



FORMER BODDINGTONS BREWERY

FLOOD RISK ASSESSMENT & DRAINAGE STATEMENT

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SECTION I SITE INVESTIGATION

INTRODUCTION

- I.1. Shepherd Gilmour Infrastructure Ltd (SGi) has been engaged by Latimer Developments Ltd to prepare a Flood Risk Assessment and Drainage Statement in support of a detailed application for the Former Boddingtons Brewery in Manchester.
- I.2. 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 (EA), Local Sewerage Undertaker, District Council and Site Owner.
- I.3. The Drainage Statement has been prepared in line with the Non-Statutory Technical Standards for Sustainable Drainage (NSTSSD) and CIRIA Report C753. It also defines the outline proposal for the disposal of surface runoff and foul effluent from the site.

EXISTING SITE DESCRIPTION

- I.4. The proposed development site (PDS) is located just off Great Ducie Street in Manchester and was the former Boddingtons Brewery site. The site is classed as a Brownfield site and spans an area of circa 0.495 hectares.

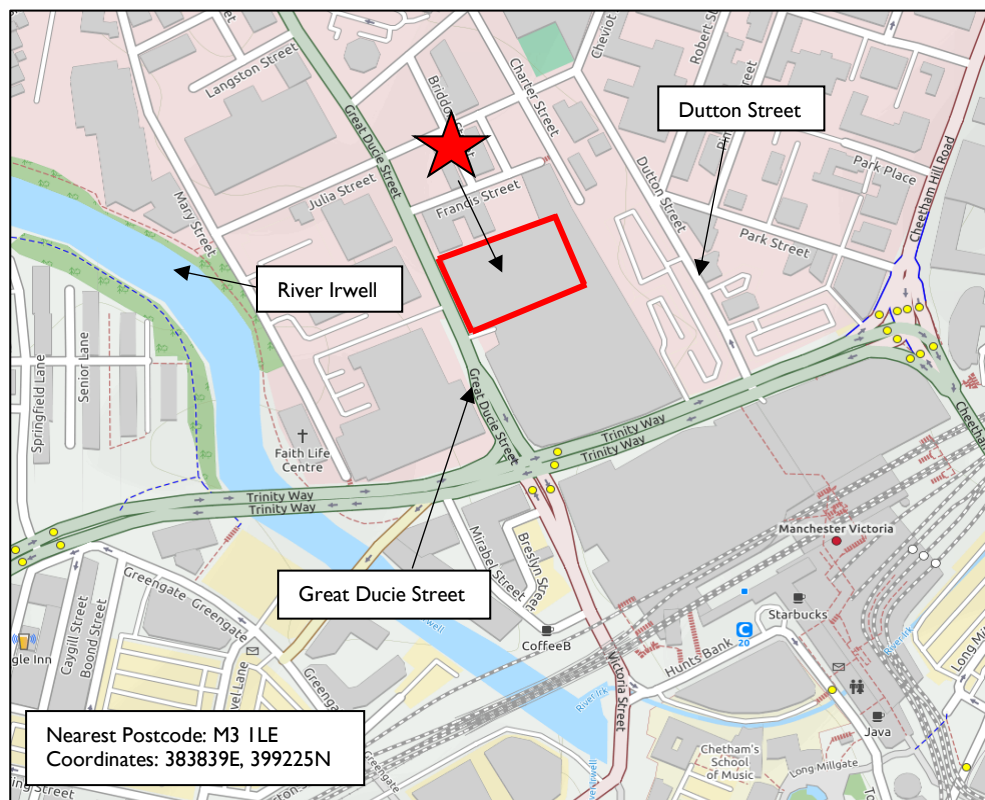


Figure I.1 Site Location (© OpenStreetMap Contributors)

1.5. A copy of the latest topographical survey has been included within **Appendix A**.

PROPOSED SITE LAYOUT

1.6. The client's proposals are for a residential-led development with ground floor commercial uses. The proposals extend from a one storey to twenty-six storeys, accommodated within two buildings (Block A & Block B).

- *Ground Floor = Commercial/retail*
- *Upper floors = Residential units*



Figure 1.2 Architects Ground Floor Layout

1.7. A full-size copy of the architect's plans has been included within **Appendix B**.

SECTION 2 POTENTIAL SOURCES OF FLOODING

2.1. There are several sources of flooding that could potentially impact a development.

- *Fluvial/Tidal,*
- *Ground Water,*
- *Artificial Waterbodies (canals, reservoirs etc) and,*
- *Pluvial.*

2.2. The risk of flooding from the above sources has been reviewed at high level in this Section and a more detailed any sources which could impact the Proposed Development Site (PDS) are discussed in further detail in **Section 3 & 4.**

FLUVIAL FLOOD RISK

Gov.UK Website

2.3. The Gov.UK website provides a flood risk service which allows for a PDS to be quickly checked against fluvial flood map. An abstract has been shown in **Figure 2.1.**

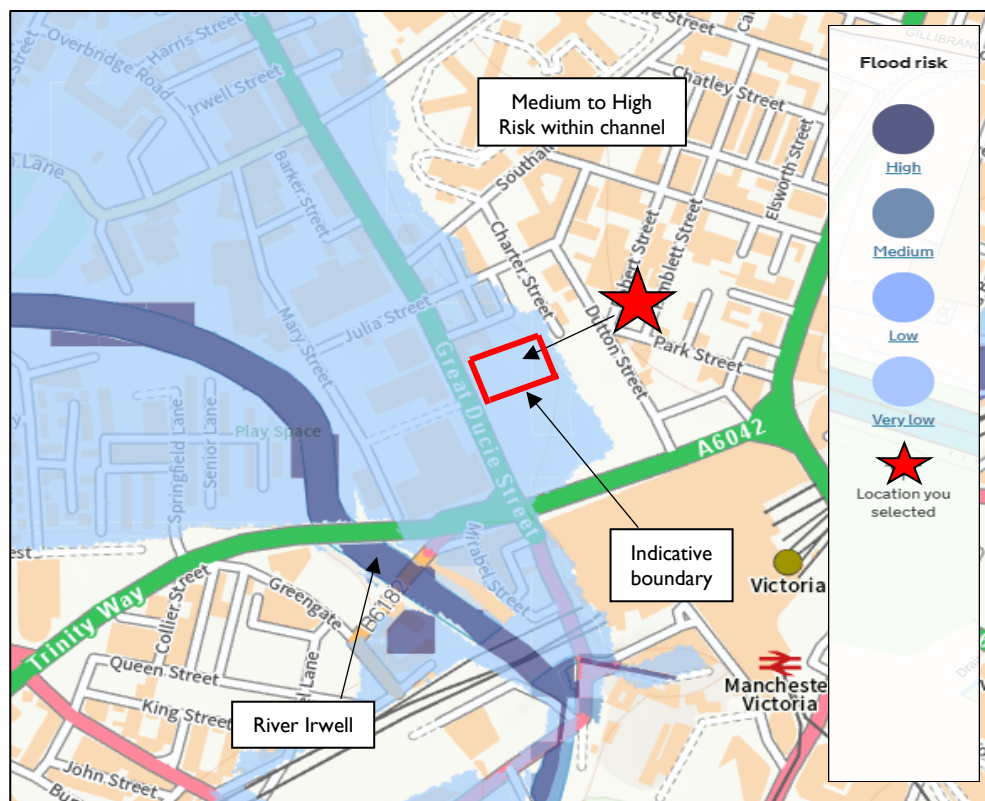


Figure 2.1 Flood Map for Planning (Gov.UK)

2.4. This flood map indicates that the site is at Low Risk of Fluvial Flooding.

Strategic Flood Risk Assessment

- 2.5. The NPPF requires Local Planning Authorities to produce Strategic Flood Risk Assessments in support of their Local Plan. These form the basis for preparing appropriate policies for flood risk management within the area and provide the framework for assessing areas of developable land.
- 2.6. The PDS is within the SFRA for Manchester City, Salford City and Trafford Council and was produced by JBA Consulting in August March 2010. The SFRA flood data confirms that the PDS is located within Flood Zone 2.

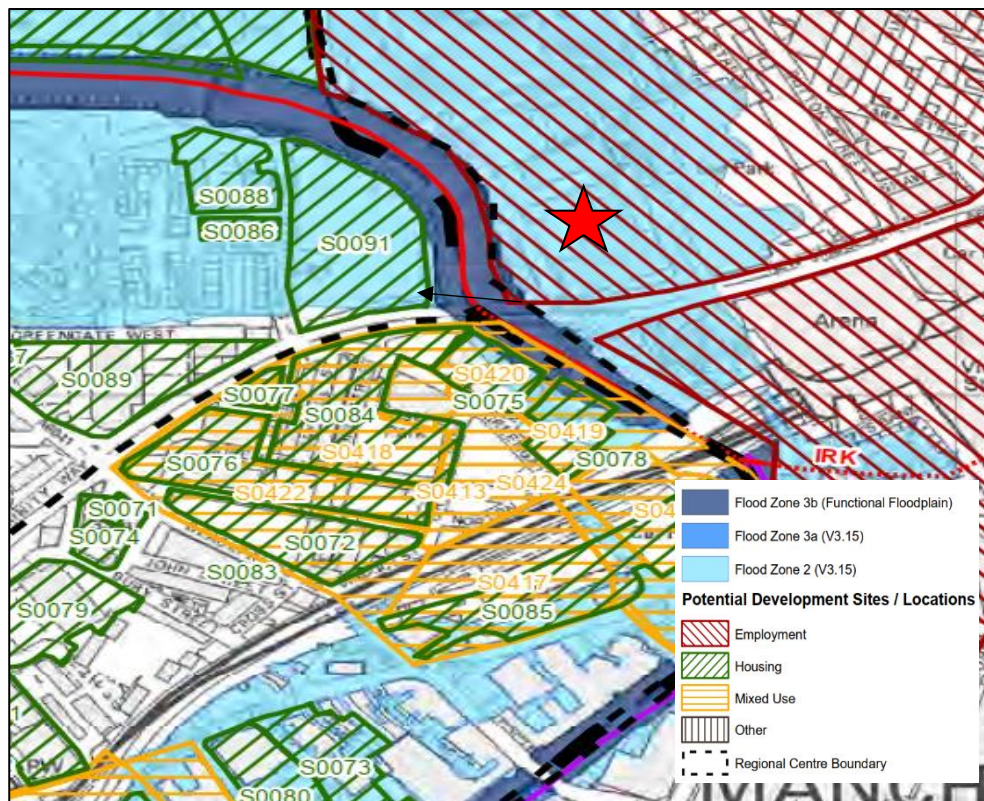


Figure 2.2 SFRA Flood Map (SFRA)

Environment Agency

- 2.7. According to the Environment Agency (EA) flood search the PDS is located within Flood Zones 2. The impact of this zones is discussed in further detail in **Section 3**.
- 2.8. An abstract of this EA Flood Map has been shown below in **Figure 2.3**.

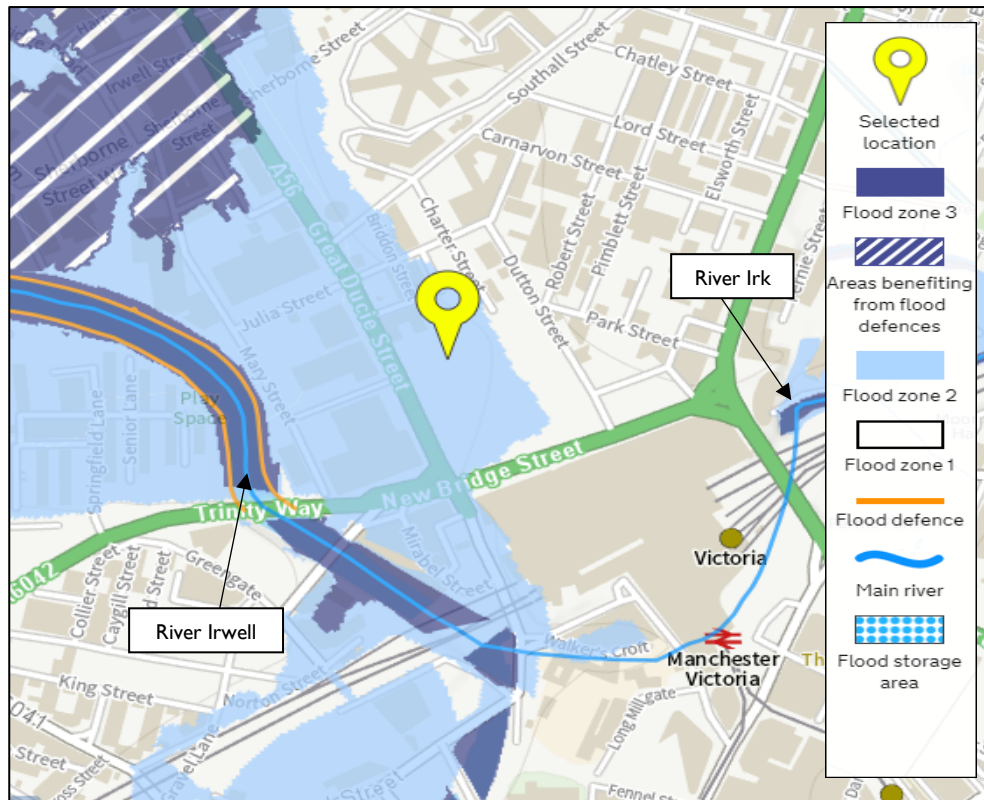


Figure 2.3 Flood Map (Environment Agency)

- Flood Zone 1 – Low Probability**

Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zones 2 and 3)
- Flood Zone 2 – Medium Probability**

Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
- Flood Zone 3 – High Probability**

Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

Ordinary Watercourse

2.9. Ordinary watercourses do not form part of a ‘main river’ and can consist of rivers, ditches, swales, drains etc. These watercourses are the responsibility of the riparian owner who must ensure that:

- Flows can pass freely without obstruction, pollution, or diversion (affecting the rights of others).

- *The banks and bed of the watercourse are maintained (including vegetation).*
- *Any approved onsite watercourse structures are maintained.*

2.10. There are no historic/hidden watercourses indicated on the available maps.

CANAL FLOOD RISK

2.11. Water levels within canals are maintained/regulated by sluice gates along the waterway and whilst a breach or overtopping is unlikely, the possible risk should be assessed.

Canal & River Trust

2.12. Many of canals in England and Wales are owned, maintained, and operated by the Canal & River Trust (CRT). The closest CRT canal to site is the Rochdale Canal and is approximately 1400m to the southeast.

2.13. Maps within the SFRA indicate that the PDS is located outside of any CRT Flood Risk.

Manchester Ship Canal (Peel Ports)

2.14. The Manchester Ship Canal (MSC) is the canalised segment of the River Irwell and starts at the convergence of the River Irwell and River Irk (300m away). The flood risk associated with the MSC is included within the EA data and discussed in the fluvial/tidal section of this report.

GROUNDWATER FLOOD RISK

2.15. Unlike flooding from rivers and the sea, groundwater does not pose a significant risk to life. It is more associated with damage to the building, due to the flooding persisting over several weeks.

2.16. The SFRA indicates that the PDS is located inside an area known to be at risk of groundwater flooding. Any groundwater issues, however, will be determined during the Phase II site investigation and any potential issues will be mitigated at the detailed design.

ARTIFICIAL WATERBODIES

2.17. The reservoirs in the area are owned and operated by United Utilities and are covered by the Reservoirs Act 1975. Whilst the probability of a catastrophic dam failure occurring is relatively low the consequences of such an event are severe.

2.18. Reservoir flood plans are still required and are prepared by their owners. These documents are considered sensitive due to national security and only indicative plans are made available by the Environment Agency/Gov.UK.

- 2.19. The reservoir flood plan (**Figure 2.5**) indicates that the PDS is potentially at risk in the event of a breach.

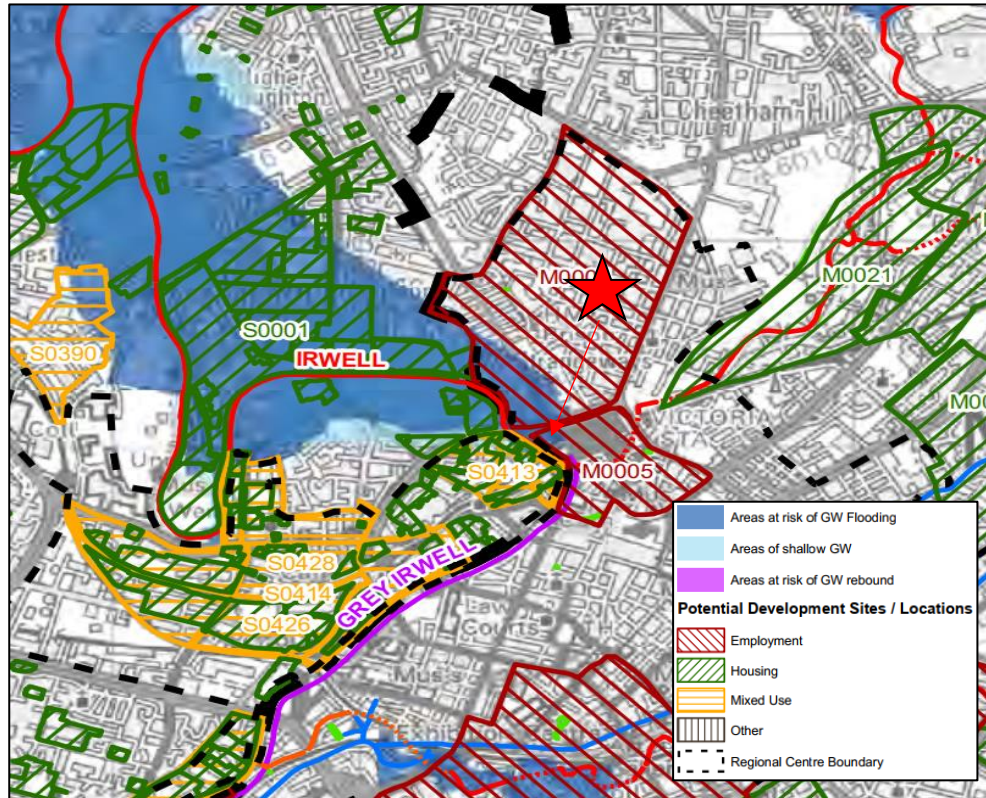


Figure 2.4 Groundwater Flood Map (SFRA)

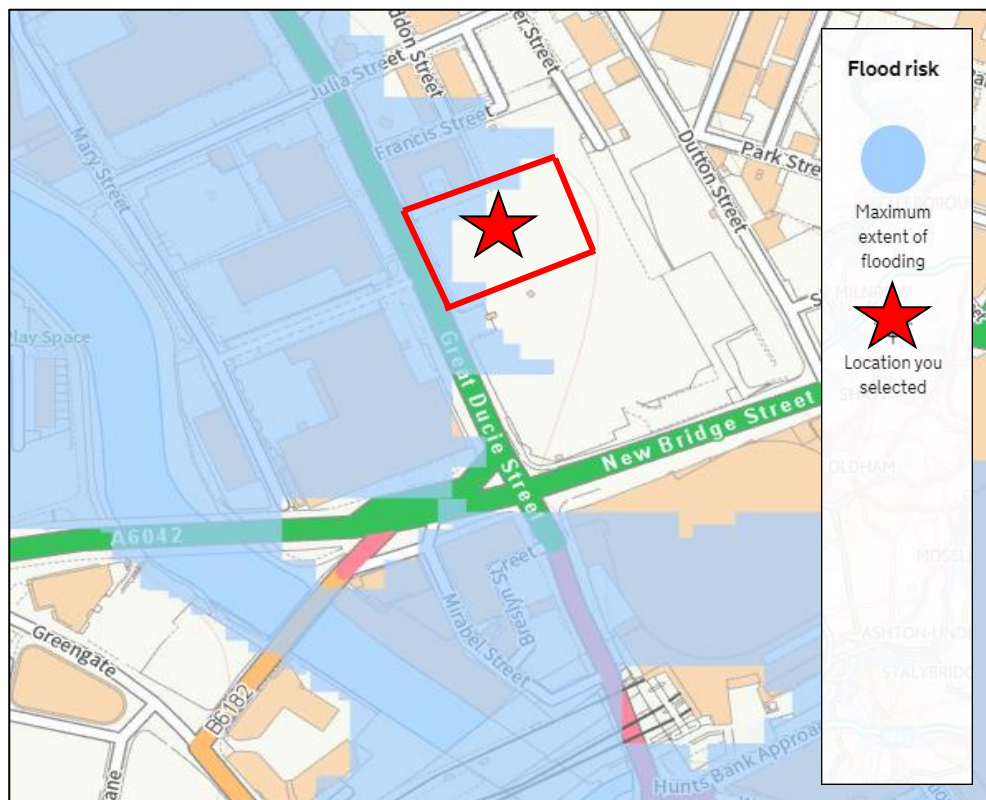


Figure 2.5 Reservoir Flood Risk Map (Gov.UK)

PLUVIAL RUNOFF

- 2.20. Pluvial flooding is defined as 'flooding from rainfall generated overland flow before the runoff enters any watercourse or sewer.' It is usually associated with high-intensity rainfall events but can also occur during low-intensity events when the ground is saturated/frozen or has low permeability.
- 2.21. Gov.UK (**Figure 2.6**) indicates that there is an area of low risk adjacent to the eastern boundary. The remainder of the site is identified as very low risk.

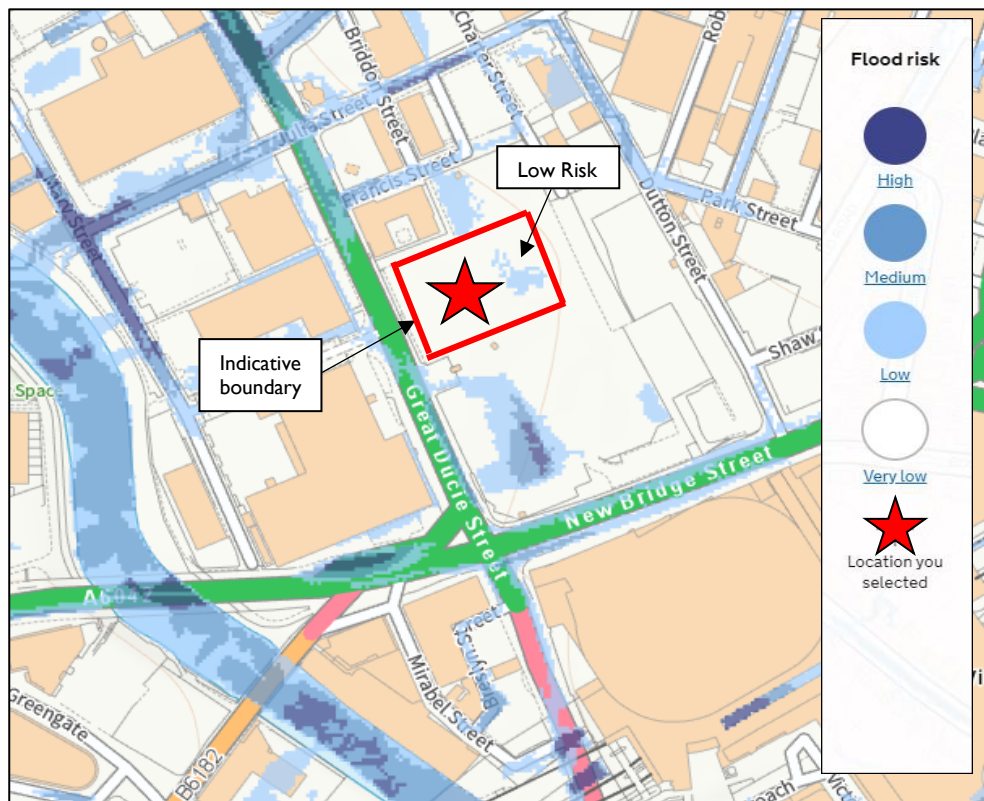


Figure 2.6 Pluvial Flood Risk Map (Gov UK)

CRITICAL DRAINAGE AREA

- 2.22. Critical Drainage Areas (CDA) are areas that are particularly sensitive to an increase in surface water runoff, either as direct overland flow or from the existing sewer network.
- 2.23. The SFRA confirms that the PDS is located within the Conurbation Core CDA. Surface water runoff from the PDS must therefore be restricted to the calculated greenfield rate and/or provide a betterment over the existing brownfield arrangement.

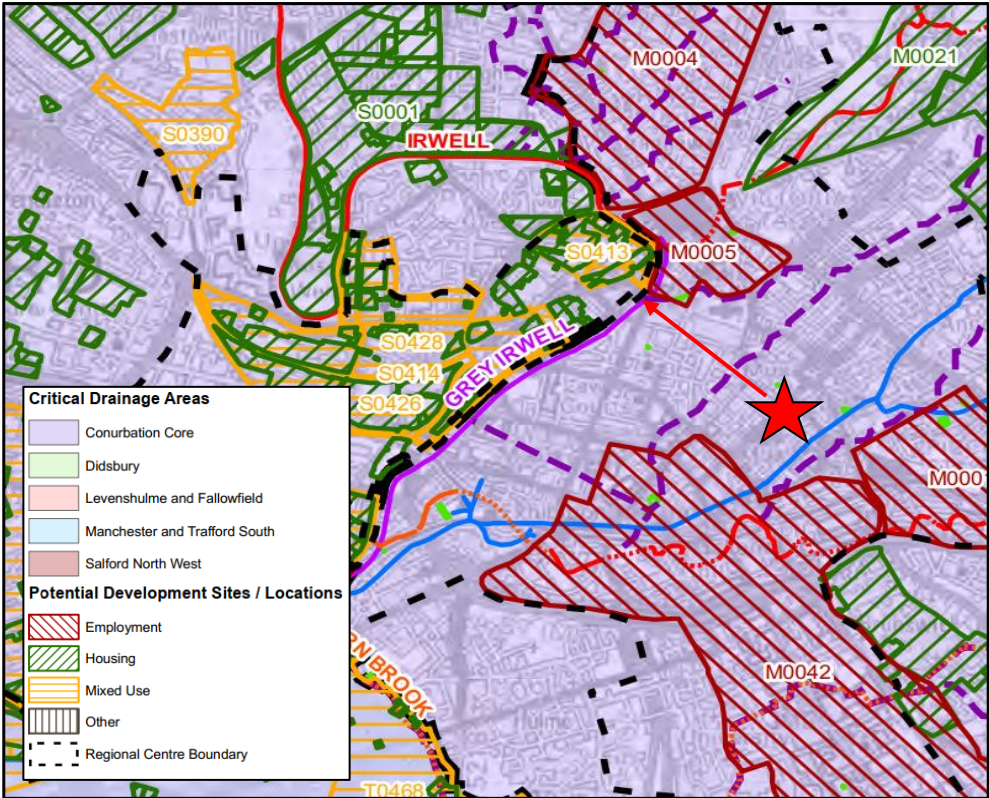


Figure 2.7 Critical Drainage Areas (SFRA)

FLOOD RISK OVERVIEW

2.24. The potential sources of flooding which could be experienced have been summarised in **Table 2.1**. Those posing the greatest flood risk to the site have been investigated further in **Section 3** to determine the potential mitigation measures.

Source of Flooding	Potential Flood Risk					Site Description
	High	Medium	Low	Very Low or Negligible	Information Not Available	
Fluvial/Tidal		X	X			The Environment Agency maps indicate that the onsite risk varies between Zone 2.
Ground Water		X	X			The SFRA maps indicate that the area could be at risk of ground water flooding.
Reservoirs			X			In the event of a breach, the PDS is located outside of any area of risk
Canal				X		A potential breach would be unlikely to affect the PDS.
Pluvial Runoff			X			The Gov.UK Maps identifies that the site is at low risk of surface flooding.
Critical Drainage Areas				X		The SFRA confirms that the area is located outside of any CDA.

Table 2.1 Potential Sources of Flooding Overview

SECTION 3 FLOOD RISK ANALYSIS

FLUVIAL FLOODING

Environment Agency Data

- 3.1. The Environment Agency has provided estimated flood data at specific node points along the River Irwell. This flood data along with the topographical survey will be used to set the minimum ground level(s) on the PDS.
- 3.2. A copy of the Environment Agency data is included within **Appendix C**.

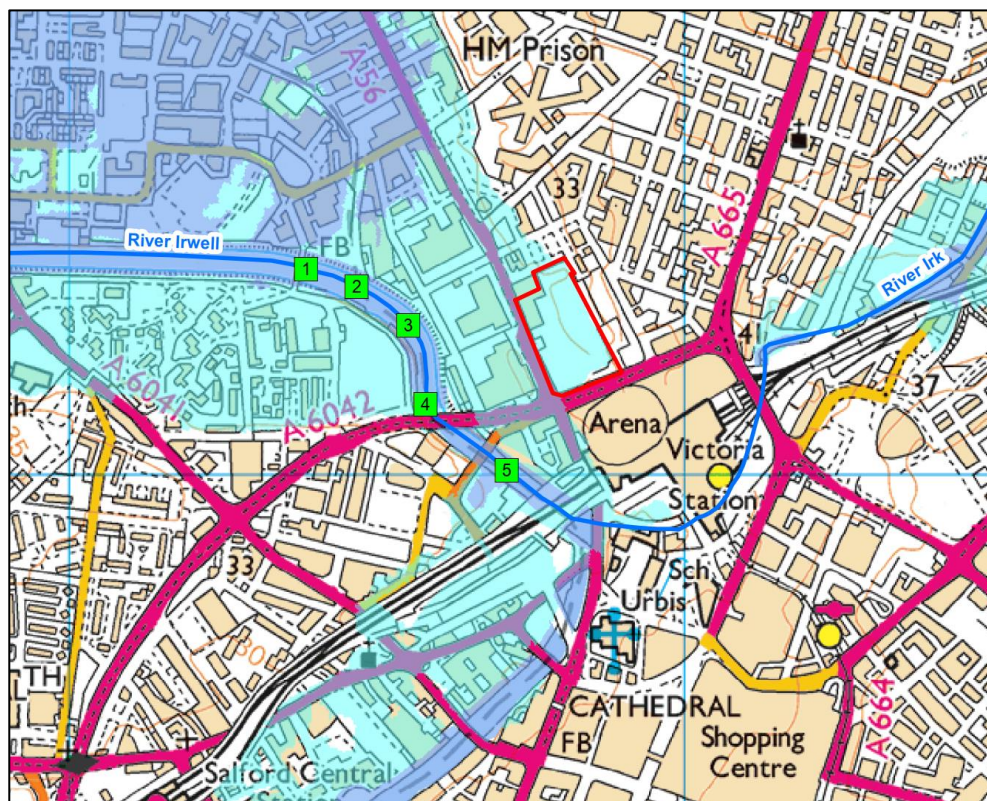


Figure 3.1 Environment Agency Node Points

Node	100 Year -1% AEP	Central Allowance	Higher Central Allowance	Upper End Allowance	1000 Year - 0.1% AEP
		+30% CC	+35% CC	+70%CC	
1	26.83m	28.18m	28.44m	29.95m	30.60m
2	26.80m	28.16m	28.42m	29.95m	30.59m
3	26.67m	28.02m	28.30m	29.89m	30.55m
4	26.57m	27.90m	28.16m	29.76m	30.46m
5	26.46m	27.71m	27.92m	29.14m	29.84m

Table 3.1 Estimated River Irwell Flood Levels - Undefended (Environment Agency)

Climate Change Allowance

3.3. The Environment Agency changed the way climate change was applied to river levels in 2016. Rather than a one size fits all approach it is now applied based on the development type, the development size, and the sites associated flood zone. The following steps confirm the climate change allowance required for the development.

Proposed Development Site – Commercial = Less Vulnerable

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1 ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1 ha to 5 ha | General industrial 1 ha to 5 ha | Retail over 1 ha to 5 ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5 ha+ | General industrial 5 ha+ | Retail 5 ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non-residential building or development over 1000 sq m.

Vulnerability Classification	Flood Risk Assessment Type			
	Flood Zone	Minor	Small-Major	Large-Major
Highly Vulnerable	Flood Zone 2	Intermediate/Basic	Intermediate/Basic	Detailed
	Flood Zone 3a	Not Appropriate		
	Flood Zone 3b	Not Appropriate		
More Vulnerable	Flood Zone 2	Basic	Basic	Intermediate/Basic
	Flood Zone 3a	Basic	Detailed	Detailed
	Flood Zone 3b	Not Appropriate		
Less Vulnerable	Flood Zone 2	Basic	Basic	Intermediate/Basic
	Flood Zone 3a	Basic	Basic	Detailed
	Flood Zone 3b	Not Appropriate		

Table 3.2 Flood Risk Assessment Guide

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts. The allowance should be derived and agreed locally by Environment Agency teams.

- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

3.4. Based on the above EA guidance the PDS would require an intermediate/basic or a detailed Flood Risk Assessment to be undertaken. A 'basic' assessment has however, been deemed adequate by SGi due to the level of risk onsite.

- For **Highly Vulnerable developments** in flood zone 2, the '**higher central**' climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **upper end** allowance.
- For **More Vulnerable developments** in flood zone 2, the '**central**' climate change allowance is our minimum benchmark for flood risk mitigation, and in flood zone 3 the '**higher central**' climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (in flood zone 2) and the **upper end** allowance (in flood zone 3).
- For **Less Vulnerable** development (e.g. commercial), the '**central**' climate change allowance for the epoch that most closely represents the lifetime of the development is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (particularly in flood zone 3) to inform built in resilience.

Mitigation Measures - Commercial Units

- 3.5. The finished floor level of the proposed buildings must be set at least 600mm above the above the most relevant node/river level (i.e., 1% plus climate allowance) This will ensure the most sensitive elements of the development are protracted from fluvial flood risk.
- 3.6. Node position 4 is located to the west of the PDS and is deemed the most relevant data to use.

Node	100 Year + 30% Central Allowance	Freeboard	Minimum Finished Floor Level
4	27.90m	+600mm	28.500m

Table 3.3 Minimum Finished Floor Levels (Commercial)

- 3.7. Minimum finished floor level for the commercial units at ground floor is 28.500m.

Mitigation Measures – Essential Infrastructure

- 3.8. Essential infrastructure should be set at or above the estimated 100-year flood level with an Upper End allowance included. The minimum level for the onsite substation would therefore be 29.760m.

Node	100 Year + 70% Central Allowance	Minimum Finished Floor Level
4	29.76m	29.76m

Table 3.4 Minimum Finished Floor Levels (Substation)

Fluvial Flood Risk = Low risk after mitigation measures have been implemented.

GROUNDWATER FLOODING

- 3.9. The SFRA map suggests there is low to medium risk of groundwater flooding.

Mitigation Measures

- 3.10. There is currently no information available on the groundwater levels and there are no records of this type of flooding on-site. Upon receipt of the Phase 2 site investigation due consideration will be given to groundwater levels in the design of earthworks, excavations, proposed levels, and general infrastructure.

Groundwater flood risk = Mitigation to be confirmed by site investigation

ARTIFICIAL WATERBODIES

- 3.11. Flooding from reservoirs is considered extremely low. The Gov.UK Maps however, indicate that the PDS could be at risk of flooding in a catastrophic breach (**Figure 2.5**). **Figure 3.2** shows that below 300mm of flood water would be on the current site.
- 3.12. The topographical survey within **Appendix A** confirms that the areas at risk are around 29.20m AOD. If the flood depths noted within **Figure 3.2** are correct, then the site could experience flooding up to 29.50m AOD. This is 1m above the minimum finished floor level of the proposed buildings.

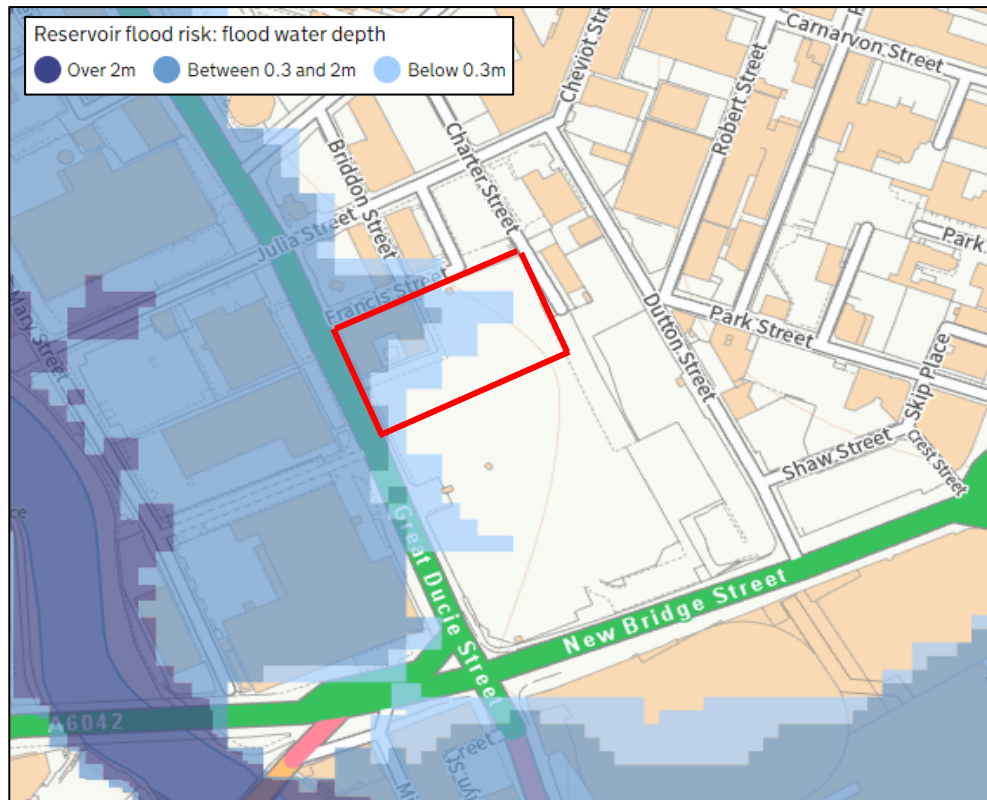


Figure 3.2 Reservoir Flood Depths

Mitigation Measures

- 3.13. No specific mitigation measures proposed. Bearing in mind that the catastrophic breach is a worst-case scenario and extremely unlikely to happen. It is not feasible to lift the site above the estimated reservoir flood level.

Reservoir flood risk = Residual risk remains

PLUVIAL FLOODING

- 3.14. The Gov.UK Maps indicates that the PDS is at risk of pluvial flooding. These maps are based on LIDAR data and purely highlight low spots/depressions on the ground that may be at risk of pluvial flooding.
- 3.15. The topographical survey (**Appendix A**) shows that the area at risk is a low spot on the site with drainage gullies.



Figure 3.3 Pluvial Flood Risk Map (Gov UK)

Mitigation Measures

- 3.16. The existing ground will be reprofiled to suit the development proposals. This will remove the onsite risks highlighted with in **Figure 3.3**. The onsite surface water drainage will also be designed to cater for all storm events up to and including the 100-year event plus 40% climate change. This will reduce the risk of pluvial flooding onsite/offsite.

Pluvial Flood Risk = Very Low risk after mitigation measures have been implemented

CRITICAL DRAINAGE AREAS

- 3.17. The PDS is located within the Conurbation Core CDA. Specific details relating to this CDA are limited and further information/discussions with United Utilities and the Lead Local Flood Authority should be undertaken at the detailed design stage.

Mitigation Measures

- 3.18. The proposed drainage system must also not contribute to any flood risk or overland flow risk elsewhere. Therefore, any runoff generated by the proposed development must provide betterment over the existing arrangement.

- 3.19. The Manchester, Salford and Trafford SFRA User Guide 2010 recommends the following surface water runoff reductions which the proposals must adhere to. Refer to **Section 6** for further details on the proposed mitigation measures.

"Developments should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, considering climate change"

Figure 3.4 SFRA User Guide (SFRA)

Pluvial Flood Risk = Low risk after mitigation measures have been implemented

SECTION 4 FLOOD ZONE REQUIREMENTS

4.1. Based on the current information the PDS is located within Flood Zone 2.

- *Flood Zone 1 Low Probability - Land having a less than 1 in 1,000 annual probability of river or sea flooding.*
- *Flood Zone 2 Medium Probability - Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.*
- *Flood Zone 3 High Probability - Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.*

Proposed Development Type

4.2. In accordance with the National Planning Policy Framework Practice Guidance on flooding, less vulnerable and more vulnerable types of development are permitted within Flood Zones 2.

Flood Zone	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	x	Exception Test Required	✓	✓
3b	Exception Test Required	x	x	x	✓

Key: ✓ Development is appropriate x Development should not be permitted

Table 4.1 Flood Risk Classification (NPPF)

Policy Aims

- 4.3. In this zone developers and Local Authorities should still seek opportunities to reduce the overall level of flood risk in the area through the layout design and form of development and the appropriate application of sustainable drainage techniques.
- 4.4. The proposed sustainable drainage techniques along with an outline drainage plan are discussed in further detail in **Section 6 & 7**.

Finished Floor Level Restrictions

- 4.5. The minimum finished floor level for the proposed Commercial Units is 28.50m AOD. This level is 600mm above the estimate flood level and will provides the necessary

freeboard for developments within Flood Zone 2 (**Table 3.3**). The proposed onsite substation and other areas of essential infrastructure should be set at or above 29.76m AOD (**Table 3.4**).

4.6. The Architects proposed ground floor plan (**Appendix B**) indicates that the proposed finished floor levels will be set at the following and is therefore compliant in terms of fluvial flood risk.

- The Commercial Units are set at or above 29.00m AOD
- The Substation is set at 29.90m AOD

Flood Compensation

4.7. Not applicable for developments within Flood Zone 2.

Flood Resilient Construction

4.8. Flood resilient construction techniques within the building should be used up to the 1000-year level of 30.46m AOD (Refer to **Table 3.1**).

Safe Access and Egress

4.9. The roads to the east of the PDS is above the estimated 1000-year flood level. These roads will provide access for emergency vehicles during a critical flood event.

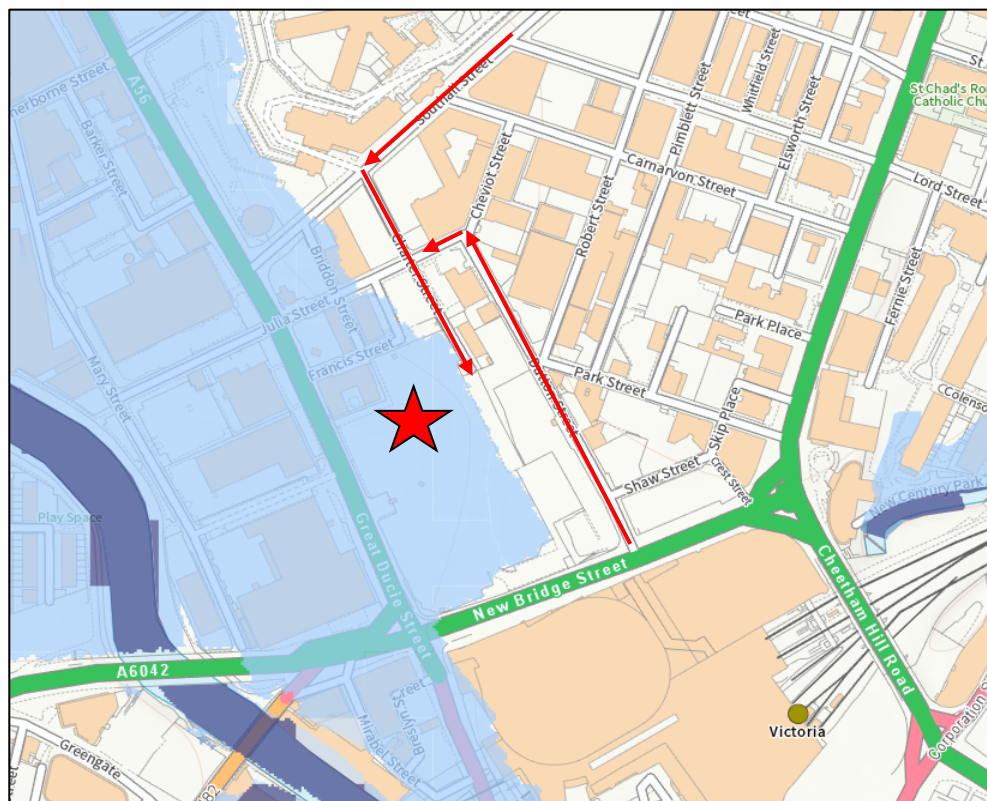


Figure 4.1 1000 Year Flood Emergency Access (Gov UK)

- 4.10. We would recommend that a site-specific flood plan following the Environment Agency guidelines should be developed at the detailed design stage. This will inform/advise both staff and residents on how to safely evacuate the site in the event of an extreme flood.

SECTION 5 EXISTING DRAINAGE INFORMATION

PUBLIC SEWERS

5.1. The public sewers in the area are owned and maintained by United Utilities (UU). A copy of these records has been included within **Appendix D**.

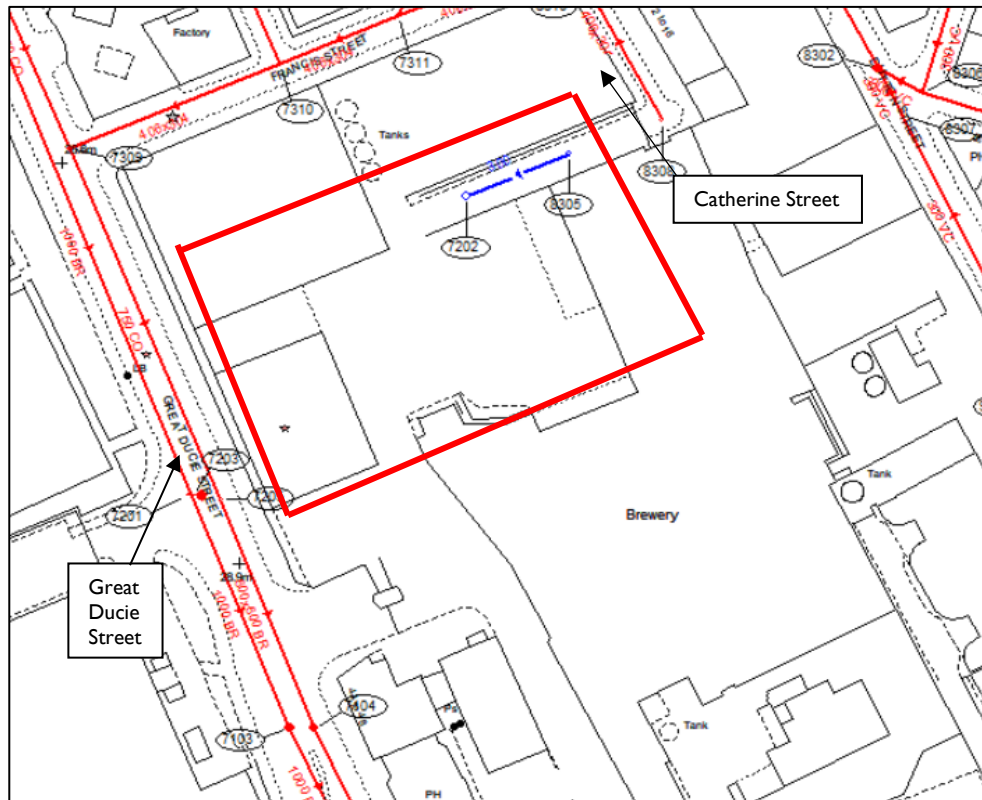


Figure 5.1 Sewer Records (United Utilities)

Surface Water Sewers

5.2. There is a 300mm diameter surface water sewer identified along the northern boundary. The system is just one length of pipe with no identifiable outfall and is likely to be part of old highway drainage within Catherine Street. There are no known watercourses in the area, so the sewer is expected to drain to the adjacent combined network.

Foul Water Sewers

5.3. There are no foul water sewers identified on or around the PDS.

Combined Water Sewers

5.4. There are two combined water sewers within Great Ducie Street (western boundary) and one within Charter Street (northern boundary).

Sewer Diversions

5.5. None required. There are no public sewers identified on the site.

PRIVATE DRAINAGE

- 5.6. The are serveral pipes onsite that have been identified by the utility survey (GPR Survey).
None of the pipes however, appear to have direct links to the sewers noted on United Utilities records and have likely been severed during the demolition works.

SECTION 6 SUSTAINABLE DRAINAGE STRATEGY

- 6.1. The general requirement set out by the NSSDS 2011 and NSTSSD 2015 technical documents is that 'the development must not increase the risk of flooding elsewhere.' In practical terms this means that the proposed development runoff rate must provide a betterment or be equal to the calculated greenfield rate.

Existing Peak Runoff Rate

- 6.2. The PDS has been in a temporary situation for a several years now and has been used as a car park since the previous site was demolished. Whilst the car park does have some identifiable drainage it should be treated as a greenfield site.

Volume Wallingford Variables	Value
M5-60 minute rainfall depth	18.2mm
Ratio of M5-60 to M5-2 day rainfalls	0.36mm
Average Annual Rainfall (SAAR)	890mm
Winter Rain Acceptance Potential (SOIL)	Soil Type 4 (0.45)

Table 6.1 Wallingford Procedure Volume 3 Variables

	m ²	ha
Red Line Boundary*	4950	0.4950

Table 6.2 Site Analysis

$$\begin{aligned}
 QBAR_{rural} &= 1.08 (AREA/100)^{0.89} \times SAAR^{1.17} \times SOIL^{2.17} \\
 \text{Where;} \quad AREA &= 50 \text{ ha (to be scaled to 0.495ha)} \\
 \quad \quad \quad SAAR &= 730\text{mm} \\
 \quad \quad \quad SOIL &= \text{Type 4 (0.45)} \\
 QBAR_{rural} &= 1.08 (AREA/100)^{0.89} \times SAAR^{1.17} \times SOIL^{2.17} \\
 &= 1.08 (50/100)^{0.89} \times 890^{1.17} \times 0.45^{2.17} \\
 &= 290.5 \text{ (50-hectare site)} \\
 \text{Therefore } QBAR &= (290.5 / 50) \times 0.495 \\
 &= \underline{\underline{2.88}}
 \end{aligned}$$

Growth Curve Factor

- 6.3. Growth curve factors have been derived for each of the 10 hydrological regions of the UK. These are based on the work carried out by the Flood Studies research and assists

in calculating multiple peak runoff rates for different events using the estimate QBAR value.

6.4. The Microdrainage calculations are shown below in **Table 6.3**.

Hydrological Region	10				
Estimated QBAR Value	2.88				
Growth Curve Year	1	2	5	30	100
Total Greenfield Peak Runoff (l/s)	2.5	2.7	3.4	4.9	6.0

Table 6.3 Peak Greenfield Runoff Rates

Proposed Development Runoff Rate

6.5. The proposed surface water discharge from the site must be limited to or better than the estimated flow rates shown in **Table 6.3**. The typical vortex flow control device, however, should have a minimum orifice size of 75mm to minimise blockages and maintenance issues in future.

6.6. A 75mm orifice is typically comparable to a 5 l/s discharge rate and we would therefore recommend that all return periods are limited to this rate.

PROPOSED RUNOFF DESTINATION

Surface Water Hierarchy

6.7. Paragraph 080 of the Flood Risk and Coastal Change Guidance within the Planning Practice Guidance sets out the following hierarchy of surface water runoff destinations:

- i. Discharge into the ground (infiltration),
- ii. Discharge to a surface waterbody,
- iii. Discharge to a surface water sewer,
- iv. Discharge to a combined sewer.

Discharge into the ground

6.8. There are five bands of soil classes in England which roughly describe the infiltration potential of an area. It is derived from factors such as, soil permeability, topography, and the likelihood of impermeable layers.

6.9. The soil classification for the PDS is Type 4 and thus the use of infiltration to dispose of surface runoff onsite is unlikely to be practical. Infiltration tests should be carried out in

accordance with BRE365 at the detailed application stage to confirm the ground type and its permeability.

Soil	WRAP	Runoff	Soil Value	Soil Characteristics
1	Very High	Very Low	0.15	Sandy, well drained
2	High	Low	0.30	Intermediate soils (sandy)
3	Moderate	Moderate	0.40	Intermediate soils (silty)
4	Low	High	0.45	Clayey, poorly drained
5	Very Low	Very High	0.50	Steep, rocky areas

Table 6.4 Soil Classification

Discharge to a surface water body

6.10. The River Irwell is 200m away from the PDS. Whilst a surface water connection is in theory possible. It would require significant works outside of the development and thru third-party ownership(s). There are also numerous services and large diameter sewers which would block any potential route.

6.11. Discharging to the River Irwell has therefore been discounted.

Discharge to a surface water sewer

6.12. There is an isolated section of surface water sewer to the north of site. Details on this sewer are very limited and its outfall location is unknown. The sewer is likely to be a historic drain that served Catherine Street and will discharge to the adjacent combined sewer.

6.13. Discharging surface water runoff to this location is an unknown and should be investigated further during the remediation stage.

Discharge to a combined sewer

6.14. There are three combined water sewers adjacent to the site that could serve the PDS. United Utilities has identified the 1000mm dia combined water sewer within Great Ducie Street as the preferred destination should the above outfalls prove to be impractical. United Utilities also confirmed the peak runoff rate from the development must not exceed 5 l/s.

6.15. A copy of the predevelopment enquiry has been included within **Appendix D**.

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 600mm x 600mm diameter public combined sewer within Gt Ducie St 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 5 l/s.

Figure 6.1 United Utilities Predevelopment Enquiry

SUSTAINABLE DRAINAGE TECHNIQUES

- 6.16. Various SuDS techniques can be used for high and low-density developments. One or more of the below techniques could be incorporated at the detailed application stage to facilitate the required reduction/betterment in flow rates.
- 6.17. Some of these techniques will also provide all, or part of the required water quality treatment onsite. By removing, capturing, and breaking down containments such as hydro-carbons and preventing the migration of sediment and heavy metals downstream.

SuDS Technique		Proposed Development Suitability
Porous pavements	Description	Pavements constructed with porous paving can provide runoff storage within the sub-base and runoff treatment.
	Suitability	Suitable for car parking areas with light-duty traffic. Suitability subject to detailed drainage design, topography, and infiltration rates.
Filter drains	Description	Granular filled linear trenches with a perforated pipe installed at the base.
	Suitability	Filter drains can be used along any embankments/boundaries to prevent surface water runoff from leaving the site if needed.
Swales	Description	Relatively shallow naturally landscaped channels that convey and/or infiltrate the surface water runoff.
	Suitability	Not suitable on this type of redevelopment.
Retention Ponds	Description	Partially filled permanent water bodies that have been designed to provide temporary surface water storage during critical events.
	Suitability	Not suitable on this type of redevelopment.
Detention Basin	Description	Naturally vegetated depression. Designed to store surface water runoff on a temporary basis during critical events.
	Suitability	Not suitable on this type of redevelopment.

Soakaways	Description	Drainage structures designed to store and infiltrate runoff into the ground.
	Suitability	Soakaways are unlikely to be suitable on this development. Infiltration tests, are to be carried out during the design stage to confirm.
Green Roofs	Description	Vegetated roof areas that reduce and runoff and increase times of concentration.
	Suitability	Potentially suitable but subject to approval from the architect/structural engineers
Underground Storage	Description	Attenuation structures installed below ground to provide surface water storage.
	Suitability	Can be located under the car park/public realm areas. The type of structure would be confirmed during detailed design stage.

Table 6.5 SuDS Techniques

CLIMATE CHANGE ALLOWANCE

- 6.18. An allowance for climate change should be included at the detailed application stage to help minimize vulnerability and provide resilience to flooding. According to the Flood Risk Assessments: Climate Change Allowances **both** the 'Upper End' and 'Central' allowances should be assessed.
- 6.19. The 'Central' allowance should be applied to the underground surface water drainage network/design to assess its ability to contain critical events. Whilst the 'Upper End' allowance should be applied to evaluate the potential implications and to ensure that the flooding is wholly contained onsite.
- 6.20. The following climate change allowances should be applied to the proposed rainfall intensities during the detailed application stage.

- *Less Vulnerable Commercial Development +20% to +40% Allowance.*

Applies across all of England	Potential Change anticipated for the 2020's	Potential Change anticipated for the 2050's	Potential Change anticipated for the 2080's
Upper End	+10%	+20%	+40%
Central	+5%	+10%	+20%

Table 6.6 Recommend Climate Change Guidance (EA)

SECTION 7 SURFACE WATER TREATMENT

CIRIA REPORT C753

7.1. CIRIA Report C753 (The SuDS Manual) outlines the simple index approach which is a best practice design standard for managing the water quality of runoff. The pollution hazard index for different land uses/sources and has been reproduced below.

No.	Proposed Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro carbons
1	Residential roofs	Very Low	0.2	0.2	0.05
2	Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 – 0.8	0.05
3	Individual property driveways, residential car parks, low traffic roads (e.g., cul-de-sac, home zones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., <300 traffic movements per day	Low	0.5	0.4	0.4
4	Commercial yard and delivery areas, non-residential car parking with frequent change (e.g., hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7

Table 7.1 Pollution Hazard Indices (CIRIA C753)

7.2. Based on the development proposals, items 1 and 3 will be applicable. The surface water runoff will therefore require at least one SuDS components, to sufficiently treat the runoff before it can be discharged offsite.

7.3. Where more than one SuDS component/technique are required there will be a reduced “performance factor” and the following formula must be applied.

$$\text{Total SuDS mitigation index} = \text{Mitigation component index} + 0.5 \times \text{Mitigation index of second component}$$

PRELIMINARY RUNOFF TREATMENT

7.4. The required runoff treatment will be confirmed during the detailed application stage. But based on the indicative masterplan there are four distinct runoff areas.

- Residential Roof
- Car Park/Public Realm

Residential/Commercial Roof

- 7.5. We would suggest that the runoff from the buildings be directed to an underground drainage system and should pass through a hydrodynamic particle separator or similar before discharging from site.

	TSS	Metals	Hydrocarbons
Pollution Hazard: Roof (See Table 7.1)	-0.2	-0.2	-0.05
Proposed Mitigation 1: Hydro International Downstream Defender	(+0.5)	(+0.4)	(+0.8)
Total Pollution Mitigation	+0.3 (Adequate)	+0.2 (Adequate)	+0.3 (Adequate)

Table 7.2 Proposed Mitigation Index: Roofs (CIRIA C753)

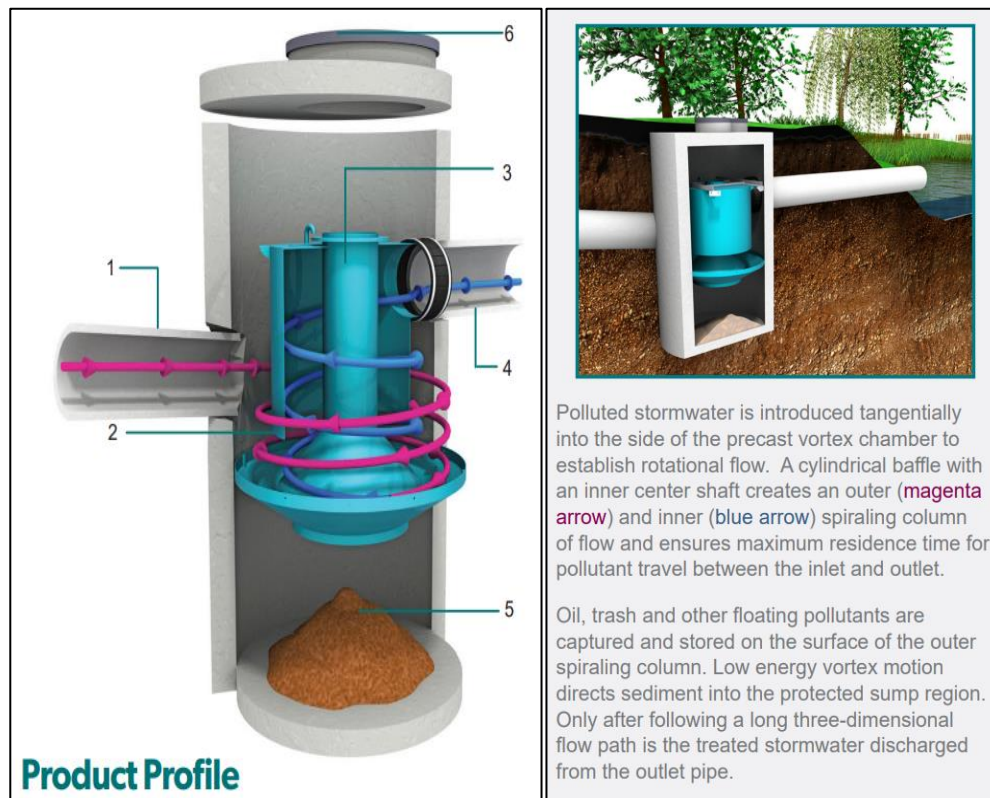


Figure 7.1 Downstream Defender Product (Hydro International)

DDA Car Parking/Public Realm

- 7.6. We would suggest that the runoff from the car park/public realm areas are directed to an underground system via a Type C Permeable Pavement before discharging from the site (**Table 7.3**).
- 7.7. If permeable pavements are not suitable for the PDS. Then the runoff could be passed through a hydrodynamic particle separator, before discharging from site. Both options will provide the necessary runoff treatment (**Table 7.4**).

	TSS	Metals	Hydrocarbons
Pollution Hazard: Car Park/Public Realm (See Table 7.1)	-0.5	-0.4	-0.4
Proposed Mitigation 1: Permeable Pavement	+0.7	+0.6	+0.7
Total Pollution Mitigation	+0.2 (Adequate)	+0.2 (Adequate)	+0.3 (Adequate)

Table 7.3 Proposed Mitigation Index: Car Park/Public Realm 1 (CIRIA C753)

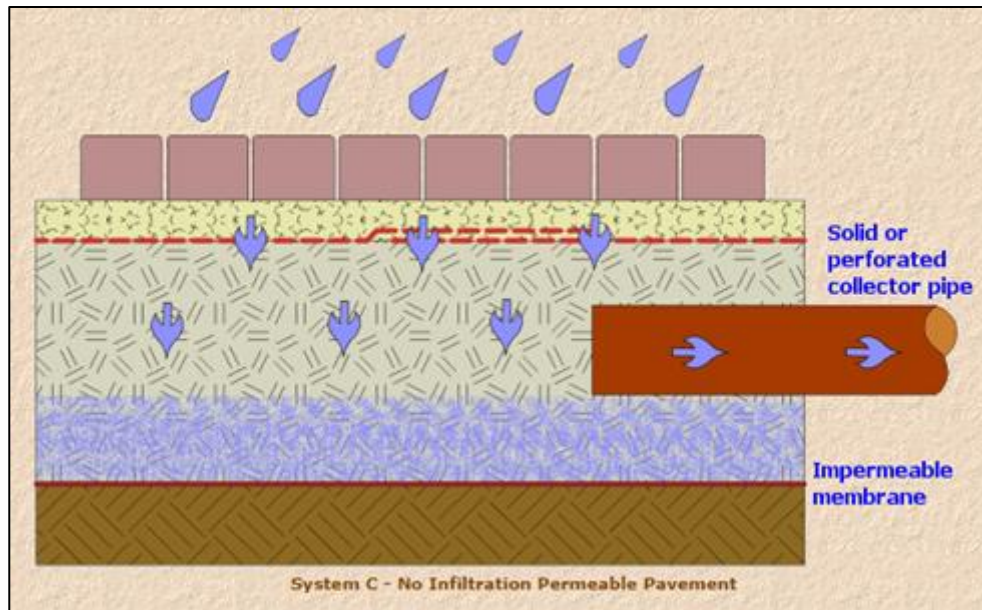


Figure 7.2 Type C Non Infiltration Pavement Construction

	TSS	Metals	Hydrocarbons
Pollution Hazard: Car Park/Public Realm (See Table 7.1)	-0.5	-0.4	-0.4
Proposed Mitigation 1: Hydro International Downstream Defender	(+0.5)	(+0.4)	(+0.8)
Total Pollution Mitigation	+0.0 (Adequate)	+0.0 (Adequate)	+0.4 (Adequate)

Table 7.4 Proposed Mitigation Index: Car Park/Public Realm 2 (CIRIA C753)

SECTION 8 PRELIMINARY DRAINAGE STRATEGY

- 8.1. A preliminary drainage strategy has been produced to identify any major issues that may affect the foul and surface water drainage for the proposed development. All recommendations are preliminary at this stage and should be developed/investigated further during the detailed application stage.
- 8.2. A preliminary drainage layout for both schemes, illustrating the below strategy, is included in **Appendix E**.

SURFACE WATER STRATEGY

- 8.3. A new underground drainage network will collect and convey the proposed development runoff towards an underground attenuation tank within the public realm area. From here the runoff will be passed thru a downstream defender and flow control device. Before discharging to United Utilities combined water sewer.
- 8.4. Note: Although both the foul and surface water have the same outfall destination, they must remain independent networks until they outfall from the PDS.
- 8.5. Runoff from the development will be permitted to discharge at a rate of 5 l/s

Development Area	Approx Impermeable Area	Climate Change +40% Attenuation
0.4950ha	100% (assumed)	310-440m ³

Note: The storage volumes noted above are estimates only and do not take into account the volume within the network or the potential/allowable surface flooding which may be available.

Table 8.1 Estimated Attenuation Volume

FOUL WATER STRATEGY

Foul Water Drainage

- 8.6. A new underground drainage network(s) will collect and convey the effluent from the proposed development to the 1000mm dia combined water sewer within Great Ducie Street.
- 8.7. Note: Although both the foul and surface water have the same outfall destination, they must remain independent networks until they outfall from the PDS.

Foul Water Flows

- 8.8. Sewers for Adoption 7th Edition recommends that drainage designs for residential developments should be based on 4000 litres per day per dwelling. Based on this the PDS would generate the following flows.

Q Foul Water (litres) = 4000 litres per dwelling/unit

Dwellings/Units = 461 units

Q Foul Water (litres) = 461 x 4000 = 1844000 litres

Q Foul Water (l/s) = 1844000 / (24 x 60 x 60) = 21.35 l/s

Development Connection Point

- 8.9. The proposed flow rate and any connection point must be agreed with United Utilities during the detailed design stage. Any proposed drainage should also be designed in accordance with Building Regulations Document H1 and Sewers for Adoption 7th Edition.

SECTION 9 FUTURE DRAINAGE MAINTENANCE

General Drainage Maintenance

- 9.1. The end-users will be provided with as-built plans to ensure that the private development drainage within their responsibility undergoes a regular maintenance regime (either as required or every 2-5 years). This includes, jetting, vacuumation and a visual/CCTV survey to check the structural condition of pipes and manholes.

SuDS Maintenance

- 9.2. The maintenance for the onsite SuDS elements will be split into the following sections and will be undertaken by an appointed Maintenance Company once the scheme/plot has been completed.

- *Regular (weeding/inspections/sweeping/litter removal/grass cutting),*
- *Occasional (sediment removal/vacuum brushing) and*
- *Remedial maintenance (repair and replacement).*

- 9.3. The Maintenance Company will be employed by the end user of the site and will be provided an Operation and Maintenance manual. This manual will outline the location(s) of any drainage infrastructure and detail the maintenance that is required. It will also include the associated cost, and how often each activity should be carried out.

- 9.4. Records must be kept by the Maintenance Company and the end user for any maintenance works undertaken and must be available for inspection when requested.

Site Specific SuDS elements

- 9.5. The design of the onsite surface water drainage networks will be carried out during the detailed design stage. But we envisage that the design will include the following SuDS elements.

- *Cellular Storage,*
- *Porous Paving,*
- *Proprietary System; Petrol Interceptors, Downstream Defenders*

- 9.6. The maintenance required for each of the SuDS elements is shown below in **Table 9.1**

Operation and Maintenance Activity	Suds Component												
	Pond	Wetland	Detention Basin	Infiltration Basin	Soakaway	Infiltration Trench	Filter Drain	Cellular Storage	Permeable Pavement	Swales	Filter Strip	Green Roof	Proprietary Systems
Regular Maintenance – Monthly Basis													
Inspection	●	●	●	●	●	●	●	●	●	●	●	●	●
Litter and debris removal	●	●	●	●	○	●	●	○	●	●	●		○
Grass cutting	●	●	●	●	○	●	●	○	○	●	●		
Weed and invasive plant control	○	○	○	○		○	○		○		○	●	
Shrub management	○	○	○	○					○	○	○		
Shoreline vegetation management	●	●	○										
Aquatic vegetation management	●	●	○										
Occasional Maintenance – Annually or as required													
Sediment management	●	●	●	●	●	●	●	●	●	●	●		●
Vegetation replacement	○	○	○	○						○	○	●	
Vacuum sweeping and brushing									●				
Remedial Maintenance – As required													
Structure rehabilitation/repair	○	○	○	○	○	○	○	○	○	○	○	○	
Infiltration surface reconditioning				○	○	○	○		○	○	○		

● Will be required ○ May be required

Table 9.1 SuDS Maintenance Management

SECTION 10 CONCLUSION

- 10.1. A Flood Risk Assessment is required to satisfy all requirements of the National Planning Policy Framework (NPPF) and the Flood Risk and Coastal Change Planning Practice Guidance (PPG).
- 10.2. This Flood Risk Assessment as far as reasonably practical; determines the potential flood risk associated with the site and has concluded the following:
- The proposed site is located within Flood Zone 2 (medium probability risk of fluvial flooding).
 - The proposed Finished Floor Level of the commercial units at ground floor must be set at or above 28.50m AOD (**Section 4**). The proposed commercial units on the Architect's plan are set at or above 29.00m AOD and are therefore satisfactory (**Appendix B**).
 - Essential infrastructure such as the substation should be set at or above 29.76m AOD (**Section 4**). The proposed substation on the Architect's plan is set at 29.90m AOD and is therefore satisfactory (**Appendix B**).
 - Flood Resilient Construction techniques should be used up to the 1000-year level of 30.46m AOD (**Section 4**).
 - The line and level of the existing drainage connection/outfall(s) should be confirmed during the detailed design stage via a CCTV survey or topographical survey.
 - The peak surface water runoff from the proposed developments must be restricted 5 l/s (**Section 6 & Appendix D**).
 - Surface water attenuation will be required because of the runoff restriction. The estimated attenuation is noted within **Section 8** and the exact type/volume will be confirmed during the detailed design stage.
 - Only clean/treated surface water runoff will be allowed to discharge from the site. Surface water runoff must be treated in accordance with CIRIA C753 (**Section 7**).
 - The foul water effluent should discharge to the 1000mm dia combined water sewer within Great Ducie Street. The allowable foul water discharge rate must be approved by United Utilities via a S106 and/or S104 application.

- j) The proposed onsite drainage system must not contribute to any offsite flood risk or overland flow risk. Any residual risk must be effectively managed onsite with the use of appropriate drainage and/or topographical level consideration.
 - k) The proposed surface water network for the proposed developments must include the “Central” climate change allowance of 20%. The proposed network must also be checked against the “Upper” climate change allowance of 40% to ensure any surface flooding remains wholly within the development.
- 10.3. SGi recommends that the Local Planning Authority accept this Flood Risk Assessment and Drainage Strategy in support of the Planning Applications.



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Consulting Engineers

APPENDIX A1



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Consulting Engineers

APPENDIX B1



General Notes

This drawing must not be scaled. This drawing must not be read in conjunction with all other relevant drawings, specification clauses and current design risk register. Areas are measured and calculated generally in accordance with the Nationally Described Space Standard and/or RICS Property Management, 2nd Edition (2018) and have been calculated in metric units. All setting out, dimensions and levels must be checked on site. Levels refer to Ordnance Datum Newlyn, unless stated otherwise. This drawing must not be used on site unless issued for construction. Refer to Information Plan for definition of drawing status.

Drawing revision prefix (not applied to sketches) :
P = Pre-Contract
C = Contract

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P03	For information	03/09/21	GN	TB
P04	For information	27/09/21	COB	TB
P05	For information	01/10/21	COB	TB
P06	For information	03/11/21	COB	TB

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Clarion Housing Group

Project title

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Drawing title

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Scale @ A1

1 : 200

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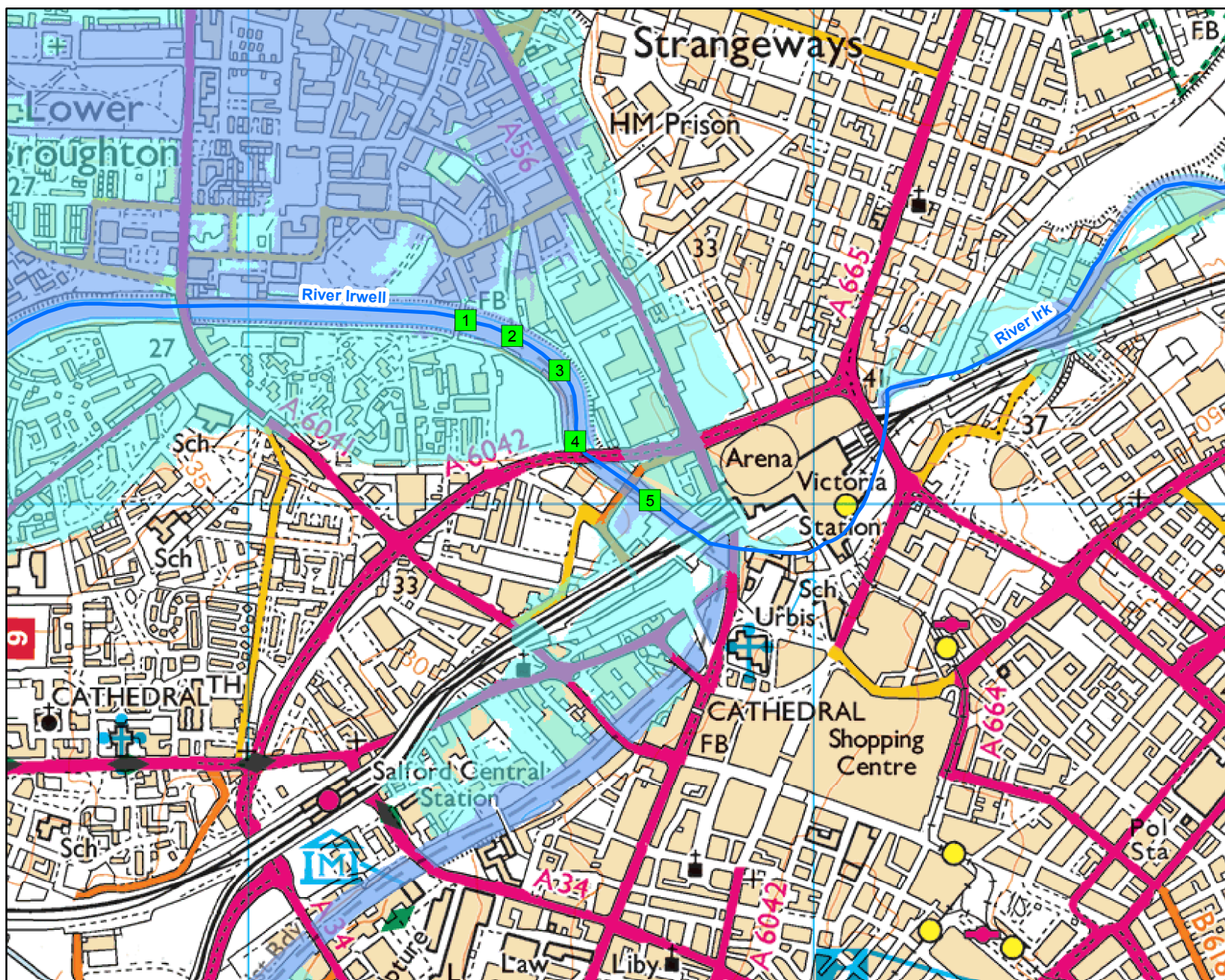
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APPENDIX C1

Detailed Flood Map centred on Great Ducie St, Cheetham Hill, Manchester M3 1PT.
Created on 13/07/2021 [GMMC224504AB]



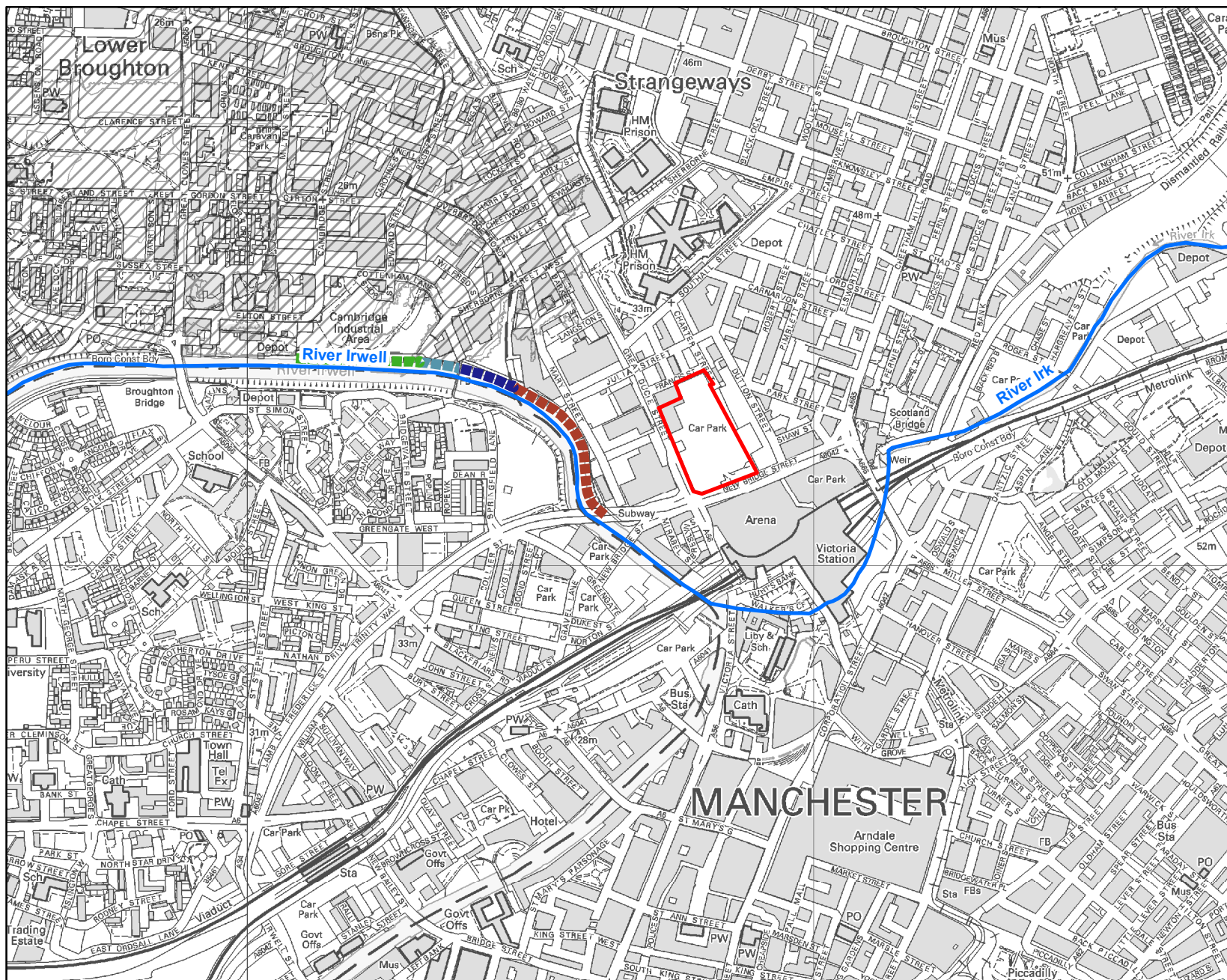
1:10,001



Legend

-  Site Location
-  Model Measurements
-  Main River
-  Flood Zone 3
-  Flood Zone 2

Flood Defence Map centred on Great Ducie St, Cheetham Hill, Manchester M3 1PT. Created on 13/07/2021 [GMMC224504AB]



1:10,001



Legend

Site Location

Main River

Defences

ASSET_ID

88831

88893

181081

452758

				Defended														Undefended													
Map Reference	Model Node Reference	Easting	Northing	Data	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flows	1 % AEP (1 in 100 year) + 35% increase in flows	1 % AEP (1 in 100 year) + 70% increase in flows	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flows	1 % AEP (1 in 100 year) + 35% increase in flows	1 % AEP (1 in 100 year) + 70% increase in flows	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)					
1	es013_0208_IRW13692	383422	399255	Modelled Water Level (m aodN)	25.54	25.92	26.26	26.48	26.61	26.68	27.52	27.69	29.53	26.98	30.24	25.32	25.64	26.18	26.48	26.61	26.83	28.18	28.44	29.95	27.35	30.60					
				Modelled Flow (cumecs)	318.42	356.75	387.29	406.85	417.61	425.33	516.71	518.61	509.23	472.52	474.40	294.54	333.01	388.01	416.70	433.33	457.32	508.89	506.19	480.96	498.71	466.21					
2	es013_0208_IRW13665	383485	399266	Modelled Water Level (m aodN)	25.52	25.90	26.24	26.47	26.59	26.66	27.50	27.66	29.52	26.96	30.24	25.30	25.62	26.15	26.46	26.59	26.80	28.16	28.42	29.95	27.32	30.59					
				Modelled Flow (cumecs)	318.43	356.77	387.32	406.88	417.65	425.36	526.40	532.84	523.37	472.53	494.47	294.55	333.02	388.03	416.72	434.26	460.26	525.61	522.09	502.07	507.94	489.16					
3	es013_0208_IRW13571	383575	399205	Modelled Water Level (m aodN)	25.39	25.77	26.11	26.34	26.47	26.55	27.36	27.53	29.45	26.83	30.19	25.17	25.48	26.02	26.33	26.46	26.67	28.02	28.30	29.89	27.18	30.55					
				Modelled Flow (cumecs)	318.47	356.83	387.40	406.98	417.76	425.47	528.87	539.41	541.44	472.59	519.73	294.60	333.04	388.06	416.74	434.28	460.28	548.53	545.82	530.36	509.27	517.98					
4	es013_0208_IRW13363	383608	399068	Modelled Water Level (m aodN)	25.27	25.66	26.02	26.25	26.38	26.46	27.26	27.42	29.27	26.74	30.07	25.05	25.37	25.91	26.23	26.37	26.57	27.90	28.16	29.76	27.09	30.46					
				Modelled Flow (cumecs)	318.61	357.00	387.63	407.25	418.05	425.74	533.13	547.56	634.40	472.74	622.17	294.75	333.13	388.16	416.86	434.36	460.29	583.44	592.73	606.14	511.82	595.14					
5	es013_0208_IRW1_3304	383749	398955	Modelled Water Level (m aodN)	25.21	25.59	25.94	26.17	26.30	26.37	27.13	27.28	28.75	26.63	29.45	25.00	25.30	25.83	26.14	26.28	26.46	27.71	27.92	29.14	26.96	29.84					
				Modelled Flow (cumecs)	318.65	357.04	387.68	407.31	418.12	425.81	533.15	547.37	678.74	472.77	674.11	294.78	333.15	388.19	416.90	434.38	460.37	587.64	606.72	685.05	511.67	672.80					

Model data taken from Lower Inwell 2017 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Flood Defences

Start Date	Asset Type	Asset ID	Standard of Protection	†Overall Condition Grade	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
14/12/2018	high Ground	88831	75	3	27.66	27.44
14/12/2018	high Ground	88893	75	2	27.44	27.20
14/12/2018	Wall	181081	75	3	27.10	27.07
14/12/2018	Embankment	452758	75	3	27.10	27.10

† Overall condition of the asset based on the (weighted) condition of each element of the latest inspection of the asset. See the attached document 'Visual Condition Grading of FCRM Assets' for interpretation of score given.



Shepherd Gilmour
Consulting Engineers

APPENDIX D1

Warren Chan

Phoenix House
Cross Street,
Manchester,
M2 4JF

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: C1467 Boddingtons
Our Ref: UUPS-ORD-345138
Date: 18/11/2021**

Dear Sirs

Location: Boddingtons 1 Great Ducie St, Manchester, M3 1PT

I acknowledge with thanks your request dated 16/11/2021 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,



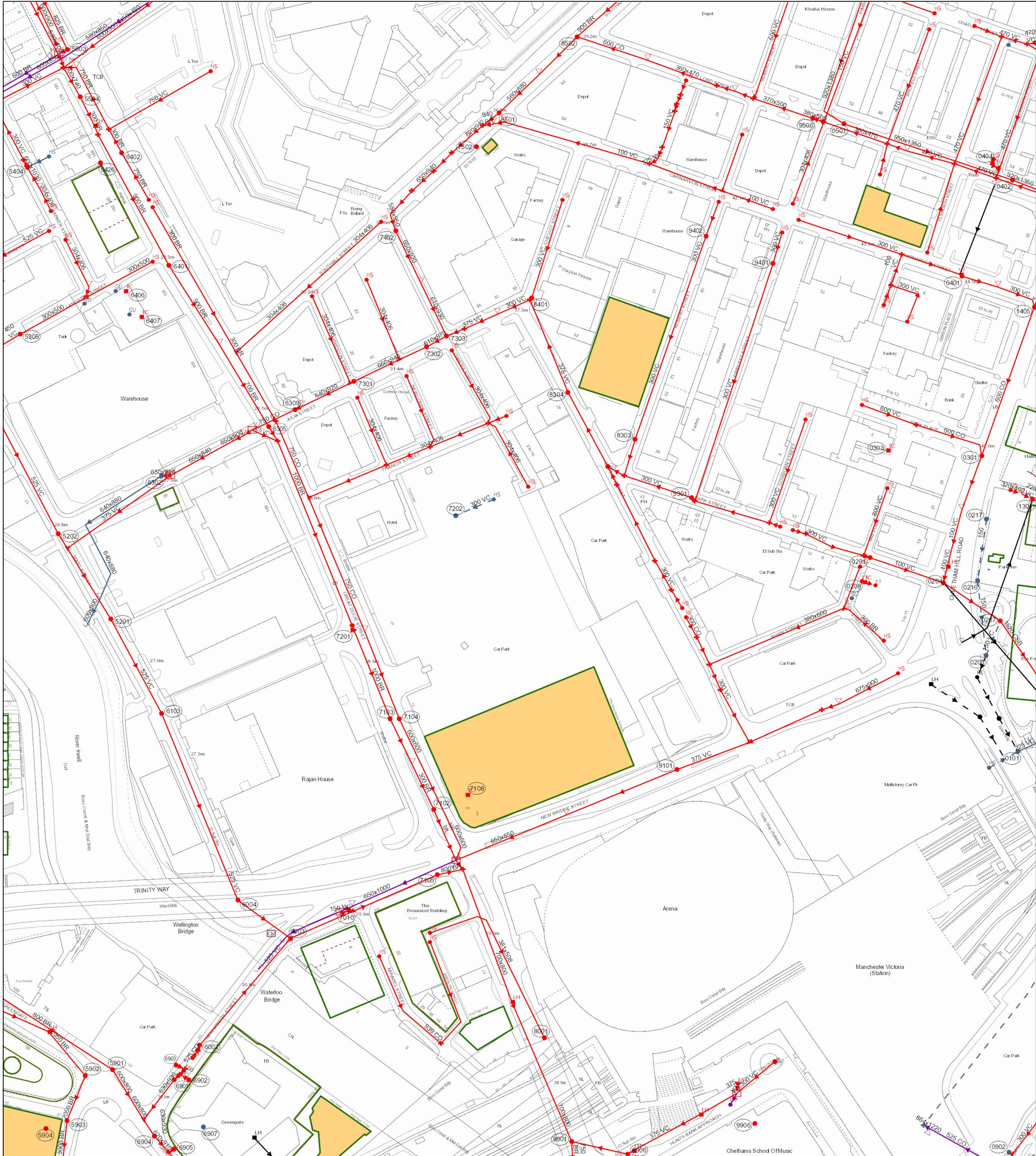
Karen McCormack
Property Searches Manager

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)".

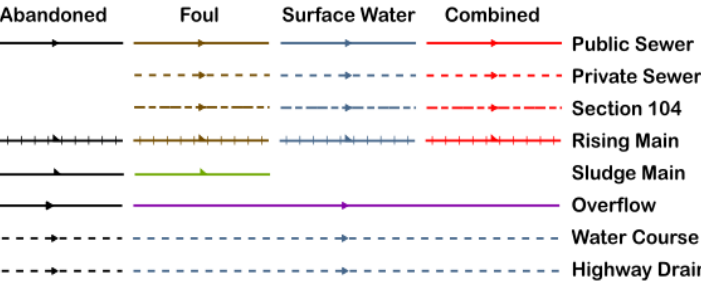
TERMS AND CONDITIONS:

- 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.



Refo	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0216	41	SW	150	150				41.61088	
0217	34	SW	150	150				34.24373	
5902	30.5	CO	26.46	300			BR	27.62889	1 in 61
5902	30.5	CO	26.46	300			BR	27.62889	1 in 61
5905	29.15	CO	26.08	150			VC	3.020551	1 in 23
7010	29.2	CO	25.4	225			VC	2.273662	1 in
1501	35.76	CO	29.71	375			VC	14.86667	1 in
0205	0205	SW	150	150			VC	20.00861	1 in 47
8402	41.75	CO	38.81	300			VC	118.596	1 in 50
9506	43.61	CO	39.34	375			VC	34.76505	1 in 46
9902	33.55	CO	27.35	300			VC	27.29153	1 in 50
7302	32.46	CO	26.82	660			BR	44.28379	1 in 46
8303	40.11	CO	36.29	300			VC	20.89661	1 in 508
6002	30.34	CO	0	525			VC	77.33692	1 in 16
0402	45.65	CO	34.82	920			BR	96.56024	1 in 87
8906	29.35	CO	25.1	375			VC	31.7905	1 in 82
0207	41	SW	150	150			CSB	45.86403	1 in 745
0204	42.02	CO	31.48	1520			CSB	37.69516	1 in 6
6401	28.13	CO	23.73	900			BR	52.15362	1 in 14
0101	40.24	SW	36.65	225			VC	45.04644	1 in 1523
9101	36.07	CO	32.58	375			VC	65.9242	1 in 66
7102	29.47	CO	23.17	300			BR	15.21105	1 in 93
5201	26.9	CO	23.27	525			VC	59.09929	
9301	40.6	CO	37.36	300			VC	38.8973	
8901	27.68	CO	22.86	750			BR	18.02776	
7303	33.51	CO	28.37	610			BR	12.52995	1 in 8
1405	44.79	CO	36.43	600			CO	86.97701	1 in 41
5504	27.36	CO	24.01	300			BR	23.27371	
6902	30.05	CO	26.83	150			VC	5.830952	
8501	36.48	CO	30.87	620			BR	11.40175	
6903	30.18	CO	0	150			VC	5.385165	
6103	27.24	CO	23.31	525			VC	111.234	1 in 445
6309	27.23	SW	23.66	640			CO	26.17348	
8302	27.23	SW	23.66	640			BR	65.57331	
5202	26.87	CO	23.34	525			VC	55.22699	1 in 789
7105	29.35	CO	0	800			BR	14.31762	
6003	29.99	CO	0	525			VC	88.23831	
9401	42.71	CO	36.36	300			VC	137.8768	
7201	28.68	CO	23.34	1000			BR	1	
7104	29.11	CO	23.37	600			BR	86.20999	
5503	27.23	CO	23.28	825			BR	5.637884	
0301	43.15	CO	36.3	600			CO	31.95309	
5404	27.26	CO	24.07	300			VC	4.472136	
7103	29.15	CO	23.25	1000			BR	27.73085	1 in 924
6901	29.98	CO	0	630			VC	38.61953	
8401	37.49	CO	33.91	300			VC	1.414214	1 in 71
9401	42.71	CO	36.36	300			VC	9.433661	
8302	39.71	CO	36.15	375			VC	46.52956	1 in 50
9401	44.56	CO	36.72	320			VC	20.89661	
8304	36.58	CO	35.2	375			VC	65.15433	1 in 42
0501	43.86	CO	34.98	950			BR	88.03061	1 in 654
7301	29.86	CO	25.86	640			BR	32.20272	
6004	26.5	CO	23.04	525			VC	35.80553	
6904	29.54	CO	25.49	620			BR	12.04159	
0902	33.33	SW	31.2	225			VC	2.236068	
5305	27.33	CO	23.67	450			VC	26.15476	
8402	27.69	CO	24.5	300			BR	14.76482	
9901	30.52	CO	26.6	600			BR	32.33017	1 in 66
7402	32.78	CO	28.37	650			BR	32.20248	1 in 93
8502	38.99	CO	31.57	900			BR	29.69848	

LEGEND



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

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

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

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

SEWER MATERIAL

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

Address or Site Reference:

Boddingtons 1 Great Ducie St,
Manchester,
M3 1PT

Scale: 1:1250 Date: 18/11/2021

Sheet: 1 of 1

Printed by: Property Searches

SEWER
RECORDS



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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Dean O Reilly

From: Filing2
Sent: 16 November 2021 14:51
To: Dean O Reilly
Subject: FW: Pre Dev for : Former Boddingtons Great Ducie Street, Manchester M3 1PT
UU ref : 4200044627

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 04 November 2021 23:14
To: Warren Chan <wchan@sgiconsulting.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: Pre Dev for : Former Boddingtons Great Ducie Street, Manchester M3 1PT UU ref : 4200044627

Caution: Email originated from outside the SGI Network.

Pre Development Enquiry for: Former Boddingtons Great Ducie Street, Manchester M3 1PT UU ref : 4200044627

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 600mm x 600mm diameter public combined sewer within Gt Ducie Street located to the west 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.

PLEASE BE AWARE THAT THE RECEIVING SEWER IS SEALED AND SURCHARGES HEAVILY IN EXTREME EVENTS. To avoid the attenuation tank filling with combined discharges which may cause blockage / pollution odour and the site from being exposed to potential flood we would encourage you to consider installing some form of non- return valve to prevent backflows.

You may also want to increase the finished floor levels of the buildings to a minimum level of 29.4m AOD.

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 river Irwell located west of the proposed development

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.

Highway Drainage

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

Public Sewer

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

Once evidence is provided as outlined above, United Utilities will consider a connection to the 600mm x 600mm diameter public combined sewer within Gt Ducie St 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 5 l/s.

PLEASE BE AWARE THAT THE RECEIVING SEWER IS SEALED AND SURCHARGES HEAVILY IN EXTREME EVENTS. To avoid the attenuation tank filling with combined discharges which may cause blockage / pollution odour and the site from being exposed to potential flood we would encourage you to consider installing some form of non- return valve to prevent backflows.

You may also want to increase the finished floor levels of the buildings to a minimum level of 29.4m AOD.

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

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

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/>

Existing Water Assets Crossing the Site

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

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

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/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



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

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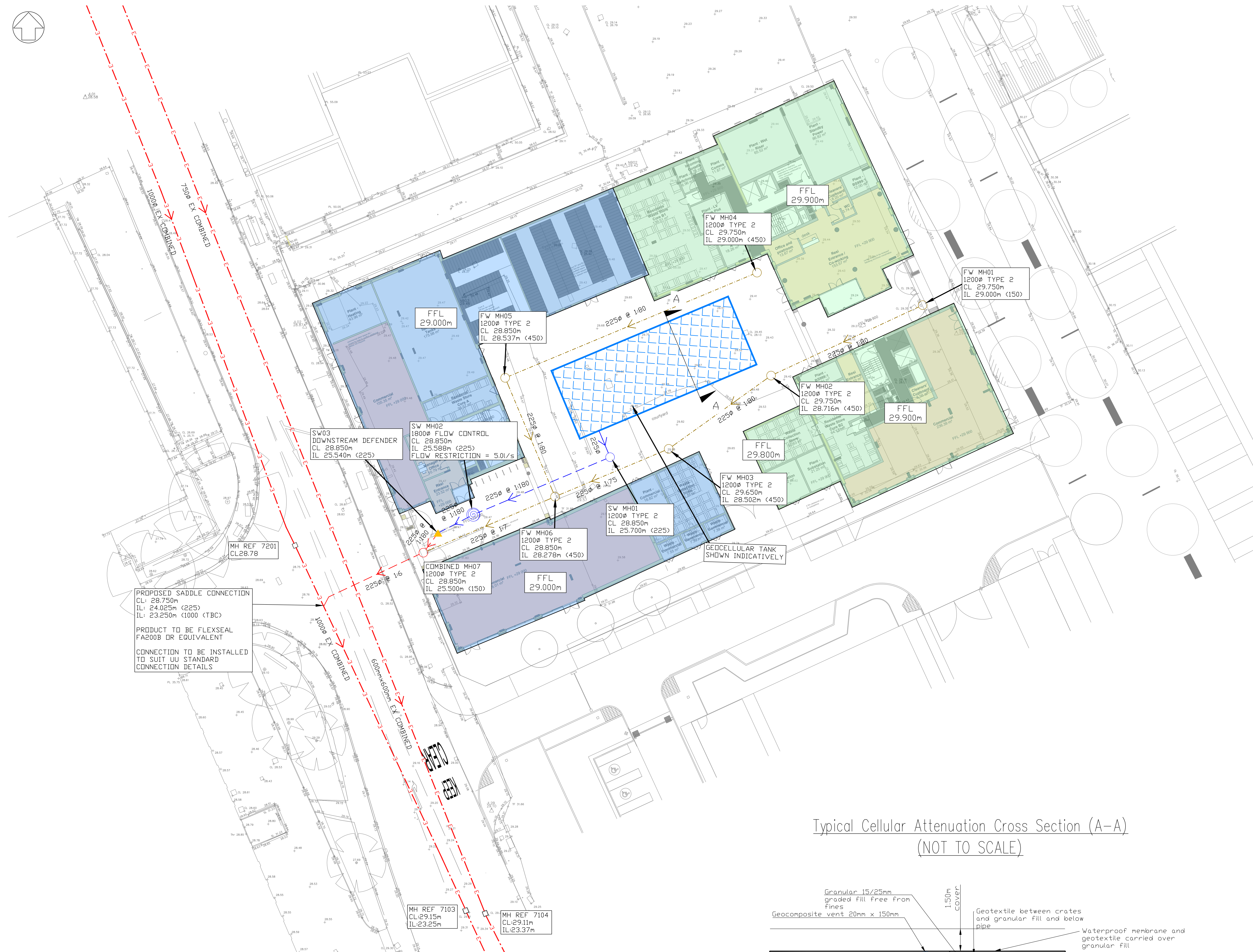
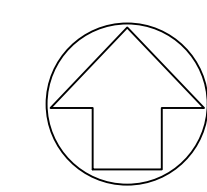
www.unitedutilities.com

www.unitedutilities.com/subsidiaries

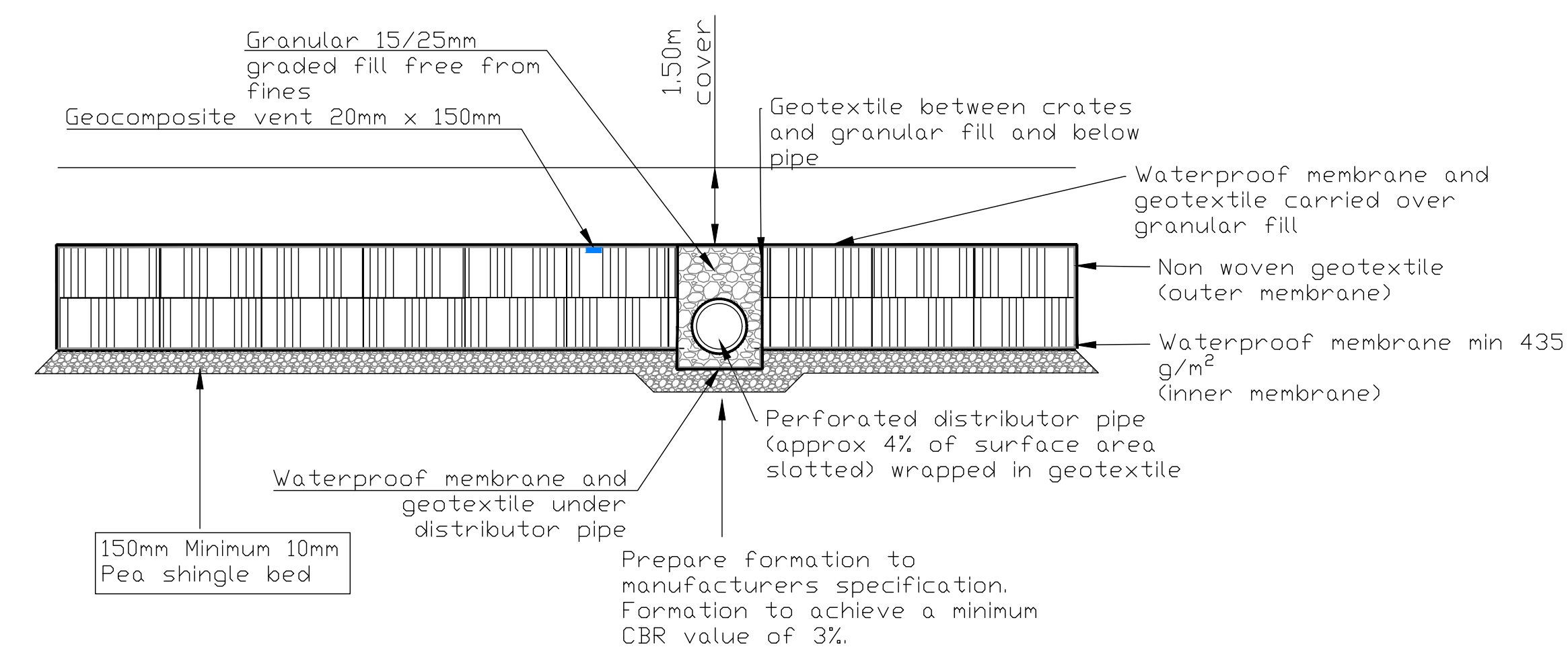


Shepherd Gilmour
Consulting Engineers

APPENDIX E1



Typical Cellular Attenuation Cross Section (A-A)
(NOT TO SCALE)



- KEY
- SITE BOUNDARY
 - EXISTING COMBINED SEWERS
 - PROPOSED SURFACE WATER SEWER
 - PROPOSED FLOW CONTROL CHAMBER
 - PROPOSED COMBINED SEWER
 - PROPOSED FOUL SEWER
 - PROPOSED GEOCELLULAR TANKS
 - PROPOSED DOWNSTREAM DEFENDER

Rev.	Description	Rev. by	Date
1	Shepherd Gilmour Consulting Engineers 3rd Floor Phoenix House, 45 Cross Street, Manchester, M2 4JF T: 0161 837 1500 W: www.sginfrastucture.co.uk		
Client	Clarion Housing		
Architect			
Project	Boddingtons Brewery		
Title	Preliminary Drainage Development Enquiry		
Date	25/11/2021	Drawn By	WC
Size	A3	Checked By	EAJ
Scale	As Shown	Approved By	EAJ
Dwg No	C1467-SK200	Rev	