



FLOOD RISK ASSESMENT AND DRAINAGE STATEMENT

One City Road

for

Commercial Development Projects Ltd

Job No.13842

August 2020

Rev B

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Flood Risk Assessment and Drainage Statement

One City Road, Manchester

1 SUMMARY

1. The client intends to redevelop the existing development known as One City Road, Manchester. The proposal includes demolition of existing office buildings and associated car parking and building two new office buildings with associated hard and soft landscaping. The site area is approximately 0.5Ha.

Nearest Postcode: M15 4PN

OS Coordinates: E 383625, N 397305

2. In accordance with National Planning Policy Framework the classification of the site is categorized LESS VULNERABLE as “buildings used for shops, financial, professional and other services”.
3. The development is consistent with the Local Development Plan Documents with regards to flood risk.
4. Sources of flooding that could affect the site have been considered, including;

- Fluvial
- Pluvial
- Ground Water
- Sewer Flooding
- Reservoir Breach
- Canal Hazard.
- River Irwell Breach.
- Manchester Ship Canal.

7. Records provided by the Environment Agency Advice Maps and the Manchester, Salford and Trafford Strategic Flood Risk Assessment (hereafter, SFRA) place the site within Flood Zone 1.

The Environment Agency Historic Flood map shows that there are no records of flooding at the site. The Historic Flood Map shows the maximum extent of individual Recorded Flood Outlines from river, the sea and groundwater springs that meet a set criteria. It shows areas of land that have previously been subject to flooding in England. This excludes flooding from surface water, except in areas where it is impossible to determine whether the source is fluvial or surface water but the dominant source is fluvial.

If an area is not covered by the Historic Flood Map it does not mean that the area has never flooded, only that the EA do not currently have records of flooding in this area that meet the criteria for inclusion. It is also possible that the pattern of flooding in this area has changed and that this area would now flood or not flood under different circumstances.

The Historic Flood Map takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages.

Flooding is shown to the land and does not necessarily indicate that properties were flooded internally.

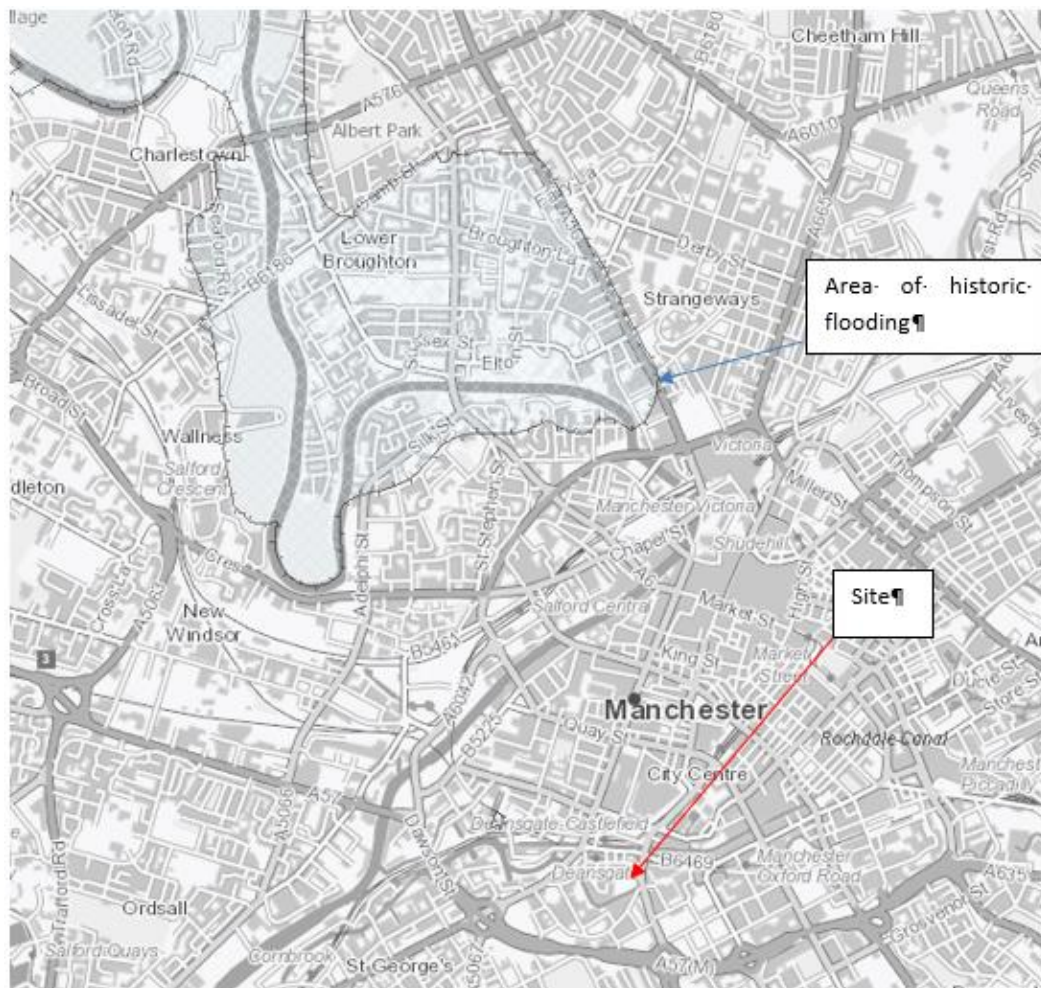


FIGURE 1 EXTRACT FROM EA HISTORICAL FLOOD MAP

8. The existing development discharges into the adjacent sewer network.
9. The SFRA maps indicate potential risk of flooding to the site from; pluvial, groundwater and canal breach. The SFRA indicates that the site is located within a Flood Zone 1. The site is in the Conurbation Core Critical Drainage Area.



FIGURE 2 EXTRACT FROM SFRA MAP- APPROXIMATE LOCATION OF THE SITE INDICATED WITH THE RED DOT. PURPLE SHADE IS THE EXTENT OF THE CRITICAL DRAINAGE AREA. RED HATCH IS THE EMPLOYMENT PLANNING ZONE.

10. From the Environment Agency's development advise Maps the site is identified as Flood Zone 1. The site is considered to be at low risk of flooding. Less than 1 in 1000 annual probability.
11. The estimated existing development runoff rates are tabulated below, along with the 50% betterment figures;

Storm Return Period	Duration (min)	Peak Runoff Rate (l/s)	50% Reduction (l/s)
1yr	5	75	37.5
1yr	10	52	26
1yr	30	27	13.5
1yr	60	18	9
1yr	120	11	5.5
1yr	240	7	3.5
1yr	360	5	2.5
1yr	1440	2	1
30yr	5	175	87.5
30yr	10	127	63.5
30yr	30	67	33.5
30yr	60	43	21.5
30yr	120	26	13
30yr	240	16	8

30yr	360	12	6
30yr	1440	4	2
100yr+30%	5	294	147
100yr+30%	10	216	108
100yr+30%	30	116	58
100yr+30%	60	73	36.5
100yr+30%	120	44	22
100yr+30%	240	26	13
100yr+30%	360	19	9.5
100yr+30%	1440	6	3

TABLE 1 PRE & POST DEVELOPMENT RUNOFF RATES

12. An allowance of 30% for climate change must be included within the design of the onsite drainage.
13. A plan of the proposed development has been included in Appendix A.
14. the proposed use is not sensitive to flood damage and will occupy the whole site. It is not necessary to consider how sensitive land uses will be placed in areas with the site that are at least risk of flooding.
15. Measures will be incorporated into the drainage scheme and landscaping to protect the site from flooding, including the potential impacts of climate change, including rainwater attenuation and controls. All hard-standing external works will be designed to slope away from the building where possible to direct rainfall away from the building and towards the drains.
16. Any residual risk to flooding downstream will be effectively managed on site with the use of appropriate drainage methods. The site is an existing brownfield site.
17. It is proposed that the runoff from the proposed building and associated hard-standings will discharge base on a 50% improvement on the original site discharge rate for a brownfield site.
18. The risk of flooding to the site is considered low, the drainage design proposals will improve the drainage characteristics of the existing site and so the effect of the development on the flood risk is not considered to be significant.
19. Management of residual flood risk will be managed by the following;

Canal Breach risk is managed by the Canal and River Trust.

The risk of flooding from sewers is managed by United Utilities.

On site drainage will be managed by the management the Proposed Development owners, typically formalized by a management company.

The risk of Fluvial flooding is managed by the EA.
20. A drainage strategy has been proposed which discharges Foul sewage into the public combined sewer in City Road East by means of the existing site connection. The Surface Water is proposed to be discharged into the River Medlock through the public surface water sewer in City Road East. The SuDs hierarchy has been considered in arriving at this proposal. Infiltration is not appropriate as the proposed building occupies the whole site and the SFRA identifies ground water flood risk. Rainfall will be attenuated and discharged at a controlled rate. Storage options include below ground tanks or oversized pipes, or Blu-Roof source control. The landscape design is proposed to include rain gardens which provide water quality treatment.

2 NATIONAL PLANNING POLICY FRAMEWORK AND MANAGING FLOOD RISK

Paragraph 155 of the National Planning Policy Framework (NPPF), under the Planning and Flood Risk section states;

“Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.”

The advised method by which this is to be achieved is set out in paragraph 157;

“All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

- (a) applying the sequential test and then, if necessary, the exception test as set out below;
- (b) safeguarding land from development that is required, or likely to be required, for current or future flood management;
- (c) using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and
- (d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.”

Further in paragraph 158;

“The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.”, and paragraph 159,

“If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.”

The SFRA shows that this site is in an area of low flood risk, and that the development is appropriate for the site. The site therefore passes the sequential test, and therefore the exception test is not required.

2.1 CRITICAL DRAINAGE AREAS

The Town and Country Planning Order 2006¹¹ defines Critical Drainage Areas as “an area within Flood Zone 1 which has critical drainage problems and which has been notified... [to]...the local planning authority by the Environment Agency”. However, the Environment Agency Standing Advice¹² also recognises the part that SFRA's play in identifying areas with drainage problems and in doing so highlighting areas that need a FRA to consider drainage in detail.

Certain locations are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. There are generally known local flooding problems associated with these areas. These areas have been defined as CDAs in the SFRA. Specific drainage requirements are required in these areas to help reduce local flood risk. These are areas with complex surface water flooding problems that would benefit from a Surface Water Management Plan and subsequent drainage strategy

The SFRA shows that the site is in the Conurbation Core Critical Drainage Area. As such, a site specific flood risk assessment is required.

3 INTRODUCTION

Booth King Partnership Ltd has been appointed by Commercial Development Projects Ltd to prepare a Flood Risk Assessment and drainage statement in support of a planning applications.

The flood Risk Assessment has been prepared in accordance with the Flood Risk and Coastal Change Planning Practice Guidance (PPG) and the National Planning Policy Framework (NPPF). It contains information from sources such as the Environment Agency, Local Sewerage Company, District Council and Site Owner.

According the NPPF a flood risk assessment is required for all developments in Flood zones 2 and 3. In flood zone 1, and assessment should accompany all proposals involving: sites of 1Ha or more; land which has been identified by the Environmental Agency (EA) as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased risk of flooding in the future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use. As the SFRA for Manchester identifies the site as being in a critical drainage area, a flood risk assessment is required.

The drainage statement has been prepared in line with the National Standards for Sustainable Systems (2011) and Sustainable Drainage Technical Standards (2015). It describes and outlines proposals for disposal of surface water runoff and foul effluent from the site.

3.1 EXISTING SITE DESCRIPTION

One City Road development is located in the centre of Manchester and consists of a commercial office development and external car parking area. The site is bound by highways on all four sides with vehicular access off City Road East.

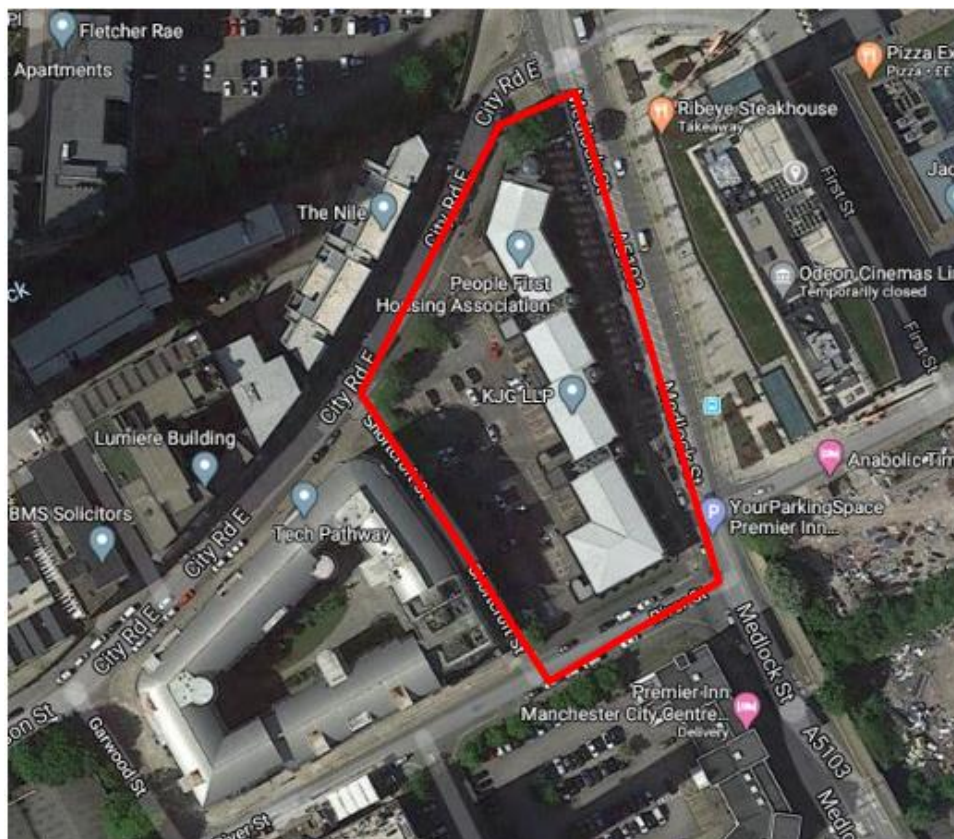


FIGURE 3 OVERALL SITE (GOOGLE MAPS) NEAREST POSTCODE M15 4PN OS E 383625, N 397305

The clients proposals include the demolition of the existing office development to make way for the construction of 10 and 14 storey grade A office blocks with basement area for services etc. The proposals are shown in Figure 4 with larger copies appended to this report. Appendix A.

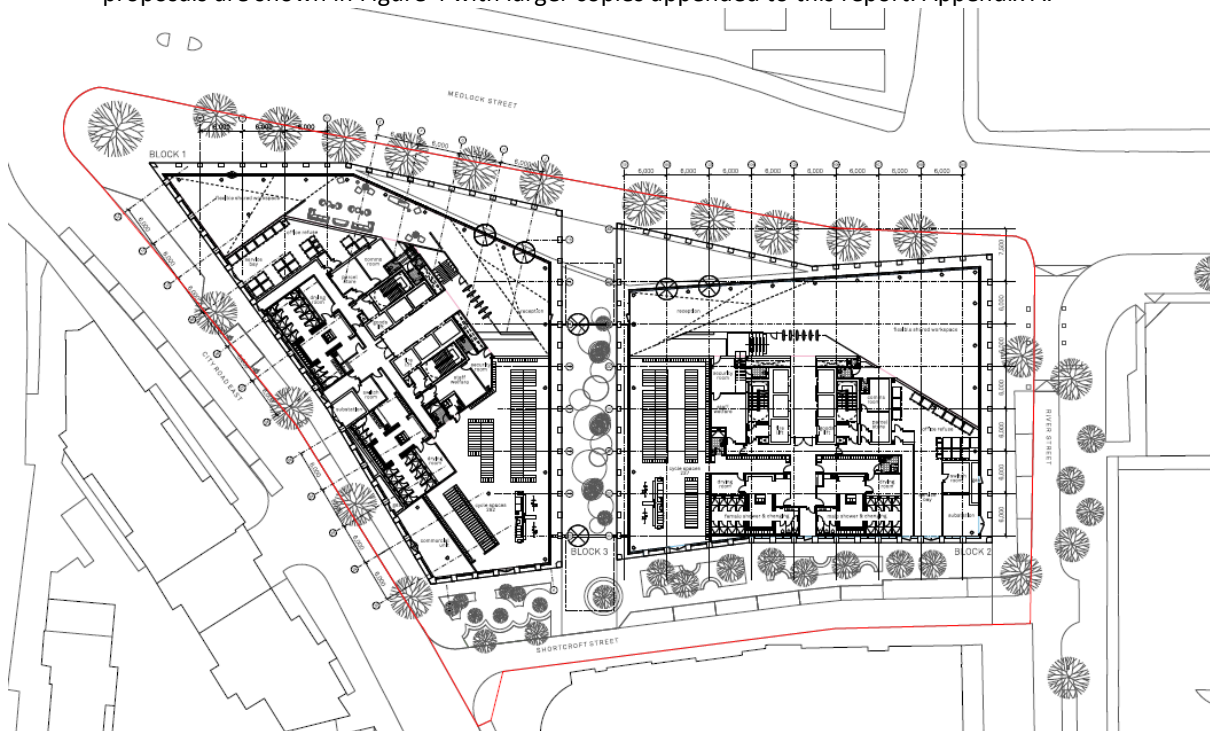


FIGURE 4 ARCHITECTS PROPOSED LAYOUT

3 POTENTIAL SOURCES OF FLOODING

3.1. The potential sources of flooding which could affect the site have been identified in this section. Their possible influence on the site is addressed and any mitigation measures required are discussed further in section 4.

3.2 FLUVIAL FLOODING – STRATEGIC FLOOD RISK ASSESSMENT

The proposed site is included within the SFRA for Manchester, which was produced by JBA Consulting in March 2011. The SFRA indicates that the development is located within Flood Zone 1 (Low Probability) as shown in the flood map extract below in Figure 2

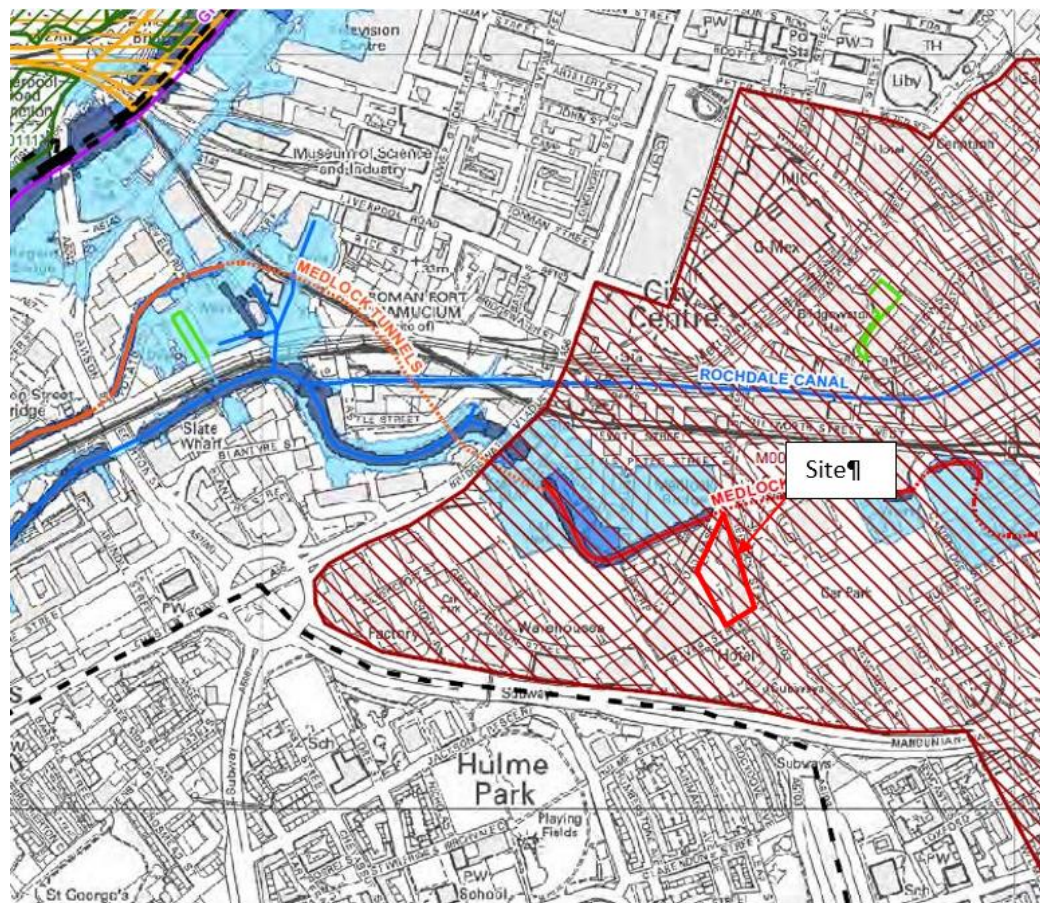
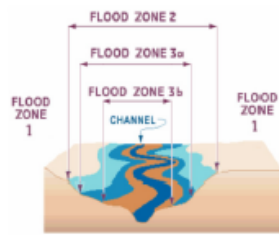


FIGURE 5 SFRA FLOOD MAP (SFRA MAP 2009S0290_MST FLOOD ZONES_FL_1.2_E)



3.3 ENVIRONMENT AGENCY ADVICE MAP

The environment Agency Advise Maps are freely available online and are updated regularly. The map for the proposed site has been shown in Figure 6 and highlights that the site is located within Flood Zone 1.



Flood Zone 1: Low Probability

Land assessed as having a less than 1 in 1000 chance of river and sea flooding.

Flood Zone 2: Medium Probability

Land assessed as having between a 1 in 100 and 1 in 1000 chance of river flooding (1%-0.1%) and between 1 in 200 and 1 in 1000 chance of sea flooding (0.5%-0.1%)

Flood Zone 3: High Probability

Land assessed as having between a 1 in 100 or greater chance of river flooding (>1%) and between 1 in 200 or greater chance of sea flooding (>0.5%).

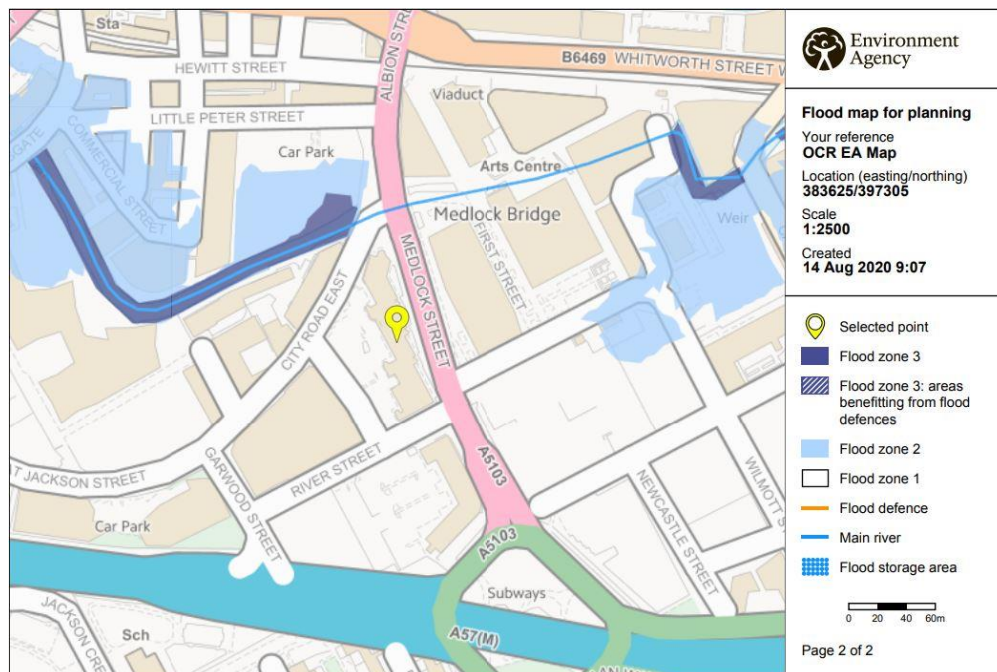


FIGURE 6 FLOOD ADVICE MAP (ENVIRONMENT AGENCY) SITE INDICATED WITH THE YELLOW FLAG

3.4 TIDAL FLOOD RISK

Not applicable for this site.

3.5 FLUVIAL FLOOD RISK (BY RIVER)

The River Medlock is the closest river to the site and is approximately 30m to the North West. The SFRA has provided a map highlighting the most probable location areas likely to be affected based on topography. As shown in Figure 7 below the site is not situated in a fluvial flood zone.

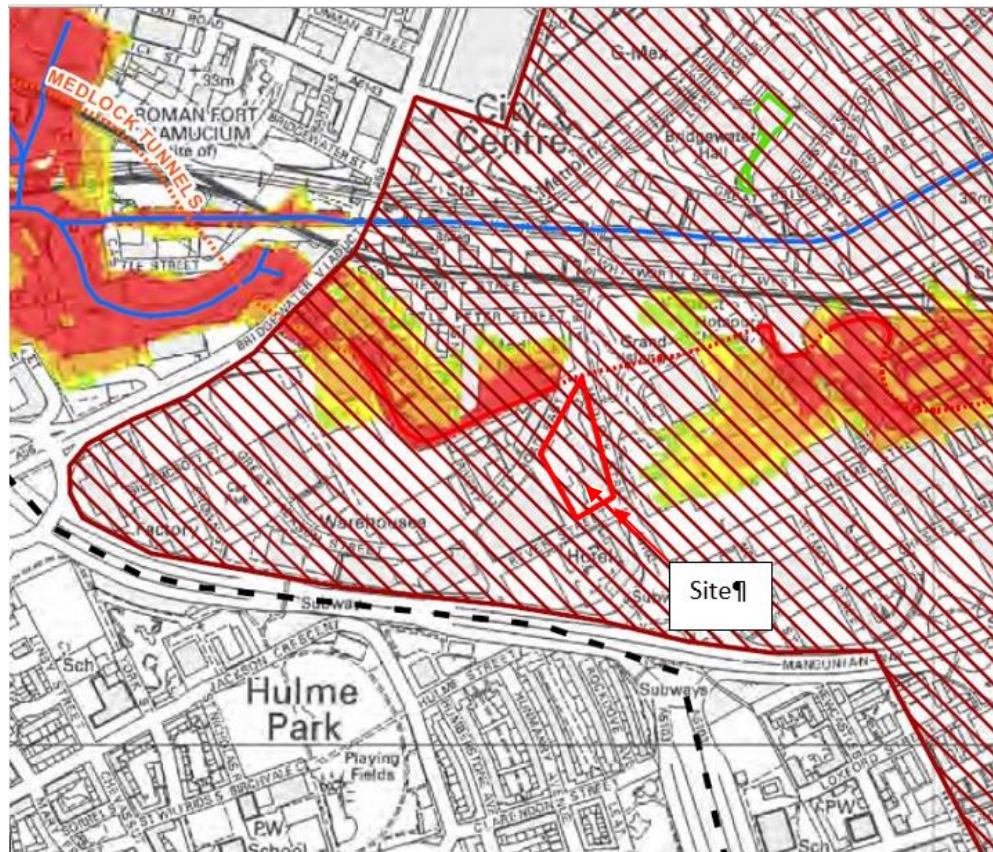


FIGURE 7 FLUVIAL FLOOD MAP.(SFRA 2009S0290_MST_FLUVIAL_Q1000_CC_HAZARD_FL_1.10B)

3.6 CANAL FLOOD RISK

Canals are owned, maintained, and operated by the Canal and River Trust (CRT). Water levels are regulated by a number by a number of sluice gates and whilst a breach or overtopping is unlikely the possible risk should be assessed.

The Rochdale Canal (Deansgate Locks) is the closest canal to the site and is approximately 250m to the North East. The SFRA has provided a map highlighting the most probable location areas likely to be affected based on topography. As shown in Figure 8 below the site is situated in canal breach zone B. Zone B is defined as “Less likely breach location, such as at wide, low or very low embankments, were identified by a walkover survey of the canal. At such locations it is more likely that this source of risk could be scoped out within any site specific FRA”.

Extract from SFRA

Flooding from the Rochdale Canal Manchester There is a limited likelihood of canal overtopping in Manchester. If it does occur, it is unlikely to affect areas beyond the canal towpath. Areas around Holland Street are an exception where canal overtopping has historically been related to low bank levels. This may affect a small area of Miles Platting M0008. The risk of canal flooding from breach is summarised below:

- *Central Park M0003, Miles Platting M0008 and Oxford Road Corridor M0042 are within Canal Breach Zone B*

The site is within the Oxford Road Corridor M0042, and is between 32.0 & 33.0mOD elevation. The canal at Deasgate locks is at approximately 30.0mOD (Photo 1), and interacts hydraulically with the River Medlock, which is between the site and the canal at approximately the same level. We therefore conclude that the site is risk of flooding from a Canal Breach is not significant.

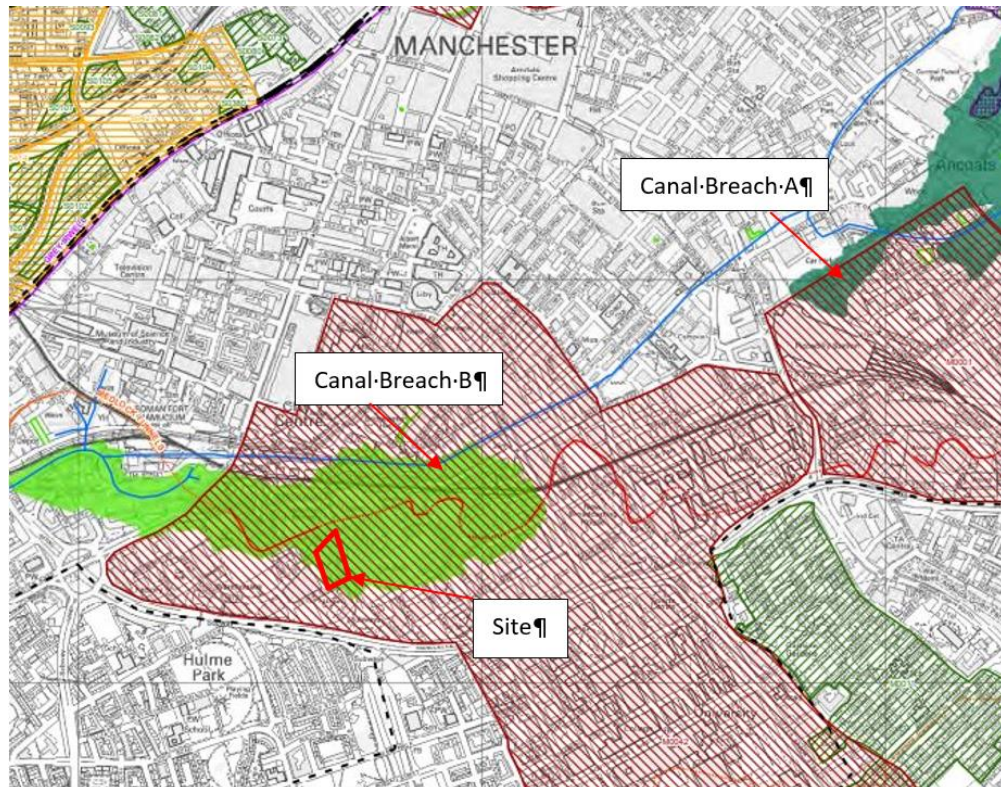


FIGURE 8 OVERLAND FLOW DIRECTIONS (SFRA 2009S0290_MST_CANAL_HAZARD_MM_3.2B)



PHOTO 1 VIEW ON DEANSGATE LOCKS APPROXIMATELY 3M BELOW STREET LEVEL

3.7 GROUND WATER FLOOD RISK

The SFRA has provided a map highlighting the site is located in an area which is potentially at risk of groundwater flooding. The map is not conclusive. Ground water flood risk is considered on a site by site basis and will be investigated as part of the geo-environmental site investigation.

We have seen the geotechnical site investigation report from the construction of the existing building (18693/10/MAG, Nov. 1988, Arup), which records ground water at depth in the boreholes;

4.3.7 Groundwater

Groundwater was limited to seepages in Boreholes 2, 4, 5 and 7 at depths of between 2.3 and 6.8m (92.23 to 97.59 mSD) and moderate flows in Boreholes 3 and 6 at depths of 4.8 and 7.1m (94.11 and 93.43 mSD). Borehole 1 and all trial pits were dry.

The historic flooding map presented above (Figure 1) records no floods on the site, and so we consider that the risk from ground water flooding is Moderate to low. Deep excavations on site for basements will probably require dewatering measures during construction, and the design of the structure will consider hydrostatic pressures. Site levels will not be reduced and so ground water flooding risk will not be increased.

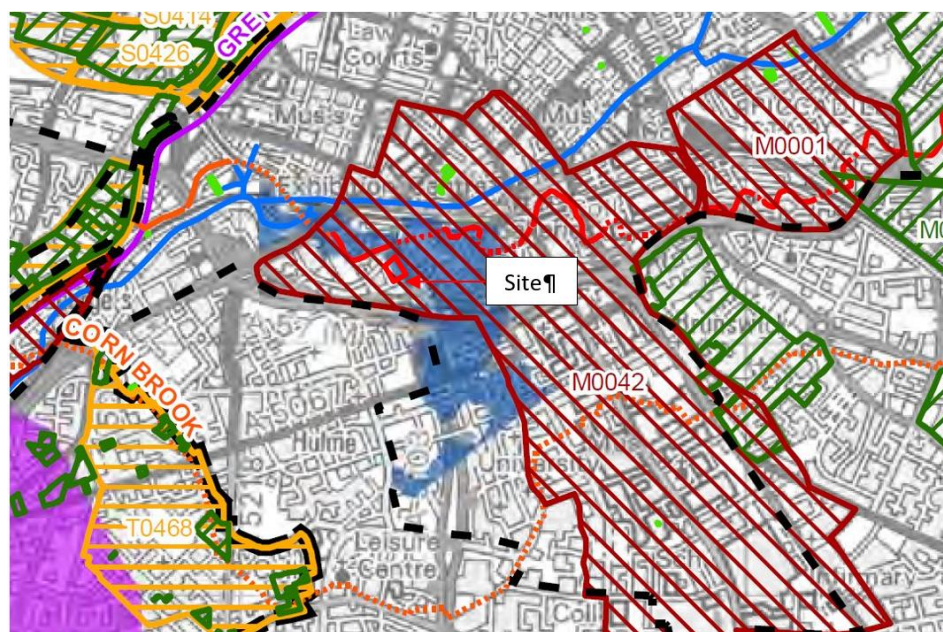


FIGURE 9 . GROUNDWATER FLOODING MAP (SFRA 2009S0290_MST_GROUNDWATERFLOODING_GW_2.1)

3.8 ARTIFICIAL WATERBODIES

There are a number of reservoirs in the catchment to the East of the site. These are owned and operated by United Utilities and fall under the Reservoir Act 1975

Whilst the probability of a catastrophic dam failure occurring is relatively low the consequences of such an event are severe. There are no noted dam failures in the SFRA but the nearest reservoirs are;

- Audenshaw reservoirs – circa 6km to the East.
- Gorton reservoirs - circa 6km to the East.
- Middleton reservoirs – circa 7.5km to the North.

Reservoir flood plans are prepared by their owners, but these documents are considered sensitive due to national security. Therefore, these documents are only available to the Environment Agency and Local Authorities.

3.9 PLUVIAL RUNOFF

The SFRA maps highlight areas that are at risk of pluvial surface water runoff. The maps show that the site is currently susceptible and is classed as an intermediate risk. An extract of the flood map is shown in Figure 10 below. The area of land highlighted in blue that is susceptible to risk appears to be related to the form of the existing buildings on site. The shaded area is the existing car park. The proposed development will remove the car park and so this risk is not considered to be significant.

The drainage of the proposed development, in particular the landscaping to the perimeter will be designed to collect and safely convey the surface water away from property.

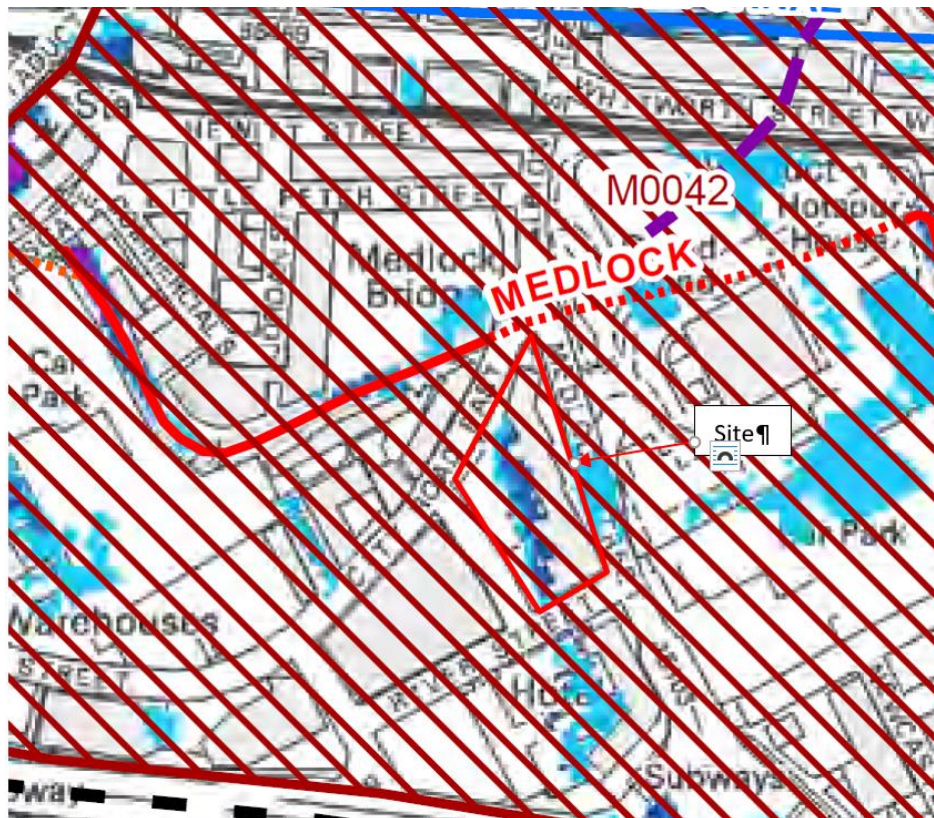


FIGURE 10 SURFACE WATER RUNOFF RISK (SFRA 2009S-0290_MST_SURFACEWATERFLOODING_CURRENT_SS_4.1_E)

3.10 CRITICAL DRAINAGE AREA.

The SFRA report highlights the area within Manchester that are particularly sensitive to an increase in the rate of surface water runoff. These maps show that the site is located within the Conurbation Core Critical Drainage Area.

Surface water flow paths in this CDA are largely linked to the natural floodplains of 'hidden' or 'lost' culverted watercourses that run through this area, particularly in Manchester city centre. The most

widespread surface water flooding is predicted in the city centre between the Irk and the Medlock with the density of properties at risk to surface water flooding in excess of 100 per 0.25 km².

An extract of the critical drainage area map is shown in Figure 11 below.

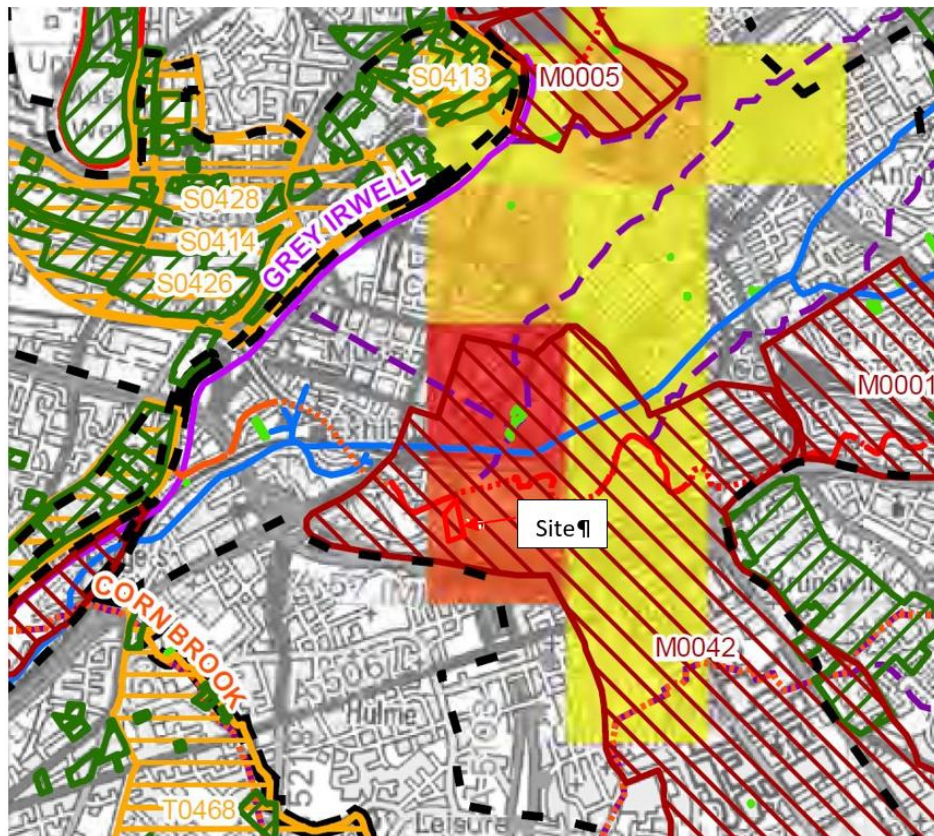


FIGURE 11 CRITICAL DRAINAGE AREA MAP (SFRA 2009S0290_MST_SURFACE WATER FLOODING RISK ASSESSMENT_CURRENT_SS_4.3)

3.11 FLOOD RISK OVERVIEW

The potential sources of flooding which could be experienced have been summarized in Table 2 below. Those posing the greatest flood risk to the site have been investigated further in section 4 to determine possible mitigation measures.

Source of Flooding	Potential Flood Risk				Description
	High	Med	Low	None	
Fluvial				X	The site is located with Flood Zone 1.
Tidal				X	Not applicable for this site.
Canal			X		The site is located in Canal Breach Zone B
Ground Water		X			SFRA data show a high potential risk of groundwater flooding onsite and in the surrounding area to the site. Historic SI indicates groundwater below 2.3m
Artificial Waterbodies			X		Residual risk posed by reservoirs located to the North and East of the site.
Pluvial Runoff			X		Existing issues highlighted onsite. These will be mitigated in the proposed development as they appear related to the existing building topography
Critical Drainage Area		X			Site is located within the Conurbation Core CDA.

TABLE 2 POTENTIAL SOURCES OF FLOOD OVERVIEW.

4 FLOOD RISK ANALYSIS

4.1 ARTIFICIAL WATERBODIES

There is a low residual risk posed by reservoirs to the North and East of the site.

- Audenshaw reservoirs – circa 6km to the East.
- Gorton reservoirs - circa 6km to the East.
- Middleton reservoirs – circa 7.5km to the North.

4.1.1 MITIGATION MEASURE

No specific mitigation measures required due to their distance from the site.

4.2 CANAL FLOOD RISK ANALYSIS

The SFRA has provided a map highlighting the most probable location areas likely to be affected based on topography. Canal breach B zone is described in the SFRA as “Less likely breach location, such as at wide, low or very low embankments, were identified by a walkover survey of the canal. At such locations it is more likely that this source of risk could be scoped out within any site specific FRA”. We have reviewed the information and based upon the local topography i.e that the canal towpath at Deansgate Locks is approximately 3m below the site, we consider the risk to be not significant.

4.2.1 MITIGATION MEASURE

None required.

4.3 GROUNDWATER FLOODING RISK ANALYSIS

The SFRA has provided a map highlighting the site is located in an area which is at risk of groundwater flooding. There is mention of ground water flooding in the SFRA Historic flooding map and historic geotechnical investigation reports detect no ground water above 2.3m below ground level

4.3.1 MITIGATION MEASURE

The Proposed Development will likely be subject to a planning condition requiring a detailed Phase 2 Geotechnical Investigation prior to the commencement of development. This exercise will establish the ground conditions, including presence of groundwater, beneath the site. The proposed development will occupy the entire site. The site specific geotechnical investigation will consider groundwater Basements and ground floor slabs will be designed following the advice of the geotechnical ground investigation report, and so we consider the risk of groundwater flooding to the proposed development to be low.

4.4 PLUVIAL SURFACE WATER RUNOFF ANALYSIS

The SFRA maps highlighted that the site is currently at risk of flooding from surface water runoff. However, there is no information on the exact source. The maps indicate an area at risk to surface water flooding which corresponds to the existing car park. The car park will be built over in the proposed development and so this risk is not considered significant.

4.4.1 MITIGATION MEASURES

The drainage for the proposed development must be adequately designed to capture and prevent runoff leaving the network in all relevant storm events. Hard standing external areas must be graded

away from the proposed buildings to ensure any possible flooding is directed away. Runoff should be prevented/intercepted at the top of the proposed entrance to any basement area to reduce the risk of flooding.

4.5 CRITICAL DRAINAGE AREA

The majority of the city centre of Manchester is within a Critical Drainage Area. Any development located in the CDA is expected to reduce runoff rates to alleviate flood risks downstream rather than having just neutral impact.

4.5.1 MITIGATION MEASURES

Surface water drainage for the new buildings and its associated hard standing externals will be designed based on 50% betterment on the current drainage runoff rates.

4.6 FLOOD ZONE REQUIREMENTS

Based on the information available the site is deemed to be within the low probability Flood Zone 1.

4.6.1 DEFINITION OF FLOOD ZONE 1

The zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

4.6.2 APPROPRIATE LAND USE

In accordance with National Planning Policy Framework Practice Guidance on flooding, all land uses are appropriate in this zone.

4.6.3 POLICY AIMS

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques.

4.6.4 FINISHED FLOOR LEVEL RESTRICTIONS

There are no restrictions on finished floor levels in Flood Zone 1.

4.6.5 FLOOD AWARENESS PROCEDURES

None required

4.6.6 SITE ACCESS AND EGRESS EVACUATION ROUTES

None required.

5 EXISTING DRAINAGE INFORMATION

5.1 PUBLIC SEWERS

The public sewers in the area are owned and maintained by United Utilities (UU). Records show that an existing combined sewer passes under the Northern tip of the site in an area to be landscaped. A copy of the records has been included within appendix B with an extract shown below.



FIGURE 12 SEWER RECORDS

At the time of writing this report information is limited on the sewer depths. However, the statutory plans indicate the sewer sizes which are as follows;

Medlock Street – 670x900 construction type unknown

City Road East – 2800 BR

River street – Various Sizes 610x79 and 600 VC

5.2 SURFACE WATER DRAINAGE

At the time of writing this report information is limited on the surface water sewer depths. However, the UU statutory plans do indicate the sewer sizes which are as follows;

Shortcroft Street – Surface Water only 300 VC

City Road East – Surface Water 450VC

The 450mm dia. Clay sewer under City Road East flows north to discharge into the River Medlock. The 300mm dia. Surface water sewer under Shortcroft Street runs South and connects to a combined sewer in River Street.

5.3 PRIVATE FOUL AND SURFACE WATER DRAINAGE

The below ground services survey indicates that the existing building drainage is a combined network , connecting to the existing combined sewer network on City Road East. However, some of the surface water connection are unknown at this stage and further investigations are planned. Refer to Figure 12 for sewer network layout.

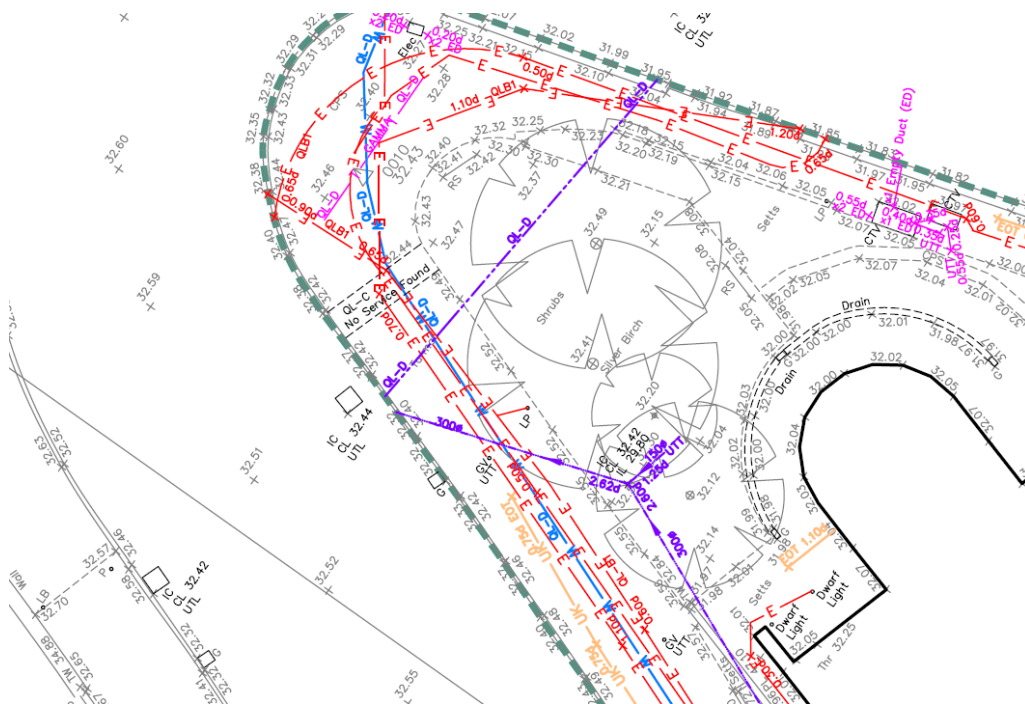


FIGURE 13 SURVEY OF EXISTING SITE SEWER CONNECTION

5.4 INFILTRATION

The proposed development is to the majority of the site footprint and therefore there is no capacity for an infiltration type drainage system to be adopted as it would be within 5.0m of the building which would not conform to building regulations.

6 DRAINAGE PROPOSALS

A drainage scheme has been conceived which will be developed in detail, subject to approval.

The proposed buildings will be drained by separate Foul and Surface water systems.

6.1 SUDS ASSESSMENT

Local Policy EN14 refers to the local Strategic Flood Risk Assessment Users Guide. Paragraph 5.43 of which says;

“Within Critical Drainage Areas, and consistent with Core Strategy policy EN14 Flood Risk, developers should aim to minimise surface water runoff from developments, and achieve at least the following runoff rates:

Greenfield runoff on Greenfield sites up to a 1 in 100 year storm event, including consideration of climate change

A 50% runoff rate reduction for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, including consideration of climate change”

Local policy EN 8 concerns Adaptation to Climate Change

“All new development will be expected to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability ...”

Local Policy EN 17 Concerns Water Quality;

“With reference to the Manchester-Salford-Trafford SFRA and other relevant documents: Development should avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological; Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses; Development close to a watercourse should also ensure that waste or litter cannot enter the watercourse from the site; Development should, where feasible and appropriate, seek to open up any culverted or hidden watercourse”

Local Policy EN14 refers to the local Strategic Flood Risk Assessment Users Guide. Paragraph 5.43 of which says;

“Within Critical Drainage Areas, and consistent with Core Strategy policy EN14 Flood Risk, developers should aim to minimise surface water runoff from developments, and achieve at least the following runoff rates:

- Greenfield runoff on Greenfield sites up to a 1 in 100 year storm event, including consideration of climate change

- A 50% runoff rate reduction for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, including consideration of climate change”

It is proposed surface water drainage will be designed considering the SuDs hierarchy to achieve a peak runoff rate of 50% of the existing site runoff rates.

The SuDs hierarchy requires that surface water is disposed of by considering the following order;

1. Infiltration
2. Water course
3. Sewers

The proposed development will occupy the majority of the site footprint, and so infiltration is not appropriate as it will not be possible to locate soakaways 5m from the building or highways.

The River Medlock runs near the site, and there is a surface water sewer which discharges into the river. We would propose that pragmatic use is made of this sewer to convey surface water drainage the short distance to the the river, UU have been approached for consent. This will mitigate both duplication of resources, and disruption to the highways and river walls which would result from laying a drain parallel to the existing sewer.

The existing peak flow rate for a 1:1 year event from this site occurs in the 5 minute storm event and is 75 l/s. Applying the factor of 50% to this value gives a design peak flow rate of 37.5 l/s, which will be treated as the limit for all storms up to 1:100 year +30% for climate change. United Utilities have responded to an initial pre-development enquiry and subsequent correspondence agreeing to the peak flow being limited to 37.5l/s.

Attenuation can be located in the ground in tanks or oversized pipes, or at the roof level, using proprietary Blu Roof products. This can be decided through the detailed design.

An estimated attenuation storage volume of approximately 100m³ is proposed. This is likely to change through detailed design. It is currently proposed that this could be provided by over sized pipes, for example 3 No. 1.5m diameter pipes 20m long, beneath the winter garden between the two buidings.

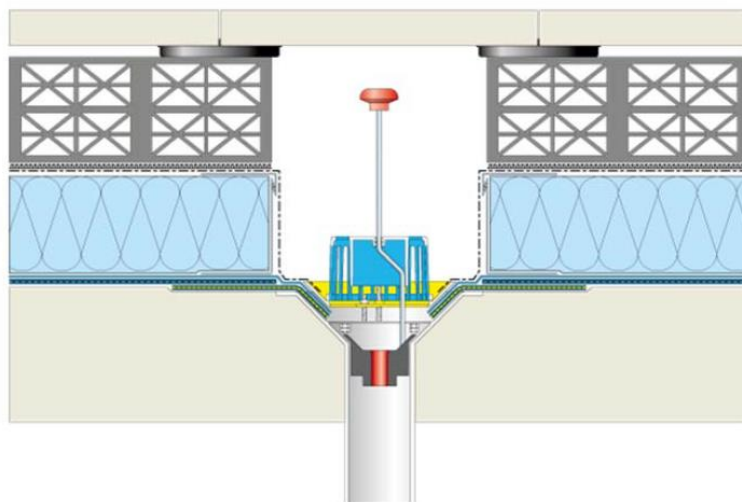


FIGURE 14 TYPICAL BLU-ROOF DETAIL

Our initial assessment of the foul peak flow rate, based upon the Discharge Unit method is 15.3 l/s for both buildings. Existing connections from the site will be investigated for re-use. United Utilities have responded to a predevelopment enquiry permitting foul discharge at an unrestricted rate.

6.2 LLFA

The Flood Protection Officer at Manchester City Council has been approached regarding the above approach for surface water drainage and they have agreed to the principle.

6.3 SUDS PROPOSALS

It is current planning advice, and best practice that the disposal of surface water into controlled waters is carried out in a sustainable manner. This requires that the developer control and treat surface water runoff prior to discharge into controlled waters so that there should be no increase in flood risk to the site or other property, no significant effect to base flows and no adverse effects on water quality or amenity. These requirements can be achieved by applying the principles of Sustainable Urban Drainage.

The SUDS manual proposes 5 selection criteria.

Land Use Characteristics

Site Characteristics

Catchment Characteristics

Quantity and quality performance requirements

Amenity and environmental requirements

There are many SUDS techniques that can be used on each site as each site is unique. Not all SUDS techniques will be suitable for a site and some may be used in combination to form part of the SUDS chain.

6.4 LAND USE

With reference to Table 3 extracted from the SuDs manual

4.Commercial Development	Some small areas within these sites, such as fuel tanks or rubbish skips should be treated as industrial (hotspot) sub-catchments. Unless receiving water is particularly sensitive, two levels of treatment will typically be required. This might consist of source control followed by site or regional controls
--------------------------	---

TABLE 3 LAND USE

With Reference to Table 4, all SUDS group techniques are appropriate to Commercial, Brownfield and Contaminated Land uses as denoted by a 'Y' in the table, with the caveats applied as set out in the footnotes to the table;

SUDS Group	Technique	Commercial	Brownfield	Contaminated Land
Retention	Pond	Y ²	Y	Y ²
	Subsurface Storage	Y	Y	Y
Wetland	All types	Y ²	Y	Y ²
Infiltration	All Types	Y ²	Y	Y ⁴
Filtration	All types	Y ²	Y	Y ²
Detention	Detention Basin	Y ²	Y	Y ²
Open Channels	Conveyance Swale	Y ²	Y	Y ²
Source Control	Green Roof	Y ²	Y	Y
	Rain water harvesting	Y ²	Y	Y
	Pervious pavements	Y ²	Y	Y ²

2 May require 3 treatment stages depending upon receiving watercourse characteristics

4 Providing designs prevent mobilization of contamination

TABLE 4 SUDS TECHNIQUES

6.5 SITE CHARACTERISTICS

Site characteristics which may preclude certain types of SUDS techniques at this site include;

The site will be densely developed with the building extending to the site boundaries implies that surface storage features will not be suitable.

The site is underlain by impermeable clay which implies that infiltration will not be appropriate

With reference to Table 5, we have identified which SuDs techniques are applicable to this development

SUDS Group	Technique	Soils		Area	Min d to water table	Site Slope	Available Head	Available Space	Comment
		Permeable	Impermeable	0-2ha	>1m	0-5%	0-1m	Low	
Retention	Pond	Y	Y	Y	Y	Y	Y	N	Ponds require large areas of landscape
	Subsurface storage	Y	Y	Y	Y	Y	Y	Y	Can be accommodated in space between buildings
Wetland	All types	Y	Y	Y	Y	Y	Y	N	Wetlands require large areas of landscape
Infiltration		Y	N	Y	Y	Y	Y	N	Require soakaways to be 5m from structures
Filtration	Surface sand	Y	Y	Y	Y	Y	N	N	
	Sub-surface sand	Y	Y	Y	Y	Y	N	Y	
	Perimeter sand	Y	Y	Y	Y	Y	Y	N	
	Bioretention /filter strips	Y	Y	Y	Y	Y	Y	Y	Rain Gardens will be incorporated in proposed landscape
	Filter Trench	Y	Y ¹	Y	Y	Y	Y	Y	Can be incorporated into landscape design, but will drain to sewer not infiltration
Detention	Detention Basin	Y	Y	Y	Y	Y	Y	N	Basins require large areas of landscape

									and to be able to infiltrate
Open Channels	All types	Y	Y	Y	Y	Y	Y	Y	Could be included, but question whether appropriate in City Centre location due to risk of trips & collecting litter
Source Control		Y	Y	Y	Y	Y	Y	Y	Considered Blu Roof

1With Liner

TABLE 5 SUDS SITE CHARACTERISTICS

Changes in the drainage characteristics of the site will be minimal as the site is primarily urban hardstanding.

6.6 CATCHMENT CHARACTERISTICS

There may be regulatory criteria which can restrict the choice of SUDS technique.

With reference to Table 6, extracted from the SuDs manual, for the proposed development, hydrologic criteria will be agreed with United Utilities.

Catchment Characteristic	Potential Issues
Coastal/estuarial waters	Discharge to coastal or estuarial waters will not generally require peak flow or volume control as there will be no deterioration in flood risk as a result of increased runoff. Due to the high dilution available, surface water discharges to coastal waters are generally considered low risk. The main risk is from Faecal coliforms, oil and metals which are all present in urban runoff affecting bathing and shellfish waters, and here high levels of treatment may be required.
Discharges to the sewer network	Hydrologic criteria must be agreed with the water authority. The allowable discharge rate will depend upon the headroom available in the downstream network. Sediment control is also likely to be of concern due to ongoing maintenance requirements.

TABLE 6 CATCHMENT CHARACTERISTICS

With reference to Table 7, extracted from the SuDs manual, the number of components in the SuDs treatment train will be;

Runoff catchment characteristic	Receiving Water sensitivity LOW
Roofs Only	1
Parking Areas/Commercial Zones	2
Refuse collection/Loading Bays	3

TABLE 7 TREATMENT CHAIN COMPONENTS

On the site, as the proposed building extends over the majority of the site footprint we are only concerned with Roof water and public realm paving area discharges.

6.7 QUALITY AND PERFORMANCE CHARACTERISTICS

The water quality treatment may be managed within a single SUDS technique, or within a series of techniques. Each technique has a different removal efficiency for each pollutant of concern, for most sites general water quality improvement is required across the suite of urban pollutants.

Hydraulic criteria require peak flow and volume control for a range of return periods.

We propose for this site that the outfall be limited to no worse than 50% of the existing runoff rates.

Using the HR Wallingford method, the peak runoff rate for this site is estimated as 75 l/s for the 1:1 year return period. Calculations are appended in appendix C

However, as the outfall will be into the existing public sewer in City Road East. A pre development enquiry has been submitted to United Utilities.

From the site characteristic SUDS selection matrix, the appropriate SUDS techniques available for this site is; source control.

From the previous discussions the recommended SUDS strategy will include the following;

Number of measures required	Measures
1	Source Control (eg Blu roof) or subsurface storage
2	Source Control and bio-retention or Silt Trap

6.8 COMMUNITY/ENVIRONMENTAL AND AMENITY PERFORMANCE

It is important to determine whether the proposed SUDS components meet all the community planning and environmental requirements of the site.

The scheme will need to balance the requirements of maintenance, community acceptability, cost and habitat creation potential. The SuDs techniques proposed are rated as Low (L), Medium (M) or High(H) in terms of their performance for maintenance, community acceptability cost and habitat creation potential as per the matrix below;

SUDS group	Technique	Maintenance	Community Acceptability	Cost	Habitat creation potential
Source Control	Roof attenuation eg Blu-roof	M	M	M	L
	Rain Gardens	M	H	M	M
Below Ground Storage	Tanks	L	L	M	L

The techniques selected for technical purposes score low to moderate for habitat creation potential. This can be mitigated by the planting around the building and landscaping of the roof terrace areas. There is no space on the site for further SUDS techniques.

6.9 DURING CONSTRUCTION

Due to site activities, for example, soil strip and soil disturbance due to vehicle movements, special attention should be paid to the water quality of the site runoff. Temporary measures may be required. The contractor will manage the risks, and discuss their proposals with the regulatory authorities with reference to the CIRIA document "Control of Water Pollution from Construction Sites", SP156).

6.10 EXCEEDENCE FLOWS

As there is little landscaping on the site, there will be no exceedance flows. All roof water is proposed to be transferred to the public sewer and onto the River Medlock, which is at a depth below 2.6m approximately and so the likelihood of surcharge and overflowing is considered very low.

6.11 TREATMENT

Roofwater can be treated by settlement in silt traps before entering the public sewer system.

6.12 MAINTENANCE RESPONSIBILITIES

The adopted sewers will be maintained by United Utilities. Private drains within the boundary will be maintained by the developer.

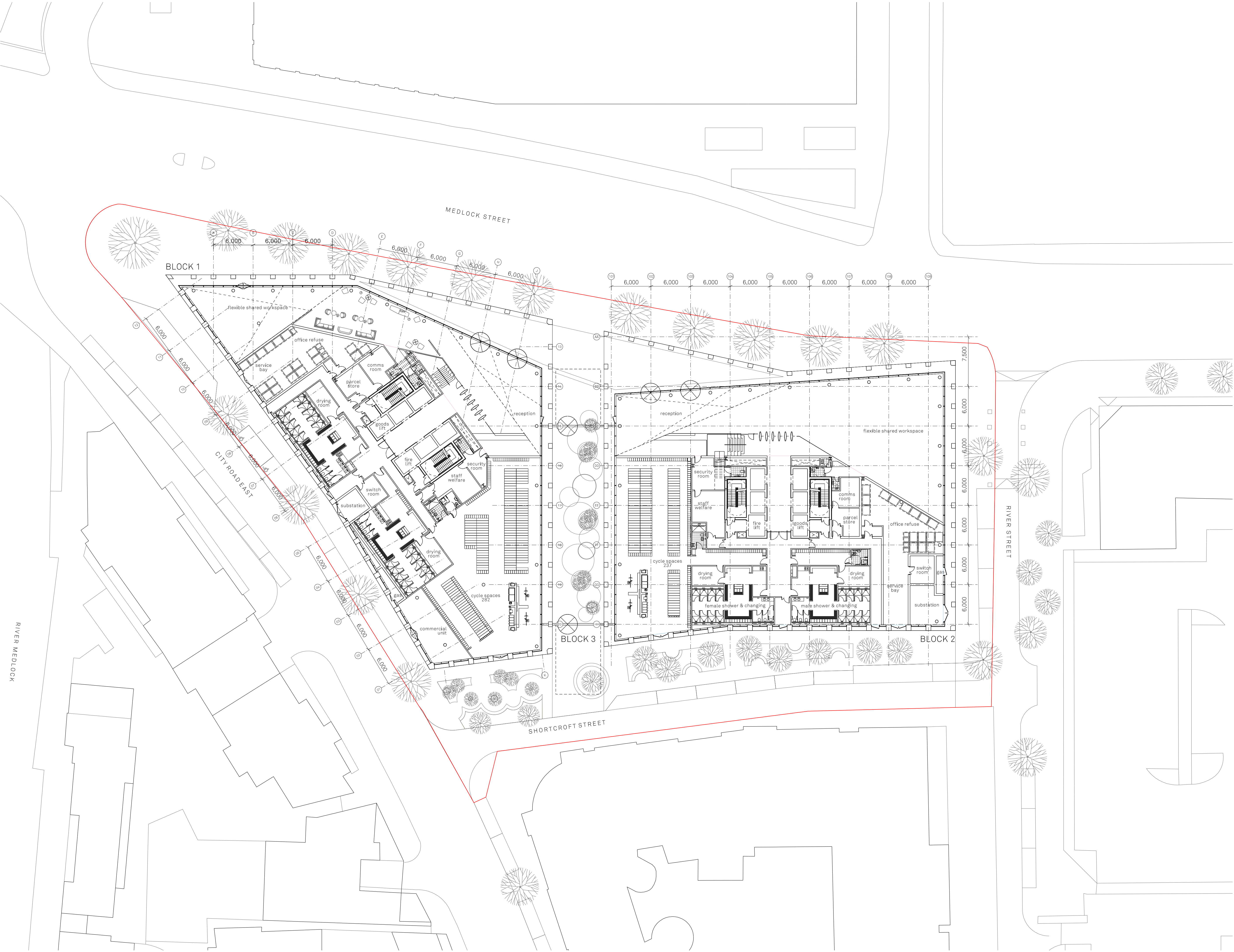
7 CONCLUSION

This Flood Risk Assessment has considered the impact of the development of 2 office buildings on the site of the existing offices and car park at 1 City Road, to satisfy the requirements of the National Planning Policy Framework (NPPF). In considering the potential sources of flooding to the site we have concluded that;

1. The site is in Flood Risk zone 1, and is considered at low risk from Fluvial Flooding
2. The proposed site drainage will need to control discharge peak flow rates to minimize the impact of the development on the risk of flooding downstream.
3. A scheme for the proposed development drainage will be developed and submitted to the local planning authority and approved prior to construction.

We consider that the flood risk to this site is generally low, and that the development can be carried out sensitively to mitigate any effects on the flood risk to downstream property.

APPENDIX A – PROPOSED DEVELOPMENT SITE LAYOUT.



APPENDIX B – UNITED UTILITIES SEWER PLANS.

Andrew Coop

**Tollgate House 9C
Bridge Street,
Bury,
BL09AB**

FAO:

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

**Your Ref: 13842 OCR Sewers
Our Ref: UUPS-ORD-173470
Date: 13/07/2020**

Dear Sirs

Location: PEOPLE FIRST HOUSING ASSOCIATION 1 CITY ROAD EAST, MANCHESTER, M15 4PN

I acknowledge with thanks your request dated 09/07/2020 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

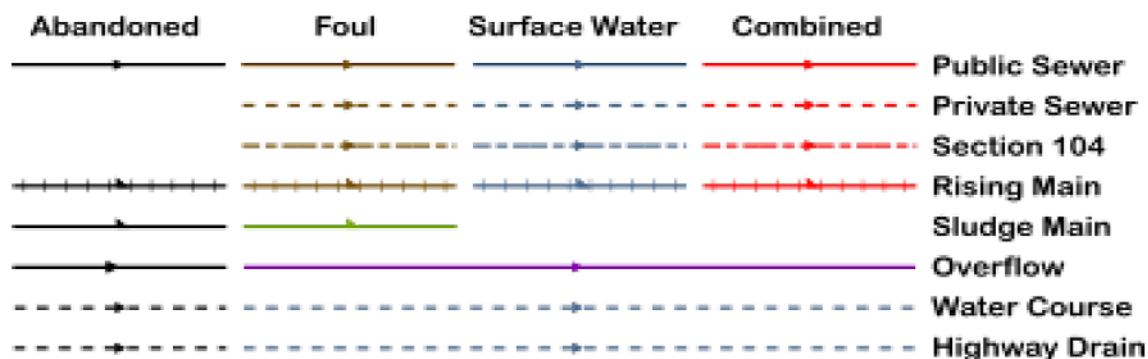
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

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.

Wastewater Symbolology



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

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



SEWER RECORDS

Address or Site Reference

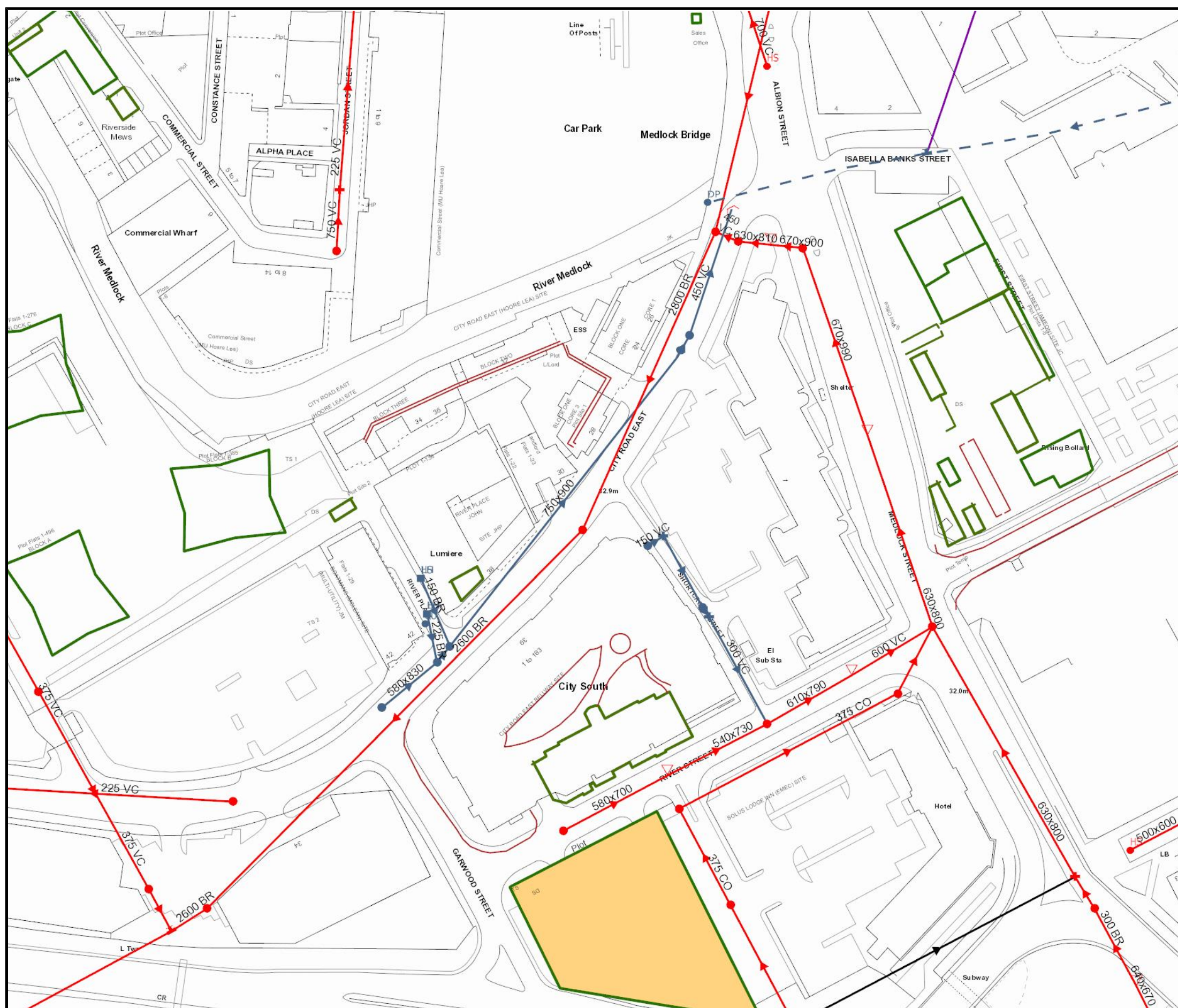
PEOPLE FIRST HOUSING
ASSOCIATION 1 CITY ROAD
EAST,
MANCHESTER,
M15 4PN

Scale: 1:1250
Date: 13/07/2020

Printed by: Property Searches

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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APPENDIX C PREDEVELOPMENT RUNOFF RATE ESTIMATES

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project				Job Ref.	
	One City Road				13842	
	Section				Sheet no./rev.	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	B	19/08/2020				

Design rainfall 1 5min	3
Design rainfall	3
Design rainfall 1 10min	3
Design rainfall	3
Design rainfall 1 30min	3
Design rainfall	3
Design rainfall 1 60min	4
Design rainfall	4
Design rainfall 1 120min	4
Design rainfall	4
Design rainfall 1 240min	4
Design rainfall	4
Design rainfall 1 360min	5
Design rainfall	5
Design rainfall 1 1440min	5
Design rainfall	5
Design rainfall 30 5min	6
Design rainfall	6
Design rainfall 30 10min	6
Design rainfall	6
Design rainfall 30 30min	6
Design rainfall	6
Design rainfall 30 60min	7
Design rainfall	7
Design rainfall 30 120min	7
Design rainfall	7
Design rainfall 30 240min	8
Design rainfall	8
Design rainfall 30 360min	8
Design rainfall	8
Design rainfall 30 1440min	8
Design rainfall	8
Design rainfall 100 5min	9
Design rainfall	9
Design rainfall 100 10min	9
Design rainfall	9

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project				Job Ref.	
	One City Road				13842	
	Section				Sheet no./rev.	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	B	19/08/2020				

Design rainfall 100 30min	9
Design rainfall	9
Design rainfall 100 60min	10
Design rainfall	10
Design rainfall 100 120min	10
Design rainfall	10
Design rainfall 100 240min	11
Design rainfall	11
Design rainfall 100 360min	11
Design rainfall	11
Design rainfall 100 1440min	11
Design rainfall	11
Stormwater attenuation design	12
Attenuation design	12

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project				Job Ref.	
	One City Road				13842	
	Section				Sheet no./rev.	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	B	19/08/2020				

DESIGN RAINFALL 1 5MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 5 min;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 0.36;
Factor Z2; Z2 = 0.62;
Design rainfall intensity; I_{max} = 48.0 mm/hr

Return period; Period = 1 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_5min_i = 6.5 mm
1 yr return period storm; M1_5min = 4.0 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
Max surface water runoff; Q_{max} = 75 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 1 10MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 10 min;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 0.51;
Factor Z2; Z2 = 0.61;
Design rainfall intensity; I_{max} = 33.7 mm/hr

Return period; Period = 1 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_10min_i = 9.2 mm
1 yr return period storm; M1_10min = 5.6 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
Max surface water runoff; Q_{max} = 52 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 1 30MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 30 min;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 0.79;
Factor Z2; Z2 = 0.62;

Return period; Period = 1 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_30min_i = 14.2 mm
1 yr return period storm; M1_30min = 8.8 mm

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project One City Road				Job Ref. 13842	
	Section				Sheet no./rev. 4	
	Calc. by B	Date 19/08/2020	Chk'd by	Date	App'd by	Date

Design rainfall intensity; $I_{\max} = 17.6$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 27$ l/s

;

DESIGN RAINFALL 1 60MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; $D = 1$ hr;

Return period; Period = **1** yr

Ratio 60 min to 2 day rainfall; $r = 0.360$;

Global warming increase; $p_{\text{climate}} = 0$ %

Factor Z1; $Z1 = 1.00$;

5yr return period storm; $M5_1\text{hr}_i = 18.0$ mm

Factor Z2; $Z2 = 0.63$;

1 yr return period storm; $M1_1\text{hr} = 11.4$ mm

Design rainfall intensity; $I_{\max} = 11.4$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 18$ l/s

;

DESIGN RAINFALL 1 120MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; $D = 2$ hr;

Return period; Period = **1** yr

Ratio 60 min to 2 day rainfall; $r = 0.360$;

Global warming increase; $p_{\text{climate}} = 0$ %

Factor Z1; $Z1 = 1.22$;

5yr return period storm; $M5_2\text{hr}_i = 22.0$ mm

Factor Z2; $Z2 = 0.65$;

1 yr return period storm; $M1_2\text{hr} = 14.2$ mm

Design rainfall intensity; $I_{\max} = 7.1$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 11$ l/s

;

DESIGN RAINFALL 1 240MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project				Job Ref.	
	One City Road				13842	
	Section				Sheet no./rev.	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	B	19/08/2020				

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; D = 4 hr;

Ratio 60 min to 2 day rainfall; r = 0.360;

Factor Z1; Z1 = 1.48;

Factor Z2; Z2 = 0.67;

Design rainfall intensity; I_{max} = 4.4 mm/hr

Return period;

Period = 1 yr

Global warming increase;

p_{climate} = 0 %

5yr return period storm;

M5_4hr_i = 26.6 mm

1 yr return period storm;

M1_4hr = 17.8 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;

Percentage impermeable area; p = 100 %

Max surface water runoff; Q_{max} = 7 l/s

;

DESIGN RAINFALL 1 360MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; D = 6 hr;

Ratio 60 min to 2 day rainfall; r = 0.360;

Factor Z1; Z1 = 1.67;

Factor Z2; Z2 = 0.68;

Design rainfall intensity; I_{max} = 3.4 mm/hr

Return period;

Period = 1 yr

Global warming increase;

p_{climate} = 0 %

5yr return period storm;

M5_6hr_i = 30.1 mm

1 yr return period storm;

M1_6hr = 20.4 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;

Percentage impermeable area; p = 100 %

Max surface water runoff; Q_{max} = 5 l/s

;

DESIGN RAINFALL 1 1440MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; D = 24 hr;

Ratio 60 min to 2 day rainfall; r = 0.360;

Factor Z1; Z1 = 2.42;

Factor Z2; Z2 = 0.71;

Design rainfall intensity; I_{max} = 1.3 mm/hr

Return period;

Period = 1 yr

Global warming increase;

p_{climate} = 0 %

5yr return period storm;

M5_24hr_i = 43.6 mm

1 yr return period storm;

M1_24hr = 30.8 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;

Percentage impermeable area; p = 100 %

Max surface water runoff; Q_{max} = 2 l/s

 Booth King Partnership Ltd 9C Tollgate House, Bridge St Ramsbottom BL0 9AB	Project One City Road				Job Ref. 13842	
	Section				Sheet no./rev. 6	
	Calc. by B	Date 19/08/2020	Chk'd by	Date	App'd by	Date

;

DESIGN RAINFALL 30 5MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = **5** min;
Ratio 60 min to 2 day rainfall; r = **0.360**;
Factor Z1; Z1 = **0.36**;
Factor Z2; Z2 = **1.45**;
Design rainfall intensity; I_{max} = **112.4** mm/hr

Return period; Period = **30** yr
Global warming increase; p_{climate} = **0** %
5yr return period storm; M5_5min_i = **6.5** mm
30 yr return period storm; M30_5min = **9.4** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²;
Max surface water runoff; Q_{max} = **175** l/s

Percentage impermeable area; p = **100** %

;

DESIGN RAINFALL 30 10MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = **10** min;
Ratio 60 min to 2 day rainfall; r = **0.360**;
Factor Z1; Z1 = **0.51**;
Factor Z2; Z2 = **1.48**;
Design rainfall intensity; I_{max} = **81.5** mm/hr

Return period; Period = **30** yr
Global warming increase; p_{climate} = **0** %
5yr return period storm; M5_10min_i = **9.2** mm
30 yr return period storm; M30_10min = **13.6** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²;
Max surface water runoff; Q_{max} = **127** l/s

Percentage impermeable area; p = **100** %

;

DESIGN RAINFALL 30 30MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = **30** min;
Ratio 60 min to 2 day rainfall; r = **0.360**;
Factor Z1; Z1 = **0.79**;

Return period; Period = **30** yr
Global warming increase; p_{climate} = **0** %
5yr return period storm; M5_30min_i = **14.2** mm

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7						

Factor Z2; Z2 = **1.52**; 30 yr return period storm; M30_30min = **21.6** mm
Design rainfall intensity; I_{max} = **43.3** mm/hr

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²; Percentage impermeable area; p = **100** %
Max surface water runoff; Q_{max} = **67** l/s

;

DESIGN RAINFALL 30 60MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = **1** hr;
Ratio 60 min to 2 day rainfall; r = **0.360**;
Factor Z1; Z1 = **1.00**;
Factor Z2; Z2 = **1.54**;
Design rainfall intensity; I_{max} = **27.7** mm/hr

Return period; Period = **30** yr
Global warming increase; p_{climate} = **0** %
5yr return period storm; M5_1hr = **18.0** mm
30 yr return period storm; M30_1hr = **27.7** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²; Percentage impermeable area; p = **100** %
Max surface water runoff; Q_{max} = **43** l/s

;

DESIGN RAINFALL 30 120MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = **2** hr;
Ratio 60 min to 2 day rainfall; r = **0.360**;
Factor Z1; Z1 = **1.22**;
Factor Z2; Z2 = **1.54**;
Design rainfall intensity; I_{max} = **16.9** mm/hr

Return period; Period = **30** yr
Global warming increase; p_{climate} = **0** %
5yr return period storm; M5_2hr = **22.0** mm
30 yr return period storm; M30_2hr = **33.8** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²; Percentage impermeable area; p = **100** %
Max surface water runoff; Q_{max} = **26** l/s

;

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DESIGN RAINFALL 30 240MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 4 hr;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 1.48;
Factor Z2; Z2 = 1.53;
Design rainfall intensity; I_{max} = 10.2 mm/hr

Return period; Period = 30 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_4hr_i = 26.6 mm
30 yr return period storm; M30_4hr = 40.7 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
Max surface water runoff; Q_{max} = 16 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 30 360MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 6 hr;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 1.67;
Factor Z2; Z2 = 1.51;
Design rainfall intensity; I_{max} = 7.6 mm/hr

Return period; Period = 30 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_6hr_i = 30.1 mm
30 yr return period storm; M30_6hr = 45.5 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
Max surface water runoff; Q_{max} = 12 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 30 1440MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
Storm duration; D = 24 hr;
Ratio 60 min to 2 day rainfall; r = 0.360;
Factor Z1; Z1 = 2.42;
Factor Z2; Z2 = 1.45;

Return period; Period = 30 yr
Global warming increase; p_{climate} = 0 %
5yr return period storm; M5_24hr_i = 43.6 mm
30 yr return period storm; M30_24hr = 63.2 mm

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Design rainfall intensity; $I_{\max} = 2.6$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 4$ l/s

;

DESIGN RAINFALL 100 5MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; $D = 5$ min;

Return period; Period = **100** yr

Ratio 60 min to 2 day rainfall; $r = 0.360$;

Global warming increase; $p_{\text{climate}} = 30$ %

Factor Z1; $Z1 = 0.36$;

5yr return period storm; $M5_{5\text{min}} = 8.4$ mm

Factor Z2; $Z2 = 1.87$;

100 yr return period storm; $M100_{5\text{min}} = 15.8$ mm

Design rainfall intensity; $I_{\max} = 189.3$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 294$ l/s

;

DESIGN RAINFALL 100 10MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester

Storm duration; $D = 10$ min;

Return period; Period = **100** yr

Ratio 60 min to 2 day rainfall; $r = 0.360$;

Global warming increase; $p_{\text{climate}} = 30$ %

Factor Z1; $Z1 = 0.51$;

5yr return period storm; $M5_{10\text{min}} = 11.9$ mm

Factor Z2; $Z2 = 1.94$;

100 yr return period storm; $M100_{10\text{min}} = 23.2$ mm

Design rainfall intensity; $I_{\max} = 139.0$ mm/hr

Maximum surface water runoff

Catchment area; $A_{\text{catch}} = 5600$ m²;

Percentage impermeable area; $p = 100$ %

Max surface water runoff; $Q_{\max} = 216$ l/s

;

DESIGN RAINFALL 100 30MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

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Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = **30** min;
 Ratio 60 min to 2 day rainfall; r = **0.360**;
 Factor Z1; Z1 = **0.79**;
 Factor Z2; Z2 = **2.02**;
 Design rainfall intensity; I_{max} = **74.6** mm/hr

Return period; Period = **100** yr
 Global warming increase; p_{climate} = **30** %
 5yr return period storm; M5_30min = **18.5** mm
 100 yr return period storm; M100_30min = **37.3** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²;
 Max surface water runoff; Q_{max} = **116** l/s

Percentage impermeable area; p = **100** %

;

DESIGN RAINFALL 100 60MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = **1** hr;
 Ratio 60 min to 2 day rainfall; r = **0.360**;
 Factor Z1; Z1 = **1.00**;
 Factor Z2; Z2 = **2.02**;
 Design rainfall intensity; I_{max} = **47.2** mm/hr

Return period; Period = **100** yr
 Global warming increase; p_{climate} = **30** %
 5yr return period storm; M5_1hr = **23.4** mm
 100 yr return period storm; M100_1hr = **47.2** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²;
 Max surface water runoff; Q_{max} = **73** l/s

Percentage impermeable area; p = **100** %

;

DESIGN RAINFALL 100 120MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = **2** hr;
 Ratio 60 min to 2 day rainfall; r = **0.360**;
 Factor Z1; Z1 = **1.22**;
 Factor Z2; Z2 = **1.98**;
 Design rainfall intensity; I_{max} = **28.3** mm/hr

Return period; Period = **100** yr
 Global warming increase; p_{climate} = **30** %
 5yr return period storm; M5_2hr = **28.5** mm
 100 yr return period storm; M100_2hr = **56.6** mm

Maximum surface water runoff

Catchment area; A_{catch} = **5600** m²;
 Max surface water runoff; Q_{max} = **44** l/s

Percentage impermeable area; p = **100** %

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;

DESIGN RAINFALL 100 240MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = 4 hr;
 Ratio 60 min to 2 day rainfall; r = 0.360;
 Factor Z1; Z1 = 1.48;
 Factor Z2; Z2 = 1.93;
 Design rainfall intensity; I_{max} = 16.7 mm/hr

Return period; Period = 100 yr
 Global warming increase; p_{climate} = 30 %
 5yr return period storm; M5_4hr_i = 34.6 mm
 100 yr return period storm; M100_4hr = 66.9 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
 Max surface water runoff; Q_{max} = 26 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 100 360MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = 6 hr;
 Ratio 60 min to 2 day rainfall; r = 0.360;
 Factor Z1; Z1 = 1.67;
 Factor Z2; Z2 = 1.90;
 Design rainfall intensity; I_{max} = 12.4 mm/hr

Return period; Period = 100 yr
 Global warming increase; p_{climate} = 30 %
 5yr return period storm; M5_6hr_i = 39.1 mm
 100 yr return period storm; M100_6hr = 74.1 mm

Maximum surface water runoff

Catchment area; A_{catch} = 5600 m²;
 Max surface water runoff; Q_{max} = 19 l/s

Percentage impermeable area; p = 100 %

;

DESIGN RAINFALL 100 1440MIN

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area; Manchester
 Storm duration; D = 24 hr;
 Ratio 60 min to 2 day rainfall; r = 0.360;
 Factor Z1; Z1 = 2.42;

Return period; Period = 100 yr
 Global warming increase; p_{climate} = 30 %
 5yr return period storm; M5_24hr_i = 56.6 mm

APPENDIX D ATTENUATION STORAGE VOLUME ESTIMATE

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
MH01	0.560	5.00	30.000	1200	0.000	0.000	1.500
MH02			30.000	1200	10.000	0.000	1.541
MH03			30.000	1800	20.000	0.000	1.582

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	MH01	MH02	10.000	0.600	28.500	28.459	0.041	243.9	300	5.17	46.0
1.001	MH02	MH03	10.000	0.600	28.459	28.418	0.041	243.9	300	5.33	45.4
1.002	MH03		1.000								

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH01	0.000	0.000	30.000	1.500	1200	0	1.000	28.500	300
MH02	10.000	0.000	30.000	1.541	1200	1	1.000	28.459	300
						0	1.001	28.459	300
MH03	20.000	0.000	30.000	1.582	1800	1	1.001	28.418	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	30	0	0

Node MH03 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	28.418	Product Number	CTL-SHE-0260-3750-1000-3750
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	37.5	Min Node Diameter (mm)	1800

Node MH02 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	28.459
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	37

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	95.0	0.0	1.000	95.0	0.0	1.001	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH01	6	28.749	0.249	66.6	2.1388	0.0000	OK
30 minute winter	MH02	22	28.646	0.187	50.2	17.9878	0.0000	OK
30 minute winter	MH03	23	28.632	0.214	29.4	0.5445	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	MH01	1.000	MH02	65.1	1.907	0.919	0.4474	
30 minute winter	MH02	1.001	MH03	29.4	0.596	0.415	0.4997	
30 minute winter	MH03	Hydro-Brake®		29.3				39.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH01	11	29.091	0.591	163.0	5.0814	0.0000	SURCHARGED
30 minute winter	MH02	25	28.997	0.538	118.0	51.7220	0.0000	SURCHARGED
30 minute winter	MH03	25	28.979	0.561	39.5	1.4270	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	MH01	1.000	MH02	150.3	2.155	2.123	0.7042	
30 minute winter	MH02	1.001	MH03	39.5	0.623	0.558	0.7042	
30 minute winter	MH03	Hydro-Brake®		37.5				97.5

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	MH01	11	29.382	0.882	210.0	7.5875	0.0000	SURCHARGED
30 minute winter	MH02	28	29.236	0.777	152.8	74.7290	0.0000	SURCHARGED
30 minute winter	MH03	28	29.221	0.803	40.4	2.0434	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	MH01	1.000	MH02	189.6	2.693	2.677	0.7042	
30 minute winter	MH02	1.001	MH03	40.4	0.625	0.570	0.7042	
30 minute winter	MH03	Hydro-Brake®		37.5				127.1

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 99.79%

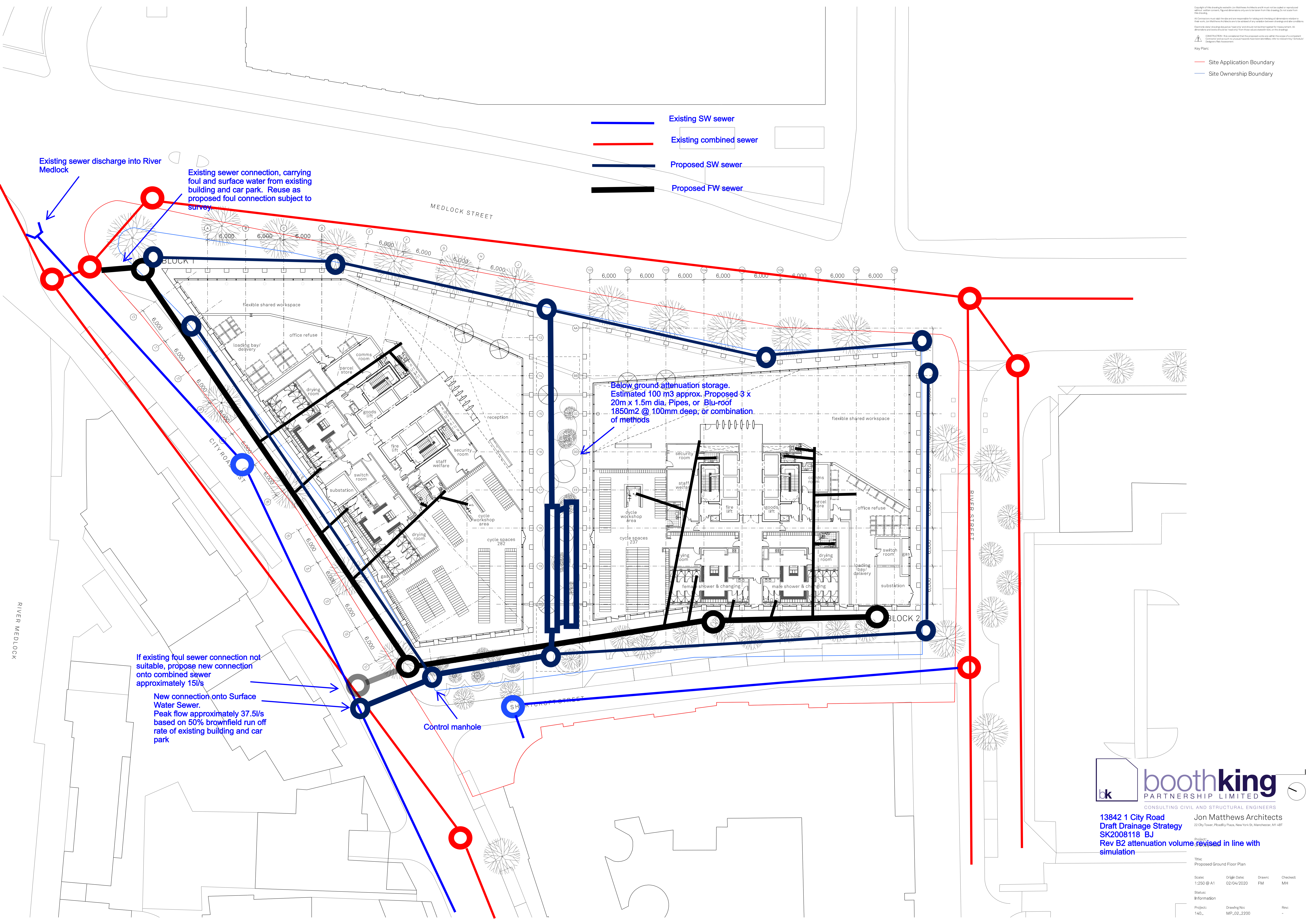
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	MH01	44	30.000	1.500	142.4	12.8970	0.9487	FLOOD
30 minute winter	MH02	27	29.971	1.512	196.7	96.7580	0.0000	FLOOD RISK
30 minute winter	MH03	27	29.943	1.525	67.6	3.8804	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	MH01	1.000	MH02	133.8	1.900	1.889	0.7042	
30 minute winter	MH02	1.001	MH03	67.6	0.960	0.955	0.7042	
30 minute winter	MH03	Hydro-Brake®		45.9				165.1

APPENDIX E PROPOSED DRAINAGE STRATEGY

Key Plan:

- Site Application Boundary
- Site Ownership Boundary



13842 1 City Road
Draft Drainage Strategy
SK2008118 BJ
Rev B2 attenuation volume revised in line with simulation

Jon Matthews Architects
22 City Tower, Finsbury Place, New York St, Manchester, M1 4BT

Title: Proposed Ground Floor Plan			
Scale: 1:250 @ A1	Origin Date: 02/04/2020	Drawn: FM	Checked: MH
Status: Information			
Project: 140_	Drawing No: MP-02-2200	Rev: -	

APPENDIX F CORRESPONDENCE WITH UNITED UTILITIES

Barry Jefcoate

From: Andrew Coop
Sent: 13 July 2020 15:21
To: Wastewater Developer Services
Subject: initial pre-development
Attachments: wastewater-pre-development-enquiry-13.07.20.pdf; 19999-TOPO-2D-A0 Scale 200.pdf

Dear Sir / Madam,

Please find attached our predevelopment enquired for a proposed development at One City Road, Manchester City Centre.

Kind regards,
Andrew.

Andrew Coop BEng (Hons)
Structural Engineer
boothking partnership limited

 Tollgate House, 9c Bridge Street, Ramsbottom, Greater Manchester, BLO 9AB
 01706 822 022.  01706 826 140.  www.booth-king.co.uk

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 PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS E-MAIL.

Barry Jefcoate

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 23 July 2020 15:11
To: Andrew Coop
Cc: Wastewater Developer Services
Subject: Pre Development Enquiry for : Medlock Street / City Rd Manchester M15 4PN UU
reference Number : 4200032472
Attachments: initial pre-development
Follow Up Flag: Follow up
Flag Status: Flagged

Dear Sirs,

Pre Development Enquiry for: Medlock Street / City Rd Manchester M15 4PN UU Reference Number : 4200032472

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 3723223 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 670 x 990mm diameter public combined sewer within Medlock St located to the east 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.

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.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the watercourse located north of the proposed site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

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 450mm diameter public surface water sewer within City Road East located west 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 15l/s which is based on a rate using the rational method and the roof area of the existing building with a 50% reduction

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 public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site (Delete section as appropriate,

We have significant assets crossing this site that cannot realistically be diverted. We would ask that you obtain a copy of our asset data records from your provider and plan your development around them ensuring that all legal easements are observed. If any work is required that may impart vibration into the ground we would ask that you contact us for further advice.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/>

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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/larger-developments/wastewater/sewer-connections/>

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.

Kind regards,



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

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Barry Jefcoate

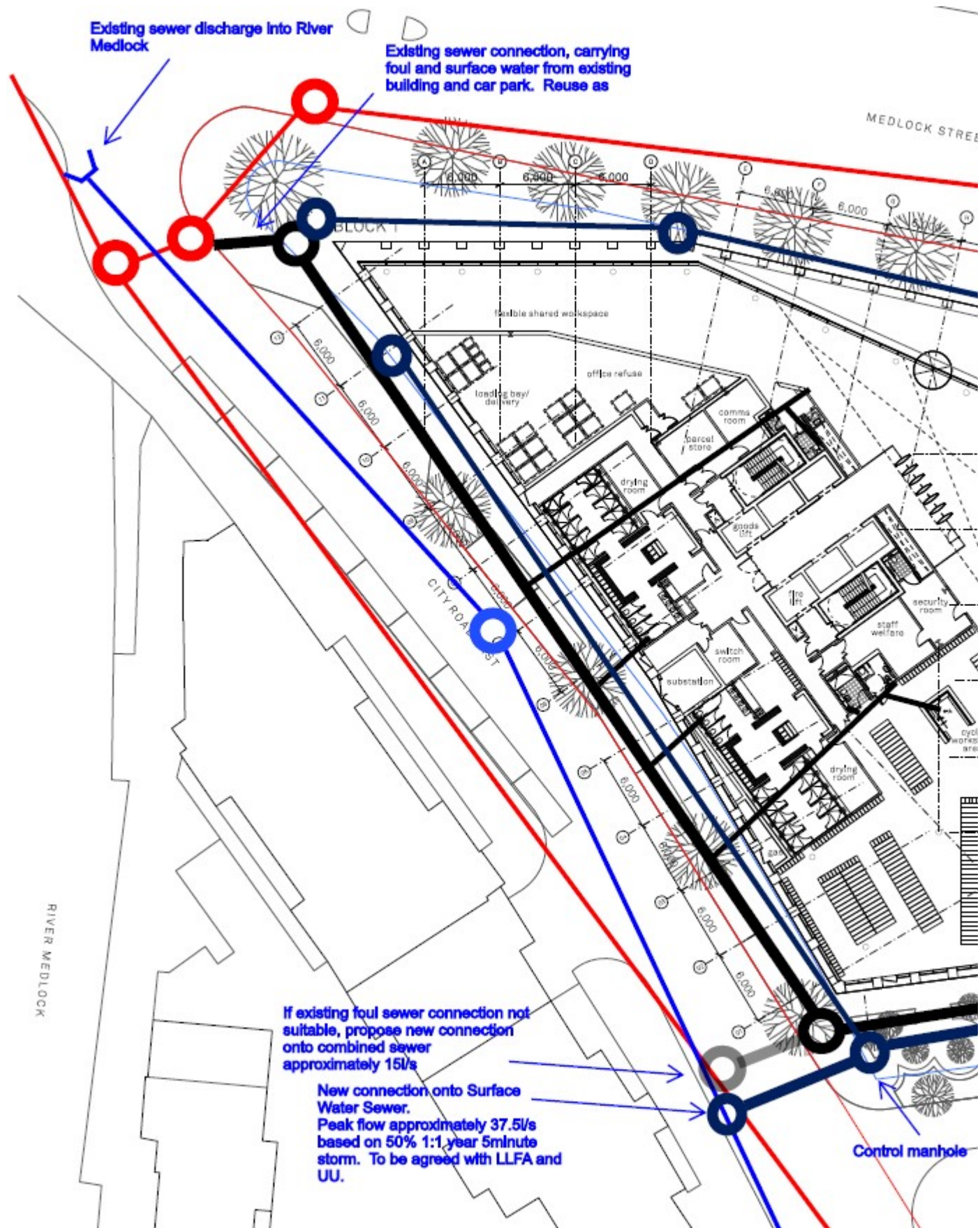
From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 02 September 2020 16:45
To: Barry Jefcoate
Cc: Wastewater Developer Services
Subject: RE: Pre Development Enquiry for : Medlock Street / City Rd Manchester M15 4PN
UU reference Number : 4200032472 [Filed 02 Sep 2020 19:16]

Hello Barry

I have reviewed the submitted drainage strategy and comments in your email below and agree that the best way to drain the site would be to drain all foul directly to the combined sewer and surface water to the dedicated sw sewer in City Road East at a controlled peak flow rate of 37.5l/s which is outlined on Drainage Strategy Drawing MP_02_2200 Rev – dated 02/04/20 which was extracted from 13842 1 City Rd Draft Drainage Strategy SK2008118 BJ.

I trust this is agreeable.

For ease I have extracted the pertinent part of the drawing below that confirms the proposed strategy





Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

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From: Barry Jefcoate [mailto:Barry.J@booth-king.co.uk]
Sent: 24 August 2020 10:12
To: Perry, Graham <Graham.Perry@uuplc.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: FW: Pre Development Enquiry for : Medlock Street / City Rd Manchester M15 4PN UU reference Number : 4200032472

Graham,
I sent the email below with an attachment which is too big for your system, I will send you a Wettransfer link
Please let me know if you don't receive it.

Regards,

Barry Jefcoate BEng PhD CEng MICE (director)
[boothking partnership limited](#)

9C Bridge Street, Ramsbottom, BL0 9AB
 01706 822022 07974414562 01706 826140. www.booth-king.co.uk



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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS E-MAIL.

From: Barry Jefcoate
Sent: 24 August 2020 10:10
To: Perry, Graham <Graham.Perry@uuplc.co.uk>; Andrew Coop <Andrew.C@booth-king.co.uk>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: RE: Pre Development Enquiry for : Medlock Street / City Rd Manchester M15 4PN UU reference Number : 4200032472

Graham,

Thank you for your email below. Since sending our initial enquiry we have carried out further assessments on the existing and proposed site drainage. We would request that the discharge rate of 15l/s referred to should be increased to include the existing car park area. The buried services survey shows that the existing building surface water and foul discharge into the combined sewer in City Road East, and we would propose re-using this connection for the foul only. The surface water, we propose a new connection to the surface water sewer in City Road East at a controlled peak flow rate of 37.5l/s which is a 50% betterment on the 1:1year peak flow rate for the building roof and car park. This sewer discharges into the River Medlock, and so we are complying with the second priority of the SuDs hierarchy (with UU assistance).

I would be grateful if you could get back to me with your agreement to the above or comments.

Regards,

Barry Jefcoate BEng PhD CEng MICE (director)
[boothking partnership limited](#)



9C Bridge Street, Ramsbottom, BL0 9AB



01706 822022 07974414562



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PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS E-MAIL.

From: Perry, Graham <Graham.Perry@uuplc.co.uk>

Sent: 23 July 2020 15:11

To: Andrew Coop <Andrew.C@booth-king.co.uk>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: Pre Development Enquiry for : Medlock Street / City Rd Manchester M15 4PN UU reference Number : 4200032472

Dear Sirs,

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 3723223 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 670 x 990mm diameter public combined sewer within Medlock St located to the east 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.

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>

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Waterbody

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Connection Application

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If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

