

# Trade City Sharston: Drainage Strategy

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## Revision Schedule

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## **Executive Summary**

The Site comprises land and buildings on Sharston Road, within Sharston Industrial Estate, outlined in red on the submitted Site Location Plan. It measures approximately 1.6ha and is predominantly flat and broadly rectangular in shape.

The Site was until recently occupied by Electrium Sales Ltd (a subsidiary of Siemens) and comprises a collection of industrial buildings developed over time for the purposes of manufacturing and distribution (Class B2/ B8). Buildings occupy almost the entirety of the Site, with limited areas of parking and landscaping provided to the northern, western and southern borders. Access to the Site is made from two principal access points from Sharston Road and Harper Road.

The Site is bound by Harper Road, to the south, Sharston Road to the west, Longley Lane to the north and existing industrial buildings to the east. To the south, east and west of the Site are predominantly commercial uses within Sharston Industrial Estate. To the north, across Longley Lane, lies residential uses, a nursery, medical centre and primary school.

The proposal for the surface water is to discharge to an existing 600mm diameter culverted watercourse present in Sharston Road. No response has been received at the time of submission from Manchester City Council as to whether they own the asset, and therefore, whether they can provide permission to connect the site drainage. The site flows will be attenuated via two tanks and will discharge via two separate Hydrobrakes at a rate of 1.8 l/s per Hydrobrake.

The preferred foul connection point is to the north of the site, utilising an existing lateral connection which discharges into a combined sewer in Longley Lane. This means that we would not have to lay a new drain within the highway. This solution has been agreed with United Utilities.

All drainage elements will be regularly maintained by a nominated management company on behalf of the client/occupier.



# **1 Chapter 1**

## **1.1 Introduction**

This report has been prepared by Stantec on behalf of Kier Sharston Limited to support the planning application. The proposed development seeks full planning permission for the development of industrial and logistic units. The proposed development site plan is included in Appendix A.

The site measures approximately 1.6ha and is predominantly flat and broadly rectangular in shape. The site was occupied by Electrium Sales Ltd (a subsidiary of Siemens) and comprises a collection of industrial buildings developed over time for the purpose of manufacturing and distribution (Class B2/B8).

This document sets out the proposed strategy for surface water and foul drainage for the development.



## 2 Development Description and Location

### 2.1 Site Location

The site is referenced in Table 1, and a location plan is provided in Figure 1.

*Table 1 - Site Referencing Information*

| Site Referencing Information    |                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site Name                       | Trade City Sharston                                                                                                                                                                                                                                                                                                                                                      |
| Site Address & Location         | Former Electrium Sales Ltd SAITE, 1934 Sharston Road, Wythenshawe                                                                                                                                                                                                                                                                                                        |
| Local Planning Authority        | Manchester City Council                                                                                                                                                                                                                                                                                                                                                  |
| Approximate Grid Reference      | E 383253 N 389328                                                                                                                                                                                                                                                                                                                                                        |
| Site Area                       | 1.6 hectares                                                                                                                                                                                                                                                                                                                                                             |
| Topography                      | The site is generally level with no significant slopes. See Appendix B for full topographical survey.                                                                                                                                                                                                                                                                    |
| Description of development      | Erection of two storey warehouse units (Use Class B2/B8), including ancillary office and trade counters, with all associated works including landscaping, car parking and alterations to access arrangements.                                                                                                                                                            |
| Proposed use                    | Nine industrial warehouse units (Class B2/B8) including provision for ancillary offices                                                                                                                                                                                                                                                                                  |
| Boundaries and Surrounding Land | The site is bound by Harper Road, to the south, Sharston Road to the west, Longley Lane to the north and existing industrial buildings to the east. To the south, east and west of the site are predominantly commercial uses within Sharston Industrial Estate. To the north, across Longley Lane, lies residential uses, a nursery, medical centre and primary school. |





Figure 1 - Site Location



## 3 Drainage Strategy

### 3.1 Existing Site Drainage

The total site area is 1.6 hectares, which will all be developed area. The site was previously occupied by Electrium Sales Ltd (a subsidiary of Siemens) and comprises a collection of industrial buildings developed over time for the purpose of manufacturing and distribution (Class B2/B8) therefore the existing site is considered as brownfield.

The topographical survey (Appendix B), and the GPR survey (Appendix C), shows the arrangement of the existing drainage network. The existing surface water network and foul water network currently discharge into a United Utilities combined sewer. It is proposed to utilise some of the existing network that provides the required depths for a gravity connection.

United Utilities pre-development enquiry sewer records indicate that there was a watercourse prior to being culverted (Appendix D). It also indicates that there is existing private surface water sewer that runs north of the development flowing from south to north, within Sharston Road. Two separate emails were sent (Appendix E) to determine if this is a Manchester City Council owned/adopted drain as it is not a United Utilities asset. No response has been received at the time of the submission.

### 3.2 Infiltration

A ground investigation was conducted by Hydrock (now Stantec) document reference 35838-HYD-XX-XX-RP-GE-0001. The report states that '*The post fieldwork monitoring between those boreholes where levels were obtained appear to show the shallow groundwater in the Glaciofluvial Sheet Deposits, is flowing towards the northeast from 33.26m AOD to 32.84m AOD.*' Therefore, infiltration into the ground is not considered feasible due to the high groundwater levels.



### 3.3 Sustainable Drainage Systems (SuDS)

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed to manage both the environmental risks resulting from the urban runoff and to contribute, wherever possible, to environmental enhancement. Therefore, SuDS objectives are to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

SuDS help to mimic the natural flow of water ensuring that both the quantity and quality of the surface water is dealt with before feeding it into the drainage network. SuDS features usually come with added maintenance; however, the benefits they reap are considered to outweigh this. The selection of the most appropriate SuDS features should consider constraints, requirements and maintenance of the site. It should be remembered that Local Planning Authorities expect SuDS to be investigated on construction projects. The implementation of SuDS features can assist in achieving the drainage requirements set out in the National Planning Policy Framework.

A strong design theme is essential if maximum aesthetic benefits are to be gained from the SuDS approach. At a more local scale SuDS should be linked with the individual plot structure, planting and amenity areas, gaining multiple benefits from a limited area of land.

The 'Management Train Approach' should be central to the surface water drainage strategy of a proposed site. The main objective is the treatment and control of runoff as near to source as possible, thus protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

- » Prevention - The use of good site design and housekeeping measures to prevent runoff and pollution (e.g. rainwater re-use).
- » Source Control - Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
- » Site Control - Management of water in a local area (e.g. ground storage/attenuation, detention ponds/basins).
- » Regional Control - Management of water from a site or various sites (e.g. wetlands, balancing ponds).

The SuDS philosophy for a development site is the promotion of Pollution Prevention and Site Control Techniques. The following design philosophy is proposed:

- » Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to conveyance.
- » Surface water discharge into the private surface water network located within Sharston Road
- » Site Control features (attenuation) to accommodate the additional surface water runoff generated by the development site before discharging into the private surface water network.



- » Provision of suitable oil separators in line with Pollution Prevention Guidance 3 criteria (where applicable).
- » Aim to limit, where possible, the impermeable fraction of development.

A review of the possible SuDS solutions that are feasible include:

- » Permeable Paving
- » Attenuation Tanks

### **3.4 Prevention and Source Control – Principles and Objectives**

The main objective of prevention and source control is the treatment and control of runoff as near to source as possible. Application of these techniques will require reduction of impermeable areas and techniques to restrict the runoff rates.

Prevention measures to be considered, where possible, as part of the overall approach to the management train at this site include rainwater harvesting. Typical examples are given in the SuDS Manual (Ciria C697) and are briefly described in Table 2 below. It must be noted that the effectiveness of each system is dependent on the final design as well as the actual site conditions.



## Trade City Sharston Drainage Strategy

Table 2 - SuDS Consideration

| SuDS Group   | Technique               | Image                                                                              | Description                                                                                                                                                                                 | Advantages                                                                                                                                    | Disadvantages                                                                  | Suitable for use on site?                            |
|--------------|-------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------|
| Retention    | Balancing Pond/Swale    |   | Provides both storm water attenuation and treatment. Run-off from each rain event is detained and treated in the pool. The retention time promotes pollutant removal through sedimentation. | Good removal of pollutants, can be used where groundwater is vulnerable, good community acceptability, high ecological, and amenity benefits. | No reduction in run-off volume, land take may limit use in high density sites. | Unsuitable due to lack of available land.            |
|              | Sub-Surface Attenuation |  | Oversized pipes, tank systems and modular geo-cellular systems that can be used to create a below ground storage structure.                                                                 | Modular and flexible, dual usage (infiltration/storage, high void ratios), can be installed beneath trafficked and soft landscaped areas.     | No water quality treatment.                                                    | Sub-surface storage can be used.                     |
| Infiltration | Infiltration Trench     |                                                                                    | Surface water run-off can be discharged directly to ground for infiltration by soakaways,                                                                                                   | Reduces the volume of run-off, effective at pollutant removal,                                                                                | Requires appropriate pre-treatment, basins require a                           | Infiltration is not considered to be feasible due to |
|              | Infiltration Basin      |                                                                                    |                                                                                                                                                                                             |                                                                                                                                               |                                                                                |                                                      |



## Trade City Sharston Drainage Strategy

|                  |                  |                                                                                    |                                                                                                                                                                        |                                                                                                                                                                                                               |                                                                                                                        |                                                                                                     |
|------------------|------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|                  | Soakaway         |   | basins, or trenches. A prerequisite is that both groundwater and ground conditions are appropriate to receive the quality and quantity of water generated.             | contributes to groundwater recharge, simple and cost effective, easy performance observation.                                                                                                                 | large flat area, offset from foundations.                                                                              | shallow groundwater                                                                                 |
|                  | Porous Paving    |   | Block or porous paving allows run-off to infiltrate through to sub base layer. Water can then be infiltrated into ground or conveyed into storage or drainage systems. | Reduces the volume of run-off and if designed for infiltration contributes towards groundwater recharge. Easy to install and retrofit. Simple to manage. If lined can be used where groundwater is sensitive. | Not suitable for heavily trafficked areas or adoptable roads. Requires regular sweeping to prevent clogging with dirt. | Permeable paving with a liner may be used which will be conveyed into the proposed drainage system. |
|                  | Permeable Paving |                                                                                    |                                                                                                                                                                        |                                                                                                                                                                                                               |                                                                                                                        |                                                                                                     |
| <b>Detention</b> | Detention Basin  |  | Surface storage basins that provide flow control through attenuation. Normally dry and in certain situations the land may also function as a recreational facility.    | Cater for a wide range of rainfall events, can be used where groundwater is vulnerable, potential for dual land use, easy to maintain.                                                                        | Land take, little reduction in run-off volume, detention depths constrained by levels.                                 | Unsuitable due to lack of available land.                                                           |



## Trade City Sharston Drainage Strategy

|                       |                      |                                                                                    |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                  |                                                                                                                                                                                          |                                                                      |
|-----------------------|----------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                       | Enhanced Dry Swale   |   | Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate.                                                                                                                                                                         | Incorporate into landscaping, good removal of pollutants, reduces run-off rates and volumes, low cost.                                                                                                                           | Not suitable for steep areas, significant land take, not suitable in areas with roadside parking.                                                                                        | Unsuitable due to lack of available land.                            |
|                       | Enhanced Wet Swale   |                                                                                    |                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                  |                                                                                                                                                                                          |                                                                      |
| <b>Source Control</b> | Green/Brown Roof     |   | 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.                                                                                                            | Mimics greenfield state of building footprint for high density developments, good removal of pollutants, ecological benefits, insulates buildings, sound absorption.                                                             | Additional weight, not appropriate for steep roofs, maintenance of roof vegetation.                                                                                                      | Unsuitable due to the additional weight on the large span structure. |
|                       | Rainwater Harvesting |  | Like the use of water butts this prevention method stores rainwater runoff from roofs and external areas in below ground tanks. The water can then be used for irrigation purposes to the soft landscaping areas or alternatively pumped to an internal storage tank where the 'Grey' water can be used for WC's and washing machines. | Harvested grey water will collect and automatically be used for various systems, such as toilet flushing, outside taps etc. The result will be less water usage and cheaper bills and a greener building or commercial premises. | Rainfall is hard to predict and sometimes little or no rainfall can limit the supply of rainwater. It also should have a "mains water" top up to ensure that you don't run out of water. | Unsuitable due to lack of available land.                            |
| <b>Filtration</b>     | Surface Sand Filter  |                                                                                    | Structures designed to treat surface water run-off through                                                                                                                                                                                                                                                                             | Flexibility of design, efficient in removing                                                                                                                                                                                     | Not for high sediment content,                                                                                                                                                           | There is no requirement for                                          |



## Trade City Sharston Drainage Strategy

|  |                            |                                                                                    |                                                                                                                                                                                                                                                            |                                                                                                                                                                                               |                                                                                                                                                |                                                                              |
|--|----------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|  | Sub-surface Sand Filter    |   | filtration using a sand bed filter medium. The filters can be designed with or without infiltration. Temporary storage of run-off is achieved through ponding above the filter layer. They are used where particularly high pollutant removal is required. | pollutants, suitable for retrofits and in tightly constrained urban locations.                                                                                                                | detention times can support algae growth, minimum hydraulic head of 1.2m required, possible odour problems, high capital and maintenance cost. | high pollution reduction at this site.                                       |
|  | Perimeter Sand Filter      |                                                                                    |                                                                                                                                                                                                                                                            |                                                                                                                                                                                               |                                                                                                                                                |                                                                              |
|  | Bioretention/ filter swale |   | Vegetated strips of land designed to accept run-off as overland sheet flow between a hard-surfaced area and a receiving system.                                                                                                                            | Landscaping features, effective in removing pollutants, flexible layout to fit into landscape, suited for highly impervious areas, good retrofit, capability, effective pre-treatment option. | Requires landscaping and management, large land required, not suitable for steep sites; no significant attenuation or reduction of flows.      | No requirement for high pollution reduction; large land areas not available. |
|  | Filter trench/drain        |  | Shallow excavations filled with rubble or stone that create temporary subsurface storage for filtration of storm water run-off. Receive lateral inflow from an adjacent impermeable surface.                                                               | Hydraulic benefits achieved with filter trenches; trenches can be incorporated into site landscaping and fit well beside roads and car parks.                                                 | High clogging potential without effective pre-treatment, limited to small catchments, high cost of replacing filter material.                  | Filter drains can be used.                                                   |



## Trade City Sharston Drainage Strategy

|                   |                            |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
|-------------------|----------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conveyance</b> | Conveyance Swales          |   | Formal linear drainage features in which surface water can be stored or conveyed. They can be incorporated with water features such as ponds or waterfalls where appropriate.                                                                                                                       | Negate the need for underground pipework. Can provide some attenuation. Possible reduction in run-off volume via plant uptake and infiltration. | Potential trip/wheel hazard, disabled access issues.                                                     | Could be used where conveyance is required but the lack of formal outside spaces at the site makes the aesthetic aspects unnecessary. |
|                   | Rills                      |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
| <b>Wetland</b>    | Shallow Wetland            |  | Wetlands provide storm water attenuation and treatment. They comprise shallow ponds and marshy areas, covered in aquatic vegetation.<br><br>Wetlands detain flows for an extended period to allow sediments to settle and to remove contaminants. They can provide significant ecological benefits. | Good pollutant removal and if lined can be used where groundwater is vulnerable. Good community acceptability, ecological and amenity benefits. | Land take is high, requires base flow, little reduction in run-off volume, not suitable for steep sites. | Unsuitable due to lack of available land.                                                                                             |
|                   | Extended Detention Wetland |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
|                   | Pond Wetland               |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
|                   | Pocket Wetland             |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
|                   | Submerged Gravel Wetland   |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |
|                   | Wetland Channel            |                                                                                    |                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 |                                                                                                          |                                                                                                                                       |



## 3.5 Surface Water Drainage Strategy

The site was previously used occupied by Electrium Sales Ltd (a subsidiary of Siemens) and comprises a collection of industrial buildings developed over time for the purpose of manufacturing and distribution (Class B2/B8) therefore the existing site is considered as brownfield. However, in accordance with the DEFRA non-statutory guidance for SuDS (2015) the surface water drainage discharge rate shall mimic the natural greenfield characteristics of the site as it is a new connection into the culverted watercourse.

### 1.3.7 Non-statutory guidance for SuDS

The non-statutory guidance<sup>6</sup> for SuDS published by DeFRA (2015), sets out the technical Standards for SuDS systems in England. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year and 1 in 100-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 must be as close as reasonably practicable to the equivalent greenfield runoff rate over the same area; never exceeding the rate of discharge from the development prior to redevelopment for any event.

The total greenfield runoff rate for the proposed developed area is 3.6l/s based on Qbar (see Appendix D). The greenfield runoff rate has been produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://www.uksuds.com).

Surface Water Drainage Strategies must follow the hierarchy of surface water disposal as set out in Building Regulations – Approved Document H, as listed below.

- » Option 1 - Into the ground (infiltration)
- » Option 2 - To a watercourse
- » Option 3 - To a public/private sewer

Due the presence of shallow groundwater infiltration into the ground is not considered feasible.

There is a culverted watercourse present in Sharston Road, this is marked as a private drain on the sewer records, as seen in Appendix D. Therefore, based on the hierarchy, Option 2 is the preferred method, whereby surface water will discharge into the nearest private surface water running within Sharston Road. This is subject to agreement with the asset owner.

If the asset owner does not grant approval, the alternative option would be to discharge to the combined sewers running within Sharston Road and Longley Lane.

Surface water run-off from roof and external areas will be directed to the below ground gravity network, run-off from car parks will pass through an oil interceptor before joining the wider private drainage network of carrier drains and will be attenuated prior to outfall, where it will discharge at a restricted rate of 3.6l/s into the culverted watercourse (see Appendix G for Proposed Drainage drawing).



## Trade City Sharston Drainage Strategy

A hydraulic model has been created using drainage software as part of the preliminary drainage design, which defines pipe sizes and attenuation volumes. Hydraulic calculations have been provided in Appendix H. It is noted that these rates and volumes are preliminary and may change at detailed design stage when more specific information is available.

An allowance for 45% climate change is to be incorporated into the surface water drainage design for the 1 in 100 year storm event in accordance with local and national planning policy as seen in Figure 2 below.

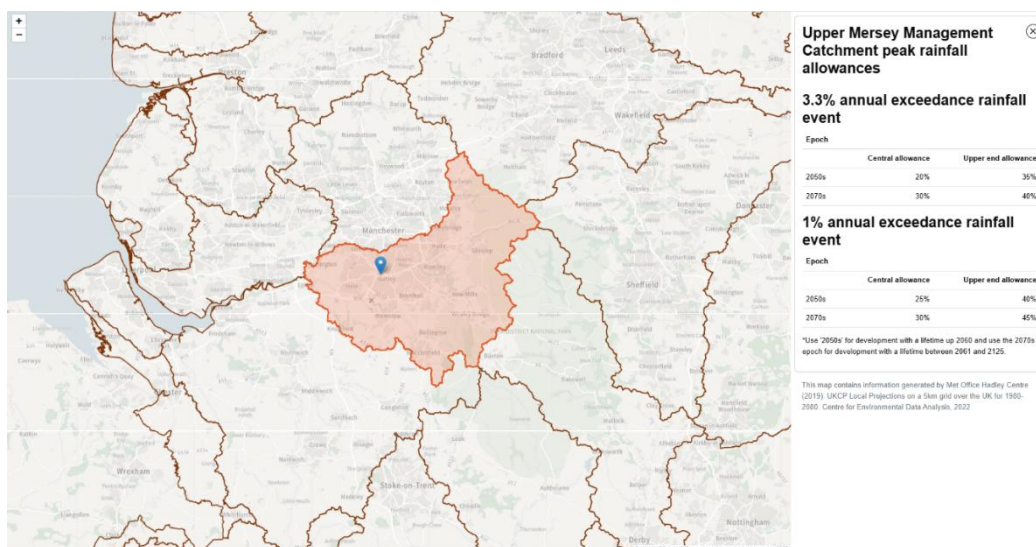


Figure 2 - Climate Change Allowance

The proposed drainage layout is designed in accordance with Design and Construction Guidance. No above ground flooding should occur for the 1 in 30-year storm event and the 1 in 100-year + 45% climate change events. There is no exceedance for 100 years + 45%. An overland flow plan has been produced to show the outcome in the event of a major blockage at the outfall. (Appendix I).

The surface water below ground gravity drainage system is to provide connections from all new rainwater pipes, channels, gullies and road gullies at ground floor level. The locations of the drainage components are to be fully coordinated with all relevant architectural, landscaping and services drawings.

HGV yards are considered to have a high pollution hazard level. To mitigate this, the use of suitable oil separators has been considered.

Gullies and drainage channels will be specified with silt traps and catch pits will be incorporated in the drainage system to reduce the risk of silt getting into the surface water network.

The drainage system should be designed so that flooding does not occur during the 1 in 100-year rainfall event in any part of the building.



## 3.6 Water Quality

The primary pollution control measure for the infrastructure elements will be in the form of an oil interceptor. Additionally, SuDS features (filter drain and permeable paving) have been integrated into the design to manage pollution for a portion of the site. Further pollution control will be provided in the form of trapped gullies.

The site mainly comprises of commercial/industry roof, commercial yard, access roads, and parking, which have pollution hazard levels ranging from low to high in accordance with CIRIA C753 table 26.2 as below.

Table 3 - CIRCA C753 Table 26.2

| Land use                                                                                                                                                                                                                                                                                                               | Pollution hazard level | Total suspended solids (TSS) | Metals                                                                     | Hydro-carbons    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|----------------------------------------------------------------------------|------------------|
| Residential roofs                                                                                                                                                                                                                                                                                                      | Very low               | 0.2                          | 0.2                                                                        | 0.05             |
| Other roofs (typically commercial/ industrial roofs)                                                                                                                                                                                                                                                                   | Low                    | 0.3                          | 0.2 (up to 0.8 where there is potential for metals to leach from the roof) | 0.05             |
| Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day                                                                               | Low                    | 0.5                          | 0.4                                                                        | 0.4              |
| Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways <sup>1</sup>                                                                                                                                 | Medium                 | 0.7                          | 0.6                                                                        | 0.7              |
| Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways <sup>1</sup> | High                   | 0.8 <sup>2</sup>             | 0.8 <sup>2</sup>                                                           | 0.9 <sup>2</sup> |



## Trade City Sharston Drainage Strategy

Appropriate SuDS mitigation indices will be provided for each area of the development in accordance with CIRIA C753 table 26.3, as below

Table 4 - CIRIA C753 table 26.3

| Type of SuDS component                       | Mitigation indices <sup>1</sup>                                                                                                                                                                                                                    |        |              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|
|                                              | TSS                                                                                                                                                                                                                                                | Metals | Hydrocarbons |
| Filter strip                                 | 0.4                                                                                                                                                                                                                                                | 0.4    | 0.5          |
| Filter drain                                 | 0.4 <sup>2</sup>                                                                                                                                                                                                                                   | 0.4    | 0.4          |
| Swale                                        | 0.5                                                                                                                                                                                                                                                | 0.6    | 0.6          |
| Bioretention system                          | 0.8                                                                                                                                                                                                                                                | 0.8    | 0.8          |
| Permeable pavement                           | 0.7                                                                                                                                                                                                                                                | 0.6    | 0.7          |
| Detention basin                              | 0.5                                                                                                                                                                                                                                                | 0.5    | 0.6          |
| Pond <sup>4</sup>                            | 0.7 <sup>3</sup>                                                                                                                                                                                                                                   | 0.7    | 0.5          |
| Wetland                                      | 0.8 <sup>3</sup>                                                                                                                                                                                                                                   | 0.8    | 0.8          |
| Proprietary treatment systems <sup>5,6</sup> | These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area. |        |              |

Table 5 - SPEL Oil Interceptor SuDS mitigation

| SPEL ESR Full Flow Treatment System                                                   |      |
|---------------------------------------------------------------------------------------|------|
| Certified Mitigation Index                                                            |      |
| TSS                                                                                   | 0.8  |
| Metals                                                                                | 0.6  |
| Hydrocarbons                                                                          | 0.9* |
| *H R Wallingford test results to BS EN 858: tested to it's maximum designed flow rate |      |

In line with C753 where two or more components in series, the total SuDS mitigation index can be calculated as:



$$\text{Total SuDS mitigation index} = \text{mitigation index}_1 + 0.5 (\text{mitigation index}_2)$$

Where:

$\text{mitigation Index}_n$  = mitigation index for component n

A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

*Figure 3 - Total SuDS mitigation index*

Therefore, following the calculation for Total SuDS mitigation index in CIRIA C753, the carpark has sufficient mitigation from the permeable paving, and the yard will have petrol interceptors to ensure there is sufficient mitigation.

### 3.7 Foul Drainage Strategy

Foul drainage for the new development will be via conventional gravity pipe system which will connect into the existing manhole which is at the north of the site. This has been approved by United Utilities and correspondence can be found in Appendix D.

### 3.8 Management, Maintenance and Residual Risk

The proposed drainage layout will be designed in accordance with building regulations. SuDS guidance will be taken from Ciria C753.

Run-off from roofs is generally clean with limited contamination and will be discharged directly to SuDS planters before entering the proposed drainage infrastructure. Silt is to be prevented from entering the drainage system using trapped gullies, interceptors or using sustainable drainage techniques.

Run-off from car park and other external areas will be treated via proprietary treatment system of a full-retention oil interceptor.

Flood risk to people and property can be managed but it can never be completely removed. Residual risk remains after flood management or mitigation measures have been put in place. This relates to a rainfall event beyond what can be fully quantified.

A private management company will maintain the drainage infrastructure as part of a site-wide management and maintenance schedule as shown in Table 6 - 9.



Table 6 - Below ground drainage (pipe works, manholes, catchpits etc.)

| MAINTENANCE SCHEDULE | REQUIRED ACTION                                                                                                           | TYPICAL FREQUENCY                                |
|----------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| REGULAR MAINTENANCE  | Inspection and identification of any areas that are not operating correctly. remedial action should be taken if required. | Monthly for the first 3 months and then annually |
|                      | Where it may cause risks to performance the removal of debris from the catchment surface is required.                     | Monthly                                          |
|                      | Removal of sediments                                                                                                      | Annually, As required                            |
| REMEDIAL ACTIONS     | Rehabilitation/repair/replace of gratings/covers, inlets, outlets, overflows and vents.                                   | As required                                      |
| MONITORING           | Inspection of inlets, outlets, vents and overflows for the insurance of good condition and operation according to design. | Annually                                         |

Table 7 - Flow Control Chamber

| MAINTENANCE SCHEDULE | REQUIRED ACTION                                                                           | TYPICAL FREQUENCY                                                                                  |
|----------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| REGULAR MAINTENANCE  | Remove litter and debris and inspect for sediment, oil and grease accumulation            | Six monthly                                                                                        |
|                      | Remove sediment, oil, grease and floatable                                                | As necessary - indicated by system inspections or immediately following significant rainfall event |
| REMEDIAL ACTIONS     | Replace malfunctioning parts or structures                                                | As required                                                                                        |
| MONITORING           | Inspect for evidence of poor operation                                                    | Every six months                                                                                   |
|                      | Inspect device and establish appropriate replacement frequencies                          | Every six months                                                                                   |
|                      | Inspect sediment accumulation rates in sump and establish appropriate removal frequencies | Monthly during first half year of operation, then every six months                                 |



Table 8 - Permeable pavements

| MAINTENANCE SCHEDULE   | REQUIRED ACTION                                                                                                                                                                       | TYPICAL FREQUENCY                                                                                                                                                                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REGULAR MAINTENANCE    | Brushing and vacuuming (standard cosmetic sweep over whole surface)                                                                                                                   | Once a year, after autumn leaf fall, or reduced frequency<br>As required, based on site-specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment |
|                        | Stabilise and mow contributing and adjacent areas                                                                                                                                     | As required                                                                                                                                                                                                                                                                                                                     |
| OCCASIONAL MAINTENANCE | Removal of weeds or management using glyphosate applied directly into the weeds by an application rather than spraying                                                                | As required - once per year on less frequently used pavements.                                                                                                                                                                                                                                                                  |
|                        | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving                                               | As required                                                                                                                                                                                                                                                                                                                     |
| REMEDIAL ACTIONS       | Remediate work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required                                                                                                                                                                                                                                                                                                                     |
|                        | Removal of weeds or management using glyphosate applied directly into the weeds by an application rather than spraying                                                                | Every 10 to 15 years or As required (if infiltration performance is reduced due to significant clogging)                                                                                                                                                                                                                        |
| MONITORING             | Initial inspection                                                                                                                                                                    | Monthly for three months after installation                                                                                                                                                                                                                                                                                     |
|                        | Inspect for evidence of poor operation and/or weed growth - if required, take remedial action                                                                                         | Three Monthly, 48h after large storms in first six months                                                                                                                                                                                                                                                                       |
|                        | Inspect silt accumulation rates and establish appropriate brushing frequencies                                                                                                        | Annually                                                                                                                                                                                                                                                                                                                        |
|                        | Monitor inspection chambers                                                                                                                                                           | Annually                                                                                                                                                                                                                                                                                                                        |



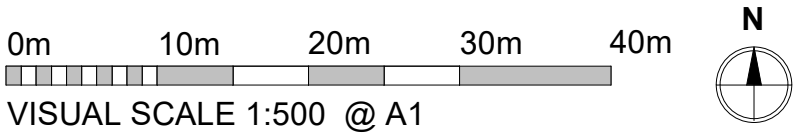
Table 9 - Below Ground Attenuation Tank

| MAINTENANCE SCHEDULE | REQUIRED ACTION                                                                                                                                                                                        | TYPICAL FREQUENCY                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| REGULAR MAINTENANCE  | Inspection and identification of any areas that are not operating correctly. remedial action should be taken if required.                                                                              | Monthly for the first 3 months and then annually |
|                      | Where it may cause risks to performance the removal of debris from the catchment surface is required.                                                                                                  | 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                                         |
|                      | Removal of sediments from pre-treatment structures and/or internal forebays.                                                                                                                           | Annually, As required                            |
| REMEDIAL ACTIONS     | Rehabilitation/repair of inlets, outlets, overflows and vents.                                                                                                                                         | As required                                      |
| MONITORING           | Inspection of inlets, outlets, vents and overflows for the insurance of good condition and operation according to design.                                                                              | Annually                                         |
|                      | Structural and sediment survey to be conducted in the interior of the tank for structural condition and sediment build-up and remedial action, silt removal if necessary.                              | Every 5 years or As required                     |



## **Appendix A – Site Plan**





05-XX\_Site Finishes Key Copy 1

- Proposed Planning boundary
- Reinforced concrete service yard inc. dock ramp. Refer to Civil Engineers details for construction / sub-base build ups
- Tarmacadam surface to vehicular access road. Refer to Civil Engineers details for construction / sub-base build ups
- Traffic Island. Refer to Civil Engineers details for further information
- Proposed areas of soft landscaping (trees / planting / hedgerows) in accordance with Landscape Architect details
- Extent of existing trees and root protection zones (dashed orange) in accordance with Arboricultural Survey to BS5837:2012. Reference number as outlined in tree survey
- Extent of existing groups of trees/planting with root protection zones (dashed orange) in accordance with Arboricultural Survey to BS5837:2012. Reference number as outlined in tree survey
- Extent of existing hedgerows with root protection zones (dashed orange) in accordance with Arboricultural Survey to BS5837:2012. Reference number as outlined in tree survey
- New trees in accordance with Landscape Architects details
- Extent of first floor accommodation space to each unit (office & core)
- Proposed Native Scrub Planting Mix  
To be planted as bare root stock, 60-80cm, planted at 1 shrub per 2-3m<sup>2</sup> including dog rose, bramble, elder, guelder rose.
- Bollards



1 05-ZZ\_Site Plan as Proposed Copy 1  
1 : 500

| 92-XX_Gross Internal Area (GIA) |                        |                        | 92-XX_Gross External Area (GEA) |                      |                        |
|---------------------------------|------------------------|------------------------|---------------------------------|----------------------|------------------------|
| Name                            | Area                   |                        | Name                            | Area                 |                        |
|                                 | Metric                 | Imperial               |                                 | Metric               | Imperial               |
| Unit 1                          |                        |                        | Unit 1                          |                      |                        |
| Warehouse                       | 2,790 m <sup>2</sup>   | 30,032 ft <sup>2</sup> | Ground Floor                    | 2,899 m <sup>2</sup> | 31,205 ft <sup>2</sup> |
| First Floor                     | 279 m <sup>2</sup>     | 3,003 ft <sup>2</sup>  | First Floor                     | 314 m <sup>2</sup>   | 3,379 ft <sup>2</sup>  |
|                                 | 3,069 m <sup>2</sup>   | 33,035 ft <sup>2</sup> |                                 | 3,213 m <sup>2</sup> | 34,584 ft <sup>2</sup> |
| Unit 2                          |                        |                        | Unit 2                          |                      |                        |
| Warehouse                       | 698 m <sup>2</sup>     | 7,513 ft <sup>2</sup>  | Ground Floor                    | 741 m <sup>2</sup>   | 7,977 ft <sup>2</sup>  |
| First Floor                     | 125 m <sup>2</sup>     | 1,345 ft <sup>2</sup>  | First Floor                     | 145 m <sup>2</sup>   | 1,558 ft <sup>2</sup>  |
|                                 | 823 m <sup>2</sup>     | 8,859 ft <sup>2</sup>  |                                 | 886 m <sup>2</sup>   | 9,535 ft <sup>2</sup>  |
| Unit 3                          |                        |                        | Unit 3                          |                      |                        |
| Warehouse                       | 558 m <sup>2</sup>     | 6,006 ft <sup>2</sup>  | Ground Floor                    | 585 m <sup>2</sup>   | 6,300 ft <sup>2</sup>  |
| First Floor                     | 139.5 m <sup>2</sup>   | 1,502 ft <sup>2</sup>  | First Floor                     | 157 m <sup>2</sup>   | 1,687 ft <sup>2</sup>  |
|                                 | 697.5 m <sup>2</sup>   | 7,508 ft <sup>2</sup>  |                                 | 742 m <sup>2</sup>   | 7,987 ft <sup>2</sup>  |
| Unit 4                          |                        |                        | Unit 4                          |                      |                        |
| Warehouse                       | 465 m <sup>2</sup>     | 5,005 ft <sup>2</sup>  | Ground Floor                    | 489 m <sup>2</sup>   | 5,265 ft <sup>2</sup>  |
| First Floor                     | 116.3 m <sup>2</sup>   | 1,251 ft <sup>2</sup>  | First Floor                     | 131 m <sup>2</sup>   | 1,410 ft <sup>2</sup>  |
|                                 | 581.3 m <sup>2</sup>   | 6,257 ft <sup>2</sup>  |                                 | 620 m <sup>2</sup>   | 6,675 ft <sup>2</sup>  |
| Unit 5                          |                        |                        | Unit 5                          |                      |                        |
| Warehouse                       | 871 m <sup>2</sup>     | 9,375 ft <sup>2</sup>  | Ground Floor                    | 920 m <sup>2</sup>   | 9,901 ft <sup>2</sup>  |
| First Floor                     | 142 m <sup>2</sup>     | 1,528 ft <sup>2</sup>  | First Floor                     | 164 m <sup>2</sup>   | 1,763 ft <sup>2</sup>  |
|                                 | 1,013 m <sup>2</sup>   | 10,904 ft <sup>2</sup> |                                 | 1,084 m <sup>2</sup> | 11,664 ft <sup>2</sup> |
| Unit 6                          |                        |                        | Unit 6                          |                      |                        |
| Warehouse                       | 585.5 m <sup>2</sup>   | 6,302 ft <sup>2</sup>  | Ground Floor                    | 625 m <sup>2</sup>   | 6,727 ft <sup>2</sup>  |
| First Floor                     | 104.3 m <sup>2</sup>   | 1,122 ft <sup>2</sup>  | First Floor                     | 116 m <sup>2</sup>   | 1,244 ft <sup>2</sup>  |
|                                 | 689.8 m <sup>2</sup>   | 7,425 ft <sup>2</sup>  |                                 | 741 m <sup>2</sup>   | 7,971 ft <sup>2</sup>  |
| Unit 7                          |                        |                        | Unit 7                          |                      |                        |
| Warehouse                       | 343.5 m <sup>2</sup>   | 3,698 ft <sup>2</sup>  | Ground Floor                    | 364 m <sup>2</sup>   | 3,918 ft <sup>2</sup>  |
| First Floor                     | 119.5 m <sup>2</sup>   | 1,286 ft <sup>2</sup>  | First Floor                     | 132 m <sup>2</sup>   | 1,420 ft <sup>2</sup>  |
|                                 | 463 m <sup>2</sup>     | 4,984 ft <sup>2</sup>  |                                 | 496 m <sup>2</sup>   | 5,338 ft <sup>2</sup>  |
| Unit 8                          |                        |                        | Unit 8                          |                      |                        |
| Warehouse                       | 513 m <sup>2</sup>     | 5,521 ft <sup>2</sup>  | Ground Floor                    | 541 m <sup>2</sup>   | 5,820 ft <sup>2</sup>  |
| First Floor                     | 96.9 m <sup>2</sup>    | 1,043 ft <sup>2</sup>  | First Floor                     | 108 m <sup>2</sup>   | 1,158 ft <sup>2</sup>  |
|                                 | 609.9 m <sup>2</sup>   | 6,564 ft <sup>2</sup>  |                                 | 648 m <sup>2</sup>   | 6,978 ft <sup>2</sup>  |
| Unit 9                          |                        |                        | Unit 9                          |                      |                        |
| Warehouse                       | 435.2 m <sup>2</sup>   | 4,684 ft <sup>2</sup>  | Ground Floor                    | 444 m <sup>2</sup>   | 4,778 ft <sup>2</sup>  |
| First Floor                     | 146.7 m <sup>2</sup>   | 1,579 ft <sup>2</sup>  | First Floor                     | 161 m <sup>2</sup>   | 1,736 ft <sup>2</sup>  |
|                                 | 581.9 m <sup>2</sup>   | 6,263 ft <sup>2</sup>  |                                 | 605 m <sup>2</sup>   | 6,514 ft <sup>2</sup>  |
| Total:                          | 8,528.3 m <sup>2</sup> | 91,798 ft <sup>2</sup> | Total:                          | 9,034 m <sup>2</sup> | 97,246 ft <sup>2</sup> |

| Parking Schedule                               |       | Bicycle Provision |  |
|------------------------------------------------|-------|-------------------|--|
| Description                                    | Count | Count             |  |
| Unit 1                                         |       | Unit 1            |  |
| Standard car parking bay                       | 25    | 18                |  |
| Standard car sharing parking bay               | 2     | Unit 2-5          |  |
| Standard electric vehicle charging parking bay | 4     | 20                |  |
| Accessible car parking bay                     | 2     | Unit 6            |  |
| Motorcycle bay                                 | 4     | 6                 |  |
|                                                | 37    | Unit 7            |  |
| Unit 2                                         |       | 4                 |  |
| Standard car parking bay                       | 4     | Unit 8            |  |
| Standard car sharing parking bay               | 1     | 6                 |  |
| Standard electric vehicle charging parking bay | 1     | Unit 9            |  |
| Accessible car parking bay                     | 1     | 4                 |  |
| Accessible electric vehicle parking bay        | 1     | 58                |  |
|                                                | 8     |                   |  |
| Unit 3                                         |       |                   |  |
| Standard car parking bay                       | 2     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 5     |                   |  |
| Unit 4                                         |       |                   |  |
| Standard car parking bay                       | 2     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 5     |                   |  |
| Unit 5                                         |       |                   |  |
| Standard car parking bay                       | 5     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible car parking bay                     | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 9     |                   |  |
| Unit 6                                         |       |                   |  |
| Standard car parking bay                       | 6     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible car parking bay                     | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 9     |                   |  |
| Unit 7                                         |       |                   |  |
| Standard car parking bay                       | 1     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible car parking bay                     | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 4     |                   |  |
| Unit 8                                         |       |                   |  |
| Standard car parking bay                       | 4     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible car parking bay                     | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 8     |                   |  |
| Unit 9                                         |       |                   |  |
| Standard car parking bay                       | 2     |                   |  |
| Standard car sharing parking bay               | 1     |                   |  |
| Standard electric vehicle charging parking bay | 1     |                   |  |
| Accessible car parking bay                     | 1     |                   |  |
| Accessible electric vehicle parking bay        | 1     |                   |  |
|                                                | 5     |                   |  |
| Total: 90                                      | 90    |                   |  |

General Notes:

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|     |                                                                                                                                                   |       |          |      |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|------|
| P09 | Issued in support of full Planning Application                                                                                                    | AD    | 19.11.25 | BB   |
| P08 | Issued in support of full Planning Application                                                                                                    | AD    | 11.11.25 | BB   |
| P07 | Issued in support of full Planning - Existing Trees T02.03.04.12 proposed to be retained, Block 3 location amended, drawing number amended.       | AD    | 20.10.25 | BB   |
| P06 | Issued in support of full Planning Application                                                                                                    | PM    | 30.07.25 | BB   |
| P05 | Final draft issue for approval prior to formal Planning issue                                                                                     | PM    | 25.07.25 | BB   |
| P04 | Parking provision and designation of spaces updated. Existing trees to be removed omitted for this issue.                                         | PM    | 13.05.25 | ME   |
| P03 | Dock ramp retaining wall reduced. Unit 2 moved to increase Unit 3 yard depth and incorporate safe pedestrian route. Trees to be removed indicated | PM    | 06.05.25 | ME   |
| P02 | Updated to incorporate comments received. Unit 2 location moved to increase Unit 3 yard depth. General updates to finishes                        | PM    | 25.04.25 | ME   |
| P01 | Issued for information purposes                                                                                                                   | PM    | 16.04.25 | ME   |
| Rev | Revision Details                                                                                                                                  | Drawn | Date     | Chkd |

|              |                        |
|--------------|------------------------|
| Project No:  | 25006                  |
| Suitability: | A APPROVED FOR STAGE 3 |
| Status:      | Planning               |

Client:

Kier Sharston Ltd

Project:

Sharston Industrial Estate  
Sharston Road,  
Wythenshawe,  
Manchester

|             |                           |
|-------------|---------------------------|
| Sheet Name: | Site Plan as Proposed     |
| Drawing No: | 25006-HFR-AV-XX-DR-A-0502 |
| Rev:        | P09                       |
| Drawn By:   | PM                        |
| Scale:      | As indicated @ A1         |
| Created:    | 16.04.25                  |

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w www.fletcher-rae.com  
e info@fletcher-rae.com

## **Appendix B – Topographical Survey**





## **Appendix C – GPR Survey**







## **Appendix D – Foul Connection Approval**



United Utilities Grasmere House, 2nd Floor  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP

**29<sup>th</sup> July 2025**

Dear **Natasha**

Pre-Development Enquiry for **Trade Sharston City M22 4RA** UU Reference Number: **07867880**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

**Modelled Flood Risk** [Please see the image at the end of this letter for details](#)

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see \*\*comment 2\*\* of the attached guidance sheet](#)

**Asset Protection**

1. We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of the proposed development.

[Please see \*\*comment 3\*\* of the attached guidance sheet and \*\*Working Near Our Pipelines Guidance document\*\*](#)

**Foul Water**

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 750mm diameter public combined sewer within Sharston Road located West of your proposed development at a maximum pass forward flow at an unrestricted rate.

**Manhole reference** SD83892301, **Grid reference** 383203 x 389368

[Please see the images at the end of this letter for clarification](#)

## Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

## Infiltration

[Please see comment 4 within the guidance sheet](#)

## Waterbody

If an evidence-based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the **Culverted Watercourse (noted as a highway drain on maps\_** located West of the proposed site.

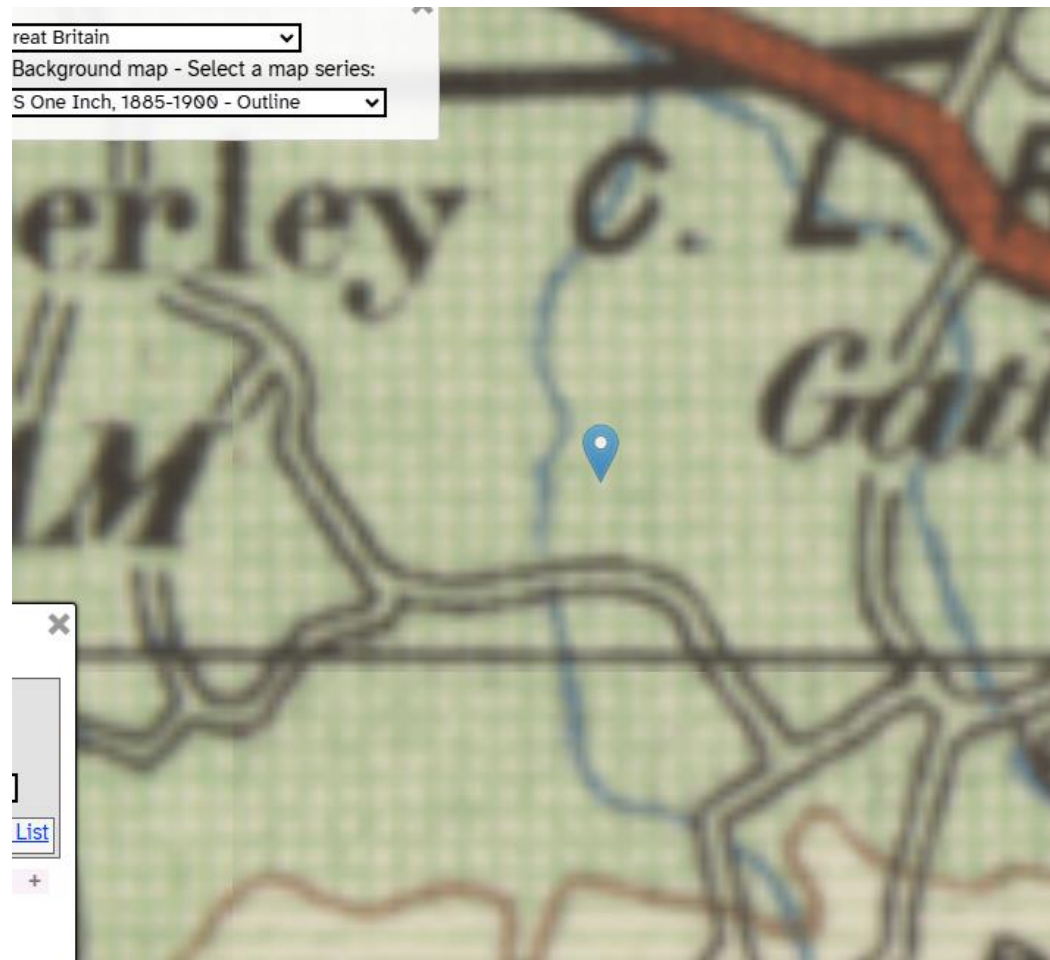
**Please see maps, and historic maps below showing watercourse that now appears to have been culverted.**

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

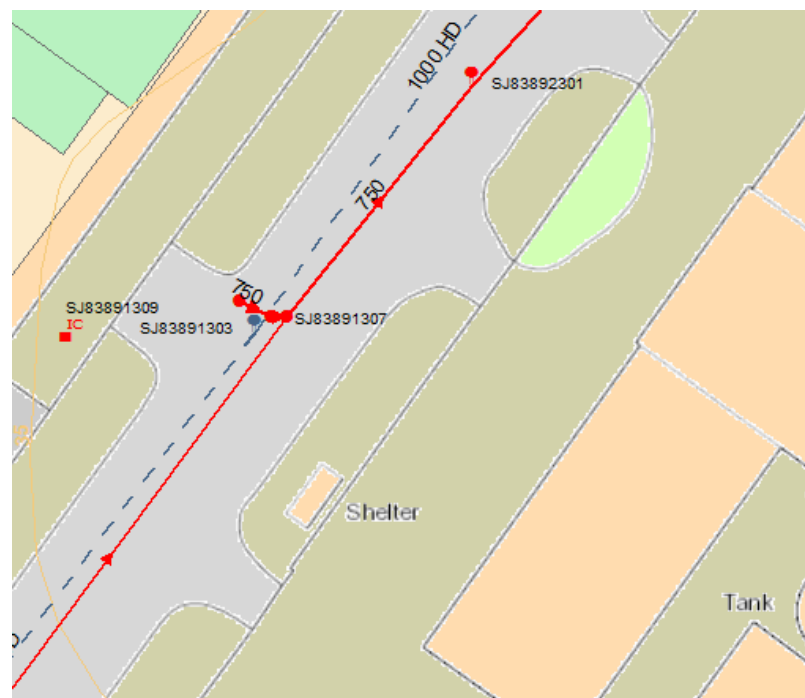
## Public Sewer

Due to the proximity of the culverted watercourse, a connection to the combined sewer for surface water discharge would not be considered at this time.

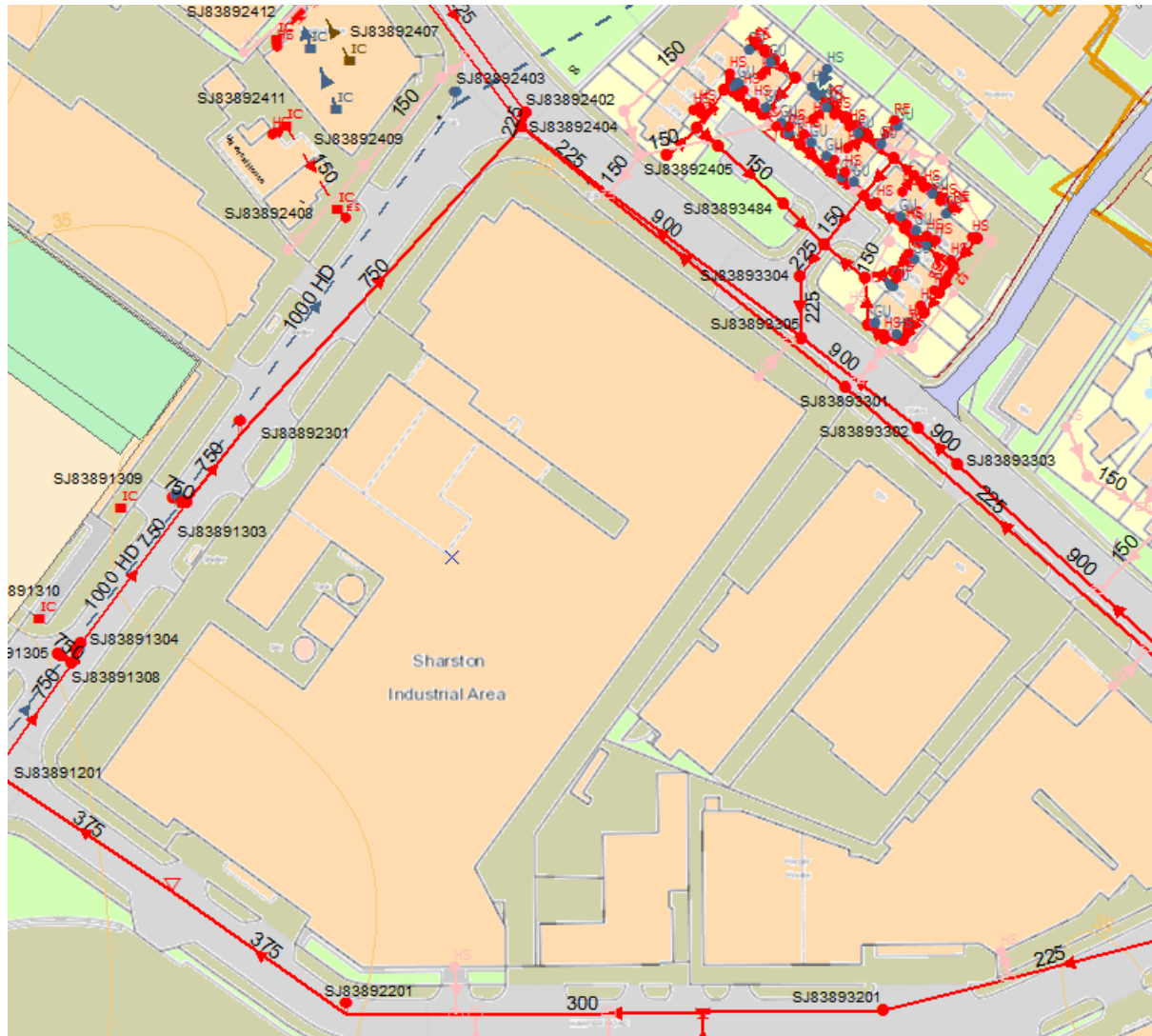
## Historic Image of Watercourse Adjacent to Development



## Foul Point of Connection



## Sewer Records



## Byrne, Neil

---

**From:** Byrne, Neil  
**Sent:** 01 August 2025 11:58  
**To:** [REDACTED]  
**Cc:** Checkley, Victoria; Fell, Chloe; Mehmood, Natasha  
**Subject:** RE: UU REF: 07867880 - Sharston Industrial Estate, M22 4RA

Hi Gary

Excellent, thanks for confirming!

Thanks

Neil

**Neil Byrne**  
Technical Director



---

**From:** [REDACTED]  
**Sent:** 01 August 2025 11:57  
**To:** Byrne, Neil [REDACTED]  
**Cc:** Checkley, Victoria [REDACTED]; Fell, Chloe [REDACTED]; Mehmood, Natasha [REDACTED]  
**Subject:** RE: UU REF: 07867880 - Sharston Industrial Estate, M22 4RA

Hi Neil,

Thanks for the email.

Glad I was able to help by finding the historic maps. They're often difficult to come by aren't they?

Let me know if you have any issues with MCC confirming the asset ownership, and I will reach out personally.

My apologies, I assumed the prior connection was to the West do the positioning of the site access.

I have absolutely no objection to the proposal of utilising the existing foul connection to the North.

Please let me know if I can assist in any other way.

Kind regards



**Gary Jaundrell**  
Developer Engineer  
Developer Services & Metering  
Customer Services  
[REDACTED]  
unitedutilities.com

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----- Original Message -----

**From:** [REDACTED]

**Sent:** 29/07/2025 11:34

**To:** [REDACTED]

**Cc:** [REDACTED]

**Subject:** UU REF: 07867880 - Sharston Industrial Estate, M22 4RA

Good Morning,

Your enquiry has been logged and sent to our engineer Gary Jaundrell and his contact number is [REDACTED]  
[REDACTED] Our service Level agreement is to respond to you within 10 working days.

Many thanks



**Laura Owens**  
Customer Advisor Advanced  
Developer Services & Metering  
Customer Services  
[REDACTED]  
unitedutilities.com

**If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated**



Visit: <https://unitedutilities.thewowawards.co.uk/nominate>

----- Original Message -----

**From:** Byrne, Neil [REDACTED]

**Sent:** 29/07/2025 11:16

**To:** [REDACTED]

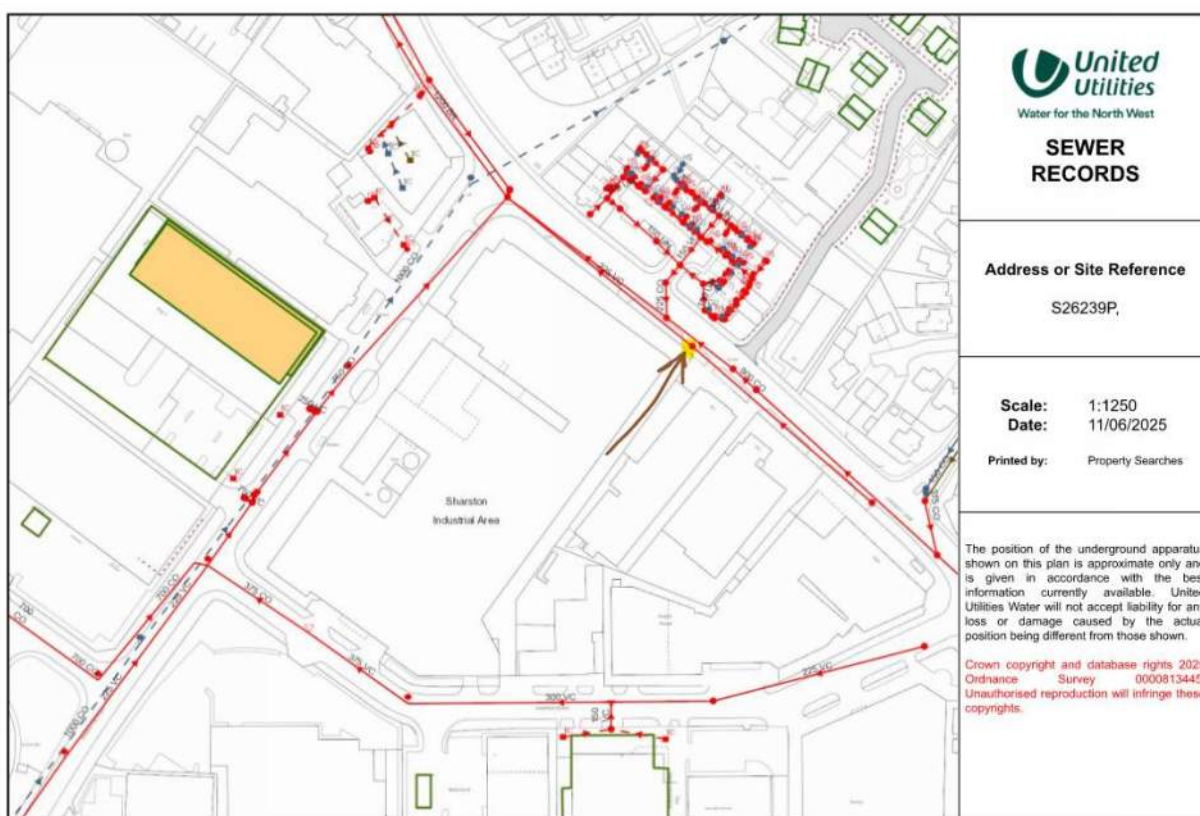
**Cc:** [REDACTED]

**Subject:** RE: UU REF: 07867880 - Sharston Industrial Estate, M22 4RA

Hi Gary

Thanks for your letter. I'm trying to get MCC to confirm that they own the SW drain in the road, as that is our preferred point of connection for SuDS hierarchy. I couldn't find any historic drawings showing that watercourse so I was pleased to see you managed to find one!

On the foul – we'd prefer to tap into the existing connection from the (now disused) buildings if we can – which is here –



Our foul flow is likely to be less than the previous buildings, and this would save us having to lay a new drain out into the highway – assuming we can survey the existing connection it would be much easier for us to connect here.

A copy of our GPR is attached – you can see that we don't have any connectivity to the south or west of the site currently. It all ends up in the same MH on the north west corner.

Would that be acceptable? Happy to discuss or provide any other info that might help.

Thanks

Neil

**Neil Byrne**  
Technical Director

[Image is no longer available]

---

**From:** [REDACTED]  
**Sent:** 29 July 2025 10:26  
**To:** Checkley, Victoria [REDACTED]  
**Cc:** Byrne, Neil [REDACTED]; Fell, Chloe [REDACTED]; Mehmood, Natasha [REDACTED]  
**Subject:** RE: UU REF: 07867880 - Sharston Industrial Estate, M22 4RA

Good Morning, Victoria/Natasha

Please find PDE response and guidance forms attached.

Kind regards



If you have received a great service today why not tell us?  
Visit: <http://unitedutilities.thewowawards.co.uk/nominate>

----- Original Message -----

**From:** [REDACTED]  
**Sent:** 22/07/2025 10:51  
**To:** [REDACTED]

## **Appendix E – Email to MCC**



## Mehmood, Natasha

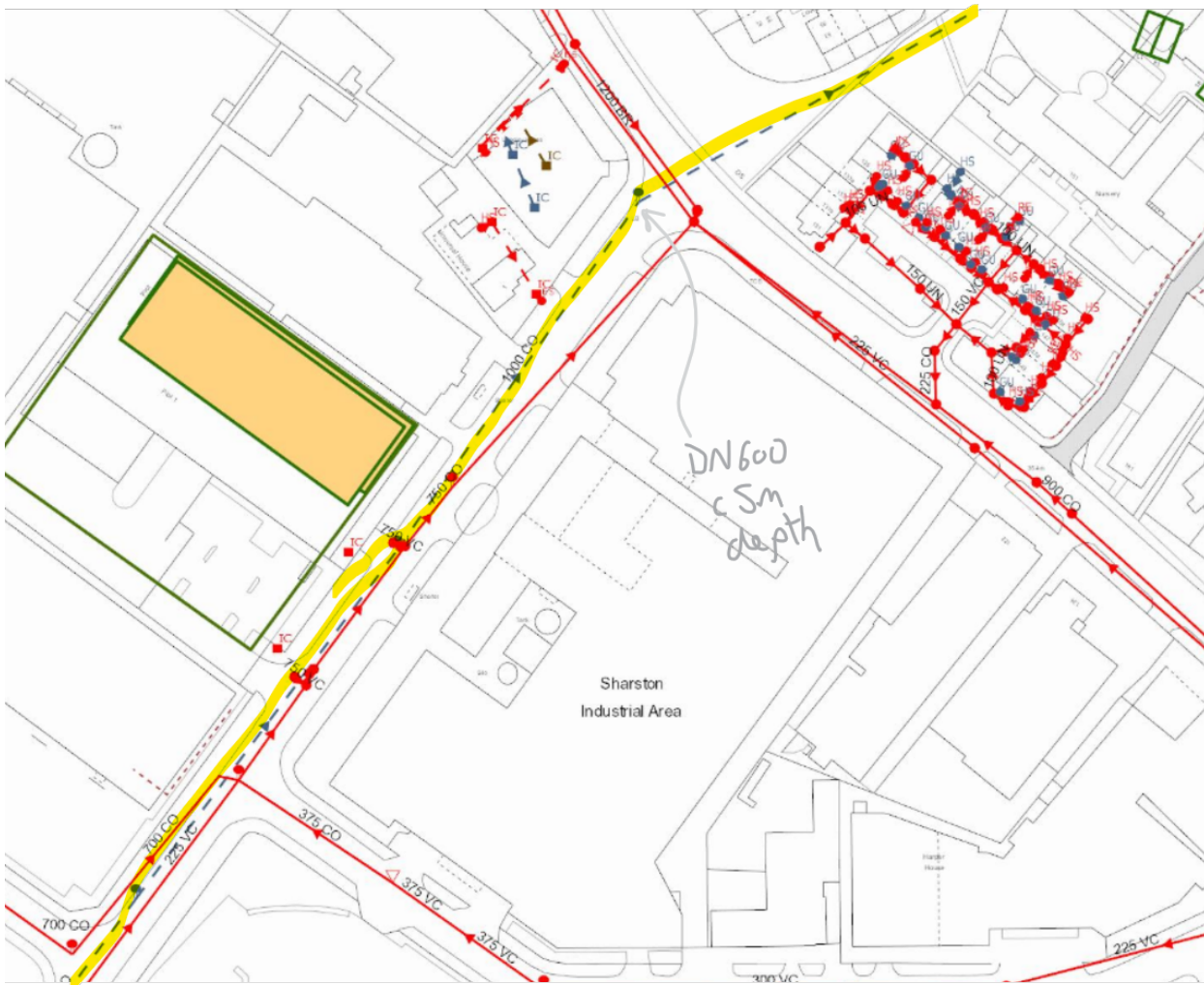
---

**From:** Byrne, Neil  
**Sent:** 08 July 2025 10:15  
**To:** [REDACTED]  
**Cc:** Checkley, Victoria; Kara, Jay; Mehmood, Natasha  
**Subject:** 600mm surface water culvert - Sharston  
**Attachments:** UU Services Plan.pdf

Hi Laura

We are looking at development in Sharston which we are hoping to submit shortly to MCC for planning permission.

Based on the sewer records there is an existing surface water drain running alongside our site. We have carried out some investigation and we have determined this is a 600mm dia pipe, at approximately 5m depth, running through Sharston Road (see snip below).



Currently our site drains to UU sewer but in line with the SW hierarchy our new development should try and connect to this SW drain. It is shown as private on the UU records and sits within the highway. Do you know if this an MCC owned/adopted drain please?

Thanks

Neil

## Mehmood, Natasha

---

**From:** Byrne, Neil  
**Sent:** 09 June 2025 09:15  
**To:** Laura Peacock  
**Cc:** Victoria Checkley; Mehmood, Natasha  
**Subject:** Shartson Industrial Estate - non UU SW sewer  
**Attachments:** UU Services Plan.pdf

Hi Laura

We are working on a scheme in Sharston and we are looking to connect to a non-UU surface water sewer which is shown on their records.

Please see attached – generally noted as 1000mm dia. Do you have any information on this drain please?

It's within the adopted highway so is that likely to be adopted by MCC? Feel free to bat me over to someone in MCC Highways if that's more appropriate.

Thanks

Neil

**Neil Byrne**  
Technical Director



**Kara, Jay**

---

**From:** Byrne, Neil  
**Sent:** 06 October 2025 15:46  
**To:** [REDACTED]  
**Cc:** Checkley, Victoria; Kara, Jay; Mehmood, Natasha  
**Subject:** RE: 600mm surface water culvert - Sharston  
**Attachments:** Register View - GM977371.pdf; Title Plan View - GM977371.pdf; Register View - MAN1114.pdf; Title Plan View - MAN1114.pdf

Hi Laura

Further to my email on this development at Sharston – we've done a bit more investigation and the land containing the culverted watercourse belongs to MCC (see attached Land Registry info) and we understand that Sharston Road is adopted.

On that basis – we assume that we need MCC's permission to connect to and discharge to this watercourse – as it must either be a highways asset or in the riparian ownership of MCC.

Please can you confirm if you agree, and if so, advise who we should contact regarding this please?

Thanks

Neil

**Neil Byrne**  
Technical Director

[REDACTED]

Stantec Hydrock Limited



**With every community, we redefine what's possible.**

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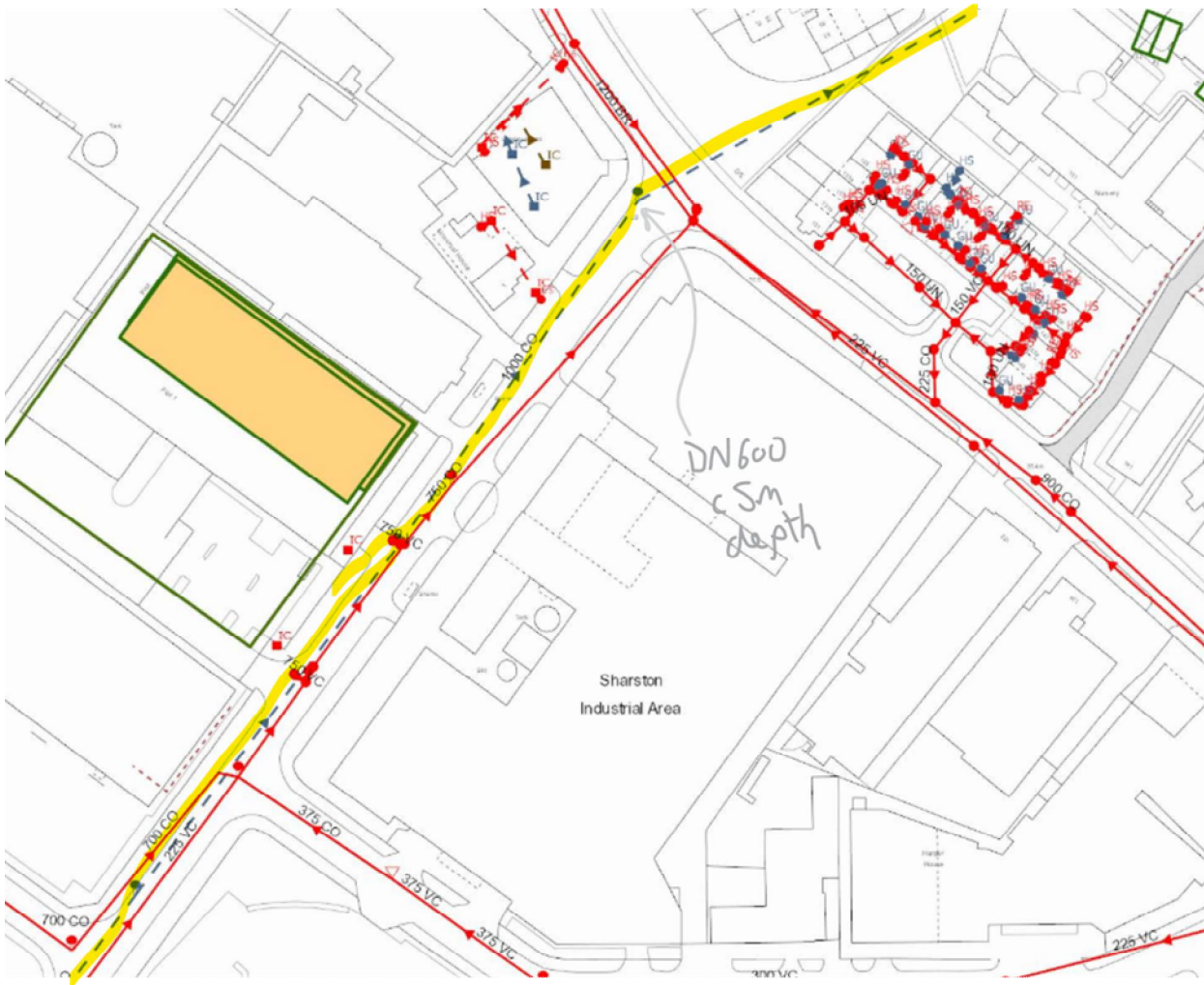
---

**From:** Byrne, Neil  
**Sent:** 08 July 2025 10:15  
**To:** [REDACTED]  
**Cc:** Checkley, Victoria [REDACTED]; Kara, Jay [REDACTED] Mehmood, Natasha  
**Subject:** 600mm surface water culvert - Sharston [Filed 08 Jul 2025 10:15]

Hi Laura

We are looking at development in Sharston which we are hoping to submit shortly to MCC for planning permission.

Based on the sewer records there is an existing surface water drain running alongside our site. We have carried out some investigation and we have determined this is a 600mm dia pipe, at approximately 5m depth, running through Sharston Road (see snip below).



Currently our site drains to UU sewer but in line with the SW hierarchy our new development should try and connect to this SW drain. It is shown as private on the UU records and sits within the highway. Do you know if this an MCC owned/adopted drain please?

Thanks

Neil

## **Appendix F – HR Wallingford**



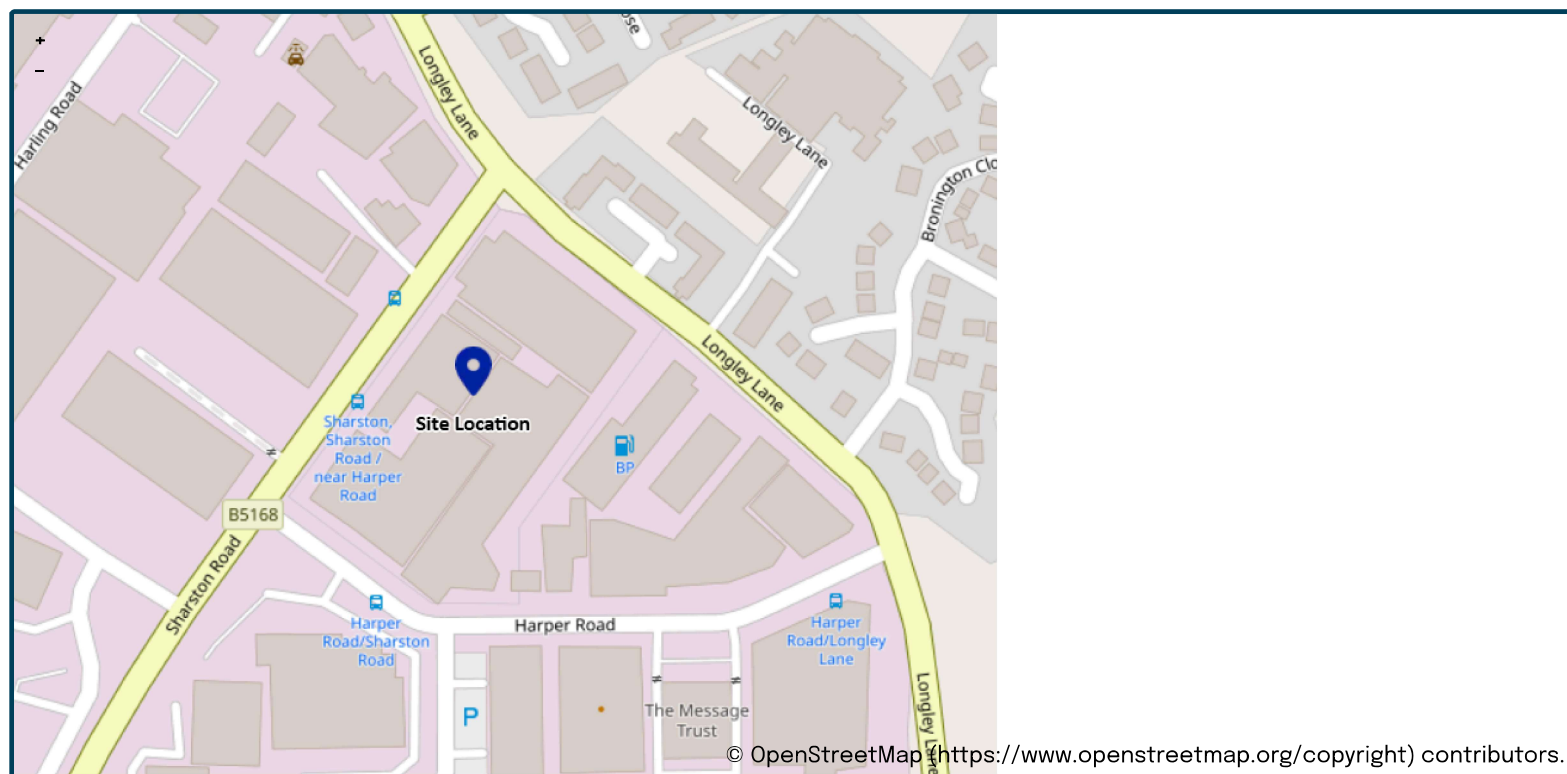
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

## Project details

|               |                                              |
|---------------|----------------------------------------------|
| Date          | <input type="text" value="08/07/2025"/>      |
| Calculated by | <input type="text" value="Natasha Mehmood"/> |
| Reference     | <input type="text" value="Sharston"/>        |
| Model version | <input type="text" value="2.0.1"/>           |

## Location

|               |                                                                                                |
|---------------|------------------------------------------------------------------------------------------------|
| Site name     | <input type="text" value="Trade City Sharston"/>                                               |
| Site location | <input type="text" value="Former Electrium Sales Ltd SAITE, 1934 Sharston Road, Wythenshawe"/> |



|               |                                     |
|---------------|-------------------------------------|
| Site easting  | <input type="text" value="383250"/> |
| Site northing | <input type="text" value="389331"/> |

## Site details

|                      |                                  |    |
|----------------------|----------------------------------|----|
| Total site area (ha) | <input type="text" value="1.6"/> | ha |
|----------------------|----------------------------------|----|

# Greenfield runoff

## Method

|                            |                           |                       |                  |
|----------------------------|---------------------------|-----------------------|------------------|
| Method                     | <div>IH124</div>          |                       |                  |
|                            |                           |                       |                  |
| <u>My value</u>            |                           | <input type="radio"/> | <u>Map value</u> |
| SAAR (mm)                  | <div>830mm</div>          |                       | <div>830</div>   |
| How should SPR be derived? | <div>WRAP soil type</div> |                       |                  |
| WRAP soil type             | <div>2</div>              | <input type="radio"/> | <div>2</div>     |
| SPR                        | <div>0.3</div>            |                       |                  |
| QBar (IH124) (l/s)         | <div>3.6l/s</div>         |                       |                  |

## Growth curve factors

|                        |                 |                       |                  |
|------------------------|-----------------|-----------------------|------------------|
|                        | <u>My value</u> | <input type="radio"/> | <u>Map value</u> |
| Hydrological region    | <div>10</div>   |                       | <div>10</div>    |
| 1 year growth factor   | <div>0.87</div> |                       |                  |
| 2 year growth factor   | <div>0.93</div> |                       |                  |
| 10 year growth factor  | <div>1.38</div> |                       |                  |
| 30 year growth factor  | <div>1.7</div>  |                       |                  |
| 100 year growth factor | <div>2.08</div> |                       |                  |
| 200 year growth factor | <div>2.37</div> |                       |                  |

## Results

|                           |                   |  |
|---------------------------|-------------------|--|
| Method                    | <div>IH124</div>  |  |
| Flow rate 1 year (l/s)    | <div>3.1l/s</div> |  |
| Flow rate 2 year (l/s)    | <div>3.3l/s</div> |  |
| Flow rate 10 years (l/s)  | <div>4.9l/s</div> |  |
| Flow rate 30 years (l/s)  | <div>6.1l/s</div> |  |
| Flow rate 100 years (l/s) | <div>7.4l/s</div> |  |
| Flow rate 200 years (l/s) | <div>8.4l/s</div> |  |

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at uksuds.com (<https://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 [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

## **Appendix G – Proposed Drainage Plan**





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- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL AND M&E SERVICES DRAWINGS AND SPECIFICATIONS.
- REFER TO DRAINAGE NOTES DRAWING FOR FURTHER REQUIREMENTS.

gend

- |  |                                                                                     |
|--|-------------------------------------------------------------------------------------|
|  | PLANNING BOUNDARY                                                                   |
|  | PROPOSED SURFACE WATER PIPE                                                         |
|  | PROPOSED SURFACE WATER MANHOLE                                                      |
|  | PROPOSED LINEAR DRAIN (CHANNEL/SLOT)                                                |
|  | PROPOSED KERB DRAIN                                                                 |
|  | PROPOSED PERMEABLE PAVING                                                           |
|  | PROPOSED FOUL PIPE                                                                  |
|  | PROPOSED FOUL MANHOLE                                                               |
|  | PROPOSED INTERCEPTOR                                                                |
|  | PROPOSED PERFORATED PIPE                                                            |
|  | PROPOSED ATTENUATION TANK                                                           |
|  | PROPOSED GULLY                                                                      |
|  | PROPOSED FILTER DRAIN                                                               |
|  | EXISTING SW DRAIN (FROM GPR)                                                        |
|  | EXISTING UU COMBINED SEWER (FROM GPR)                                               |
|  | PROPOSED RAINWATER PIPE                                                             |
|  | ROOT PROTECTION AREAS (REFER TO DRAWING 25006-HFR-AV-XDDR-A010) PRODUCED BY ARBTECH |

|                             |      |       |            |
|-----------------------------|------|-------|------------|
| LAYOUT AND DRAINAGE UPDATES | NM   | NB    | 25.11.25   |
| LAYOUT AND DRAINAGE UPDATES | TF   | NB    | 17.10.25   |
| LAYOUT UPDATED              | JM   | CF    | 07.08.25   |
| PLANNING ISSUE              | NM   | NB    | 31.07.25   |
| Prepared/Revision           | By   | Appd  | DD.MM.YYYY |
|                             | NM   | NB    | 25.11.25   |
|                             | Dwn. | Dsgn. | Chkd.      |
|                             | NM   | NB    | 25.11.25   |
|                             | Dwn. | Dsgn. | Chkd.      |

Due Status

#### 4 - SUITABLE FOR STAGE APPROVAL

This document is suitable only for the purpose noted above. Use of this document for any other purpose is not permitted.

ent/Project Logo



ent/Project  
IER SHARSTON Ltd

HARSTON INDUSTRIAL ESTATE

HARSTON ROAD

PROPOSED DRAINAGE LAYOUT

|             |                            |
|-------------|----------------------------|
| Project No. | A0 Scale                   |
| 15838       | 1:200                      |
| Division    | Drawing No.                |
| 04          | 25006-STN-EX-XX-DR-C-00500 |



## **Appendix H – Hydraulic Calculations**



|                                                                    |                                                                   |             |              |
|--------------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                               | Date:<br>25/11/2025                                               |             |              |
|                                                                    | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Stormwater Controls<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



Tank Unit 1

Type : Tank

Dimensions

|                      |         |
|----------------------|---------|
| Exceedance Level (m) | 34.955  |
| Depth (m)            | 2.205   |
| Base Level (m)       | 32.750  |
| Freeboard (mm)       | 0       |
| Initial Depth (m)    | 0.000   |
| Porosity (%)         | 95      |
| Average Slope (1:X)  | 0.00    |
| Total Volume (m³)    | 571.205 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000     | 600.00    | 0.000       |
| 1.000     | 600.00    | 570.000     |

Inlets

Inlet

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

Inlet (2)

|                    |                |
|--------------------|----------------|
| Inlet Type         | Point Inflow   |
| Incoming Item(s)   | SW1.005        |
| Bypass Destination | (None)         |
| Capacity Type      | No Restriction |

Outlets

Outlet

|                     |                |
|---------------------|----------------|
| Outgoing Connection | Pipe (7)       |
| Outlet Type         | Free Discharge |

Advanced

|            |          |
|------------|----------|
| Perimeter  | Circular |
| Length (m) | 33.835   |

|                                                                    |                                                                   |             |              |
|--------------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                               | Date:<br>25/11/2025                                               |             |              |
|                                                                    | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Stormwater Controls<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



Tank Unit 2 and 3

Type : Tank

Dimensions

|                      |         |
|----------------------|---------|
| Exceedance Level (m) | 35.362  |
| Depth (m)            | 2.212   |
| Base Level (m)       | 33.150  |
| Freeboard (mm)       | 0       |
| Initial Depth (m)    | 0.000   |
| Porosity (%)         | 95      |
| Average Slope (1:X)  | 0.00    |
| Total Volume (m³)    | 476.212 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000     | 500.00    | 90.000      |
| 1.000     | 500.00    | 90.000      |

Inlets

Inlet (2)

|                    |                |
|--------------------|----------------|
| Inlet Type         | Point Inflow   |
| Incoming Item(s)   | SW7.002        |
| Bypass Destination | (None)         |
| Capacity Type      | No Restriction |

Inlet (1)

|                    |                |
|--------------------|----------------|
| Inlet Type         | Point Inflow   |
| Incoming Item(s)   | SW9.007        |
| Bypass Destination | (None)         |
| Capacity Type      | No Restriction |

Inlet (3)

|                    |                |
|--------------------|----------------|
| Inlet Type         | Point Inflow   |
| Incoming Item(s)   | SW11.000       |
| Bypass Destination | (None)         |
| Capacity Type      | No Restriction |

Outlets

Outlet

|                     |                |
|---------------------|----------------|
| Outgoing Connection | Pipe (11)      |
| Outlet Type         | Free Discharge |

Advanced

|            |          |
|------------|----------|
| Perimeter  | Circular |
| Length (m) | 32.016   |

|                                                                    |                                                                   |             |              |
|--------------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                               | Date:<br>25/11/2025                                               |             |              |
|                                                                    | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Stormwater Controls<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



Porous Paving

Type : Porous Paving

Dimensions

|                             |          |
|-----------------------------|----------|
| Exceedance Level (m)        | 35.220   |
| Depth (m)                   | 0.500    |
| Base Level (m)              | 34.720   |
| Paving Layer Depth (mm)     | 130      |
| Membrane Percolation (m/hr) | 1.0      |
| Porosity (%)                | 30       |
| Length (m)                  | 42.624   |
| Long. Slope (1:X)           | 10000.00 |
| Width (m)                   | 5.119    |
| Total Volume (m³)           | 24.747   |

Under Drain

|                       |             |
|-----------------------|-------------|
| Height Above Base (m) | 0.100       |
| Diameter (mm)         | 150         |
| No. of Barrels        | 1           |
| Release Height (m)    | 0.000       |
| Friction Scheme       | Manning's n |
| n                     | 0.015       |

Inlets

Inlet (1)

|                    |                     |
|--------------------|---------------------|
| Inlet Type         | Lateral Inflow      |
| Incoming Item(s)   | Catchment Area (16) |
| Bypass Destination | (None)              |
| Capacity Type      | No Restriction      |

Outlets

Outlet

|                     |             |
|---------------------|-------------|
| Outgoing Connection | Pipe (13)   |
| Outlet Type         | Under Drain |

Advanced

|                     |       |
|---------------------|-------|
| Conductivity (m/hr) | 216.0 |
|---------------------|-------|

|                                                            |                                                                   |             |              |
|------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                       | Date:<br>25/11/2025                                               |             |              |
|                                                            | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Connections<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



| Name         | Length (m) | Connection Type | Slope (1:X) | Manning's n | Colebrook-White Roughness (mm) | Diameter / Base Width (mm) | Upstream Cover Level (m) | Upstream Invert Level (m) |
|--------------|------------|-----------------|-------------|-------------|--------------------------------|----------------------------|--------------------------|---------------------------|
| SW1.001      | 7.828      | Pipe            | 142.320     |             | 0.6                            | 225                        | 35.480                   | 34.355                    |
| SW1.002      | 20.054     | Pipe            | 227.885     |             | 0.6                            | 300                        | 35.480                   | 33.300                    |
| SW1.008      | 43.847     | Pipe            | 199.305     |             | 0.6                            | 225                        | 35.471                   | 32.665                    |
| SW7.002      | 6.123      | Pipe            | 103.779     |             | 0.6                            | 225                        | 35.433                   | 33.684                    |
| SW7.000      | 26.551     | Pipe            | 149.161     |             | 0.6                            | 150                        | 35.428                   | 34.080                    |
| SW1.009      | 14.670     | Pipe            | 16.862      |             | 0.6                            | 300                        | 35.365                   | 32.370                    |
| SW9.005      | 16.960     | Pipe            | 199.530     |             | 0.6                            | 225                        | 35.557                   | 33.819                    |
| SW9.000      | 25.668     | Pipe            | 150.105     |             | 0.6                            | 150                        | 35.614                   | 34.563                    |
| SW9.001      | 20.409     | Pipe            | 200.085     |             | 0.6                            | 225                        | 35.614                   | 34.392                    |
| SW1.003      | 27.858     | Pipe            | 246.527     |             | 0.6                            | 300                        | 35.480                   | 33.212                    |
| SW4.000      | 20.755     | Pipe            | 149.315     |             | 0.6                            | 225                        | 35.358                   | 34.008                    |
| SW7.004      | 13.609     | Pipe            | 151.213     |             | 0.6                            | 225                        | 35.292                   | 33.110                    |
| SW9.006      | 19.279     | Pipe            | 200.819     |             | 0.6                            | 225                        | 35.557                   | 33.734                    |
| SW8.000      | 22.719     | Pipe            | 149.470     |             | 0.6                            | 150                        | 35.416                   | 34.070                    |
| SW1.004      | 8.647      | Pipe            | 247.044     |             | 0.6                            | 300                        | 35.483                   | 33.099                    |
| SW9.007      | 12.166     | Pipe            | 187.166     |             | 0.6                            | 300                        | 35.557                   | 33.550                    |
| SW11.000     | 18.565     | Pipe            | 26.906      |             | 0.6                            | 300                        | 35.244                   | 33.840                    |
| SW5.001      | 7.507      | Pipe            | 197.547     |             | 0.6                            | 300                        | 34.843                   | 33.247                    |
| SW6.001      | 42.015     | Pipe            | 150.054     |             | 0.6                            | 225                        | 35.244                   | 33.894                    |
| SW5.001 (1)  | 9.993      | Pipe            | 32.339      |             | 0.6                            | 300                        | 34.843                   | 33.209                    |
| Pipe         | 4.815      | Pipe            | 32.101      |             | 0.6                            | 300                        | 35.100                   | 32.900                    |
| Pipe (1)     | 16.492     | Pipe            | 149.929     |             | 0.6                            | 225                        | 35.336                   | 34.200                    |
| Pipe (2)     | 17.363     | Pipe            | 105.873     |             | 0.6                            | 225                        | 35.384                   | 34.090                    |
| Pipe (3)     | 29.987     | Pipe            | 54.424      |             | 0.6                            | 225                        | 35.395                   | 33.926                    |
| SW1.000      | 8.441      | Pipe            | 153.479     |             | 0.6                            | 225                        | 35.103                   | 33.975                    |
| Pipe (5)     | 4.493      | Pipe            | 149.780     |             | 0.6                            | 150                        | 35.480                   | 34.430                    |
| Pipe (6)     | 5.188      | Pipe            | 148.232     |             | 0.6                            | 300                        | 35.480                   | 32.700                    |
| SW7.001      | 14.534     | Pipe            | 148.309     |             | 0.6                            | 150                        | 35.426                   | 33.902                    |
| SW7.001 (1)  | 18.067     | Pipe            | 150.558     |             | 0.6                            | 150                        | 35.430                   | 33.804                    |
| SW10.000     | 24.863     | Pipe            | 147.994     |             | 0.6                            | 225                        | 35.556                   | 34.210                    |
| SW10.000 (1) | 20.848     | Pipe            | 149.989     |             | 0.6                            | 225                        | 35.556                   | 34.042                    |
| Pipe (7)     | 7.962      | Pipe            | 159.244     |             | 0.6                            | 300                        | 34.955                   | 32.750                    |
| SW1.005      | 8.436      | Pipe            | 248.124     |             | 0.6                            | 375                        | 35.352                   | 32.989                    |
| Pipe (8)     | 15.095     | Pipe            | 201.263     |             | 0.6                            | 225                        | 35.614                   | 34.000                    |
| Pipe (9)     | 20.412     | Pipe            | 200.119     |             | 0.6                            | 225                        | 35.614                   | 33.925                    |
| Pipe (10)    | 26.869     | Pipe            | 98.421      |             | 0.6                            | 300                        | 35.614                   | 33.823                    |
| Pipe (11)    | 8.829      | Pipe            | 220.727     |             | 0.6                            | 300                        | 35.362                   | 33.150                    |
| Pipe (4)     | 30.987     | Pipe            | 99.959      |             | 0.6                            | 225                        | 35.132                   | 33.920                    |
| Pipe (12)    | 9.462      | Pipe            | 28.243      |             | 0.6                            | 225                        | 34.998                   | 33.710                    |
| Pipe (13)    | 3.737      | Pipe            | 3.088       |             | 0.6                            | 150                        | 35.224                   | 34.820                    |

|                                                            |                                                                   |             |              |
|------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                       | Date:<br>25/11/2025                                               |             |              |
|                                                            | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Connections<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



| Name         | Downstream Cover Level (m) | Downstream Invert Level (m) | Lock | Flow Restriction (L/s) | Culvert Type | Culvert Entrance |
|--------------|----------------------------|-----------------------------|------|------------------------|--------------|------------------|
| SW1.001      | 35.480                     | 34.300                      | All  |                        | (None)       | (None)           |
| SW1.002      | 35.480                     | 33.212                      | None |                        | (None)       | (None)           |
| SW1.008      | 35.365                     | 32.445                      | All  | 2.0                    | (None)       | (None)           |
| SW7.002      | 35.362                     | 33.625                      | All  |                        | (None)       | (None)           |
| SW7.000      | 35.426                     | 33.902                      | None |                        | (None)       | (None)           |
| SW1.009      | 35.000                     | 31.500                      | None |                        | (None)       | (None)           |
| SW9.005      | 35.557                     | 33.734                      | None |                        | (None)       | (None)           |
| SW9.000      | 35.614                     | 34.392                      | None |                        | (None)       | (None)           |
| SW9.001      | 35.614                     | 34.290                      | All  |                        | (None)       | (None)           |
| SW1.003      | 35.483                     | 33.099                      | None |                        | (None)       | (None)           |
| SW4.000      | 35.352                     | 33.869                      | All  |                        | (None)       | (None)           |
| SW7.004      | 35.365                     | 33.020                      | All  | 1.8                    | (None)       | (None)           |
| SW9.006      | 35.557                     | 33.638                      | All  |                        | (None)       | (None)           |
| SW8.000      | 35.433                     | 33.918                      | All  |                        | (None)       | (None)           |
| SW1.004      | 35.352                     | 33.064                      | All  |                        | (None)       | (None)           |
| SW9.007      | 35.362                     | 33.485                      | All  |                        | (None)       | (None)           |
| SW11.000     | 35.362                     | 33.150                      | None |                        | (None)       | (None)           |
| SW5.001      | 34.843                     | 33.209                      | None |                        | (None)       | (None)           |
| SW6.001      | 35.100                     | 33.614                      | All  |                        | (None)       | (None)           |
| SW5.001 (1)  | 35.100                     | 32.900                      | None |                        | (None)       | (None)           |
| Pipe         | 34.955                     | 32.750                      | None |                        | (None)       | (None)           |
| Pipe (1)     | 35.384                     | 34.090                      | None |                        | (None)       | (None)           |
| Pipe (2)     | 35.395                     | 33.926                      | None |                        | (None)       | (None)           |
| Pipe (3)     | 35.480                     | 33.375                      | All  |                        | (None)       | (None)           |
| SW1.000      | 35.132                     | 33.920                      | None |                        | (None)       | (None)           |
| Pipe (5)     | 35.483                     | 34.400                      | All  |                        | (None)       | (None)           |
| Pipe (6)     | 35.471                     | 32.665                      | None |                        | (None)       | (None)           |
| SW7.001      | 35.430                     | 33.804                      | None |                        | (None)       | (None)           |
| SW7.001 (1)  | 35.433                     | 33.684                      | None |                        | (None)       | (None)           |
| SW10.000     | 35.556                     | 34.042                      | None |                        | (None)       | (None)           |
| SW10.000 (1) | 35.557                     | 33.903                      | All  |                        | (None)       | (None)           |
| Pipe (7)     | 35.480                     | 32.700                      | None |                        | (None)       | (None)           |
| SW1.005      | 34.955                     | 32.955                      | All  |                        | (None)       | (None)           |
| Pipe (8)     | 35.614                     | 33.925                      | None |                        | (None)       | (None)           |
| Pipe (9)     | 35.614                     | 33.823                      | None |                        | (None)       | (None)           |
| Pipe (10)    | 35.557                     | 33.550                      | None |                        | (None)       | (None)           |
| Pipe (11)    | 35.292                     | 33.110                      | None |                        | (None)       | (None)           |
| Pipe (4)     | 34.998                     | 33.610                      | None |                        | (None)       | (None)           |
| Pipe (12)    | 35.480                     | 33.375                      | All  |                        | (None)       | (None)           |
| Pipe (13)    | 34.998                     | 33.610                      | None | 0.0                    | (None)       | (None)           |

|                                                               |  |                                                                   |             |                                                                                     |              |
|---------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Trade City Sharston:                                          |  | Date:<br>25/11/2025                                               |             |  |              |
|                                                               |  | Designed by:<br>NM                                                | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Inflow Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |                                                                                     |              |

| Inflow Label        | Connected To    | Flow (L/s) | Runoff Method         | Area (ha) | Percentage Impervious (%) | Urban Creep (%) | Adjusted Percentage Impervious (%) | Area Analysed (ha) |
|---------------------|-----------------|------------|-----------------------|-----------|---------------------------|-----------------|------------------------------------|--------------------|
| Catchment Area      | SWMH14 (1)      |            | Time of Concentration | 0.026     | 100                       | 0               | 100                                | 0.026              |
| Catchment Area (1)  | SWMH24          |            | Time of Concentration | 0.029     | 100                       | 0               | 100                                | 0.029              |
| Catchment Area (2)  | SWMH26          |            | Time of Concentration | 0.025     | 100                       | 0               | 100                                | 0.025              |
| Catchment Area (3)  | SWMH21          |            | Time of Concentration | 0.040     | 100                       | 0               | 100                                | 0.040              |
| Catchment Area (4)  | SWMH29          |            | Time of Concentration | 0.034     | 100                       | 0               | 100                                | 0.034              |
| Catchment Area (5)  | SWMH10          |            | Time of Concentration | 0.078     | 100                       | 0               | 100                                | 0.078              |
| Catchment Area (6)  | SWMH10          |            | Time of Concentration | 0.045     | 100                       | 0               | 100                                | 0.045              |
| Catchment Area (7)  | SWMH10          |            | Time of Concentration | 0.112     | 100                       | 0               | 100                                | 0.112              |
| Catchment Area (9)  | SWMH12          |            | Time of Concentration | 0.075     | 100                       | 0               | 100                                | 0.075              |
| Catchment Area (10) | SWMH30          |            | Time of Concentration | 0.087     | 100                       | 0               | 100                                | 0.087              |
| Catchment Area (13) | SWMH30          |            | Time of Concentration | 0.079     | 100                       | 0               | 100                                | 0.079              |
| Catchment Area (14) | SWMH30          |            | Time of Concentration | 0.094     | 100                       | 0               | 100                                | 0.094              |
| Catchment Area (15) | SWMH30          |            | Time of Concentration | 0.089     | 100                       | 0               | 100                                | 0.089              |
| Catchment Area (16) | Porous Paving   |            | Time of Concentration | 0.022     | 100                       | 0               | 100                                | 0.022              |
| Catchment Area (17) | SWMH1           |            | Time of Concentration | 0.058     | 100                       | 0               | 100                                | 0.058              |
| Catchment Area (18) | SWMH2 (1)       |            | Time of Concentration | 0.017     | 100                       | 0               | 100                                | 0.017              |
| Catchment Area (19) | SWMH16          |            | Time of Concentration | 0.046     | 100                       | 0               | 100                                | 0.046              |
| Catchment Area (20) | SWMH20          |            | Time of Concentration | 0.037     | 100                       | 0               | 100                                | 0.037              |
| Catchment Area (21) | SW18 HYDROBRAKE |            | Time of Concentration | 0.037     | 100                       | 0               | 100                                | 0.037              |
| Catchment Area (22) | SWMH19          |            | Time of Concentration | 0.029     | 100                       | 0               | 100                                | 0.029              |
| Catchment Area (23) | SWMH31          |            | Time of Concentration | 0.029     | 100                       | 0               | 100                                | 0.029              |
| Catchment Area (24) | SWMH18          |            | Time of Concentration | 0.025     | 100                       | 0               | 100                                | 0.025              |
| Catchment Area (25) | SWMH5           |            | Time of Concentration | 0.025     | 100                       | 0               | 100                                | 0.025              |
| Catchment Area (26) | SWMH17          |            | Time of Concentration | 0.046     | 100                       | 0               | 100                                | 0.046              |
| Catchment Area (27) | SWMH23          |            | Time of Concentration | 0.032     | 100                       | 0               | 100                                | 0.032              |
| Catchment Area (28) | SWMH27          |            | Time of Concentration | 0.027     | 100                       | 0               | 100                                | 0.027              |
| Catchment Area (29) | SWMH28          |            | Time of Concentration | 0.018     | 100                       | 0               | 100                                | 0.018              |
| Catchment Area (30) | SWMH22          |            | Time of Concentration | 0.022     | 100                       | 0               | 100                                | 0.022              |
| Catchment Area (31) | SWMH4 (1)       |            | Time of Concentration | 0.079     | 100                       | 0               | 100                                | 0.079              |
| Catchment Area (32) | SWMH13 (1)      |            | Time of Concentration | 0.075     | 100                       | 0               | 100                                | 0.075              |
| Catchment Area (33) | SWMH8           |            | Time of Concentration | 0.079     | 100                       | 0               | 100                                | 0.079              |
| Catchment Area (34) | SWMH2 (1)       |            | Time of Concentration | 0.016     | 100                       | 0               | 100                                | 0.016              |

|                      |        |            |                         |              |              |                                                                                     |     |              |
|----------------------|--------|------------|-------------------------|--------------|--------------|-------------------------------------------------------------------------------------|-----|--------------|
| Trade City Sharston: |        |            | Date:<br>25/11/2025     |              |              |  |     |              |
|                      |        |            | Designed by:            | Checked by:  | Approved By: |                                                                                     |     |              |
|                      |        |            | NM                      |              |              |                                                                                     |     |              |
| Report Details:      |        |            | 100 Barbirolli Square : |              |              |                                                                                     |     |              |
| Type: Inflow Summary |        |            | Manchester              |              |              |                                                                                     |     |              |
| Storm Phase: Phase   |        |            | United Kingdom          |              |              |                                                                                     |     |              |
|                      |        |            | M2 3PW                  |              |              |                                                                                     |     |              |
| Catchment Area (35)  | SWMH16 |            | Time of Concentration   | 0.014        | 100          | 0                                                                                   | 100 | 0.014        |
| <b>TOTAL</b>         |        | <b>0.0</b> |                         | <b>1.545</b> |              |                                                                                     |     | <b>1.545</b> |

|                                                                        |                                                                   |             |              |
|------------------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                                   | Date:<br>25/11/2025                                               |             |              |
|                                                                        | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Network Design Criteria<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



Flow Options

|                           |                               |
|---------------------------|-------------------------------|
| Peak Flow Calculation     | (UK) Modified Rational Method |
| Min. Time of Entry (mins) | 5                             |
| Max. Travel Time (mins)   | 30                            |

Pipe Options

|                       |                          |
|-----------------------|--------------------------|
| Lock Slope Options    | None                     |
| Design Options        | Minimise Excavation      |
| Design Level          | Level Soffits            |
| Min. Cover Depth (m)  | 1.200                    |
| Min. Slope (1:X)      | 500.00                   |
| Max. Slope (1:X)      | 40.00                    |
| Min. Velocity (m/s)   | 1.0                      |
| Max. Velocity (m/s)   | 3.0                      |
| Use Flow Restriction  | <input type="checkbox"/> |
| Reduce Channel Depths | <input type="checkbox"/> |

Manhole Options

|              |                          |
|--------------|--------------------------|
| Apply Offset | <input type="checkbox"/> |
|--------------|--------------------------|

|                                                                |                                                                   |             |              |                                                                                     |
|----------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|-------------------------------------------------------------------------------------|
| Trade City Sharston:                                           | Date:<br>25/11/2025                                               |             |              |  |
|                                                                | Designed by:<br>NM                                                | Checked by: | Approved By: |                                                                                     |
| Report Details:<br>Type: Outfall Details<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |                                                                                     |

|          |
|----------|
| Outfalls |
|----------|

| Outfall       | Outfall Type   | Gated | Fixed Surcharged Level (m) | Level Curve |
|---------------|----------------|-------|----------------------------|-------------|
| EX SW CULVERT | Free Discharge |       |                            |             |

|                                             |                                                                   |             |              |
|---------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                        | Date:<br>25/11/2025                                               |             |              |
|                                             | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Title:<br>Rainfall Analysis Criteria | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



|                                 |                          |
|---------------------------------|--------------------------|
| 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) | 300                      |
| Perform No Discharge Analysis   | <input type="checkbox"/> |

Rainfall

FSR

Type: FSR

|            |                                     |
|------------|-------------------------------------|
| Region     | England And Wales                   |
| M5-60 (mm) | 18.0                                |
| Ratio R    | 0.385                               |
| Summer     | <input checked="" type="checkbox"/> |
| Winter     | <input checked="" type="checkbox"/> |

Return Period

| Return Period (years) | Increase Rainfall (%) |
|-----------------------|-----------------------|
| 2.0                   | 0.000                 |
| 30.0                  | 0.000                 |
| 100.0                 | 0.000                 |
| 100.0                 | 45.000                |

Storm Durations

| Duration (mins) | Run Time (mins) |
|-----------------|-----------------|
| 15              | 30              |
| 30              | 60              |
| 60              | 120             |
| 120             | 240             |
| 240             | 480             |
| 360             | 720             |
| 480             | 960             |
| 960             | 1920            |
| 1440            | 2880            |

|                                                                  |                                                                   |             |              |
|------------------------------------------------------------------|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                             | Date:<br>25/11/2025                                               |             |              |
|                                                                  | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: Phase | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |





**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 (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status     |
|-----------------|------------------------------------------|-----------------|------------------|----------------|----------------|-------------------|---------------------------|--------------------------|--------------------|-----------------------------|------------|
| SWMH1           | FSR: 100 years: +45 %: 15 mins: Summer   | 35.103          | 33.975           | 34.699         | 0.724          | 31.6              | 0.819                     | 0.000                    | 23.6               | 13.696                      | Surcharged |
| SWMH16          | FSR: 100 years: +45 %: 15 mins: Summer   | 35.480          | 34.355           | 34.521         | 0.166          | 32.5              | 0.047                     | 0.000                    | 31.1               | 14.062                      | OK         |
| SWMH4 (1)       | FSR: 100 years: +45 %: 15 mins: Summer   | 35.480          | 33.300           | 34.475         | 1.175          | 133.3             | 1.329                     | 0.000                    | 123.3              | 77.854                      | Surcharged |
| SWMH5           | FSR: 100 years: +45 %: 15 mins: Summer   | 35.480          | 33.212           | 34.168         | 0.956          | 136.6             | 1.081                     | 0.000                    | 131.8              | 83.619                      | Surcharged |
| SW18 HYDROBRAKE | FSR: 100 years: +45 %: 1440 mins: Winter | 35.471          | 32.665           | 33.716         | 1.051          | 2.2               | 1.189                     | 0.000                    | 1.8                | 278.598                     | Surcharged |
| SWMH32          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.365          | 32.370           | 32.394         | 0.024          | 3.6               | 0.035                     | 0.000                    | 3.6                | 483.050                     | OK         |
| SWMH21          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.614          | 34.563           | 35.188         | 0.625          | 1.0               | 0.177                     | 0.000                    | 1.0                | 33.691                      | Surcharged |
| EX SW CULVERT   | FSR: 100 years: +45 %: 1440 mins: Winter | 35.000          | 31.500           | 31.524         | 0.024          | 3.6               | 0.000                     | 0.000                    | 3.6                | 483.050                     | OK         |
| SWMH29          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.556          | 34.210           | 35.189         | 0.979          | 0.9               | 1.107                     | 0.000                    | 0.9                | 29.325                      | Surcharged |
| SWMH28          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.557          | 33.550           | 35.189         | 1.639          | 5.6               | 1.853                     | 0.000                    | 5.3                | 188.582                     | Surcharged |
| SWMH27          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.557          | 33.734           | 35.188         | 1.454          | 1.3               | 0.412                     | 0.000                    | 1.3                | 43.086                      | Surcharged |
| SWMH17          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.428          | 34.080           | 35.189         | 1.109          | 1.1               | 1.254                     | 0.000                    | 1.2                | 39.296                      | Flood Risk |
| SWMH30          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.244          | 33.840           | 35.188         | 1.348          | 8.7               | 1.525                     | 0.000                    | 8.7                | 297.575                     | Flood Risk |
| SWMH23          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.614          | 33.823           | 35.188         | 1.365          | 3.0               | 1.544                     | 0.000                    | 3.0                | 103.243                     | Surcharged |
| SWMH24          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.614          | 33.925           | 35.189         | 1.264          | 0.7               | 0.358                     | 0.000                    | 0.7                | 26.630                      | Surcharged |
| SWMH19          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.433          | 33.684           | 35.189         | 1.505          | 3.4               | 1.702                     | 0.000                    | 3.4                | 115.199                     | Flood Risk |
| SWMH18          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.426          | 33.902           | 35.188         | 1.286          | 1.8               | 0.364                     | 0.000                    | 1.8                | 60.013                      | Flood Risk |
| SWMH22          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.614          | 34.392           | 35.188         | 0.796          | 1.5               | 0.225                     | 0.000                    | 1.5                | 51.992                      | Surcharged |
| SWMH26          | FSR: 100 years: +45 %: 1440 mins: Winter | 35.557          | 33.819           | 35.188         | 1.369          | 0.6               | 0.387                     | 0.000                    | 0.6                | 20.843                      | Surcharged |

|                                                                  |  |                                                                   |             |              |
|------------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                             |  | Date:<br>25/11/2025                                               |             |              |
|                                                                  |  | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



|                        |                                                |            |            |        |       |      |       |       |      |         |            |
|------------------------|------------------------------------------------|------------|------------|--------|-------|------|-------|-------|------|---------|------------|
| SWMH6                  | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.48<br>3 | 33.09<br>9 | 33.716 | 0.617 | 9.7  | 0.698 | 0.000 | 9.5  | 332.413 | Surcharged |
| SWMH12                 | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.24<br>4 | 33.89<br>4 | 34.069 | 0.175 | 40.8 | 0.198 | 0.000 | 36.9 | 17.681  | OK         |
| SWMH10                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 34.84<br>3 | 33.24<br>7 | 33.716 | 0.469 | 5.8  | 0.531 | 0.000 | 5.8  | 199.001 | Surcharged |
| SWMH8                  | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.35<br>8 | 34.00<br>8 | 34.204 | 0.196 | 42.8 | 0.221 | 0.000 | 40.3 | 18.551  | OK         |
| SWMH7                  | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.35<br>2 | 32.98<br>9 | 33.716 | 0.727 | 11.5 | 0.823 | 0.000 | 11.4 | 397.970 | Surcharged |
| SWMH13<br>(1)          | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.33<br>6 | 34.20<br>0 | 34.807 | 0.607 | 40.9 | 0.172 | 0.000 | 32.2 | 17.753  | Surcharged |
| SW27<br>HYDROBR<br>AKE | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.29<br>2 | 33.11<br>0 | 35.188 | 2.078 | 2.5  | 3.672 | 0.000 | 1.8  | 204.716 | Flood Risk |
| SWMH20                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.41<br>6 | 34.07<br>0 | 35.188 | 1.118 | 0.9  | 1.265 | 0.000 | 0.9  | 31.585  | Flood Risk |
| SWMH25                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.61<br>4 | 34.00<br>0 | 35.189 | 1.189 | 0.2  | 0.336 | 0.000 | 0.3  | 1.611   | Surcharged |
| SWMH9                  | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.10<br>0 | 32.90<br>0 | 33.716 | 0.816 | 7.7  | 0.923 | 0.000 | 7.6  | 261.022 | Surcharged |
| SWMH11                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 34.84<br>3 | 33.20<br>9 | 33.716 | 0.507 | 5.8  | 0.574 | 0.000 | 5.8  | 198.567 | Surcharged |
| SWMH14<br>(1)          | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.38<br>4 | 34.09<br>0 | 34.725 | 0.635 | 46.5 | 0.180 | 0.000 | 38.5 | 23.959  | Surcharged |
| SWMH15                 | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.39<br>5 | 33.92<br>6 | 34.606 | 0.680 | 38.5 | 0.192 | 0.000 | 38.2 | 23.905  | Surcharged |
| SWMH2 (1)              | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.13<br>2 | 33.92<br>0 | 34.672 | 0.752 | 41.8 | 0.851 | 0.000 | 34.0 | 21.617  | Surcharged |
| SWMH31                 | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 35.48<br>0 | 34.43<br>0 | 34.575 | 0.145 | 15.8 | 0.041 | 0.000 | 15.4 | 6.873   | OK         |
| SWMH34                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.48<br>0 | 32.70<br>0 | 33.716 | 1.016 | 1.9  | 1.149 | 0.000 | 2.0  | 247.387 | Surcharged |
| SWMH35                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.43<br>0 | 33.80<br>4 | 35.188 | 1.384 | 1.8  | 0.392 | 0.000 | 1.8  | 59.699  | Flood Risk |
| SWMH33                 | FSR: 100 years:<br>+45 %: 1440 mins:<br>Winter | 35.55<br>6 | 34.04<br>2 | 35.188 | 1.146 | 0.9  | 0.324 | 0.000 | 0.9  | 30.332  | Surcharged |
| SWMH3 (1)              | FSR: 100 years:<br>+45 %: 15 mins:<br>Summer   | 34.99<br>8 | 33.61<br>0 | 34.520 | 0.910 | 34.0 | 1.029 | 0.000 | 35.6 | 21.237  | Surcharged |

|                                                                            |  |                                                                   |             |                                                                                     |              |
|----------------------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Trade City Sharston:                                                       |  | Date:<br>25/11/2025                                               |             |  |              |
|                                                                            |  | Designed by:<br>NM                                                | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |                                                                                     |              |



**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. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Percentage Available (%) | Status |
|--------------------|------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|--------------------|-----------------------------|--------------------------|--------|
| Tank Unit 1        | FSR: 100 years: +45 %: 1440 mins: Winter | 33.716            | 33.716            | 0.966             | 0.966             | 19.0              | 550.824                   | 0.000                    | 0.000                  | 1.9                | 250.326                     | 3.568                    | OK     |
| Tank Unit 2 and 3  | FSR: 100 years: +45 %: 1440 mins: Winter | 35.189            | 35.189            | 2.039             | 2.039             | 17.5              | 476.152                   | 0.000                    | 0.000                  | 2.5                | 207.958                     | 0.013                    | OK     |
| Porous Paving      | FSR: 100 years: +45 %: 1440 mins: Summer | 34.925            | 34.854            | 0.201             | 0.134             | 0.8               | 11.682                    | 0.000                    | 0.000                  | 0.3                | 10.400                      | 52.796                   | OK     |

|                                                                    |  |                                                                   |             |                                                                                     |              |
|--------------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|--------------|
| Trade City Sharston:                                               |  | Date:<br>25/11/2025                                               |             |  |              |
|                                                                    |  | Designed by:<br>NM                                                | Checked by: |                                                                                     | Approved By: |
| Report Details:<br>Type: Connections Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |                                                                                     |              |



**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 (m³) | Max. Velocity (m/s) | Flow / Capacity | Max. Flow (L/s) | Status     |
|------------|------------------------------------------|-----------------|------------------|-------------------|--------------------------|-------------------------|---------------------|-----------------------|---------------------|-----------------|-----------------|------------|
| SW1.001    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH1 6          | SWMH4 (1)         | 35.480                   | 34.521                  | 0.171               | 14.062                | 1.0                 | 0.72            | 31.1            | OK         |
| SW1.002    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH4 (1)        | SWMH5             | 35.480                   | 34.475                  | 0.300               | 77.854                | 1.7                 | 1.68            | 123.3           | Surcharged |
| SW1.008    | FSR: 100 years: +45 %: 1440 mins: Winter | Pipe            | SW18 HYDRO BRAKE | SWMH3 2           | 35.471                   | 33.716                  | 0.034               | 278.446               | 0.5                 | 0.05            | 1.8             | Surcharged |
| SW7.002    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH1 9          | Tank Unit 2 and 3 | 35.433                   | 33.955                  | 0.225               | 32.175                | 1.4                 | 1.06            | 54.2            | Surcharged |
| SW7.000    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH1 7          | SWMH1 8           | 35.428                   | 34.945                  | 0.150               | 10.874                | 1.0                 | 1.27            | 18.4            | Surcharged |
| SW1.009    | FSR: 100 years: +45 %: 1440 mins: Winter | Pipe            | SWMH3 2          | EX SW CULVERT     | 35.365                   | 32.394                  | 0.024               | 483.050               | 1.3                 | 0.01            | 3.6             | OK         |
| SW9.005    | FSR: 100 years: +45 %: 15 mins: Winter   | Pipe            | SWMH2 6          | SWMH2 7           | 35.557                   | 33.924                  | 0.139               | 5.809                 | 0.4                 | 0.28            | 10.2            | OK         |
| SW9.000    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH2 1          | SWMH2 2           | 35.614                   | 34.882                  | 0.150               | 9.365                 | 1.1                 | 1.32            | 19.1            | Surcharged |
| SW9.001    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH2 2          | SWMH2 3           | 35.614                   | 34.557                  | 0.154               | 14.431                | 1.0                 | 0.8             | 29.3            | OK         |
| SW1.003    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH5            | SWMH6             | 35.480                   | 34.168                  | 0.300               | 83.619                | 1.9                 | 1.87            | 131.8           | Surcharged |
| SW4.000    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH8            | SWMH7             | 35.358                   | 34.204                  | 0.182               | 18.551                | 1.2                 | 0.95            | 40.3            | OK         |
| SW7.004    | FSR: 100 years: +45 %: 1440 mins: Winter | Pipe            | SW27 HYDRO BRAKE | SWMH3 2           | 35.292                   | 35.188                  | 0.032               | 204.650               | 0.5                 | 0.04            | 1.8             | Flood Risk |
| SW9.006    | FSR: 100 years: +45 %: 15 mins: Winter   | Pipe            | SWMH2 7          | SWMH2 8           | 35.557                   | 33.907                  | 0.210               | 12.116                | 0.7                 | 0.54            | 19.9            | OK         |
| SW8.000    | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe            | SWMH2 0          | SWMH1 9           | 35.416                   | 34.290                  | 0.150               | 8.675                 | 1.0                 | 1.19            | 17.2            | Surcharged |

|                                                                    |  |                                                                   |             |              |
|--------------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|--------------|
| Trade City Sharston:                                               |  | Date:<br>25/11/2025                                               |             |              |
|                                                                    |  | Designed by:<br>NM                                                | Checked by: | Approved By: |
| Report Details:<br>Type: Connections Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |



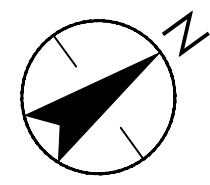
|              |                                         |      |            |                   |        |        |       |         |     |      |       |            |
|--------------|-----------------------------------------|------|------------|-------------------|--------|--------|-------|---------|-----|------|-------|------------|
| SW1.004      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH6      | SWMH7             | 35.483 | 33.696 | 0.300 | 90.465  | 2.0 | 2.05 | 144.2 | Surcharged |
| SW9.007      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH28     | Tank Unit 2 and 3 | 35.557 | 33.907 | 0.300 | 53.202  | 1.4 | 1.22 | 99.2  | Surcharged |
| SW11.000     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH30     | Tank Unit 2 and 3 | 35.244 | 34.109 | 0.208 | 82.594  | 3.8 | 0.87 | 187.5 | OK         |
| SW5.001      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH10     | SWMH11            | 34.843 | 33.679 | 0.300 | 55.265  | 1.8 | 1.59 | 124.9 | Surcharged |
| SW6.001      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH12     | SWMH9             | 35.244 | 34.069 | 0.168 | 17.681  | 1.2 | 0.87 | 36.9  | OK         |
| SW5.001 (1)  | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH11     | SWMH9             | 34.843 | 33.426 | 0.233 | 55.273  | 2.0 | 0.61 | 119.0 | OK         |
| Pipe         | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH9      | Tank Unit 1       | 35.100 | 33.150 | 0.251 | 72.449  | 3.7 | 0.78 | 153.7 | OK         |
| Pipe (1)     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH13 (1) | SWMH14 (1)        | 35.336 | 34.807 | 0.225 | 17.753  | 0.8 | 0.76 | 32.2  | Surcharged |
| Pipe (2)     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH14 (1) | SWMH15            | 35.384 | 34.725 | 0.225 | 23.959  | 1.1 | 0.76 | 38.5  | Surcharged |
| Pipe (3)     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH15     | SWMH4 (1)         | 35.395 | 34.606 | 0.225 | 23.905  | 1.0 | 0.54 | 38.2  | Surcharged |
| SW1.000      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH1      | SWMH2 (1)         | 35.103 | 34.699 | 0.225 | 13.696  | 0.7 | 0.56 | 23.6  | Surcharged |
| Pipe (5)     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH31     | SWMH6             | 35.480 | 34.575 | 0.130 | 6.873   | 0.9 | 1.06 | 15.4  | OK         |
| Pipe (6)     | FSR: 100 years: +45 %: 960 mins: Winter | Pipe | SWMH34     | SW18 HYDRO BRAKE  | 35.480 | 33.692 | 0.300 | 157.610 | 0.1 | 0.03 | 2.6   | Surcharged |
| SW7.001      | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH18     | SWMH35            | 35.426 | 34.654 | 0.150 | 16.649  | 1.5 | 1.83 | 26.6  | Surcharged |
| SW7.001 (1)  | FSR: 100 years: +45 %: 30 mins: Summer  | Pipe | SWMH35     | SWMH19            | 35.430 | 34.265 | 0.150 | 22.062  | 1.4 | 1.68 | 24.3  | Surcharged |
| SW10.000     | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH29     | SWMH33            | 35.556 | 34.318 | 0.106 | 8.067   | 1.0 | 0.42 | 17.9  | OK         |
| SW10.000 (1) | FSR: 100 years: +45 %: 15 mins: Summer  | Pipe | SWMH33     | SWMH28            | 35.556 | 34.146 | 0.100 | 8.052   | 1.0 | 0.39 | 16.5  | OK         |

|                                                                    |  |                                                                   |             |              |                                                                                     |
|--------------------------------------------------------------------|--|-------------------------------------------------------------------|-------------|--------------|-------------------------------------------------------------------------------------|
| Trade City Sharston:                                               |  | Date:<br>25/11/2025                                               |             |              |  |
|                                                                    |  | Designed by:<br>NM                                                | Checked by: | Approved By: |                                                                                     |
| Report Details:<br>Type: Connections Summary<br>Storm Phase: Phase |  | 100 Barbirolli Square :<br>Manchester<br>United Kingdom<br>M2 3PW |             |              |                                                                                     |

|           |                                          |      |                   |                  |        |        |       |         |     |      |       |            |
|-----------|------------------------------------------|------|-------------------|------------------|--------|--------|-------|---------|-----|------|-------|------------|
| Pipe (7)  | FSR: 100 years: +45 %: 960 mins: Summer  | Pipe | Tank Unit 1       | SWMH3 4          | 34.955 | 33.687 | 0.300 | 161.266 | 0.3 | 0.02 | 2.0   | Surcharged |
| SW1.005   | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe | SWMH7             | Tank Unit 1      | 35.352 | 33.447 | 0.375 | 108.694 | 1.7 | 1.44 | 182.8 | Surcharged |
| Pipe (8)  | FSR: 100 years: +45 %: 1440 mins: Winter | Pipe | SWMH2 5           | SWMH2 4          | 35.614 | 35.189 | 0.225 | 0.006   | 0.0 | 0.01 | 0.3   | Surcharged |
| Pipe (9)  | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe | SWMH2 4           | SWMH2 3          | 35.614 | 34.025 | 0.127 | 6.808   | 0.6 | 0.4  | 14.6  | OK         |
| Pipe (10) | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe | SWMH2 3           | SWMH2 8          | 35.614 | 33.977 | 0.256 | 28.707  | 0.9 | 0.53 | 59.4  | OK         |
| Pipe (11) | FSR: 100 years: +45 %: 15 mins: Winter   | Pipe | Tank Unit 2 and 3 | SW27 HYDRO BRAKE | 35.362 | 33.499 | 0.300 | 2.554   | 0.4 | 0.04 | 3.2   | Surcharged |
| Pipe (4)  | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe | SWMH2 (1)         | SWMH3 (1)        | 35.132 | 34.672 | 0.225 | 21.617  | 0.9 | 0.65 | 34.0  | Surcharged |
| Pipe (12) | FSR: 100 years: +45 %: 15 mins: Summer   | Pipe | SWMH3 (1)         | SWMH4 (1)        | 34.998 | 34.520 | 0.225 | 21.237  | 1.0 | 0.36 | 35.6  | Surcharged |
| Pipe (13) | FSR: 100 years: +45 %: 960 mins: Summer  | Pipe | Porous Paving     | SWMH3 (1)        | 35.224 | 34.897 | 0.070 | 8.370   | 0.0 | 0    | 0.3   | OK         |

## **Appendix I – Overland Flow Plan**





SHARSTON ROAD

LONGLEY LANE

HARPER ROAD

0 4 8 12 16 20m  
SCALE 1:200

NO EXCEEDANCE IN THE 1:100 YEAR + 45% CLIMATE CHANGE STORM. ALL SURFACE WATER WOULD BE CONTAINED WITHIN THE SITE. IN THE EVENT OF A MORE SEVERE STORM, SURFACE WATER WOULD BE HELD WITHIN YARD AND CAR PARK AREAS ON THE SURFACE UNTIL THE WATER LEVEL SUBSIDES AFTER WHICH THE WATER HELD ON THE SURFACE WOULD DISCHARGE THROUGH THE DRAINAGE SYSTEM. IN THE EVENT OF A MAJOR BLOCKAGE AT THE OUTFALL - WATER WOULD SPILL OUT OF THE SITE AS SHOWN. THIS IS FOR INFORMATION ONLY AND THE DESIGN AND MAINTENANCE SCHEDULE AIM TO PREVENT THIS

IN THE EVENT OF A MAJOR BLOCKAGE AT THE OUTFALL - WATER WOULD SPILL OUT OF THE SITE AS SHOWN. THIS IS FOR INFORMATION ONLY AND THE DESIGN AND MAINTENANCE SCHEDULE AIM TO PREVENT THIS

Unit 2  
(Block 2)

Unit 3  
(Block 2)

Unit 4  
(Block 2)

Unit 5  
(Block 2)

Unit 9  
(Block 3)

Unit 8  
(Block 3)

Unit 7  
(Block 3)

Unit 6  
(Block 3)

Unit 1  
(Block 1)

CS

CS



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Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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