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PLOT 10A FIRST STREET, MANCHESTER

SURFACE AND FOUL WATER DRAINAGE STRATEGY

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PLOT 10A FIRST STREET, MANCHESTER
SURFACE AND FOUL WATER DRAINAGE STRATEGY

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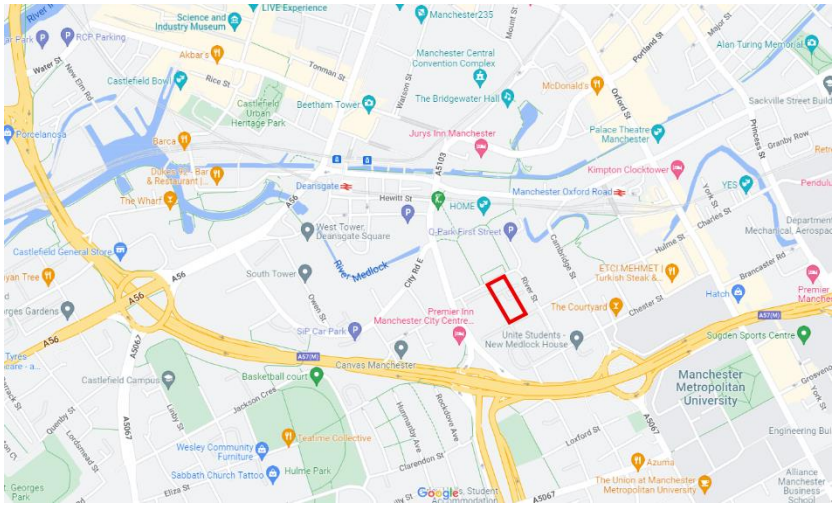
Appendix 1 – Existing drainage information
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1. INTRODUCTION

Ramboll UK Ltd has been appointed to undertake a Drainage Strategy in support of a planning application for the erection of a 13-storey building with basement comprising office accommodation (Use Class E(c)), 204 cycle spaces and associated facilities, landscaping, and associated works. The development consists of 20,155sqm of commercial office space at Plot 10a, First Street, Manchester.

The proposed development will hereafter be referred to as the "Site".

Location plans can be found below.



National Grid Ref
SJ837972

X Co-ordinates
383774

Y Co-ordinates
397280

WhatThreeWords
gravel.wallet.gains

Figure 1.1: Wider Context Site Location [Google Earth Extract ©2022 Google]



Figure 1.2: Plot Site Location [Google Earth Extract ©2022 Google]

2. SCOPE AND OBJECTIVES

2.1 Scope

This Drainage Strategy report was prepared to support the planning application for the development of the Site. It has subsequently been utilised to address planning conditions set following the planning application. This should be read in conjunction with the Flood Risk Assessment reference 1620007819-RAM-XX-XX-RP-EV-00001 and all other planning documents.

Plot 10b foul & surface water run-off will be constructed as a separate systems and will connect into the proposed diversion works within River Street. And thus, is not being considered as part of the drainage strategy for Plot 10a. See figure 2.1 below for summary of plot layouts.

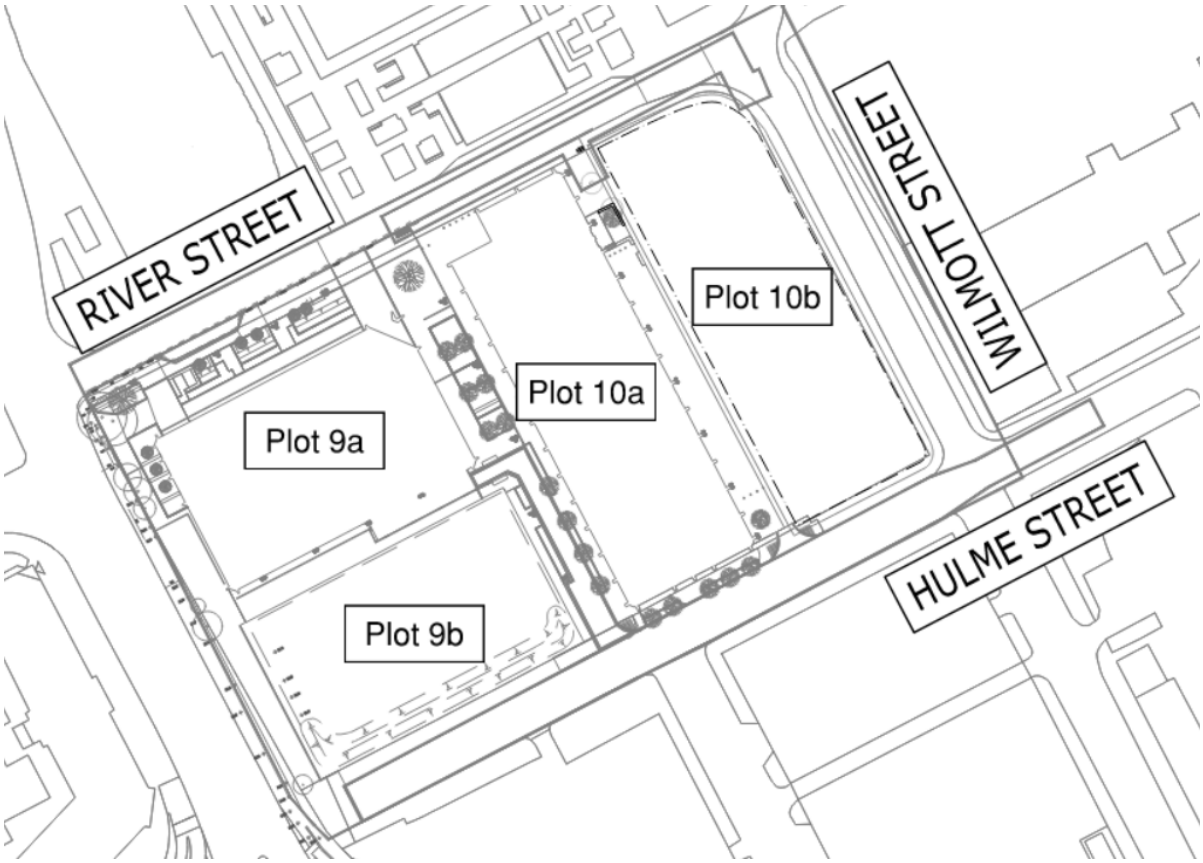


Figure 2.1: Plot Site Location Plan

2.2 Objectives

The specific objectives of this assessment are to establish the following:

- Existing drainage systems in and adjacent to the application site.
- Proposals for collection and discharge of surface water from the application site.
- Proposals for collection and discharge of foul water from the application site.

3. LIMITATIONS

This report has been prepared for the detailed planning application of the Site and shall not be relied upon by any third party unless that party has been granted a contractual right to rely on this report for the purpose for which it was prepared.

The findings and opinions in the report are based upon information derived from a variety of information sources. Ramboll believe these information sources to be reliable and where possible have tried to verify the information.

This report has been prepared based on the proposed end land use defined by the Client at the time of writing. If this proposed end land use is altered or changed then it will be necessary to review the findings of this report.

It should be noted that some of the aspects considered in this study are subject to change with time. Therefore, if the development is delayed or postponed for a significant period then it should be reviewed to confirm that no changes have taken place, either at the Site or within relevant legislation.

4. LEGISLATION

The following legislation has been reviewed and has been considered in preparation of the proposed drainage strategy.

4.1 Planning Policy

Government has strengthened planning policy on the provision of sustainable drainage systems (SuDS) for 'major' planning applications and this is covered in Section 14 of National Planning Policy Framework February 2019. As per the guidance issued by the Department of Communities and Local Government (DCLG), all 'major' planning applications being determined from 6 April 2015 and the NPPF 2021, must consider sustainable drainage systems.

Assessment of the suitability of sustainable drainage systems must be undertaken in accordance with Section 14 Meeting the challenge of climate change, flooding and coastal change.

The department for Environment, Food and Rural Affairs has produced a non-statutory technical standard for sustainable drainage systems.

In regard to peak discharge this states:

For greenfield developments the peak runoff rate from the development to any highways, sewer, or surface water body for the 1 in 1 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

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

In regard to volume control this states.

S4: Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer, or surface water body in the 1 in 100-year, 6-hour rainfall event should never exceed the greenfield runoff volume for the same event.

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

S6: Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

In regard to flood risk within the application site this states;

S7: The drainage system must be designed so that, unless an area is designated to hold

and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event.

S8: The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of a building (including a basement); or in any utility plant susceptible to water (e.g., pumping station or electricity substation) within the development.

S9: The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.

4.2 Strategic Flood Risk Assessment

The Level 2 Manchester City Council, Salford City and Trafford Councils Strategic Flood Risk Assessment (SFRA) dated March 2011 has been reviewed. Criteria related to flood risk will be covered within the Flood Risk Assessment.

The SFRA states that for sites less than 1 ha in size but situated within a critical drainage area mitigation of potential surface water runoff from within the site will need to be included as part of the planning application assessments.

For critical drainage areas the SFRA states.

- Development 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; and
- Development should be designed so that there is no flooding to the development in a 1 in 30-year event and so that there is no property flooding in a 1 in 100 year plus climate change event.

5. SITE DESCRIPTION

5.1 Existing Site Description

The site is located 1.3km southeast of Manchester City Centre and is located within the First Street Strategic Development Framework (SDF) 2018 area. It is part of a wider vision to create a mixed-use neighbourhood in the area, supported by a mixture of leisure, office, and residential blocks.

The application site is known as Plot 10a and is bound by River Street to the north, Plot 10b & Wilmott Street to the east, Hulme Street to the south, and two development sites known as Plot 9a & Plot 9b to the west. The site area is 0.370 ha.

The application site is currently mostly hardstanding, reflecting its recent use as a temporary car parking area ahead of the plot's permanent redevelopment, although limited positive drainage has been found on the site it is believed that this area was drained into the public sewer network. There is limited vegetation on site, limited to small shrubbery around the site.

Assessment of flood risk has determined a low baseline risk of flooding from fluvial, pluvial (surface water) and groundwater sources. Additionally, no flooding risk from artificial sources or reservoirs was identified. For the full flood risk assessment, refer to 1620007819-RAM-XX-XX-RP-EV-00001 by Ramboll.

5.2 Topography

A topographical survey was undertaken in in April 2022 by Survey Operations for the Plot 9a, 9b and 10 sites.

The levels within Plot 10 indicate a level of 30.80 from the corner of River Street/Medlock Street to the Plot 10a boundary with Plot 9a. Levels then rise towards Hulme Street. A level of 33.20 is indicated where Hulme Street meets the proposed Plot 9a boundary to 33.10 where Hulme Street meets the application site boundary.

5.3 Existing Drainage

A review of the United Utilities public sewer records has been undertaken which indicates an existing 600x500 vitrified clay sewer within Hulme Street. CCTV surveys have found that public sewer manhole 7201 is 5.65m deep with an invert level of 27.57m.

The surveys found that this sewer appears to start within Hulme Street adjacent to the Plot 10 site and is therefore different from what is indicated on the sewer records. This sewer collects surface water from the gullies within Hulme Street and backdrop into the sewer.

A 590x680 brick combined public sewer is located within Plot 10 flowing from manhole 7201 to 7203. Sewer record information indicates the invert level of 7203 as 26.75. The sewer then changes from a brick sewer to a 610mm diameter concrete sewer from manholes 7203 to 7301 with the invert level of 7301 at 26.68m.

The sewer then heads Northeast along River Street within the Plot 10 boundary in a 610mm concrete sewer and connects into a large storage chamber outside of the site at the corner of River Street and Wilmott Street.

There is a 450mm diameter outfall from the storage tank which heads South along Wilmott Street. The sewer records indicate a high level 300mm diameter overflow from the storage tank into the River Medlock although the physical surveys undertaken found that this was no longer in use. A copy of the sewer records and existing drainage drawing can be found in Appendix 1 and figure 5.1 below.

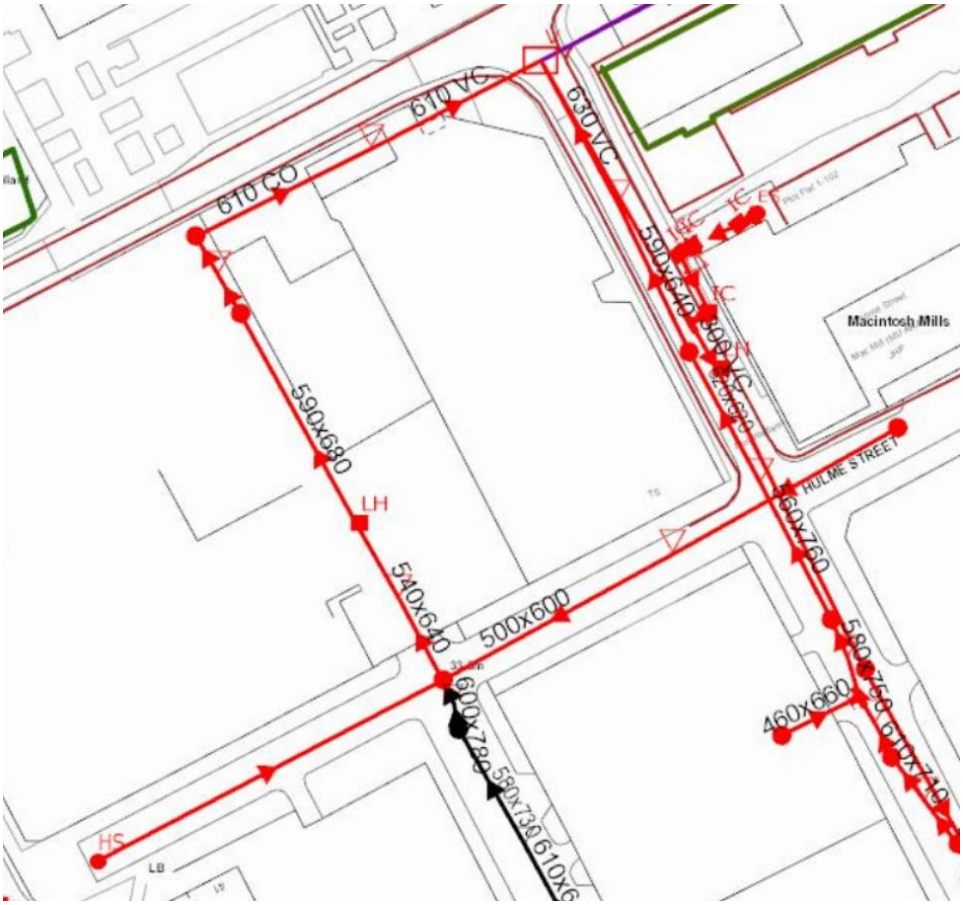


Figure 5.1: Existing drainage extract

Two S185 applications have been submitted to divert this pipework into River Street (UU ref 03032983) & Hulme Street (UU ref 03793791) respectively as part of a separate package of works. The proposals set out for these S185 applications can be found in Appendix 2.

There is minimal private drainage within the application site currently, apart from a small system for collection of foul drainage from recent toilet facilities for the construction of No 8 First Street. Several connections from the site into the public sewer systems were found during the survey but due to the demolition of the existing buildings these have been severed within the boundary and are therefore unable to survey. All private drainage within the site will be removed as part of the proposed works and will not be considered further.

A private surface water drain is located within the existing First Street which collects surface water from No 8 First Street, associated public realm, River Street, and the existing section of First Street. The Private Network was installed as part of the First Street North development circa 2016. The head of this system is at the boundary of Plot 9a.

The existing drainage can be found on drawing FSP10A-RAM-SI-XX-DR-CX-00010 in Appendix 1.

5.4 Existing Surface Water Flows

The existing site, whilst it has been developed in the past currently does not have a full positive drainage system discharging from the site although connections into the sewer are visible along its length. It is not possible to model any of the existing private sections of drainage therefore both greenfield and brownfield rates have been calculated for the application site. The site is not deemed to be greenfield as it would have drained to the sewer previously.

To establish the existing peak storm run-off rates, two methods have been reviewed.

- Wallingford Procedure for brownfield developments; and
- Greenfield rates assuming a soil value of 0.50 for brownfield developments.

Table 1: Existing Run-off – Wallingford Procedure - Site Area = 0.370 ha

Return Period	Peak Run-off Rate (l/s)
M1-5	54.2 l/s
M2-5	69.0 l/s
M30-5	124.6 l/s
M100-5	156.3 l/s

Table 1: Existing Run-off - Greenfield - Site Area = 0.370 ha

Return Period	Peak Run-off Rate (l/s)
Q_{bar}	2.3 l/s
M1-5	2.0 l/s
M30-5	4.0 l/s
M100-5	4.9 l/s

6. SURFACE WATER DRAINAGE PROPOSALS

6.1 Surface Water Discharge Strategy

The following hierarchy has been reviewed regarding discharge of surface water from the Plot 10a site:

- To Ground/Infiltration
- To Watercourse
- To Sewer

Infiltration

Existing ground conditions comprise of hard standing/gravel surfacing overlying granular and cohesive made ground which overlays alluvium. It may be possible to infiltrate some of the water, however the development proposals for the application site indicate minimal external space between the 5m easement from proposed substructure, future buildings, and restrictions due to existing Cadent gas services and public sewers across the site.

Watercourse

The River Medlock is located approximately 80m northeast of the application site and is culverted in this location. Surface water drainage was installed as part of the First Street North Development which starts at the north of Plot 10a within River Street.
The sewer records indicate there is also an overflow from the combined public sewer in the north-east corner of the site into the River Medlock, but survey work indicated this as being no longer utilised.

A review has previously been undertaken to determine whether a gravity connection could be installed to discharge to the watercourse. To enable a connection to be constructed a minimum of approximately 130m of 300mm pipework would be required which will need to cross existing infrastructure. Based on the information known on the existing services routing through would be complex and may require significant service diversions outside of the redline boundary in third party land or a pumped system to be installed from our site.

The private surface water drainage within First Street which discharges to the watercourse appears to drain River Street, First Street, and the existing Plot 5 and 6 buildings. A high-level capacity check of this has been undertaken to identify if there is any residual capacity for collection of Plot 9 and 10 surface water drainage. The review of the brownfield rates from the external works alone indicates that there would be limited capacity within the network for an additional connection and therefore this has been discounted.

Sewer

There are combined public sewers located within Plot 10. An S185 package has been technically approved by United Utilities to divert the public sewer into the nearby River Street to allow for the Application site's proposals. It is therefore proposed that discharge of foul and surface water from Plot 10a will be into this diverted combined public sewer.

Agreement with United Utilities on a connection into the diverted public sewer will be required via a formal S106 agreement, however the connection was discussed during the S185 diversion works and has been allowed for as part of the S185 proposals.

The proposed surface water drainage system for the application site shall be designed to adhere to the following criteria:

- No surcharging of pipework during storms up to a 1:2-year annual probability
- No flooding to occur on site during storms up to a 1:30-year annual probability

- No flooding of third-party land or buildings during storms up to a 1:100-year annual probability + 45% allowance for climate change.

6.2 Review of Sustainable Drainage Techniques

Planning policy promotes sustainable management of surface water run-off from a new development or redevelopment, and the use of SuDS is recommended. Due to the restrictions imposed on the surface water discharge attenuation will need to be incorporated within the design of the Plot 10a application site.

A review of potential sustainable drainage systems has been undertaken to identify the likely form of attenuation which could be included, and which methods are possible.

Possible Sustainable Drainage/Attenuation Systems

- Tank/Cellular Storage: A method involving storage tanks or geocellular crates installed below the lowest ground level that can be used to provide large volumes of storage prior to discharge. Cellular storage has the advantage of having a 95% void ratio allowing it to attenuate large volumes. The use of a tank solution is possible on this site within the section of public realm between Plot 10a and Plot 10b, possible crane base locations and the public sewer easement.

- Increased pipe sizes: The use of large diameter pipework could be used for attenuation and convey rainwater to the discharge point. The use of large pipes could be possible however due to the fall across the site, however space may be limited to external works spatial restrictions for other services.

- Rainwater Harvesting: The use of rainwater harvesting for greywater use within the buildings would decrease the volume and rate of surface water runoff. This will reduce the roof runoff in low return period events, however it cannot be considered to reduce peak flows since the drainage strategy has to assume that the rainwater tank is full and therefore overflowing. Rainwater Harvesting is being utilised for this scheme and will reduce the runoff rate from site in low return period events, but as stated above must be discarded as a storage solution and therefore excluded from this drainage strategy report.

- Green/Brown Roofs: Multi-layered system that covers the roof of a building with vegetation cover/landscaping over a drainage layer. Designed to intercept and retain precipitation, reducing the volume of run-off and attenuating peak flows. These structures are not a reliable attenuation system for extreme storm events due to the potential to become saturated. There are no proposals to install a green roof on the building due to the height or the building and future maintenance. As such the use of green roofs have been excluded from the drainage strategy.

- Blue Roofs: A blue roof is a system which is a method of storing water at roof level within geocellular shallow crates and restricted discharge at roof level. Cellular storage has the advantage of having a 95% voids ratio allowing it to attenuate roof drainage however this would need to be combined with additional attenuation for external works. A blue roof solution at levels 12 and 13 have been included for within the drainage strategy.

- Permeable or porous surfaces: Surfacing systems which allow water to infiltrate through the surface to an underlying gap-graded sub-base or into a sub-base tank and attenuated before discharge either through infiltration or restricted discharge. This use of permeable surfacing was considered for in some of the paved areas but due to area available for an effective area of storage and coordination of services it has been discounted for this site.

Sustainable Drainage Systems/Attenuation Not Possible on This Site

- Infiltration measures: Soakaways which infiltrate directly into the ground as opposed to discharging to a watercourse or sewer are only possible for small areas of the site due to the space restrictions on the site between substructure (5m away from any structure) and easements of public sewers. Due to the spatial limitations these have been discounted.

- Detention Basins: Surface storage basins are normally dry and can provide attenuation of surface water run-off in peak storm conditions. The spatial requirements for detention basins are not possible on this development.

- Swales: A grassland depression which is shallow and wider than a conventional ditch. Swales convey surface water run-off from the drained surface into a storage or infiltration system or let the surface water infiltrate directly and provide storage for peak surface water runoff flows. Swales require a large plan area for construction and therefore are not possible on this development.

The proposed strategy for the Plot 10a is to install surface water attenuation within a blue roof which will then outfall to a rainwater harvesting system & SuDS enabled tree pit systems to capture low rainfall events and underground geocellular storage tanks to capture any rainwater harvesting overflow & the external works during high rainfall events.

Based on a Plot 10a site area of 0.370 ha and a proposed discharge rate of 5.0 l/s, a total storage volume will be required on site will be approximately 225m^3.

The proposed drainage strategy is shown on the drawing in Appendix 3.

6.3 Surface Water Discharge Calculations

There are several driving factors behind the selected discharge rate for the proposed development.

- Restrictions imposed by the LLFA to suit local and site development plans – 50% betterment on existing flows
- Restrictions imposed by the EA to suit local flood risk requirements – as per expected LLFA requirements
- Capacity of the existing downstream system
- Proposed site layout and adjacencies dictating viable space for attenuation or SuDS features

As such, an assessment of these flows has been undertaken and can be found in the table below.

Table 6.1: Proposed Discharge Rates – Plot 10a

Return Period	**Predevelopment run-off rate assuming brownfield** (l/s)	**Predevelopment run-off rate assuming greenfield** (l/s)	**50% Betterment on Brownfield** (l/s)	**Proposed Development Maximum Discharge Rates**
M1-5	54.1	2.0	27.1	**5.0 l/s**
M30-5	124.7	4.0	62.3	**5.0 l/s**
M100-5	156.3	4.9	78.2	**5.0 l/s**
* M100-5 + 45% CC	226.6	7.1	113.3	**5.0 l/s**

** The M100 + Climate Change figure does not apply to the existing system but has been included for reference.*

Whilst the site is a brownfield site, we have tried to reduce the discharge to as close to greenfield rates as possible in line with the LLFA polices and guidance.

A review of the sustainable drainage options can be found in Section 6.2 of this report and include the option of a blue roof for this scheme.

To enable a blue roof to be included within the scheme, alongside attenuation in First Street, a minimum surface water discharge of 5.0 l/s has been calculated as practically achievable. A full hydraulic calculation for the site which demonstrates the above discussed parameters have been met.

United Utilities have been contacted regarding the proposed maximum discharge rates through the development of the S185 application in River Street, and a formal agreement application has been submitted to United Utilities.

A copy of the initial calculations & full hydraulic calculations for the scheme can be found in Appendix 4.

6.4 Surface Water Design Criteria

The following British Standards and design guides shall be used for storm water design purposes. Please note that this list is not exhaustive but covers the overall general drainage requirements.

- BS EN 752 Drain and Sewer Systems Outside Buildings
- BS EN 12056-3 Gravity Drainage Systems Inside Buildings – Part 3 Roof Drainage
- BS EN 16933-2 Drain and Sewer Systems Outside Buildings – Part 2: Design
- CIRIA C753 The SuDS Manual
- HR Wallingford Wallingford Procedure for Design and Analysis of Urban Storm Drainage
- PPG3 Environment Agency Pollution Prevention Guidelines 3 (Withdrawn but remains best practice)
- SSG 2019 Sewer Sector Guidance (formerly Sewers for Adoption)
- Building Regulations 2010 Approved Document H – Drainage and Waste Disposal 2015

In accordance with Building Regulations 2010 Approved Document H, Section H5, separate foul and surface water systems shall be designed for the proposed development.

7. FOUL SEWAGE PROPOSALS

7.1 Foul Water Discharge Strategy

In accordance with Building Regulations 2010 Approved Document H, foul and surface water drainage systems will be kept separate on the application site prior to discharge.

It is envisaged due to previous development approvals within this locality that United Utilities will confirm that unrestricted foul flows from Plot 10a would be acceptable into the public combined sewer system adjacent to the site at a point appropriate to the buildings construction.

The strategy for Plot 10a would be to construct a separate foul drainage system which would either connect directly into the diverted public sewer system within River Street.

The below ground foul network shall be designed to achieve a minimum self-cleansing velocity of 1.0 m/s.

The foul drainage strategy is indicated on the drawing in Appendix 3.

7.2 Proposed Peak Foul Water Flows

Allowing for 6m^2 of office space per person the peak foul water flow rate using the Population Method as prescribed in BS EN 752, BS EN 16933-2 and British Water Flows and Loads Code of Practice has been calculated and a flow rate of 5.9 l/s has been determined.

The peak foul flow rate using the probability method has been calculated also and a flow rate of 16.3 l/s has been determined with a frequency factor of 0.5.

The proposed foul drainage pipes shall be sized using the Probability Method as prescribed by BS EN 752, BS EN 12056-2, and BS EN 16933-2.

Foul calculations can be found in Appendix 4.

7.3 Design Codes

The detailed foul drainage system will be designed in accordance with the following codes of practice:

- BS EN 752 - Drain and Sewer Systems Outside Buildings
- BS EN 12056-2 - Gravity Drainage Systems Inside Buildings – Part 2 Sanitary Drainage
- BS EN 16933-2 - Drain and Sewer Systems Outside Buildings – Part 2: Design
- SSG 2019 - Sewer Sector Guidance (formerly Sewers for Adoption)
- BW COP 4 - British Water Flows and Loads 4
- Building Regulations 2010 - Approved Document H – Drainage and Waste Disposal 2015

7.4 Summary of total discharge rate

The total peak discharge rate for foul and surface water has been calculated using the probability method as 21 l/s for the application site & an expected daily peak flow calculated by the population method of 10.9 l/s. For the basis of the design, the probability volume has been used.

The proposed S185 diversion sewer is a 375mm diameter carrier to be installed at a gradient of 1 in 207, having a full-bore capacity of 125 l/s. This sewer will serve Plots 9 and 10 only. These results suggest that there is existing capacity in the system for a new connection from Plot 10a. The S185 diversion works looked to emulate that of the existing public sewer downstream but reduced the diameter of the sewer to 375mm due to the limited plots being served by the sewer.

8. CONSULTATIONS & PLANNING CONDITION RESPONSES

8.1 United Utilities (UU)

Within the confines of this application, an existing 600mm dia United Utilities sewer crosses the site, and several S185 applications have been submitted in relation to this apparatus.

Summary of the reasoning for each diversion in relation to Plot 10a are as follows:

- River Street (reference 03032983)
  - Removal of existing sewer from neighbouring Plot 10b site
  - New point of connection provided at CS01 that has been identified for connection from the proposed works within Plot 10a.
  - Sewer has been sized to accommodate flows from Plots 9 & 10.
- Hulme Street (reference 03793791)
  - Removal of existing sewer crossing Plot 10a site
  - Diversion of flow within Hulme Street into Wilmott Street.

Refer to Appendix 2 for a copy of the S185 proposals for each scheme.

As part of the River Street application, details of anticipated surface water & foul flows were submitted to UU for acceptance when sizing the proposed sewer as the proposed flows from the First street developments (Plot 9a, Plot 10a & Plot 10b) were the flows that would be traveling through the sewer. River Street gained technical approval on the 28th June & is currently being developed further for construction.

For Plot 10a First Street, following the technical acceptance of the diversion proposals & anticipated flows from the various sites, a pre-development enquiry has been submitted to confirm the flows previously discussed with United Utilities following the completion of the detailed drainage design. The flows designed for are as discussed above (5.0 l/s surface water & 5.9 l/s foul).

Based upon previous experience with United Utilities the strategy for foul and surface water discharge is as follows:

- Foul drainage to drain to the public combined sewer network at an unrestricted rate.
- Surface water would need to drain to either soakaway or directly to watercourse unless evidence could be if this was not possible before connection to the public sewer.
- Formal sewer connection agreement would have to entered to confirm connections.
- Any adoptions would need to be in accordance with Sector Sewerage Guidance and any pumping stations in accordance with United Utilities addendum to this.
- Site drainage must be designed in accordance with Building Regulations, National Planning Policy and local flood authority guidelines.

Infiltration and a connection to a watercourse is not possible for the site as discussed in depth in section 6.1, therefore the maximum pass forward flow rate of 5 l/s has been designed for in accordance with planning condition 9 point 7 *"Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with the aim of reducing to the Greenfield runoff rates, as the site is located within Conurbation Core Critical Drainage Area".*

Refer to Appendix 5 for a copy of the consultations to date.

8.2 Lead Local Flood Authority Manchester City Council (LLFA)

The proposed strategy has been produced in line with that of the LLFA guidelines & following the planning submission a coordinated strategy proposal with the wider design team has been undertaken to confirm the viability of various SuDS elements such as the blue roof, the tree pit systems, rainwater harvesting & geocellular storage systems.

8.3 Planning Conditions

Following the application for planning permission, the following conditions were placed, which relate to the below ground drainage system:

- Condition 9 – Sustainable Drainage
- Condition 11 – Sustainable Drainage
- Condition 40 – Drainage

An extract of the various conditions that relate to the below ground drainage can be found below.

8.3.1 Condition 9 – Sustainable Drainage

The following pre-commencement condition has been placed on the scheme shown in italics. Response to each of the points are below each italic point to identify relevant section of planning report.

Notwithstanding the details as set out within condition 2 (k) no development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority. This shall include:

- *A finalised drainage layout showing all components, outfalls, levels and connectivity.*
    - Refer to Appendix 3 for the finalised drainage layout as of Stage 4.
- *Confirmation of finalised FFLs of the ground floor set to 31.36 m AOD in-line with the FRA.*
    - Refer to Appendix 6 for a copy of the proposed ground floor plan, FFL of portion of ground floor is 30.930 however, access points to the East of the site are at FFL 31.560.
- *Details of the finalised resistance/resilience measures to mitigate groundwater flood risk to the proposed basement.*
    - Refer to structural design strategy for details regarding mitigation of groundwater flood risk within proposed basement.
- *An assessment of blue roof feasibility and design.*
    - Blue roof feasibility considered at Stage 3, refer to initial calculations contained within Appendix 4 for feasibility of blue roof design. This was developed further at Stage 4 within the InfoDrainage modelling process, refer to InfoDrainage results within Appendix 4 for design of blue roof within InfoDrainage. Blue roof layout & design information can be found within Appendix 3.
- *Maximised integration of green SuDS components (utilising infiltration or attenuation) if practicable;*
    - There are six green spaces provided within the Plot 10a boundary, and four of these are utilised for Tree pit attenuation systems on the site to store flows during low rainfall events. Refer to landscape architects drawing within Appendix 7 for details of all green spaces, and proposed drainage strategy drawing within Appendix 3.
- *Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with the aim of reducing to the Greenfield runoff rates, as the site is located within Conurbation Core Critical Drainage Area;*

- Refer to table below detailing reduction in runonff rate when compared with existing rates & compared with greenfield rates:

Table 8.1: Proposed Discharge Rates – Plot 10a

Return Period	**Predevelopment run-off rate assuming brownfield** (l/s)	**Predevelopment run-off rate assuming greenfield** (l/s)	**Proposed Development Maximum Discharge Rates** (l/s)	**Reduction in runoff rate percentage** (%)
M1-5	54.1	2.0	5.0	91
M30-5	124.7	4.0	5.0	96
M100-5	156.3	4.9	5.0	97
* M100-5 + 45% CC	226.6	7.1	5.0	98

The above values show the reduction is greater than 50% & it can be seen the proposed rate is near to that of the greenfield rate for each of the storm events.

- *An existing and proposed impermeable areas drawing to accompany all discharge rate calculations.*
    - The existing site of 3665m^2 is 100% impermeable, and as part of the proposed works 105m^2 of permeable surfacing is proposed, reducing the impermeable area to 3560m^2.
- *Runoff volume in the 1 in 100 year, 6 hours rainfall shall be constrained to a value as close as is reasonable practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment;*
    - 360 minute storm events have been modelled within the hydraulic modelling pack, these can be found within Appendix 4. The critical storm during the 1 in 100 year + 45%CC event was the 180 minute event, with an outfall value of 4.2 l/s, which is lower than the 4.9 l/s greenfield runoff rate.
- *Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 45% climate change in any part of a building;*
    - Hydraulic calculations attached within Appendix 4 evidence the design has been undertaken for a 1 in 100 year + 45% climate change event.
- *Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.*
    - Site has been designed for all flows to be captured within drainage channels & for no flooding in a 1 in 100 +45% CC event across the site, however should an exceedance event occur, the flow would travel to the north & any flood flow would be contained within River Street & drain into the private sewer network within the carriageway.
- *Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.*
    - Discussions have been held with United Utilities regarding the flow rate as part of the S185 works as noted within the technical appraisal in Appendix 5. Further consultations are currently taking place and further evidence will be provided.

- *Where public sewer diversions are proposed, evidence of a proposed diversion plan agreed in principle by United Utilities is required.*
    - Refer to Appendix 4 for technical approval of River Street drainage diversion works.
- *Hydraulic calculation of the proposed drainage system;*
    - Refer to Appendix 5 for InfoDrainage hydraulic calculations of the proposed drainage system.
- *Construction details of flow control and SuDS elements.*
    - Typical construction detail for tree pits, blue roof, flow control devices & geocellular attenuation tank details included within Appendix 8.

The approved details shall be implemented as part of the development.

Reason: To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution. This condition is imposed in light of national policies within the NPPF and NPPG and local policies EN08 and EN14.

8.3.2 Condition 11 – Sustainable Drainage

The following pre-occupation condition has been placed on the scheme shown in italics. Response below in non-italic.

No development hereby permitted shall be occupied until details of the implementation, maintenance and management of the sustainable drainage scheme have been submitted to and approved by the local planning authority. The scheme shall be implemented and thereafter managed and maintained in accordance with the approved details. Those details shall include:

a) Verification report providing photographic evidence of construction as per design drawings;
b) As built construction drawings if different from design construction drawings;
c) Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

Reason: To manage flooding and pollution and to ensure that a managing body is in place for the sustainable drainage system and there is funding and maintenance mechanism for the lifetime of the development. This condition is imposed in light of national policies within the NPPF and NPPG and local policies EN08 and EN14.

The requirement for a Sustainable Drainage Systems Operation & Maintenance Manual to be produced for the various elements across the site is noted & will be produced pre-occupation as per the condition. This will include as photographic evidence of the constructed SuDS elements, as built drawings of the below ground drainage works & the management and maintenance plan for the development.

Section 10 states the proposed management & maintenance requirements for the SuDS features across the site. Once the chosen methods have been finalised & have been constructed on site the full report will be produced and submitted as part of the Health & Safety file and the report will contain each of the required documents as mentioned within Condition 11.

8.3.3 Condition 40 – Drainage

Before development commences a scheme for dealing with the discharge of surface water and which demonstrates that the site will be drained on a separate system, with only foul drainage

connected into the foul sewer, shall be submitted to and approved in writing by the City Council as Local Planning Authority. The approved scheme shall be implemented in full before use of the use first commences.

Reason - Pursuant to National Planning Policy Framework policies (PPS 1 (22) and PPS 25 (F8)).

Ramboll can confirm that the surface & foul water drainage systems will be kept separate up until the point of connection into the combined sewer system within River Street as discussed throughout the report, primarily within section 6.

Details of connection locations & overall drainage strategy can be found within proposed drainage strategy drawings within Appendix 3.

9. BREEAM Compliance Confirmation

The application site is to be designed to target BREEAM Outstanding at this stage. This drainage strategy relates to several credits within the 'Pollution' reference category under 'Pol 03 – Flood and Surface Water Management'. These credits are as follows:

9.1 Credit 2: Surface Water Runoff

As mentioned within the surface water drainage proposals, it has been determined that whilst this is a brownfield site. There are no obvious drain connections within the site into the public sewer that crosses the site.

The proposals for the surface water drainage network are for a flow rate that is as close to greenfield rates as is reasonably practical to enable all SuDS features to be utilised within the design.

9.2 Credit 3: Minimising Watercourse Pollution

To achieve this credit it requires for no discharge from the developed site for rainfall up to 5mm.

The site will be designed to achieve no flooding for a 1 in 100 year +45% climate change events. All the surface water on the site will be captured through the blue roof, drainage channels and SuDS features for this storm event, which would enable for a value greater than 5mm of rainfall to be captured and retained within the developed site.

10. MAINTENANCE OF DRAINAGE SYSTEMS

10.1 Performance Objectives

The operational maintenance need of the installed drainage system is to provide:

- a system that will continue to perform in accordance with the design;
- that the operation of the system is safe, environmentally acceptable, economically efficient and provide the client with a functional and easily operated asset.

The drainage design solution is integral with the landscaping design and any changes to this will impact on the drainage within the application site.

10.2 Maintenance Requirements

Effective maintenance includes a combination of planned and reactive tasks and looks to ensure that the system is kept in a condition where it can function as required.

The tasks may include:

- Localised repair or replacement of damaged pipework or other structures
- Removal of natural occurring sediments, abnormal obstructions etc. to restore hydraulic capacity
- Maintenance of mechanical plant
- Rodent and insect control

10.3 Maintenance Schedule

A strategy for the maintenance of the drainage elements will be developed incorporating normal regular maintenance requirements, any potential long term maintenance work and any monitoring required.

Any parties involved with the disposal of any waste materials from the underground drainage system should hold appropriate management licenses to undertake any such activities. Disposal of any site materials is required to be made in accordance with current legislation and guidance.

This initial maintenance schedule has been prepared using guidance provided in 'CIRIA C625 – Model agreements for sustainable water management systems', CIRIA 626 – Rainwater and Greywater systems, the SuDS Manual and manufacturers recommendation for specialist drainage elements.

The following table notes the likely maintenance requirements for this project and is to be developed further at the next stage of the design.

The tables below, taken from the CIRIA SuDS Manual, provides guidance on the type of operational and maintenance requirements that may be appropriate for the drainage features proposed in this Drainage Strategy report.

Table 4. Maintenance Requirements of Drainage Components (Rainwater Harvesting) [CIRIA SuDS manual, chapter 11]

TABLE 11.6 Operation and maintenance requirements for RWH systems

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 5. Maintenance Requirements of Drainage Components (Proprietary Treatment Systems) [CIRIA SuDS manual, chapter 14]

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Table 6. Maintenance Requirements of Drainage Components (Trees) [CIRIA SuDS manual, chapter 19]

TABLE 19.3 Operation and maintenance requirements for trees (after CRWA, 2009)

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets and outlets	Inspect monthly
Occasional maintenance	Check tree health and manage tree appropriately	Annually
	Remove silt build-up from inlets and surface and replace mulch as necessary	Annually, or as required
	Water	As required (in periods of drought)
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Table 7. Maintenance Requirements of Drainage Components (Attenuation Storage Tanks) [CIRIA SuDS manual, chapter 21]

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

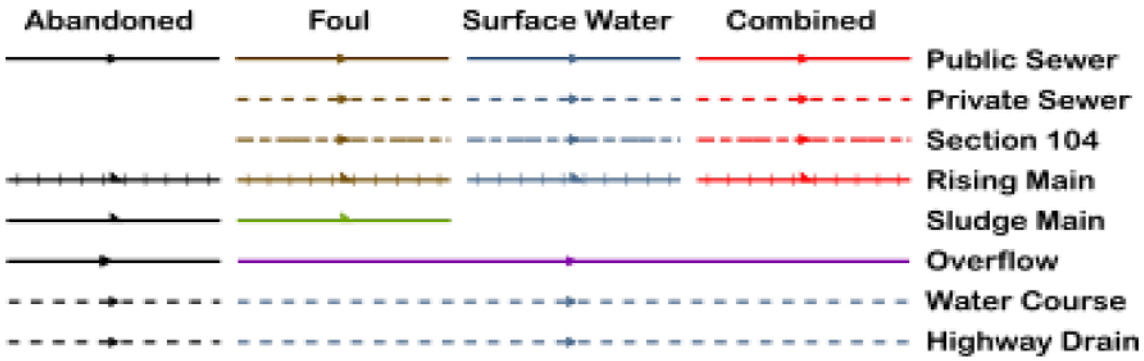
In addition to the items listed above, the table below provides further guidance on type of operational and maintenance requirements that may be appropriate for the drainage features not included in the tables provided above.

Table 8: Drainage Maintenance Strategy

Drainage Feature	Regular Maintenance	Occasional/Remedial Maintenance	Monitoring
Drainage channels/Gullies	Inspections will include gratings; covers including their locking bolts; sumps and sump buckets; exposed concrete surround and adjacent surfacing. Check for accumulation of debris and silt and cleaned as necessary Gratings, frames and all associated locking parts to be checked for damage. Exposed concrete and adjacent surfacing to be checked for cracking and general damage. Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures Check for accumulation of debris and silt and cleaned as necessary.	Channel cleaning will be by flushing with water or high pressure jetting (no boiling water or cleaning agent will be used). All silt buckets and sumps will be cleaned out replaced back into the units ensuring they are correctly fitted. All channel surfaces and joints will be checked and repaired as necessary. Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	Inspect every 4 months or after large storm.
Catchpit Manholes/Inspection Chambers	Covers and frames to be checked for damage. Exposed concrete and adjacent surfacing to be checked for cracking and general damage. Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures	Clean as necessary. All manhole and inspection chamber covers and frames to be replaced as necessary. Repair exposed concrete and surfacing as necessary Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	Inspect every 6 months or after large storm.

APPENDIX 1
EXISTING DRAINAGE INFORMATION & DIVERSION PROPOSALS

Wastewater Symbology



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

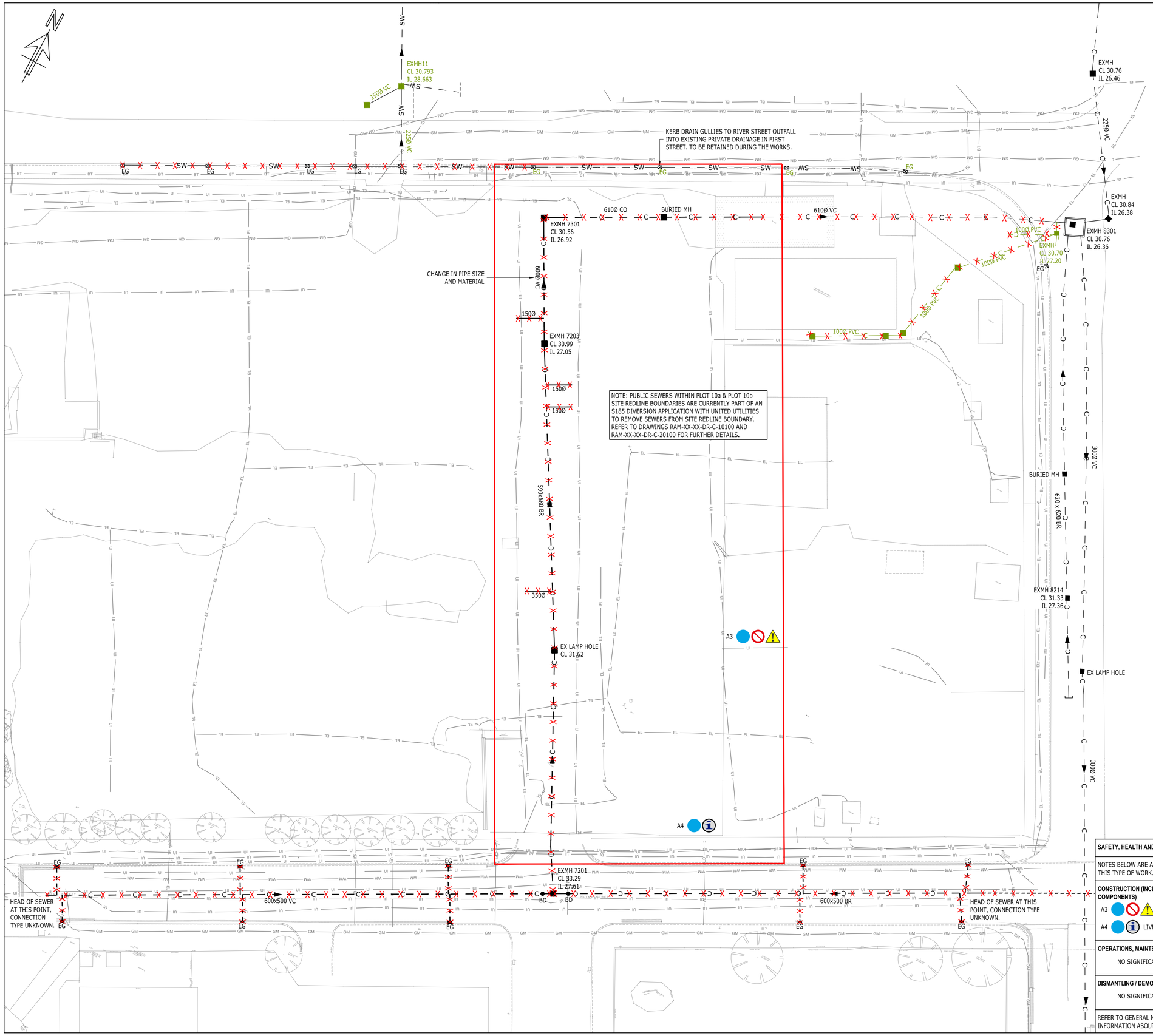
- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- CA Catchpit
- VC Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- CK Control Kiosk
- Change of Characteristic



Scale:	1:1667	**SEWER RECORDS**	United Utilities helping life flow smoothly
Date:	18/02/2020		
Address or Site Reference:	20B030		
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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KEY

- EXMH (CL ----- IL -----) — EXISTING MANHOLE
- EG — EXISTING GULLY
- C — EXISTING COMBINED UNITED UTILITIES SEWER
- C — EXISTING COMBINED PRIVATE DRAIN
- SW — EXISTING PRIVATE SURFACE WATER DRAIN
- ASSUMED EXISTING DRAIN
- UTL — UNABLE TO LIFT
- BD — C — BACKDROP INTO MANHOLE
- RED LINE - PLOT 9a BOUNDARY
- EG — EXISTING GULLY TO BE REMOVED
- SW — EXISTING PRIVATE SURFACE WATER DRAIN TO BE REMOVED

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

Rev	Description	Date	By	Chk	App
P04	STAGE 4 ISSUE	23/06 2023	CO	JI	NM
P03	STAGE 3 ISSUE	14/04 2023	CO	SP	NM
P02	PLANNING ISSUE - REDLINE BOUNDARY UPDATED	13/01 2023	CO	SP	NM
P01	PLANNING ISSUE	16/09 2022	CO	SP	NM

D2 - ISSUED FOR TENDER

PLOT 10A FIRST STREET MANCHESTER

RAMBOLL

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EXISTING BELOW GROUND DRAINAGE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: FSP10A-RAM-XX-XX-HS-CX-00002

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

A3 SERVICES (IDENTIFIED AND UNIDENTIFIED) ARE PRESENT WITHIN AND ADJACENT TO THE REDLINE BOUNDARY.

A4 LIVE GAS MAIN IDENTIFIED WITHIN THE SITE BOUNDARY.

OPERATIONS, MAINTENANCE

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

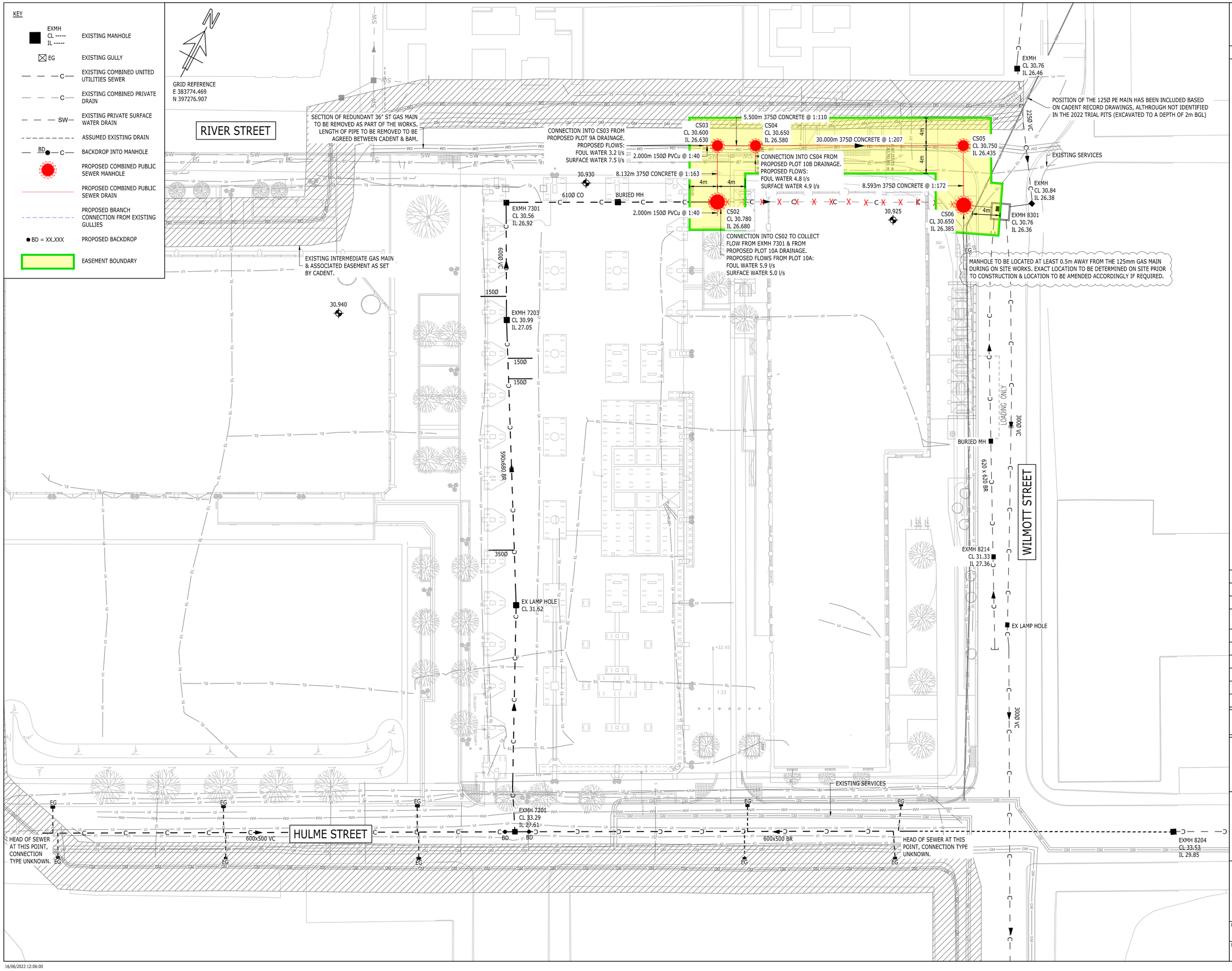
REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:250	CO	09/2022

Drawing No: FSP10A-RAM-SI-XX-DR-CX-00010 Rev: P04

22/06/2023 14:32:29

APPENDIX 2
PROPOSED DIVERSION WORKS



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6. MANHOLES TO BE PRECAST CONCRETE RINGS IN ACCORDANCE WITH BS 5911-3 AND BS EN 1917, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
7. ALL COMBINED DRAINAGE TO BE PVCu SOLID WALL TYPE B TO BS EN 13476-1 AND -3, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
8. ALL SURFACE WATER PIPES TO BE STRUCTURED WALL HDPE TO BS EN 13476-1 AND -3, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
9. ALL DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE AND RELEVANT UTILITY COMPANIES STANDARD AND HEALTH AND SAFETY POLICES
10. ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION
11. CONCRETE FOR GENERAL DRAINAGE WORKS TO BE GEN3 TO BS 8500-1, BS EN 206-1 AND ENGINEERS SPECIFICATION
12. PIPES ARE NOT DESIGNED FOR CONSTRUCTION TRAFFIC, CONTRACTOR WILL TAKE NECESSARY PRECAUTIONS TO PROTECT PIPES DURING CONSTRUCTION
13. REFER TO SEWER ABANDONMENT GENERAL ARRANGEMENT ON DRAWING RAM-XX-XX-DR-C-10010
14. REFER TO SEWER DIVERSION SCHEDULES & PLAN SECTIONS ON DRAWING SERIES RAM-XX-XX-DR-C-10200
13. REFER TO SEWER DIVERSION LONG SECTIONS ON DRAWING SERIES RAM-XX-XX-DR-C-10250
14. REFER TO UNITED UTILITIES DEVELOPER SERVICES CONSTRUCTION DETAILS AND DRAWING SERIES RAM-XX-XX-DR-C-10400 FOR STANDARD DETAILS DRAWINGS

Rev	Description	Date	By	Chk	App
P09	UU COMMENTS ADDRESSED	18/06 2023	CO	SP	NM
P08	UU COMMENTS ADDRESSED	17/03 2023	CO	SP	NM
P07	ISSUED FOR APPROVAL	28/02 2023	CO	SP	NM
P06	ISSUED FOR COMMENT - HULME STREET DIVERSION REMOVED	14/02 2023	CO	SP	NM
P05	ISSUED FOR COMMENT	17/01 2023	CO	BF	NM
P04	ISSUED FOR COMMENT	13/01 2023	CO	SP	NM
P03	ISSUED FOR COMMENT	21/12 2022	CO	SP	NM
P02	ISSUED FOR COMMENT	07/12 2022	CO	SP	NM
P01	ISSUED FOR COMMENT	02/11 2022	CO	SP	NM

FOR APPROVAL

PLOT 10A
FIRST STREET
MANCHESTER

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PROPOSED RIVER STREET SEWER DIVERSION GENERAL ARRANGEMENT

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:250	CO	10/2022

Drawing No: RAM-XX-XX-DR-C-10100 Rev: P09

16/06/2023 12:06:00

KEY

- EXMH / CL ----- / IL ----- EXISTING MANHOLE
- EG EXISTING GULLY
- — — —C— EXISTING COMBINED UNITED UTILITIES SEWER
- — — —C— EXISTING COMBINED PRIVATE DRAIN
- — — — SW— EXISTING PRIVATE SURFACE WATER DRAIN
- ASSUMED EXISTING DRAIN
- BD C BACKDROP INTO MANHOLE
- EXISTING COMBINED PRIVATE DRAIN TO BE REMOVED AS PART OF PLOT 10A WORKS
- EXISTING UNITED UTILITIES COMBINED SEWER TO BE REMOVED AS PART OF THIS S185 APPLICATION
- PROPOSED COMBINED PUBLIC SEWER MANHOLE
- PROPOSED COMBINED PUBLIC SEWER DRAIN
- PROPOSED BRANCH CONNECTION FROM EXISTING GULLIES
- BD = XX.XXX PROPOSED BACKDROP
- SU KD-1 PROPOSED KERB DRAIN WITH SUMP UNIT
- EASEMENT BOUNDARY

REFER TO RIVER STREET DIVERSION DRAWINGS (RAM-XX-XX-DR-C-10100) & SUBMISSION (UU REF 03032983) FOR FURTHER DETAILS

RIVER STREET

WILMOTT STREET

HULME STREET

ALL EXISTING GULLIES TO BE REMOVED & REPLACED WITH MINI BEANY KERB DRAINAGE

KD-1

KD-2

150Ø STUB CONNECTION INTO CS07 FOR FUTURE PLOT 9B CONNECTION

EXISTING SERVICES

CS07
CL 33.100
IL 31.600

30.000m 300Ø PVCu @ 1:200

CS08
CL 32.960
IL 31.450

10.000m 300Ø PVCu @ 1:12

BD IL = 30.585

CS09
CL 32.880
IL 28.785

BD IL = 27.310

10.000m 300Ø PVCu @ 1:7

BD IL = 27.160

23.432m 150Ø PVCu @ 1:9

CS10
CL 32.650
IL 25.510

GRID REFERENCE
E 383774.469
N 397276.907

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6. MANHOLES TO BE PRECAST CONCRETE RINGS IN ACCORDANCE WITH BS 5911-3 AND BS EN 1917, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
7. ALL COMBINED DRAINAGE TO BE PVCu SOLID WALL TYPE B TO BS EN 13476-1 AND -3, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
8. ALL SURFACE WATER PIPES TO BE STRUCTURED WALL HDPE TO BS EN 13476-1 AND -3, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
9. ALL DRAINAGE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE AND RELEVANT UTILITY COMPANIES STANDARD AND HEALTH AND SAFETY POLICES
10. ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION
11. CONCRETE FOR GENERAL DRAINAGE WORKS TO BE GEN3 TO BS 8500-1, BS EN 206-1 AND ENGINEERS SPECIFICATION
12. PIPES ARE NOT DESIGNED FOR CONSTRUCTION TRAFFIC, CONTRACTOR WILL TAKE NECESSARY PRECAUTIONS TO PROTECT PIPES DURING CONSTRUCTION
13. REFER TO SEWER ABANDONMENT GENERAL ARRANGEMENT ON DRAWING RAM-XX-XX-DR-C-20010
14. REFER TO SEWER DIVERSION SCHEDULES & PLAN SECTIONS ON DRAWING SERIES RAM-XX-XX-DR-C-20200
13. REFER TO SEWER DIVERSION LONG SECTIONS ON DRAWING SERIES RAM-XX-XX-DR-C-20250
14. REFER TO UNITED UTILITIES DEVELOPER SERVICES CONSTRUCTION DETAILS AND DRAWING SERIES RAM-XX-XX-DR-C-20400 FOR STANDARD DETAILS DRAWINGS

Rev	Description	Date	By	Chk	App
P02	UU COMMENTS ADDRESSED	26/05/2023	CO	JI	NM
P01	ISSUED FOR APPROVAL	08/03/2023	CO	SP	NM

FOR APPROVAL

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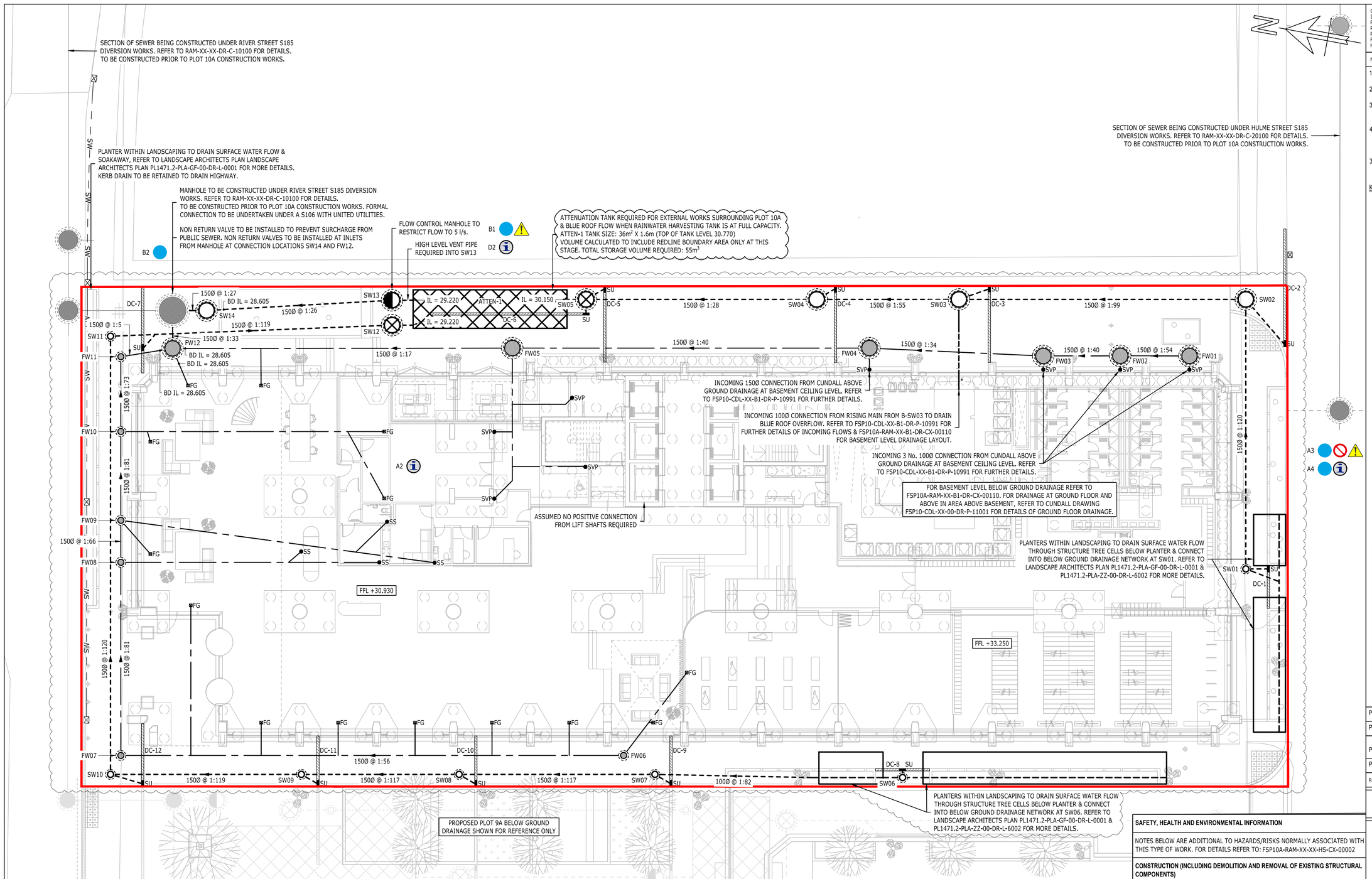
PROPOSED HULME STREET SEWER DIVERSION GENERAL ARRANGEMENT

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:250	CO	02/2023

Drawing No: RAM-XX-XX-DR-C-20100 Rev: P02

25/05/2023 17:02:44

APPENDIX 3
PROPOSED DRAINAGE STRATEGY



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4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS
3. REFER TO PROPOSED DRAINAGE NOTES DRAWING FSP10A-RAM-SI-XX-DR-CX-00001 FOR FURTHER DETAILS.

KEY

- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED COMBINED MANHOLE (TO BE CONSTRUCTED AS PART OF S185 DIVERSION WORKS)
- PROPOSED CATCH PIT CHAMBER
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED FOUL WATER DRAIN
- PROPOSED SURFACE WATER DRAIN
- EXISTING COMBINED DRAIN & MANHOLE
- EXISTING SURFACE WATER DRAIN & MANHOLE
- PROPOSED CHANNEL DRAIN WITH SUMP UNIT
- BELOW GROUND ATTENUATION TANK
- SU — SUMP UNIT IN DRAINAGE CHANNEL
- FG — PROPOSED FLOOR GULLY
- SVP/SS — FOUL DISCHARGE PIPE
- BD — PROPOSED BACKDROP
- REDLINE BOUNDARY

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

Rev	Description	Date	By Chk	App
P04	STAGE 4 ISSUE	23/06 2023	CO JI	NM
P03	STAGE 3 ISSUE	14/04 2023	CO SP	NM
P02	PLANNING ISSUE - REDLINE BOUNDARY UPDATED	13/01 2023	CO SP	NM
P01	DRAFT ISSUE FOR PLANNING	16/09 2022	CO SP	NM

D2 - ISSUED FOR TENDER

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: FSP10A-RAM-XX-XX-HS-CX-00002

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

- A2 ABOVE GROUND DRAINAGE DESIGN CURRENTLY AT STAGE 3, DESIGN SUBJECT TO CHANGE PENDING MEP STAGE 4 SUBMISSION.
- A3 SERVICES (IDENTIFIED AND UNIDENTIFIED) ARE PRESENT WITHIN AND ADJACENT TO THE REDLINE BOUNDARY.
- A4 LIVE GAS MAIN IDENTIFIED WITHIN THE SITE BOUNDARY.
- B1 DEEP EXCAVATIONS WILL BE REQUIRED FOR THE CONSTRUCTION OF THE EXTERNAL DRAINAGE ATTENUATION.
- B2 COMBINED WATER CONNECTION TO EXISTING DRAINAGE. DEEP EXCAVATIONS REQUIRED FOR CONNECTION.

OPERATIONS, MAINTENANCE

- D2 ACCESS TO ATTENUATION REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

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PROPOSED BELOW GROUND DRAINAGE GENERAL ARRANGEMENT GROUND FLOOR LEVEL

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:150	CO	08/2022

Drawing No: FSP10A-RAM-SI-XX-DR-CX-00100 Rev: P04

22/06/2023 15:57:07

SURFACE WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
B-SW01	28.450	27.400	1.050	150Ø	150Ø @ IL 27.475 In 150Ø @ IL 27.475 In 150Ø @ IL 27.475 In 150Ø @ IL 27.475 In 150Ø @ IL 27.400 Out	PCC	1200Ø	750x600	B125	-	383789445,397247147
B-SW02	28.450	27.250	1.200	150Ø	150Ø @ IL 27.325 In 150Ø @ IL 27.250 In 150Ø @ IL 27.325 In 150Ø @ IL 27.250 Out	PCC	1200Ø	750x600	B125	-	383784609,397258255
B-SW03	28.450	REFER TO PUMP STATION SCHEDULE FOR DETAILS				PCC	1800Ø	600x600	B125	-	383793232,397262765
SW01	33.200	31.450	1.750	150Ø	100Ø @ IL 31.525 In 150Ø @ IL 31.525 In 150Ø @ IL 31.450 Out	PPIC	475Ø	475 Dia.	D400	-	383792403,397237084
SW02	33.000	31.275	1.725	150Ø	150Ø @ IL 31.275 In 150Ø @ IL 31.350 In 150Ø @ IL 31.275 Out	PCC	1200Ø	750x600	D400	-	383811025,397246823
SW03	32.400	31.050	1.350	150Ø	150Ø @ IL 31.050 In 150Ø @ IL 31.125 In R.M. @ IL T.B.C. In 150Ø @ IL 31.050 Out	PCC	1200Ø	750x600	D400	-	383800657,397266648
SW04	32.200	30.850	1.350	150Ø	150Ø @ IL 30.850 In 150Ø @ IL 30.925 In 150Ø @ IL 30.850 Out	PCC	1200Ø	750x600	D400	-	383795518,397276476
SW05	31.550	29.750	1.800	150Ø	150Ø @ IL 30.200 In 150Ø @ IL 30.275 In 150Ø @ IL 30.275 In 150Ø @ IL 30.200 Out	PCC	1200Ø	600x600	D400	Catchpit	383787182,397292415
SW06	32.050	30.300	1.750	100Ø	100Ø @ IL 30.375 In 100Ø @ IL 30.300 In 100Ø @ IL 30.300 Out	PPIC	475Ø	450x450	B125	-	383765579,397253260
SW07	31.650	30.100	1.550	150Ø	100Ø @ IL 30.100 In 150Ø @ IL 30.175 In 150Ø @ IL 30.100 Out	PPIC	475Ø	450x450	B125	-	383756847,397270497
SW08	31.230	29.970	1.260	150Ø	150Ø @ IL 29.970 In 150Ø @ IL 30.045 In 150Ø @ IL 29.970 Out	PPIC	475Ø	450x450	B125	-	383749769,397284029
SW09	30.930	29.865	1.065	150Ø	150Ø @ IL 29.865 In 150Ø @ IL 29.940 In 150Ø @ IL 29.865 Out	PPIC	475Ø	450x450	B125	-	383744071,397294925
SW10	30.850	29.740	1.110	150Ø	150Ø @ IL 29.740 In 150Ø @ IL 29.815 In 150Ø @ IL 29.740 Out	PPIC	475Ø	450x450	B125	-	383737172,397308116
SW11	30.800	29.455	1.345	150Ø	150Ø @ IL 29.455 In 150Ø @ IL 29.455 Out	PPIC	475Ø	450x450	B125	-	383767450,397323951
SW12	31.500	28.820	2.680	150Ø	150Ø @ IL 29.270 In 150Ø @ IL 29.270 Out	PCC	1200Ø	600x600	D400	Catchpit	383778392,397304894
SW13	31.500	28.720	2.780	150Ø	150Ø @ IL 29.170 In 150Ø @ IL 29.170 Out	PCC	1200Ø	600x600	D400	Flow control chamber	383780108,397305798
SW14	30.930	26.955	3.975	150Ø	150Ø @ IL 28.605 In 150Ø @ IL 26.955 Out	PCC	1200Ø	600x600	D400	Backdrop into chamber	383772700,397318241

ATTENUATION TANK SCHEDULE

REF.	MANUFACTURER & TYPE	MIN. STORAGE VOLUME (m^3)	PLAN AREA (m^2)	HEIGHT (m)	INVERT LEVEL (m)	PIPE IN INVERT (m)	PIPE OUT INVERT (m)
ATTEN-1	POLYPIPE POLYSTORM (95% VOID RATIO)	55	36	1.6	29.170	150Ø @ 30.150 150Ø @ 29.220	150Ø @ 29.220

1. TANK TO BE WRAPPED AND TAPED IN IMPERMEABLE GEOMEMBRANE AND GEOTEXTILE PROTECTION FLEECE. WELDED JOINTS REQUIRED DUE TO GROUND WATER LEVELS AND DEPTHS OF TANKS.
2. 100mm VENT PIPE FROM SOFFIT LEVEL OF TANK INTO DOWNSTREAM MANHOLE TO BE PROVIDED.
3. BEDDING AND SURROUND TO BE 150mm OF 6H SHARP SAND ON UNDISTURBED GROUND WITH 5% CBR AND FULL PERIMETER TO PROTECT GEOTEXTILE AND GEOMEMBRANE.

PUMPING STATION SCHEDULE

REF.	MANUFACTURER & TYPE	CONFIGURATION	CHAMBER SIZE (m)	PUMP DUTY (l/s)	PUMPING MAIN	GEODETIC HEAD (m)	PIPE IN INVERT (m)	MAIN OUT LEVEL (m)	SUMP LEVEL (m)
B-SW03	PACKAGED PUMP STATIONM	DUTY / ASSIST	1.800m Ø (TBC WITH PUMP SPECIALIST)	DUTY @ 3.0 ASSIST @ 7.0	1no. DN100 MDPE SDR11 RISING MAIN TBC BY PUMP SPECIALIST	TBC BY SPECIALIST TO SUIT FINAL WET-WELL DESIGN	150Ø @ 27.130m AOD	27.130m AOD TBC BY SPECIALIST TO SUIT WET WELL DESIGN	TBC BY SPECIALIST TO SUIT WET WELL AND LEVEL CONTROLS ALLOWANCE FOR SUMP IL = -0.550m

1. REFER TO M&E ENGINEERS DRAWINGS FOR CONTROL PANEL LOCATIONS, BMS LINKAGE AND POWER SUPPLY
2. DN100 VENT PIPE TO ABOVE GROUND TO BE INSTALLED AND TERMINATED IN A LOCATION AGREED BY THE ARCHITECT. APPROXIMATE LOCATIONS INDICATED ON GENERAL ARRANGEMENT.
3. ANCILLARY REQUIREMENTS (SUCH AS ELECTRICAL REQUIREMENTS) TO BE CONFIRMED BY SPECIALIST PUMP MANUFACTURER.
4. ALL INFORMATION PROVIDED IN THIS SCHEDULE IS SUBJECT TO DETAILED DESIGN BY M&E CONTRACTOR AND PUMP SPECIALIST/MANUFACTURER
5. RISING MAIN & WET WELL ARE TO BE SIZED TO EMPTY DURING EACH CYCLE
6. STORAGE REQUIREMENT BEING SATISFIED WITHIN BELOW GROUND DRAINAGE SYSTEM FOR DUTY STORAGE IS TO BE SIGNED OFF BY BUILDING CONTROL PRIOR TO ANY CONSTRUCTION WORKS
7. ASSIST FLOW RATE BASED ON MAXIMUM FLOW RATE WHEN DRAINING SPRINKLER TANKS, ALLOWABLE FLOW RATE TO BE 10 L/S. TO BE CONFIRMED AT MEP STAGE 4.

OIL SEPARATOR SCHEDULE

REF.	MANUFACTURER & TYPE	DESIGNATION	COVER LEVEL	OIL CAPACITY	OVERALL LENGTH (mm)	OVERALL DIAMETER (mm)	INLET INVERT/ DIA (m/ mm)	OUTLET INVERT/ DIA (m/ mm)	COVER SIZE (mm)	COVER LOADING
OS-1	SPEL STORMCEPTOR CLASS 1	NSB3	28.450	45 LITRES	1550mm	1300mm Ø	27.425 / 150	27.375 / 150	450 dia	B125

1. BESPOKE SQUARE COVER AND CONCRETE SUPPORT AROUND CIRCULAR ACCESS SHAFT
2. OIL SEPARATOR TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. TO BE INSTALLED ON 500mm FND2 CONCRETE BASE WITH 500mm CONCRETE SURROUND.
3. OIL ALARM LINKED TO BMS REQUIRED. DN100 VENT PIPE TO ABOVE GROUND TO BE INSTALLED AND TERMINATED IN A LOCATION AGREED BY THE ARCHITECT

FOUL WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
FW01	32.900	31.550	1.350	150Ø	100Ø @ IL 31.625 In 150Ø @ IL 31.550 Out	PCC	1200Ø	750x600	D400	-	383805082,397248670
FW02	32.800	31.450	1.350	150Ø	150Ø @ IL 31.450 In 100Ø @ IL 31.525 In 150Ø @ IL 31.450 Out	PCC	1200Ø	750x600	D400	-	383802590,397253460
FW03	32.650	31.300	1.350	150Ø	150Ø @ IL 31.300 In 100Ø @ IL 31.375 In 150Ø @ IL 31.300 Out	PCC	1200Ø	750x600	D400	-	383799799,397258772
FW04	32.250	30.900	1.350	150Ø	150Ø @ IL 30.900 In 150Ø @ IL 30.975 In 150Ø @ IL 30.900 Out	PCC	1200Ø	750x600	D400	-	383794057,397271071
FW05	31.550	30.200	1.350	150Ø	150Ø @ IL 30.200 In 100Ø @ IL 30.275 In 150Ø @ IL 30.200 Out	PCC	1200Ø	750x600	D400	-	383781149,397295752
FW06	31.500	30.450	1.050	150Ø	100Ø @ IL 30.525 In 150Ø @ IL 30.450 Out	PPIC	475Ø	450x450	B125	-	383757022,397273338
FW07	30.800	29.750	1.050	150Ø	150Ø @ IL 29.750 In 150Ø @ IL 29.750 Out	PPIC	475Ø	450x450	B125	-	383738850,397308085
FW08	30.800	29.565	1.235	150Ø	150Ø @ IL 29.565 In 100Ø @ IL 29.640 In 150Ø @ IL 29.565 Out	PPIC	475Ø	450x450	B125	-	383752199,397315067
FW09	30.800	29.515	1.285	150Ø	150Ø @ IL 29.515 In 100Ø @ IL 29.590 In 100Ø @ IL 29.590 In 150Ø @ IL 29.515 Out	PPIC	475Ø	450x450	B125	-	383755102,397316585
FW10	30.800	29.430	1.370	150Ø	150Ø @ IL 29.430 In 100Ø @ IL 29.505 In 150Ø @ IL 29.430 Out	PPIC	475Ø	450x450	B125	-	383761232,397319791
FW11	30.800	29.350	1.450	150Ø	150Ø @ IL 29.350 In 150Ø @ IL 29.350 Out	PPIC	475Ø	450x450	B125	-	383766403,397322495
FW12	30.900	26.955	3.945	150Ø	150Ø @ IL 28.605 In 100Ø @ IL 28.605 In 150Ø @ IL 28.605 In 150Ø @ IL 26.955 Out	PCC	1200Ø	600x600	D400	Backdrop into chamber	383768848,397319220

CHANNEL DRAIN SCHEDULE

REF.	MANUFACTURER & TYPE	DESIGNATION	COVER LOADING AND MINIMUM TYPE	NUMBER OF OUTLETS	OUTLET DIA (mm)	LENGTH (m)	DRAINED AREA (m^2)
DC-1	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	3.3	15
DC-2	ACO ROADDRAIN	PD100 F 30.1	F900 ROADDRAIN PD100 F 30.1 CHANNEL	1	150	9.2	67
DC-3	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	6.0	126
DC-4	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	6.0	81
DC-5	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	6.0	121
DC-6	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	9.0	129
DC-7	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	6.8	66
DC-8	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.2	100
DC-9	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.0	47
DC-10	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.0	60
DC-11	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.0	49
DC-12	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	5.0	60

ALL CHANNELS HAVE BEEN DESIGNED FOR A DESIGN RAINFALL INTENSITY OF 110mm/hr (1in5yr EVENT +40% CLIMATE CHANGE, WITH A RISK CATEGORY 3)
ALL OUTLETS TO BE DN150 WITH SUMPS AND RODDABLE TRAPS

VORTEX FLOW CONTROL SCHEDULE

MANUFACTURER	UNIT	DESIGN FLOW (l/s)	DESIGN HEAD (m)	MANHOLE REFERENCE
HYDRO-BRAKE® OPTIMUM	SHE-0097-5000-1600-5000	5.0	1.6	SW13

ALL FLOW CONTROL DEVICES HAVE BEEN SIZED TO REDUCE UPSTREAM STORAGE VOLUMES.
THE BELOW GROUND DRAINAGE SYSTEM HAS BEEN SIZED BASED ON THE HEAD/DISCHARGE RELATIONSHIP FOR THE HYDROBRAKE AS SPECIFIED ABOVE. SHOULD ANOTHER TYPE/MANUFACTURER OF THE FLOW CONTROL DEVICE BE SPECIFIED THEN THE VOLUME OF THE BELOW GROUND ATTENUATION TANK AND ASSOCIATED PIPE SIZES WILL BE INCORRECT AND MAY REQUIRE RE-DESIGNING.

NON RETURN VALVE SCHEDULE

MANHOLE REF.	DRAINAGE SYSTEM	MANUFACTURER & TYPE	TYPE
SW14	SURFACE WATER	ALTHON WASTOP	WASTOP SS150mm GRADE 304
FW12	FOUL WATER	ALTHON WASTOP	WASTOP SS150mm GRADE 304

ALL NON RETURN VALVES TO BE INSTALLED AS PER MANUFACTURER'S REQUIREMENTS
ALL NON RETURN VALVES TO BE FITTED ON DOWNSTREAM PIPE U.N.O (I.E. MANHOLE OUTLET)

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3. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS
3. REFER TO PROPOSED DRAINAGE NOTES DRAWING FSP10A-RAM-SI-XX-DR-CX-00001 FOR FURTHER DETAILS.
4. REFER TO THE BELOW FOR ABBREVIATIONS USED ON THIS DRAWING:
   PCC = PRECAST CONCRETE MANHOLE
   PPIC = POLYPROPYLENE INSPECTION CHAMBER
   RM = RISING MAIN
5. BRANCH CONNECTIONS OF DN150 OR LESS TO DISCHARGE INTO MAIN CHANNEL AT HALF PIPE LEVEL.
6. BRANCH CONNECTIONS GREATER THAN DN150 TO BE SET LEVEL WITH SOFFIT OF MAIN DRAIN.

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: FSP10A-RAM-XX-XX-HS-CX-00002

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

- A1 BLUE ROOF DESIGN YET TO BE FINALISED AS OF STAGE 4.
- A2 ABOVE GROUND DRAINAGE DESIGN CURRENTLY AT STAGE 3, DESIGN SUBJECT TO CHANGE PENDING MEP STAGE 4 SUBMISSION.
- B1 DEEP EXCAVATIONS WILL BE REQUIRED FOR THE CONSTRUCTION OF THE EXTERNAL DRAINAGE ATTENUATION.
- B2 COMBINED WATER CONNECTION TO EXISTING DRAINAGE. DEEP EXCAVATIONS REQUIRED FOR CONNECTION.
- B3 GROUND WATER LIKELY TO BE ENCOUNTERED ON SITE DURING CONSTRUCTION OF BASEMENT DRAINAGE.
- B4 ALL BELOW GROUND DRAINAGE LOCATED WITHIN BASEMENT IS APPROXIMATELY 4m BGL. POSSIBLE UNKNOWN OBSTRUCTIONS.

OPERATIONS, MAINTENANCE

- C1 INTERNAL MANHOLES LOCATED WITHIN THE BASEMENT.
- D2 ACCESS TO ATTENUATION REQUIRED FOR MAINTENANCE.
- D3 ACCESS TO OIL SEPARATOR REQUIRED FOR MAINTENANCE.
- D4 ACCESS TO PUMP STATIONS REQUIRED FOR MAINTENANCE.
- D6 ACCESS TO BLUE ROOF REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

Rev	Description	Date	By	Chk	App
P02	STAGE 4 ISSUE	23/06 2023	CO	JI	NM
P01	STAGE 3 ISSUE	14/04 2023	CO	SP	NM

D2 - ISSUED FOR TENDER

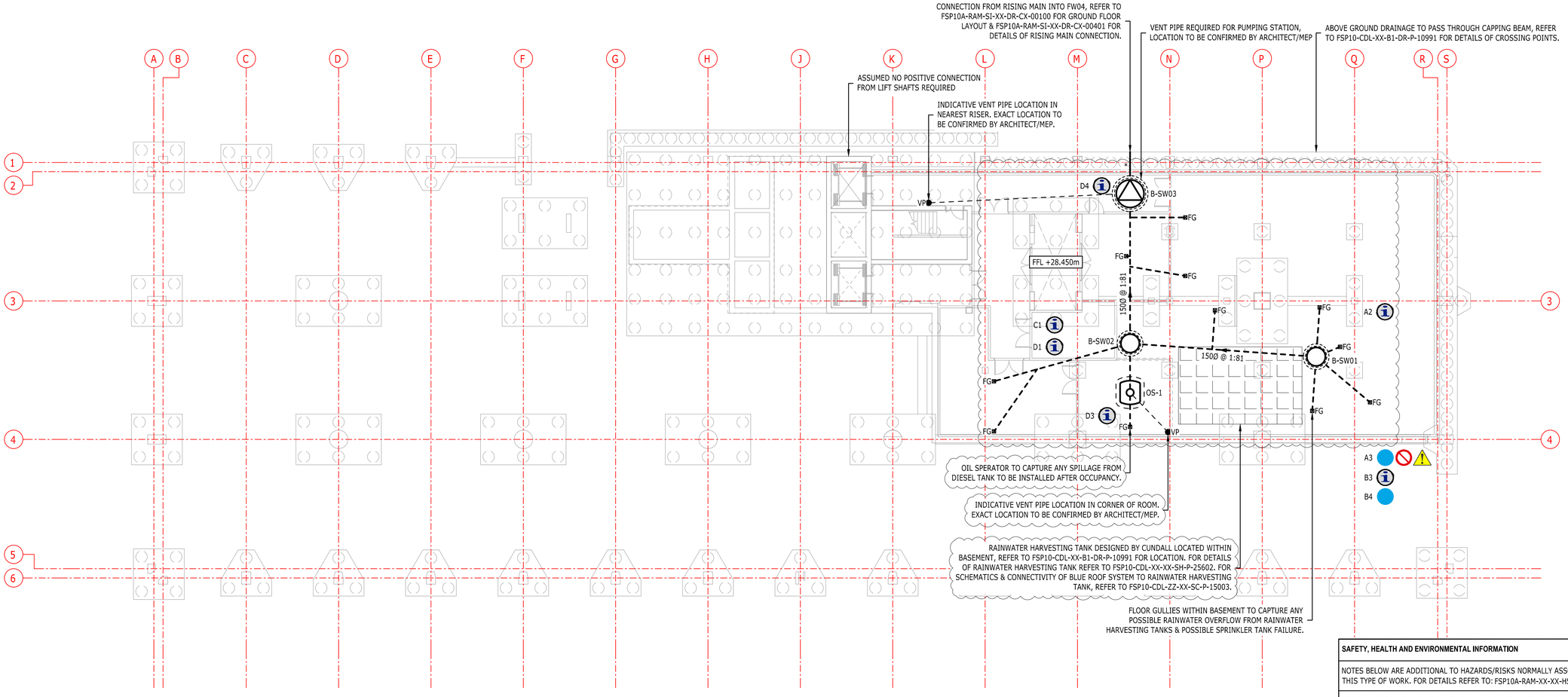
PLOT 10A
FIRST STREET
MANCHESTER

RAMBOLL
tel 01244 311855 chester@ramboll.co.uk
www.ramboll.co.uk

PROPOSED MANHOLE SCHEDULE

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	N/A	CO	04/2023

Drawing No: FSP10A-RAM-SI-XX-DR-CX-00200 Rev: P02



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3. REFER TO PROPOSED DRAINAGE NOTES DRAWING FSP10A-RAM-SI-XX-DR-CX-00001 FOR FURTHER DETAILS.

KEY

- PROPOSED SURFACE WATER MANHOLE
- PROPOSED PUMP CHAMBER
- PROPOSED SURFACE WATER DRAIN
- PROPOSED RISING MAIN
- FG PROPOSED FLOOR GULLY

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: FSP10A-RAM-XX-XX-HS-CX-00002

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

- A2 ABOVE GROUND DRAINAGE DESIGN CURRENTLY AT STAGE 3, DESIGN SUBJECT TO CHANGE PENDING MEP STAGE 4 SUBMISSION.
- A3 SERVICES (IDENTIFIED AND UNIDENTIFIED) ARE PRESENT WITHIN AND ADJACENT TO THE REDLINE BOUNDARY.
- B3 GROUND WATER LIKELY TO BE ENCOUNTERED ON SITE DURING CONSTRUCTION OF BASEMENT DRAINAGE.
- B4 ALL BELOW GROUND DRAINAGE LOCATED WITHIN BASEMENT IS APPROXIMATELY 4m BGL. POSSIBLE UNKNOWN OBSTRUCTIONS.

OPERATIONS, MAINTENANCE

- C1 INTERNAL MANHOLES LOCATED WITHIN THE BASEMENT.
- D1 MANHOLES LOCATED WITHIN INTERNAL SPACES AT BASEMENT LEVEL.
- D3 ACCESS TO OIL SEPARATOR REQUIRED FOR MAINTENANCE.
- D4 ACCESS TO PUMP STATIONS REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

Rev	Description	Date	By	Chk	App
P02	STAGE 4 ISSUE	23/06 2023	CO JI		NM
P01	STAGE 3 ISSUE	14/04 2023	CO SP		NM

D2 - ISSUED FOR TENDER

PLOT 10A
FIRST STREET
MANCHESTER

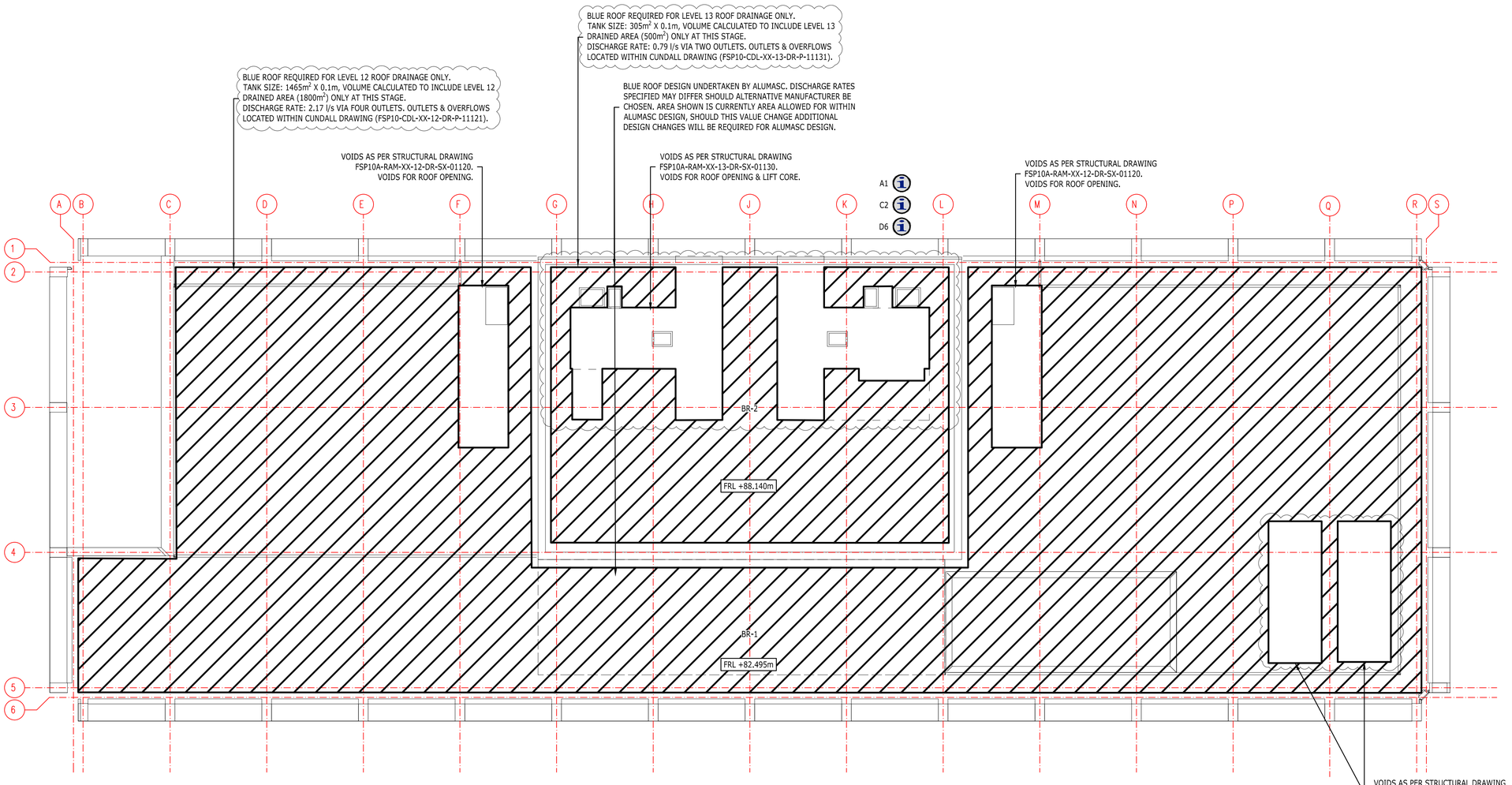
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PROPOSED BELOW GROUND DRAINAGE GENERAL ARRANGEMENT BASEMENT LEVEL

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:150	CO	04/2023

Drawing No: FSP10A-RAM-XX-B1-DR-CX-00110 Rev: P02

22/06/2023 15:24:07



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: FSP10A-RAM-XX-XX-HS-CX-00002

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

A1 BLUE ROOF DESIGN YET TO BE FINALISED AS OF STAGE 4.

OPERATIONS, MAINTENANCE

C2 BLUE ROOF ATTENUATION STORAGE REQUIRED AS PART OF BELOW GROUND DRAINAGE DESIGN STRATEGY.

D6 ACCESS TO BLUE ROOF REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

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KEY

BLUE ROOF ATTENUATION CRATE

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
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- INDICATES A RESIDUAL RISK AS A WARNING

Rev	Description	Date	By	Chk	App
P02	STAGE 4 ISSUE	23/06 2023	CO JI		NM
P01	STAGE 3 ISSUE	14/04 2023	CO SP		NM

D2 - ISSUED FOR TENDER

PLOT 10A
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PROPOSED BLUE ROOF GENERAL ARRANGEMENT

Project No:	Scale (@A1):	Drawn:	Date:
1620007819	1:150	CO	04/2023

Drawing No: FSP10A-RAM-XX-RF-DR-CX-00120 Rev: P02

22/06/2023 14:29:08

APPENDIX 4
CALCULATIONS

Print | Close Report

HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Conor O'Loughlin
Site name:	Plot 10
Site location:	Manchetser

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.47313° N
Longitude:	2.24259° W
Reference:	106258972
Date:	Aug 03 2022 14:01

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.37

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	879	879
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	2.33	2.33
1 in 1 year (l/s):	2.03	2.03
1 in 30 years (l/s):	3.96	3.96
1 in 100 year (l/s):	4.85	4.85
1 in 200 years (l/s):	5.53	5.53

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

PLOT 10 MANCHESTER
CALCULATION SHEET

1. Site Information

Nearest Postcode: M15 4RB XY Coordinates: 383774, 397280
M5-60: 18.000 mm r: 0.365 z_1: 0.360

2. Drained Area Calculations

For the following Greenfield calculations, the following hard standing areas will be utilised:

- Redline Boundary Area: 3,700 m^2 or 0.370 ha
- Plot 10 Building Area at Roof Level: 2,600 m^2 or 0.260 ha
- Plot 10 Building Area at Ground Level: 2,350 m^2 or 0.235 ha
- Plot 10 Externals Area: 1,350m^2 or 0.135 ha

3. Greenfield Calculations

These results were produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The outputs from this tool are estimates of greenfield runoff rates, see below:

Storm Event	Redline Boundary Area	Plot 10 Roof Area	Plot 10 Externals Area
Qbar	2.33 l/s	1.64 l/s	0.85 l/s
1 in 1 year	2.03 l/s	1.43 l/s	0.74 l/s
1 in 30 year	3.96 l/s	2.79 l/s	1.45 l/s
1 in 100 year	4.85 l/s	3.41 l/s	1.77 l/s
1 in 200 year	5.53 l/s	3.88 l/s	2.02 l/s

Plot 9a utilises an overall flow rate of 7.5 l/s for an overall area of 0.510 ha. Plot 10 is approximately 70% of the Plot 9a area.

4. Brownfield Calculations

During previous consultations with united utilities & the LLFA on other schemes a 50% betterment was required, so the following calculations are the areas with a betterment of 50% for the entire site & for the externals only.

Redline Boundary Area		
Storm Event	Existing Runoff	Proposed Discharge with a 50% Betterment
M1 - 5	54.152 l/s	27.076 l/s
M2 - 5	69.001 l/s	34.500 l/s
M5 - 5	89.089 l/s	44.545 l/s
M30 - 5	124.609 l/s	62.304 l/s
M100 - 5	156.343 l/s	78.172 l/s

Plot 10 Externals Area		
Storm Event	Existing Runoff	Proposed Discharge with a 50% Betterment
M1 - 5	19.758 l/s	9.879 l/s
M2 - 5	25.176 l/s	12.588 l/s
M5 - 5	32.506 l/s	16.253 l/s

M30 - 5	45.465 l/s	22.733 l/s
M100 - 5	57.044 l/s	28.522 l/s

5. Storage Estimates

5.1 Quick Storage Calculations

Using a combined runoff rate to calculate a quick storage estimate for various elements of the site (excluding façade areas) for a 1 in 100 year + 40% CC event.

- Redline Boundary Area: 3,700 m^2 or 0.370 ha
  - Greenfield Rate, 2.0 l/s: 219m^3 to 307m^3
  - Brownfield Betterment, 27.0 l/s: 75m^3 to 138m^3
  - Expected Rate, 5.0 l/s: 165m^3 to 238m^3
- Plot 10 Building Area at Roof Level: 2,600 m^2 or 0.260 ha
  - Greenfield Rate, 1.5 l/s: 151m^3 to 212m^3
  - Expected Rate, 2.0 l/s: 138m^3 to 196m^3
- Plot 10 Externals Area: 1,350m^2 or 0.135 ha
  - Greenfield Rate, 0.75 l/s: 78m^3 to 109m^3
  - Brownfield Betterment, 10 l/s: 27m^3 to 50m^3
  - Expected Rate, 3 l/s: 50m^3 to 75m^3

5.2 Blue Roof Initial Design

To gain a better understanding of the feasibility of a blue roof system being utilised for Plot 10 over the several roof levels an exercise has been carried out to assess blue roof capacity on each level. A 100mm depth crate has been assumed at this stage.

5.2.1 Available Areas

The area breakdown is as follows:

- Level 13:
  - Total Area: 480 m^2 or 0.048 ha
  - Available Area: 440 m^2 or 0.044 ha
- Level 12:
  - Total Area: 1900 m^2 or 0.190 ha
  - Available Area: 1680 m^2 or 0.168 ha
- Level 11:
  - Total Area: 100 m^2 or 0.010 ha
  - Available Area: N/A

5.2.2 Feasibility for 100mm Crate

To consider the feasibility the volume of storage required has been calculated based on areas.

- Level 13 (20% of roof area):
  - Greenfield Rate, 0.3 l/s: 30m^3 to 42m^3
  - Expected Rate, 0.4 l/s: 28m^3 to 39m^3
- Level 12 (80% of roof area):
  - Greenfield Rate, 1.2 l/s: 121m^3 to 170m^3
  - Expected Rate, 1.6 l/s: 110m^3 to 157m^3

Based on a 95% void ratio (standard for cellular crates), the evaluation is as follows based off the higher limit for the storage.

- Level 13 (20% of roof area):
  - Greenfield Rate, 42m^3: 445m^2 required – **NOT** feasible

  - Expected Rate, 39m^3: 410m^2 required – feasible
- Level 12 (80% of roof area):
  - Greenfield Rate, 170m^3: 1790m^2 required – **NOT** feasible
  - Expected Rate, 157m^3: 1650m^2 required – feasible

6. Foul Flow Calculations

Due to the nature of the office space the peak foul flow rate will only occur for a typical office working day. Therefore, an eight-hour peak period will be utilised for the calculations. All below ground drainage will be designed to sustain a self-cleansing velocity during quitter periods.

At this stage, above ground flow calculations have not been undertaken so flow rates are subject to change.

To assess the foul flow calculations the population & expected probability rates as outlined within BS EN 752 & BS EN 12056 will be calculated and will be compared to gain an understanding of the flow rate.

6.1 Population Method

At this moment in time, occupancy figures have not been provided for the proposed Plot 10a building. However, utilising information within building regulations Approved Document B2, 'Fire safety: Buildings other than dwelling houses' Table C1 – Floor space factors. The floor space factor for an office is stated as 6.0 m^2 / person. The most area schedules (as of 14/06/2022) states the following office space per floor.

Grnd	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	Total
0	1539	1878	1878	1878	1878	1878	1878	1878	1878	1878	1878	0	20319

Occupancy value: 1 person per 6m^2 therefore 20319 / 6 = 3386.5 people, round down.

A total area of 20,319m^2 would provide a maximum occupancy value of 3,386.

To establish the expected flow per person 'Flows & Loads 4' will be utilised to determine the most suitable scenario. The most applicable activity would be 'Office / Factory without canteen' which gives a base flow of 50 litres per person per day. Applying this value to the 3,386 expected capacity of the stand, a total foul flow volume can be calculated.

Therefore, U = 3386 * 50 l/p/d = 169,300 litres.
As mentioned previously, an eight-hour duration for an event is being utilised for a peak value for the foul flows. The peak foul flow, Q_{pop} can be calculated as follows: $Q_{pop} = \frac{U\ (in\ litres)}{t\ (in\ seconds)}$ l/s

Therefore, $Q_{pop} = 169300 / (8 * 60 * 60) = 5.89$ l/s

6.2 Probability Method

The number of appliances below are as per JMA layout dated 09/09/2021. Number of floor gullies have been assumed within plant spaces. For these calculations 'System II: Single discharge stack system with small bore discharge branch pipes' will be utilised, and a frequency factor of 0.5 will be utilised which is used for 'Intermittent use, e.g. in dwelling, guesthouse, office'.

The breakdown of the appliances are as follows:

- Ground floor (level 0): 7 WC's, 20 Showers, 1 Sink, 13 Wash hand basins, 6 FG's (assumed)
- Level 1 to 11 per floor: 18 WC's, 1 Sink, 18 Wash hand basins

- Total:
    - 207 WC's (2.0 DU): 414 DU
    - 213 Wash hand basins (0.3 DU): 63.9 DU
    - 20 Showers without plug (0.4 DU): 8 DU
    - 13 Sinks (0.6 DU): 7.8 DU
    - 8 Floor Gullies (1.2 DU): 9.6
    - Assume additional 40 DU for potential kitchen
        - Total DU: 543.3

Peak foul flow, Q_{ww} can be calculated as follows: $Q_{ww} = k\sqrt{\sum DU}$
Therefore, $Q_{ww} = 0.5 * \sqrt{543.3}$ = 16.3 l/s

Note, this value may increase/decrease dependent on any design changes at detailed design.

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Attenuation

Type : Cellular Storage

Dimensions

Exceedance Level (m)	30.850
Depth (m)	1.600
Base Level (m)	29.170
Number of Crates Long	24
Number of Crates Wide	3
Number of Crates High	4
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	1
Crate Height (m)	0.4
Total Volume (m^3)	54.800

Inlets

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	2.009
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.005
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.006
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Tree Pit - First 2

Type : Cellular Storage

Dimensions

Exceedance Level (m)	31.500
Depth (m)	1.250
Base Level (m)	30.250
Number of Crates Long	5
Number of Crates Wide	10
Number of Crates High	1
Porosity (%)	20
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	1.25
Total Volume (m^3)	3.125

Inlets

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	2.002
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	2.003
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Tree Pit - First 1

Type : Cellular Storage

Dimensions

Exceedance Level (m)	31.600
Depth (m)	1.250
Base Level (m)	30.350
Number of Crates Long	38
Number of Crates Wide	5
Number of Crates High	1
Porosity (%)	20
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	1.25
Total Volume (m^3)	11.875

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	DC-8
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	2.001
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 1

Type : Cellular Storage

Dimensions

Exceedance Level (m)	32.750
Depth (m)	1.250
Base Level (m)	31.500
Number of Crates Long	21
Number of Crates Wide	5
Number of Crates High	1
Porosity (%)	20
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	1.25
Total Volume (m^3)	6.563

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Tree Pit - Hulme 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.001a
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 2

Type : Cellular Storage

Dimensions

Exceedance Level (m)	32.750
Depth (m)	1.250
Base Level (m)	31.500
Number of Crates Long	8
Number of Crates Wide	5
Number of Crates High	1
Porosity (%)	20
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	1.25
Total Volume (m^3)	2.500

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Tree Pit - Hulme 2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.001b
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Blue Roof L12

Type : Cellular Storage

Dimensions

Exceedance Level (m)	28.450
Depth (m)	0.100
Base Level (m)	28.250
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	75
Crate Width (m)	19.5
Crate Height (m)	0.1
Total Volume (m^3)	139.038

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Roof L12
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	BR L12
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address:		



Blue Roof L13

Type : Cellular Storage

Dimensions

Exceedance Level (m)	28.450
Depth (m)	0.100
Base Level (m)	28.250
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	75
Crate Width (m)	4
Crate Height (m)	0.1
Total Volume (m^3)	28.600

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Roof L13
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	BR L13
Outlet Type	Free Discharge

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
SW02	33.000 31.275		Diameter / Length: 1.200	{1} 1.001	Pipe	31.275	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383811.031 N:397246.829	1.725									
IP E:383811.031 IP N:397246.829				{a} 1.002	Pipe	31.275	Diam/Width: 150	Not Applicable		
SW03	32.400 31.050		Diameter / Length: 1.200	{1} 1.002	Pipe	31.050	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383800.651 N:397266.642	1.350			{2} Pump	Pipe	31.050	Diam/Width: 100			
IP E:383800.651 IP N:397266.642				{a} 1.003	Pipe	31.050	Diam/Width: 150	Not Applicable		
SW04	32.200 30.850		Diameter / Length: 1.200	{1} 1.003	Pipe	30.850	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383795.540 N:397276.450	1.350									
IP E:383795.540 IP N:397276.450				{a} 1.004	Pipe	30.850	Diam/Width: 150	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
SW05	31.550 29.750		Diameter / Length: 1.200	{1} 1.004	Pipe	29.750	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383787.215 N:397292.384	1.800									
IP E:383787.215 IP N:397292.384				{a} 1.005	Pipe	30.200	Diam/Width: 150	Not Applicable		
SW06	32.080 30.300		Diameter / Length: 0.475	{1} 2.001	Pipe	30.300	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383765.577 N:397253.272	1.780									
IP E:383765.577 IP N:397253.272				{a} 2.002	Pipe	30.300	Diam/Width: 150	Not Applicable		
SW07	31.650 30.100		Diameter / Length: 0.475	{1} 2.003	Pipe	30.100	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383756.847 N:397270.505	1.550									
IP E:383756.847 IP N:397270.505				{a} 2.004	Pipe	30.100	Diam/Width: 150	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
SW08	31.230 29.970		Diameter / Length: 0.475	{1} 2.004	Pipe	29.970	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383749.776 N:397284.018	1.260									
IP E:383749.776 IP N:397284.018				{a} 2.005	Pipe	29.970	Diam/Width: 150	Not Applicable		
SW09	30.930 29.865		Diameter / Length: 0.475	{1} 2.005	Pipe	29.865	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383744.055 N:397294.922	1.065									
IP E:383744.055 IP N:397294.922				{a} 2.006	Pipe	29.865	Diam/Width: 150	Not Applicable		
SW11	30.800 29.455		Diameter / Length: 0.475	{1} 2.007	Pipe	29.455	Diam/Width: 150	Manhole - Access Required	{a} Free Discharge	
E:383767.439 N:397323.959	1.345									
IP E:383767.439 IP N:397323.959				{a} 2.008	Pipe	29.455	Diam/Width: 150	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
SW14	30.930 26.955		Diameter / Length: 1.200	{1} 3.000	Pipe	28.605	Diam/Width: 150	Manhole	{a} Free Discharge	
E:383772.693 N:397318.250	3.975									
IP E:383772.693 IP N:397318.250				{a} 3.001	Pipe	26.955	Diam/Width: 150	Not Applicable		
Outfall	30.930 26.905		Diameter / Length: 2.100	{1} 3.001	Pipe	26.905	Diam/Width: 150	Manhole		
E:383771.467 N:397320.596	4.025									
IP E:383771.467 IP N:397320.596								Not Applicable		
SW10	30.850 29.740		Diameter / Length: 0.475	{1} 2.006	Pipe	29.740	Diam/Width: 150	Manhole	{a} Free Discharge	
E:383737.162 N:397308.112	1.110									
IP E:383737.162 IP N:397308.112				{a} 2.007	Pipe	29.740	Diam/Width: 150	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
SW01	33.200 31.450		Diameter / Length: 0.475	{1} 1.001a {2} 1.001b	Pipe Pipe	31.450 31.450	Diam/Width: 150 Diam/Width: 150	Manhole	{a} Free Discharge	
E:383792.400 N:397237.087	1.750									
IP E:383792.400 IP N:397237.087				{a} 1.001	Pipe	31.450	Diam/Width: 150	Not Applicable		
SW13	31.500 28.720		Diameter / Length: 1.200	{1} 1.006	Pipe	29.170	Diam/Width: 150	Manhole	{a} Hydro-Brake®	29.170
E:383780.107 N:397305.802	2.780									
IP E:383780.107 IP N:397305.802				{a} 3.000	Pipe	29.170	Diam/Width: 150	Not Applicable		
SW12	31.500 28.820		Diameter / Length: 1.200	{1} 2.008	Pipe	29.270	Diam/Width: 150	Manhole	{a} Free Discharge	
E:383778.405 N:397304.898	2.680									
IP E:383778.405 IP N:397304.898				{a} 2.009	Pipe	29.270	Diam/Width: 150	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Storm	Company Address:		

Setting Out Information	
Easting Origin (m)	0.000
Northing Origin (m)	0.000
Orientation (Degrees anticlockwise from North)	0

Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type		
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type	Flow Control Type	Flow Control IL (m)
Intersection (m)				Outgoing Connections				Cover		
B-SW03	28.450 27.130		Diameter / Length: 1.800	{1} B.001	Pipe	27.130	Diam/Width: 100	Manhole	{a} Pump	27.130
E:383793.230 N:397262.768	1.320									
IP E:383793.230 IP N:397262.768				{a} Pump	Pipe	27.130	Diam/Width: 100	Not Applicable		
B-SW02	28.450 27.250		Diameter / Length: 1.200	{1} BR L12 {2} BR L13	Pipe Pipe	27.250 27.250	Diam/Width: 100 Diam/Width: 100	Manhole	{a} Orifice	27.250
E:383784.605 N:397258.258	1.200									
IP E:383784.605 IP N:397258.258				{a} B.001	Pipe	27.250	Diam/Width: 100	Not Applicable		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Outfall Details Storm Phase: Storm	Company Address:		

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Outfall	Free Discharge		

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address:		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	0
Prefill Manhole Sumps	☑
Perform No Discharge Analysis	☑
Rainfall Depth (mm)	5.0
Run Time (mins)	360

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Title: Dry Weather Flow Analysis Criteria	Company Address:		

Run Time (mins)	0
Output Interval (mins)	5
Time Step	Default
Junction Flood Risk Margin (mm)	0
Prefill Manhole Sumps	☐

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Storm	Company Address:		

FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
DC-12	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.6	0.741
DC-11	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.8	0.357
DC-10	FSR: 2 years: +0 %: 15 mins: Winter	0.01	0.9	0.441
DC-9	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.7	0.345
DC-8	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.6	0.723
DC-1	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.2	0.108
DC-2	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.1	0.492
DC-3	FSR: 2 years: +0 %: 15 mins: Winter	0.01	2.0	0.924
DC-4	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.3	0.588
DC-5	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.9	0.879
DC-7	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.0	0.480
DC-6	FSR: 2 years: +0 %: 15 mins: Winter	0.01	2.0	0.942
Tree Pit - Hulme 2	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.6	0.288
Tree Pit - Hulme 1	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.4	0.207
Roof L11	FSR: 2 years: +0 %: 15 mins: Winter	0.01	2.0	0.906
Roof L12	FSR: 2 years: +0 %: 15 mins: Winter	0.17	27.6	12.729
Roof L13	FSR: 2 years: +0 %: 15 mins: Winter	0.05	7.8	3.613

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Storm	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
DC-12	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.0	1.404
DC-11	FSR: 30 years: +0 %: 15 mins: Winter	0.00	1.5	0.672
DC-10	FSR: 30 years: +0 %: 15 mins: Winter	0.01	1.8	0.834
DC-9	FSR: 30 years: +0 %: 15 mins: Winter	0.00	1.4	0.651
DC-8	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.0	1.371
DC-1	FSR: 30 years: +0 %: 15 mins: Winter	0.00	0.4	0.207
DC-2	FSR: 30 years: +0 %: 15 mins: Winter	0.01	2.0	0.927
DC-3	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.8	1.745
DC-4	FSR: 30 years: +0 %: 15 mins: Winter	0.01	2.4	1.116
DC-5	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.6	1.664
DC-7	FSR: 30 years: +0 %: 15 mins: Winter	0.01	2.0	0.906
DC-6	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.9	1.784
Tree Pit - Hulme 2	FSR: 30 years: +0 %: 15 mins: Winter	0.00	1.2	0.537
Tree Pit - Hulme 1	FSR: 30 years: +0 %: 15 mins: Winter	0.00	0.8	0.393
Roof L11	FSR: 30 years: +0 %: 15 mins: Winter	0.01	3.7	1.712

Roof L12	FSR: 30 years: +0 %: 15 mins: Winter	0.17	52.1	24.064
Roof L13	FSR: 30 years: +0 %: 15 mins: Winter	0.05	14.8	6.835

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Storm	Company Address:		

FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
DC-12	FSR: 100 years: +45 %: 15 mins: Winter	0.01	5.7	2.628
DC-11	FSR: 100 years: +45 %: 15 mins: Winter	0.00	2.7	1.263
DC-10	FSR: 100 years: +45 %: 15 mins: Winter	0.01	3.4	1.560
DC-9	FSR: 100 years: +45 %: 15 mins: Winter	0.00	2.6	1.221
DC-8	FSR: 100 years: +45 %: 15 mins: Winter	0.01	5.5	2.568
DC-1	FSR: 100 years: +45 %: 15 mins: Winter	0.00	0.8	0.390
DC-2	FSR: 100 years: +45 %: 15 mins: Winter	0.01	3.8	1.737
DC-3	FSR: 100 years: +45 %: 15 mins: Winter	0.01	7.1	3.261
DC-4	FSR: 100 years: +45 %: 15 mins: Winter	0.01	4.5	2.091
DC-5	FSR: 100 years: +45 %: 15 mins: Winter	0.01	6.7	3.120
DC-7	FSR: 100 years: +45 %: 15 mins: Winter	0.01	3.7	1.695
DC-6	FSR: 100 years: +45 %: 15 mins: Winter	0.01	7.2	3.342
Tree Pit - Hulme 2	FSR: 100 years: +45 %: 15 mins: Winter	0.00	2.2	1.011
Tree Pit - Hulme 1	FSR: 100 years: +45 %: 15 mins: Winter	0.00	1.6	0.738
Roof L11	FSR: 100 years: +45 %: 15 mins: Winter	0.01	6.9	3.204

Roof L12	FSR: 100 years: +45 %: 15 mins: Winter	0.17	97.5	45.067
Roof L13	FSR: 100 years: +45 %: 15 mins: Winter	0.05	27.7	12.791

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address:		

FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW02	FSR: 2 years: +0 %: 15 mins: Winter	33.000	31.275	31.308	0.033	2.1	0.037	0.000	1.9	1.067	OK
SW03	FSR: 2 years: +0 %: 15 mins: Winter	32.400	31.050	31.100	0.050	5.3	0.056	0.000	5.0	3.521	OK
SW04	FSR: 2 years: +0 %: 15 mins: Winter	32.200	30.850	30.887	0.037	6.3	0.041	0.000	6.1	4.084	OK
SW05	FSR: 2 years: +0 %: 15 mins: Winter	31.550	29.750	30.271	0.521	10.1	0.589	0.000	9.9	5.879	OK
SW06	FSR: 2 years: +0 %: 15 mins: Winter	32.080	30.300	30.320	0.020	1.1	0.004	0.000	1.1	0.681	OK
SW07	FSR: 2 years: +0 %: 15 mins: Winter	31.650	30.100	30.131	0.031	1.7	0.005	0.000	1.5	1.003	OK
SW08	FSR: 2 years: +0 %: 15 mins: Winter	31.230	29.970	30.009	0.039	2.5	0.007	0.000	2.3	1.435	OK
SW09	FSR: 2 years: +0 %: 15 mins: Winter	30.930	29.865	29.909	0.044	3.1	0.008	0.000	2.8	1.783	OK
SW11	FSR: 2 years: +0 %: 15 mins: Winter	30.800	29.455	29.510	0.055	5.1	0.010	0.000	4.3	2.922	OK
SW14	FSR: 2 years: +0 %: 60 mins: Winter	30.930	26.955	27.002	0.047	4.2	0.053	0.000	4.2	18.176	OK
Outfall	FSR: 2 years: +0 %: 60 mins: Winter	30.930	26.905	26.947	0.042	4.2	0.000	0.000	4.2	18.176	OK
SW10	FSR: 2 years: +0 %: 15 mins: Winter	30.850	29.740	29.792	0.052	4.5	0.009	0.000	4.0	2.513	OK
SW01	FSR: 2 years: +0 %: 15 mins: Winter	33.200	31.450	31.476	0.026	1.1	0.005	0.000	1.0	0.582	OK
SW13	FSR: 2 years: +0 %: 60 mins: Winter	31.500	28.720	29.388	0.668	4.2	0.756	0.000	4.2	18.237	Surcharged
SW12	FSR: 2 years: +0 %: 60 mins: Winter	31.500	28.820	29.391	0.571	3.3	0.646	0.000	2.9	5.085	OK
B-SW03	FSR: 2 years: +0 %: 240 mins: Winter	28.450	27.130	27.225	0.095	2.4	0.241	0.000	2.4	29.771	OK
B-SW02	FSR: 2 years: +0 %: 240 mins: Winter	28.450	27.250	27.972	0.722	2.3	0.817	0.000	2.2	27.543	Surcharged

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW02	FSR: 30 years: +0 %: 15 mins: Winter	33.000	31.275	31.322	0.047	4.1	0.053	0.000	3.8	2.035	OK
SW03	FSR: 30 years: +0 %: 15 mins: Winter	32.400	31.050	31.122	0.072	10.1	0.082	0.000	9.7	7.224	OK
SW04	FSR: 30 years: +0 %: 15 mins: Winter	32.200	30.850	30.903	0.053	12.1	0.059	0.000	11.9	8.294	OK
SW05	FSR: 30 years: +0 %: 15 mins: Winter	31.550	29.750	30.309	0.559	19.4	0.633	0.000	19.1	11.701	OK
SW06	FSR: 30 years: +0 %: 15 mins: Winter	32.080	30.300	30.331	0.031	2.4	0.006	0.000	2.3	1.326	OK
SW07	FSR: 30 years: +0 %: 15 mins: Winter	31.650	30.100	30.147	0.047	3.6	0.008	0.000	3.4	1.952	OK
SW08	FSR: 30 years: +0 %: 15 mins: Winter	31.230	29.970	30.029	0.059	5.2	0.011	0.000	4.9	2.777	OK
SW09	FSR: 30 years: +0 %: 15 mins: Winter	30.930	29.865	29.931	0.066	6.4	0.012	0.000	6.1	3.439	OK
SW11	FSR: 30 years: +0 %: 120 mins: Winter	30.800	29.455	29.670	0.215	4.1	0.038	0.000	4.1	12.026	Surcharged
SW14	FSR: 30 years: +0 %: 60 mins: Winter	30.930	26.955	27.005	0.050	4.7	0.057	0.000	4.7	26.761	OK
Outfall	FSR: 30 years: +0 %: 60 mins: Winter	30.930	26.905	26.949	0.044	4.7	0.000	0.000	4.7	26.761	OK
SW10	FSR: 30 years: +0 %: 15 mins: Winter	30.850	29.740	29.819	0.079	9.1	0.014	0.000	8.5	4.837	OK
SW01	FSR: 30 years: +0 %: 15 mins: Winter	33.200	31.450	31.487	0.037	2.2	0.007	0.000	2.1	1.115	OK
SW13	FSR: 30 years: +0 %: 120 mins: Winter	31.500	28.720	29.666	0.946	4.9	1.070	0.000	4.7	53.297	Surcharged
SW12	FSR: 30 years: +0 %: 120 mins: Winter	31.500	28.820	29.669	0.849	4.1	0.961	0.000	3.8	11.967	Surcharged
B-SW03	FSR: 30 years: +0 %: 240 mins: Winter	28.450	27.130	27.594	0.464	3.1	1.180	0.000	2.5	56.906	Surcharged
B-SW02	FSR: 30 years: +0 %: 240 mins: Winter	28.450	27.250	28.276	1.026	3.4	1.161	0.000	2.6	52.844	Surcharged

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address:		

FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Status
SW02	FSR: 100 years: +45 %: 15 mins: Winter	33.000	31.275	31.343	0.068	7.9	0.077	0.000	7.4	3.845	OK
SW03	FSR: 100 years: +45 %: 15 mins: Winter	32.400	31.050	31.151	0.101	17.0	0.114	0.000	16.4	10.808	OK
SW04	FSR: 100 years: +45 %: 15 mins: Winter	32.200	30.850	30.922	0.072	20.9	0.082	0.000	20.6	12.854	OK
SW05	FSR: 100 years: +45 %: 15 mins: Winter	31.550	29.750	30.445	0.695	34.6	0.786	0.000	34.1	19.274	Surcharged
SW06	FSR: 100 years: +45 %: 15 mins: Winter	32.080	30.300	30.347	0.047	4.7	0.008	0.000	4.6	2.520	OK
SW07	FSR: 100 years: +45 %: 180 mins: Winter	31.650	30.100	30.330	0.230	2.1	0.041	0.000	2.1	8.902	Surcharged
SW08	FSR: 100 years: +45 %: 180 mins: Winter	31.230	29.970	30.330	0.360	2.9	0.064	0.000	2.9	12.568	Surcharged
SW09	FSR: 100 years: +45 %: 180 mins: Winter	30.930	29.865	30.330	0.465	3.6	0.082	0.000	3.6	15.372	Surcharged
SW11	FSR: 100 years: +45 %: 180 mins: Winter	30.800	29.455	30.329	0.874	5.9	0.155	0.000	5.5	24.147	Surcharged
SW14	FSR: 100 years: +45 %: 180 mins: Winter	30.930	26.955	27.005	0.050	4.7	0.057	0.000	4.7	78.784	OK
Outfall	FSR: 100 years: +45 %: 180 mins: Winter	30.930	26.905	26.949	0.044	4.7	0.000	0.000	4.7	78.784	OK
SW10	FSR: 100 years: +45 %: 180 mins: Winter	30.850	29.740	30.329	0.589	5.0	0.104	0.000	4.9	21.117	Surcharged
SW01	FSR: 100 years: +45 %: 15 mins: Winter	33.200	31.450	31.502	0.052	4.3	0.009	0.000	4.2	2.115	OK
SW13	FSR: 100 years: +45 %: 180 mins: Winter	31.500	28.720	30.326	1.606	5.0	1.817	0.000	4.7	78.896	Surcharged
SW12	FSR: 100 years: +45 %: 180 mins: Winter	31.500	28.820	30.329	1.509	5.5	1.706	0.000	5.1	23.105	Surcharged
B-SW03	FSR: 100 years: +45 %: 120 mins: Winter	28.450	27.130	27.996	0.866	3.9	2.204	0.000	2.5	31.100	Surcharged
B-SW02	FSR: 100 years: +45 %: 240 mins: Winter	28.450	27.250	28.319	1.069	3.5	1.210	0.000	2.5	55.391	Surcharged

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Storm	Company Address:		

FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation	FSR: 2 years: +0 %: 60 mins: Winter	29.391	29.391	0.221	0.221	9.0	7.544	0.000	0.000	4.2	18.338	86.233	OK
Tree Pit - First 2	FSR: 2 years: +0 %: 30 mins: Winter	30.273	30.273	0.023	0.023	1.0	0.059	0.000	0.000	1.0	0.928	98.121	OK
Tree Pit - First 1	FSR: 2 years: +0 %: 15 mins: Winter	30.371	30.371	0.021	0.021	1.6	0.202	0.000	0.000	1.1	0.685	98.302	OK
Tree Pit - Hulme 1	FSR: 2 years: +0 %: 15 mins: Winter	31.512	31.512	0.012	0.012	0.4	0.065	0.000	0.000	0.3	0.193	99.016	OK
Tree Pit - Hulme 2	FSR: 2 years: +0 %: 15 mins: Winter	31.516	31.516	0.016	0.016	0.6	0.032	0.000	0.000	0.6	0.285	98.707	OK
Blue Roof L12	FSR: 2 years: +0 %: 480 mins: Winter	28.268	28.268	0.018	0.018	3.5	25.117	0.000	0.000	1.4	30.497	81.935	OK
Blue Roof L13	FSR: 2 years: +0 %: 120 mins: Winter	28.266	28.266	0.016	0.016	2.5	4.505	0.000	0.000	1.2	6.026	84.247	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Storm	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m^3)	Max. Flooded Volume (m^3)	Total Lost Volume (m^3)	Max. Outflow (L/s)	Total Discharge Volume (m^3)	Percentage Available (%)	Status
Attenuation	FSR: 30 years: +0 %: 120 mins: Winter	29.669	29.669	0.499	0.499	12.2	17.079	0.000	0.000	4.9	53.476	68.834	OK
Tree Pit - First 2	FSR: 30 years: +0 %: 15 mins: Winter	30.284	30.284	0.034	0.034	2.3	0.085	0.000	0.000	2.1	1.310	97.283	OK
Tree Pit - First 1	FSR: 30 years: +0 %: 15 mins: Winter	30.382	30.382	0.032	0.032	3.0	0.301	0.000	0.000	2.4	1.330	97.462	OK
Tree Pit - Hulme 1	FSR: 30 years: +0 %: 15 mins: Winter	31.518	31.518	0.018	0.018	0.8	0.095	0.000	0.000	0.7	0.378	98.547	OK
Tree Pit - Hulme 2	FSR: 30 years: +0 %: 15 mins: Winter	31.523	31.523	0.023	0.023	1.2	0.046	0.000	0.000	1.1	0.534	98.163	OK
Blue Roof L12	FSR: 30 years: +0 %: 360 mins: Winter	28.285	28.285	0.035	0.035	7.8	48.617	0.000	0.000	2.1	50.905	65.033	OK
Blue Roof L13	FSR: 30 years: +0 %: 180 mins: Winter	28.281	28.281	0.031	0.031	3.7	8.722	0.000	0.000	2.1	13.619	69.503	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Storm	Company Address:		

FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Attenuation	FSR: 100 years: +45 %: 180 mins: Winter	30.328	30.328	1.158	1.158	16.1	39.620	0.000	0.000	5.0	79.820	27.701	OK
Tree Pit - First 2	FSR: 100 years: +45 %: 180 mins: Winter	30.330	30.330	0.080	0.080	1.4	0.199	0.000	0.000	1.4	6.035	93.619	OK
Tree Pit - First 1	FSR: 100 years: +45 %: 15 mins: Winter	30.397	30.397	0.047	0.047	5.5	0.447	0.000	0.000	4.7	2.525	96.233	OK
Tree Pit - Hulme 1	FSR: 100 years: +45 %: 15 mins: Winter	31.526	31.526	0.026	0.026	1.6	0.135	0.000	0.000	1.4	0.722	97.947	OK
Tree Pit - Hulme 2	FSR: 100 years: +45 %: 15 mins: Winter	31.533	31.533	0.033	0.033	2.2	0.066	0.000	0.000	2.1	1.008	97.374	OK
Blue Roof L12	FSR: 100 years: +45 %: 360 mins: Winter	28.327	28.327	0.077	0.077	14.6	107.488	0.000	0.000	2.1	61.617	22.692	OK
Blue Roof L13	FSR: 100 years: +45 %: 240 mins: Winter	28.322	28.322	0.072	0.072	5.6	20.457	0.000	0.000	1.9	19.690	28.474	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm	Company Address:		

FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	33.000	31.308	0.041	1.067	0.5	0.11	1.9	OK
1.003	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	32.400	31.100	0.043	3.521	1.2	0.21	5.0	OK
1.004	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	32.200	30.887	0.150	4.084	0.3	0.14	6.1	OK
2.004	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	31.650	30.131	0.035	1.003	0.5	0.09	1.5	OK
2.005	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	31.230	30.009	0.041	1.435	0.6	0.14	2.3	OK
3.001	FSR: 2 years: +0 %: 60 mins: Winter	Pipe	SW14	Outfall	30.930	27.002	0.044	18.176	1.0	0.17	4.2	OK
2.006	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW09	SW10	30.930	29.909	0.048	1.783	0.6	0.18	2.8	OK
2.007	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW10	SW11	30.850	29.792	0.053	2.513	0.7	0.25	4.0	OK
1.001	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	33.200	31.476	0.029	0.582	0.4	0.06	1.0	OK
3.000	FSR: 2 years: +0 %: 60 mins: Winter	Pipe	SW13	SW14	31.500	29.388	0.035	18.210	1.3	0.12	4.2	Surcharged
1.006	FSR: 2 years: +0 %: 60 mins: Winter	Pipe	Attenuation	SW13	30.850	29.391	0.150	18.338	0.4	0.14	4.2	Surcharged
1.001a	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 1	SW01	32.750	31.512	0.019	0.193	0.2	0.01	0.3	OK
1.001b	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 2	SW01	32.750	31.516	0.021	0.285	0.4	0.02	0.6	OK
2.008	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW11	SW12	30.800	29.510	0.054	2.922	0.8	0.27	4.3	OK
2.009	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	SW12	Attenuation	31.500	29.373	0.128	3.982	1.0	0.14	4.3	OK
2.001	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - First 1	SW06	31.600	30.371	0.021	0.685	0.8	0.04	1.1	OK
2.002	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW06	Tree Pit - First 2	32.080	30.320	0.021	0.681	0.7	0.03	1.1	OK
2.003	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	Tree Pit - First 2	SW07	31.500	30.273	0.027	0.928	0.5	0.05	1.0	OK
1.005	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	SW05	Attenuation	31.550	30.271	0.064	5.879	1.4	0.31	9.9	OK

Project:		Date: 19/05/2023		
		Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm		Company Address:		

Pump	FSR: 2 years: +0 %: 240 mins: Winter	Pipe	B-SW03	SW03	28.450	27.225	0.015	29.771	0.0	0.4	2.4	OK
B.001	FSR: 2 years: +0 %: 240 mins: Winter	Pipe	B-SW02	B-SW03	28.450	27.972	0.067	27.521	0.5	0.33	2.2	Surcharged
BR L13	FSR: 2 years: +0 %: 120 mins: Winter	Pipe	Blue Roof L13	B-SW02	28.450	28.266	0.100	6.026	0.2	0.06	1.2	OK
BR L12	FSR: 2 years: +0 %: 480 mins: Winter	Pipe	Blue Roof L12	B-SW02	28.450	28.268	0.100	30.497	0.2	0.08	1.4	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm	Company Address:		

FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW02	SW03	33.000	31.322	0.060	2.035	0.6	0.21	3.8	OK
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW03	SW04	32.400	31.122	0.062	7.224	1.4	0.41	9.7	OK
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW04	SW05	32.200	30.903	0.150	8.294	0.7	0.27	11.9	OK
2.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW07	SW08	31.650	30.147	0.053	1.952	0.6	0.2	3.4	OK
2.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW08	SW09	31.230	30.029	0.063	2.777	0.7	0.3	4.9	OK
3.001	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	SW14	Outfall	30.930	27.005	0.047	26.761	1.0	0.19	4.7	OK
2.006	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW09	SW10	30.930	29.931	0.073	3.439	0.7	0.37	6.1	OK
2.007	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW10	SW11	30.850	29.819	0.082	4.837	0.9	0.52	8.5	OK
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW01	SW02	33.200	31.487	0.042	1.115	0.5	0.13	2.1	OK
3.000	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	SW13	SW14	31.500	29.654	0.037	26.823	1.4	0.13	4.7	Surcharged
1.006	FSR: 30 years: +0 %: 30 mins: Winter	Pipe	Attenuation	SW13	30.850	29.593	0.150	13.151	0.3	0.16	5.0	Surcharged
1.001a	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 1	SW01	32.750	31.518	0.027	0.378	0.3	0.03	0.7	OK
1.001b	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 2	SW01	32.750	31.523	0.030	0.534	0.4	0.04	1.1	OK
2.008	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW11	SW12	30.800	29.540	0.148	5.523	0.9	0.57	9.2	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm	Company Address:		

2.009	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW12	Attenuation	31.500	29.510	0.150	5.132	0.8	0.28	8.7	Surcharged
2.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - First 1	SW06	31.600	30.382	0.031	1.330	0.9	0.08	2.4	OK
2.002	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW06	Tree Pit - First 2	32.080	30.331	0.033	1.326	0.8	0.07	2.3	OK
2.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	Tree Pit - First 2	SW07	31.500	30.284	0.040	1.310	0.6	0.11	2.1	OK
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	SW05	Attenuation	31.550	30.309	0.096	11.701	1.6	0.6	19.1	OK
Pump	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	B-SW03	SW03	28.450	27.261	0.014	3.146	0.0	0.42	2.5	Surcharged
B.001	FSR: 30 years: +0 %: 30 mins: Summer	Pipe	B-SW02	B-SW03	28.450	28.262	0.100	5.776	0.3	0.38	2.5	Surcharged
BR L13	FSR: 30 years: +0 %: 60 mins: Winter	Pipe	Blue Roof L13	B-SW02	28.450	28.279	0.100	6.845	0.4	0.15	2.9	OK
BR L12	FSR: 30 years: +0 %: 240 mins: Winter	Pipe	Blue Roof L12	B-SW02	28.450	28.285	0.100	37.695	0.3	0.11	2.1	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Storm	Company Address:		

FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.002	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW02	SW03	33.000	31.343	0.084	3.845	0.7	0.42	7.4	OK
1.003	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW03	SW04	32.400	31.151	0.086	10.808	1.6	0.68	16.4	OK
1.004	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW04	SW05	32.200	30.922	0.150	12.854	1.2	0.47	20.6	OK
2.004	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW07	SW08	31.650	30.169	0.080	3.715	0.7	0.41	6.7	OK
2.005	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW08	SW09	31.230	30.060	0.102	5.263	0.8	0.59	9.7	OK
3.001	FSR: 100 years: +45 %: 180 mins: Winter	Pipe	SW14	Outfall	30.930	27.005	0.047	78.784	1.0	0.19	4.7	OK
2.006	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW09	SW10	30.930	30.007	0.150	6.512	0.8	0.75	12.2	OK
2.007	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	SW10	SW11	30.850	29.866	0.150	8.025	0.9	0.97	15.7	OK
1.001	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW01	SW02	33.200	31.502	0.060	2.115	0.6	0.26	4.2	OK
3.000	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	SW13	SW14	31.500	29.915	0.037	12.891	1.4	0.13	4.7	Surcharged
1.006	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Attenuation	SW13	30.850	29.817	0.150	6.935	0.3	0.19	5.8	Surcharged
1.001a	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 1	SW01	32.750	31.526	0.039	0.722	0.4	0.06	1.4	OK
1.001b	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Tree Pit - Hulme 2	SW01	32.750	31.533	0.042	1.008	0.5	0.08	2.1	OK
2.008	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW11	SW12	30.800	29.850	0.150	9.706	0.9	1	16.3	Surcharged

Project:				Date: 19/05/2023								
				Designed by: COLOU	Checked by:	Approved By:						
Report Details: Type: Connections Summary Storm Phase: Storm				Company Address:								

2.009	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW12	Attenuation	31.500	29.817	0.150	9.013	1.0	0.47	14.6	Surcharged
2.001	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Tree Pit - First 1	SW06	31.600	30.397	0.047	2.525	1.0	0.15	4.7	OK
2.002	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW06	Tree Pit - First 2	32.080	30.347	0.048	2.520	0.9	0.14	4.6	OK
2.003	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Tree Pit - First 2	SW07	31.500	30.300	0.059	2.503	0.7	0.23	4.4	OK
1.005	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW05	Attenuation	31.550	30.445	0.150	19.274	1.9	1.07	34.1	Surcharged
Pump	FSR: 100 years: +45 %: 15 mins: Summer	Pipe	B-SW03	SW03	28.450	27.618	0.015	3.720	0.0	0.42	2.5	Surcharged
B.001	FSR: 100 years: +45 %: 480 mins: Winter	Pipe	B-SW02	B-SW03	28.450	28.319	0.100	116.416	0.4	0.37	2.5	Surcharged
BR L13	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	Blue Roof L13	B-SW02	28.450	28.295	0.100	4.544	0.6	0.23	4.7	OK
BR L12	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	Blue Roof L12	B-SW02	28.450	28.288	0.100	2.204	0.4	0.15	2.8	OK

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Attenuation
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 60 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.4	0.001	0.030	0.000	0.0
10	1.2	0.008	0.264	0.000	0.0
15	1.7	0.021	0.708	0.000	0.0
20	2.8	0.040	1.353	0.000	0.0
25	5.2	0.072	2.446	0.000	1.2
30	8.2	0.112	3.828	0.000	2.7
35	9.0	0.160	5.460	0.000	3.9
40	7.4	0.198	6.755	0.000	4.1
45	5.3	0.217	7.416	0.000	4.2
50	4.0	0.221	7.544	0.000	4.2
55	3.6	0.217	7.424	0.000	4.1
60	3.2	0.211	7.212	0.000	4.1
65	2.4	0.200	6.843	0.000	4.0
70	2.1	0.185	6.328	0.000	3.9
75	2.0	0.169	5.789	0.000	3.8
80	1.9	0.154	5.262	0.000	3.5
85	1.7	0.140	4.773	0.000	3.2
90	1.6	0.127	4.340	0.000	3.0
95	1.5	0.116	3.967	0.000	2.5
100	1.4	0.107	3.648	0.000	2.4
105	1.2	0.099	3.377	0.000	2.0
110	1.2	0.092	3.149	0.000	1.9
115	1.1	0.087	2.963	0.000	1.7
120	1.1	0.082	2.807	0.000	1.4

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 2
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 30 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.2	0.006	0.014	0.000	0.1
15	0.7	0.019	0.047	0.000	0.6
20	1.0	0.023	0.059	0.000	1.0
25	0.6	0.020	0.049	0.000	0.7
30	0.3	0.014	0.035	0.000	0.3
35	0.1	0.010	0.026	0.000	0.2
40	0.1	0.007	0.018	0.000	0.1
45	0.0	0.005	0.013	0.000	0.0
50	0.0	0.004	0.010	0.000	0.0
55	0.0	0.003	0.008	0.000	0.0
60	0.0	0.003	0.007	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 1
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.4	0.006	0.058	0.000	0.1
10	1.6	0.021	0.202	0.000	1.1
15	0.4	0.017	0.164	0.000	0.8
20	0.0	0.009	0.090	0.000	0.2
25	0.0	0.005	0.052	0.000	0.1
30	0.0	0.004	0.037	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 1
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.1	0.003	0.017	0.000	0.0
10	0.4	0.012	0.065	0.000	0.3
15	0.1	0.011	0.057	0.000	0.2
20	0.0	0.006	0.034	0.000	0.1
25	0.0	0.004	0.019	0.000	0.0
30	0.0	0.003	0.013	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 2
Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.008	0.015	0.000	0.1
10	0.6	0.016	0.032	0.000	0.6
15	0.2	0.010	0.021	0.000	0.2
20	0.0	0.005	0.009	0.000	0.1
25	0.0	0.002	0.004	0.000	0.0
30	0.0	0.001	0.003	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Blue Roof L12 Type : Cellular Storage

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 480 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.2	0.000	0.025	0.000	0.0
15	0.3	0.000	0.095	0.000	0.0
20	0.4	0.000	0.195	0.000	0.0
25	0.4	0.000	0.319	0.000	0.0
30	0.5	0.000	0.463	0.000	0.0
35	0.5	0.000	0.622	0.000	0.0
40	0.6	0.001	0.790	0.000	0.0
45	0.6	0.001	0.964	0.000	0.0
50	0.6	0.001	1.143	0.000	0.0
55	0.6	0.001	1.324	0.000	0.0
60	0.6	0.001	1.506	0.000	0.0
65	0.6	0.001	1.688	0.000	0.0
70	0.6	0.001	1.870	0.000	0.0
75	0.6	0.001	2.051	0.000	0.0
80	0.6	0.002	2.232	0.000	0.0
85	0.6	0.002	2.413	0.000	0.0
90	0.6	0.002	2.597	0.000	0.0
95	0.6	0.002	2.783	0.000	0.0
100	0.7	0.002	2.973	0.000	0.0
105	0.7	0.002	3.168	0.000	0.0
110	0.7	0.002	3.373	0.000	0.0
115	0.8	0.003	3.588	0.000	0.0
120	0.8	0.003	3.818	0.000	0.0
125	0.9	0.003	4.064	0.000	0.0
130	1.0	0.003	4.329	0.000	0.0
135	1.0	0.003	4.615	0.000	0.0
140	1.1	0.004	4.925	0.000	0.1
145	1.2	0.004	5.261	0.000	0.1
150	1.3	0.004	5.626	0.000	0.1
155	1.4	0.004	6.020	0.000	0.1
160	1.6	0.005	6.446	0.000	0.1
165	1.7	0.005	6.906	0.000	0.1
170	1.8	0.005	7.400	0.000	0.1
175	2.0	0.006	7.930	0.000	0.1
180	2.1	0.006	8.494	0.000	0.2
185	2.2	0.007	9.093	0.000	0.2
190	2.4	0.007	9.728	0.000	0.2
195	2.5	0.007	10.395	0.000	0.2
200	2.7	0.008	11.094	0.000	0.3
205	2.8	0.009	11.822	0.000	0.3
210	2.9	0.009	12.576	0.000	0.4
215	3.0	0.010	13.353	0.000	0.4
220	3.2	0.010	14.150	0.000	0.5
225	3.3	0.011	14.965	0.000	0.5
230	3.3	0.011	15.790	0.000	0.6
235	3.4	0.012	16.624	0.000	0.6
240	3.5	0.013	17.459	0.000	0.7
245	3.5	0.013	18.281	0.000	0.8

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	3.4	0.014	19.075	0.000	0.8
255	3.3	0.014	19.830	0.000	0.9
260	3.3	0.015	20.542	0.000	1.0
265	3.2	0.015	21.208	0.000	1.0
270	3.0	0.016	21.821	0.000	1.1
275	2.9	0.016	22.381	0.000	1.1
280	2.8	0.016	22.886	0.000	1.2
285	2.7	0.017	23.338	0.000	1.2
290	2.5	0.017	23.735	0.000	1.3
295	2.4	0.017	24.078	0.000	1.3
300	2.2	0.018	24.369	0.000	1.4
305	2.1	0.018	24.608	0.000	1.4
310	2.0	0.018	24.798	0.000	1.4
315	1.8	0.018	24.942	0.000	1.4
320	1.7	0.018	25.041	0.000	1.4
325	1.6	0.018	25.098	0.000	1.4
330	1.4	0.018	25.117	0.000	1.4
335	1.3	0.018	25.101	0.000	1.4
340	1.2	0.018	25.054	0.000	1.4
345	1.1	0.018	24.980	0.000	1.4
350	1.0	0.018	24.880	0.000	1.4
355	1.0	0.018	24.758	0.000	1.4
360	0.9	0.018	24.618	0.000	1.4
365	0.8	0.018	24.464	0.000	1.4
370	0.8	0.017	24.296	0.000	1.3
375	0.7	0.017	24.120	0.000	1.3
380	0.7	0.017	23.937	0.000	1.3
385	0.7	0.017	23.750	0.000	1.3
390	0.6	0.017	23.561	0.000	1.3
395	0.6	0.017	23.374	0.000	1.2
400	0.6	0.017	23.190	0.000	1.2
405	0.6	0.017	23.008	0.000	1.2
410	0.6	0.016	22.831	0.000	1.2
415	0.6	0.016	22.660	0.000	1.2
420	0.6	0.016	22.493	0.000	1.2
425	0.6	0.016	22.332	0.000	1.1
430	0.6	0.016	22.176	0.000	1.1
435	0.6	0.016	22.023	0.000	1.1
440	0.6	0.016	21.872	0.000	1.1
445	0.6	0.016	21.721	0.000	1.1
450	0.6	0.016	21.568	0.000	1.1
455	0.5	0.015	21.412	0.000	1.0
460	0.5	0.015	21.245	0.000	1.0
465	0.4	0.015	21.064	0.000	1.0
470	0.3	0.015	20.864	0.000	1.0
475	0.2	0.015	20.641	0.000	1.0
480	0.1	0.015	20.388	0.000	0.9
485	0.0	0.014	20.116	0.000	0.9
490	0.0	0.014	19.844	0.000	0.9
495	0.0	0.014	19.580	0.000	0.9
500	0.0	0.014	19.321	0.000	0.9
505	0.0	0.014	19.064	0.000	0.8
510	0.0	0.014	18.813	0.000	0.8
515	0.0	0.013	18.566	0.000	0.8
520	0.0	0.013	18.325	0.000	0.8
525	0.0	0.013	18.090	0.000	0.8
530	0.0	0.013	17.860	0.000	0.8
535	0.0	0.013	17.636	0.000	0.7

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
540	0.0	0.013	17.417	0.000	0.7
545	0.0	0.012	17.204	0.000	0.7
550	0.0	0.012	16.996	0.000	0.7
555	0.0	0.012	16.793	0.000	0.7
560	0.0	0.012	16.595	0.000	0.7
565	0.0	0.012	16.402	0.000	0.6
570	0.0	0.012	16.213	0.000	0.6
575	0.0	0.012	16.029	0.000	0.6
580	0.0	0.011	15.849	0.000	0.6
585	0.0	0.011	15.674	0.000	0.6
590	0.0	0.011	15.503	0.000	0.6
595	0.0	0.011	15.335	0.000	0.6
600	0.0	0.011	15.172	0.000	0.5
605	0.0	0.011	15.012	0.000	0.5
610	0.0	0.011	14.856	0.000	0.5
615	0.0	0.011	14.704	0.000	0.5
620	0.0	0.010	14.555	0.000	0.5
625	0.0	0.010	14.410	0.000	0.5
630	0.0	0.010	14.268	0.000	0.5
635	0.0	0.010	14.129	0.000	0.5
640	0.0	0.010	13.994	0.000	0.4
645	0.0	0.010	13.861	0.000	0.4
650	0.0	0.010	13.731	0.000	0.4
655	0.0	0.010	13.604	0.000	0.4
660	0.0	0.010	13.479	0.000	0.4
665	0.0	0.010	13.357	0.000	0.4
670	0.0	0.010	13.239	0.000	0.4
675	0.0	0.009	13.123	0.000	0.4
680	0.0	0.009	13.009	0.000	0.4
685	0.0	0.009	12.899	0.000	0.4
690	0.0	0.009	12.790	0.000	0.4
695	0.0	0.009	12.684	0.000	0.3
700	0.0	0.009	12.581	0.000	0.3
705	0.0	0.009	12.479	0.000	0.3
710	0.0	0.009	12.380	0.000	0.3
715	0.0	0.009	12.282	0.000	0.3
720	0.0	0.009	12.186	0.000	0.3
725	0.0	0.009	12.091	0.000	0.3
730	0.0	0.009	11.997	0.000	0.3
735	0.0	0.009	11.905	0.000	0.3
740	0.0	0.009	11.814	0.000	0.3
745	0.0	0.008	11.724	0.000	0.3
750	0.0	0.008	11.636	0.000	0.3
755	0.0	0.008	11.549	0.000	0.3
760	0.0	0.008	11.464	0.000	0.3
765	0.0	0.008	11.380	0.000	0.3
770	0.0	0.008	11.298	0.000	0.3
775	0.0	0.008	11.217	0.000	0.3
780	0.0	0.008	11.137	0.000	0.3
785	0.0	0.008	11.059	0.000	0.3
790	0.0	0.008	10.982	0.000	0.3
795	0.0	0.008	10.906	0.000	0.3
800	0.0	0.008	10.831	0.000	0.2
805	0.0	0.008	10.757	0.000	0.2
810	0.0	0.008	10.685	0.000	0.2
815	0.0	0.008	10.613	0.000	0.2
820	0.0	0.008	10.543	0.000	0.2
825	0.0	0.008	10.473	0.000	0.2

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
830	0.0	0.007	10.405	0.000	0.2
835	0.0	0.007	10.337	0.000	0.2
840	0.0	0.007	10.270	0.000	0.2
845	0.0	0.007	10.205	0.000	0.2
850	0.0	0.007	10.140	0.000	0.2
855	0.0	0.007	10.076	0.000	0.2
860	0.0	0.007	10.014	0.000	0.2
865	0.0	0.007	9.951	0.000	0.2
870	0.0	0.007	9.890	0.000	0.2
875	0.0	0.007	9.830	0.000	0.2
880	0.0	0.007	9.770	0.000	0.2
885	0.0	0.007	9.712	0.000	0.2
890	0.0	0.007	9.654	0.000	0.2
895	0.0	0.007	9.597	0.000	0.2
900	0.0	0.007	9.540	0.000	0.2
905	0.0	0.007	9.485	0.000	0.2
910	0.0	0.007	9.430	0.000	0.2
915	0.0	0.007	9.375	0.000	0.2
920	0.0	0.007	9.322	0.000	0.2
925	0.0	0.007	9.269	0.000	0.2
930	0.0	0.007	9.217	0.000	0.2
935	0.0	0.007	9.166	0.000	0.2
940	0.0	0.007	9.115	0.000	0.2
945	0.0	0.007	9.065	0.000	0.2
950	0.0	0.006	9.015	0.000	0.2
955	0.0	0.006	8.966	0.000	0.2
960	0.0	0.006	8.918	0.000	0.2

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Blue Roof L13 Type : Cellular Storage

Critical by Return Period: FSR: 2 years: Increase Rainfall (%): +0: 120 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.000	0.024	0.000	0.0
10	0.4	0.000	0.107	0.000	0.0
15	0.5	0.001	0.234	0.000	0.0
20	0.5	0.001	0.372	0.000	0.0
25	0.5	0.002	0.510	0.000	0.0
30	0.6	0.002	0.661	0.000	0.0
35	0.8	0.003	0.850	0.000	0.0
40	1.0	0.004	1.104	0.000	0.1
45	1.4	0.005	1.451	0.000	0.1
50	1.8	0.007	1.899	0.000	0.2
55	2.2	0.009	2.436	0.000	0.3
60	2.5	0.011	3.024	0.000	0.5
65	2.5	0.013	3.588	0.000	0.8
70	2.3	0.014	4.044	0.000	1.0
75	1.9	0.015	4.347	0.000	1.1
80	1.4	0.016	4.492	0.000	1.2
85	1.1	0.016	4.505	0.000	1.2
90	0.8	0.016	4.424	0.000	1.2
95	0.6	0.015	4.288	0.000	1.1
100	0.5	0.015	4.133	0.000	1.0
105	0.5	0.014	3.985	0.000	0.9
110	0.5	0.014	3.854	0.000	0.9
115	0.4	0.013	3.729	0.000	0.8
120	0.2	0.013	3.580	0.000	0.7
125	0.0	0.012	3.393	0.000	0.7
130	0.0	0.011	3.205	0.000	0.6
135	0.0	0.011	3.037	0.000	0.5
140	0.0	0.010	2.887	0.000	0.5
145	0.0	0.010	2.753	0.000	0.4
150	0.0	0.009	2.630	0.000	0.4
155	0.0	0.009	2.519	0.000	0.4
160	0.0	0.008	2.418	0.000	0.3
165	0.0	0.008	2.324	0.000	0.3
170	0.0	0.008	2.235	0.000	0.3
175	0.0	0.008	2.151	0.000	0.3
180	0.0	0.007	2.072	0.000	0.3
185	0.0	0.007	1.997	0.000	0.2
190	0.0	0.007	1.928	0.000	0.2
195	0.0	0.007	1.863	0.000	0.2
200	0.0	0.006	1.803	0.000	0.2
205	0.0	0.006	1.746	0.000	0.2
210	0.0	0.006	1.692	0.000	0.2
215	0.0	0.006	1.642	0.000	0.2
220	0.0	0.006	1.594	0.000	0.2
225	0.0	0.005	1.548	0.000	0.1
230	0.0	0.005	1.505	0.000	0.1
235	0.0	0.005	1.464	0.000	0.1
240	0.0	0.005	1.424	0.000	0.1

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Attenuation
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 120 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.001	0.018	0.000	0.0
10	1.1	0.006	0.202	0.000	0.0
15	1.7	0.019	0.632	0.000	0.0
20	1.9	0.035	1.182	0.000	0.0
25	2.1	0.052	1.783	0.000	0.0
30	2.4	0.068	2.337	0.000	1.0
35	3.1	0.081	2.754	0.000	1.6
40	4.4	0.097	3.324	0.000	2.1
45	6.1	0.121	4.131	0.000	2.9
50	7.8	0.153	5.215	0.000	3.7
55	9.9	0.195	6.670	0.000	4.2
60	11.8	0.252	8.603	0.000	4.6
65	12.2	0.316	10.812	0.000	4.8
70	10.8	0.373	12.755	0.000	4.9
75	9.6	0.420	14.369	0.000	4.9
80	8.2	0.456	15.608	0.000	4.8
85	6.8	0.480	16.429	0.000	4.8
90	5.7	0.494	16.887	0.000	4.7
95	5.0	0.499	17.070	0.000	4.7
100	4.5	0.499	17.079	0.000	4.7
105	4.4	0.497	17.008	0.000	4.7
110	4.4	0.494	16.912	0.000	4.7
115	4.2	0.491	16.786	0.000	4.7
120	3.5	0.484	16.542	0.000	4.7
125	2.9	0.471	16.114	0.000	4.6
130	2.8	0.455	15.571	0.000	4.6
135	2.7	0.439	15.006	0.000	4.6
140	2.8	0.422	14.441	0.000	4.6
145	2.8	0.406	13.883	0.000	4.6
150	2.8	0.390	13.330	0.000	4.6
155	2.8	0.374	12.782	0.000	4.6
160	2.8	0.358	12.238	0.000	4.6
165	2.8	0.342	11.699	0.000	4.5
170	2.8	0.327	11.168	0.000	4.5
175	2.8	0.311	10.649	0.000	4.5
180	2.7	0.296	10.135	0.000	4.4
185	2.6	0.281	9.607	0.000	4.4
190	2.6	0.265	9.081	0.000	4.3
195	2.6	0.251	8.571	0.000	4.3
200	2.6	0.236	8.081	0.000	4.2
205	2.6	0.223	7.614	0.000	4.1
210	2.6	0.210	7.168	0.000	4.1
215	2.6	0.197	6.744	0.000	4.0
220	2.6	0.185	6.343	0.000	3.9
225	2.6	0.174	5.962	0.000	3.8
230	2.6	0.164	5.606	0.000	3.8
235	2.6	0.154	5.284	0.000	3.6
240	2.6	0.146	4.999	0.000	3.4

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 2
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.002	0.005	0.000	0.0
10	2.3	0.034	0.085	0.000	2.1
15	1.4	0.029	0.073	0.000	1.6
20	0.4	0.016	0.041	0.000	0.5
25	0.1	0.009	0.023	0.000	0.1
30	0.0	0.006	0.016	0.000	0.1

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 1
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.8	0.011	0.102	0.000	0.3
10	3.0	0.032	0.301	0.000	2.4
15	0.8	0.023	0.220	0.000	1.4
20	0.0	0.012	0.111	0.000	0.3
25	0.0	0.006	0.058	0.000	0.1
30	0.0	0.004	0.040	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 1
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.006	0.030	0.000	0.1
10	0.8	0.018	0.095	0.000	0.7
15	0.2	0.014	0.074	0.000	0.4
20	0.0	0.008	0.041	0.000	0.1
25	0.0	0.004	0.022	0.000	0.0
30	0.0	0.003	0.014	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 2
Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.3	0.011	0.022	0.000	0.3
10	1.2	0.023	0.046	0.000	1.1
15	0.3	0.013	0.027	0.000	0.4
20	0.0	0.006	0.011	0.000	0.1
25	0.0	0.002	0.004	0.000	0.0
30	0.0	0.001	0.003	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Blue Roof L12 Type : Cellular Storage

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 360 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.000	0.017	0.000	0.0
10	0.5	0.000	0.122	0.000	0.0
15	0.8	0.000	0.324	0.000	0.0
20	1.0	0.000	0.602	0.000	0.0
25	1.2	0.001	0.935	0.000	0.0
30	1.3	0.001	1.304	0.000	0.0
35	1.3	0.001	1.695	0.000	0.0
40	1.4	0.002	2.096	0.000	0.0
45	1.4	0.002	2.503	0.000	0.0
50	1.4	0.002	2.910	0.000	0.0
55	1.4	0.002	3.313	0.000	0.0
60	1.4	0.003	3.715	0.000	0.0
65	1.4	0.003	4.117	0.000	0.0
70	1.4	0.003	4.527	0.000	0.0
75	1.5	0.004	4.948	0.000	0.1
80	1.6	0.004	5.388	0.000	0.1
85	1.7	0.004	5.856	0.000	0.1
90	1.8	0.005	6.361	0.000	0.1
95	2.0	0.005	6.914	0.000	0.1
100	2.2	0.005	7.523	0.000	0.1
105	2.5	0.006	8.194	0.000	0.1
110	2.8	0.006	8.942	0.000	0.2
115	3.1	0.007	9.769	0.000	0.2
120	3.5	0.008	10.685	0.000	0.3
125	3.8	0.008	11.698	0.000	0.3
130	4.2	0.009	12.804	0.000	0.4
135	4.7	0.010	14.013	0.000	0.5
140	5.1	0.011	15.322	0.000	0.5
145	5.5	0.012	16.732	0.000	0.6
150	5.9	0.013	18.240	0.000	0.8
155	6.3	0.014	19.827	0.000	0.9
160	6.7	0.015	21.488	0.000	1.1
165	7.0	0.017	23.209	0.000	1.2
170	7.3	0.018	24.970	0.000	1.4
175	7.6	0.019	26.753	0.000	1.6
180	7.7	0.021	28.552	0.000	1.4
185	7.7	0.022	30.463	0.000	1.4
190	7.6	0.023	32.356	0.000	1.4
195	7.4	0.025	34.193	0.000	1.3
200	7.0	0.026	35.950	0.000	1.3
205	6.7	0.027	37.614	0.000	1.3
210	6.3	0.028	39.169	0.000	1.3
215	5.9	0.029	40.604	0.000	1.3
220	5.5	0.030	41.919	0.000	1.3
225	5.1	0.031	43.103	0.000	1.3
230	4.7	0.032	44.158	0.000	1.4
235	4.2	0.032	45.084	0.000	1.4
240	3.8	0.033	45.882	0.000	1.4
245	3.5	0.034	46.562	0.000	1.4

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	3.1	0.034	47.126	0.000	1.4
255	2.8	0.034	47.581	0.000	1.4
260	2.5	0.035	47.941	0.000	1.5
265	2.2	0.035	48.210	0.000	1.5
270	2.0	0.035	48.403	0.000	1.5
275	1.8	0.035	48.529	0.000	1.5
280	1.7	0.035	48.596	0.000	1.5
285	1.6	0.035	48.617	0.000	1.6
290	1.5	0.035	48.601	0.000	1.6
295	1.4	0.035	48.557	0.000	1.6
300	1.4	0.035	48.485	0.000	1.7
305	1.4	0.035	48.389	0.000	1.7
310	1.4	0.035	48.279	0.000	1.8
315	1.4	0.035	48.159	0.000	1.8
320	1.4	0.035	48.031	0.000	1.8
325	1.4	0.034	47.896	0.000	1.8
330	1.3	0.034	47.749	0.000	1.8
335	1.3	0.034	47.586	0.000	1.8
340	1.2	0.034	47.397	0.000	1.9
345	1.0	0.034	47.167	0.000	1.9
350	0.8	0.034	46.881	0.000	1.9
355	0.5	0.033	46.518	0.000	1.9
360	0.2	0.033	46.057	0.000	1.9
365	0.0	0.033	45.514	0.000	1.9
370	0.0	0.032	44.942	0.000	1.9
375	0.0	0.032	44.367	0.000	1.9
380	0.0	0.032	43.790	0.000	1.9
385	0.0	0.031	43.212	0.000	1.9
390	0.0	0.031	42.632	0.000	1.9
395	0.0	0.030	42.050	0.000	1.9
400	0.0	0.030	41.466	0.000	1.9
405	0.0	0.029	40.882	0.000	2.0
410	0.0	0.029	40.296	0.000	2.0
415	0.0	0.029	39.709	0.000	2.0
420	0.0	0.028	39.121	0.000	2.0
425	0.0	0.028	38.532	0.000	2.0
430	0.0	0.027	37.942	0.000	2.0
435	0.0	0.027	37.352	0.000	2.0
440	0.0	0.026	36.761	0.000	2.0
445	0.0	0.026	36.169	0.000	2.0
450	0.0	0.026	35.577	0.000	2.0
455	0.0	0.025	34.984	0.000	2.0
460	0.0	0.025	34.392	0.000	2.0
465	0.0	0.024	33.798	0.000	2.0
470	0.0	0.024	33.205	0.000	2.0
475	0.0	0.023	32.611	0.000	2.0
480	0.0	0.023	32.017	0.000	2.0
485	0.0	0.023	31.422	0.000	2.0
490	0.0	0.022	30.815	0.000	2.0
495	0.0	0.022	30.195	0.000	2.1
500	0.0	0.021	29.587	0.000	2.0
505	0.0	0.021	29.002	0.000	1.9
510	0.0	0.020	28.440	0.000	1.8
515	0.0	0.020	27.898	0.000	1.8
520	0.0	0.020	27.376	0.000	1.7
525	0.0	0.019	26.873	0.000	1.6
530	0.0	0.019	26.388	0.000	1.6
535	0.0	0.019	25.920	0.000	1.5

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
540	0.0	0.018	25.468	0.000	1.5
545	0.0	0.018	25.031	0.000	1.4
550	0.0	0.018	24.609	0.000	1.4
555	0.0	0.017	24.201	0.000	1.3
560	0.0	0.017	23.806	0.000	1.3
565	0.0	0.017	23.423	0.000	1.3
570	0.0	0.017	23.053	0.000	1.2
575	0.0	0.016	22.695	0.000	1.2
580	0.0	0.016	22.347	0.000	1.1
585	0.0	0.016	22.011	0.000	1.1
590	0.0	0.016	21.684	0.000	1.1
595	0.0	0.015	21.368	0.000	1.0
600	0.0	0.015	21.060	0.000	1.0
605	0.0	0.015	20.761	0.000	1.0
610	0.0	0.015	20.471	0.000	1.0
615	0.0	0.015	20.186	0.000	0.9
620	0.0	0.014	19.905	0.000	0.9
625	0.0	0.014	19.631	0.000	0.9
630	0.0	0.014	19.362	0.000	0.9
635	0.0	0.014	19.101	0.000	0.9
640	0.0	0.014	18.845	0.000	0.8
645	0.0	0.013	18.596	0.000	0.8
650	0.0	0.013	18.352	0.000	0.8
655	0.0	0.013	18.115	0.000	0.8
660	0.0	0.013	17.884	0.000	0.8
665	0.0	0.013	17.659	0.000	0.7
670	0.0	0.013	17.439	0.000	0.7
675	0.0	0.012	17.225	0.000	0.7
680	0.0	0.012	17.016	0.000	0.7
685	0.0	0.012	16.813	0.000	0.7
690	0.0	0.012	16.615	0.000	0.7
695	0.0	0.012	16.422	0.000	0.6
700	0.0	0.012	16.233	0.000	0.6
705	0.0	0.012	16.049	0.000	0.6
710	0.0	0.011	15.869	0.000	0.6
715	0.0	0.011	15.694	0.000	0.6
720	0.0	0.011	15.522	0.000	0.6

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Blue Roof L13 Type : Cellular Storage

Critical by Return Period: FSR: 30 years: Increase Rainfall (%): +0: 180 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.000	0.024	0.000	0.0
10	0.4	0.000	0.114	0.000	0.0
15	0.6	0.001	0.269	0.000	0.0
20	0.6	0.002	0.452	0.000	0.0
25	0.6	0.002	0.640	0.000	0.0
30	0.7	0.003	0.825	0.000	0.0
35	0.7	0.004	1.007	0.000	0.1
40	0.7	0.004	1.197	0.000	0.1
45	0.8	0.005	1.407	0.000	0.1
50	1.0	0.006	1.649	0.000	0.1
55	1.3	0.007	1.939	0.000	0.2
60	1.6	0.008	2.288	0.000	0.3
65	1.9	0.009	2.703	0.000	0.4
70	2.3	0.011	3.183	0.000	0.6
75	2.7	0.013	3.720	0.000	0.8
80	3.1	0.015	4.307	0.000	1.1
85	3.4	0.017	4.910	0.000	1.4
90	3.6	0.019	5.492	0.000	1.8
95	3.7	0.021	6.004	0.000	2.1
100	3.4	0.023	6.629	0.000	1.3
105	3.1	0.025	7.221	0.000	1.3
110	2.7	0.027	7.722	0.000	1.2
115	2.3	0.029	8.119	0.000	1.2
120	1.9	0.030	8.408	0.000	1.1
125	1.6	0.030	8.596	0.000	1.1
130	1.3	0.031	8.695	0.000	1.1
135	1.0	0.031	8.722	0.000	1.0
140	0.8	0.031	8.695	0.000	1.0
145	0.7	0.030	8.633	0.000	1.0
150	0.7	0.030	8.553	0.000	1.0
155	0.7	0.030	8.469	0.000	0.9
160	0.7	0.029	8.389	0.000	0.9
165	0.6	0.029	8.314	0.000	0.9
170	0.6	0.029	8.236	0.000	0.9
175	0.4	0.029	8.134	0.000	0.8
180	0.2	0.028	7.976	0.000	0.8
185	0.0	0.027	7.756	0.000	0.8
190	0.0	0.026	7.515	0.000	0.8
195	0.0	0.026	7.278	0.000	0.8
200	0.0	0.025	7.052	0.000	0.7
205	0.0	0.024	6.845	0.000	0.7
210	0.0	0.023	6.656	0.000	0.6
215	0.0	0.023	6.482	0.000	0.6
220	0.0	0.022	6.315	0.000	0.6
225	0.0	0.022	6.149	0.000	0.6
230	0.0	0.021	5.984	0.000	0.5
235	0.0	0.020	5.820	0.000	0.5
240	0.0	0.020	5.657	0.000	0.5
245	0.0	0.019	5.494	0.000	0.5

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	0.0	0.019	5.332	0.000	0.5
255	0.0	0.018	5.171	0.000	0.5
260	0.0	0.018	5.011	0.000	0.5
265	0.0	0.017	4.852	0.000	0.5
270	0.0	0.016	4.693	0.000	0.5
275	0.0	0.016	4.534	0.000	0.5
280	0.0	0.015	4.377	0.000	0.5
285	0.0	0.015	4.219	0.000	0.5
290	0.0	0.014	4.062	0.000	0.5
295	0.0	0.014	3.906	0.000	0.5
300	0.0	0.013	3.750	0.000	0.5
305	0.0	0.013	3.594	0.000	0.5
310	0.0	0.012	3.439	0.000	0.5
315	0.0	0.012	3.284	0.000	0.5
320	0.0	0.011	3.129	0.000	0.5
325	0.0	0.010	2.975	0.000	0.5
330	0.0	0.010	2.832	0.000	0.5
335	0.0	0.009	2.703	0.000	0.4
340	0.0	0.009	2.586	0.000	0.4
345	0.0	0.009	2.479	0.000	0.3
350	0.0	0.008	2.381	0.000	0.3
355	0.0	0.008	2.289	0.000	0.3
360	0.0	0.008	2.201	0.000	0.3

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Attenuation
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 180 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.000	0.017	0.000	0.0
10	1.2	0.006	0.214	0.000	0.0
15	2.1	0.021	0.728	0.000	0.0
20	2.6	0.042	1.445	0.000	0.0
25	2.9	0.065	2.234	0.000	0.6
30	3.0	0.080	2.728	0.000	1.5
35	3.1	0.091	3.128	0.000	1.9
40	3.4	0.102	3.485	0.000	2.3
45	4.0	0.113	3.858	0.000	2.6
50	4.8	0.126	4.311	0.000	3.1
55	5.8	0.143	4.905	0.000	3.5
60	7.2	0.168	5.732	0.000	3.9
65	9.0	0.203	6.930	0.000	4.2
70	10.9	0.252	8.599	0.000	4.6
75	12.5	0.313	10.702	0.000	4.8
80	13.4	0.382	13.051	0.000	4.9
85	15.1	0.463	15.825	0.000	5.0
90	16.1	0.555	18.990	0.000	5.0
95	15.5	0.649	22.201	0.000	4.9
100	14.7	0.741	25.326	0.000	4.8
105	13.4	0.825	28.193	0.000	4.5
110	12.1	0.899	30.725	0.000	4.1
115	10.5	0.963	32.922	0.000	4.1
120	9.2	1.013	34.641	0.000	4.1
125	8.1	1.052	35.985	0.000	4.2
130	7.1	1.082	37.009	0.000	4.2
135	6.2	1.103	37.718	0.000	4.2
140	5.5	1.117	38.199	0.000	4.2
145	5.2	1.127	38.537	0.000	4.2
150	5.0	1.134	38.790	0.000	4.2
155	4.9	1.140	38.998	0.000	4.2
160	4.9	1.146	39.190	0.000	4.2
165	4.9	1.151	39.375	0.000	4.2
170	4.7	1.156	39.536	0.000	4.3
175	4.3	1.158	39.620	0.000	4.2
180	3.6	1.156	39.542	0.000	4.2
185	3.1	1.148	39.276	0.000	4.2
190	3.0	1.138	38.928	0.000	4.2
195	2.9	1.128	38.566	0.000	4.1
200	2.9	1.117	38.200	0.000	4.1
205	2.8	1.106	37.836	0.000	4.1
210	3.0	1.096	37.476	0.000	4.1
215	2.9	1.085	37.120	0.000	4.1
220	2.7	1.075	36.752	0.000	4.0
225	2.9	1.064	36.384	0.000	4.0
230	2.8	1.053	36.015	0.000	4.0
235	2.8	1.042	35.645	0.000	4.0
240	2.8	1.032	35.281	0.000	4.0
245	2.8	1.021	34.926	0.000	3.9

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	2.8	1.011	34.575	0.000	3.9
255	2.8	1.001	34.229	0.000	3.9
260	2.8	0.991	33.888	0.000	3.9
265	2.8	0.981	33.552	0.000	3.9
270	2.8	0.971	33.219	0.000	3.9
275	2.8	0.962	32.889	0.000	3.8
280	2.7	0.952	32.563	0.000	3.8
285	2.7	0.943	32.240	0.000	3.8
290	2.7	0.933	31.921	0.000	3.8
295	2.7	0.924	31.596	0.000	3.8
300	2.7	0.915	31.277	0.000	3.8
305	2.7	0.905	30.963	0.000	3.8
310	2.7	0.896	30.644	0.000	3.8
315	2.7	0.886	30.319	0.000	3.8
320	2.7	0.877	29.982	0.000	3.9
325	2.7	0.866	29.633	0.000	3.9
330	2.7	0.856	29.271	0.000	4.0
335	2.7	0.845	28.895	0.000	4.0
340	2.8	0.833	28.506	0.000	4.1
345	2.8	0.822	28.106	0.000	4.1
350	2.8	0.810	27.692	0.000	4.2
355	2.7	0.797	27.260	0.000	4.2
360	2.7	0.784	26.812	0.000	4.2

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 2 Type : Cellular Storage

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 180 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.0	0.000	0.000	0.000	0.0
10	0.0	0.000	0.001	0.000	0.0
15	0.1	0.006	0.016	0.000	0.1
20	0.2	0.011	0.027	0.000	0.2
25	0.2	0.012	0.030	0.000	0.2
30	0.2	0.012	0.030	0.000	0.2
35	0.3	0.012	0.031	0.000	0.3
40	0.3	0.013	0.031	0.000	0.3
45	0.3	0.013	0.033	0.000	0.3
50	0.4	0.014	0.035	0.000	0.3
55	0.4	0.016	0.039	0.000	0.4
60	0.5	0.017	0.043	0.000	0.5
65	0.7	0.019	0.048	0.000	0.7
70	0.8	0.021	0.053	0.000	0.8
75	1.0	0.023	0.057	0.000	1.0
80	1.1	0.025	0.062	0.000	1.1
85	1.3	0.026	0.065	0.000	1.3
90	1.4	0.027	0.068	0.000	1.4
95	1.4	0.028	0.069	0.000	1.4
100	1.3	0.027	0.068	0.000	1.3
105	1.2	0.026	0.065	0.000	1.2
110	1.1	0.024	0.061	0.000	1.1
115	0.9	0.023	0.056	0.000	1.0
120	0.8	0.020	0.050	0.000	0.8
125	0.7	0.018	0.046	0.000	0.7
130	0.5	0.017	0.042	0.000	0.5
135	0.4	0.027	0.067	0.000	0.3
140	0.4	0.040	0.099	0.000	0.3
145	0.3	0.049	0.123	0.000	0.2
150	0.3	0.056	0.141	0.000	0.2
155	0.2	0.062	0.156	0.000	0.2
160	0.2	0.068	0.170	0.000	0.2
165	0.2	0.073	0.183	0.000	0.2
170	0.2	0.078	0.195	0.000	0.2
175	0.2	0.080	0.199	0.000	0.2
180	0.1	0.077	0.192	0.000	0.2
185	0.1	0.069	0.172	0.000	0.2
190	0.1	0.059	0.147	0.000	0.2
195	0.0	0.048	0.120	0.000	0.1
200	0.0	0.037	0.093	0.000	0.1
205	0.0	0.026	0.066	0.000	0.1
210	0.0	0.016	0.040	0.000	0.1
215	0.0	0.006	0.015	0.000	0.1
220	0.0	0.004	0.010	0.000	0.0
225	0.0	0.003	0.009	0.000	0.0
230	0.0	0.003	0.008	0.000	0.0
235	0.0	0.003	0.007	0.000	0.0
240	0.0	0.003	0.007	0.000	0.0
245	0.0	0.003	0.007	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	0.0	0.003	0.006	0.000	0.0
255	0.0	0.002	0.006	0.000	0.0
260	0.0	0.002	0.006	0.000	0.0
265	0.0	0.002	0.006	0.000	0.0
270	0.0	0.002	0.005	0.000	0.0
275	0.0	0.002	0.005	0.000	0.0
280	0.0	0.002	0.005	0.000	0.0
285	0.0	0.002	0.004	0.000	0.0
290	0.0	0.002	0.004	0.000	0.0
295	0.0	0.001	0.004	0.000	0.0
300	0.0	0.001	0.003	0.000	0.0
305	0.0	0.001	0.003	0.000	0.0
310	0.0	0.001	0.003	0.000	0.0
315	0.0	0.001	0.003	0.000	0.0
320	0.0	0.001	0.003	0.000	0.0
325	0.0	0.001	0.003	0.000	0.0
330	0.0	0.001	0.003	0.000	0.0
335	0.0	0.001	0.002	0.000	0.0
340	0.0	0.001	0.002	0.000	0.0
345	0.0	0.001	0.002	0.000	0.0
350	0.0	0.001	0.002	0.000	0.0
355	0.0	0.001	0.002	0.000	0.0
360	0.0	0.001	0.002	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - First 1
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	1.5	0.018	0.167	0.000	0.8
10	5.5	0.047	0.447	0.000	4.7
15	1.5	0.032	0.300	0.000	2.4
20	0.0	0.014	0.136	0.000	0.5
25	0.0	0.007	0.063	0.000	0.1
30	0.0	0.004	0.042	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 1
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.4	0.010	0.051	0.000	0.2
10	1.6	0.026	0.135	0.000	1.4
15	0.4	0.018	0.095	0.000	0.7
20	0.0	0.009	0.049	0.000	0.2
25	0.0	0.005	0.025	0.000	0.0
30	0.0	0.003	0.015	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Tree Pit - Hulme 2
Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 15 mins: Winter

Type : Cellular Storage

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.6	0.015	0.031	0.000	0.5
10	2.2	0.033	0.066	0.000	2.1
15	0.6	0.017	0.035	0.000	0.7
20	0.0	0.007	0.014	0.000	0.1
25	0.0	0.002	0.004	0.000	0.0
30	0.0	0.001	0.003	0.000	0.0

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Blue Roof L12 Type : Cellular Storage

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 360 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.3	0.000	0.045	0.000	0.0
10	1.0	0.000	0.245	0.000	0.0
15	1.5	0.000	0.627	0.000	0.0
20	2.0	0.001	1.152	0.000	0.0
25	2.2	0.001	1.778	0.000	0.0
30	2.4	0.002	2.472	0.000	0.0
35	2.5	0.002	3.207	0.000	0.0
40	2.6	0.003	3.961	0.000	0.0
45	2.6	0.003	4.722	0.000	0.1
50	2.6	0.004	5.480	0.000	0.1
55	2.6	0.004	6.233	0.000	0.1
60	2.6	0.005	6.981	0.000	0.1
65	2.6	0.006	7.728	0.000	0.1
70	2.7	0.006	8.483	0.000	0.2
75	2.8	0.007	9.254	0.000	0.2
80	3.0	0.007	10.054	0.000	0.2
85	3.2	0.008	10.903	0.000	0.3
90	3.4	0.009	11.810	0.000	0.3
95	3.8	0.009	12.799	0.000	0.4
100	4.2	0.010	13.884	0.000	0.4
105	4.7	0.011	15.078	0.000	0.5
110	5.3	0.012	16.407	0.000	0.6
115	5.8	0.013	17.877	0.000	0.7
120	6.6	0.014	19.499	0.000	0.9
125	7.2	0.015	21.286	0.000	1.0
130	8.0	0.017	23.227	0.000	1.2
135	8.8	0.018	25.338	0.000	1.5
140	9.5	0.020	27.609	0.000	1.7
145	10.4	0.022	30.127	0.000	1.3
150	11.2	0.024	32.962	0.000	1.3
155	11.9	0.026	36.033	0.000	1.3
160	12.7	0.028	39.344	0.000	1.2
165	13.3	0.031	42.876	0.000	1.2
170	13.9	0.034	46.601	0.000	1.1
175	14.3	0.036	50.498	0.000	1.1
180	14.6	0.039	54.527	0.000	1.0
185	14.6	0.042	58.619	0.000	1.0
190	14.3	0.045	62.684	0.000	0.9
195	13.9	0.048	66.651	0.000	0.8
200	13.3	0.051	70.476	0.000	0.8
205	12.7	0.053	74.136	0.000	0.8
210	11.9	0.056	77.595	0.000	0.7
215	11.2	0.058	80.833	0.000	0.7
220	10.4	0.060	83.847	0.000	0.7
225	9.5	0.062	86.615	0.000	0.7
230	8.8	0.064	89.140	0.000	0.8
235	8.0	0.066	91.422	0.000	0.8
240	7.2	0.067	93.460	0.000	0.8
245	6.6	0.069	95.276	0.000	0.9

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	5.8	0.070	96.870	0.000	0.9
255	5.3	0.071	98.259	0.000	1.0
260	4.7	0.072	99.465	0.000	1.0
265	4.2	0.072	100.499	0.000	1.0
270	3.8	0.073	101.389	0.000	1.1
275	3.5	0.074	102.148	0.000	1.1
280	3.2	0.074	102.795	0.000	1.2
285	3.0	0.074	103.356	0.000	1.2
290	2.8	0.075	103.845	0.000	1.3
295	2.7	0.075	104.281	0.000	1.3
300	2.6	0.075	104.680	0.000	1.3
305	2.6	0.076	105.054	0.000	1.4
310	2.6	0.076	105.412	0.000	1.4
315	2.6	0.076	105.761	0.000	1.4
320	2.6	0.076	106.102	0.000	1.5
325	2.6	0.077	106.435	0.000	1.5
330	2.5	0.077	106.750	0.000	1.5
335	2.4	0.077	107.037	0.000	1.5
340	2.2	0.077	107.272	0.000	1.5
345	2.0	0.077	107.433	0.000	1.6
350	1.6	0.077	107.488	0.000	1.6
355	1.0	0.077	107.392	0.000	1.6
360	0.4	0.077	107.109	0.000	1.6
365	0.0	0.077	106.667	0.000	1.7
370	0.0	0.076	106.163	0.000	1.7
375	0.0	0.076	105.651	0.000	1.7
380	0.0	0.076	105.132	0.000	1.7
385	0.0	0.075	104.606	0.000	1.8
390	0.0	0.075	104.074	0.000	1.8
395	0.0	0.075	103.531	0.000	1.8
400	0.0	0.074	102.969	0.000	1.9
405	0.0	0.074	102.391	0.000	1.9
410	0.0	0.073	101.809	0.000	1.9
415	0.0	0.073	101.223	0.000	2.0
420	0.0	0.072	100.635	0.000	2.0
425	0.0	0.072	100.044	0.000	2.0
430	0.0	0.072	99.451	0.000	2.0
435	0.0	0.071	98.855	0.000	2.0
440	0.0	0.071	98.258	0.000	2.0
445	0.0	0.070	97.658	0.000	2.0
450	0.0	0.070	97.057	0.000	2.0
455	0.0	0.069	96.454	0.000	2.0
460	0.0	0.069	95.850	0.000	2.0
465	0.0	0.069	95.244	0.000	2.0
470	0.0	0.068	94.636	0.000	2.0
475	0.0	0.068	94.028	0.000	2.0
480	0.0	0.067	93.418	0.000	2.0
485	0.0	0.067	92.807	0.000	2.0
490	0.0	0.066	92.195	0.000	2.0
495	0.0	0.066	91.582	0.000	2.0
500	0.0	0.065	90.969	0.000	2.0
505	0.0	0.065	90.354	0.000	2.0
510	0.0	0.065	89.739	0.000	2.1
515	0.0	0.064	89.123	0.000	2.1
520	0.0	0.064	88.507	0.000	2.1
525	0.0	0.063	87.890	0.000	2.1
530	0.0	0.063	87.272	0.000	2.1
535	0.0	0.062	86.654	0.000	2.1

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
540	0.0	0.062	86.036	0.000	2.1
545	0.0	0.061	85.417	0.000	2.1
550	0.0	0.061	84.798	0.000	2.1
555	0.0	0.061	84.178	0.000	2.1
560	0.0	0.060	83.559	0.000	2.1
565	0.0	0.060	82.939	0.000	2.1
570	0.0	0.059	82.318	0.000	2.1
575	0.0	0.059	81.698	0.000	2.1
580	0.0	0.058	81.077	0.000	2.1
585	0.0	0.058	80.456	0.000	2.1
590	0.0	0.057	79.835	0.000	2.1
595	0.0	0.057	79.214	0.000	2.1
600	0.0	0.057	78.593	0.000	2.1
605	0.0	0.056	77.972	0.000	2.1
610	0.0	0.056	77.351	0.000	2.1
615	0.0	0.055	76.729	0.000	2.1
620	0.0	0.055	76.108	0.000	2.1
625	0.0	0.054	75.487	0.000	2.1
630	0.0	0.054	74.865	0.000	2.1
635	0.0	0.053	74.244	0.000	2.1
640	0.0	0.053	73.622	0.000	2.1
645	0.0	0.053	73.001	0.000	2.1
650	0.0	0.052	72.379	0.000	2.1
655	0.0	0.052	71.758	0.000	2.1
660	0.0	0.051	71.137	0.000	2.1
665	0.0	0.051	70.516	0.000	2.1
670	0.0	0.050	69.895	0.000	2.1
675	0.0	0.050	69.274	0.000	2.1
680	0.0	0.049	68.653	0.000	2.1
685	0.0	0.049	68.032	0.000	2.1
690	0.0	0.049	67.411	0.000	2.1
695	0.0	0.048	66.790	0.000	2.1
700	0.0	0.048	66.170	0.000	2.1
705	0.0	0.047	65.549	0.000	2.1
710	0.0	0.047	64.929	0.000	2.1
715	0.0	0.046	64.309	0.000	2.1
720	0.0	0.046	63.688	0.000	2.1

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		



Blue Roof L13 Type : Cellular Storage

Critical by Return Period: FSR: 100 years: Increase Rainfall (%): +45: 240 mins: Winter

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
5	0.2	0.000	0.026	0.000	0.0
10	0.6	0.000	0.138	0.000	0.0
15	0.8	0.001	0.340	0.000	0.0
20	0.9	0.002	0.594	0.000	0.0
25	1.0	0.003	0.868	0.000	0.0
30	1.0	0.004	1.147	0.000	0.1
35	1.0	0.005	1.422	0.000	0.1
40	1.0	0.006	1.685	0.000	0.1
45	1.0	0.007	1.934	0.000	0.2
50	1.1	0.008	2.177	0.000	0.3
55	1.2	0.009	2.422	0.000	0.3
60	1.3	0.009	2.679	0.000	0.4
65	1.5	0.010	2.961	0.000	0.5
70	1.8	0.012	3.278	0.000	0.7
75	2.1	0.013	3.642	0.000	0.8
80	2.5	0.014	4.066	0.000	1.0
85	2.9	0.016	4.542	0.000	1.2
90	3.3	0.018	5.065	0.000	1.5
95	3.8	0.020	5.628	0.000	1.9
100	4.2	0.022	6.310	0.000	1.3
105	4.7	0.026	7.264	0.000	1.3
110	5.1	0.029	8.356	0.000	1.2
115	5.4	0.034	9.569	0.000	1.2
120	5.6	0.038	10.872	0.000	1.2
125	5.6	0.043	12.213	0.000	1.2
130	5.4	0.047	13.521	0.000	1.2
135	5.1	0.052	14.745	0.000	1.2
140	4.7	0.056	15.856	0.000	1.2
145	4.3	0.059	16.838	0.000	1.2
150	3.8	0.062	17.684	0.000	1.2
155	3.3	0.065	18.393	0.000	1.2
160	2.9	0.067	18.968	0.000	1.2
165	2.5	0.068	19.420	0.000	1.2
170	2.1	0.069	19.761	0.000	1.1
175	1.8	0.070	20.005	0.000	1.1
180	1.5	0.071	20.171	0.000	1.1
185	1.3	0.071	20.273	0.000	1.1
190	1.2	0.071	20.331	0.000	1.0
195	1.1	0.071	20.360	0.000	1.0
200	1.0	0.072	20.374	0.000	1.0
205	1.0	0.072	20.384	0.000	1.0
210	1.0	0.072	20.397	0.000	0.9
215	1.0	0.072	20.417	0.000	0.9
220	1.0	0.072	20.440	0.000	0.9
225	0.9	0.072	20.457	0.000	0.9
230	0.8	0.072	20.450	0.000	0.9
235	0.6	0.072	20.395	0.000	0.8
240	0.2	0.071	20.256	0.000	0.8
245	0.0	0.070	20.038	0.000	0.8

Project:	Date: 19/05/2023		
	Designed by: COLOU	Checked by:	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Storm	Company Address:		

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
250	0.0	0.069	19.797	0.000	0.8
255	0.0	0.069	19.560	0.000	0.8
260	0.0	0.068	19.329	0.000	0.8
265	0.0	0.067	19.103	0.000	0.7
270	0.0	0.066	18.882	0.000	0.7
275	0.0	0.066	18.665	0.000	0.7
280	0.0	0.065	18.454	0.000	0.7
285	0.0	0.064	18.246	0.000	0.7
290	0.0	0.063	18.043	0.000	0.7
295	0.0	0.063	17.844	0.000	0.7
300	0.0	0.062	17.649	0.000	0.6
305	0.0	0.061	17.463	0.000	0.6
310	0.0	0.061	17.295	0.000	0.5
315	0.0	0.060	17.141	0.000	0.5
320	0.0	0.060	16.992	0.000	0.5
325	0.0	0.059	16.844	0.000	0.5
330	0.0	0.059	16.698	0.000	0.5
335	0.0	0.058	16.553	0.000	0.5
340	0.0	0.058	16.409	0.000	0.5
345	0.0	0.057	16.266	0.000	0.5
350	0.0	0.057	16.125	0.000	0.5
355	0.0	0.056	15.984	0.000	0.5
360	0.0	0.056	15.845	0.000	0.5
365	0.0	0.055	15.707	0.000	0.5
370	0.0	0.055	15.569	0.000	0.5
375	0.0	0.054	15.432	0.000	0.5
380	0.0	0.054	15.297	0.000	0.5
385	0.0	0.053	15.162	0.000	0.4
390	0.0	0.053	15.027	0.000	0.4
395	0.0	0.052	14.894	0.000	0.4
400	0.0	0.052	14.761	0.000	0.4
405	0.0	0.051	14.629	0.000	0.4
410	0.0	0.051	14.497	0.000	0.4
415	0.0	0.050	14.366	0.000	0.4
420	0.0	0.050	14.235	0.000	0.4
425	0.0	0.050	14.104	0.000	0.4
430	0.0	0.049	13.975	0.000	0.4
435	0.0	0.049	13.845	0.000	0.4
440	0.0	0.048	13.716	0.000	0.4
445	0.0	0.048	13.587	0.000	0.4
450	0.0	0.047	13.458	0.000	0.4
455	0.0	0.047	13.330	0.000	0.4
460	0.0	0.046	13.202	0.000	0.4
465	0.0	0.046	13.074	0.000	0.4
470	0.0	0.045	12.946	0.000	0.4
475	0.0	0.045	12.818	0.000	0.4
480	0.0	0.045	12.691	0.000	0.4

APPENDIX 5
CONSULTATIONS

Conor O Loughlin

From: seweradoptions@uuplc.co.uk
Sent: 28 June 2023 12:57
To: csmith@chromaconsulting.co.uk
Cc: joanne.hill@uuplc.co.uk; david.syme@lendlease.com; Simeon Parker; Niall Meyers; Ben Freeman; shoaib.tauqeer@uuplc.co.uk; bskinner@chromaconsulting.co.uk; Conor O Loughlin
Subject: SECTION 185 - Plot 10a, First Street UU REF – 03032983

Hi Chris,

On Behalf of: Shoaib Tauqeer

APPLICATION FOR DIVERSION OF PUBLIC SEWER, SECTION 185 WATER INDUSTRY ACT 1991 AT Plot 10a, First Street UU REF – 03032983

I refer to your recent correspondence dated 26/06/2023 and would inform you that your submission is now satisfactory for incorporating into a sewer diversion agreement under Section 185, Water Industry Act 1991, providing that the diversion can be constructed in full accordance with the acceptable drawings numbers as follows:-

Drainage Plan – RAM-XX-XX-DR-C-10100 S185 AGREEMENT LAYOUT
Long Section/Details – RAM-XX-XX-DR-C-10250 SEWER LONG SECTIONS
1:20 MH Schedules – RAM-XX-XX-DR-C-10200 MANHOLE DETAILS
Land Registry Plan – RAM-XX-XX-DR-C-10001 S185 LAND REGISTRY PLAN
Abandonment Plan – RAM-XX-XX-DR-C-10010 SEWER ABANDONMENT PLAN

United Utilities Standard Construction Details (available for download via the following link https://www.unitedutilities.com/globalassets/documents/pdf/developer-services-construction-details_acc16.pdf)

Please see below payment breakdown which will be collected through our legal section on preparing the S185 Agreement. (there will also be legal fees for preparing the S185 Agreement).

Payment breakdown

100% Surety Or Cash Deposit	**£44,711.85**
Inspection fee (5% of the total construction cost)	£**2235.59**
Application Fee (Inclusive of printing)	£480
Recharge costs (due repeat submissions)	£0.00
Total fee	**£1755.59**

The pipe to be abandoned must be either removed or filled with aerated concrete, this must be agreed and inspected on site by UU Field Staff. Any redundant connections within existing manholes must be stopped off and made good. Any live connections must be maintained and flows diverted into the public sewerage system.

Where connections are to be made to existing public sewer manholes, the costs for rebuilding the manhole to United Utilities requirements, if deemed necessary by UU Field Staff, must be borne by the developer.

The Developer or his contractor is responsible for verifying all existing service positions and levels on site including those of the existing public sewerage system, before work commences. If the works cannot be constructed in accordance with the acceptable plans, the developer must submit revised proposals for appraisal before continuing with the works.

Any costs associated with service diversions required to enable the scheme to be carried out in accordance with the acceptable drawings must be borne by the developer

Please note however that under no circumstances must any work commence on site before completion of the S185 Agreement. You will be committing a statutory nuisance by commencing work prior to the Agreement being completed. Under S109 of the Act you will be committing a criminal offence if you make an unlawful communication to a public sewer and the Company will treat this very seriously.

The developer must also obtain specific permission to construct any new manhole or make any connections to the public sewerage system. Please visit our web-site where you will find the S106 Sewer Connection Application form. The form is in two parts but only the second part is required for this scheme which is called **'Request for permission to work on a public sewer'** application form, which the appointed contractor must complete and return to the address on the form. Here is the link to the form: http://www.unitedutilities.com/connecting-public-sewer.aspx

Should you require any further information in the meantime, please do not hesitate to contact me.

Kind Regards,

United Utilities
Water for the North West

Eireann Thompson
Assistant Developer Engineer
Developer Services & Metering
Customer Services
Mobex: 07553074138
unitedutilities.com

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry https://www.unitedutilities.com/builders-developers/ or you can email us at developerserviceswater@uuplc.co.uk

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---------- Original Message ----------
From: Chris Smith [csmith@chromaconsulting.co.uk]
Sent: 28/06/2023 09:34
To: seweradoptions@uuplc.co.uk; niall.meyers@ramboll.co.uk
Cc: joanne.hill@uuplc.co.uk; david.syme@lendlease.com; simeon.parker@ramboll.co.uk; ben.freeman@ramboll.co.uk; shoaib.tauqeer@uuplc.co.uk; bskinner@chromaconsulting.co.uk; conor.oloughlin@ramboll.co.uk
Subject: RE: Our reference - 03032983

Hi Shoaib,

Further to your call with Niall Meyers yesterday, can you confirm the status of the technical approval for River Street, and also advise on next steps for the S185.

Kind Regards

Chris Smith

Senior Project Manager

CHROMA

07581 155 804

csmith@chromaconsulting.co.uk

Chroma Consulting UK Ltd

3rd Floor, One St Peters Square, Manchester, M2 3AE

www.chromaconsulting.co.uk

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: Monday, June 26, 2023 12:33 PM
To: niall.meyers@ramboll.co.uk
Cc: Chris Smith <csmith@chromaconsulting.co.uk>; joanne.hill@uuplc.co.uk; david.syme@lendlease.com; simeon.parker@ramboll.co.uk; ben.freeman@ramboll.co.uk; shoaib.tauqeer@uuplc.co.uk; Brennand Skinner <bskinner@chromaconsulting.co.uk>; conor.oloughlin@ramboll.co.uk
Subject: RE: Our reference - 03032983

Good Afternoon,

Thank you for your email, I can confirm the we transfer has been downloaded. This has been logged to the engineer, they have a service level agreement to respond on or before 30/06/2023.

Kind regards,

Tonicha Wilde
Customer Advisor Advanced
Developer Services & Metering
Customer Services
Direct Tel: N/A
Tel: 0345 026 8989 (option 4)
unitedutilities.com

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Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry https://www.unitedutilities.com/builders-developers/ or you can email us at WastewaterDeveloperServices@uuplc.co.uk

---------- Original Message ----------
From: Niall Meyers [niall.meyers@ramboll.co.uk]
Sent: 26/06/2023 10:15
To: shoaib.tauqeer@uuplc.co.uk; joanne.hill@uuplc.co.uk
Cc: csmith@chromaconsulting.co.uk; david.syme@lendlease.com; simeon.parker@ramboll.co.uk; ben.freeman@ramboll.co.uk; seweradoptions@uuplc.co.uk; bskinner@chromaconsulting.co.uk; conor.oloughlin@ramboll.co.uk
Subject: RE: Our reference - 03032983

Good morning Shoaib/Joanne,

Just following up on Conor's emails of 16/06, 21/06 and 26/06 with regards to the River Street S185 – I have tried to call a couple of times over the last 10-days.

The project team are trying to finalise dates for commencement of the drainage diversion works, and as the technical approvals we re originally submitted in Oct/Nov 2022, we are keen to resolve urgently in ordetr that we can progress to the legal agreement.

Please can you advise if you have been able to download the documents and if you have any further queries on the technical submission.

Kind regards
Niall Meyers

MEng CEng MICE APM PMQ
Director, Head of North Structures

M +44 7436267480
niall.meyers@ramboll.co.uk

Classification: Confidential

From: Conor O Loughlin <conor.oloughlin@ramboll.co.uk>
Sent: 23 June 2023 17:01
To: SewerAdoptions <seweradoptions@uuplc.co.uk>
Cc: Ben Freeman <Ben.Freeman@ramboll.co.uk>; Chris Smith <csmith@chromaconsulting.co.uk>; Simeon Parker <simeon.parker@ramboll.co.uk>; Niall Meyers <Niall.Meyers@ramboll.co.uk>; Brennand Skinner <bskinner@chromaconsulting.co.uk>; Syme, David <David.Syme@lendlease.com>
Subject: RE: Our reference - 03032983

Good afternoon Shoaib,

Please see attached for an updated wetransfer link as the link sent through on the 16th June has now expired: https://we.tl/t-ictm57kPKJ

Note, the transfer link expires in one week so please download the information as soon as possible.

Please can you download the information and confirm a date for a response.

Thank you,

Kind regards
Conor O'Loughlin
Apprentice Engineer

D +44 1244 606661
M +44 7870 806776
conor.oloughlin@ramboll.co.uk

Ramboll UK Limited Registered in England & Wales Company No: 03659970
Registered office: 240 Blackfriars Road, London SE1 8NW

Please note, my working days are currently Tuesday - Friday.

From: Conor O Loughlin
Sent: 21 June 2023 09:04
To: SewerAdoptions <seweradoptions@uuplc.co.uk>
Subject: RE: Our reference - 03032983

Good morning Shoaib,

Please can you download the attached files in the link as to not delay the next response process.

I will be on leave from the 26th June until 7th July so would not be able to repackage the information.

The rest of the team will be able to respond to any queries you have in the meantime though.

Kind regards
Conor O'Loughlin
Apprentice Engineer

D +44 1244 606661
M +44 7870 806776
conor.oloughlin@ramboll.co.uk

Ramboll UK Limited Registered in England & Wales Company No: 03659970
Registered office: 240 Blackfriars Road, London SE1 8NW

Please note, my working days are currently Tuesday - Friday.

From: Conor O Loughlin
Sent: 16 June 2023 17:25
To: seweradoptions@uuplc.co.uk
Cc: Ben Freeman <Ben.Freeman@ramboll.co.uk>; csmith@chromaconsulting.co.uk; Simeon Parker <simeon.parker@ramboll.co.uk>; Niall Meyers <Niall.Meyers@ramboll.co.uk>; bskinner@chromaconsulting.co.uk; Syme, David <David.Syme@lendlease.com>
Subject: RE: Our reference - 03032983

Good afternoon Shoaib,

Please see wetransfer link for an updated response & additional files as requested: https://we.tl/t-G7OX79wYoZ

Please can you review & advise on your availability for next week to confirm what additional information you may require in order to close out the technical approval.

Thank you,

Kind regards
Conor O'Loughlin
Apprentice Engineer

D +44 1244 606661
M +44 7870 806776
conor.oloughlin@ramboll.co.uk

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Registered office: 240 Blackfriars Road, London SE1 8NW

Please note, my working days are currently Tuesday - Friday.

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 13 June 2023 17:14
To: Ben Freeman <ben.freeman@ramboll.co.uk>; Conor O Loughlin <conor.oloughlin@ramboll.co.uk>; csmith@chromaconsulting.co.uk; Simeon Parker <simeon.parker@ramboll.co.uk>; Niall Meyers <niall.meyers@ramboll.co.uk>; bskinner@chromaconsulting.co.uk
Subject: Our reference - 03032983

Hi Conor,

Thank you for your email and sending in the revised drawings. Please see attached TA form - a few more/outstanding comments.

Kind regards,

Shoaib.

United Utilities
Water for the North West

Shoaib Tauqeer
Developer Engineer
Developer Services & Metering
M: 07876745601
unitedutilities.com

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Wastewater Developer Services Engineer Feedback Form (S185)

Proposed Section 185 Diversion at Plot 10a, First Street, Manchester UU Reference – 03032983

	1	2	3	4	5	6	7	8	9	10
Date of UU response	09/03/2023	03/04/2023	13/06/2023	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.

Form contents

Section 1 – **Information required for a Section 185 submission**

Section 2 – **Initial check of the high level strategy**

Section 3 – **CCTv surveys / Sewer Abandonment**
- 3a CCTv surveys
- 3b Abandonment plan

Section 4 – **Drawings checklist / Technical Appraisal comments**
- 4a S185 Agreement Plan
- 4b Land registry compliant plan
- 4c Long sections
- 4d Manhole schedules / 1:20 details
- 4e Other drawings (delete if applicable)

Section 1 - Information required for Section 185 submission

Note: any item selected as 'not submitted' will need to be provided to support and progress the application to Technical Acceptance.

Please note that United Utilities Developer Services support guide is available to download from our webpage using the following link:

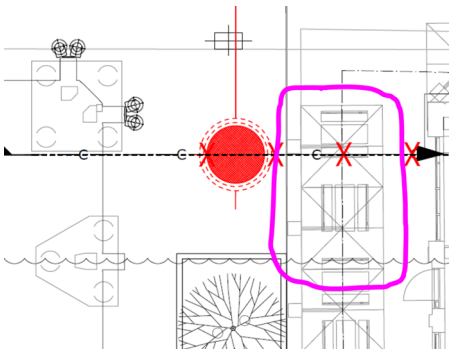
This shows how information should be provided for a variety of technical plans and also highlights critical design checks that need to be satisfied.

Section 1 **Information required**	**Submitted**	**Not submitted**	**N/A**	**Designer** Tick to highlight where information noted as 'not submitted' has now been provided
• S185 agreement plan	☒	☐	☐	☐
• Long section drawings	☒	☐	☐	☐
• Manhole schedules / 1:20 details In certain circumstances, it can make sense for the overall strategy to be checked for compliance in principal before the manhole schedules / 1:20 details are drawn up. However please note that manhole sizes will not be confirmed or accepted until formal technical acceptance is given (the scaled layout can show the need to adjust manhole diameters)	☒	☐	☐	☐
• A3 land registry compliant plan A PDF copy of a plan with full extent of land edged green shown, scale as near to 1:1250 or 1:500 as possible at A3 size, North Arrow, Landmarks and road names, Easement strip dimensioned and coloured yellow (if there are any). The green boundary should be closed so that the 'parcel' of land is identifiable and the development needs to fit the whole page.	☒	☐	☐	☐
• Abandonment plan (if applicable)	☒	☐	☐	☐
• CCTV survey (if applicable) • A copy of the report and CCTV footage is to be provided. The numbering of survey lengths should correspond with the drainage layout.	☒	☐	☐	☐
• Local council planning consent	☒	☐	☐	☐
• Copy of the site investigation report & (remediation strategy – if applicable)	☐	☒	☐	☒
• Topographical Survey	☒	☐	☐	☐

Section 2 – Initial check of the high level strategy

High level check	Yes	No	TBC	See comments
• Is the proposed diversion shown to be within the Development boundary?	☐	☐	☒	☒
• Has permission been given for the diversion to be carried out by the developer?	☐	☐	☐	☒
• Does the proposed design give United Utilities a cost effective proposal for the life of the assets, considering the long term operability?	☐	☐	☒	☒
• Are the proposed gradients and proposed routing of the diverted sewers acceptable?	☐	☐	☒	☒
• Does the proposal show any cover levels on the proposed diverted sewer to be lower than the existing public sewer cover levels/ nearby cover levels? In the absence of modelling information of the existing sewer, we do not recommend that any manhole cover levels are lowered as part of the proposed works.	☐	☒	☐	☐
• Has the line, level, position and diameter of the existing sewers been verified at the proposed points of connection?	☐	☐	☒	☒

Date	Comment number	Engineer General comments	Designers comments	Status (To be completed by UU personnel only)
09/03/2023	1	Please advise if the shown greenline boundary is public highway (River Street) or is River Street within the landowners boundary? One of the conditions that need to be met to self lay the diverted sewer is: 1) The developer owns all the land where the diversion is taking place.	River Street is currently within the footprint of First Street Development Ltd. And will remain under their ownership. Therefore, River Street is not currently within public highway, there is of course the possibility that this may change in the future. However, at the time of making this application the above is believed to be correct. The site is owned by the First Street Development Ltd	Accepted
09/03/2023	2	Has permission been given for the diversion to be carried out by the developer?	The developer is the applicant and landowner, and hence has confirmed they wish to divert the sewer, relocating it from one part of their land to another. Through discussions with UU, dating back several years, UU have advised that in principle they consider the proposed diversion to be acceptable (subject to technical review). The developer proposes to undertake the diversion works, rather than request that UU to undertake the diversion works, and the developer understand that the contractor will need to be approved by UU to undertake the diversion works.	Accepted
09/03/2023	3	Has the line, level, position and diameter of the existing sewers been verified at the proposed points of connection?	Yes, by survey where access was available.	Accepted
09/03/2023	4	• Please provide correspondence from the gas main utility company to understand if the overlapping of United Utilities required sewer easement can be located within the gas main easement and if this would be acceptable. UU 13.6.23 - For Cadent to review our easement terms (deed of grant for sewers located on site) this document can be found under our Local Practices drop down menu on the below website, please confirm this is acceptable with Cadent. https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-adoptions/adopt-a-sewer/ • Please advise if the low pressure gas main has an easement and if laying the sewer as proposed is acceptable with the gas utility company. • The existing 125mm gas main running near proposed MH CS06 has not been accurately located and as such may be being built over, will you locate this asset accurately before works are carried out? and discuss and provide correspondence from Cadent on their required easement and their acceptance on building a new manhole near to the main after it is accurately located. It may be practical to adjust the location of the manhole towards the kerb away from the mapped line of the gas main. UU 13.6.23 Ok – understood the manhole will be located at least 0.5m away from the 125mm gas main during on site works – please add a note to the drawings to	We have developed the drainage diversion proposals in parallel with discussions with Cadent. ○ Through the discussions we have held with Cadent, they are aware that there are overlapping easements given the busy city centre location, including existing easements for both UU and Cadent assets within River Street, and the location of the existing services were used to inform the location of the diverted public sewers. ○ The proposed location of the diverted public sewers in River Street and Hulme Street in relation to the existing services have been agreed with Cadent – see attached email from 11/04/2023 ○ Easements are in place for the low pressure gas main in River Street and the intermediate pressure gas mains in Hulme Street, which are located within the land ownership of First Street Development Ltd ○ The proposed location of the diverted public sewers in River Street and Hulme Street in relation to the existing services have been agreed with Cadent – see attached email from 11/04/2023 ○ We have agreed with Cadent that the location of the new manhole should be located at least 0.5m away from the 125mm gas main ○ We have undertaken trial pits in this location, however the location of the 125mm gas main remains unconfirmed, hence the final manhole location will be determined during the drainage diversion works ○ We have received confirmation from Cadent that the existing 36” gas main within River Street has been decommissioned – see attached email 19/08/2022 ○ Cadent have advised that the existing it will require a live/dead check before removal, and this will be arranged between Cadent and contractor undertaking the drainage diversion works	Action required

		show this. Is this gas main not able to be located by other means before consutruction begins as it may impact the design of the S185. • Please provide correspondence from Cadent confirming the gas main within the route of the proposed diverted sewer can be abandoned. UU 13.6.23 Ok accepted • Please provide RAMS/further information for measures on future access (excavation) to the proposed diverted sewer running adjacent to existing gas mains and how this can be safely carried out where the existing services are within our easement. UU 13.6.23 RAMS provided seem to cover Hulme Street, not River Street. Are you able to provide for River Street for review	○ We have received confirmation from Cadent that they consider that if we can demonstrate that it is safe to excavate to lay then they consider that it should be able to safely re-excavate to carry out any necessary future works – see attached email from 11/04/2023 ○ We have attached a copy of the proposed RAMS for the proposed diversion works, but please advise if you require a specific RAMS for future works (this will be almost identical)	
	4a	• UU 13.6.23 - For Cadent to review our easement terms (deed of grant for sewers located on site) this document can be found under our Local Practices drop down menu on the below website, please confirm this is acceptable with Cadent. https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-adoptions/adopt-a-sewer/ • UU 13.6.23 Ok – understood the manhole will be located at least 0.5m away from the 125mm gas main during on site works – please add a note to the drawings to show this. Is this gas main not able to be located by other means before consutruction begins as it may impact the design of the S185. • UU 13.6.23 RAMS provided seem to cover Hulme Street, not River Street. Are you able to provide for River Street for review	○ Refer to email response from Chris Smith on 15/06/2023 with regards to no additional emails or agreements requested for River Street. ○ Note added to drawing (see attached updated 10100) & item to be picked up within RAMS. Despite conducting GPR surveys of the site and performing 3m trail pit excavations in the area, the gas main was not located. Therefore, it has been determined that the precise location of the gas main cannot be found prior to construction. However, week 1 of the works will be trial holes to locate and confirm the existing services not previously located. This will be done by vac ex and hand digging only. ○ With regards to updated RAMS, these will not be available until contracts terms & conditions are accepted for the appointed subcontractor. These will be provided in advance to the works as Part 2 of the S185 application.	
09/03/2023	5	Please include the proposed building/foundation outlines on the plans and provide a section drawing to understand if there will be any loading on the sewer from the buildings as per DCG document figure B1 if the required easement is not met.	Sections added to cross sections drawing RAM-XX-XX-DR-D-10255	Completed
09/03/2023	6	Please include cover and invert levels for the proposed diverted sewer on the diversion plan.	Cover & invert levels now shown on diversion plan (RAM-XX-XX-DR-D-10100)	Completed
03/04/2023	7	Please advise what the shown outline items around the external face of the building in particular 10a - will these have an impact on the sewer in terms of loading? The pile cap shown in section D-D, please confirm piles are being taken below the sewer/manhole invert and that continuous flight augured (CFA) piling is to be used as the method to pile near the diverted sewer.	All CFA piles are founded to the underlying bedrock, below the level of existing sewers. there will be no load impacts of the proposed building foundations to the sewer	Accepted
13/6/23	8	Further to comment 7, apologies I was referring to the circled item below. 	The circled items are part of the Plot 10b development proposals and are the external seating & umbrella and will not provide an impact on the sewer in terms of loading. It should be noted that no foundations will be necessary for these items.	Action required
13/6/23	9	Please provide copy of the site investigation report & (remediation strategy – if applicable)	Please see attached files for ground investigation report (4302R001-3 First Street Plots 9 & 10) & remediation strategy (1620007819-RAM-XX-XX-RP-CL-00010)	Action required
13/6/23	10	Have Cadent approved the S185 design with regards to their assets or is there outstanding actions yet required.	Cadent have been involved in the developing design of the River Street drainage, so we consider that the proposals have been approved, however we have requested formal confirmation from Cadent on 15/06/2023 that they have no further comments.	Action required

Other general comments	Yes	No	TBC	N/A	See comments
If applicable, has ground remediation been considered at the depths and location of the proposed sewers offered for adoption?	☐	☐	☒	☐	☒
Has 0.5m clearance been achieved from kerb line to outer ring wall of manholes and 1.0m clearance to outer wall of sewers included in the diversion proposals?	☐	☒	☐	☐	☒
Has a minimum 300mm clearance been achieved between pipe crossings? Please note that this distance must be between the outer walls of pipes	☐	☐	☒	☐	☒
Are there any walls higher than 1.8m or any retaining walls within the development in proximity to the diverted network that require consideration (i.e. loading)	☐	☐	☒	☐	☒
Confirm if any large diameter thermoplastic pipes are proposed as there will be additional information / assessment required	☐	☐	☐	☒	☒

Date	Comment number	Engineer comments	Designers comments	Status (To be completed by UU personnel only)
09/03/2023	1	If applicable, has ground remediation been considered at the depths and location of the proposed sewers offered for adoption if so please provide details	No ground remediation is required	Accepted
09/03/2023	2	Noted that chambers are located adjacent to the kerb due to the live gas main location.	Correct, position of manhole has been discussed and agreed during the meeting with on 08/03/2023 with UU (Shoaib Tauqeer and Joanne Hill).	Accepted
09/03/2023	3	Please advise where the proposed diversion crosses the existing private surface water sewer that 300mm clearance is achieved with the proposed diverted sewer.	Surface water network is at road level, so there is approximately 4m clearance from crossing at the points between CS02 into CS03.	Accepted
09/03/2023	4	Has the existing private surface water sewer been accurately located- the proposed diversion runs in parallel and may clash with the proposed manholes or sewer – please accurately locate and show offset on a section plan for further assessment. (after our meeting it is understood this is kerb drainage only – please confirm)	Private sewer is at road level (via a kerb drain) so has been accurately located during survey works, will be added to section plan to show clearance.	Accepted
09/03/2023	5	Please confirm if there are any walls to be installed over the sewer	None proposed	Accepted
09/03/2023	6	The 150mm sewer from CS01 to CS03 does not form part of the S185 diversion and should be coloured grey. This sewer would need to be submitted as part of an S104 adoption application.	CS01 to CS03 removed from the application and replaced with a stub. Connection will be part of an S104 application in the future.	Accepted

Section 3 – CCTv survey / sewer abandonment

CCTv surveys / Sewer abandonment ☐ Submitted ☐ Not yet submitted	Yes	No	See comments
The provided camera survey (report and disc) is acceptable and complies with the guidance available on United Utilities website?	☐	☐	☒
A camera survey has been provided for all affected lengths to be diverted to confirm/ disprove connectivity?	☐	☐	☒
Adequate investigation and or justification to confirm any observed connections are 'dead'? *This should not be assumed – all observed connections should be dye tested and traced, with drawings provided to confirm findings.*	☐	☐	☒

Date	Comment number	Engineer comments	Designers comments	Status (To be completed by UU personnel only)
09/03/2023	1	Please provide CCTV footage	CCTV footage has been provided.	Completed
09/03/2023	2	The shown 150mm lateral incoming connections would need to be surveyed to confirm as '*dead*' connections. It is noted that a separate document showing evidence of historic demolished housing in this area has been provided to show what these connections may have previously likely served. Please also add the below note within the drawings using a clear text box (and not in the notes section): i) Any live connections are to be reconnected to the pubic sewer ii) UU Inspector to be present for all diversion and abandonment works iii) Existing sewers to be grubbed up	During the meeting with on 08/03/2023 with UU (Shoaib Tauqeer and Joanne Hill), UU advised that through engineering judgement, based on the evidence provided to date, it would be reasonable to assume the existing public sewer within Hulme Street (to the west of Wilmott Street) only collects highway drainage from Hulme Street, and **no** further survey work is required to prove otherwise Notes added to drawing RAM-XX-XX-DR-D-10010	Accepted
Click here to enter a date.				Choose an item.
Click here to enter a date.				Choose an item.
Click here to enter a date.				Choose an item.

Abandonment plan ☐ Submitted ☐ Not yet submitted	Yes (Acceptable)	No	TBC	N/A	(Designer) Tick to confirm addressed with resubmission

• The sewers and manholes which the developer is applying to abandon are clearly labelled and referenced with details of the pipe diameters, pipe material and also include survey numbers	☒	☐	☐	☐	☐
• The sewers which are being considered for abandonment shall be identified by using black crosses with notes confirming details of the proposed method of abandonment, e.g. grubbing out, or grouting	☒	☐	☐	☐	☐
• Information detailed to confirm it is understood all abandonments must be witnessed for the status of the pipe to be changed on the public sewer records, confirming that the minimum of 72 hours' notice will be provided.	☐	☐	☒	☐	☒
• Detail of how any manholes will be abandoned should also be included on the drawing with separate sections or details to support where required	☐	☐	☐	☒	☐
• Drawing shows the position and levels of proposed sewers and manholes	☐	☒	☐	☐	☒

Date	Comment number	Engineer comments	Designers comments	Status
09/03/2023	1	Please confirm/provide the requirement as stated on the 3rd point above	Yes, we confirm we will provide UU 72 hours notice for undertaking witnessing.	Accepted
09/03/2023	2	Please add position and levels of proposed sewers and manholes on the abandonment plan	Added to drawing RAM-XX-XX-DR-D-10010	Completed
09/03/2023	3	Remove other coloured utilities from the abandonment plan	Utilities removed from RAM-XX-XX-DR-D-10010	Completed
Click here to enter a date.				Choose an item.
Click here to enter a date.				Choose an item.
Click here to enter a date.				Choose an item.
Click here to enter a date.				Choose an item.

Section 4 – Drawings checklists / Technical Appraisal comments

Note: any points marked as 'No' or 'TBC' will require amendments to the drawings.

The Engineer will make comments in the column named 'Engineers comments'. Should these comments ask questions please ensure that you provide response comments (with clarification and or justification) in the adjacent column.

Note: Designer's response comments **must** be given to any Engineer comments for the application to progress to Technical Acceptance.

Section 4a **S185 Agreement Plan** ☐ Submitted ☐ Not yet submitted	**Yes** (Acceptable)	**No**	**TBC**	**N/A**	**(Designer)** Tick to confirm addressed with resubmission
• Boundary shown in green (and clearly visible). The green boundary must surround all of the works including any 3rd party land owners. Landmarks and road names will also be required. If this cannot be shown on one drawing then a separate location plan must be provided to show the full extent of the development boundary again, including landmarks and road names so the site can be easily identified	☐	☐	☒	☐	☒
• Scaled to fit A1 or A0	☒	☐	☐	☐	☐
• Sewers proposed for diversion to be coloured as follows; (foul – brown, combined – red, surface water – blue)	☐	☐	☒	☐	☒
• Any sewers proposed for abandonment are shown in a black cross hatched line	☐		☒		X
• Existing sewers, highway drains, culverted watercourses shown in black (not coloured)	☐	☐	☒	☐	☒
• **Easements –** ○ Coloured yellow and dimensioned? – see UU easement local practice	☐	☐	☒	☐	☒
○ Provided where sewer runs through third party land?	☐	☐	☒	☐	☒
○ Provided for a surface water outfall pipe to watercourse?	☐	☐	☐	☒	☐
• Pipe lengths labelled with the diameter, gradient and pipe material	☒	☐	☐	☐	☐
• Manholes labelled with cover and invert levels	☐	☐	☒	☐	☒
• Finished floor levels shown for the plots	☐	☐	☒	☐	☒
• Road numbering system clearly visible	☒	☐	☐	☐	☐

Drawing number: RAM-XX-XX-DR-C-101	**Revision**	**P07**	P08								
	Date	28/02/2023	17/03/2023	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.

Rev.	Comment number.	Engineers comments	Designer's response comments	Status
	1	Please amend the boundary plan after removing CS01 and the sewer running to CS03	Drawing RAM-XX-XX-DR-D-10100 amended to suit layout.	Completed
	2	Please provide details on all the proposed plot developments to connect into this sewer which is to be diverted including detailed drainage design for each plot, proposed surface and foul water discharge rates, finished floor levels and information on any proposed basements.	Information added to drawings, however for clarity. Flow from various sites: Plot 9a: Foul 3.2 l/s, Surface 7.5 l/s Plot 10a: Foul 5.9 l/s, Surface 5 l/s Plot 10b: Foul 4.8 l/s, Surface 4.9 l/s Total flow rate: 31.3 l/s Plot 9a drainage drawing attached. Plot 10a & 10b are currently at Stage 3. Flow rates will not be exceeded. FFL & basement information: Plot 9a: GF 30.940 Basement: 27.240 Plot 10a: GF 30.930 Basement: 29.005 Plot 10b: GF 30.925 No Basement	Accepted

	3	Grey out all utilities/private assets shown apart from UU assets part of the S185. The redline boundary should also be removed.	Drawing RAM-XX-XX-DR-D-10100 amended to suit comment.	Completed
	4	Please show section of sewer to be abandoned	Drawing RAM-XX-XX-DR-D-10100 amended to suit comment.	Completed
	5	Amend the shown easements in line with United Utilities easement local practice guidance for new sewers. https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-adoptions/adopt-a-sewer/	Drawing RAM-XX-XX-DR-D-10100 amended to suit comment.	Completed
	6	Please label manholes on the diversion plan with cover and invert level information	Drawing RAM-XX-XX-DR-D-10100 amended to suit comment.	Completed
	7	Please provide information to understand if self-cleansing velocity will be achieved for the diverted sewer	Information provided within correspondence on 13/03/2023 which confirms self-cleansing velocity will be achieved.	Accepted

Section 4b **A3 Land registry plan** ☐ Submitted ☐ Not yet submitted	**Yes** (Acceptable)	**No**	**TBC**	**N/A**	**(Designer)** Tick to confirm addressed with resubmission
• A PDF copy of a plan scale as near to 1:1250 as possible at A3 size (or a suitable scale for UU legal)	☒	☐	☐	☐	☐
• North Arrow, Landmarks, coordinates and a minimum of two road names clearly visible	☒	☐	☐	☐	☐
• Outline of the plots visible	☐	☒	☐	☐	☒
• Site boundary shows the full extent of the land edged green. (This green boundary should be closed so that the 'parcel' of land is identifiable)	☐	☒	☐	☐	☒
• Easement strip coloured yellow and dimensioned? – see UU easement local practice	☐	☒	☐	☐	☒
• Sewers proposed for diversion to be coloured as follows; (foul – brown, combined – red, surface water – blue)	☒	☐	☐	☐	☐
• Ensure the words 'DO NOT SCALE' are **not** contained within the drawing	☒	☐	☐	☐	☐

Drawing number: RAM-XX-XX-DR-C-100	**Revision**	P05	P06								
	Date	28/02/2023	17/03/2023	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.

Rev.	**Comment number.**	**Engineers comments**	**Designer's response comments**	**Status**
	1	Remove gas main easement, and remove redline, add a green line boundary to include the development land as well as the area of S185 diversion works	Items removed & green line boundary extended to include development land on RAM-XX-XX-DR-D-10001	Completed
	2	Amend easement width on plan to suit UU local practice easement guide.	Easement amended on drawings RAM-XX-XX-DR-D-10001 & RAM-XX-XX-DR-D-10100	Completed
				Choose an item.
				Choose an item.
				Choose an item.
				Choose an item.

For comments made within Section 4c, long sections and 4d – Manhole Schedules/1:20 details, changes are to be made as requested, the designer response comments section should only be used if the requested changes are not feasible. In such instances, sufficient justification should be provided.

Please ensure that anything ticked as 'no' or 'TBC' within the check list has been addressed on all drawings provided with your resubmission.

Section 4c **Long sections** ☐ Submitted ☐ Not yet submitted	**Yes** (Acceptable)	**No**	**TBC**	**N/A**	**(Designer)** Tick to confirm addressed with resubmission
• Connections to the public sewer are shown to be made at soffit to soffit level	☐	☐	☒	☐	☐
• Manholes labelled with the cover and invert levels	☒	☐	☐	☐	☐
• Pipe lengths are labelled with pipe diameters, numbers, materials and gradients	☒	☐	☐	☐	☐
• Pipe bedding detail confirmed for each pipe length	☒	☐	☐	☐	☐
• Adequate cover is provided to the pipes and that concrete protection is indicated where necessary (this can be via pipe surround or slab	☒	☐	☐	☐	☐
• Proposed gradients are appropriate	☒	☐	☐	☐	☐
• The existing and proposed ground levels are shown, with the chainage (linear distance)	☐	☒	☐	☐	☐
• Pipe crossings are shown to confirm acceptable vertical clearance • Additionally the relative location of other known service crossings shown	☐	☐	☒	☐	☐

Drawing number: RAM-XX-XX-DR-C-10250	**Revision**	P04	P05								
	Date	28/02/2023	17/03/2023	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.

Rev.	**Comment number.**	**Engineers comments**	**Designer's response comments**	**Status**
	1	Please show existing ground level	No changes are proposed to existing ground level. However, existing ground level spot levels provided across long sections drawing RAM-XX-XX-DR-D-10250	Completed
	2	Please show existing private surface water crossing if applicable	Existing crossing from kerb drain added on drawing RAM-XX-XX-DR-D-10250	Completed

	3	Please remove 150mm pipe as it is not part of the S185	150mm pipe removed from all drawings. Comment noted regarding future connection on drawing RAM-XX-XX-DR-D-10250	Completed
	4	Provide long section for the existing sewer	Long section provided for existing sewer on drawing RAM-XX-XX-DR-D-10250	Completed
	5	Please show the incoming connections on the existing sewer longsection as at soffit rather than invert.	Drawings now show incoming connection from Plot 10a shown at soffit. Main channels shown at invert.	Accepted

Section 4d **Manhole schedules / 1:20 details** ☒ Submitted ☐ Not yet submitted	**Yes** (Acceptable)	**No**	**TBC**	**N/A**	**(Designer)** Tick to confirm addressed with resubmission
• Manholes referenced and correspond with the drainage layout	☒	☐	☐	☐	☐
• Manholes labelled with the cover and invert levels	☒	☐	☐	☐	☐
• Depth to soffit displayed (depth to cut out landing for shallow manholes and depth to invert for flow control manholes)	☒	☐	☐	☐	☐
• Check to confirm no manholes >6m depth (For any manholes identified this should be designed out where possible and if unavoidable a bespoke design must be supplied with an intermediate landing).	☒	☐	☐	☐	☐
• Manhole diameter noted	☐	☐	☒	☐	☒
• Manhole type noted (as per UU Standard Construction Details or Design & Construction Guidance)	☐	☐	☒	☐	☒
• Minimum benching widths dimensioned and achieved	☐	☐	☒	☐	☒
• Direction of flow shown	☒	☐	☐	☐	☐
• Hole size in cover slab noted for each manhole	☐	☐	☒	☐	☒
• Drawings confirm that all lateral connections will be made at soffit level to the main channel	☐	☐	☒	☐	☒
• Use of appropriate rocker pipe lengths confirmed/ reference to variable features on STND/19/010	☒	☐	☐	☐	☐
• Detail provided for any connections proposed to an existing manhole A detail must be provided to confirm feasibility and ensure there is adequate space to facilitate the additional connection. Where a connection will cause detriment, for example passing through the landing space, a detail should show how this will be upgraded to suit the new connection.	☐	☐	☐	☒	☐

Drawing number: RAM-XX-XX-DR-C-10		**Revision**	P05	P06								
		Date	28/02/2023	17/11/2016	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.	Click here to enter a date.

Rev.	**Comment number.**	**Engineers comments**	**Designer's response comments**	**Status**
	1	Please ensure anything with the tick box selected with 'no' or 'TBC' is addressed on the revised drawing	All items added to drawing RAM-XX-XX-DR-D-10200	Action required
	2	Please revise the manholes schedules and plans in line with the requirements for a 600mm diameter sewer. The manhole schedules and plans require updating to suit a 600mm sewer i.e. required benching width etc.	Manholes with additional requirements for 600mm pipework amended to suit guidance on drawing RAM-XX-XX-DR-D-10200	Completed
	3	Please add a note that all lateral connections will be made at soffit level to the main channel	Note added regarding lateral connections on drawing RAM-XX-XX-DR-D-10200	Completed
	4	• Please add annotation for a ladder to benching is required as per Table 10 Variable Features STND/19/010 • Double steps required to invert recess access for type 2 manholes • Amend label for cover slab opening to be 750 x 600mm for hole in cover slab and 600 x 600mm for manhole cover opening for all proposed manholes in accordance with Table 10 Variable Features STND/19/010 • Show channel width • As per Table 10 Variable Features STND/19/010 there is a requirement for bench railings, safety chain, invert recess access details on the detail, step iron above pipe etc for the type 2 manholes where the diameter of the larger pipes is 600mm.	Plan sections amended to suit comments, all notes added & type 2 requirements added.	Accepted

APPENDIX 6
PROPOSED GROUND FLOOR PLAN

Copyright of this drawing is vested in Jon Matthews Architects and it must not be copied or reproduced without written consent. Figured dimensions only are to be taken from this drawing. Do not scale from this drawing.

All Contractors must visit the site and are responsible for taking and checking all dimensions relative to their work. Jon Matthews Architects are to be advised of any variation between drawings and site conditions.

Electronic data/ drawings issued as 'read only' and should not be interrogated for measurement. All dimensions and levels should be 'read only' from those values stated in text, on the drawings.

CONSTRUCTION - It is considered that the proposed works are within the scope of a competent contractor but we do not consider that unusual hazards have been identified, refer to relevant Pegi Scheduler Designers Risk Assessment.

Key:



Site Location
Site Boundary

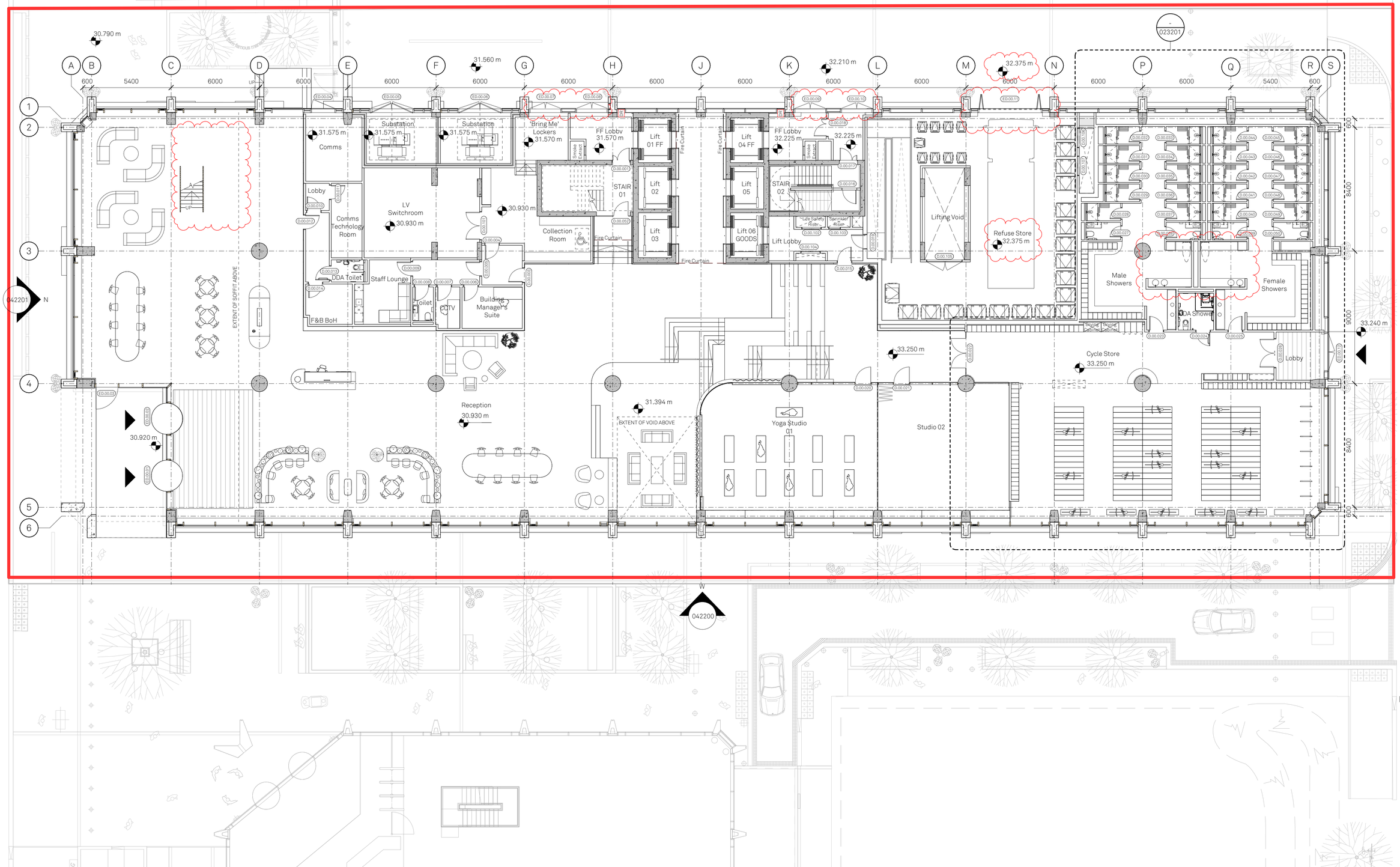
GENERAL NOTES:

All drawings to be read in conjunction with all relevant specifications, architectural drawings and schedules.

All drawings to be read along with other consultant + sub contractor information.

All boundaries shown indicatively and are subject to site survey and ownerships.

Any discrepancies must be brought to the attention of Jon Matthews Architects.



Rev:	Date:	Details:
P02	30.06.23	Stage 4 Issue
P01	23.06.23	Stage 4 Issue

Jon Matthews Architects
4th Floor Centurion House, 129 Deansgate, Manchester, M3 3WR

Project:
Plot 10A - First Street

Title:
Ground Floor General Arrangement Plan
Proposed GA Plan

Scale:	Origin Date:	Drawn:	Checked:
1:125 @ A1	June 2023	CS	JC

Status:
For Tender

Drawing No: FSP10A-JMA-XX-00-DR-A-022200
Rev: P02

APPENDIX 7
PROPOSED LANDSCAPE PLANS

RIVER STREET

WILMOTT STREET

HULME STREET

5 no. visitor cycle stands (10 no. cycle parking spaces) to be provided in First Street public realm as part of Plot 9A development.

2 no. visitor cycle stands (4 no. cycle parking spaces)to be provided in First Street public realm as part of Plot 9A development.

Boulevard of trees to be delivered as part of Plot 9B development.

PLOT 10A

FUTURE PLOT 9B DEVELOPMENT

MEANWHILE LAWN
Species rich wildflower lawn to be installed on plot 10B

Tree in planter to be delivered as part of plot 10B development. Temporary access required for servcing to plot 10A.

Completion of servicing yard access to be delivered as part of plot 10B development. Temporary access required for servcing to plot 10A.

EXTENT OF BULKHEAD

VOID ABOVE EXTENT OF

Provision in abeyance Locker and Cycle Parking

KEY

SITE BOUNDARY

HARDWORKS

S1 YORKSTONE FLAG PAVING
- **Product:** Scourtmoor Yorkstone Flags. To match existing specification of existing First Street surfacing.
- **Size:** W 550 - 850 mm, to be randomly laid x L 600mm x D 75m (to be confirmed)
- **Finish:** Swan

S2 LINEAR CONCRETE BLOCK
- **Product:** Hydro Lineo. To match existing specification of First Street Plot 9A surfacing.
- **Finish:** Standard
- **Size:** 100 x 100 x 63mm
- **Laid:** Stack bond
- **Supplier:** Hardscape or equal and approved
- **Other:** 5mm butt jointed

S3 INSITU CONCRETE SURFACING
- **Product:** Artevia Exposed Concrete or equal and approved
- **Colour:** Smoke with Silver Granite
- **Supplier:** Aggregate Industries or equal and approved

S4 RESIN-BOUND GRAVEL
To be installed under screening gate at servicing yard
- **Product**: Addabound Resin Bound Gravel
- **Colour**: Golden Field
- **Size**: 6mm aggregate
- **Laid**: 20mm depth
- **Supplier**: Addagrip or equal and approved supplier

B1 TACTILE BLISTER PAVING TO PEDESTRIAN CROSSING
- **Product:** Granite Blister Paving. To match existing paving of wider estate.
- **Finish:** Flamed finish, blister texture to standard details
- **Colour:** Kobra
- **Size:** W 395 x L 395 x D 65mm
- **Laid:** Double stack bond
- **Supplier:** Hardscape or equal and approved

G1 GRANITE UPSTAND ROAD KERB
- **Product:** Granite Kerb
- **Finish:** Flamed finish
- **Colour:** Royal White
- **Size:** W 300 x L 200 with 125mm upstand. 15mm bullnose to outer edge.
- **Supplier:** Hardscape or equal and approved

G2 FLUSH GRANITE KERB
- **Product:** Granite Kerb
- **Finish:** Flamed finish
- **Colour:** Royal White
- **Size:** W 300 x L 200
- **Laid:** Flush with 6mm upstand

G3 UPSTAND GRANITE KERB - PLANTER EDGING
- **Product:** Raised granite upstand edge to planting area. Corner to be cut out 150mm cube and laid flush to allow water draining into planter.
- **Finish:** Polished top, flamed finish outer, polished bullnose
- **Colour:** Kobra Green
- **Size:** 15mm bullnose to outer edge.
- **Laid:** 125mm upstand
- **Supplier:** Hardscape or equal and approved

G4 UPSTAND GRANITE KERB - PLANTER EDGING
- **Product:** Raised granite upstand edge to planting area. Corner to be cut out 150mm cube and laid flush to allow water draining into planter.
- **Finish:** Polished top, flamed finish outer, polished bullnose
- **Colour:** Kobra Green
- **Size:** 15mm bullnose to outer edge.
- **Laid:** 20mm upstand
- **Supplier:** Hardscape or equal and approved

ST 1 GRANITE STEPS
- **Product:** Granite steps
- **Finish:** Flamed finish
- **Colour:** Royal White
- **Size:** W 300 x L 2000 & 2805 mm x H 160mm
- **Supplier:** Hardscape or equal and approved

W1 CONCRETE RETAINING WALL
- **Colour:** Buff/natural stone
- **Size:** W 200mm. 15mm bullnose to outer edge.
- **Supplier:** Evans Concrete Products Ltd (OSA) or equal and approved

W2 GRANITE RETAINING WALL
- **Product:** Granite stone retaining wall. Flush to footpath.
- **Finish:** Flamed finish
- **Colour:** Kobra Green
- **Size:** W 300mm x L 814mm x H Various. 15mm bullnose to outer edge. Refer to Detail 20 for more information.
- **Supplier:** Hardscape or equal and approved
- **Other:** 6mm butt jointed

SLOT DRAIN - Proposed to engineers details & final location

SOFTWORKS

SEMI-MATURE TREE
Refer to planting schedule.

SHRUB/PERENNIAL PLANTING
Refer to planting schedule.

INSTANT LOW HEDGE PLANTING
Refer to planting schedule.

STRUCTURE TREE CELLS
To include aeration and watering point accessories.
- **Product:** Rootspace or equal and approved
- **Supplier:** Green Blue Urban or equal and approved
- **Size:** min W 5000 x L 5000 x D 1000mm - 25m3 soil volume per tree

FURNITURE

Bo1 PROPOSED SHALLOW MOUNTED FIXED BOLLARD
- **Product:** Apex Shallow Mount Bollard or equal and approved
- **Supplier:** Heald or equal and approved
- **Size:** 220mm ø x 1020mm height
- **Materials:** Stainless steel with stainless steel cover
- **Other:** With reflective bond to top.

Bo2 PROPOSED AUTOMATIC TELESCOPIC BOLLARD
- **Product:** EVO Bollard or equal and approved
- **Supplier:** Heald or equal and approved
- **Size:** 273mm ø x 1000mm height with 1100mm foundation depth
- **Materials:** Stainless steel with stainless steel cover
- **Other:** With reflective bond to top.

Bo3 PROPOSED MANUAL TELESCOPIC BOLLARD
- **Product:** EVO Bollard or equal and approved
- **Supplier:** Heald or equal and approved
- **Size:** 273mm ø x 1000mm height with 1100mm foundation depth
- **Materials:** Stainless steel with stainless steel cover
- **Other:** With reflective bond to top.

T1 PROPOSED WAYFINDING TOTEM
- **Product:** Bespoke wayfinding totem with lighting to be installed on foundation. Power supply required.
- **Supplier:** Tbc
- **Size:** Approximately size D 200 x W 800 x H 3000mm
- **Materials:** Metal tbc
- **Other:** Subject to further design with street furniture specialist.

P1 PROPOSED TIMBER PLANTERS
Timber slated planter with minimum 75mm bark mulch, 400mm top soil and 50mm pea gravel at the bottom to improve drainage. Soil to incorporate high quality leca to improve soil moisture retention.
- **Product:** Highlife III planter to building entrance.
- **Supplier:** Streetlife or equal and approved supplier.
- **Size:** W 1500 x L 1500 x H 900mm. Internal: H 830mm
- **Materials:** FSC Hardwood
- **Colour:** II - Virgin

P2 PROPOSED RAISED METAL PLANTERS
To servicing yard entrance
- **Product:** Stapel planter edge or equal and approved.
- **Supplier:** Logic or equal and approved.
- **Size:** W 2000 x L 3000 x H 900mm
- **Materials:** Steel
- **Finish:** Powder coated
- **Colour:** RAL 7004

TEMPORARY TIMBER KNEE RAILING
Install in Plot 10B development plot. To be removed before the construction of Plot 10B

C1 PROPOSED CYCLE STANDS
For visitor cycle parking. To be installed on First Street as part of Plot 9A development.

GA1 BESPOKE STEEL SCREEN & GATE
To servicing yard and Pocket Square interface
- **Supplier:** tbc
- **Size:** H 2100mm above ground; Width to be site measured
- **Materials:** Stainless Steel

LIGHTING

L1 PROPOSED BUILDING MOUNTED LIGHTING
- **Product:** Multi Woody Wall Mounted or equal and approved
- **Supplier:** iGuzzini Ltd or equal and approved
- **Size:** 4m mounted above ground, size tbc.
- **Materials:** Optical assembly, arm, base and frame: aluminum alloy.
- **Other:** Indicative locations to engineers details.

L2 PROPOSED PLANTING UPLIGHTER -IN SOFT
- **Product:** 7111 'Light Up Garden', LED:4200 Neutral or equal and approved
- **Supplier:** iGuzzini Ltd or equal and approved
- **Size:** 130mm ø
- **Materials:** Stainless steel
- **Other:** To illuminate feature trees. Indicative location to engineers details.

L3 PROPOSED LIGHTING COLUMN
- **Product:** Multi Woody
- **Supplier:** iGuzzini Ltd or equal and approved
- **Size:** 5m column, 3 light fittings per column
- **Materials:** Optical assembly, arm, base and frame aluminum alloy
- **Finished:** Stainless steel
- **Other:** To illuminate feature trees. Indicative location to engineers details.
- **Other:** Indicative locations to electrical consultants details

Revision	Date	Description	Drawn	Apprvd.
P12	03-07-23	Stage 4 Issue	YH	RM
P11	09-06-23	Updates following workshops	EF	RM
P10	24-04-23	Minor updates	YH	RM
P09	20-04-23	Stage 3 issue	YH	RM
P08	12-04-23	Additional cycle parking	YH	RM
P07	06-04-23	Stage 3 Draft issue	YH	RM
P06	20-03-23	Gas main coordination	VE	RM
P05	13-02-23	Additional planting	YH	RM
P04	12-01-23	Minor amendments	YH	RM
P03	04-01-23	Layout update	YH	RM
P02	15-09-22	Layout update	VE	RM
P01	02-09-22	First Issue	VE	RM

Client: Ask

Project: First Street Plot 10a

Drg Title: General Arrangement

Created on: 02-09-22 | Created by: YH | Approved by: RM

Scale: 1:200 | Size: A1 | Workstage: For tender

Drg No.: PL1471.2-PLA-GF-00-DR-L-0001

Suitability: S4 | Revision: P11

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6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

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RIVER STREET

Future Plot 10b
Development

WILMOTT STREET

Future Plot 9b
Development

HULME STREET

Refuse room FFL under review with JMA.
External levels at servicing yard subject to change.

KEY

SITE BOUNDARY

LEVELS & CONSTRAINTS

31.21+ **SPOT LEVEL - Existing**
Levels as per Topographic Survey

31.21+ **SPOT LEVEL - Proposed**

SLOT DRAIN - Proposed to engineers details & final location

Revision	Date	Description	Drawn	Apprvd.
P06	03-07-23	Stage 4 Issue	YH	RM
P05	24-04-23	Minor updates	YH	RM
P04	20-04-23	Stage 3 issue	YH	RM
P03	06-04-23	Stage 3 DRAFT issue	YH	RM
P02	12-01-23	Minor update	YH	RM
P01	02-09-22	First issue	VE	RM

Client Ask

Project First Street Plot 10a

Drg Title Levels and Drainage

Created on	Created by	Approved by
02-09-22	VE	RM

Scale	Size	Workstage
1:200	A1	For tender

Drg No.
PL1471.2-PLA-GF-00-DR-L-3000

Suitability	Revision
S4	P06

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APPENDIX 8
TYPICAL SUDS DETAILS

Hydro-Brake® Optimum

Reduce Storage Needs

Product Summary

The Hydro-Brake® Optimum Vortex Flow Control is a versatile, self-activating device with a unique geometry designed to harness the energy of vortex flow.

The Hydro-Brake® Optimum is used to maximize savings on new construction projects by minimizing stormwater detention volumes. Also an economical retrofit solution, the Hydro-Brake® Optimum can be installed in over-discharging ponds and catch basins to restrict the outflow without requiring the construction of additional detention volumes.

With large openings that guard against blockages and an installation base upwards of 25,000 units, the Hydro-Brake® is a trusted and proven solution used to reduce the rate of stormwater runoff.

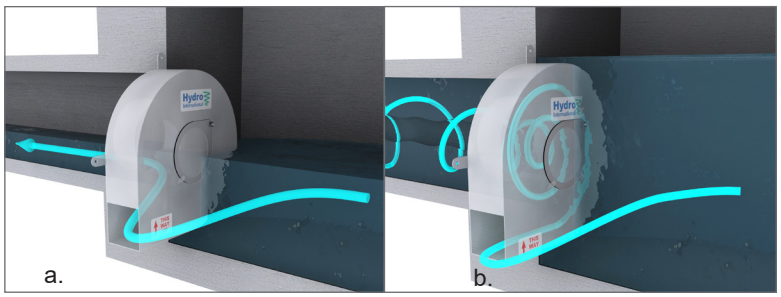


Fig.1 The Hydro-Brake® operates like (a) a large orifice under low flow conditions, and (b) a small orifice under higher flow / higher head conditions when a vortex air core forms within the device and throttles the flow.

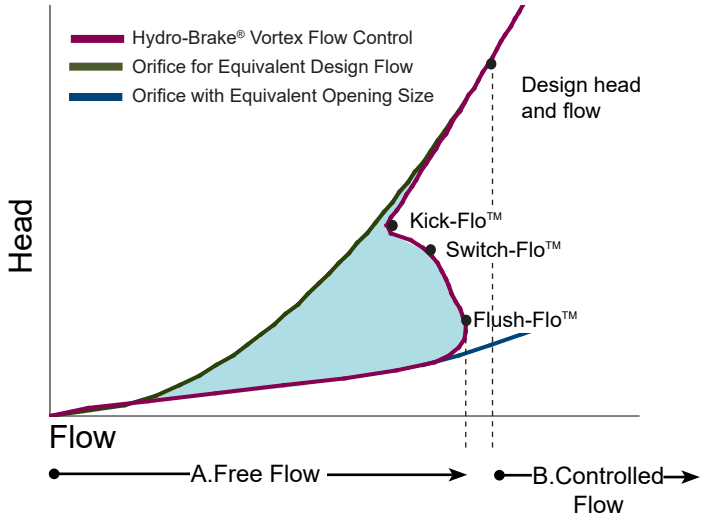


Fig.2 The characteristic of the Hydro-Brake® vs. an equivalent orifice.

The Hydro-Brake® Vortex Flow Control optimizes flow control to allow for higher discharge rates at lower heads than conventional flow control options. The head/discharge curves shown below illustrate the behavior of a Hydro-Brake® Vortex Flow Control compared to an orifice (Fig.2).

How it Works

Reduce Storage Volumes by 40%



The Hydro-Brake® Optimum operates on simple fluid hydraulics. Flow enters the volute tangentially through the inlet. Under low flow conditions, the Hydro-Brake® Optimum acts as a large orifice and water passes directly from the inlet to the outlet (Fig.1a).

As flow increases and reaches the Flush-Flo™ point, high peripheral velocities initiate the throttling action. As head increases, the valve approaches the Switch-Flo™ and Kick-Flo™ points and an air-filled core starts to form in the volute. As head continues to increase, the air core fully stabilizes and the valve discharge is throttled to that of a smaller orifice (Fig.1b).

Benefits

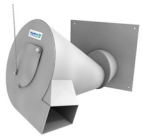
- Reduced stormwater storage volumes by up to 40%
- Up to 50% savings in project storage costs
- Self-activating with no moving parts or power requirements
- Available in wall-mounted or floor-mounted geometries
- Area of opening is 3-6 times larger than the equivalent orifice
- Virtually maintenance free
- Proven performance with over 25,000 installations worldwide

Stormwater Solutions

→ hydro-int.com/hydro-brake

Sizing & Design

Three series of Hydro-Brake® Optimum Vortex Flow Controls are available to suit various applications and design constraints. Refer to the Hydro-Brake® Optimum Design Chart for typical sizing guidelines.

Series	S Series	V Series	C Series
Typical Geometry			
Models	SH STH SXH SMH SMXH	SV SXV SMV	C CX CH
Typical Applications	• Flow control at the inlet of the storm drain system • Outlet flow control for stormwater detention systems	• Erosion control & energy dissipation • Roof runoff control for “Blue Roof” detention schemes	• Outlet flow control for flood dams and levees • Outlet flow control for stormwater detention systems
Typical Mount Style	Wall Mount	Downspout/Roof Mount Floor Mount Pipe Mount	Floor Mount
Typical Diameter Range*	2 - 16 in (5 - 41 cm)	2 - 16 in (5 - 41 cm)	3 - 20 in (7.5 - 51 cm)
Typical Flow Range**	0.05 - 5.6 cfs (1 - 157 L/s)	0.05 - 6.0 cfs (1 - 174 L/s)	0.18 - 14.3 cfs (5.3 - 405 L/s)

**Listed diameter ranges are typical guidelines only. Hydro-Brake® Optimum Vortex Flow Controls can be manufactured to any specified diameter up to 6'.*
***Flow ranges listed are for 4' - 6.5' of head.*
Contact Hydro International for site-specific sizing and design requirements.

Optional Design Accessories

Pivoting Bypass Door



For maintenance access to the outlet pipe.

Curved Backplate



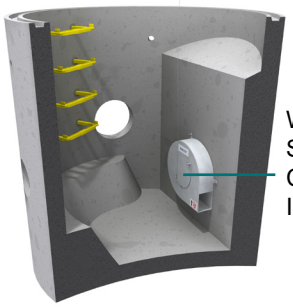
To allow for flush-mounting to the wall of a round manhole.

Vortex Suppressor Pipe

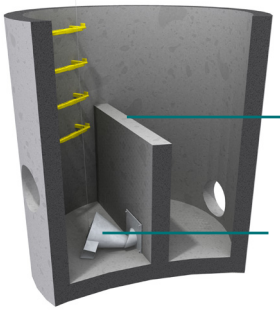


To eliminate air core for emergency bypass.

Typical Chamber Configurations

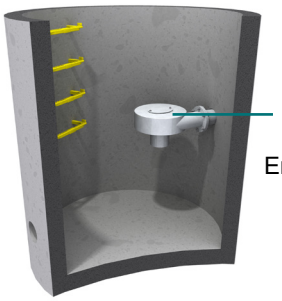


Wall Mounted SXH Model for Catch Basin Inlet Control



Large Storm Bypass Weir

Floor Mounted CH Model for Small Storm Flow Control



Pipe Mounted SXV Model for Energy & Velocity Dissipation

Hydro International®

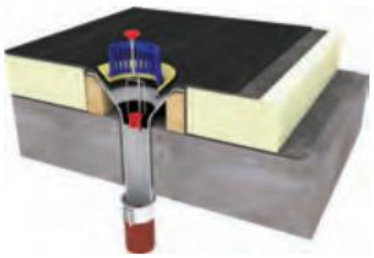
Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200
Email: stormwaterinquiry@hydro-int.com
Web: www.hydro-int.com/hydro-brake

HB_SS_A_2203

Product Datasheet
Alumasc BluRoof Outlet

Description

Alumasc BluRoof rainwater outlets incorporate specially designed flow restrictor inserts, the number and aperture diameters of which are calculated on a job-by-job basis to reduce the rainwater discharge to a specific maximum rate advised by the designer. The unit has an integral vented handle to prevent the drainage becoming siphonic, and a 100mm spigot (outside diameter 110mm). An extended spigot is required where the unit must pass through a concrete slab, to allow accessible coupling.



The units are supplied only as integral parts of fully bespoke Alumasc BluRoof membrane systems.

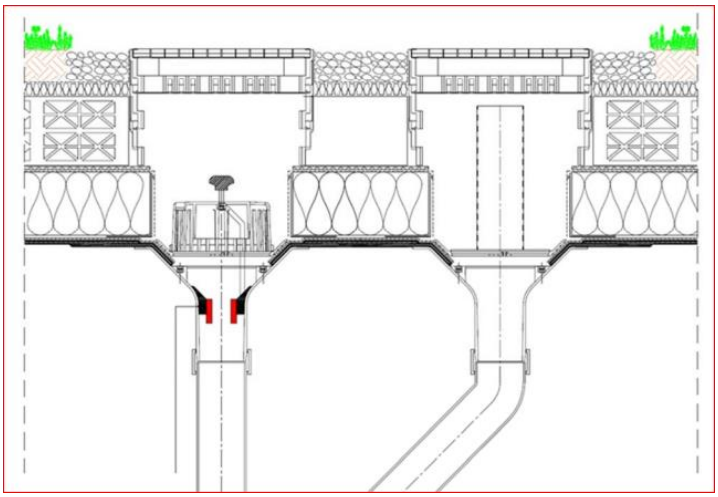
Use

A Blue Roof is a 'SuDS' (Sustainable Drainage System) measure intended to significantly reduce peak rates of rainwater runoff, especially during extreme rainfall events. This is achieved by ensuring the waterproofing system provides the requisite protection to the underlying building and restricting the roof drainage system's capacity in a controlled fashion. The attenuated stormwater is allowed to back-up on the roof and is temporarily detained at roof level for subsequent controlled discharge that is integral to the mitigation of flood risk.

Features

- Restricts stormwater discharge rates
- Provides managed roof attenuation options
- Excellent for urban areas where land excavation is at a premium
- Considerable project cost savings compared to underground excavation

Each BluRoof outlet must be situated adjacent to a standard outlet fitted with an overflow weir (ref OF46), cut to the appropriate height to allow normal gravity overflow should the depth of water exceed the design maximum due to blockage, e.g.



Our company policy is one of continuous research and development; we therefore reserve the right to amend content herein without prior notice.

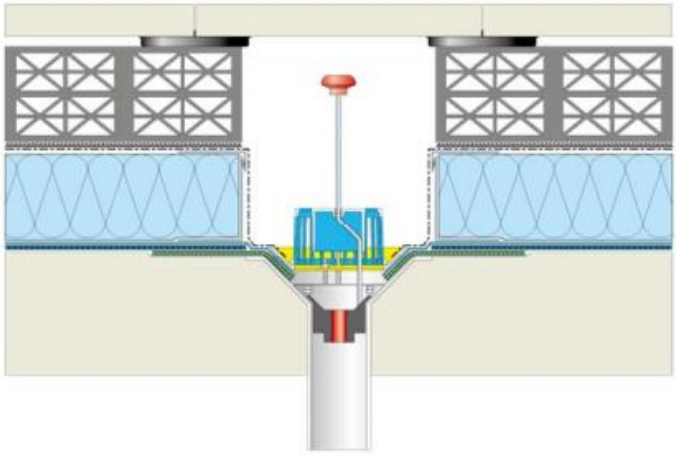
Alumasc Roofing is a trading name of Alumasc Building Products Ltd
Registered in England & Wales No: 2992960

Application

The **Alumasc BluRoof Waterproofing**; the specification, detailing and installation of which is integral to the success of a BluRoof system – protecting the building against water ingress. There are essentially 2 types of BluRoof; each with 2 typical variants:

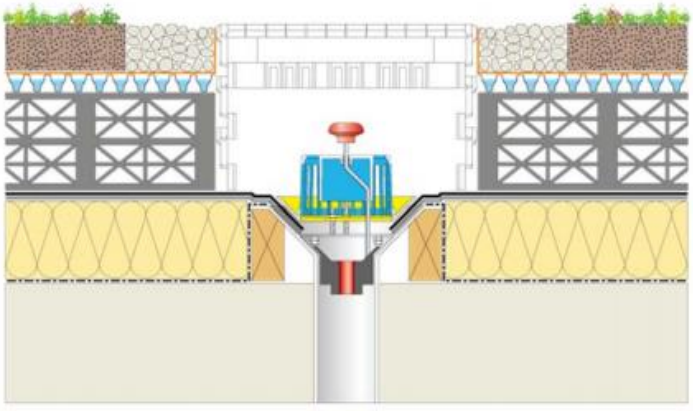
a) Inverted Roof
A roof with the insulation situated above the primary waterproofing layer

- **Podium -** surfaced with paving stones on supports
- **Green roof -** typically comprising vegetation, substrate and water management (or detention, drainage and filtration) layers



b) Warm Roof
A roof with insulation immediately below the primary waterproofing layer and above the independent vapour control layer

- **Open surface -** similar to a conventional flat roof; albeit with extended details to accommodate the higher-than-typical depth of water to be managed at roof level
- **Green roof -** typically comprising extensive green roof vegetation, substrate and water management (or detention, drainage and filtration) layers



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Health & Safety
Safety Data Sheets are available upon request and can also be downloaded directly from www.alumascroofing.com.

Technical Support
Technical advice is available from Alumasc Technical Services at:

Telephone: +44 (0)1744 648400

Email: technical@alumascroofing.com

The company pursues a policy of constant product development and information contained in this publication is therefore subject to change without notice. The customer is responsible for ensuring that each product is fit for its intended purpose and that the conditions for use are suitable. All quoted data is nominal and subject to production tolerances.

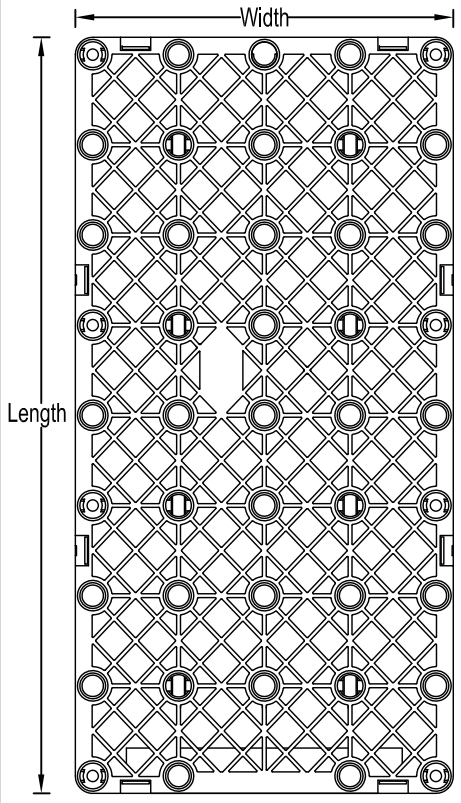
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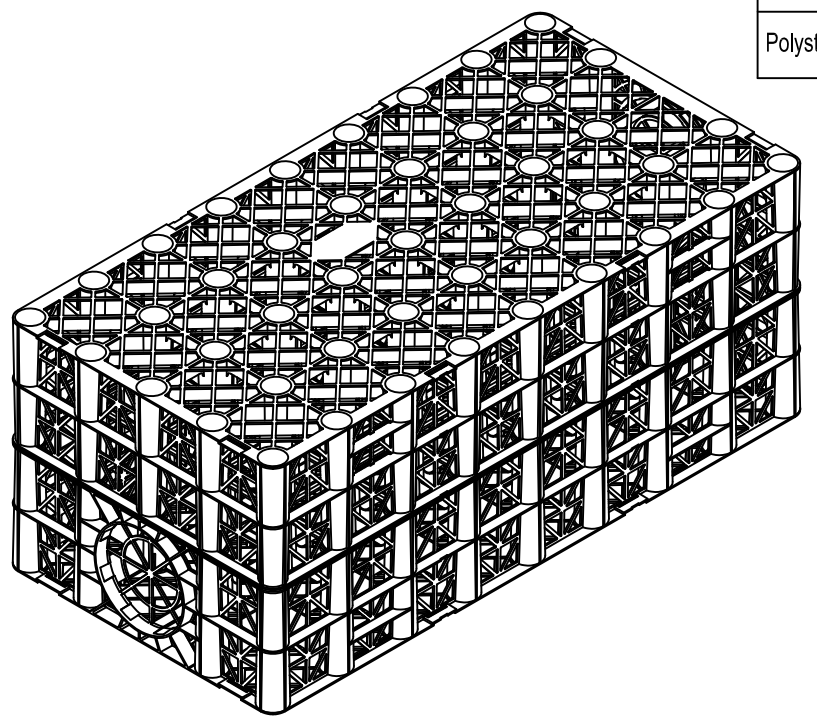
POLYSTORM CELLS

Product Code: PSM1, PSM1A & PSM2

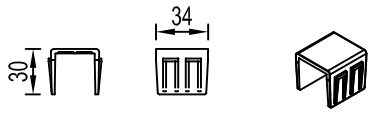
POLYSTORM TABLE									
NAME	CODE	LENGTH (mm)	WIDTH (mm)	HEIGHT (mm)	A (mm)	VERTICAL STRENGTH (kN/m²)	LATERAL STRENGTH (kN/m²)	COLOUR	MATERIAL
Polystorm	PSM1	1000	500	400	25	440	63	Grey	Prime Polypropylene
Polystorm - R	PSM1A	1000	500	400	25	610	63	Black	Recycled Polypropylene
Polystorm Lite	PSM2	1000	500	400	25	200	40	Black	Recycled Polypropylene



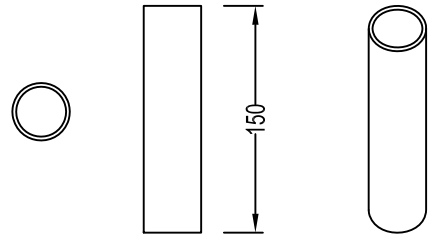
PLAN VIEW
Scale 1:10



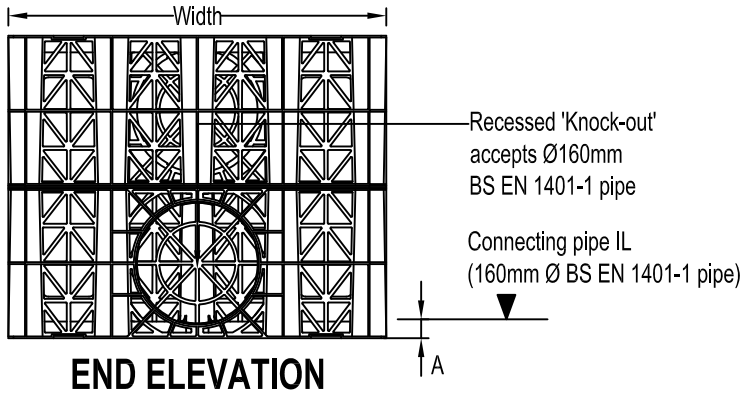
ISOMETRIC VIEW
Scale 1:10



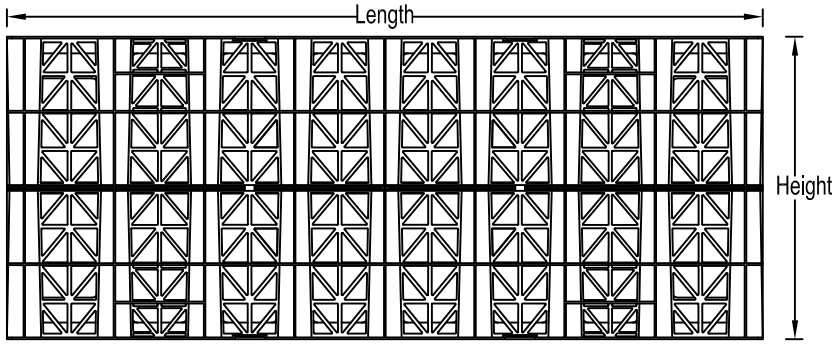
POLYSTORM CLIP
Scale 1:5



POLYSTORM SHEAR CONNECTOR
Scale 1:5



END ELEVATION
Scale 1:10



SIDE ELEVATION
Scale 1:10

POLYSTORM SYSTEM NOTES

1. Polystorm units are available with either a Ø225mm or Ø300mm Ridgidrain socket upon request. Please refer to:- PSM_SD_004

NOTES

1. All dimensions in millimetres, unless otherwise stated.
2. All dimensions are nominal and may vary within manufacturing or construction tolerances.
3. All site temporary and enabling works by others.
4. Polypipe products to be installed in accordance with Polypipe civils recommendations (refer to Polypipe technical guidance for further information), giving due consideration to the requirements of the organisation who will be taking ultimate owner ship of the installation.
5. This drawing is intended for guidance only. Confirmation of the information contained within this document should be sought from the consulting engineers before final design or construction activities commence.

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PROJECT: POLYSTORM STANDARD DETAILS

TITLE: POLYSTORM GEOCELLULAR COMPONENT

STATUS: FOR INFORMATION

DATE: 17/03/16

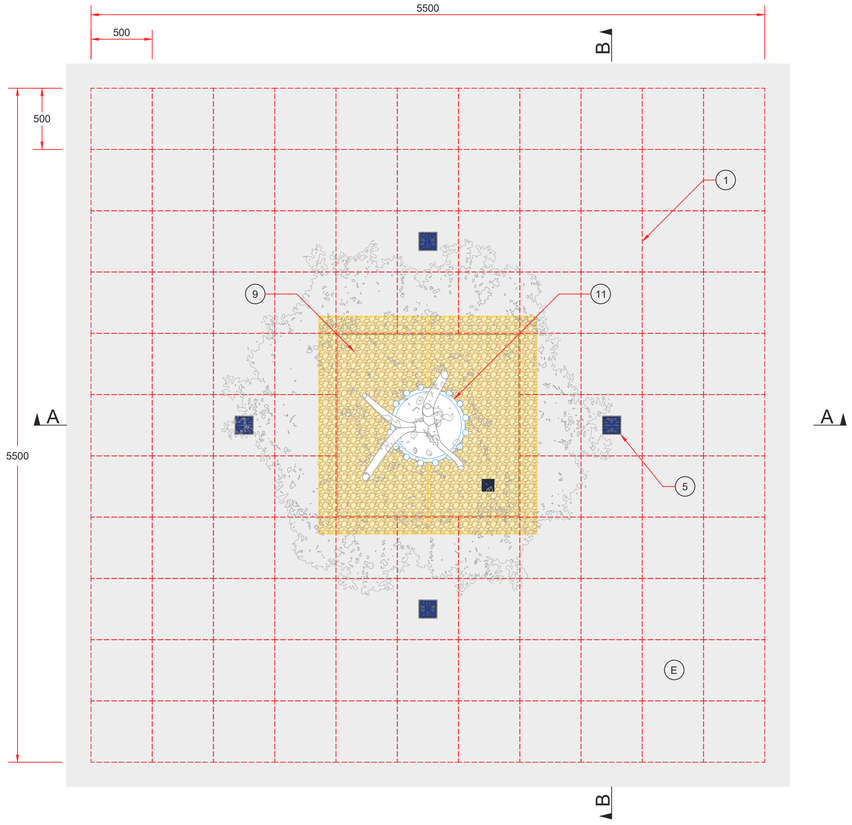
DRAWN BY: JL

ORIGINAL SIZE: A3

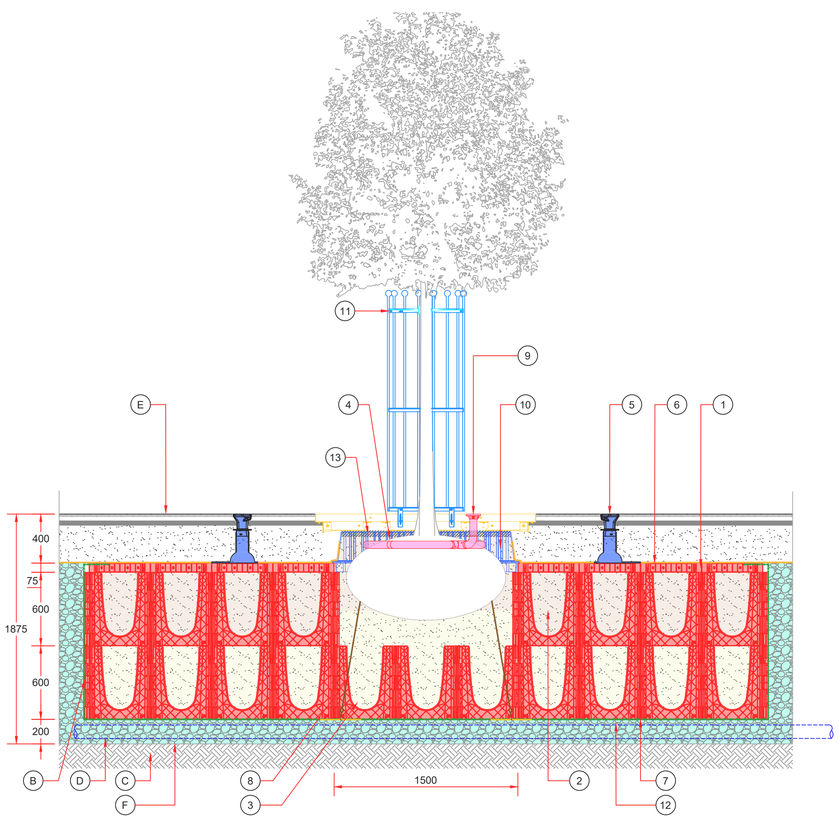
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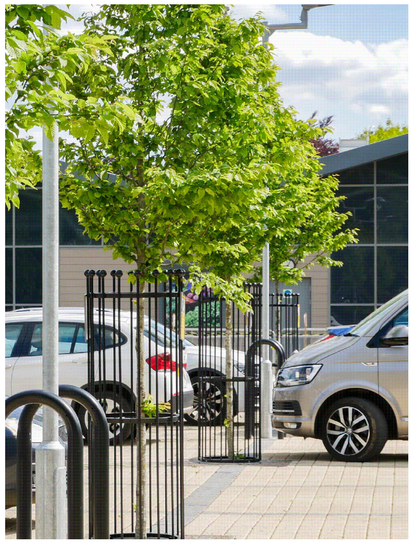
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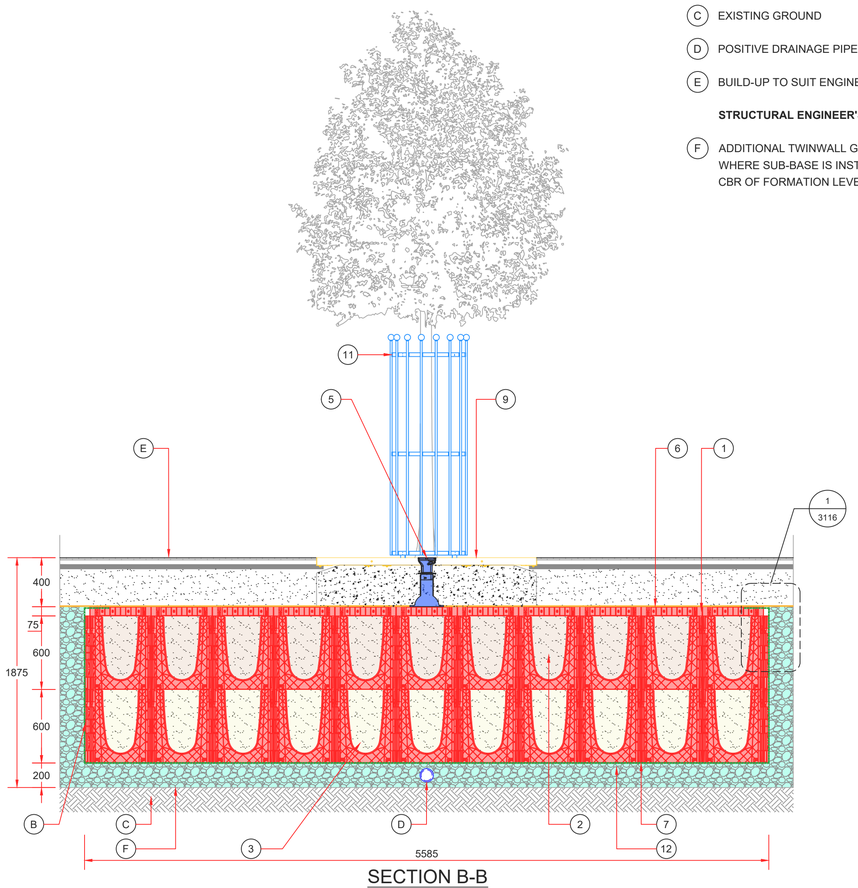


PLAN VIEW

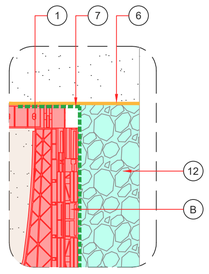


SECTION A-A





SECTION B-B



DETAIL 1

PACKAGE INCLUDES THE FOLLOWING GREENBLUE URBAN PRODUCTS PER TREE:

1. ROOTSPACE @ 1200mm DEPTH (2 UNIT DEEP) C/W TWIN WALLED GEONET & OPEN REINFORCING MESH - GBURS62A
2. ROOTSOIL 20 TOPSOIL FOR USE WITHIN TOP 600 OF SOIL PROFILE - ROOTSOIL20
3. ROOTSOIL SUB SUBSOIL FOR USE WITHIN SOIL PROFILES 600mm OR DEEPER - ROOTSOILSUBA
4. ROOTSTART PROFESSIONAL MYCORRHIZA FUNGI ALLOW 200g PER TREE - RSPMF2.5LA
5. ROOTRAIN ARBORVENT CAST ALUMINUM TRAFFICABLE AERATION INLET WITH 150mm SQUARE TOP AND MANIFOLD - RRARBV150B
6. TWIN WALLED STRUCTURAL GEONET (INCLUDED IN ITEM 1) SEE NOTE 1 - GLTWGNA
7. 20mm OPEN REINFORCING MESH (INCLUDED IN ITEM 1) SEE NOTE 1 - GRN20A
8. ARBORGUY ANCHORPLATE STRAPPED ANCHOR SYSTEM - SASAP12A
9. ARBORESIN PRECAST TREE GRILLE 1800mm SQUARE WITH 600mm CENTRAL APERTURE WITH GALVANISED SUPPORT FRAME INCLUDING ROOTRAIN ARBORVENT IRRIGATION SYSTEM - ARBPC18A
10. ROOTDIRECTOR FOR USE WITH ROOTSPACE TO SUIT ROOTSPACE APERTURE OF 1500mm SQUARE - 1300mm CLEAR APERTURE FOR ROOTBALL - RD1500-RSA
11. ULLSWATER VERTICAL STEEL TREE GUARD 1800mm HIGH X 600mm Ø, INCLUDING TREE GUARD TIE - ULLSSP6A
12. 10mm - 20mm CLEAN ANGULAR DRAINAGE AGGREGATE - GBUDRSA
13. ARBORMULCH BARK MULCH - GBUMULCHA

NOTES:

A. ALLOW 20% ADDITIONAL FOR GEOTEXTILE AND REINFORCED GEOGRID FOR OVERLAP AND CUTTING REQUIREMENTS

B. INSTALL ROOTSPACE SIDE PANELS TO INSTALLATION AS DIRECTED BY ENGINEER

C. EXISTING GROUND

D. POSITIVE DRAINAGE PIPE (110mm PERFORATED PIPE)

E. BUILD-UP TO SUIT ENGINEER DESIGNS AND REQUIREMENTS

STRUCTURAL ENGINEER'S NOTE:

F. ADDITIONAL TWINWALL GEONET (GLTWGNA) TO BE INSTALLED WHERE SUB-BASE IS INSTALLED BELOW 3% CBR - MINIMUM 2% CBR OF FORMATION LEVEL TO BE ASSESSED BY ENGINEER

NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. GROUND INVESTIGATION SHOULD BE UNDERTAKEN PRIOR TO CONSTRUCTION STAGE. INFILTRATION TESTING TO BE UNDERTAKEN TO BRE365 STANDARDS AND MONITORING OF GROUND WATER LEVEL TO BE UNDERTAKEN TO ASSESS THE MAXIMUM WATER LEVEL.
3. GREENBLUE PRODUCTS SHOWN IN THE COLORS ARE INDICATIVE ONLY ORIGINAL COLOR VARIES.

* * SOIL VOLUME FOR THIS DESIGN : 34.95m^3 IN ROOTSPACE

Rev.	Date	Description of revision	Drawn	Checked	Reviewd	Approv'd
C	OCT2021	Standard Drawing GBU 3116	BK	SF	SF	SF
C	SEP2022	Standard Drawing GBU 3116	EB	SF	SF	SF

DRAWING STATUS

APPROVED

CLIENT

GREENBLUE URBAN

SCHEME TITLE

TREE PRODUCT PACKAGES

DRAWING TITLE

TREE PIT FOR VERY LARGE TREE SPECIES IN HARD LANDSCAPE, ROOTSPACE 1200

DRAWING UNITS U.N.O.	SCALE AT A1 (841x594mm)
ALL DIMENSIONS IN MILLIMETERS UNLESS STATED OTHERWISE	1:25@ A1

DRAWING No.	REV.
GBU-STANDARD-3116	C

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