

Gorton Community Hub

Library Site, Drainage Strategy

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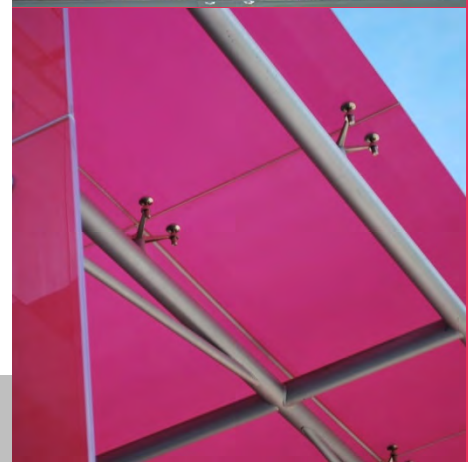
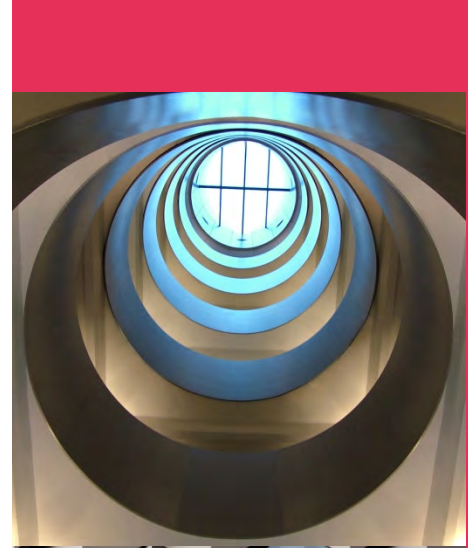
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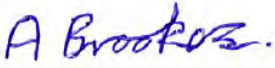
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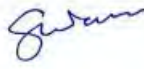
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1.0 Introduction

1.1 Project Background

Curtins were instructed by Morgan Sindall PLC to develop a Drainage Strategy (DS) for the proposed car park remediation and extension at Gorton Library, Garratt Way, Manchester M18 8HE. The purpose of the DS is to accompany a planning application. The site is centred on National Grid Ref: 388580mE 396260mN.

The report provides information on the drainage strategy for the site and follows National and Local Government guidance with regards to development and drainage and is based on currently available information.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2 Proposed Development

The proposed works include demolition of the existing library building, to make way for the extension of the existing car park which served the library. The existing car park is to remain, with minimal alteration or remediation required to facilitate tie-in to that proposed.

The architect's site plan is in Appendix D of this report.

2.0 SuDS Guidance and Standards

2.1 Introduction

In July 2018, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems¹ (SuDS) a requirement for the determination of planning applications for 'major' developments. The requirements of a sustainable drainage system are set out in the government's Non-statutory technical standards for sustainable drainage systems.

A Drainage Strategy will therefore be required as part of the Planning Application for the development, as the site is considered to be 'major' development by the Town and Country Planning Order 2015 as total floor space will exceed 1,000m².

2.2 National Planning Policy and Guidance

National Planning Policy Guidance² (NPPF) states that:

Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- take account of advice from the lead local flood authority
- have appropriate proposed minimum operational standards
- have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
- where possible, provide multifunctional benefits.

Guidance on the design criteria for different site situations in the Non-Statutory Technical Standards for Sustainable Drainage state:-

Peak Flow Control

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

¹ <https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards>

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

Volume Control

- Where reasonably practicable, for greenfield developments, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.
- Brownfield developments - Where reasonably practicable, the runoff volume from the development in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.
- Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with points above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

Flood Risk Within the Development

- The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.
- The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event.
- The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

Sustainable Drainage Hierarchy

Paragraph 056 of the NPPF Planning Practice Guidance on Flood risk and coastal Change³ states:

The types of sustainable drainage system which it may be appropriate to consider, will depend on the proposed development and its location, as well as any planning policies and guidance that apply locally. Where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

³ <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

2.3 Climate Change

On 10th May 2022 the Environment Agency published revised climate change allowances⁴ for peak rainfall intensities which should be applied to new developments, based on the River Management Catchment the development lies in, and development design life.

2.4 Consultation

A pre-development enquiry was originally submitted to United Utilities (UU) on 29/03/2019, from which an accepted surface water discharge to the surface water sewer at a 50% betterment on the brownfield runoff rate was accepted. UU also provided the sewer record plans in Appendix A. The consultation response is now beyond its 12 month validity limit, therefore it is unlikely that the discharge rate will remain acceptable since it does not comply with current national standards. The discharge point to the sewer should remain acceptable since the disposal hierarchy has not changed.

Planning permission was granted under application 135449/VO/2022 on 14/11/2022, with the following condition.

13) Notwithstanding the drainage details on the Gorton Hub Staff Car Park library site Proposed Drainage Layout GCH-CUR-XX-XX-DR-C-92101-P02 and in the Gorton Hub 135449/VO/2022 Page 7 of 8 Staff Car Park library site Drainage Strategy GCH-CUR-XX-XX-RP-C-92100-P02 dated 11th November 2022;

development shall not begin until a surface water drainage scheme for the site, based on sustainable drainage principles has been submitted to and approved in writing by the local planning authority. The development shall be constructed and completed in accordance with the approved details.

Reason - To prevent the increased risk of flooding, to improve and protect water quality and ensure future maintenance of the surface water drainage system pursuant to policy EN17 of the Manchester Core Strategy (2012).

Curtins also reviewed the delegated officer report.

A new wastewater pre-development enquiry was submitted to United Utilities on 19/01/2023, correspondence is in Appendix G.

2.5 Approach to Determining Appropriate Strategy

The following sections of this strategy are subsequent to the above guidance in:

- Setting strategic surface water management objectives,
- Assessing the existing site and development characterisations,

⁴ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#peak-rainfall-intensity-allowance>

- Setting the SuDS design criteria,
- Identifying suitable points of discharge,
- assessing Opportunities and Constraints, and
- producing a drainage strategy appropriate for planning purposes

3.0 Strategic Surface Water Management (SWM) Objectives

Following CIRIA 753 Section 7.4, the below objectives are considered by Curtins to be suitable for the surface water drainage design, based on national guidance, standards and best practice.

Topic	Strategic objective
Flood risk	The site lies wholly within Flood Zone 1. Rates of surface water discharge will be controlled, and attenuation will be provided, as outlined in section 5.0.
Water quality	Surface water is proposed to discharge to the surface water sewer, so will require treatment. Where possible, SuDS will be utilised.
Urban heating & air pollution	The development is in an urban area with dispersed green spaces, so urban cooling is not a key driver. The perimeter landscaping will be of benefit.
Replenishing groundwater	As per best practice, infiltration should be used where feasible.
Biodiversity	Most of the site area will be devoted to car parking, so any benefits will need to be provided in the perimeter landscaping.
Water resource	The development will not include any features which would benefit from harvested rainwater, such as in buildings or formal planting.
Low carbon construction	Selecting paving and drainage systems and materials which have a low embodied carbon, limiting excavation, using systems which provide dual purpose such as permeable sub-base for pavement sub-structure and attenuation, and minimising the use of steel, cement and certain plastics, will all be considered. A non-pumped solution will be sought.
Amenity	The development provides limited opportunity for amenity due to the site usage.
Approval and adoption	The local planning authority will be the approving body for the surface water management system. The proposed discharge is to the public surface sewer so will require United Utilities approval. The site drainage will be entirely owned and operated by the developer, so operation and maintenance design need only consider their needs and capabilities.

4.0 Conceptual design

4.1 Site characterisation outcomes

Following the guidance set out in CIRIA 753 Section 7.5.1, the characteristics set out in the below tables relating to surface water management were established for the site and development respectively.

Site topography	The site is broadly flat with levels around 68.2m AOD.
Existing flow routed and discharge points	The GPR survey in Appendix B shows that the existing building and car park are drained by rainwater pipes and a slotted linear drain, respectively. They are understood to discharge unrestricted via below ground pipework to private drainage on the north-west corner of the site, which discharges to the United Utilities surface water sewer.
Potential for infiltration	Ground investigations undertaken to date show the ground is mostly clay and peat soils which are expected to have low permeability but will be tested to confirm. No ground water was encountered in any of the trial pit locations. There are no known groundwater source protection zones within range of the site.
Potential for surface water discharge	There are no existing watercourses within range of the site which are feasible for surface water disposal. Two 225mm diameter surface water sewers are adjacent to the site, one in Engell Close to the north, and one in Sibley Street to the east. Existing private surface water drainage has been mapped with GPR on the west site of the site, which is understood to discharge to the sewer in Engell Close. Sewer records are in Appendix A.
Site flood risks	The site lies wholly within Flood Zone 1 for river, sea and reservoir flooding. Flood risk from surface water is identified on the EA maps in the adjacent highways of Engell Close and Sibley Street. Due to the nature of the site and the flood risk, it is not considered necessary to prepare an FRA.
Existing site land use	The site is an existing library building and associated car park.
Existing site infrastructure	The existing library building has existing water, gas and electric supply as well as foul and surface water drainage. The lowest surface water manhole where flows leave site is at 66.31m, which is circa 1.89m below typical ground levels. A relatively shallow surface water network could connect without pumping.
Existing soils	Existing topsoil and subsoil will require testing if it is proposed to be used in any SuDS components.
Local habitats and biodiversity	No ecological assessment or environmental impact assessment were available at the time of writing this report to make a detailed assessment.
Local landscapes and townscape	The surrounding area is understood to be residential in nature, and the colour green is often used for features such as fences. The paving is typically asphalt (black top) in the surrounding area. Beyond that, there was little information available for this report.

4.2 Development characterisation outcomes

Proposed topography, land use and landscape characteristics	Ground levels will remain broadly the same as existing. The library building will be demolished, so the roof area will be replaced with car parking. The extent of surrounding landscape will be largely unchanged, and existing trees will be preserved where possible. The design life is assumed to be 60 years.
Proposed flood risk management strategy	No mitigations are required by the site-specific Flood Risk Assessment. The drainage calculations will include a surcharged outfall.
Proposed site infrastructure	The existing water and gas supply and foul drainage will be redundant. However, the surface water drainage will be utilised, and the electricity supply will power proposed lighting.
Proposed building style and form	N/A
Proposed adoption and maintenance of surface water management system	The SWM system will be owned and operated by the developer. Maintenance guidance is included in Section 6.0 of this report.

4.3 SuDS Design Criteria

	Delivery of Design Criteria
Water quantity	It is proposed that the existing car park drainage and discharge is unchanged, and that the proposed car park discharges greenfield Q_{BAR}. The site lies in the Irwell Management Catchment, for the EA guidance⁵ on peak rainfall allowances. Therefore, attenuation will be provided for the 1:30 year +25% climate change and the 1:100 year +30% events. The ground levels and SuDS design will allow for up to 100mm of controlled surface water ponding for rainfall events in excess of the 1:30 year +25% climate change. This is in accordance with best practice since 100mm depth of standing water minimises the risk of harm to people and damage of vehicles, while maximising design efficiency, thereby reducing construction material, waste and embodied carbon.
Water quality	The land use will have no higher pollution risk than that of non-residential car parking with frequent change, therefore:

⁵ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

	Medium hazard indices Table 26.2: TSS: 0.7, metals: 0.6, HCs: 0.7
Amenity	Minimise the adverse impact of the SuDS design on existing landscaping.
Biodiversity	Retain existing trees and planting.

4.4 Feasible points of discharge

Surface Water Disposal Method	Potential	Description
Into the ground (infiltration)	X	Unsuitable due to low permeability clay and peat soils.
Surface water body	X	None within a feasible connection distance of the site.
Surface water sewer, highway drain of other drainage	✓	Possible via existing private surface water drainage on the west side of the site which discharged to the 225mm UU surface water sewer in Engell Close. The lowest manhole on site has a surveyed IL of 66.31m which should provide sufficient depth for a gravity connection. Defects on the existing drainage, proposed to be reused have been identified on the proposed drainage layout, as well as recommended remedial action.
Combined sewer	✓	Only possible via a new direct connection to the 300mm diameter UU combined sewer in Sibley Street. Not proposed.

4.5 Surface water sub-catchments and flow routes

The site is divided into the **existing car park** (to the north) and the **proposed car park extension** (to the south), also referred to as Phase 1 and Phase 2. All surface water runoff is proposed to be routed to the existing surface water drain on the west side of the site.

The existing car park drainage channel and discharge arrangement will not be altered; however, it is recommended that the drainage is cleared of any blockages.

4.6 SuDS components for the proposed car park extension

Water quantity	Runoff collection	Ground falls laid to direct flow from proposed impervious areas to pervious paving.
	Interception	Not feasible.
	Storage	Permeable sub-base

	Conveyance	Perforated collector pipes under permeable sub-base
	Exceedance	Levels designed to allow up to 100mm of controlled ponding during rainfall in excess of the 1in100 year event. Raised kerbs to perimeter of the car park, with the only outlet at the vehicle entrance onto Sibley Street (highway).
Water quality	Discharges to surface waters	Permeable pavement surface. SuDS mitigation indices (CIRIA 753 Table 26.4): TSS: 0.7, metals: 0.6, HCs: 0.7 (acceptable as equal or higher than hazard indices).
Amenity	The surface finish of porous asphalt has been selected to better fit with the existing car park which is to be retained.	
Biodiversity	By minimising the drainage to be installed in the landscaped areas, disruption to these areas will be minimised.	

5.0 Outline design

5.1 Size SuDS components at site scale

The proposed impermeable area for the site is 0.180 ha.

The hydrological characteristics of the region are:

SAAR (mm)	900
SOIL	0.47
Hydrometric area	10

The site greenfield runoff rate has been estimated using the IH124 equation as follows:

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

The site is less than 50 ha, so the formula has been applied for 50 ha and result factored.

$$Q_{BAR(rural)} = \frac{0.00108 * 0.5^{0.89} * 900^{1.17} * 0.47^{2.17}}{50ha} = 0.00648 \text{ m}^3/\text{s/ha} = 6.48 \text{ l/s/ha}$$

Therefore, the proposed car park impermeable area of 0.180 ha should be restricted to:

$$Q_{BAR} = 6.48 * 0.180 = 1.166 \text{ l/s}$$

Since the lowest practical unprotected flow control discharge rate is 2 l/s, this will be the minimum rate.

The allowable peak flow rates are defined by the growth factors from CIRIA 753 Table 24.2, and the greenfield limiting discharge rates for the site are given below.

Return Period	Growth factor	Whole site (l/s)	Unit value (l/s/m ²)
1:1 year	0.87	1.0 (Use 2.0)	0.00056
1:30 year	1.70	2.0	0.00110
1:100 year	2.08	2.4	0.00134

5.2 Site attenuation storage volumes

The volume of attenuation required has been estimated using the UK SuDS Storage Estimation Tool at 88m³. Calculations are shown in Appendix C.

6.0 Maintenance

This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. It may be that the exceedance flows above the 1 in 100-year plus climate change storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking or other space. As the flows are generally being attenuated on site and within SuDS features there will be a period after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted in this section.

SuDS are categorised to suit the CIRIA C753 The SuDS Manual. SuDS which are not used are noted as such.

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented. It is assumed that the maintenance of the drainage will be the responsibility of an on-site facilities management team. A copy of the final construction drainage layout should be provided in the final Operations and Maintenance Manual.

It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after significant storm events.

Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris and litter.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

6.1 Inspection, Manhole and Catchpit Chambers

The indicative locations of the Inspection Chambers, Manholes are indicated on Curtins drainage layout drawing(s).

Access points should be located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.

6.2 Pipes

The indicative locations of the drainage pipes are indicated on Curtins drainage layout drawing(s).

Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the Curtins drainage specification.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers and manholes.

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Table 6.1: Operation and Maintenance Requirements for Pipes		
Schedule	Required Action	Frequency
Monitoring	Initial Inspection should be provided as a post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	Quarterly and 48 hours after large storms.
Regular Maintenance	Check and remove large vegetation growth near pipes.	Monthly or as required.
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.

Table 6.1: Operation and Maintenance Requirements for Pipes

Schedule	Required Action	Frequency
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

6.1 Drainage Channels and Gullies

The indicative locations of and typical details of the drainage channels and gullies are indicated on Curtins drainage layout drawing.

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned using a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should always be kept clear to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Table 6.2: Operation and Maintenance Requirements for Drainage Channels and Gullies

Schedule	Required Action	Frequency
Monitoring	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance	Litter and debris removal.	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required.
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be	3-monthly, 48 hours after large storms.

Table 6.2: Operation and Maintenance Requirements for Drainage Channels and Gullies

Schedule	Required Action	Frequency
	reprofiled to provide a flat area or berm adjacent to the paving.	
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

6.2 Permeable Pavements

The indicative locations and build-up of the permeable paving areas are indicated on Curtins drainage layout drawing.

Permeable pavements contain proprietary products and as such where used the manufacturer's recommendations should be followed.

The permeable pavements are intended to be water quality and attenuation storage features. These features are intended to be dry except during rainfall events.

The surface has been designed to contain gaps where rain can flow through the upper construction layers into the voided stone or geocellular structure which makes up the subbase. Where these features are intended to be used as infiltration devices or soakaways any capping also needs to be permeable to permit the flows to the formation.

Access for maintenance is provided by inspection/access pipes, although access will be limited as this is a surface feature only.

Regular inspection and maintenance is important for the effective operation of the pervious pavement.

Table 6.3: Operation and Maintenance Requirements for Pervious Pavement

Schedule	Required Action	Frequency
Monitoring	Initial Inspection.	Monthly for first three months.
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	Quarterly and 48 hours after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	Annually.

Table 6.3: Operation and Maintenance Requirements for Pervious Pavement

Schedule	Required Action	Frequency
	Monitor inspection chamber.	Annually.
Regular maintenance	Brushing and Vacuuming (standard cosmetic sweep over whole surface).	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weeds.	As required.
Remedial Action	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

6.3 Flow Control Units

The indicative locations and typical details of flow control chambers are indicated on Curtins drainage layout drawing.

The flow control units are intended for flood control and flow restriction. The flow control specification is subject to detailed design. The manufacturer's recommendations should also be taken into consideration.

Access for maintenance has been provided by locating within manhole chambers.

Table 6.4: Operation and Maintenance Requirements for Flow Control Units

Schedule	Required Action	Frequency
Monitoring	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
Regular maintenance	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

7.0 Proposed Foul Water Drainage Strategy

The site will not require foul drainage, so it is proposed that existing foul water drainage is surveyed to confirm it is redundant, before being grubbed up. It may be better for the longevity of the existing car park surfacing if any redundant drainage under it is grouted instead of grubbing up and introducing scars.

8.0 Appendices

Appendix A	Sewer Records
Appendix B	GPR & CCTV Survey
Appendix C	Greenfield Runoff and Surface Water Storage Estimation
Appendix D	Architectural Site Plan
Appendix E	Proposed Drainage Drawings
Appendix F	Proposed Drainage Calculations
Appendix G	Correspondence with United Utilities

See also 'GCH-CUR-00-XX-SH-Z-00001_TIDP-IssueSheet_LibrarySite' for a current list of design documents.

Appendix A Sewer Records

Appendix B GPR & CCTV Survey



CCTV Inspection Report



Manchester South & Central

Unit 23, Adlington Industrial Estate, Cheshire, SK10 4NL
Tel: 01625 879035



Project Information

Metro Rod Manchester
Unit 23,
Adlington Industrial Estate,
Adlington,
Cheshire,
SK10 4NL

Job Number
504835

Surveyed by (Operator)
PAUL BOURHILL

Base Unit
YFNWKCBFBM

Date
17/10/2022

Client Details:

MORGAN SINDALL CONSTRUCTION &
INFRASTRUCTURE

Site Details:

GORTON LIBRARY
GARRATT WAY
MANCHESTER
M18 8HE

Contractor Details:

Metro Rod Manchester
Unit 23,
Adlington Industrial Estate,
Adlington,
Cheshire,
SK10 4NL

Office Contact Name: Scott Stevenson

Purpose of Survey:

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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Job Information

Total Distance Surveyed: **270.85 metres**
Engineer: **PAUL BOURHILL**
Number of Surveys: **27**
Number of Surveys grade 4 or above: **7**

Section 1 Overview (17/10/2022)

Manholes: **MH6 to HOL**
Pipe Length: **1.69 metres**
Structural Grade: **4**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Foul**

The survey of this 100mm drain run shows a damaged gully trap.
We recommend an excavation to remove the defective gully and install new.

Section 2 Overview (17/10/2022)

Manholes: **MH6 B1 to HOL**
Pipe Length: **4.05 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run was found to be in a serviceable condition.

Section 3 Overview (17/10/2022)

Manholes: **MH6 B2 to HOL**
Pipe Length: **7.71 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run was found to be in a serviceable condition.

Section 4 Overview (18/10/2022)

Manholes: **MH10 to HOL**
Pipe Length: **4.5 metres**
Structural Grade: **2**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 150/100mm drain run shows a crack at 1.6m.
We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 5 Overview (18/10/2022)

Manholes: **MH10 B1 to HOL**
Pipe Length: **3.02 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run was found to be in a serviceable condition.

Job Number
504835

Surveyed by (Operator)
PAUL BOURHILL

Base Unit
YFNWKCBFBM

Date
17/10/2022

Section 6 Overview (18/10/2022)

Manholes: **MH10 B2 to HOL**
Pipe Length: **3.76 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run was found to be in a serviceable condition.

Section 7 Overview (18/10/2022)

Manholes: **MH10 B3 to HOL**
Pipe Length: **4.79 metres**
Structural Grade: **3**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run shows multiple cracking at 1.74m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 8 Overview (18/10/2022)

Manholes: **MH10 B4 to HOL**
Pipe Length: **2.86 metres**
Structural Grade: **2**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run shows a crack at 0.43m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 9 Overview (18/10/2022)

Manholes: **MH11 B1 to HOL**
Pipe Length: **4.29 metres**
Structural Grade: **1**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run shows a large displacement at 1.12m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 10 Overview (18/10/2022)

Manholes: **MH11 B2 to HOL**
Pipe Length: **2.98 metres**
Structural Grade: **4**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run shows a fracture at 1.17m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 11 Overview (18/10/2022)

Manholes: **MH11 B3 to HOL**
Pipe Length: **3.12 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run was found to be in a serviceable condition.

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
Section 12 Overview (18/10/2022) Manholes: MH11 to MH10 Pipe Length: 2.02 metres Structural Grade: 0 Service Grade: 0 Material: Vitrified clay Pipe Size: 100mm Use: Foul			
The survey of this 100mm drain run was found to be in a serviceable condition.			
Section 13 Overview (18/10/2022) Manholes: MH3 to MH11 Pipe Length: 20.83 metres Structural Grade: 4 Service Grade: 0 Material: Vitrified clay Pipe Size: 150mm Use: Foul			
The survey of this 150mm drain run shows cracking and displacement faults. We recommend installing 21 metre x 150mm resin inversion liner to seal and secure the noted defects.			
Section 14 Overview (18/10/2022) Manholes: MH3 to MH6 Pipe Length: 19.31 metres Structural Grade: 4 Service Grade: 0 Material: Vitrified clay Pipe Size: 150mm Use: Foul			
The survey of this 150mm drain run shows a broken section and cracks between 0.0 and 1.76m. We recommend if accessible, installing 3 x 150mm localised structural repairs to seal and secure the noted defects.			
Section 15 Overview (18/10/2022) Manholes: MH5 to MH3 Pipe Length: 27.36 metres Structural Grade: 4 Service Grade: 2 Material: Vitrified clay Pipe Size: 150mm Use: Foul			
The survey of this 150mm drain run shows roots and cracking faults through-out. We recommend treating the line with Picote milling works. We recommend installing a 28 metre x 150mm resin inversion liner to seal and secure the noted defects.			
Section 16 Overview (18/10/2022) Manholes: MH5 B1 to HOL Pipe Length: 0 metres Structural Grade: 0 Service Grade: 4 Material: Polyvinyl chloride Pipe Size: 100mm Use: Foul			
The survey of this 100mm drain run shows root intrusions through-out. We recommend treating the line with picote milling works.			
Section 17 Overview (18/10/2022) Manholes: MH5 to M SEWER Pipe Length: 5.5 metres Structural Grade: 3 Service Grade: 2 Material: Vitrified clay Pipe Size: 150mm Use: Foul			
The survey of this 150mm drain run shows roots and a fracture at 0.0m. We recommend if accessible, installing 1 x 150mm localised structural repairs to seal and secure the noted defect.			

Job Number
504835

Surveyed by (Operator)
PAUL BOURHILL

Base Unit
YFNWKCBFBM

Date
17/10/2022

Section 18 Overview (18/10/2022)

Manholes: **MH5 B2 to HOL**
Pipe Length: **8.76 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Polyvinyl chloride**
Pipe Size: **100mm**
Use: **Foul**

The survey of this 100mm drain run appears to be redundant.

Section 19 Overview (19/10/2022)

Manholes: **MH12 to MH9**
Pipe Length: **33.69 metres**
Structural Grade: **3**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

The survey of this 150mm drain run shows cracking and fractures.

We recommend if accessible, installing 4 x 150mm localised structural repairs to seal and secure the noted defects.

Section 20 Overview (19/10/2022)

Manholes: **MH12 B1 to HOL**
Pipe Length: **21.36 metres**
Structural Grade: **4**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Surface water**

The survey of this 100mm drain run shows a crack at 0.0m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Section 21 Overview (19/10/2022)

Manholes: **MH12 to BURIED MH**
Pipe Length: **0 metres**
Structural Grade: **3**
Service Grade: **3**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

Section 22 Overview (19/10/2022)

Manholes: **MH12 to BURIED MH**
Pipe Length: **21 metres**
Structural Grade: **4**
Service Grade: **3**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

The survey of this 150mm drain run shows fractures at 0.1m, 1.12m and 19.67m.

We recommend if accessible, installing 3 x 150mm localised structural repairs to seal and secure the noted defects.

Section 23 Overview (19/10/2022)

Manholes: **MH4 B1 to ACO**
Pipe Length: **14.9 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

The survey of this 150mm drain run was found to be in a serviceable condition.

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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Section 24 Overview (19/10/2022)

Manholes: **MH4 to BURIED MH**
Pipe Length: **23.16 metres**
Structural Grade: **0**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **225mm**
Use: **Surface water**

The survey of this 225mm drain run was found to be in a serviceable condition.

Section 25 Overview (19/10/2022)

Manholes: **MH4 to M LINE CONNECTION**
Pipe Length: **8.41 metres**
Structural Grade: **1**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **225mm**
Use: **Surface water**

The survey of this 225mm drain run shows a large displacement at 8.41m.

We recommend carrying out sonar tracing works to locate the defective area, this will allow us to provide an accurate quote for the repairs required.

Section 26 Overview (19/10/2022)

Manholes: **GY1 to M LINE**
Pipe Length: **17.95 metres**
Structural Grade: **2**
Service Grade: **0**
Material: **Vitrified clay**
Pipe Size: **150mm**
Use: **Surface water**

The survey of this 150mm drain run shows a crack and displacement.

We recommend if accessible, installing 2 x 100mm localised structural repairs to seal and secure the noted defects.

Section 27 Overview (19/10/2022)

Manholes: **GY1 to M LINE**
Pipe Length: **3.83 metres**
Structural Grade: **0**
Service Grade: **2**
Material: **Vitrified clay**
Pipe Size: **100mm**
Use: **Surface water**

The survey of this 100mm drain run shows root intrusions at 0.4m.

We recommend if accessible, installing a single 100mm localised structural repair to seal and secure the noted defect.

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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STRUCTURAL DEFECTS

Grade 3; Best practice suggests consideration to be given to repair in the medium term.

Grade 4; Best practice suggests consideration to be given to repair to avoid potential collapse.

Grade 5; Best practice suggests this pipe is at risk of collapse at any time; urgent consideration should be given to repair to avoid collapse.

Structural Defects			
Section	PLR	Grade	Fault Description
1	HOL X	4	Broken pipe from 6 to 12 o'clock
7	HOL X	3	Cracks multiple from 12 to 12 o'clock
10	HOL X	4	Fracture multiple from 1 to 10 o'clock
13	MH11 X	4	Fracture multiple from 12 to 12 o'clock
			Fracture multiple from 3 to 9 o'clock, Start
			Fracture multiple from 3 to 9 o'clock, Finished
14	MH6 X	4	Broken pipe from 4 to 7 o'clock
15	MH3 X	4	Fracture radiates from 3 o'clock, Start
			Fracture radiates from 3 o'clock, Finished
17	MH5 X	3	Fracture longitudinal at 10 o'clock
19	MH9 X	3	Crack spiral from 6 to 6 o'clock
			Fracture circumferential from 2 to 11 o'clock, Start
			Fracture circumferential from 2 to 11 o'clock, Finished
20	HOL X	4	Fracture multiple from 12 to 12 o'clock
21	MH12 X	3	Other attached deposits from 3 to 6 o'clock 10% cross-sectional area loss - Remark FIXED CONCRETE AND MOT
			Fracture circumferential from 12 to 12 o'clock
			Fracture longitudinal at 11 o'clock
22	MH12 X	4	Fracture multiple from 12 to 12 o'clock
			Fracture multiple from 12 to 12 o'clock

SERVICE / OPERATIONAL DEFECTS

Grade 3; Best practice suggests consideration to be given to maintenance activities in the medium term.

Grade 4; Best practice suggests consideration to be given to maintenance to avoid potential blockage.

Grade 5; Best practice suggests this pipe is at risk of backing up / causing flooding.

Service Defects			
Section	PLR	Grade	Fault Description
16	HOL X	4	Roots tap
21	MH12 X	3	Other attached deposits from 3 to 6 o'clock 10% cross-sectional area loss - Remark FIXED CONCRETE AND MOT
			Fracture circumferential from 12 to 12 o'clock
			Fracture longitudinal at 11 o'clock
22	MH12 X	3	Other attached deposits from 4 to 6 o'clock 10% cross-sectional area loss - Remark CONCRETE
			Fracture longitudinal at 11 o'clock

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBBFM	Date 17/10/2022
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ABANDONED SURVEYS

Camera no access		
Section	PLR	Fault Description
16	HOL X	Survey abandoned - Remark: DUE TO TAPP ROOT

INFORMATION

These summaries are based on the SRM grading from the WRC

Main Sections

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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No.	US MH	DS MH	Date	Road	Material	m
1	MH6	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	1.69
2	MH6 B1	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	4.05
3	MH6 B2	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	7.71
4	MH10	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	4.5
5	MH10 B1	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	3.02
6	MH10 B2	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	3.76
7	MH10 B3	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	4.79
8	MH10 B4	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	2.86
9	MH11 B1	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	4.29
10	MH11 B2	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	2.98
11	MH11 B3	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	3.12
12	MH11	MH10	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	2.02
13	MH3	MH11	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	20.83
14	MH3	MH6	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	19.31
15	MH5	MH3	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	27.36
16	MH5 B1	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Polyvinyl chloride	0
17	MH5	M SEWER	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	5.5
18	MH5 B2	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Polyvinyl chloride	8.76
19	MH12	MH9	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	33.69
20	MH12 B1	HOL	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	21.36

Main Sections

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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No.	US MH	DS MH	Date	Road	Material	m
21	MH12	BURIED MH	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	8.9
22	MH12	BURIED MH	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	21
23	MH4 B1	ACO	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	14.9
24	MH4	BURIED MH	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	23.16
25	MH4	M LINE CONNECTION	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	8.41
26	GY1	M LINE	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	17.95
27	GY1	M LINE	17/10/2022	GORTON LIBRARY GARRATT WAY MANCHESTER M18 8HE	Vitrified clay	3.83

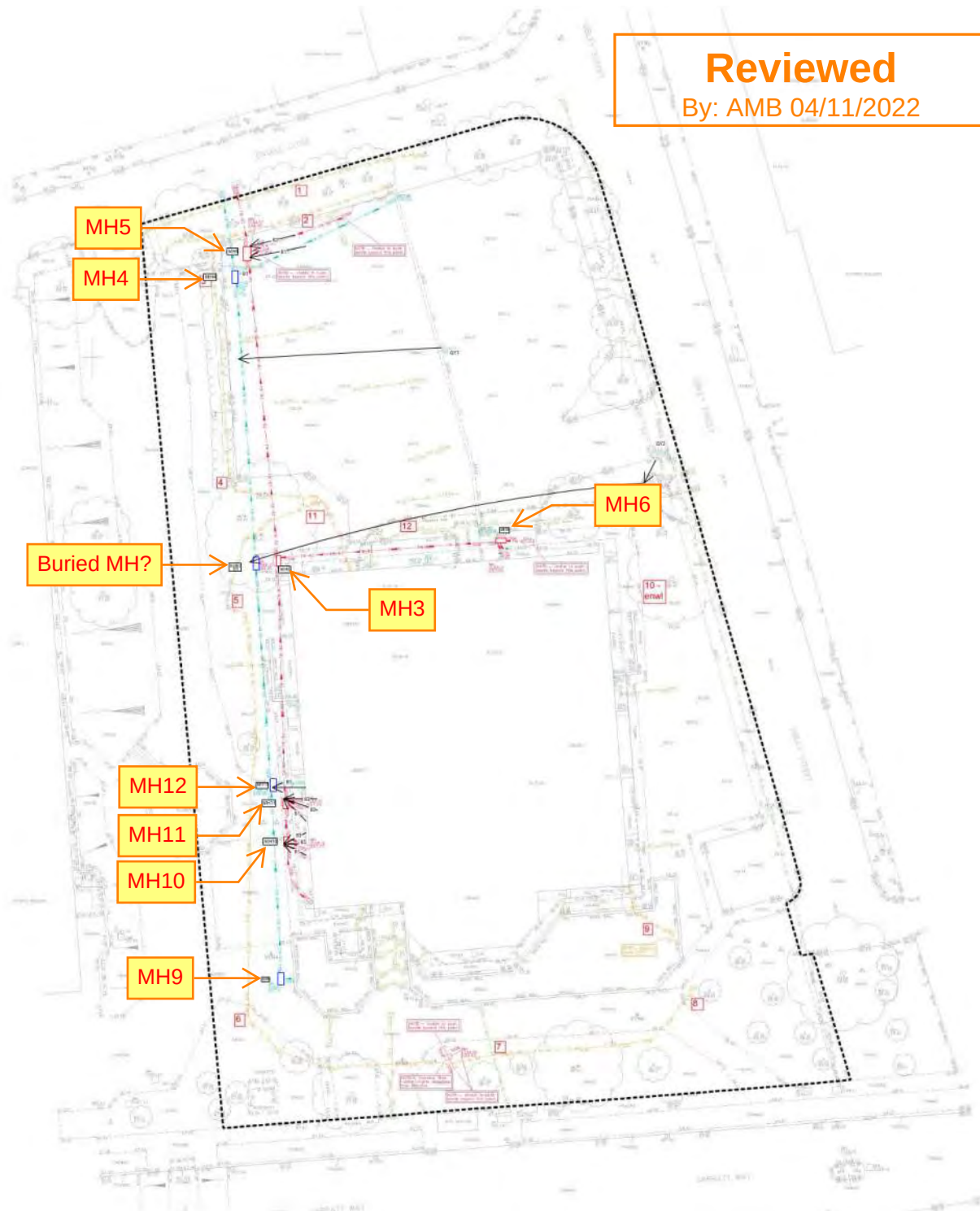
Pipe size: 150 = 162.23m
Pipe size: 100 = 77.05m
Pipe size: 225 = 31.57m

All sections = 270.85m

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
1: Occurences without damage. For example, laterals, joints,etc. NO DEFECTS WERE DETECTED.			
2: Constructional deficiencies or occurences with insignificant influence to tightness, hydraulic or static pressure or pipe: Eg. wide joints, badly torched intakes, minor deformation of plastic pipes, minor erosions etc. REHABILITATION CAN BE SCHEDULED LONG-TERM.			
3: Constructional deficiencies diminishing static, hydraulic and tightness: Eg. untorched intakes, cracks, minor drainage obstructions such as calcite build ups, protruding laterals, minor damages to pipe wall, individual root penetrations, corroded pipe walls etc. REHABILITATION IS NECESSARY MEDIUM-TERM WITHIN 3 TO 5 YEARS.			
4: Constructional damages with insufficient static safety, hydraulic or tightness: Eg. axial/radial pipe bursts, pipe deformations, visually noticeable infiltration/exfiltration, cavities, in pipe-wall, severe protruding, laterals severe root penetrations, severe corrosion of pipe wall etc. REHABILITATION PROCEDURE IS URGENT AND HAS TO BE COMPLETED WITHIN 1 TO 2 YEARS. NECESSITY FOR EMERGENCY OPERATIONS HAS TO BE EXAMINED.			
5: Pipe is already or will shortly be impermeable: Eg. collapsed pipe, deeply rooted pipe or other drainage obstructions. Pipe loses water or danger of backwater in basements etc. REHABILITATION IS URGENT AND SHORT-TERM. IN ORDER TO PREVENT FURTHER DAMAGE, NECESSARY TEMPORARY SPOT REPAIR HAS TO BE CONDUCTED ON EMERGENCY LEVEL.			

Job Number 504835	Surveyed by (Operator) PAUL BOURHILL	Base Unit YFNWKCBFBM	Date 17/10/2022
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This sketch is not to scale and does not represent the exact routing of the drainage system



Appendix C Greenfield Runoff and Surface Water Storage Estimation

[Print](#)[Close Report](#)

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Andrew Brookes

Site name: Gorton Library Site

Site location: Gorton

Site Details

Latitude: 53.46299° N

Longitude: 2.1734° W

Reference: 4212847037

Date: Nov 03 2022 12:43

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.

Runoff estimation approach: IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{EF} estimator method: Calculate from SPR and SAAR

SPR estimator method: Calculate from SOIL type

Soil characteristics

Default Edited

SOIL type: 4 4

HOST class: N/A N/A

SPR/SPRHOST: 0.47 0.47

Hydrological characteristics

Default Edited

SAAR (mm): 900 900

Hydrological region: 10 10

Growth curve factor 1 year: 0.87 0.87

Growth curve factor 3C years: 1.7 1.7

Growth curve factor 100 years: 2.08 2.08

Growth curve factor 200 years: 2.37 2.37

Notes

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

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

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

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

(3) Is $SPR/SPRHOST \leq 0.3$?

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

Greenfield runoff rates

Default

Edited

Q_{EF} (l/s): 6.48 6.48

1 in 1 year (l/s): 5.64 5.64

1 in 3C years (l/s): 11.01 11.01

1 in 100 year (l/s): 13.47 13.47

1 in 200 years (l/s): 15.35 15.35

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

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Surface water storage requirements for sites

www.uksubs.com | Storage estimation tool

Calculated by:

Site name:

Site location:

This is an estimation of the storage volume requirements that are needed 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). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:

Longitude:

Reference:

Date:

Site characteristics

Total site area (ha):	0.3
Significant public open space (ha):	0.12
Area positively drained (ha):	0.18
Impermeable area (ha):	0.18
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.18
Net impermeable area for storage volume design (ha):	0.18
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.3
Urban creep allowance factor:	1.0
Volume control approach:	Use long term storage
Intercepted rainfall depth (mm):	0
Minimum flow rate (l/s):	2

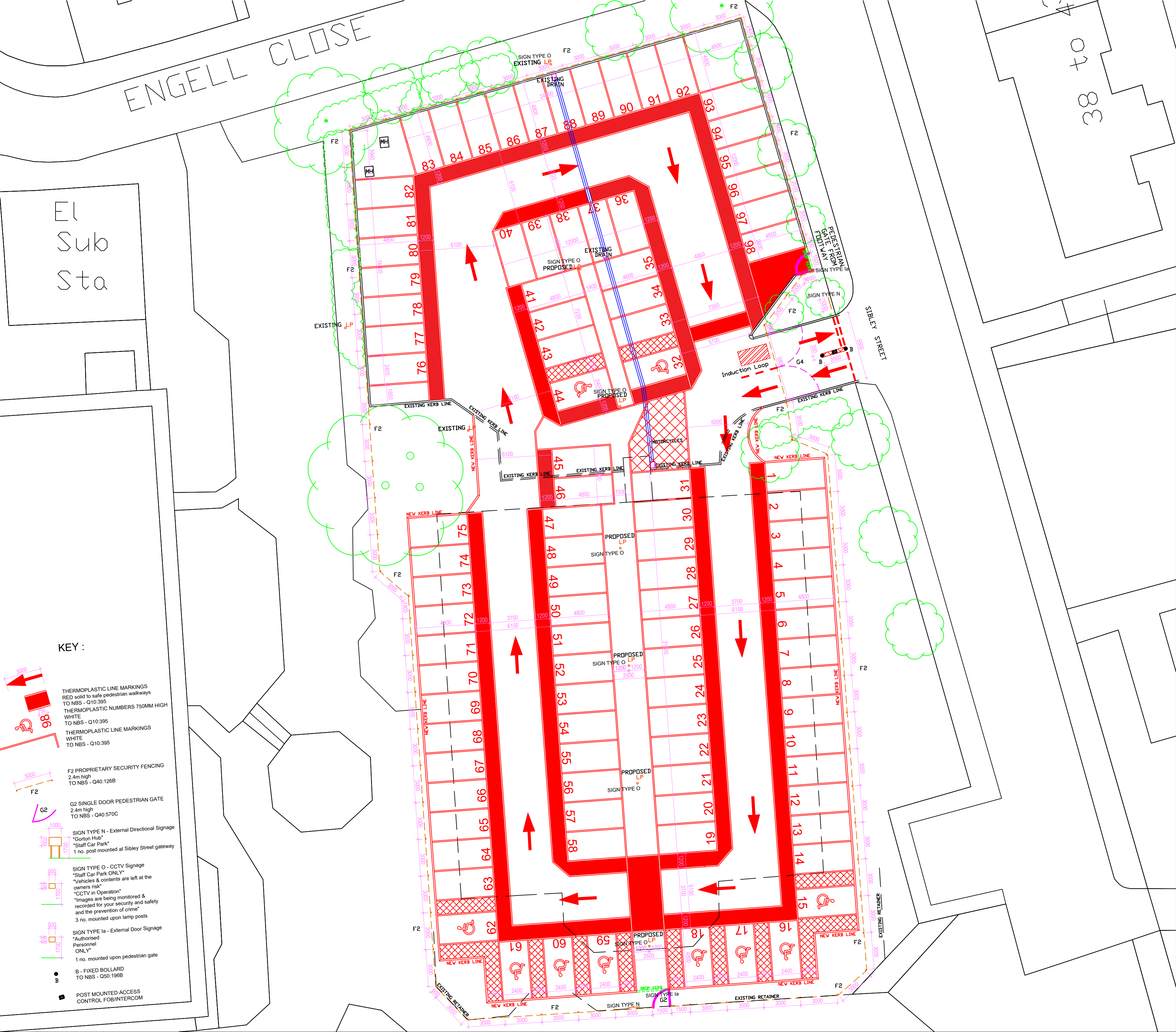
Methodology

Esti	IH124	
Q_{EAF} estimation method:	Calculate from SPR and SAAR	
SPR estimation method:	Calculate from SOIL type	
Soil characteristics	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47
Hydrological characteristics	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	74.34
FEH / FSR conversion factor:	1.18	1.18
SAAR (mm):	900	900
M5-6C Rainfall Depth (mm):	17	17
'r' Ratio M5-6C/M5-2 day:	0.4	0.4
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{EAF} for total site area (l/s):	1.94	1.94
Q_{EAF} for net site area (l/s):	1.17	1.17

Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	2	2	Attenuation storage 1/100 years (m³):	88	88
1 in 30 years (l/s):	2	2	Long term storage 1/100 years (m³):	0	0
1 in 100 year (l/s):	2.4	2.4	Total storage 1/100 years (m³):	88	88

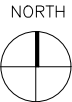
This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix D Architectural Site Plan



- Notes:
- This drawing is copyright.
 - Do not scale dimensions from this drawing.
 - All discrepancies on this drawing are to be reported to the architect.
 - Do not modify any element of this drawing.
 - Use drawing only for purpose(s) issued.

North Sign / Key Plan



The following external model files are included within this drawing:

Rev	Date	Revision Notes	Dn	Rv
P03	25.10.22	2no. fixed bollards & hatch markings added to entry	KL	TK
P02	20.10.22	Parking spaces updated, numbers updated Signage added, KEY added	KL	TK
P01	13.10.22	Phase 1 Parking entry control fob/intercom pillar relocated Pedestrian gate G2 relocated, drop kerb added Phase 2 Parking arrangement updated	KL	TK

Rev	Date	Revision Notes	Dn	Rv
Client / Contractor				

**MORGAN
SINDALL**

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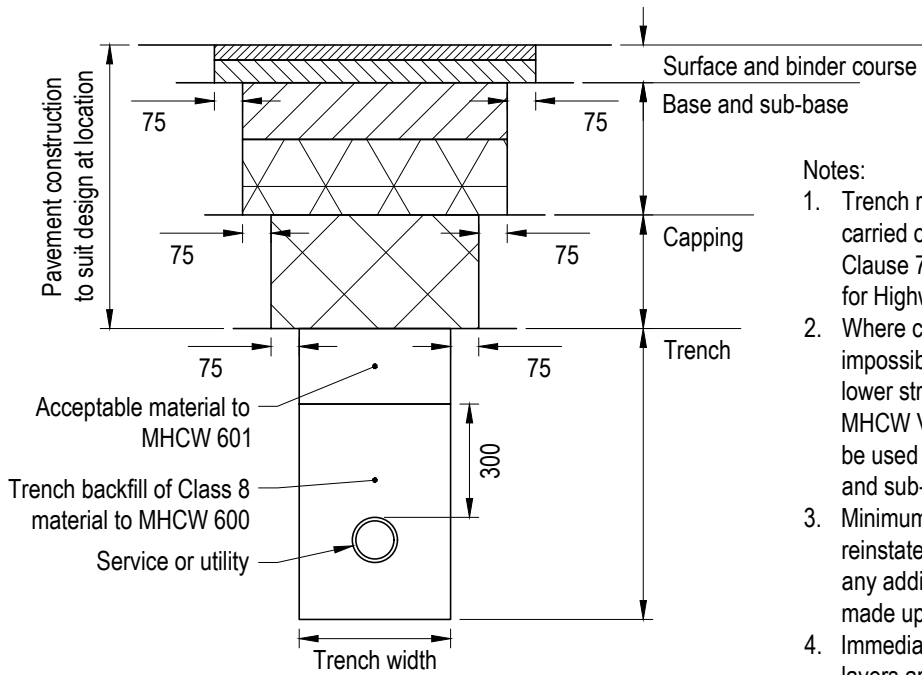
Project
GORTON_LIBRARY_CAR_PARK_PHASE_2

Drawing Title
PROPOSED_SITE_PLAN

Job Number	Date	Scale@A2
50786	13/07/22	1:200
Status	Purpose	
PRELIMINARY	COMMENT	

Drawing Number	Revision
GCH-IBI-WS-XX-DR-A-100-0006	P03

Appendix E Proposed Drainage Drawings

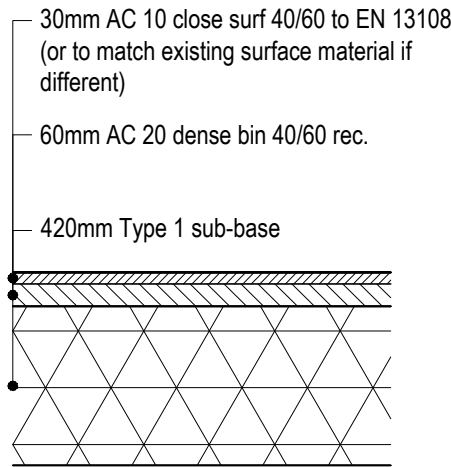


TRENCH REINSTATEMENT BITUMINOUS PAVEMENT

Design code: MHCW Vol 1 Clause 706
(Scale 1:20)

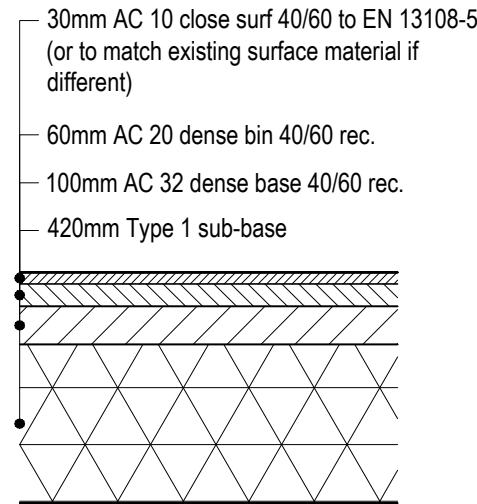
Notes:

- Trench reinstatements shall be carried out in accordance with Clause 706 of the Specification for Highway Works
- Where compaction is made impossible due to trench width, lower strength concrete to MHCW Vol Clause 1030 may be used in place of capping and sub-base.
- Minimum depth of reinstatement to be 450mm, any additional depth to be made up in Type 1 sub-base.
- Immediately before bituminous layers are reinstated, the edges of existing material shall be cleaned of all loose material and be coated with an appropriate hot bituminous binder or equivalent treatment.



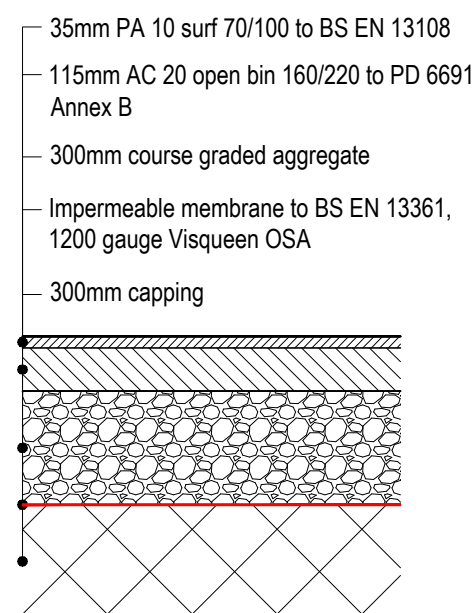
CAR PARK REINSTATEMENT

Design code: To match existing
Subgrade: CBR 2.5% (see Foundations: Asphalt)



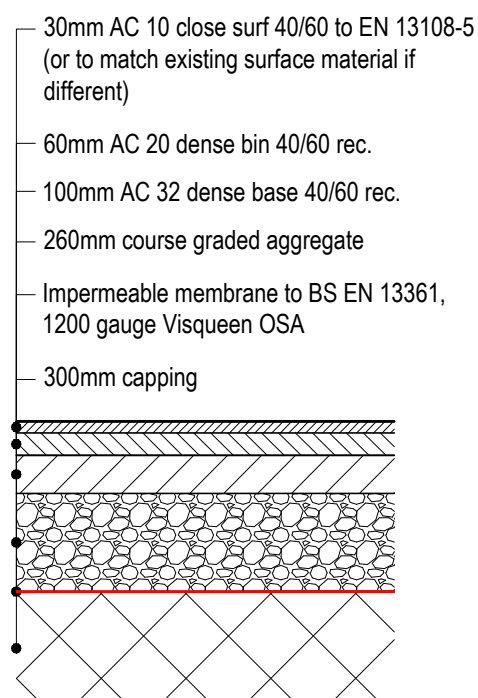
ASPHALT CAR PARK

With traditional sub-base
Design code: MPA Asphalt Applications
Traffic: Heavier usage / Category 4
Subgrade: CBR 2.5% (see Foundations: Asphalt)



POROUS ASPHALT

Design code: CIRIA C753 Chapter 20
Traffic: Category 4
Subgrade: CBR 2.5% (see Foundations: Pervious)

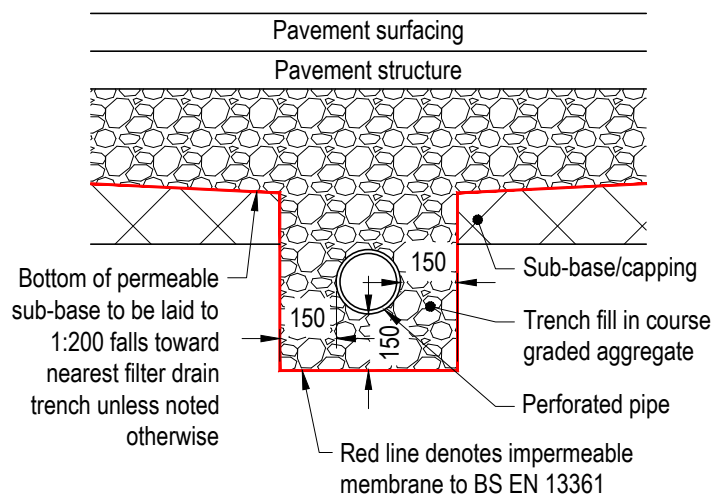


ASPHALT CAR PARK

With permeable sub-base
Design code: MPA Asphalt Applications
Traffic: Heavier usage
Subgrade: CBR 2.5% (see Foundations: Pervious)

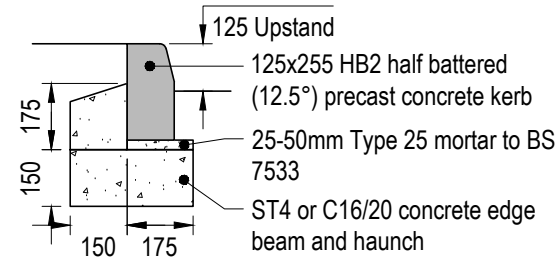
Foundations: Asphalt		
The below foundations should be provided for pavements trafficked by vehicles, as either sub-base on capping or sub-base only, based on the measured subgrade CBR. Table adapted from CD 225		
CBR	Sub-base + capping (mm)	Sub-base only (mm)
<2.5%	Contact engineer	Contact engineer
≥2.5%	250 + 430	420
≥3%	230 + 380	370
≥4%	220 + 340	330
≥5%	210 + 300	300
≥6%	190 + 240	260
≥8%	160 + 220	240
≥10%	150 + 200	230
≥12%	150 + 180	220
≥15%	150 + 150	200

Foundations: Pervious	
The below foundations should be provided below the permeable sub-base (CGA) for pervious pavements, based on the measured subgrade CBR. Based on C753 Ch 20	
CBR	Additional foundation treatment
<2.5%	Contact engineer
2.5%	300mm capping
3%	225mm capping
4%	150mm capping
5%+	No additional foundation



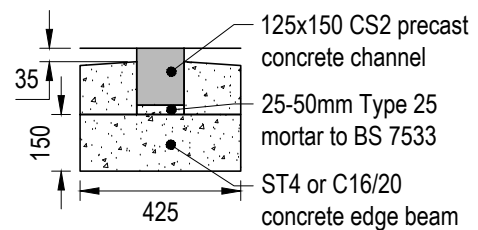
PERVIOUS PAVING FILTER DRAIN

See drainage layout for pipe locations and levels
(Scale 1:20)



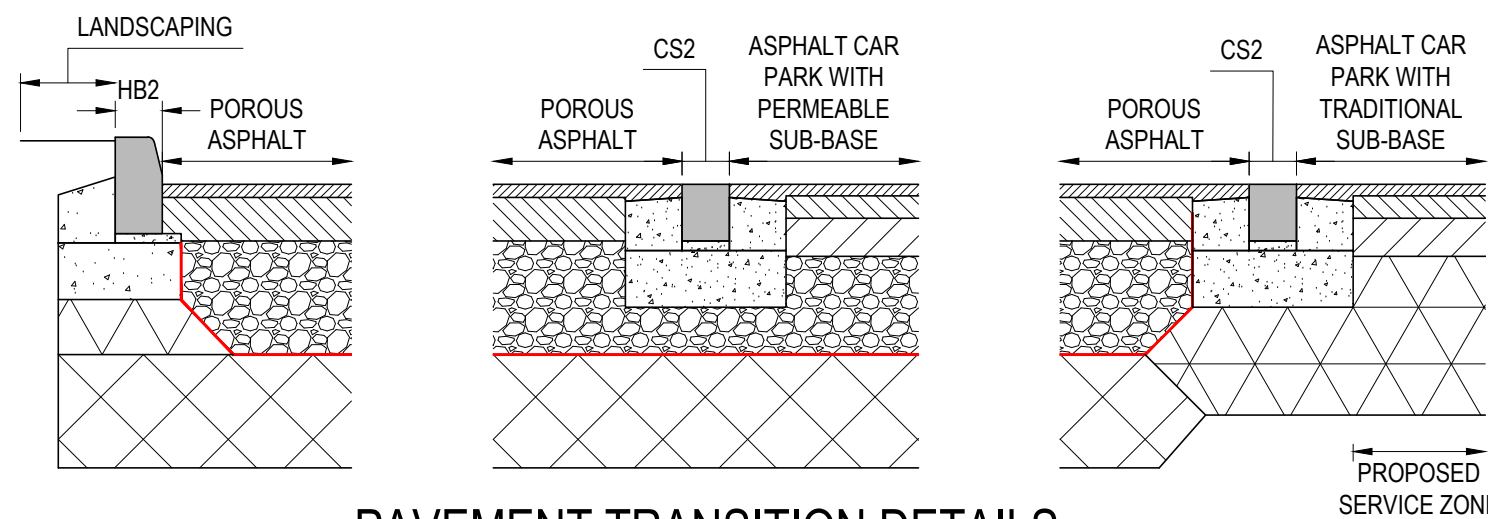
HB2 KERB

Design code: BS 7533-101:2021
Traffic: Categories 4-6
(Scale 1:20)



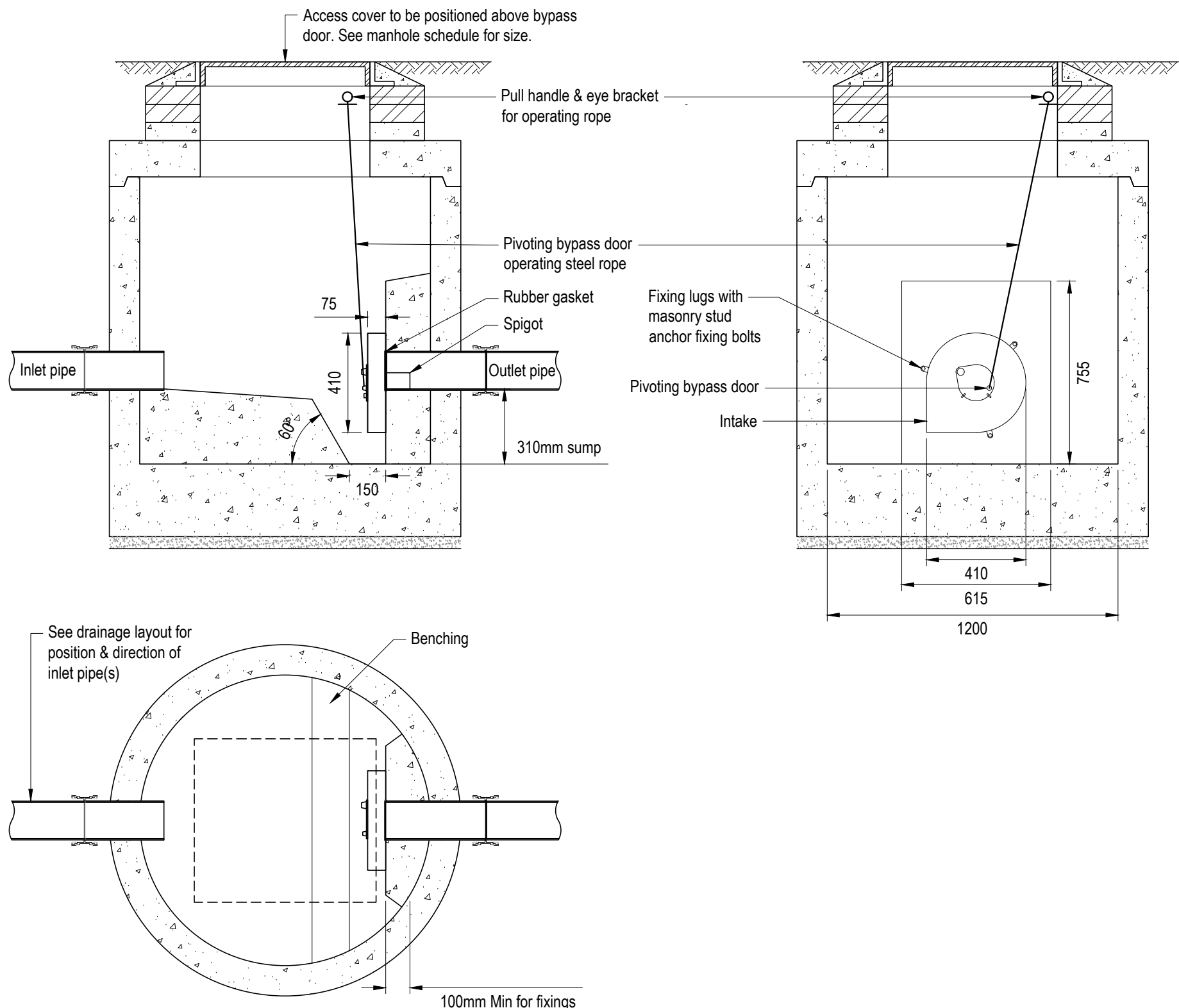
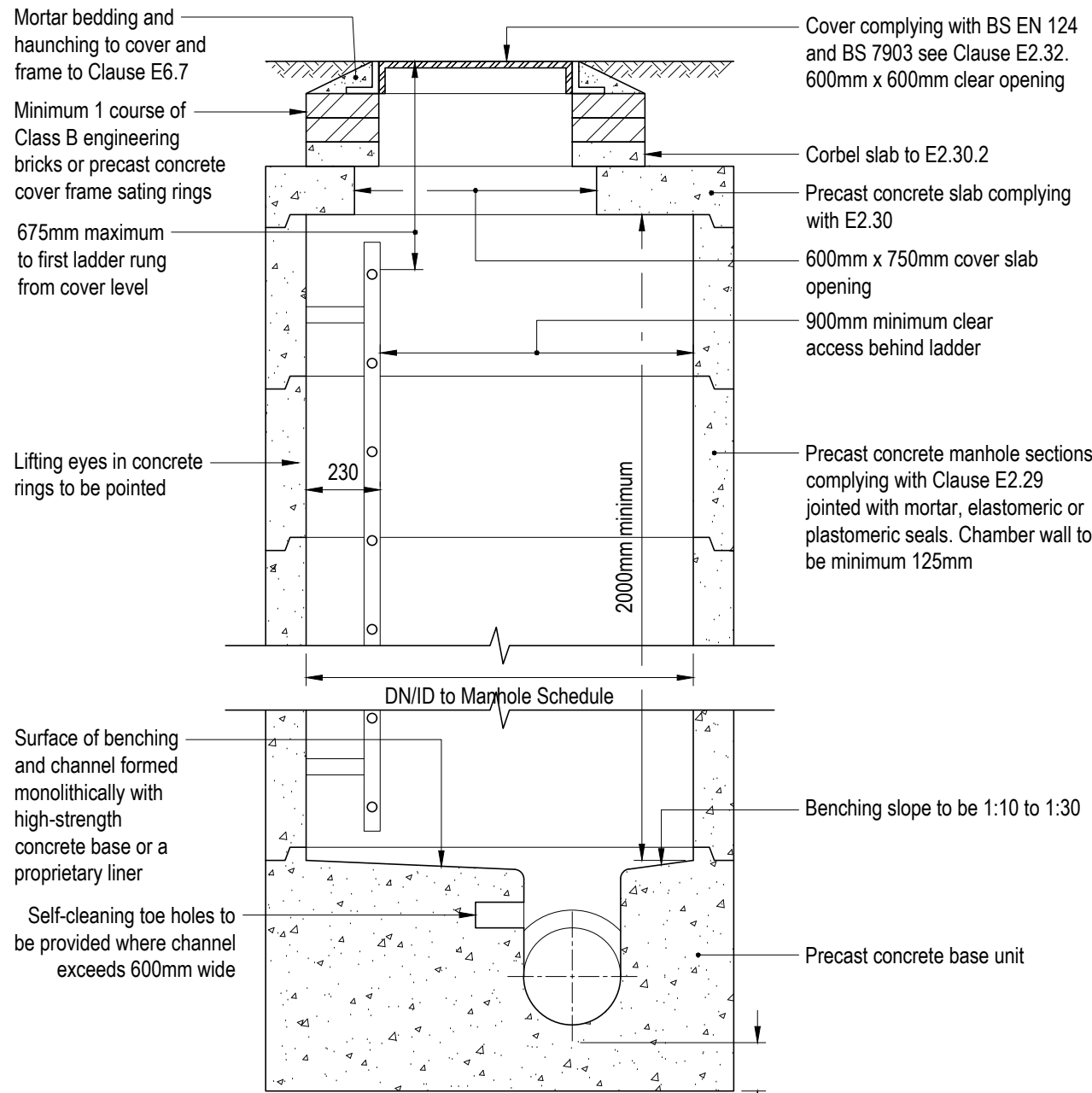
CS2 KERB

Design code: BS 7533-101:2021
Traffic: Categories 4-6
(Scale 1:20)



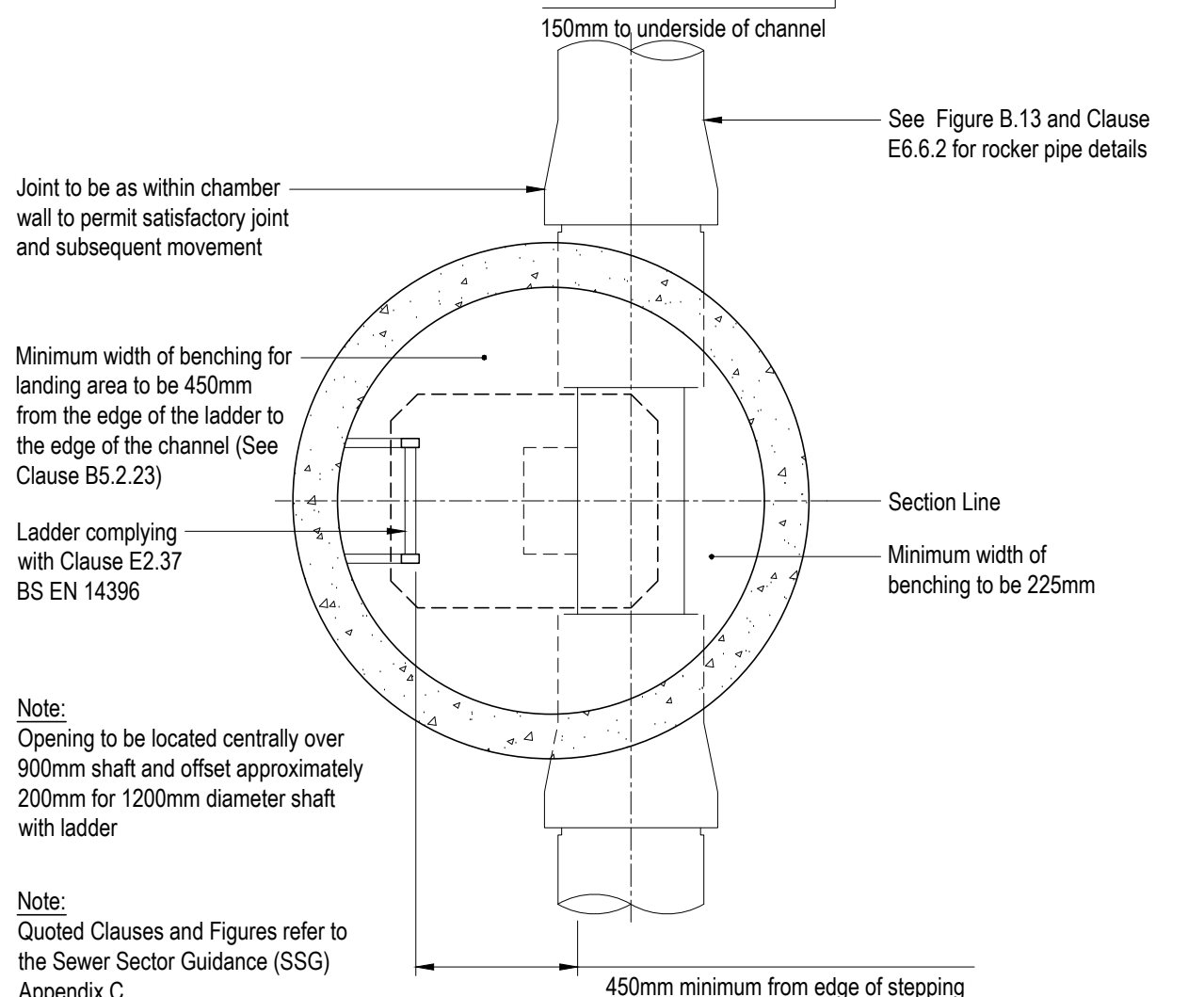
PAVEMENT TRANSITION DETAILS

(Scale 1:20)



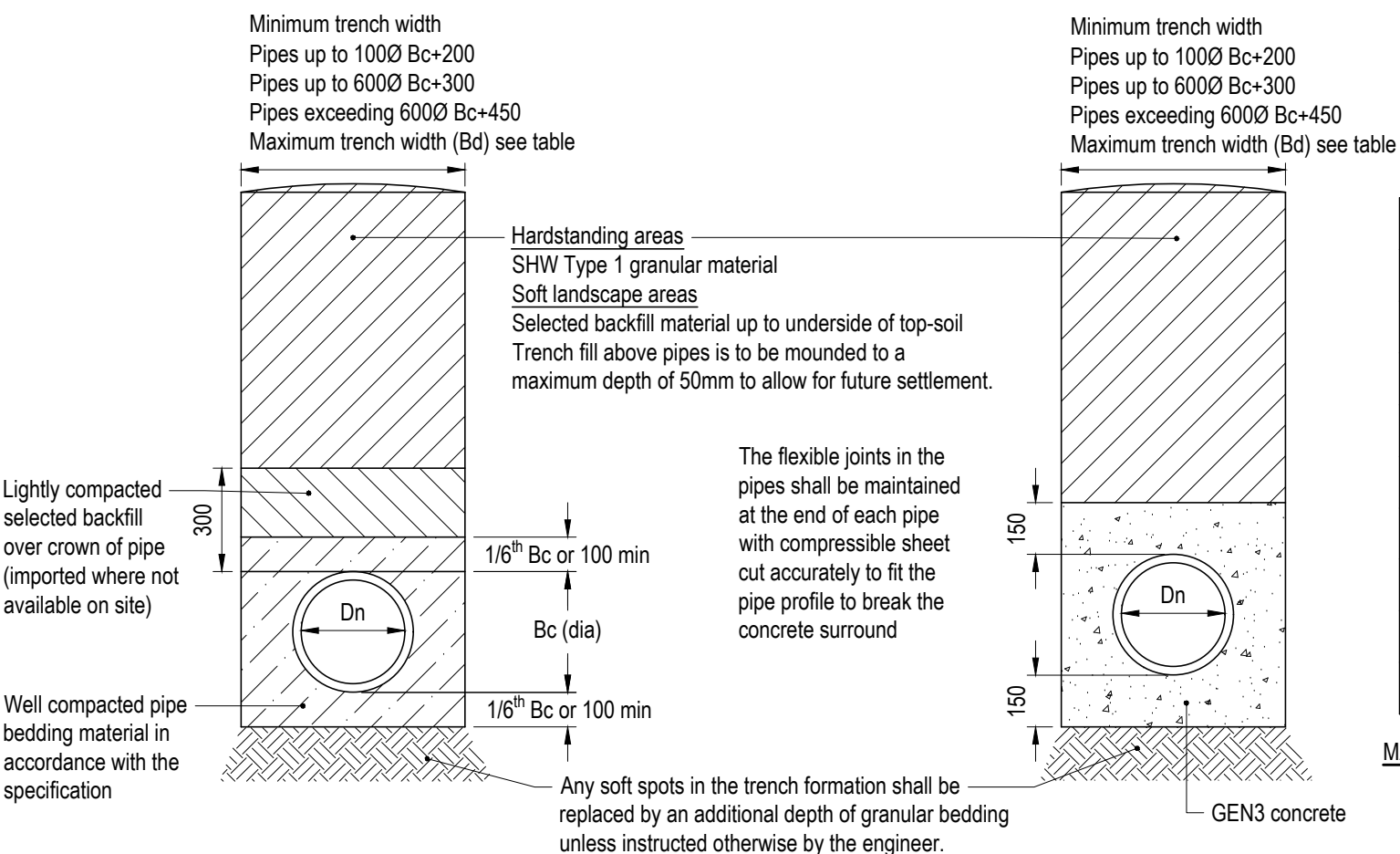
VORTEX FLOW CONTROL

To be installed in accordance with manufacturer's instructions
(Scale 1:20)



SSG APPENDIX C FIGURE B 6 TYPICAL MANHOLE DETAIL - TYPE A2

Depth from cover level to soffit of pipe 3m to 6m with ladder
rigid material construction without concrete surround
(Scale 1:20)



CLASS S - 360° GRANULAR SURROUND PIPE BEDDING DETAIL

(SCALE 1:20)

CLASS Z - CONCRETE BED AND SURROUND PIPE BEDDING DETAIL

Cover < 900mm in vehicular loading and open field.
Cover < 600mm elsewhere except under buildings.
(Scale 1:20)

Dn	Bd
150	0.6
225	0.7
300	0.85
375	1.05
450	1.15
525	1.25
600	1.35
675	1.45
750	1.50

MAXIMUM TRENCH WIDTH

GENERAL NOTES:

PAVING NOTES

- This drawing is to be read in conjunction with all relevant architects and engineers drawings and specifications.
- Do not scale this drawing. Any ambiguities, omissions or errors on drawings shall be brought to the engineers attention immediately. All dimensions must be checked / verified on site.
- All works and materials to be in accordance with current British Standards (BS) and Building Regulations.
- This drawing makes references to the below sections of Standards for Highways, which are freely available at standardsforhighways.co.uk
 - Design Manual for Roads and Bridges (DMRB)
 - Manual of Contract Documents for Highway Works (MHCW)
 - Specification for Highway Works (SHW)
 - Interim Advice Notes (IANs)
- The construction depths given are the minimum required (compacted).
- Subgrade California Bearing Ratio (CBR)
- Pavement constructions details state their assumed CBR value.
- CBR tests should be carried out at formation and pavement foundations adjusted in accordance with the relevant Pavement Foundation tables.
- CBR test procedure is detailed within DMRB CD 225 and BS 1377-4.
- Measured CBR value to be at formation level and to be a 'soaked' condition.
- Any variations in ground conditions should be notified to the engineer prior to construction.

Pavement Foundations

- In areas where levels are to be raised, acceptable fill material is to be used to the underside of the proposed construction make up.
- The construction depths given assume formation is non-frost susceptible.
- Where formation is frost susceptible contractor to provide capping material to give a minimum 450mm overall construction thickness.
- Construction detail are for private areas only and not for adoptable highways.
- All sub-bases and capping layers to be graded and compacted to the SHW.
- No regulating or fill material has been included in construction build up. contractor to include for regulating/fill material in their rates.
- In areas where levels are to be lowered, existing construction is to be removed (full depth).

Pavement Materials

- Capping material to be to SHW Clause 613 Sub-formation and Capping.
- Sub-base material to be to SHW Clauses 803 (Type 1), 804 (Type 2), 806 (Category B) or 807 (Type 4). Type 1 is most commonly used.
- CGA (Coarse Graded Aggregate) to be either Coarse Aggregate 4-40mm or 4-20mm to BS 7533-13:2009, or Type 3 to SHW Clause 805, and must have at least 30% voids.
- AC (Asphalt Concrete) to be to SHW Clause 900.
- Laying course for impermeable paving to be naturally occurring sand or mortar in accordance with BS 7533 requirements.

Information to be Confirmed

- Extent of highway boundary to be confirmed prior to commencement of works.
- The landscape architect's drawing has been used as a base for this plan. Please refer to the latest landscaping layout.
- Refer to landscape architects specification for surface finishes.
- Kerbing requirements/detail to be confirmed by landscape architect.
- Refer to landscape architects specification for jointing material. Consideration required of compatibility of jointing and bedding material and whether sub-surface drainage is required.

P04	ADDED KERB AND PAVEMENT TRANSITION DETAILS.	07/12/22	AMB	GW
P03	REVISED TO DESIGN TEAM COMMENTS AND ADDED VORTEX FLOW CONTROL DETAIL.	10/11/22	AMB	CJS
P02	ADDED DRAINAGE DETAILS FOR PLANNING SUBMISSION.	04/11/22	AMB	CJS
P01	FIRST ISSUE SHOWING REINSTATEMENT WORKS.	24/10/22	AMB	-
Rev.	Description:	Date:	By:	Chk:



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Status: **SUITABLE FOR INFORMATION** **S2**

Client:

MORGAN SINDALL

Project:

GORTON COMMUNITY HUB

Orig Title:

LIBRARY SITE,
CIVIL ENGINEERING
CONSTRUCTION DETAILS
SHEET 1

Drawn By: AMB

Designed By: AMB

Checked By: PT

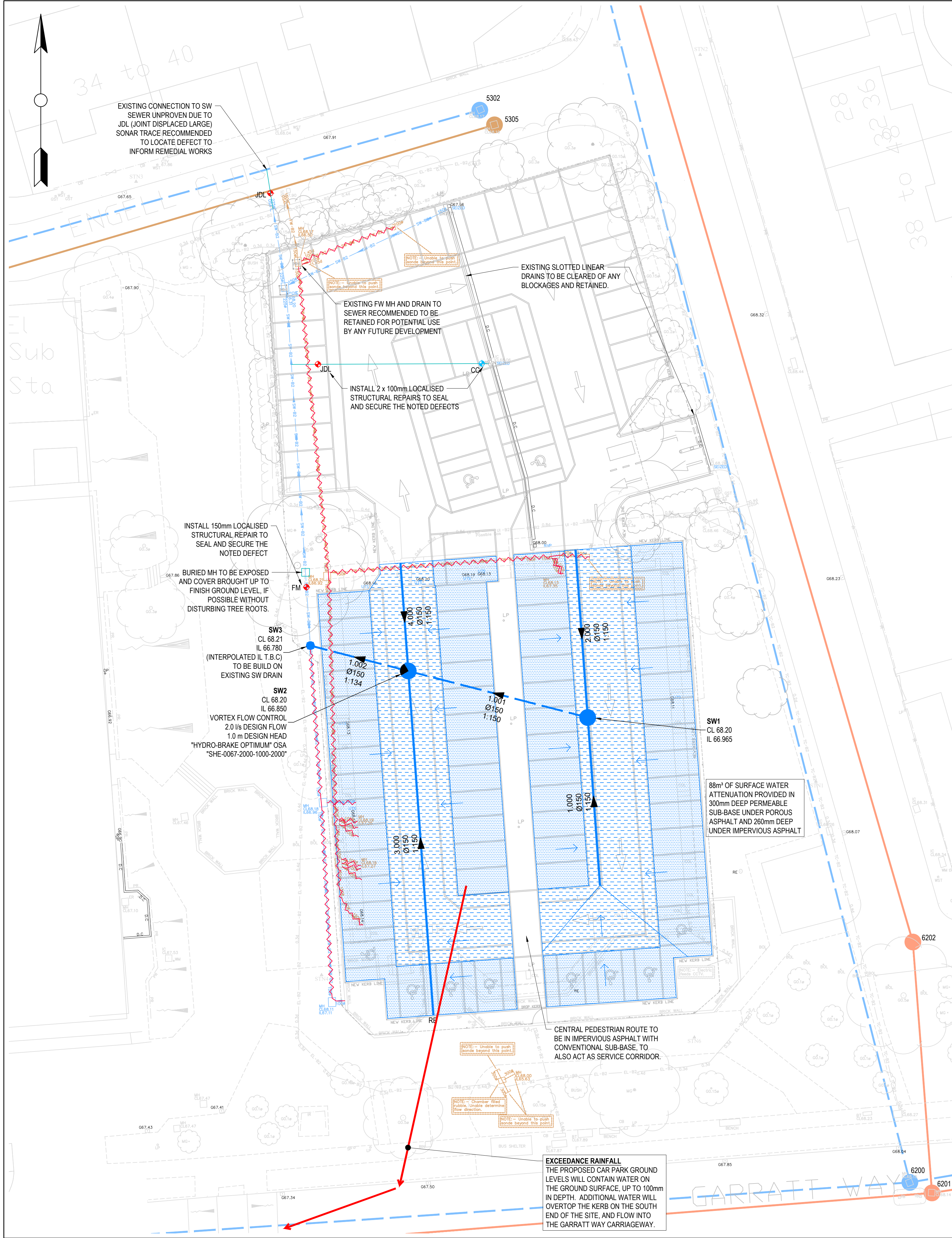
Date: 21/10/2022

Scales @ A1: 1:20 OR AS NOTED

Project No - Originator - Function - Spatial - Form - Discipline - Number

GCH - CUR - XX - XX - DR - C - 90111

Revision: P04



KEY:

Existing combined water sewer

Existing foul water sewer

Existing surface water sewer

Existing foul water drain

Existing surface water drain

Existing pipes and manholes to be grubbed up or grouted if located under retained works

Surface water private drain

Surface water highway drain

Surface water flow control

Filter Drain

Porous asphalt pavement

Impervious asphalt pavement on permeable sub-base

Permeable sub-base formation slopes (note that this is not finished ground gradients)

Overland surface water flow from rainfall exceedance event (greater than 1:100 year +CC)

Drainage defect Grade 1-2 - May require remedial monitoring (none identified)

Drainage defect Grade 3 - Some form of remedial works probably required

Drainage defect Grade 4-5 - Remedial repair or replacement required

Drainage defect notes:- CC: Crack circumferential, FM: Fractures multiple, JDL: Joint displaced large. Only defects on retained drainage are shown.

Drainage Notes:

1. This drawing is to be read in conjunction with all relevant architects and engineers drawings and specifications.

2. Do not scale this drawing. Any ambiguities, omissions or errors on drawings shall be brought to the engineers attention immediately. All dimensions must be checked / verified on site.

3. Design based on topographical survey and cch survey information available at the time of design.

4. All drainage works to be in accordance with the Civil Engineering Specification for the Water Industry (CESWI) as included in Sewers for Adoption 7th Edition (SFA), the requirements of The Building Regulations 2010: Approved Document H (Part H).

5. All dimensions are in metres and levels in metres above ordnance datum unless otherwise noted.

6. It is advised that the contractor survey retained existing drainage prior to commencement to confirm location and condition, with cleansing to facilitate survey if required.

7. Existing drainage locations where the proposed drainage is to connect, are to be surveyed and exact levels confirmed and provided to engineer prior to commencement of works.

8. All existing services to be located prior to commencement of any drainage works, and where necessary protection or diversions to be undertaken to avoid conflict with the proposed work.

9. All existing drains to be abandoned shall be either removed or grouted up if not possible. Grouting to be performed by capping all ends / connections and filling the retaining void with grout, in accordance with CESWI.

10. All soft spots to be removed from bottom of excavations and to be refilled to formation level in accordance with groundworks specifications.

11. Raised ground must be filled in accordance with groundworks specifications and consolidated before any sewer works are carried out.

12. All adoptable drainage works including works to existing public sewers to be undertaken in accordance with SFA, CESWI and the relevant statutory undertakers details.

13. All private drainage works to be in accordance with CESWI, BS EN 752 2017 'Drain And Sewer Systems Outside Buildings' and the Part H.

15. All diameters given are nominal internal pipe diameters.

16. Bedding and backfill materials to conform to the requirements of WIS 4-08-02 (Table A2).

17. The first pipe out of manholes to be as short as possible to the outside face of the concrete surround and connected to a length of rocker pipe.

18. Sewer pipes to be laid in maximum 3 metre lengths unless there is a specific operational need to lay longer lengths.

19. All new connections into existing manholes (or into existing sewers) to be 'soffits level' unless otherwise noted.

20. The chamber size of manholes with more than one connection in them may need to be increased to accommodate the connections and bends.

21. All branch connections to be made with swept bends in the direction of flow in the main drain.

22. Unless noted otherwise in the manhole schedule, all manhole, gully and channel covers (ironwork) should be the following specification:

- B125 load class in pedestrian areas
- D400 load class in vehicular areas.

44. Cover levels, gully positions, and building location are approximate and shall be confirmed by architectural/landscape architect. Contractor to allow for adjustment to suit agreed positions and finished levels, and confirm all cover levels on site.

45. Outfall connection(s) subject to agreement with the approving authority.

46. The contractor shall comply with the following:-

- (i). All operations should be carried out in accordance with the general health and safety policy of the developer as required by sections 2 of the Health and Safety at Work Act 1974 and in particular The Construction (Health, Safety and Welfare) Regulations 1995.
- (ii). The local authority and utilities companies are to be notified prior to commencement of work on site.
- (iii). Prior to construction the actual positions and depths of services likely to be affected by the works should be established by means of hand dig in close liaison with the utility companies. The contractor shall immediately advise the engineer of any services exposed which may affect the design.
- (iii). All operatives working on the highway works must have street works accreditation.

47. The contractor shall be responsible for ensuring that pipes are adequately protected from concentrated loading by construction traffic during the construction period.

48. The contractor shall allow for the protection, temporary and permanent support, and temporary and permanent diversion works, as necessary to all existing services.

49. The contractor shall allow for keeping trenches and excavations as dry as practicable by pumping from temporary pumps and de-watering as appropriate. The point and method of discharge to be agreed with the drainage authority & LULFA and environment agency.

50. It is advised that drainage works are to be constructed from the outfall towards the head of run to ensure the outfall can be achieved.

51. All drains to be CCTV surveyed on completion of the works.

MANHOLE SCHEDULE

MANHOLE NAME & COORDINATES	CL & DEPTH TO INVERT	PIPE NAME	PIPE IL	PIPE DIA.	MANHOLE SIZE & COVER CLASS	MANHOLE TYPE, ACCESS SIZE & DESCRIPTION
SW1 E. 388591.540 N. 396267.626	68.200 1.235	In In Out	2.000 1.000 1.001	66.965 66.965 66.965	150 150 150	1,200 DIA D400 PCC 750X750 ACCESS
SW2 E. 388574.897 N. 396271.945	68.200 1.350	In In Out	1.001 4.000 3.000	66.850 66.850 66.850	150 150 150	1,200 DIA D400 PCC 750X750 ACCESS VORTEX FLOW CONTROL 2.0 IS DESIGN FLOW 1.0 m DESIGN HEAD "HYDRO-BRAKE OPTIMUM" OSA "SHE-0067-2000-1000-2000"
SW3 E. 388565.823 N. 396274.299	68.213 1.433	In	1.002	66.780	150	800 B125 PPIC MAX 350 ACCESS (INTERPOLATED I.L.T.B.C.) TO BE BUILT ON EXISTING SW DRAIN

0

5m

10m

15m

20m

1:1

0

10

20

30

40

50

60

70

80

90

100

GENERAL NOTES:

1. Design based on the following:

- 1.1. S17569-T Topographical survey by SEP, dated Nov 2018
- 1.2. S17569-U Utility Survey by SEP, dated Apr 2019
- 1.3. S04835 CCTV Inspection Report by Metro Rod, received 03/11/2022
- 1.4. GCH-IBI-WS-XX-DR-A-100-006-Proposed Phase 2 Plan, rec' 26/10/2022

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Status:

SUITABLE FOR INFORMATION

S2

Client:

MORGAN SINDALL

Project:

GORTON COMMUNITY HUB

Dwg Title:

LIBRARY SITE,
PROPOSED DRAINAGE LAYOUT

Drawn By

AMB

Designed By

AMB

Checked By

CJS

Date

24/10/2022

Scales

@ A1

1:200

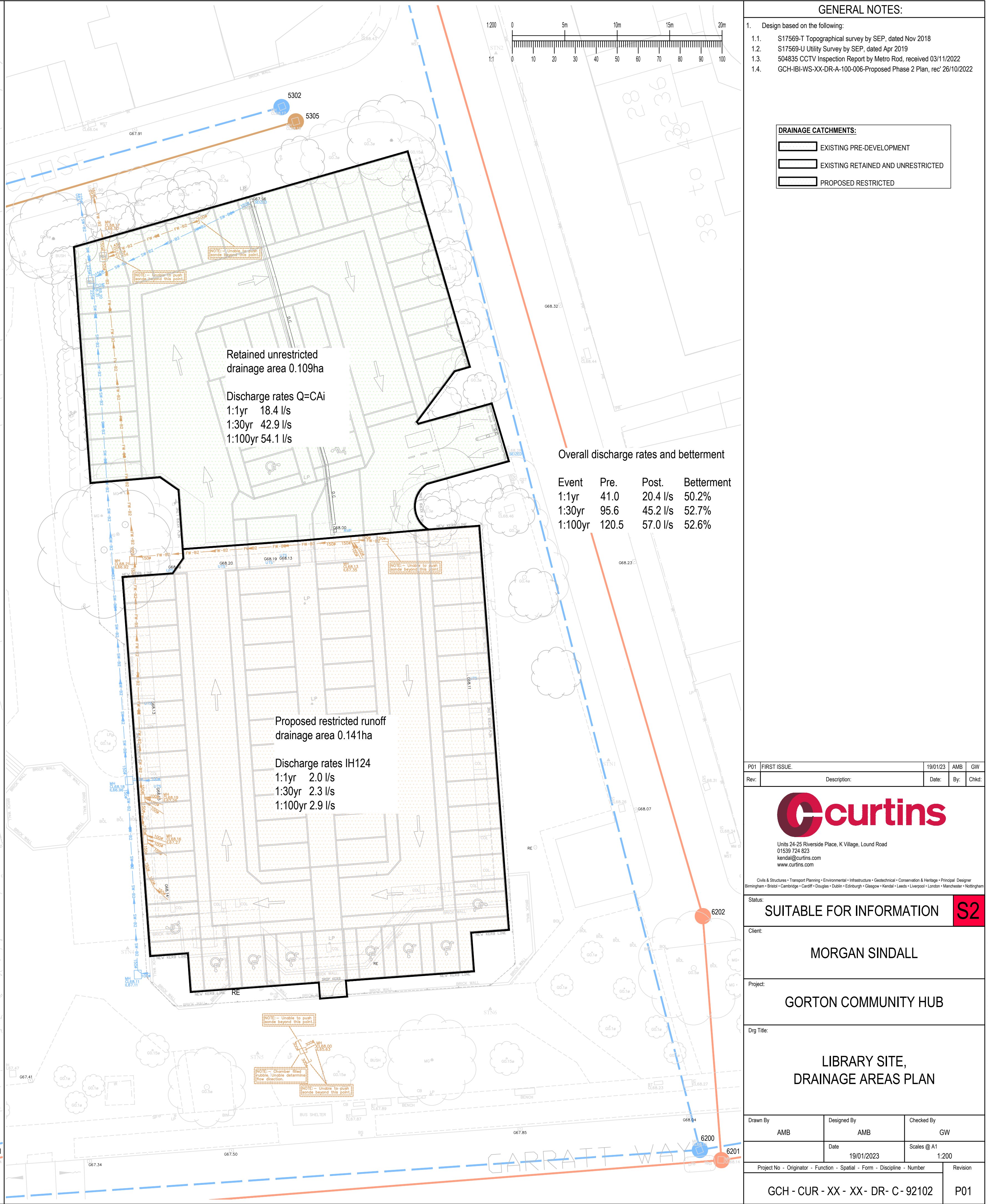
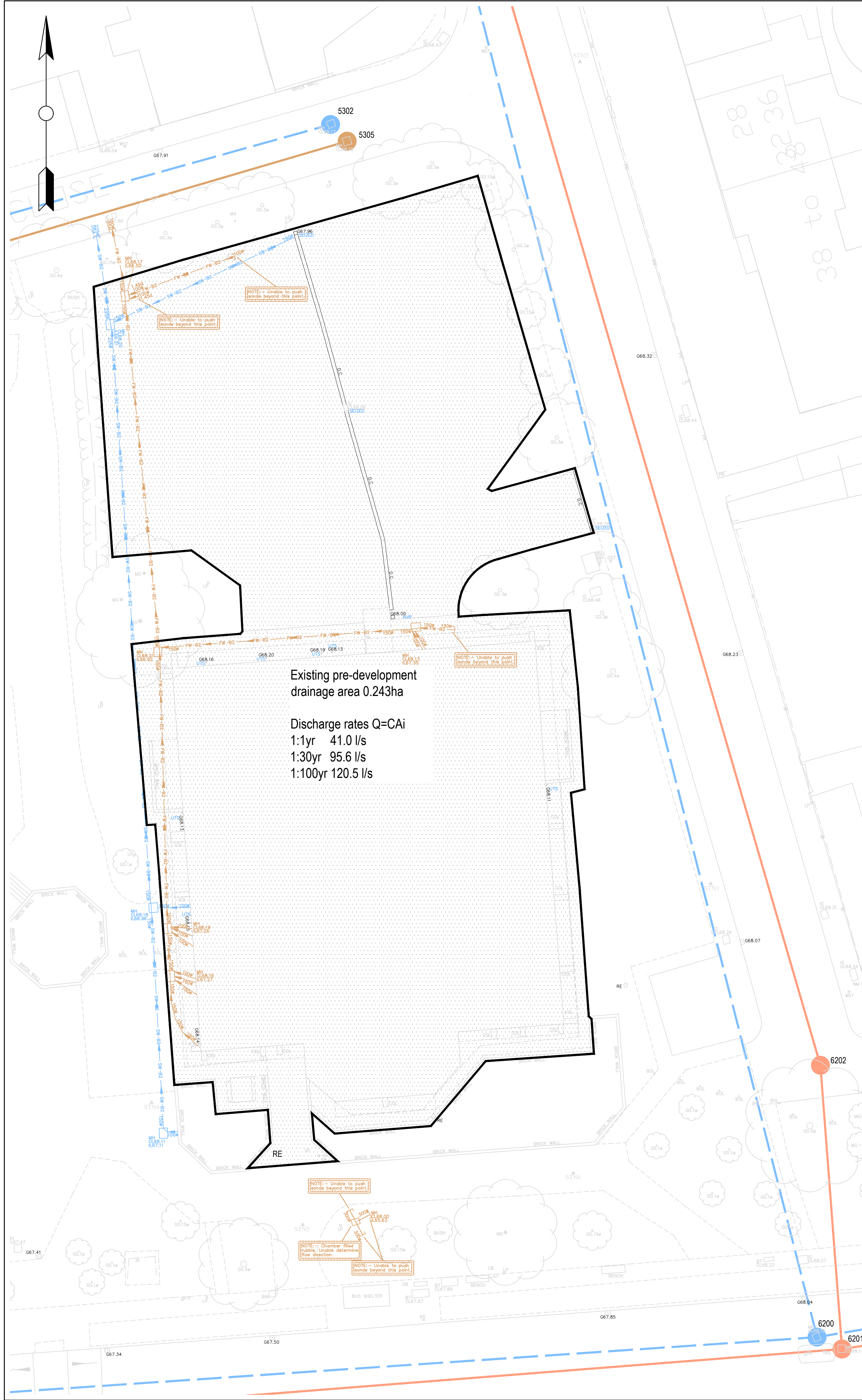
Project No - Originator - Function - Spatial - Form - Discipline - Number

GCH - CUR - XX - XX - DR - C - 92101

Revision

P05

Web/20/Project/6862407 Gorton Community Hub 04-Production/44-Models Drawings/GORTON LIBRARY REDEVELOPMENT CAD/04



GENERAL NOTES:

- Design based on the following:
 - S17569-T Topographical survey by SEP, dated Nov 2018
 - S17569-U Utility Survey by SEP, dated Apr 2019
 - 504835 CCTV Inspection Report by Metro Rod, received 03/11/2022
 - GCH-IBI-WS-XX-DR-A-100-006-Proposed Phase 2 Plan, rec' 26/10/2022

DRAINAGE CATCHMENTS:

- EXISTING PRE-DEVELOPMENT
- EXISTING RETAINED AND UNRESTRICTED
- PROPOSED RESTRICTED

P01	FIRST ISSUE:	19/01/23	AMB	GW
Rev:	Description:	Date:	By:	Chkd:

curtins

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Status: **SUITABLE FOR INFORMATION** **S2**

Client: **MORGAN SINDALL**

Project: **GORTON COMMUNITY HUB**

Dwg Title: **LIBRARY SITE, DRAINAGE AREAS PLAN**

Drawn By	Designed By	Checked By
AMB	AMB	GW
Date	19/01/2023	Scales @ A1
1:200		

Project No - Originator - Function - Spatial - Form - Discipline - Number

GCH - CUR - XX - XX - DR - C - 92102

Revision: **P01**

Appendix F Proposed Drainage Calculations



Curtins Consulting Ltd
Units 24-25 Riverside Place
K Village, Lound Road
Kendal, LA9 7FH

File: GCH-CUR-XX-XX-DR-C-92611-P
Network: Storm Network
Designed: AMB Checked: GW
09/02/2023

Page 1
Gorton Community Hub
Library Site
Drainage Calculations Rev: P02

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	30	Maximum Rainfall (mm/hr)	20.0
Additional Flow (%)	30	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.358	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
E1		5.00	68.200		388592.674	396252.067	1.131
E2		5.00	68.200		388590.406	396283.185	1.131
SW1	0.090	5.00	68.200	1200	388591.540	396267.626	1.235
E3		5.00	68.200		388577.224	396240.013	1.137
E4		5.00	68.200		388574.167	396281.959	1.283
SW2	0.090	5.00	68.200	1200	388574.897	396271.945	1.350
SW3			68.213	600	388565.823	396274.299	1.433

Links

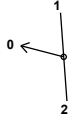
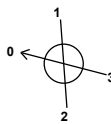
Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	E1	SW1	15.600	0.600	67.069	66.965	0.104	150.0	150	5.32	20.0
2.000	E2	SW1	15.600	0.600	67.069	66.965	0.104	150.0	150	5.32	20.0
1.001	SW1	SW2	17.194	0.600	66.965	66.850	0.115	150.0	150	5.67	20.0
3.000	E3	SW2	32.017	0.600	67.063	66.850	0.213	150.0	150	5.65	20.0
4.000	E4	SW2	10.041	0.600	66.917	66.850	0.067	150.0	150	5.20	20.0
1.002	SW2	SW3	9.374	0.600	66.850	66.780	0.070	133.9	150	5.85	20.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	0.818	14.5	0.0	0.981	1.085	0.000	0.0
2.000	0.818	14.5	0.0	0.981	1.085	0.000	0.0
1.001	0.818	14.5	8.5	1.085	1.200	0.090	0.0
3.000	0.818	14.5	0.0	0.987	1.200	0.000	0.0
4.000	0.818	14.5	0.0	1.133	1.200	0.000	0.0
1.002	0.866	15.3	16.9	1.200	1.283	0.180	0.0

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
E1	388592.674	396252.067	68.200	1.131					
						0	1.000	67.069	150
E2	388590.406	396283.185	68.200	1.131					
						0	2.000	67.069	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW1	388591.540	396267.626	68.200	1.235	1200		1	2.000	66.965	150
						2	1.000	66.965	150	
						0	1.001	66.965	150	
E3	388577.224	396240.013	68.200	1.137						
							0	3.000	67.063	150
E4	388574.167	396281.959	68.200	1.283						
							0	4.000	66.917	150
SW2	388574.897	396271.945	68.200	1.350	1200		1	4.000	66.850	150
						2	3.000	66.850	150	
						3	1.001	66.850	150	
						0	1.002	66.850	150	
SW3	388565.823	396274.299	68.213	1.433	600		1	1.002	66.780	150

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	480
FSR Region	England and Wales	Additional Storage (m³/ha)	5.0
M5-60 (mm)	18.000	Check Discharge Rate(s)	✓
Ratio-R	0.358	2 year (l/s)	2.0
Summer CV	1.000	30 year (l/s)	2.3
Winter CV	0.840	100 year (l/s)	2.9
Analysis Speed	Detailed	Check Discharge Volume	x
Skip Steady State	x		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	25	0	0
100	30	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.180	Betterment (%)	0
SAAR (mm)	900	QBar	1.2
Soil Index	4	Q 1 year (l/s)	1.0
SPR	0.47	Q 30 year (l/s)	2.3
Region	10	Q 100 year (l/s)	2.9
Growth Factor 1 year	0.85		



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Node SW2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	66.850	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node SW1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	67.550	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	424	Depth (m)	0.260
Safety Factor	2.0	Width (m)	41.200	Inf Depth (m)	
Porosity	0.30	Length (m)	15.150		

Node SW2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	67.550	Slope (1:X)	200.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	416	Depth (m)	0.260
Safety Factor	2.0	Width (m)	40.500	Inf Depth (m)	
Porosity	0.30	Length (m)	15.150		

Node SW2 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	4.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	66.850	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)		Diameter (mm)	500

Node SW1 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	2.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	66.965	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)		Diameter (mm)	500

Node SW1 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	1.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	66.965	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)		Diameter (mm)	500

Node SW2 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	3.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	66.850	Surround Shape	(Trench)
Safety Factor	2.0	Time to half empty (mins)		Diameter (mm)	500

Approval Settings

Node Size	✓	Cover Depth	✓
Node Losses	✓	Minimum Cover Depth (m)	1.200
Link Size	✓	Maximum Cover Depth (m)	3.000
Minimum Diameter (mm)	150	Backdrops	✓
Link Length	✓	Minimum Backdrop Height (m)	0.200
Maximum Length (m)	100.000	Maximum Backdrop Height (m)	1.500
Coordinates	✓	Full Bore Velocity	x
Accuracy (m)	1.000	Proportional Velocity	x
Crossings	✓	Surcharged Depth	x



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Approval Settings

Flooding	✓	1 year (l/s)	2.0
Return Period (years)	30	30 year (l/s)	2.3
Time to Half Empty	✓	100 year (l/s)	2.9
Return Period (years)	30	Discharge Volume	x
Discharge Rates	✓		



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Results for 2 year Critical Storm Duration. Lowest mass balance: 96.42%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	E1	118	67.610	0.541	0.9	0.0000	0.0000	SURCHARGED
120 minute summer	E2	118	67.610	0.541	0.9	0.0000	0.0000	SURCHARGED
120 minute summer	SW1	108	67.609	0.644	8.6	7.2155	0.0000	SURCHARGED
120 minute summer	E3	108	67.610	0.547	1.0	0.0000	0.0000	SURCHARGED
120 minute summer	E4	106	67.610	0.693	0.9	0.0000	0.0000	SURCHARGED
120 minute summer	SW2	108	67.609	0.759	10.2	9.3353	0.0000	SURCHARGED
15 minute summer	SW3	1	66.780	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	E1	1.000	SW1	-0.9	-0.051	-0.062	0.2746	
120 minute summer	E2	2.000	SW1	-0.9	-0.051	-0.062	0.2746	
120 minute summer	SW1	1.001	SW2	2.0	0.297	0.138	0.3027	
120 minute summer	E3	3.000	SW2	-1.0	-0.065	-0.072	0.5637	
120 minute summer	E4	4.000	SW2	-0.9	-0.050	-0.061	0.1768	
120 minute summer	SW2	Hydro-Brake®	SW3	2.0				32.5



Results for 30 year +25% CC Critical Storm Duration. Lowest mass balance: 96.42%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	E1	240	67.730	0.661	0.4	0.0000	0.0000	SURCHARGED
240 minute summer	E2	240	67.730	0.661	0.4	0.0000	0.0000	SURCHARGED
240 minute summer	SW1	240	67.730	0.765	12.2	30.0844	0.0000	SURCHARGED
240 minute summer	E3	228	67.729	0.666	0.4	0.0000	0.0000	SURCHARGED
240 minute summer	E4	240	67.730	0.813	0.4	0.0000	0.0000	SURCHARGED
240 minute summer	SW2	240	67.729	0.879	13.1	32.1191	0.0000	SURCHARGED
15 minute summer	SW3	1	66.780	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	E1	1.000	SW1	-0.4	-0.024	-0.029	0.2746	
240 minute summer	E2	2.000	SW1	-0.4	-0.024	-0.029	0.2746	
240 minute summer	SW1	1.001	SW2	1.4	0.283	0.095	0.3027	
240 minute summer	E3	3.000	SW2	-0.4	-0.022	-0.027	0.5637	
240 minute summer	E4	4.000	SW2	-0.4	-0.025	-0.027	0.1768	
240 minute summer	SW2	Hydro-Brake®	SW3	2.0				78.0



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Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 96.42%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	E1	244	67.906	0.837	0.3	0.0000	0.0000	FLOOD RISK
240 minute summer	E2	244	67.906	0.837	0.3	0.0000	0.0000	FLOOD RISK
240 minute summer	SW1	244	67.906	0.941	16.7	46.0274	0.0000	FLOOD RISK
240 minute summer	E3	244	67.905	0.842	0.3	0.0000	0.0000	FLOOD RISK
240 minute summer	E4	244	67.905	0.988	0.3	0.0000	0.0000	FLOOD RISK
240 minute summer	SW2	244	67.905	1.055	17.6	48.3963	0.0000	FLOOD RISK
15 minute summer	SW3	1	66.780	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	E1	1.000	SW1	-0.3	-0.019	-0.023	0.2746	
240 minute summer	E2	2.000	SW1	-0.3	-0.019	-0.023	0.2746	
240 minute summer	SW1	1.001	SW2	1.9	0.289	0.130	0.3027	
240 minute summer	E3	3.000	SW2	-0.3	-0.026	-0.022	0.5637	
240 minute summer	E4	4.000	SW2	-0.3	-0.034	-0.024	0.1768	
240 minute summer	SW2	Hydro-Brake®	SW3	2.1				81.2



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Node Name	E1	SW1	SW2	SW3
A4 drawing Hor Scale 1000 Ver Scale 50 Datum (m) 65.000				
Link Name	1.000	1.001	1.002	
Section Type	150mm	150mm	150mm	
Slope (1:X)	150.0	150.0	133.9	
Cover Level (m)	68.200	68.200	68.200	68.213
Invert Level (m)	67.069 66.965	66.965 66.850	66.850 66.780	
Length (m)	15.600	17.194	9.374	



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Node Name	E2	SW1	
A4 drawing Hor Scale 1000 Ver Scale 50 Datum (m) 65.000			
Link Name	2.000		
Section Type	150mm		
Slope (1:X)	150.0		
Cover Level (m)	68.200	68.200	
Invert Level (m)	67.069	66.965	
Length (m)	15.600		



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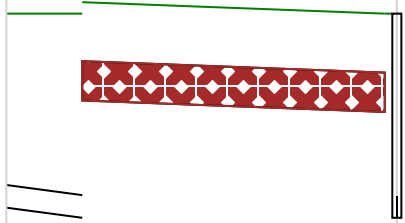
Node Name	E3	SW2	
A4 drawing Hor Scale 1000 Ver Scale 50 Datum (m) 65.000			
Link Name	3.000		
Section Type	150mm		
Slope (1:X)	150.0		
Cover Level (m)	68.200	68.200	
Invert Level (m)	67.063	66.850	
Length (m)	32.017		



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Node Name	E4	SW2	
A4 drawing Hor Scale 1000 Ver Scale 50 Datum (m) 65.000			
Link Name	4.000		
Section Type	150mm		
Slope (1:X)	150.0		
Cover Level (m)	68.200	68.200	
Invert Level (m)	66.917	66.850	
Length (m)	10.041		

Appendix G Correspondence with United Utilities

Andrew Brookes

From: Andrew Brookes
Sent: 09 February 2023 10:43
To: wastewaterdeveloperservices@uuplc.co.uk
Subject: RE: Gorton Library - Surface water discharge application 134600/VO/2022 - UU Ref. 03495667

FAO Josephine at United Utilities

Good morning, Josephine,

I hope you are well.

Apologies for the confusion. I used the incorrect planning application reference. The planning reference for the library demolition and car park extension is 135449/VO/2022. I also forgot to submit the UU Wastewater pre-development enquiry form.

I've prepared a fresh pack of supporting information including the completed form and everything from your below list in the below WeTransfer link. Please note that item 3, the soil infiltration test results are in the Phase 2 GI Report. Drainage calculations are in the Drainage Strategy appendix.

<https://we.tl/t-GfrLTWrwFq>

Regards,
Andy

Andrew Brookes (He/him) Project Civil Engineer
Curtins
T. 01539 724 823 | andrew.brookes@curtins.com

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 07 February 2023 12:43
To: Andrew Brookes <Andrew.Brookes@curtins.com>
Subject: RE: Gorton Library - Surface water discharge application 134600/VO/2022 - UU Ref. 03495667

Good afternoon, Andrew.

Thanks for your email.

Our Engineer, Shoaib Tauqeer, who looks after Manchester's area is off for a few days.

Regarding the application, I am confused about the information you submitted.

The Manchester planning application reference no. 134600/VO/2022 is related to for the works to existing car park located to the north of the library.

However, the drawing of the Library Site, Proposed Drainage Layout, ref: GCH CUR XX XX DR C 92101 revision P03 dated 8/12/2022 is related to a new car park after library is to be demolished.

Therefore, please submit the following for our Shoaib's assessment once he comes back to the office.

1. A site location plan with site boundary line and two street names
2. A ground condition report

3. Soil infiltration test results under BRE365 with site photos
4. A revised proposed drainage layout plan with proposed discharge rates and connection points
5. A full set of calculation

Many thanks and kind regards,

Josephine

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

From: Andrew Brookes [andrew.brookes@curtins.com]

Sent: 19/01/2023 16:04

To: wastewaterdeveloperservices@uuplc.co.uk

Cc: jeff.boothroyd@morgansindall.com; peter.broster@morgansindall.com; peter.thomas@curtins.com; adam.winkley@morgansindall.com; tim.kilpatrick@ibigroup.com; glen.watson@curtins.com

Subject: RE: Gorton Library - Surface water discharge application 134600/VO/2022

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Sirs,

It's not clear whether the LPA consulted UU on the below planning application, but the planning officer advised us to seek UU approval to the surface water discharge. Please could you review the below and advise if UU approve the proposed indirect S106 connection.

The planning application was approved on 28/09/2022, details below.

Planning Reference: 134600/VO/2022

Address: Gorton Library Garratt Way Manchester M18 8HE

Proposal: CITY COUNCIL DEVELOPMENT for works to existing car park to create staff car parking for a temporary period of 3 years to serve Gorton Hub including new boundary fencing, new pedestrian gate, new vehicular gates to existing access off Sibley Street, new lighting & CCTV to existing / new columns and new markings to existing surface

The drainage strategy is to retain the existing car park drainage with an unrestricted outfall. The new car park will have permeable construction for water treatment and attenuation with a greenfield surface water discharge to the public surface water sewer in Engell Close, using the existing private drainage outfall.

You will note that the existing surface water outfall to the surface water sewer has not yet been categorically proven by survey due to a historic defect in the last 2.3m length of private pipe, even though all record information shows connectivity is highly likely. We would understand if UU needed to caveat their approval of the surface water discharge as pending proof of the existing connection. However, we do note that a new surface water connection would be in accordance with the surface water disposal hierarchy (see the Drainage Strategy) and that the final discharge rates (including retained unrestricted areas) represent at least a 50% betterment on the likely existing discharge rate (see the Drainage Areas Plan).

Please see the below list of documents, downloadable via this WeTransfer link <https://we.tl/t-NHlyb8vYZ0>, for further detail.

GCH-CUR-XX-XX-DR-C-90111-P04-Library Site, Civil Engineering Construction Details Sh1

GCH-CUR-XX-XX-DR-C-92101-P03-Library Site, Proposed Drainage Layout

GCH-CUR-XX-XX-DR-C-92102-P01-Library Site, Drainage Areas Plan
GCH-CUR-XX-XX-RP-C-92100-P02-Drainage_Strategy (as LLFA approved)

A pre-commencement drainage condition 13 is in place which the developer will soon apply to discharge. The developer will need to evidence UU approval for this.

Please let me know if you require any additional information.

Regards,
Andy

Andrew Brookes (He/him)
Project Civil Engineer
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