please note that United Utilities Water Limited (UUW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.
Our response does not include:
- any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UUW has no control and not a facet of sewer capacity; or
- any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure

Kind Regards

United Utilities
Water for the North West

Lewis Barr
Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541
unitedutilities.com

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---------- Original Message ----------
From: wastewaterdeveloperservices@uuplc.co.uk [wastewaterdeveloperservices@uuplc.co.uk]
Sent: 08/01/2024 11:53
To: j.lowe@thelkgroup.com
Subject: PDE CA28, 2 Seymour Road, Manchester, M8 5BG - 05139437

Good Morning,

PRE DEVELOPMENT APPLICATION AT: 2 Seymour Road, Manchester, M8 5BG – UU Ref 05139437

Please accept this email as receipt of your application received on 08/01/2024 for the above development. This has now been logged on our system and the job reference is 05139437 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Lewis for

technical assessment. You will receive their response on or before 22/01/2024.

Kind regards,

Katie Houghton
Customer Advisor Advanced
Developer Services & Metering
Customer Services

Tel: 0345 072 6067 (option 4)
unitedutilities.com

---------- Original Message ----------
From: Jenna Lowe [j.lowe@thelkgroup.com]
Sent: 08/01/2024 09:41
To: wastewaterdeveloperservices@uuplc.co.uk
Subject: SuDS QUERY - FRA 23 1091 - 2 Seymour Road, Manchester

Dear Sir/Madam,

LK Consult Ltd. has been commissioned to undertake a Sustainable Drainage Systems (SuDS) Strategy, for a site located at 2 Seymour Road, Manchester, M8 5BG, centred at approximate National Grid Reference 383778E , 402037N.

The area of interest appears to be within Flood Zone 1.

BGS data indicates that the site is within an area underlain by Glaciofluvial Sheet Deposits, Devensian - Sand and gravel superficial deposits and Manchester Marls Formation - Mudstone bedrock.

The site location and Wastewater Pre-Development Enquiry form are attached to this email.

To complete the SuDS Strategy, we would be grateful if you could supply us with the following, if available, for the vicinity of the site:

1. Records of any historic flood events and potential sources of flooding from foul and surface water sewers on site and in the area.
2. Any restrictions to discharge into the sewers

If you have any queries, please do not hesitate to get in touch.

We are, of course, happy to pay your reasonable charge for this service. Please let me know by return what information is available, what the charge will be, and we will pay the relevant fees by debit card as soon as possible.

Any advice or recommendations you may have regarding the potential discharges from the development of this site would also be appreciated.

We will be in contact with all other relevant authorities to get a more complete understanding of the issues in the area.

Regards

Jenna

[Image is no longer available]

[Image is no longer available]

Jenna Lowe MSc, BSc. (Hons)
Flood Risk Engineer
0161 763 7200 | 07467 957756
Manchester | London | Swindon | Liverpool | Glasgow
www.thelkgroup.com

I N C R E A S I N G L A N D V A L U E

[Image is no longer available]

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APPENDIX D

CALCULATIONS

MasterDrain SW

The LK Group

www.thelkgroup.com

Eton Business Park,
Eton Hill Road,
Radcliffe M26 2ZS
Tel: 0161 763 7200
email: m.jones@thelkgroup.com

Job No.			
Sheet no.	1		
Date	01/02/24		
Project	Seymour Road, Manchester Qbar Existing Runoff	By	Checked / Reviewed
Title	Seymour Road, Manchester Qbar Existing Runoff		

Area data:-

FSR data
M5-60 = 18
Soil index = 0.45
WRAP value = 4
r = 0.35
SAAR = 1000
Nat grid = SD 8302

Site data:-

Ret. period (yrs) = 2.33
Time of entry = 7.00
Impervious area drained = 1360 m²
Site slope = Mild <2% (1:50)
Length of overland flow = 0.00
ToC = 7.0 mins
Overland flow time = 0.0 mins
Pervious area drained = 0 m²
Soil type = Clay
Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 81.0%
Rainfall rate= 56.8 mm/Hr
UCWI = 102.9
Runoff rate (gross)= 17.4 l/s

Methods

Runoff factor (RF) = 81.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program

MasterDrain SW

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Job No.			
Sheet no.	1		
Date	01/02/24		
Project	Seymour Road, Manchester 1 Year Existing Runoff	By	Checked / Reviewed
Title	Seymour Road, Manchester 1 Year Existing Runoff		

Area data:-

FSR data
M5-60 = 18
Soil index = 0.45
WRAP value = 4
r = 0.35
SAAR = 1000
Nat grid = SD 8302

Site data:-

Ret. period (yrs) = 1
Time of entry = 10.00
Impervious area drained = 1360 m²
Site slope = Mild <2% (1:50)
Length of overland flow = 0.00
ToC = 10.0 mins
Overland flow time = 0.0 mins
Pervious area drained = 0 m²
Soil type = Clay
Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 81.0%
Rainfall rate= 39.9 mm/Hr
UCWI = 102.9
Runoff rate (gross)= 12.2 l/s

Methods

Runoff factor (RF) = 81.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program

MasterDrain SW

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email: m.jones@thelkgroup.com

Job No.			
Sheet no.	1		
Date	01/02/24		
Project	Seymour Road, Manchester 30 Years Existing Runoff	By	Checked / Reviewed
Title	Seymour Road, Manchester 30 Years Existing Runoff		

Area data:-

FSR data
M5-60 = 18
Soil index = 0.45
WRAP value = 4
r = 0.35
SAAR = 1000
Nat grid = SD 8302

Site data:-

Ret. period (yrs) = 30
Time of entry = 6.00
Impervious area drained = 1360 m²
Site slope = Mild <2% (1:50)
Length of overland flow = 0.00
ToC = 6.0 mins
Overland flow time = 0.0 mins
Pervious area drained = 0 m²
Soil type = Clay
Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 81.0%
Rainfall rate= 100.2 mm/Hr
UCWI = 102.9
Runoff rate (gross)= 30.7 l/s

Methods

Runoff factor (RF) = 81.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program

MasterDrain SW

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email: m.jones@thelkgroup.com

Job No.			
Sheet no.	1		
Date	01/02/24		
Project	Seymour Road, Manchester 100 Years Existing Runoff	By	Checked / Reviewed
Title	Seymour Road, Manchester 100 Years Existing Runoff		

Area data:-

FSR data
M5-60 = 18
Soil index = 0.45
WRAP value = 4
r = 0.35
SAAR = 1000
Nat grid = SD 8302

Site data:-

Ret. period (yrs) = 100
Time of entry = 6.00
Impervious area drained = 1360 m²
Site slope = Mild <2% (1:50)
Length of overland flow = 0.00
ToC = 6.0 mins
Overland flow time = 0.0 mins
Pervious area drained = 0 m²
Soil type = Clay
Climate change factor = 0.0 %

Calculated data:-

Calculated runoff factor = 81.0%
Rainfall rate= 126.7 mm/Hr
UCWI = 102.9
Runoff rate (gross)= 38.8 l/s

Methods

Runoff factor (RF) = 81.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Calculations produced by MasterDrain Surface Water design program

Hydrological Data:-

FSR Hydrology:-

Location	= SEYMOUR RD	Grid reference	= SD 8302
M5-60 (mm)	= 18	r	= 0.35
Soil runoff	= 0.45	SAAR (mm/yr)	= 1000
WRAP	= 4	Area = England & Wales	
Hydrological area = 10		Hydrological zone = 4	

Soil classification for WRAP type 4
Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Area = 0.00136 Km² - 0.136 Ha - 1360 m²

Calculation method:-

Runoff is calculated from:-

$$Q_{BAR(rural)} = 0.00108\ AREA^{0.89}\ .\ SAAR^{1.17}\ .\ SOIL^{2.17}$$

where

AREA = Site area in Km²
SAAR = Standard Average Annual Rainfall (mm/yr)
SOIL = Soil value derived from Winter Rainfall Acceptance Potential
$Q_{BAR(rural)}$ = Runoff (cumecs)

$Q_{BAR(rural)}$ is then multiplied by a growth factor - GC(T) - for different storm return periods derived from EA publication W5-074/A.

Calculated data:-

For areas less than 50Ha, a modified calculation which multiplies the 50Ha runoff value by the ratio of the site area to 50Ha is used
Reducing factor used for these calculations is 0.003

Mean Annual Peak Flow $Q_{BAR(rural)}$ = 0.91 l/s

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MasterDrain
HY 11.0

Job No.			
Sheet no.	2		
Date	01/02/24		
Project	SEYMOUR ROAD MANCHESTER GREENFIELD RUNOFF	By	Checked / Reviewed
Title	SEYMOUR ROAD MANCHESTER GREENFIELD RUNOFF		

Values for $Q_{BAR(rural)}$

Ret. per.	m³/hr	l/s	l/s/ha	Ret. per.	m³/hr	l/s	l/s/ha
1yr	2.775	0.771	5.668	100yr+20%	8.227	2.285	16.804
2yr	3.036	0.843	6.201	100yr+30%	8.913	2.476	18.204
5yr	3.950	1.097	8.069	100yr+40%	9.598	2.666	19.604
10yr	4.505	1.251	9.202	200yr	7.835	2.176	16.004
30yr	5.485	1.524	11.203	200yr + 30%	10.186	2.829	20.805
50yr	6.040	1.678	12.336	500yr	8.913	2.476	18.204
100yr	6.856	1.904	14.003	1000yr	9.925	2.757	20.271

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.93	1.21	1.38	1.68	1.85	2.10	2.40	2.73	3.04

The above is based on the Institute of Hydrology Report 124
to which you are referred for further details (see Sect 7).
Note that the 200 and above year growth curves were taken from W5-074.

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Job No.			
Sheet no.	1		
Date	01/02/24		
Project	30 Years + 35% CC Storage Event Seymour Road, Manchester	By	Checked / Reviewed
Title	30 Years + 35% CC Storage Event Seymour Road, Manchester		

Data:-

FSR Hydrology:-

Location = SEYMOUR RD
M5-60 (mm) = 18
Soil index = 0.00
Return period = 30
UCWI = 105.3

Grid reference = SD 8302
r = 0.35
SAAR (mm/yr) = 1000
WRAP = 0
Climate change = 35

Runoff factor (RF) = 70.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Design data:-

Imperv. area = 1360 m²
Total area (TA) = 1360 m²
Mean disch. rate = 5.000 l/s
Additional flow = 0.00 l/s

Pervious area = 0 m²
Equiv area = 952 m² (TA x RF).
Areal reduction factor = 1.000
Climate change factor = 35

Calculated data:-

Time to max = 36.0 mins
Rainfall at max = 52.12 mm/hr
Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Calculated storage volume = 19.0 m³
Allowed discharge rate = 5.000 l/s
Available MH storage = 0.0 m³

Fixed 6 hour data:-

Rainfall event = 6 hours
Rainfall rate = 10.00 mm/hr

Calculated storage volume = 0.0 m³
Allowed discharge rate = 5.000 l/s

Rainfall intensities calculated using the Wallingford Procedure

Storage lengths for initial calculation (x 1.1, 1.2, 1.3 or 1.5 as above if required) :-

Diam	Len	Diam	Len
100	2415.9	1125	19.1
150	1073.7	1200	16.8
225	477.2	1275	14.9
300	268.4	1350	13.3
375	171.8	1425	11.9
450	119.3	1500	10.7
525	87.7	1575	9.7
600	67.1	1650	8.9
675	53.0	1725	8.1
750	42.9	1800	7.5
825	35.5	1875	6.9
900	29.8	1950	6.4
975	25.4	2025	5.9
1050	21.9	2100	5.5

Ovoid	Len
400 x 600	105.4
600 x 900	45.9
800 x 1200	25.8

Box culvert	Len
500 x 500	75.9
500 x 750	50.6
500 x 1000	37.9
750 x 1000	25.3
750 x 1200	21.1
750 x 1500	16.9
1000 x 1000	19.0
1000 x 1200	15.8
1000 x 1500	12.6
1000 x 1800	10.5
1000 x 2000	9.5
1500 x 1500	8.4
1500 x 1800	7.0
1500 x 2000	6.3

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email: m.jones@thelkgroup.com

Job No.	
Sheet no.	2
Date	01/02/24
By	
Checked	
Reviewed	

MasterDrain SW

Project 30 Years + 35% CC Storage Event Seymour Road, Manchester

Title 30 Years + 35% CC Storage Event Seymour Road, Manchester

Data:-

Time (mins)	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)
10	108.0	17.135	3.000	14.135
20	75.0	23.672	6.000	17.672
30	58.0	27.820	9.000	18.820
40	49.0	30.923	12.000	18.923
50	42.0	33.428	15.000	18.428
60	37.0	35.540	18.000	17.540
70	34.0	37.374	21.000	16.374
80	31.0	38.998	24.000	14.998
90	28.0	40.459	27.000	13.459
100	26.0	41.788	30.000	11.788
110	25.0	43.009	33.000	10.009
120	23.0	44.138	36.000	8.138
130	22.0	45.190	39.000	6.190
140	21.0	46.173	42.000	4.173
150	20.0	47.098	45.000	2.098
160	19.0	47.970	48.000	0.000
170	18.0	48.796	51.000	0.000
180	17.0	49.580	54.000	0.000
190	17.0	50.326	57.000	0.000
200	16.0	51.038	60.000	0.000
210	16.0	51.719	63.000	0.000
220	15.0	52.372	66.000	0.000
230	15.0	52.997	69.000	0.000
240	14.0	53.599	72.000	0.000
250	14.0	54.178	75.000	0.000
260	13.0	54.736	78.000	0.000
270	13.0	55.274	81.000	0.000
280	13.0	55.794	84.000	0.000
290	12.0	56.297	87.000	0.000
300	12.0	56.783	90.000	0.000
310	12.0	57.255	93.000	0.000
320	11.0	57.712	96.000	0.000
330	11.0	58.155	99.000	0.000
340	11.0	58.612	102.000	0.000
350	11.0	59.054	105.000	0.000
360	10.0	59.487	108.000	0.000
370	10.0	59.910	111.000	0.000
380	10.0	60.324	114.000	0.000
390	10.0	60.730	117.000	0.000
400	10.0	61.128	120.000	0.000
410	9.0	61.517	123.000	0.000
420	9.0	61.900	126.000	0.000
430	9.0	62.275	129.000	0.000
440	9.0	62.643	132.000	0.000
450	9.0	63.005	135.000	0.000
460	9.0	63.361	138.000	0.000
470	9.0	63.710	141.000	0.000
480	8.0	64.054	144.000	0.000
490	8.0	64.392	147.000	0.000
500	8.0	64.725	150.000	0.000
510	8.0	65.052	153.000	0.000
520	8.0	65.375	156.000	0.000
530	8.0	65.692	159.000	0.000
540	8.0	66.005	162.000	0.000
550	8.0	66.314	165.000	0.000
560	7.0	66.618	168.000	0.000
570	7.0	66.917	171.000	0.000
580	7.0	67.213	174.000	0.000
590	7.0	67.505	177.000	0.000
600	7.0	67.792	180.000	0.000

Storage volume (m^3) = 19.0 m^3

The LK Group

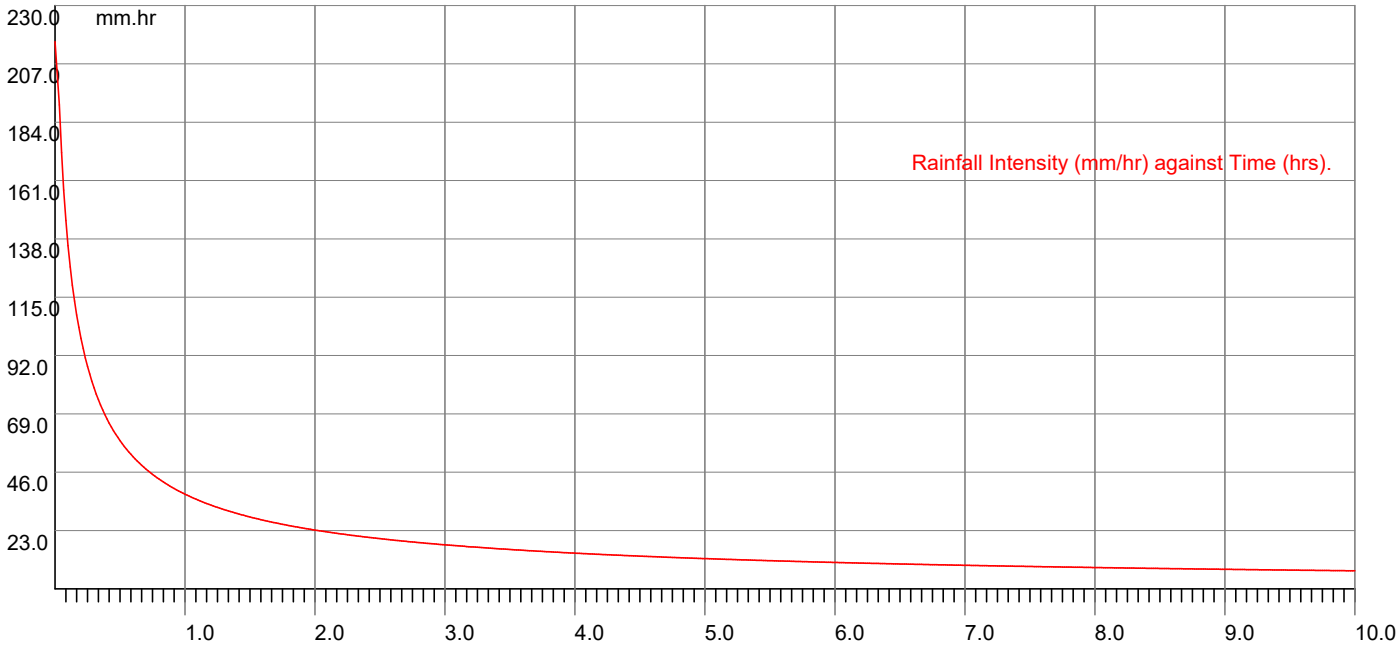
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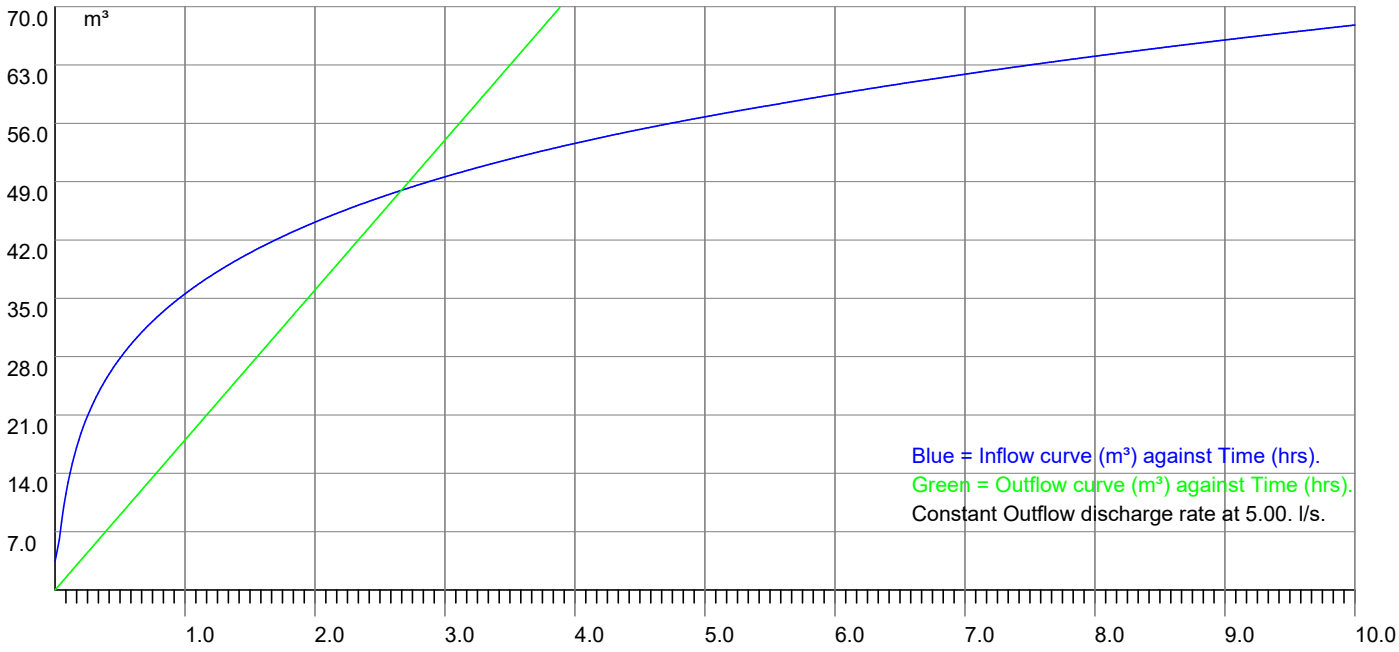
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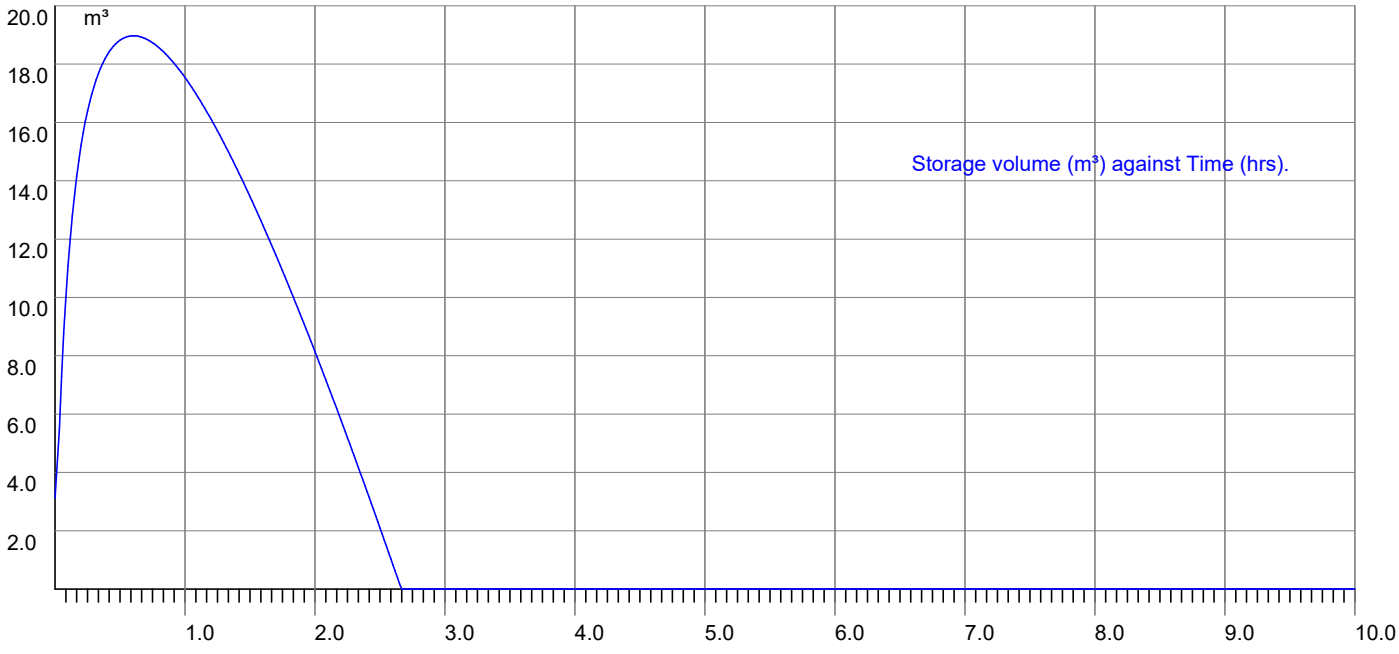
Job No.	
Sheet no.	3
Date	01/02/24

MasterDrain SW

Project	30 Years + 35% CC Storage Event Seymour Road, Manchester	By	Checked / Reviewed
Title	30 Years + 35% CC Storage Event Seymour Road, Manchester		







Explanatory notes for Peak Flow Storage

1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
2) The balance is calculated from the inflow minus the outflow.
3) The storage volume is the maximum value of the balance curve.
4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
5) References to 'storm duration' relate only to the hydrograph method (qv).
6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

Explanatory notes for Hydrograph Storage

1) The user has the choice of Summer or Winter curves
2) The mean intensity varies with the duration of the storm curve
3) There are always 120 steps in the calculation process, irrespective of storm duration.
4) The balance is calculated from the inflow minus the outflow.
5) The storage volume is the sum of the balance values for each step.
6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage. The outflow volume is constant throughout the process at the specified discharge rate.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps.The outflow volume varies with the hydraulic head on the control device using flow equations provided by the control manufacturer. This is a far more accurate method than the peak flow method and often results in bigger storage volumes.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.

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www.thelkgroup.com		Sheet no.	1	
		Date	06/02/24	
Project 100 Years + 45% CC Storage Event		By	Checked	Reviewed
Title Pump storage calcs for SEYMOUR RD				

Data:-

FSR Hydrology:-

Location = SEYMOUR RD
M5-60 (mm) = 18
Soil index = 0.45
Return period = 100
UCWI = 105.3

Grid reference = SD 8302
r = 0.35
SAAR (mm/yr) = 1000
WRAP = 4
Climate change = 45

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Runoff factor (RF) = 82.0, calculated from:-

Runoff factor = (0.829*PIMP)+(25*SOIL)+(0.078*UCWI)-20.7
where
PIMP = Impervious Area*100/(Impervious Area+Pervious Area)
UCWI = Calculated value for Wetness Index

Design data:-

Imperv. area = 1360 m²
Total area (TA) = 1360 m²
Mean pump disch. rate = 5.000 l/s
Additional flow = 0.00 l/s

Pervious area = 0 m²
Equiv area = 1115 m² (TA x RF).
Areal reduction factor = 1.000
Climate change factor = 45

Calculated data:-

Time to max = 66.0 mins
Rainfall at max = 49.39 mm/hr
Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Calculated storage volume = 40.1 m³
Allowed discharge rate = 5.000 l/s
Available MH storage = 0.0 m³

Fixed 6 hour data:-

Rainfall event = 6 hours
Rainfall rate = 14.00 mm/hr

Calculated storage volume = 0.0 m³
Allowed discharge rate = 5.000 l/s

Rainfall intensities calculated using the Wallingford Procedure

Storage lengths for initial calculation (x 1.1, 1.2, 1.3 or 1.5 as above if required) :-

Diam	Len	Diam	Len
100	5100.4	1125	40.3
150	2266.8	1200	35.4
225	1007.5	1275	31.4
300	566.7	1350	28.0
375	362.7	1425	25.1
450	251.9	1500	22.7
525	185.0	1575	20.6
600	141.7	1650	18.7
675	111.9	1725	17.1
750	90.7	1800	15.7
825	74.9	1875	14.5
900	63.0	1950	13.4
975	53.7	2025	12.4
1050	46.3	2100	11.6

Ovoid	Len
400 x 600	222.5
600 x 900	96.9
800 x 1200	54.5

Box culvert	Len
500 x 500	160.2
500 x 750	106.8
500 x 1000	80.1
750 x 1000	53.4
750 x 1200	44.5
750 x 1500	35.6
1000 x 1000	40.1
1000 x 1200	33.4
1000 x 1500	26.7
1000 x 1800	22.3
1000 x 2000	20.0
1500 x 1500	17.8
1500 x 1800	14.8
1500 x 2000	13.4

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Job No.		
Sheet no.	2	
Date	06/02/24	
By	Checked	Reviewed

MasterDrain SW

Project: 100 Years + 45% CC Storage Event

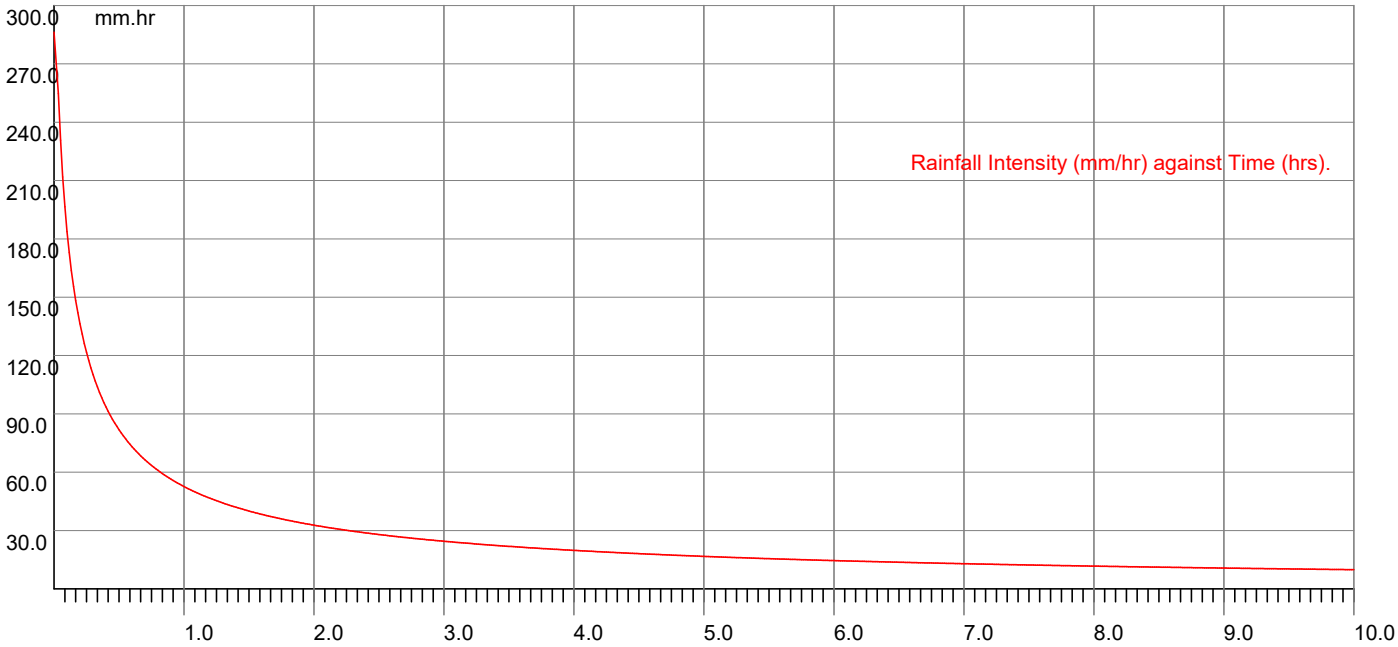
Title: Pump storage calcs for SEYMOUR RD

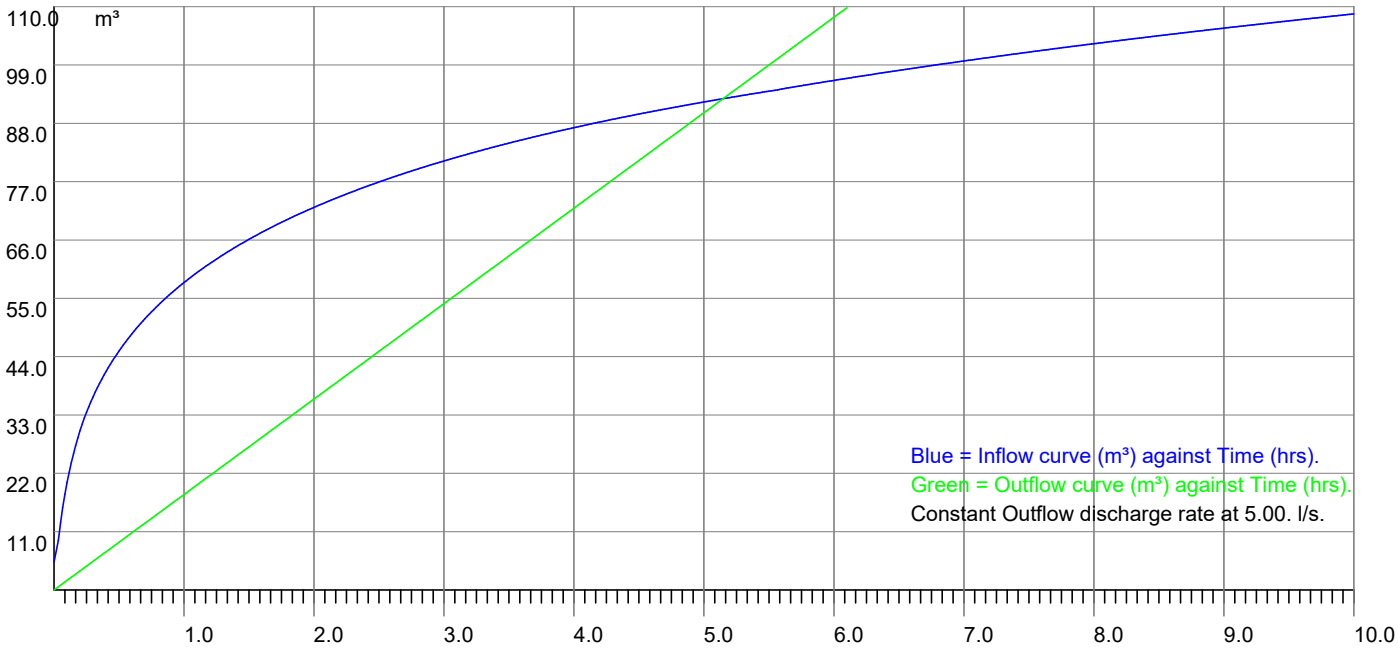
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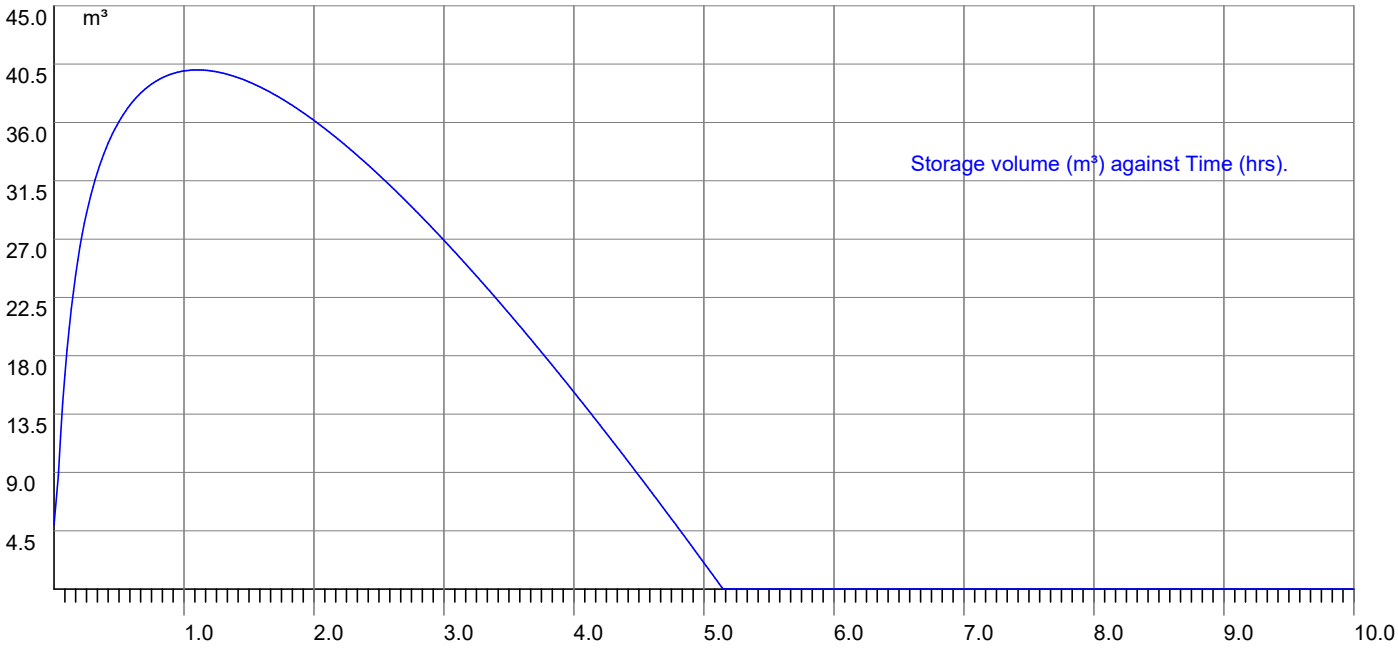
Time (mins)	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)
10	148.0	27.243	3.000	24.243
20	104.0	38.141	6.000	32.141
30	82.0	45.073	9.000	36.073
40	68.0	50.266	12.000	38.266
50	59.0	54.451	15.000	39.451
60	53.0	57.973	18.000	39.973
70	47.0	61.022	21.000	40.022
80	43.0	63.714	24.000	39.714
90	40.0	66.127	27.000	39.127
100	37.0	68.313	30.000	38.313
110	35.0	70.313	33.000	37.313
120	33.0	72.156	36.000	36.156
130	31.0	73.863	39.000	34.863
140	29.0	75.455	42.000	33.455
150	28.0	76.943	45.000	31.943
160	27.0	78.342	48.000	30.342
170	26.0	79.660	51.000	28.660
180	24.0	80.905	54.000	26.905
190	24.0	82.086	57.000	25.086
200	23.0	83.206	60.000	23.206
210	22.0	84.273	63.000	21.273
220	21.0	85.290	66.000	19.290
230	20.0	86.261	69.000	17.261
240	20.0	87.190	72.000	15.190
250	19.0	88.079	75.000	13.079
260	19.0	88.932	78.000	10.932
270	18.0	89.751	81.000	8.751
280	18.0	90.539	84.000	6.539
290	17.0	91.296	87.000	4.296
300	17.0	92.025	90.000	2.025
310	16.0	92.728	93.000	0.000
320	16.0	93.406	96.000	0.000
330	16.0	94.061	99.000	0.000
340	15.0	94.761	102.000	0.000
350	15.0	95.436	105.000	0.000
360	15.0	96.095	108.000	0.000
370	14.0	96.739	111.000	0.000
380	14.0	97.369	114.000	0.000
390	14.0	97.986	117.000	0.000
400	13.0	98.589	120.000	0.000
410	13.0	99.181	123.000	0.000
420	13.0	99.760	126.000	0.000
430	13.0	100.329	129.000	0.000
440	12.0	100.886	132.000	0.000
450	12.0	101.434	135.000	0.000
460	12.0	101.971	138.000	0.000
470	12.0	102.499	141.000	0.000
480	12.0	103.018	144.000	0.000
490	12.0	103.527	147.000	0.000
500	11.0	104.029	150.000	0.000
510	11.0	104.522	153.000	0.000
520	11.0	105.007	156.000	0.000
530	11.0	105.485	159.000	0.000
540	11.0	105.956	162.000	0.000
550	11.0	106.419	165.000	0.000
560	10.0	106.875	168.000	0.000
570	10.0	107.325	171.000	0.000
580	10.0	107.768	174.000	0.000
590	10.0	108.205	177.000	0.000
600	10.0	108.636	180.000	0.000

Storage volume (m^3) = 40.1 m^3

MasterDrain SW	**The LK Group** www.thelkgroup.com	Eton Business Park, Eton Hill Road, Radcliffe M26 2ZS Tel: 0161 763 7200 email: m.jones@thelkgroup.com	Job No. Sheet no. 3 Date 06/02/24
	Project **100 Years + 45% CC Storage Event**		By / Checked / Reviewed
	Title **Pump storage calcs for SEYMOUR RD**		







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