

ROPEMAKER, MANCHESTER

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

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Client Name: Ropemaker PROPCO Ltd

Client Address: 10 Fenchurch Avenue, London, EC3M 5AG

Site Address: Ropemaker, 500 Moss Ln E, Manchester M14 4PL

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P01	Issued for comments	JC	MW	11 March 2026
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1. INTRODUCTION

1.1. Project Background

Curtins has been appointed by Ropemaker PROPCO Ltd to provide a Flood Risk Assessment (FRA) and Drainage Strategy for the proposed development located at Ropemaker, 500 Moss Ln E, Manchester M14 4PL (x: 384946, y: 395636).

The report provides information on the nature of flood risk at the site and follows Government guidance regarding development and flood risk.

The report is based on currently available information and preliminary discussions.

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. Scope of Assessment

The assessment is to be undertaken in accordance with the standing advice and requirements of the Environment Agency (EA) for Flood Risk Assessments as outlined in the Communities and Local Governments Planning Policy Guidance to the National Planning Policy Framework (NPPF).

The assessment will:

- Summarise all potential risks of flooding to the site,
- Consider the impact the development may have elsewhere with regards to flooding,
- Consider design proposals to mitigate any potential risk of flooding determined to be present; and
- Consider foul and surface water drainage proposals for the proposed development.

The site area is approximately 0.35 hectares and following scrutiny of the Environment Agency flood maps it has been identified that the site lies within Flood Zone 1 and is located within the conurbation core critical drainage area. As the site is less than 1 hectare and lies within Flood Zone 1, a full FRA is not required for planning, therefore report only summarises the flood risk associated with the site.

In April 2015, the Government made changes to the National Planning Policy Framework, which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for all developments.

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

This Flood Risk Assessment and Drainage Strategy reviews the following information:

- Environment Agency flood maps for rivers and sea flooding.
- UK Government Flood maps for planning.
- Manchester City Council Preliminary Flood Risk Assessment (PFRA), dated December 2017
- Manchester City Council Level 1 Strategic Flood Risk Assessment (SFRA), dated March 2010
- Manchester City Council Level 2 Strategic Flood Risk Assessment (SFRA), dated March 2011
- United Utilities Wastewater Pre-development Enquiry Response, dated January 2026.
- Topographical Survey & Utility survey completed by Lucion Surveys (Landform) LTD, dated October 2025.
- CCTV survey by Layer Survey dated February 2026

1.3. Proposed Development

The proposed development consists of 2 new buildings, internal layout changes and external works,

1. Area A - A new single-storey amenity pavilion within the existing car park
2. Area B - A new gym with a courtyard area within the existing soft landscape within the existing student accommodation area.
3. Some alterations are proposed to the ground floor layout of the existing building adjacent to the new pavilion.

The Proposed Site Layout is enclosed in Appendix A.

2. EXISTING SITE DETAILS

2.1. History and Current Use

The site is located in Rusholme, Manchester and is bound by Moss Lane East to the north, a carpark to the east, buildings to the south and Heald Grove to the west. Refer to Figure 1 for the location.

The site is 0.35ha of existing student accommodation with associated parking and landscaping.

Figure 1 – Site Location Plan



2.2. Existing Watercourses and Other Waterbodies

There are no main rivers or watercourses identified within the proposed site.

The closest watercourse is The Gore Brook which is located 1.1km southeast of the site.

There are no canals located within 1km of the site.

2.3. Existing Drainage

United Utilities records indicate there is a 590x940mm public combined sewer that runs north along Heald Grove. This sewer discharges to a 1060mm public combined sewer that runs west within Moss Lane East.

The records indicate that there are no public sewers located within the site.

There is an existing separate surface and foul water private drainage network onsite which has been confirmed by a GPR and CCTV survey. The existing network is in general good condition with minor repairs required and appears to outfall to the public combined sewer within Heald Grove.

Within Area A, the CCTV survey confirms the presence of a 1050 mm diameter surface water pipe and a hydrobrake within the final surface water chamber prior to connection to the combined private drainage which discharge to combined sewer within Heald Grove. Archive drainage records indicate that the hydrobrake restricts discharge to 86 l/s. The CCTV survey also indicates that parts of the drainage system are combined; however, it remains unclear which existing roof areas discharge to the private combined drainage system, as the existing RWPs serving the building have not been fully investigated. It has therefore been assumed that all external hardstand areas discharge to the surface water drainage system, and some areas of existing roof, which is attenuated via the 1050 mm pipe and restricted by the existing flow control.

The sewer records CCTV survey and drainage records have been enclosed within in *Appendix B*.

2.4. Topography

The majority of the site is occupied by an existing student accommodation building, along with its associated external car park and areas of soft landscaping. The existing car park slopes from 38.52 m AOD to 38.14 m AOD, with the lowest point at the eastern corner at 38.04 m AOD. The soft landscape to the south ranges between 40.24 m and 38.58 m AOD, while the central soft landscape is approximately 38.52 m AOD.

2.5. Geology

The British Geological Survey mapping confirms that the superficial deposits at the site comprise Till (Devensian Diamicton), with the underlying bedrock geology identified as the Chester Formation Sandstone.

Curtins has undertaken a Phase 2 Site Investigation; however, not all results were available at the time of writing this report.

The available window samples (WS101, WS104B, WS103C, and WS107) indicate that made ground was encountered to depths between approximately 0.70 m and 0.90 m, underlain by clay to a depth of up to 5.45 m. Other window samples indicate made ground to approximately 1.10 m, overlain by concrete.

Perched water was encountered in WS101 at 0.80 m below ground level (37.31 m AOD).

From the single monitoring visit undertaken to date, groundwater levels were recorded between 1.5 m and 4.0 m below ground level.

Draft results are included in Appendix C.

Based on the DEFRA MAGIC Map – Source Protection Zones (Environment Agency) the site is located within the extents of a Groundwater Source Protection Zone. The zone classification is Zone III – Total Catchment. This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.

3. DEVELOPMENT AND FLOOD RISK

3.1. National Planning Policy Framework (NPPF) and Planning Practice Guidance

In December 2024, the Ministry of Housing Communities and Local Government published the latest iteration of the NPPF, and the Planning Practice Guidance was originally published in March 2014 (and is periodically updated from time to time), with the Flood Risk and Coastal change section last updated in September 2025, which provides guidance on how flood risk should be assessed during the planning and development process.

As the site is located within Flood Zone 1 and the proposed development, comprising a new pavilion with a gym and associated external works, is classified as Less Vulnerable, the development does not trigger the requirement for the Sequential Test or Exception Test (refer to the Flood Zone compatibility table in the NPPF Technical Guidance). The Flood map has been included in Appendix D

4. HYDROLOGICAL ASSESSMENT

4.1. Sources of Flood Risk

This study assesses the risk from different types of flooding to the development and the risk of flooding from the development, taking into consideration climate change, as well as how flood risks should be managed. The approach to assessing flood risk at the development site was informed by the requirements of NPPF in conjunction with the client and Environment Agency requirements.

4.2. Fluvial Flooding (Rivers and Streams)

The UK Government's Long-Term Flood Risk from rivers and sea included in Appendix D indicates development is not located in areas considered of risk of fluvial flooding. Therefore the site is considered to be in Flood Zone 1.

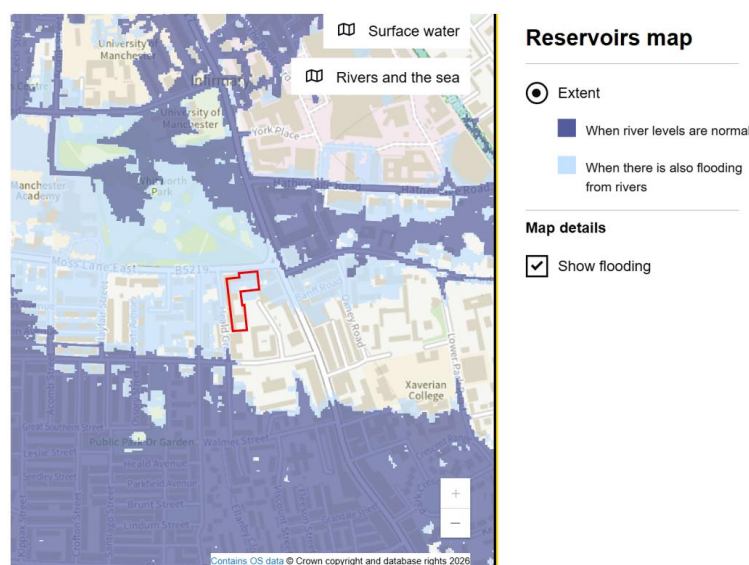
4.3. Tidal Flooding (Coastal or Estuarine)

The site is remote from coastal and Estuarine areas, and therefore is at low risk of flooding from tidal sources.

4.4. Reservoir Flooding

Based on the long-term flood risk map for reservoir flooding, the site lies within the potential flood extent associated with a reservoir breach occurring concurrently with river flooding.

Figure 2 - Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs (© Crown Copyright)



Reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority and ensures that reservoirs are inspected regularly, and essential safety work is carried out.

As the reservoir flooding is unlikely, the risk of flooding is low,

4.5. Canal Flooding

As stated in section 2.3, there are no canals located within 1km of the site.

There is no mention of flooding caused by canals, within or surrounding the site, in the Manchester City Council SFRA which would suggest there are no flooding issues caused by canals in the area.

4.6. Groundwater Flooding

Groundwater flooding tends to be more persistent than other sources of flooding, typically lasting for weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant risk to property.

According to the Manchester City Council SFRA, there are no specific records of groundwater flooding within the area surrounding the site. A groundwater susceptibility map from the Manchester City Council PFRA does not show the site within the extents of areas susceptible to groundwater flooding.

Also UK Government Longterm Flood Risk indicates location is outside of a groundwater flood alert area.

Based on preliminary Site investigation results there is a perched groundwater at 0.80m and 1 monitoring visit undertaken to date, water levels between 1.5 and 4mbgl.

Given the nature of the proposals, it is unlikely to have any significant lowering of ground levels, therefore, it is not anticipated that groundwater would impact on future development use. The risk of flooding from groundwater can be considered to be low.

4.7. Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

United Utilities sewer maps show that there are sewers surrounding the site. A full description of the sewers is provided in section 2.3 above. There are gullies within the highways surrounding the site. These gullies are likely to be highway assets maintained by Manchester City Council Highways.

Gullies can flood due to high intensity rainfall periods as well as blockages entering the gullies. In the event that road gullies flood, water would flow along the kerb line to other gullies further down the road.

The SFRA does not identify any recorded flooding incidents in the vicinity of the development.

Providing United Utilities and Manchester City Council Highways maintain their drainage assets within the vicinity of the site, the risk of flooding to the proposed development site from public sewers or highway drainage is considered to be **low**.

4.8. Surface Water Flooding to the site

Surface water flooding can be caused when rainwater during extreme rainfall events does not drain away through the normal drainage system or soak into the ground can result in overland flows which if originating at a higher elevation than the development site can potentially pose a flood risk.

From the UK Government's Flood Risk from Surface Water (extent of flooding) map;

- Where a site is located in a dark blue shaded zone, this indicates that the site is at high risk of flooding, where flooding occurs as a result of rainfall with a greater than 1 in 30 (3.3%) chance in any given year.

- Where a site is located in a mid-blue shaded zone, this indicates that the site is at medium risk of flooding, where flooding occurs as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
- Where a site is located in a light blue shaded zone, this indicates that the site is at low risk of flooding, where flooding occurs as a result of rainfall of between 1 in 1000 (0.1%) and 1 in 100 (1%) chance in any given year.
- Where a site is located in a clear (unshaded) area; this indicates that the site is at very low risk of flooding, where flooding occurs as a result of rainfall with less than 1 in 1000 (0.1%) chance in any given year.

The extent of surface water flooding across the site is shown in Figures 4, 5, and 6. The figure shows there is no surface water overland flow from outside the site towards the site.

Based on figure 5&6 there is flooding observed in the adjacent southern car park outside the site boundary; however, due to the presence of upstand kerbs, surface water from this adjacent car park is prevented from flowing into the development.

4.9. Surface Water Flooding from the site

Figure 4 indicates that surface water flooding occurs within the onsite car park during a 1 in 30 year storm event. A small area in the lower part of the existing car park is identified as beginning to flood under this event.

Figure 4 - Risk of Flooding from Surface Water - Extent of Flooding1:30

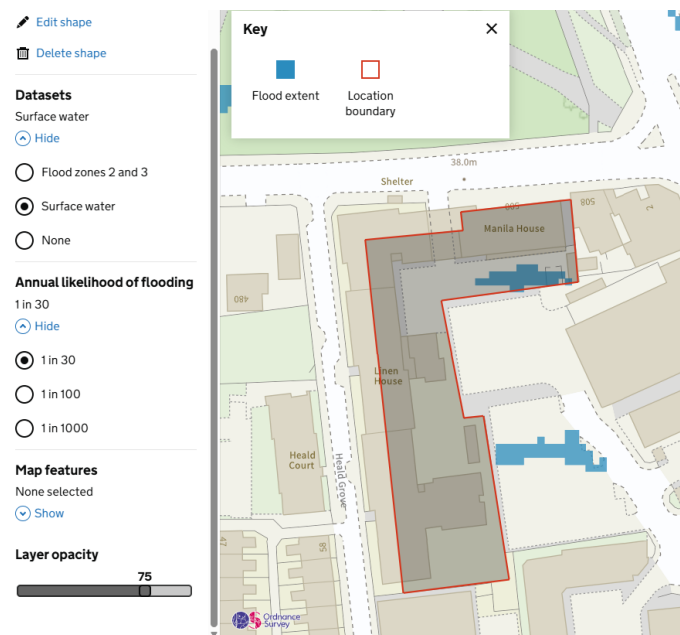


Figure 5 illustrates the flood extent for a 1 in 100 year storm event, showing an expanded area of flooding within the existing car park that reaches up to the building line, flows toward the western part of the site, and begins to extend offsite.

Figure 5- Risk of Flooding from Surface Water - Extent of Flooding1:100

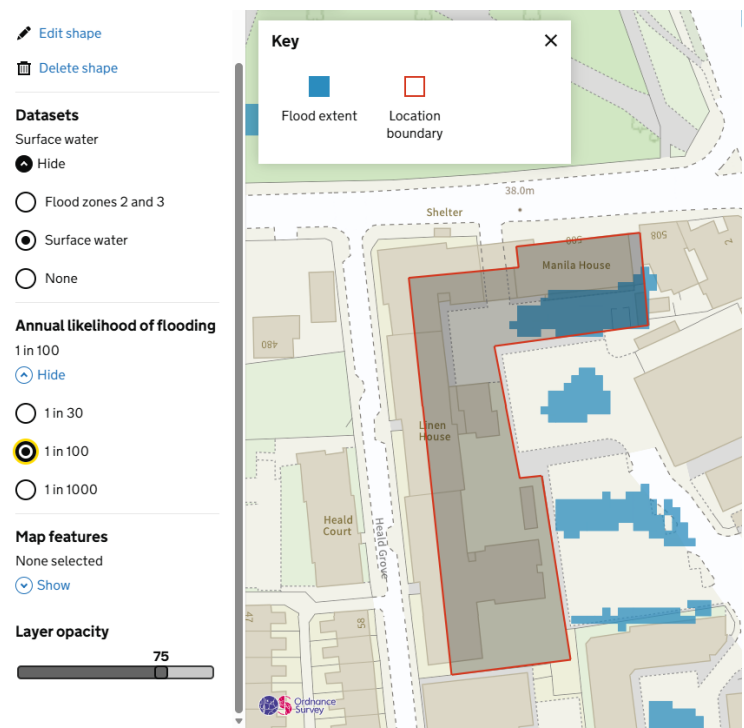
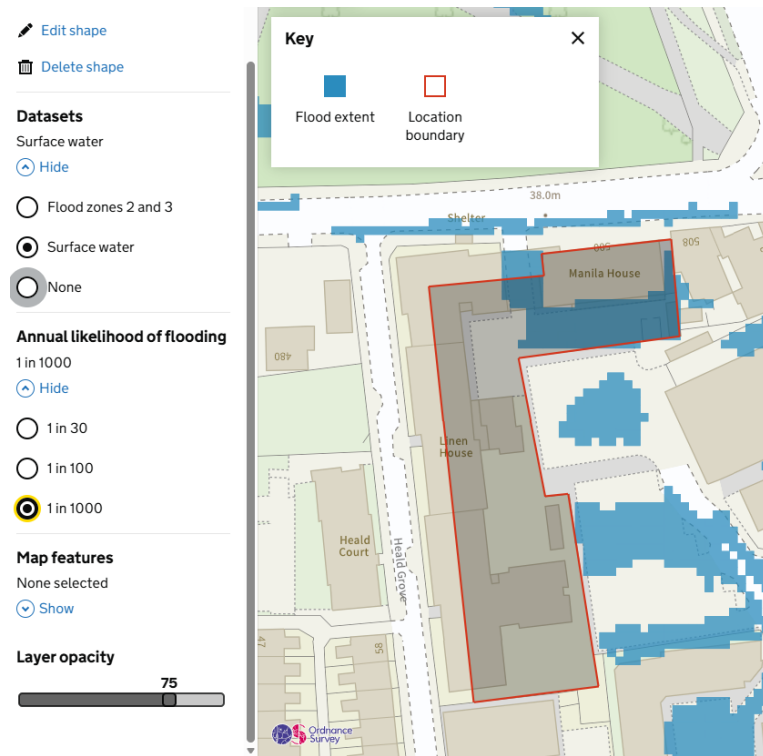


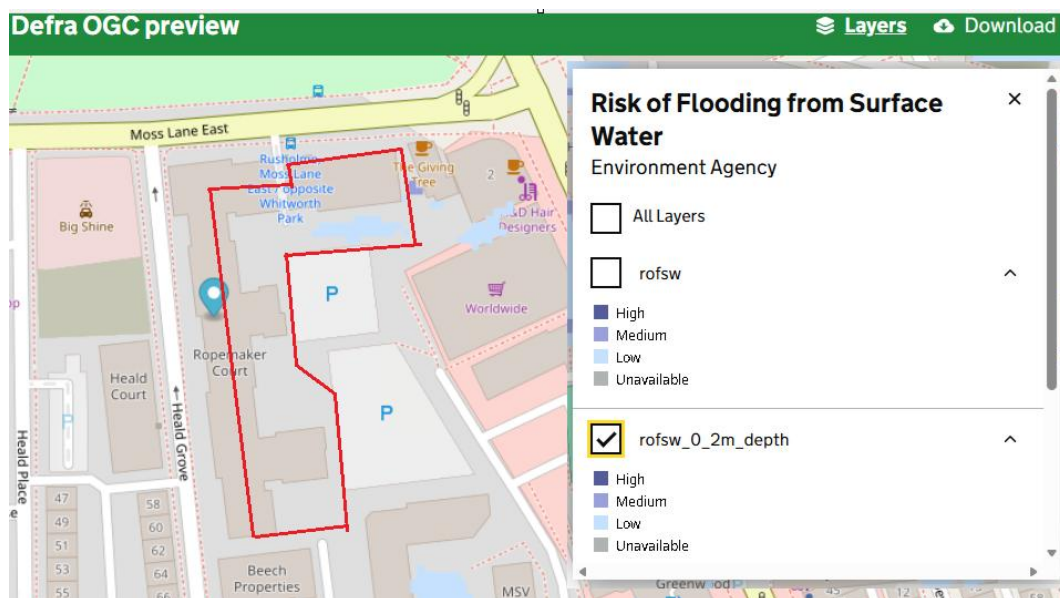
Figure 6 illustrates the flood extent for a 1 in 1000 year storm event, showing that flooding begins to flow toward the site entrance.

Figure 6- Risk of Flooding from Surface Water - Extent of Flooding1:1000



Additional mapping has been reviewed to understand the extent and depth of potential surface water flooding. Figure 7 shows low flood risk extent with a maximum depth of 200mm. Light blue indicates low risk (flooding up to 200 mm with 1 in 1,000 to 1 in 100 annual chance).

Figure 7 - Risk of Flooding from Surface Water – flood depth



Based on the above maps, there is potential for surface water flooding of up to 200 mm during events with a 1 in 1,000 to 1 in 100 annual probability. Figures 4, 5, and 6 indicate the presence of surface water flooding, although the actual depths are expected to be lower.

As a CCTV survey was provided, the existing drainage model was developed using FLOW software. According to this model, flooding is not expected during a 1 in 30 year storm event. Flooding may occur during 15-, 30-, and critical 60-minute storm events for a 1 in 100 year event with a 45% climate change allowance, with a maximum volume of 26 m³. The existing drainage calculation has been included in Appendix G.

The proposed building is located within the car park area, where existing flooding issues have been identified. Portions of the existing drainage system will be redesigned to address these flooding problems. The proposed mitigation is presented in Section 5.

4.10. Historical Flooding

Client has advised there were some historic flooding within on site car park. This aligns with the surface water flood maps and proposed mitigation measures are outlined in Section 5.

4.11. Summary of Flood Risk

From the evidence collated and subsequent negotiations the site is considered to be at potential risk of:

- Surface water flooding within the site and from the site.

5. MITIGATION

5.1. Surface Water Flooding within/from the Site

A new pavilion building is proposed within the existing car park and above the existing 1050 mm oversized pipes, which currently provides 29.3 m³ of attenuation. Surface water will be diverted via a smaller pipe around the southern perimeter of the new building. The existing oversized surface water pipe will be removed, and a new 34 m³ attenuation tank will be installed between EXSWMH05 and EXSWMH04 to provide the required storage volume and mitigate the existing flooding issues.

The calculations included in Appendix H indicate that flooding will not occur for storm events up to the 1 in 100 year event with a 45% climate change allowance.

6. DRAINAGE STRATEGY

6.1. Propose Private Drainage Diversion

The new pavilion building is proposed within the existing car park and is located above the existing 1050 mm surface water pipe and partially clashes with the existing 100mm private combined drainage near the northern elevation.

Surface water will be diverted around the southern perimeter of the new pavilion, and a new attenuation tank will be installed between EXSWMH05 and EXSWMH04.

The 100mm combined drainage will be partially relocated to the existing footway between the existing and new pavilion building. The diverted pipe location is subject to detailed design and coordination with existing and proposed buildings foundation.

6.2. Proposed Foul Water Drainage

A Pre-Development Enquiry has been submitted to United Utilities, and they have confirmed that there is sufficient capacity in their network for foul water to be discharged at an unrestricted rate to the 590x940mm public combined sewer within Heald Grove.

It is proposed that any required foul water connection will be connected to the existing private combined drainage system within the site. The existing private combined connection to the public drainage network will be reused.

Based on the current layout it seems that only bin store and gym toilet will require a new foul water connection.

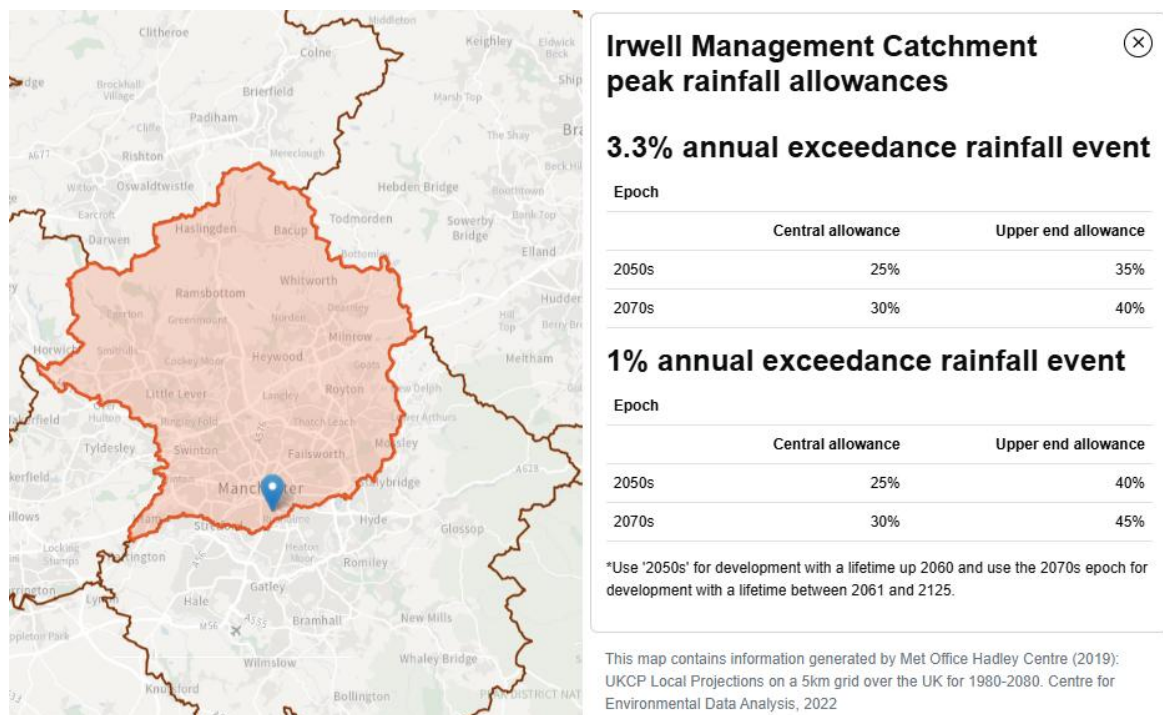
The proposed foul water network is shown on the Drainage Strategy which is enclosed in Appendix F. United Utilities correspondence is enclosed in Appendix E.

6.3. Proposed Surface Water Drainage

Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

In May 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Rather than nationwide allowances, each area has its own peak rainfall allowances. In the case of the proposed site area, this is the Irwell Management Catchment peak river flow allowance. Figure 8 demonstrates the climate change allowances with central and upper end allowances being considered for the 1% event.

Figure 8: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments



Based on the nature of the development, a lifespan in excess of 100 years is anticipated. Therefore, the potential climate change allowance for the 2070's ranges between 30% for the central allowance and 45% for the upper end allowance. As such, an allowance of 45% for climate change on peak rainfall intensity will be included in calculations.

Surface Water hierarchy

In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

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Infiltration

Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy; however, the ground conditions indicate the presence of clay and concrete below made ground with high perched groundwater. Therefore, soakaways are considered as unsuitable for the site.

Watercourse

There are no watercourses within the vicinity of the site.

Surface Water Sewer

There are no surface water sewers within the vicinity of the site.

Combined Water Sewer

There is a 590x940mm public combined sewer within Heald Grove, where site currently discharges for surface water.

Table 1 summarises the options for surface water disposal.

Table 1: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	X	Infiltration is not suitable due to ground condition
Watercourse	X	There are no suitable nearby watercourses.
Surface Water Public Sewer	X	There is no surface water sewer adjacent to site.
Combined Public Sewer	✓	It is proposed do discharge to the existing combined sewer via the existing private combined drainage

Area A - It is proposed that the new pavilion, located within the existing car park, will be connected to the existing surface water drainage system, which already includes flow restrictions and attenuation. As the overall impermeable area is not increasing, and the attenuation tank as a replacement for oversize pipes will provide the required storage volume and mitigate the existing flooding issues, therefore the new pavilion will reduce the site's flooding risk.

Area B - The new impermeable area, consisting of the gym and adjacent external surfaces currently covered by soft landscaping. Area B will be limited to a discharge rate of 5 l/s and connected to the private combined drainage within site. It is proposed that the new external surfaces will use a permeable paving system, with attenuation provided within the subbase. The new roof water pipes (RWPs) from the gym will discharge into the permeable pavement subbase.

A Pre-Development Enquiry has been submitted to United Utilities, and they have confirmed that there is sufficient capacity in their network to accommodate the additional 5 l/s from the new impermeable area with the existing flows from the site.

United Utilities correspondence is enclosed in Appendix E and the proposed drainage strategy is included in Appendix F.

The proposed drainage has been designed not to flood up to the 1 in 100 year +45% Climate change event, The calculations have been included in Appendix H.

It is proposed that all drains within the site boundary will remain private, with the new connections tying into the existing private drainage on site. Therefore, a Section 106 Agreement application for the indirect connection should be submitted to United Utilities before construction.

6.4. Sustainable Drainage Systems and Green Infrastructure

Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Figure 9 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 9: Pollution Hazard indices for land use classification (Table 26.2 the CIRIA SuDS manual 2015)

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Figure 10 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015)

Figure 10: Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

The selection of treatment should ensure that the SuDS mitigation component index (Figure 10) exceeds the pollution hazard index (Figure 9).

As the proposed external surface is a pedestrian area, the risk of pollution is low and permeable pavement provides sufficient treatment.

Sustainable drainage system (SuDs)

In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate.

The following options have been considered for the site:

Infiltration Systems:

Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy, however, due to the ground conditions and limited space on site infiltration are not considered suitable for the site.

Permeable Paving

Permeable paving is specified for new external areas. This system allows surface water to infiltrate through the paving surface into an underlying sub-base, providing both water quality treatment and attenuation storage.

The permeable paving should be designed in accordance to BS 7533-13.

Swales and ponds:

Due to limited space on site swales and pond are not proposed

Attenuation Tanks:

An attenuation tank is proposed within the existing drainage system to replace the storage volume lost from abandoning the existing 1050 mm pipe located beneath the proposed pavilion.

6.5. Summary

The site is considered at low risk of flooding from all assessed sources—including rivers, coastal areas, reservoirs, canals, groundwater, public sewers, and highway drainage—with only limited surface water flooding within site which will be mitigated by the installation of an attenuation tank within the existing drainage system, which will replace the slightly bigger than storage volume lost due to the abandonment of the 1050 mm pipe located beneath the proposed pavilion.

The site drainage is designed to prevent flooding for the 1 in 100-year + 45% climate change event on-site without affecting buildings, services, or adjacent properties.

SW drainage Area A - It is proposed that the new pavilion, located within the existing car park, will be connected to the existing surface water drainage system, which already includes flow restrictions and attenuation. As the overall impermeable area is not increasing, the new pavilion will not increase the site's flooding risk.

SW Drainage Area B - The new impermeable area, consisting of the gym and adjacent external surfaces currently covered by soft landscaping, will be limited to a discharge rate of 5 l/s and connected to private combined drainage within site. It is proposed that the new external surfaces will use a permeable paving system, with attenuation provided within the subbase and offer pollution treatment. The new roof water pipes (RWPs) from the gym will discharge into the permeable pavement subbase.

7. MAINTENANCE

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 recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. 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.

A management company may be required for maintenance of attenuation facilities.

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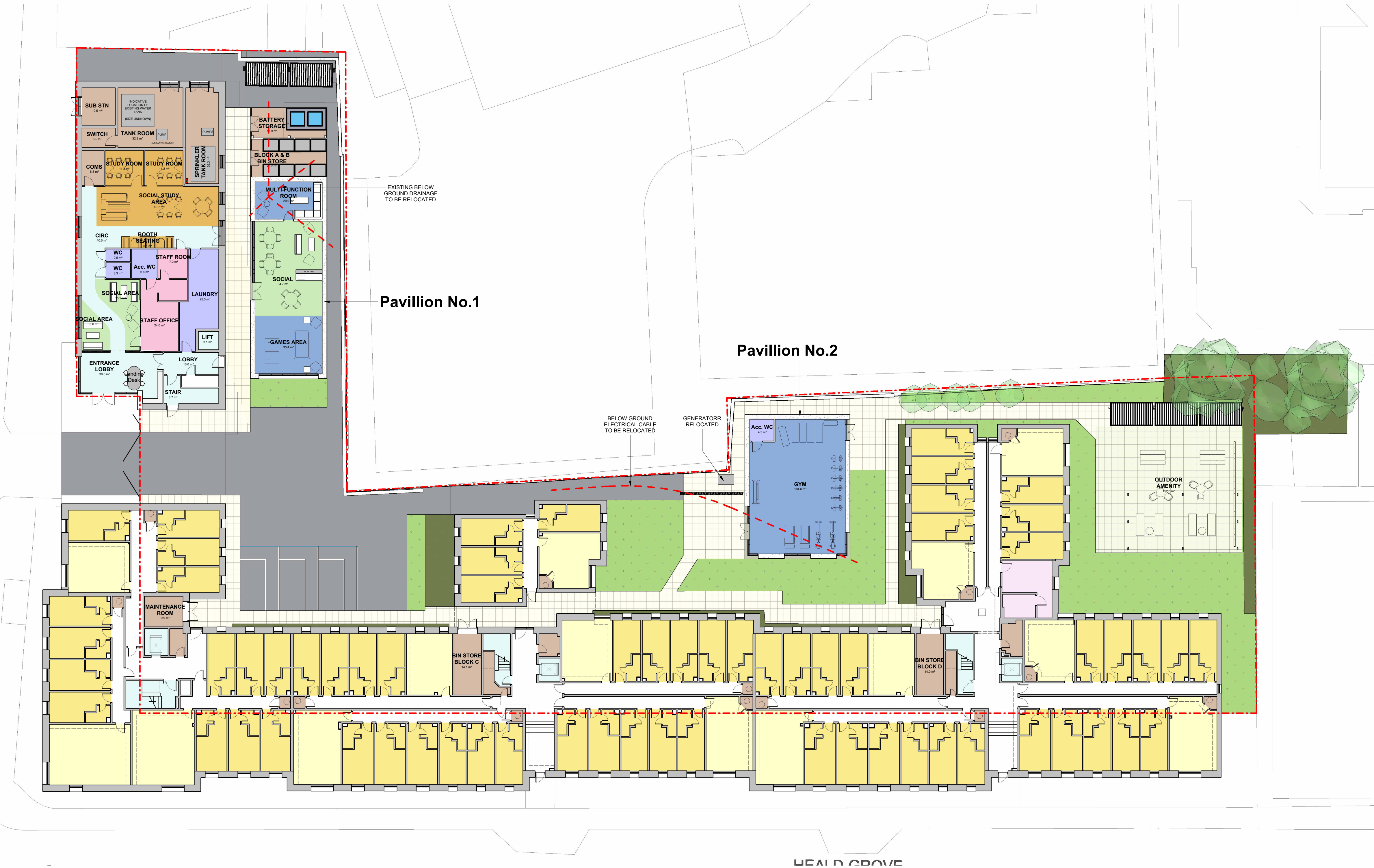
Appendix A – Proposed Site Layout

MAIN FUNCTION

- AMENITY
- AMENITY - ACTIVITY / ENTERTAINMENT
- AMENITY - OUTDOOR
- AMENITY - SOCIAL
- AMENITY - STUDY
- BEDROOM
- Corridor
- DDA BEDROOM
- STAFF
- FM
- CIRC
- KLD All Types

TOTAL BEDS - 416

AMENITY AREAS
EXISTING GF - 164sqm
EXISTING 01 - 21sqm
PAVILLION 1 - 109sqm
PAVILLION 2 - 109sqm
TOTAL - 403sqm
sqm per student = 0.97sqm



GA PLAN - LEVEL 00 - PROPOSED
SCALE: 1 : 200

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Constructors must only work to figured dimensions which are to be checked on site. Do not scale from hard copy drawings.

DATE	REVISION	REV	DR	CH
02/10/25	FIRST ISSUE	P01	DS	RL
08/10/25	DESIGN CHANGES	P02	RL	SB
17/10/25	DESIGN CHANGES	P03	DS	SB
31/10/25	STAGE 02 & PLANNING PRE-APP	P04	DS	TC
06/11/25	AMENDMENTS TO PRE-APP ISSUE	P05	DS	TC
02/01/26	REMOVAL OF SOUTH PAVILLION, RELOCATION OF FM WORKSHOP AND EXTERNAL BIN STORE	P06	RL	TC
09/01/26	POTENTIAL BATTERY LOCATIONS, RELOCATION OF FM WORKSHOP AND SPRINKLER TANK	P07	RL	TC
23/01/26	BATTERY LOCATION FINALISED, CENTRAL SOCIAL AREA FINALISED	P08	RL	TC
05/03/26	UPDATES IN-LINE WITH SPRINKLER DESIGN AND INTERIOR DESIGN COORDINATION	P09	RL	TC
10/03/26	PLANNING ISSUE	P10	RL	TC
11/03/26	UPDATES FOLLOWING DTM 10/03/26	P11	TC	SB

Keyplan

THIS DRAWING IS SUBJECT TO FULL VERIFICATION BY MEASURED AND STRUCTURAL SURVEY, ENGINEERING DESIGN, CONFIRMATION OF BOUNDARIES, EASEMENTS AND COVENANTS, FLOOD RISK ASSESSMENT, SERVICES AND UTILITIES, TOPOGRAPHICAL SURVEY, ECOLOGY ASSESSMENT, CONTAMINATION ASSESSMENT, PLANNING / BUILDING CONTROL, AND HIGHWAYS APPROVAL. NOTE THESE ADDITIONAL REQUIREMENTS ARE NOT EXHAUSTIVE.

PLEASE NOTE SITE / TOPO INFORMATION WAS SUPPLIED BY LUCION SURVEY PLAN 691546.001, AND BOUNDARY INFORMATION SUPPLIED BY CLIENT ON SEARCH ACUMEN PLAN HALJ272574.51291.

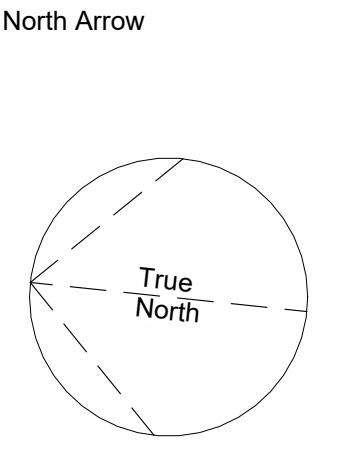
EXISTING BUILDING INFORMATION TAKEN FROM GREEN HATCH GROUP DRAWINGS (AUG 2024)

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THIS DRAWING IS SUBJECT TO FULL CONSULTATION WITH STATUTORY BODIES AND ASSOCIATED CONSENTS.

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An Ingenium International Company

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Project SPINNAKER ESTATES		Drawing Title GA PLAN - LEVEL 00 - PROPOSED	
Project Ropemaker Court			
Drawn DS	Date 17/10/25	Sheet Status S0 - WORK IN PROGRESS	
Checked SB	Date 17/10/25	Project No. RZ3025-0074	
Scale 1 : 200 @ A1		Drawing No. RMCT-NOR-XX-00-DR-A-00001	Rev. P11

Appendix B – Topographical survey, CCTV survey & Sewer records

Cornerstone Projects Ltd

**91
Market Street, HOYLAKE
Wirral, Merseyside
CH47 5AA**

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: 692547
Our Ref: UUPS-ORD-678442
Date: 18/09/2025**

Dear Sirs

Location: 692547

I acknowledge with thanks your request dated 17/09/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

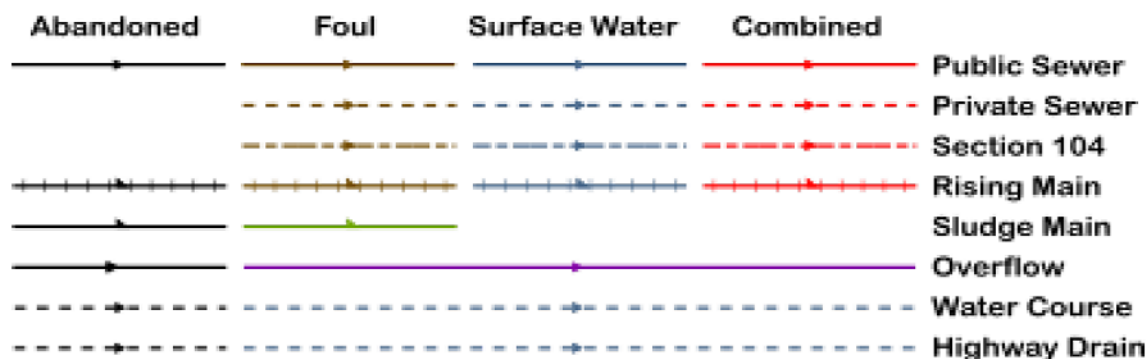
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

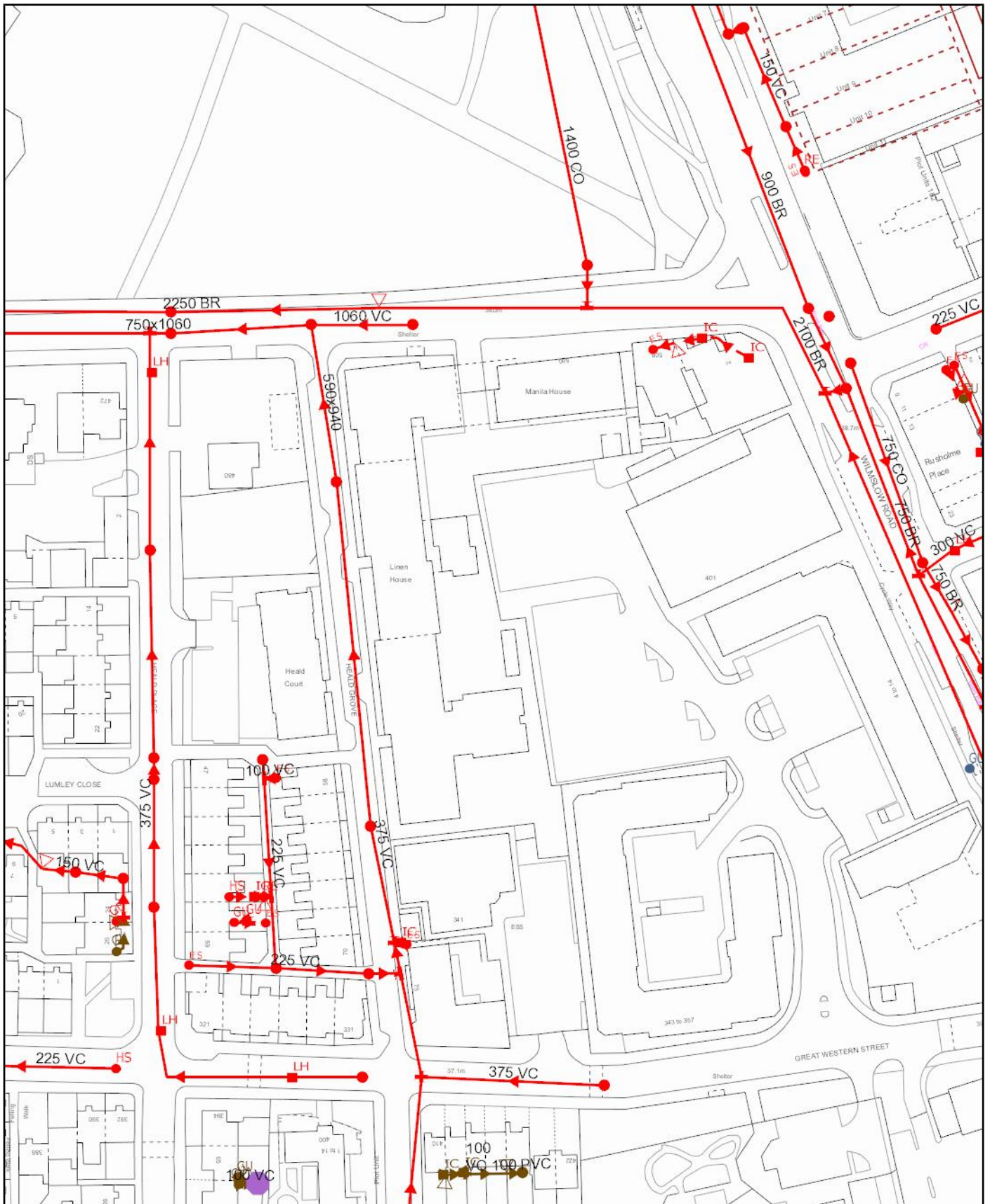
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



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

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



Scale: 1:1250
Date: 18/09/2025

SEWER RECORDS



Water for the North West

Address or Site Reference: 692547

Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Appendix C – Boreholes



Trial Pit Log

Trialpit No

HP101

Sheet 1 of 1

Project Name: Ropemaker

Project No.
B088474

Co-ords:	384965.95 - 395611.33
----------	-----------------------

Level: 38.33

Date _____

12/02/2026

Location: Manchester

Dimensions
(m):

0.2

0.2

Scale
1:20

Logged
LW

Client: Ropemaker Propco Ltd

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.17	38.16		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite and ceramic.
				0.25	38.08		MADE GROUND: Grey sandy gravel. Sand is fine to coarse. Gravel is fine to medium, subangular of limestone, quartzite and brick. <div style="text-align: right;">End of pit at 0.25 m</div>

Remarks:	Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.25m bgl to facilitate a TRL.
----------	--

Stability: Stable



<div>Curtins</div>				<div>Trial Pit Log</div>			<div>Trialpit No HP103 Sheet 1 of 1</div>				
Project Name: Ropemaker				Project No. B088474		Co-ords: 384978.49 - 395579.11 Level: 38.61		Date 12/02/2026			
Location: Manchester				Client: Ropemaker Propco Ltd		Dimensions (m): Depth 0.36		0.2 <div></div> <div>0.2</div>		Scale 1:20	
						Logged LW					
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
	Depth	Type	Results								
				0.30 0.36	38.31 38.25	<div></div> <div></div>	MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite and ceramic.				
							Firm brown CLAY. ----- End of pit at 0.36 m				
<div>1</div> <div>2</div> <div>3</div> <div>4</div>											
Remarks: Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.36m bgl to facilitate a TRL.											
Stability: Stable											
<div>AGS</div>											

<div>Curtins</div>				<div>Trial Pit Log</div>			<div>Trialpit No HP104 Sheet 1 of 1</div>		
Project Name: Ropemaker				Project No. B088474		Co-ords: 384984.98 - 395658.81 Level: 38.04		Date 12/02/2026	
Location: Manchester				Dimensions (m):		0.2		Scale 1:20	
Client: Ropemaker Propco Ltd				Depth 0.36		<div>0.2</div>		Logged LW	
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.26	37.78		MADE GROUND: Black/dark grey tarmac.		
				0.35	37.69		MADE GROUND: Yellowish grey sandy gravel underlain by a geotextile membrane. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.		
				0.36	37.68		Firm brown CLAY.		
							End of pit at 0.36 m		
Remarks: Position GPR cleared by specialist subcontractor prior to excavation. Ground surface broken via breaker. Hand excavated beneath the hardstanding to 0.36m bgl to facilitate a TRL.				<div>1</div> <div>2</div> <div>3</div> <div>4</div>					
Stability: Stable									
				<div>AGS</div>					

Level: 38.06

0.2

1:20

Client: Ropemaker Propco Ltd

Depth
0.33

Logged
LW

4

Stability: Stable

Project:	Ropemaker	Date of Test:	12-Feb-26
Project No.	B088474	Soil type:	GRAVEL
Test No.	HP101	Soil condition:	Unsaturated
Test Depth (To)	0.25m bgl	Operator:	LW

Blow count	Penetration (mm)	Penetration (m)	Penetration Index (DPI) mm/blow	log DPI	log CBR	Estimated CBR1 (%) ¹	log CBR	Estimated CBR2 (%) ²
0	25	0.025	1.0	0.000	2.460	288	2.480	302
1	26	0.026	1.0	0.000	2.460	288	2.480	302
1	27	0.027	1.0	0.000	2.460	288	2.480	302
1	28	0.028	1.0	0.000	2.460	288	2.480	302
1	29	0.029	1.0	0.000	2.460	288	2.480	302
1	30	0.030	1.0	0.000	2.460	288	2.480	302
1	30	0.030	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	30	0.030	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	31	0.031	1.0	0.000	2.460	288	2.480	302
1	32	0.032	1.0	0.000	2.460	288	2.480	302
1	33	0.033	1.0	0.000	2.460	288	2.480	302
1	34	0.034	1.0	0.000	2.460	288	2.480	302
1	35	0.035	1.0	0.000	2.460	288	2.480	302
1	36	0.036	1.0	0.000	2.460	288	2.480	302
1	37	0.037	1.0	0.000	2.460	288	2.480	302
1	38	0.038	1.0	0.000	2.460	288	2.480	302
1	39	0.039	1.0	0.000	2.460	288	2.480	302
1	40	0.040	1.0	0.000	2.460	288	2.480	302
1	41	0.041	1.0	0.000	2.460	288	2.480	302
1	43	0.043	2.0	0.301	2.123	133	2.162	145
1	45	0.045	2.0	0.301	2.123	133	2.162	145
1	46	0.046	1.0	0.000	2.460	288	2.480	302
1	48	0.048	2.0	0.301	2.123	133	2.162	145
1	48	0.048	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	49	0.049	1.0	0.000	2.460	288	2.480	302
1	49	0.049	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	50	0.050	1.0	0.000	2.460	288	2.480	302
1	50	0.050	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	50	0.050	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	51	0.051	1.0	0.000	2.460	288	2.480	302
1	51	0.051	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	52	0.052	1.0	0.000	2.460	288	2.480	302
1	53	0.053	1.0	0.000	2.460	288	2.480	302
1	53	0.053	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	54	0.054	1.0	0.000	2.460	288	2.480	302
1	55	0.055	1.0	0.000	2.460	288	2.480	302
1	56	0.056	1.0	0.000	2.460	288	2.480	302
1	57	0.057	1.0	0.000	2.460	288	2.480	302
1	57	0.057	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	58	0.058	1.0	0.000	2.460	288	2.480	302
1	59	0.059	1.0	0.000	2.460	288	2.480	302
1	60	0.060	1.0	0.000	2.460	288	2.480	302
1	61	0.061	1.0	0.000	2.460	288	2.480	302
1	62	0.062	1.0	0.000	2.460	288	2.480	302
1	63	0.063	1.0	0.000	2.460	288	2.480	302
1	63	0.063	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	63	0.063	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	64	0.064	1.0	0.000	2.460	288	2.480	302
1	65	0.065	1.0	0.000	2.460	288	2.480	302
1	65	0.065	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	66	0.066	1.0	0.000	2.460	288	2.480	302
1	67	0.067	1.0	0.000	2.460	288	2.480	302
1	67	0.067	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	68	0.068	1.0	0.000	2.460	288	2.480	302
1	68	0.068	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	69	0.069	1.0	0.000	2.460	288	2.480	302
1	69	0.069	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	70	0.070	1.0	0.000	2.460	288	2.480	302
1	70	0.070	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	71	0.071	1.0	0.000	2.460	288	2.480	302
1	71	0.071	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	72	0.072	1.0	0.000	2.460	288	2.480	302
1	72	0.072	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	73	0.073	1.0	0.000	2.460	288	2.480	302
1	73	0.073	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	74	0.074	1.0	0.000	2.460	288	2.480	302
1	74	0.074	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	75	0.075	1.0	0.000	2.460	288	2.480	302
1	76	0.076	1.0	0.000	2.460	288	2.480	302
1	77	0.077	1.0	0.000	2.460	288	2.480	302
1	78	0.078	1.0	0.000	2.460	288	2.480	302
1	78	0.078	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	79	0.079	1.0	0.000	2.460	288	2.480	302
1	80	0.080	1.0	0.000	2.460	288	2.480	302
1	80	0.080	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	81	0.081	1.0	0.000	2.460	288	2.480	302
1	82	0.082	1.0	0.000	2.460	288	2.480	302
1	83	0.083	1.0	0.000	2.460	288	2.480	302
1	85	0.085	2.0	0.301	2.123	133	2.162	145
1	86	0.086	1.0	0.000	2.460	288	2.480	302
1	87	0.087	1.0	0.000	2.460	288	2.480	302
1	88	0.088	1.0	0.000	2.460	288	2.480	302
1	88	0.088	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	89	0.089	1.0	0.000	2.460	288	2.480	302
1	89	0.089	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
10	89	0.089	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
		0.000						

Notes:

0

1. CBR calculated based on Webster et al. 1992.

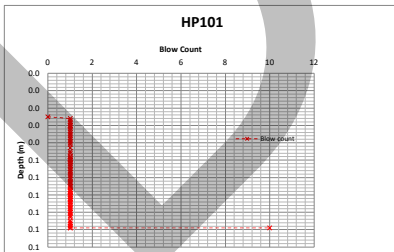
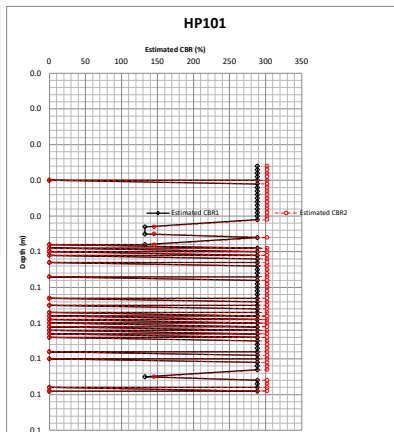
2. CBR calculated based on DMRB, 2008.

Reference:

Webster S, Grau R and Williams T. 1992. Description and Application of Dual Mass Dynamic Cone Penetrometer.

Dept of Army Waterways Equipment Station, Instruction rpt GL 92-3.

Highways Agency, 2008. Design Manual for Roads and Bridges (DMRB), Data for Pavement Assessment. HD29/08.



Project:	Ropemaker			Date of Test:	12-Feb-26
Project No.	B088474			Soil type:	GRAVEL
Test No.	HP102			Soil condition	Unsaturated
Test Depth (Top)	0.29m bgl			Operator:	LW

Blow count	Penetration (mm)	Penetration (m)	Penetration Index (DPI) mm/blow	log DPI	log CBR	Estimated CBR1 (%) ¹	log CBR	Estimated CBR2 (%) ²
0	29	0.029						
1	33	0.033	4.0	0.602	1.786	61	1.844	70
1	35	0.035	2.0	0.301	2.123	133	2.162	145
1	36	0.036	1.0	0.000	2.460	288	2.480	302
1	36	0.036	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	37	0.037	1.0	0.000	2.460	288	2.480	302
1	37	0.037	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	38	0.038	1.0	0.000	2.460	288	2.480	302
1	38	0.038	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	39	0.039	1.0	0.000	2.460	288	2.480	302
1	39	0.039	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	40	0.040	1.0	0.000	2.460	288	2.480	302
1	40	0.040	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	41	0.041	1.0	0.000	2.460	288	2.480	302
1	41	0.041	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	42	0.042	1.0	0.000	2.460	288	2.480	302
1	42	0.042	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	43	0.043	1.0	0.000	2.460	288	2.480	302
1	44	0.044	1.0	0.000	2.460	288	2.480	302
1	44	0.044	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	45	0.045	1.0	0.000	2.460	288	2.480	302
1	46	0.046	1.0	0.000	2.460	288	2.480	302
1	46	0.046	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	47	0.047	1.0	0.000	2.460	288	2.480	302
1	47	0.047	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	48	0.048	1.0	0.000	2.460	288	2.480	302
1	48	0.048	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	49	0.049	1.0	0.000	2.460	288	2.480	302
1	49	0.049	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	50	0.050	1.0	0.000	2.460	288	2.480	302
1	50	0.050	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	50	0.050	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	50	0.050	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	52	0.052	2.0	0.301	2.123	133	2.162	145
1	52	0.052	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	53	0.053	1.0	0.000	2.460	288	2.480	302
1	54	0.054	1.0	0.000	2.460	288	2.480	302
1	55	0.055	1.0	0.000	2.460	288	2.480	302
1	55	0.055	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	56	0.056	1.0	0.000	2.460	288	2.480	302
1	56	0.056	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	56	0.056	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	56	0.056	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	56	0.056	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
5	60	0.060	0.8	-0.097	2.569	370	2.582	382
5	63	0.063	0.6	-0.222	2.708	511	2.714	518
5	69	0.069	1.2	0.079	2.371	235	2.396	249
1	70	0.070	1.0	0.000	2.460	288	2.480	302
1	71	0.071	1.0	0.000	2.460	288	2.480	302
1	73	0.073	2.0	0.301	2.123	133	2.162	145
1	75	0.075	2.0	0.301	2.123	133	2.162	145
1	76	0.076	1.0	0.000	2.460	288	2.480	302
1	77	0.077	1.0	0.000	2.460	288	2.480	302
1	79	0.079	2.0	0.301	2.123	133	2.162	145
1	81	0.081	2.0	0.301	2.123	133	2.162	145
1	84	0.084	3.0	0.477	1.926	84	1.976	95
1	86	0.086	2.0	0.301	2.123	133	2.162	145
1	90	0.090	4.0	0.602	1.786	61	1.844	70
1	93	0.093	3.0	0.477	1.926	84	1.976	95
1	97	0.097	4.0	0.602	1.786	61	1.844	70
1	100	0.100	3.0	0.477	1.926	84	1.976	95

Notes:

1. CBR calculated based on Webster et al, 1992.

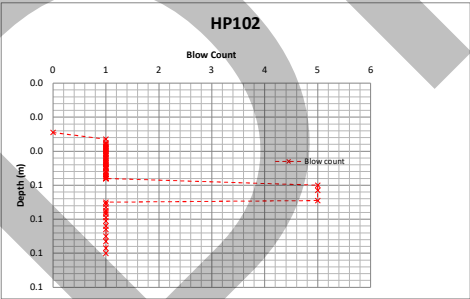
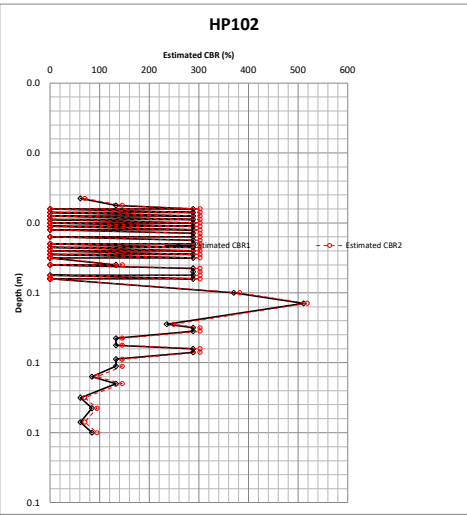
2. CBR calculated based on DMRB, 2008.

Reference:

-Webster S, Grau R and Williams T. 1992. Description and Application of Dual Mass Dynamic Cone Penetrometer.

Dept of Army Waterways Equipment Station, Instruction rpt GL-92.3.

-Highways Agency, 2008. Design Manual for Roads and Bridges (DMRB), Data for Pavement Assessment. HD29/08.



RESULTS OF DYNAMIC CONE PENETROMETER (DCP) TESTING

Project:	Ropemaker	Date of Test:	12-Feb-26
Project No.	B088474	Soil type:	CLAY
Test No.	HP103	Soil condition:	Unsaturated
Test Depth (Top)	0.36m bgl	Operator:	LW

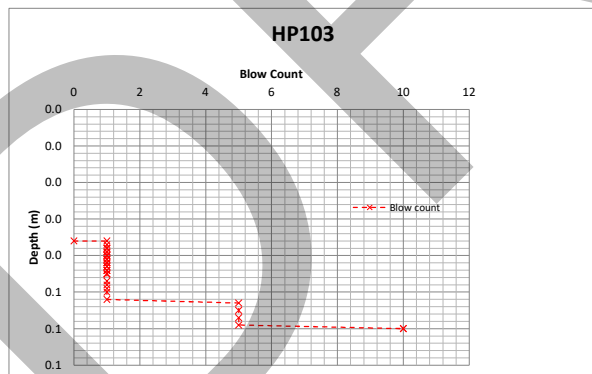
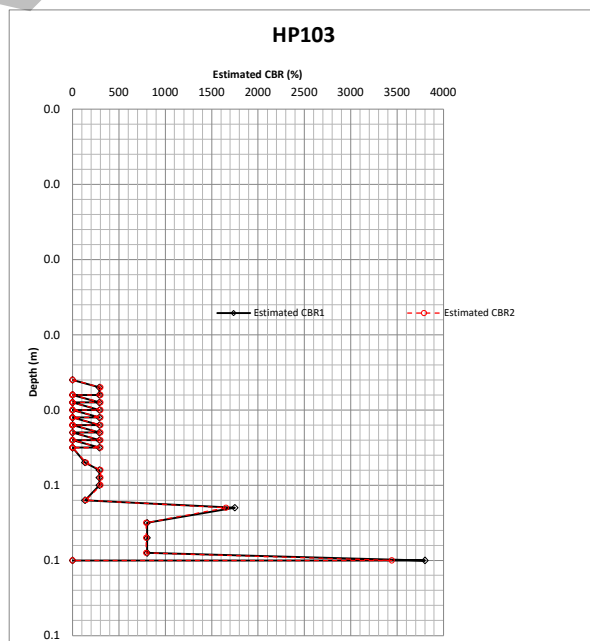
Blow count	Penetration (mm)	Penetration (m)	Penetration Index (DPI) mm/blow	log DPI	log CBR	Estimated CBR1 (%) ¹	log CBR	Estimated CBR2 (%) ²
0	36	0.036						
1	36	0.036	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	37	0.037	1.0	0.000	2.460	288	2.480	302
1	38	0.038	1.0	0.000	2.460	288	2.480	302
1	38	0.038	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	38	0.038	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	39	0.039	1.0	0.000	2.460	288	2.480	302
1	39	0.039	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	39	0.039	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	40	0.040	1.0	0.000	2.460	288	2.480	302
1	40	0.040	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	40	0.040	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	41	0.041	1.0	0.000	2.460	288	2.480	302
1	41	0.041	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	41	0.041	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	42	0.042	1.0	0.000	2.460	288	2.480	302
1	42	0.042	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	42	0.042	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	42	0.042	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	43	0.043	1.0	0.000	2.460	288	2.480	302
1	43	0.043	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	44	0.044	1.0	0.000	2.460	288	2.480	302
1	44	0.044	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	44	0.044	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	45	0.045	1.0	0.000	2.460	288	2.480	302
1	45	0.045	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	45	0.045	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	47	0.047	2.0	0.301	2.123	133	2.162	145
1	48	0.048	1.0	0.000	2.460	288	2.480	302
1	49	0.049	1.0	0.000	2.460	288	2.480	302
1	50	0.050	1.0	0.000	2.460	288	2.480	302
1	52	0.052	2.0	0.301	2.123	133	2.162	145
5	53	0.053	0.2	-0.699	3.243	1749	3.219	1655
5	55	0.055	0.4	-0.398	2.906	805	2.901	795
5	57	0.057	0.4	-0.398	2.906	805	2.901	795
5	59	0.059	0.4	-0.398	2.906	805	2.901	795
10	60	0.060	0.1	-1.000	3.580	3802	3.537	3443
10	60	0.060	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!

Notes:

1. CBR calculated based on Webster et al, 1992.
2. CBR calculated based on DMRB, 2008.

Reference:

- Webster S, Grau R and Williams T. 1992. Description and Application of Dual Mass Dynamic Cone Penetrometer. Dept of Army Waterways Equipment Station, Instruction rpt GL-92.3.
- Highways Agency, 2008. Design Manual for Roads and Bridges (DMRB), Data for Pavement Assessment. HD29/08.



Project:	Ropemaker	Date of Test:	12-Feb-26
Project No.	B088474	Soil type:	CLAY
Test No.	HP104	Soil condition:	Unsaturated
Test Depth (Top)	0.43m bgl	Operator:	LW

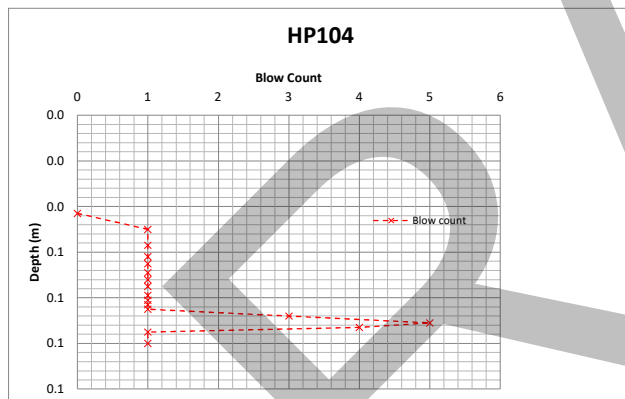
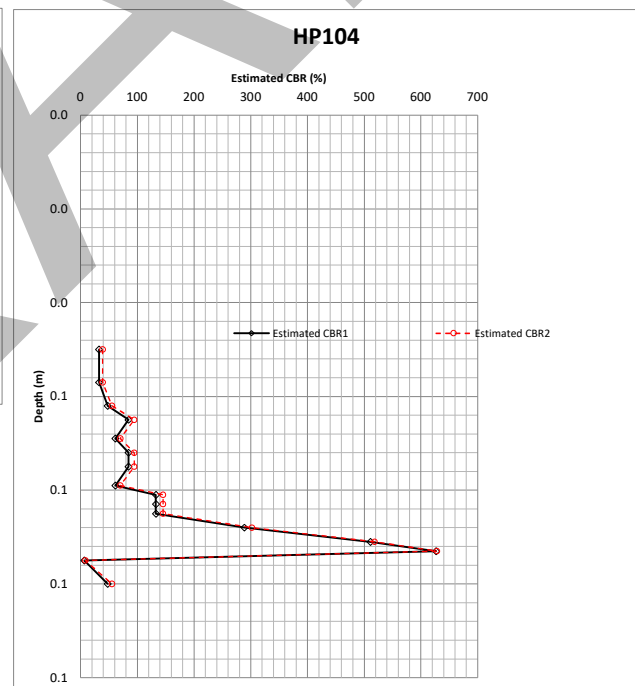
Blow count	Penetration (mm)	Penetration (m)	Penetration Index (DPI) mm/blow	log DPI	log CBR	Estimated CBR1 (%) ¹	log CBR	Estimated CBR2 (%) ²
0	43	0.043						
1	50	0.050	7.0	0.845	1.513	33	1.587	39
1	57	0.057	7.0	0.845	1.513	33	1.587	39
1	62	0.062	5.0	0.699	1.677	48	1.741	55
1	65	0.065	3.0	0.477	1.926	84	1.976	95
1	69	0.069	4.0	0.602	1.786	61	1.844	70
1	72	0.072	3.0	0.477	1.926	84	1.976	95
1	75	0.075	3.0	0.477	1.926	84	1.976	95
1	79	0.079	4.0	0.602	1.786	61	1.844	70
1	81	0.081	2.0	0.301	2.123	133	2.162	145
1	83	0.083	2.0	0.301	2.123	133	2.162	145
1	85	0.085	2.0	0.301	2.123	133	2.162	145
3	88	0.088	1.0	0.000	2.460	288	2.480	302
5	91	0.091	0.6	-0.222	2.708	511	2.714	518
4	93	0.093	0.5	-0.301	2.797	627	2.798	628
1	95	0.095	30.0	1.477	0.806	6	0.919	8
1	100	0.100	5.0	0.699	1.677	48	1.741	55

Notes:

1. CBR calculated based on Webster et al, 1992.
2. CBR calculated based on DMRB, 2008.

Reference:

- Webster S, Grau R and Williams T. 1992. Description and Application of Dual Mass Dynamic Cone Penetrometer. Dept of Army Waterways Equipment Station, Instruction rpt GL-92-3.
- Highways Agency, 2008. Design Manual for Roads and Bridges (DMRB), Data for Pavement Assessment. HD29/08.



Project:	Ropemaker	Date of Test:	12-Feb-26
Project No.	B088474	Soil type:	CLAY
Test No.	HP105	Soil condition:	Unsaturated
Test Depth (Top)	0.45m bgl	Operator:	LW

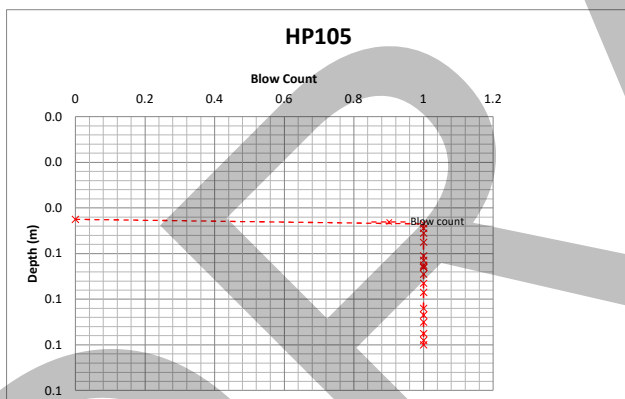
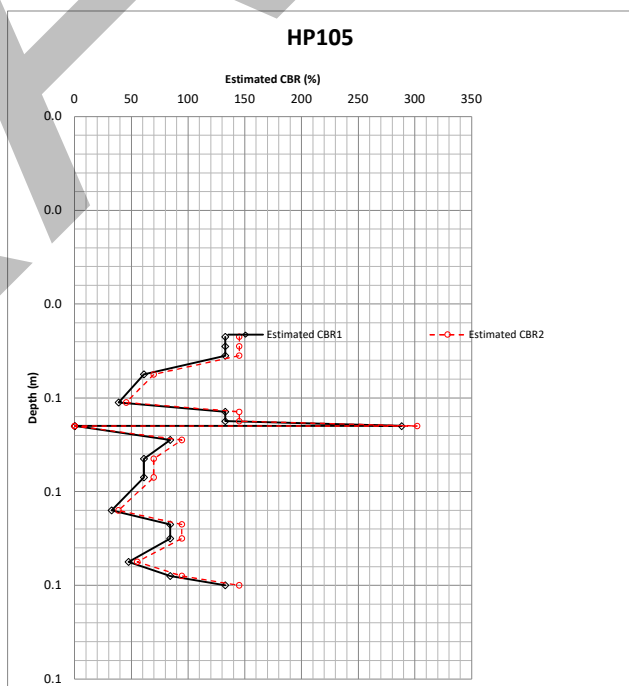
Blow count	Penetration (mm)	Penetration (m)	Penetration Index (DPI) mm/blow	log DPI	log CBR	Estimated CBR1 (%) ¹	log CBR	Estimated CBR2 (%) ²
0	45	0.045						
1	47	0.047	2.0	0.301	2.123	133	2.162	145
1	49	0.049	2.0	0.301	2.123	133	2.162	145
1	51	0.051	2.0	0.301	2.123	133	2.162	145
1	55	0.055	4.0	0.602	1.786	61	1.844	70
1	61	0.061	6.0	0.778	1.588	39	1.657	45
1	63	0.063	2.0	0.301	2.123	133	2.162	145
1	65	0.065	2.0	0.301	2.123	133	2.162	145
1	66	0.066	1.0	0.000	2.460	288	2.480	302
1	66	0.066	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	66	0.066	0.0	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
1	69	0.069	3.0	0.477	1.926	84	1.976	95
1	73	0.073	4.0	0.602	1.786	61	1.844	70
1	77	0.077	4.0	0.602	1.786	61	1.844	70
1	84	0.084	7.0	0.845	1.513	33	1.587	39
1	87	0.087	3.0	0.477	1.926	84	1.976	95
1	90	0.090	3.0	0.477	1.926	84	1.976	95
1	95	0.095	5.0	0.699	1.677	48	1.741	55
1	98	0.098	3.0	0.477	1.926	84	1.976	95
1	100	0.100	2.0	0.301	2.123	133	2.162	145

Notes:

1. CBR calculated based on Webster et al, 1992.
2. CBR calculated based on DMRB, 2008.

Reference:

- Webster S, Grau R and Williams T. 1992. Description and Application of Dual Mass Dynamic Cone Penetrometer. Dept of Army Waterways Equipment Station, Instruction rpt GL-92-3.
- Highways Agency, 2008. Design Manual for Roads and Bridges (DMRB), Data for Pavement Assessment. HD29/08.



395675N

395650N

395625N

395600N

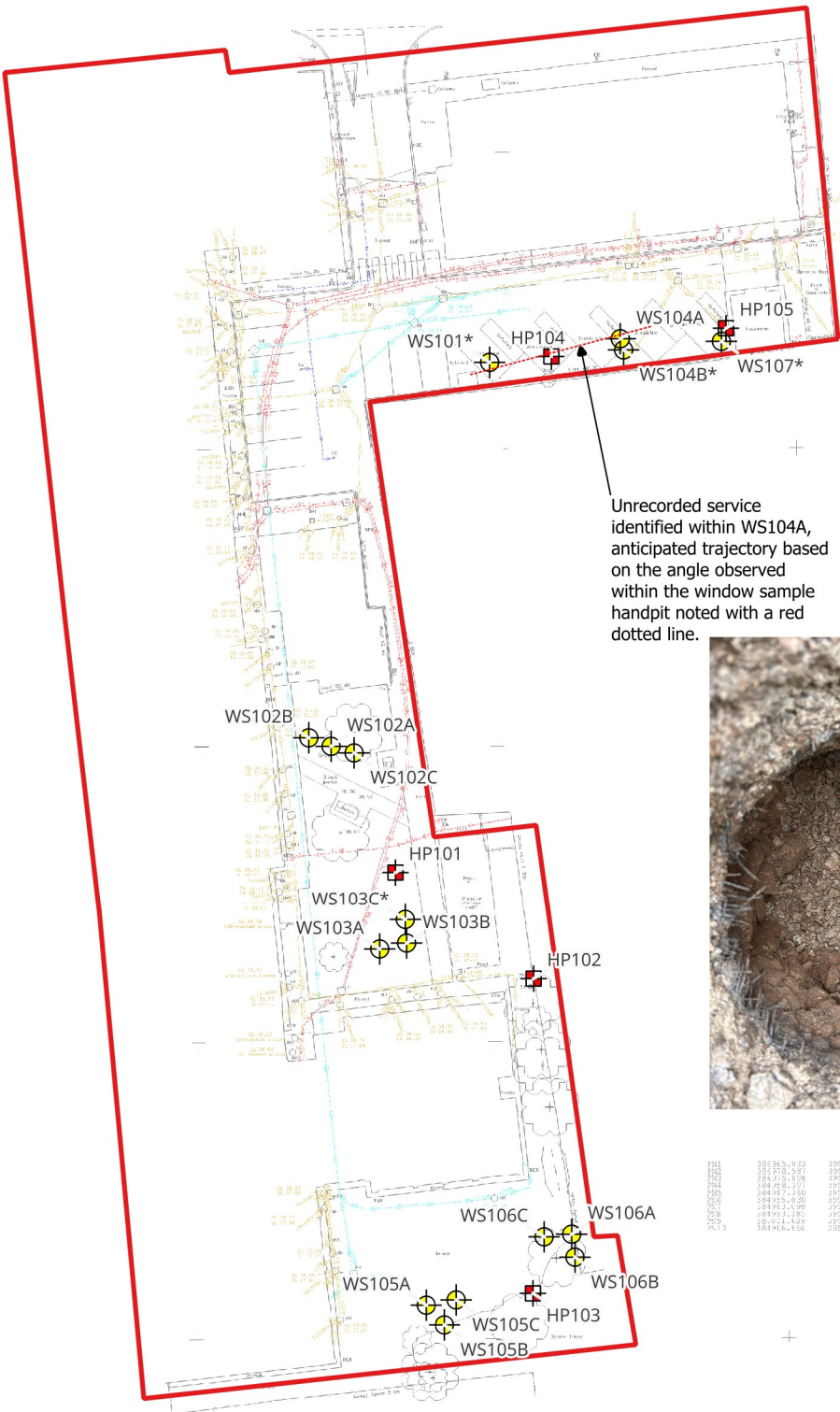
395575N

395675N

395650N

395575N

395575N



Unrecorded service identified within WS104A, anticipated trajectory based on the angle observed within the window sample handpit noted with a red dotted line.



PN1	301945.873	395572.448	28.624
PN2	301970.557	395586.381	28.588
PN3	302075.378	395602.307	28.578
PN4	304258.377	395608.308	28.525
PN5	304267.130	395608.308	28.522
PN6	304225.020	395629.722	28.556
PN7	304062.140	395638.170	28.588
PN8	304952.185	395669.880	28.161
PN9	305022.428	395688.880	28.103
PN10	304966.666	395681.120	28.267

Legend

Exploratory Positions

- Hand Excavated Pits with TRL Probes
- Window Sample Boreholes
- * denotes a monitoring well installation

692336 Ropemaker Court, Manchester
Utilities Survey-A0 1-200

GENERAL 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 AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED/VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- FOR GENERAL NOTES REFER TO DRAWING.

Curtins

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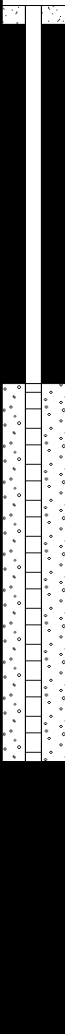
Structures - Civils - Environmental - Infrastructure - Transport Planning - Sustainability - Expert Advisory Services
Birmingham - Bristol - Cardiff - Douglas - Edinburgh - Kendal - Leeds - Liverpool - London - Manchester

Status	INFORMATION			
Project:	ROPEMAKER			
Drg Title:	Exploratory Hole Location Plan with Utilities Plan			
Scale:	NTS	Size:	A3	Issue Date:
				18/02/2026
Drawn:	LW	Checked:	JL	
Drg No:	088474-CUR-XX-XX-D-GE-80003			Rev:
				P02

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Map data ©2026 Google

Project Name: Ropemaker
Project No. B088474
Co-ords: 384975.85 - 395658.34
Location: Manchester
Level: 38.11
Client: Ropemaker Propco Ltd
Dates: 11/02/2026 - 11/02/2026

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.24	37.87		MADE GROUND: Black/dark grey tarmac with concrete inclusions.
		0.50	ES		0.35	37.76		MADE GROUND: Yellowish grey sandy gravel underlain by a geotextile membrane. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.
					0.84	37.27		MADE GROUND: Dark brown slightly sandy gravelly clay with a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone, brick, slate and ceramic.
		1.20		N=17 (3,4/4,4,4,5)	1.15	36.96		MADE GROUND: Yellowish grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone and sandstone.
		2.00		N=20 (3,3/4,5,5,6)				Firm becoming stiff, brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded of sandstone, mudstone and coal.
		2.00 - 2.45	D					
		3.00		N=24 (3,3/5,5,7,7)				
		3.00 - 3.45	D					
		4.00		N=21 (4,4/4,5,5,7)				
		5.00		N=23 (4,4/5,5,6,7)				
					5.45	32.66		
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
			</					

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Ground surface broken via breaker. Hand excavated pit beneath the hardstanding to 1.20m bgl. Perched water encountered at 0.80m bgl, described as a slow seepage. Borehole completed at 5.45m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384957.29 - 395625.88

Hole Type
WS

Location: Manchester

Level: 44.84

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10	ES		0.18 0.32 0.33	44.66 44.52 44.51		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of metal, brick, slate, quartzite and ceramic. Cobbles are subangular of brick. MADE GROUND: Dark grey and grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, quartzite and brick. MADE GROUND: Concrete. End of borehole at 0.33 m	1 2 3 4 5 6 7 8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.33m bgl upon which a concrete obstruction was encountered. Perched water encountered at 0.20m bgl, described as a slow seepage. Exploratory hole location terminated at 0.33m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384958.96 - 395625.54

Hole Type
WS

Location: Manchester

Level: 43.84

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	▼				0.16 0.25 0.26	43.68 43.59 43.58		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of metal, brick, slate, quartzite and ceramic. Cobbles are subangular of brick. MADE GROUND: Dark grey and grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, quartzite and brick. MADE GROUND: Concrete. End of borehole at 0.26 m	1 2 3 4 5 6 7 8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.26m bgl upon which a concrete obstruction was encountered. Perched water encountered at 0.21m bgl, described as a slow seepage. Exploratory hole location terminated at 0.26m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384956.26 - 395627.04

Hole Type
WS

Location: Manchester

Level: 43.36

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.18	43.18		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of metal, brick, slate, quartzite and ceramic. Cobbles are subangular of brick.	1
					0.35	43.01			
					0.36	43.00			
								MADE GROUND: Dark grey and grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to angular of limestone, quartzite and brick.	
								MADE GROUND: Concrete. End of borehole at 0.36 m	
									2
									3
									4
									5
									6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.36m bgl upon which a concrete obstruction was encountered. Perched water encountered at 0.24m bgl, described as a slow seepage. Exploratory hole location terminated at 0.36m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384968.68 - 395606.51

Hole Type
WS

Location: Manchester

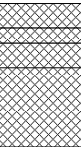
Level: 38.45

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.65	ES		0.13	38.32		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite and ceramic. Cobbles are subangular of brick.	
					0.21	38.24			
		0.65	ES		0.34	38.11		MADE GROUND: Grey sandy gravel. Sand is fine to coarse. Gravel is fine to medium, subangular of limestone, quartzite and brick.	1
					0.76	37.69			
		0.65	ES		0.77	37.68		MADE GROUND: Brown gravelly clay. Gravel is fine to coarse, subangular of brick, slate and ceramic.	2
								MADE GROUND: Black/dark greyish brown sandy ashy clayey gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slag, metal, concrete, quartzite and charcoal.	
		0.65	ES					From 0.34m - 0.77m bgl: slight hydrocarbon odour.	3
								MADE GROUND: Concrete.	
		0.65	ES					End of borehole at 0.77 m	4
		0.65	ES						5
		0.65	ES						6
		0.65	ES						7
		0.65	ES						8

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.77m bgl upon which a concrete obstruction was encountered. No groundwater encountered. Exploratory hole location terminated at 0.77m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384966.26 - 395606.31

Hole Type
WS

Location: Manchester

Level: 38.45

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.11	38.34		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite and ceramic. Cobbles are subangular of brick.	
					0.23	38.22			
					1.09	37.36		MADE GROUND: Grey sandy gravel. Sand is fine to coarse. Gravel is fine to medium, subangular of limestone, quartzite and brick.	1
					1.10	37.35			
								MADE GROUND: Black/dark greyish brown sandy ashy clayey gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slag, metal, concrete, quartzite and charcoal. <i>From 0.23m - 1.10m bgl: slight hydrocarbon odour.</i>	2
								MADE GROUND: Concrete. End of borehole at 1.10 m	3
									4
									5
									6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 1.10m bgl upon which a concrete obstruction was encountered. No groundwater encountered. Exploratory hole location terminated at 1.10m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384968.42 - 395607.89

Hole Type
WS

Location: Manchester

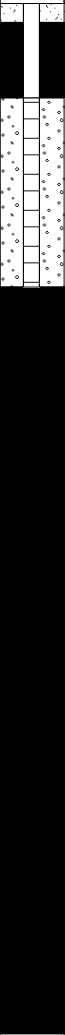
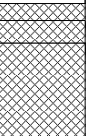
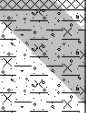
Level: 38.42

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 11/02/2026 - 11/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.09 0.21			0.09 0.21	38.33 38.21		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite and ceramic. Cobbles are subangular of brick.	
		1.20		N=1 (1,0/1,0,0,0)				MADE GROUND: Grey sandy gravel. Sand is fine to coarse. Gravel is fine to medium, subangular of limestone, quartzite and brick.	1
		2.00 2.00 - 2.45		N=7 (1,0/0,2,2,3)				MADE GROUND: Black/dark greyish brown sandy ashy clayey gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slag, metal, concrete, quartzite and charcoal. <i>From 0.21m - 1.70m bgl: slight hydrocarbon odour.</i>	
		3.00		N=30 (4,4/6,7,8,9)				Firm becoming stiff, brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded of sandstone, mudstone and coal.	2
		4.00 4.00 - 4.45		N=24 (5,5/5,6,6,7)					3
		5.00		N=25 (5,5/6,6,6,7)					4
		5.45			5.45	32.97		End of borehole at 5.45 m	5
									6
									7
									8

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 1.20m bgl. No groundwater encountered. Borehole completed at 5.45m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384989.39 - 395659.91

Hole Type
WS

Location: Manchester

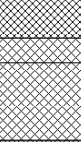
Level: 38.05

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.21	37.84		MADE GROUND: Black/dark grey tarmac.	
					0.34	37.71		MADE GROUND: Yellowish grey sandy gravel underlain by a geotextile membrane. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.	
					0.75	37.30		MADE GROUND: Yellowish grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone and sandstone.	
					0.76	37.29		UNRECORDED SERVICE End of borehole at 0.76 m	
									1
									2
									3
									4
									5
									6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Ground surface broken via breaker. Hand excavated pit beneath the hardstanding to 0.76m bgl upon a ceramic pipe was encountered. Exploratory hole position terminated due to unrecorded service.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384989.39 - 395660.00

Hole Type
WS

Location: Manchester

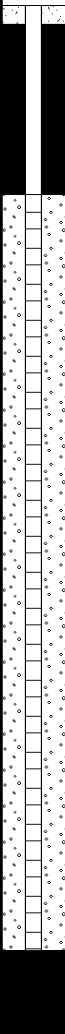
Level: 38.05

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.21	37.84		MADE GROUND: Black/dark grey tarmac.	
					0.34	37.71		MADE GROUND: Yellowish grey sandy gravel underlain by a geotextile membrane. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.	
		1.00	ES		0.90	37.15		MADE GROUND: Yellowish grey sandy gravel. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone and sandstone.	1
		1.20		N=16 (4,4/4,4,4,4)				Firm becoming stiff, brown mottled grey slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded of sandstone, mudstone and coal.	
		2.00		N=20 (3,3/4,5,5,6)					2
		3.00		N=21 (2,2/5,5,5,6)					3
		4.00		N=27 (3,4/5,7,7,8)					4
		4.00 - 4.45	D						
		5.00		N=27 (4,4/6,6,7,8)					5
		5.00 - 5.45	D		5.45	32.60		End of borehole at 5.45 m	6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Ground surface broken via breaker. Hand excavated pit beneath the hardstanding to 1.20m bgl. No groundwater encountered. Borehole completed at 5.45m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384969.93 - 395577.69

Hole Type
WS

Location: Manchester

Level: 38.50

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	▼				0.49 0.50	38.01 38.00		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite, broken glass and ceramic. Cobbles are subangular of brick. MADE GROUND: Metal plate obstruction. End of borehole at 0.50 m	1
									2
									3
									4
									5
									6
									7
									8

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.50m bgl upon which a metal obstruction (flat surface) was encountered. Perched water encountered at 0.49m bgl, described as a slow seepage. Exploratory hole location terminated at 0.50m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384969.00 - 395578.00

Hole Type
WS

Location: Manchester

Level: 38.50

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	▼				0.46 0.47	38.04 38.03		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite, broken glass and ceramic. Cobbles are subangular of brick. MADE GROUND: Metal plate obstruction. End of borehole at 0.47 m	1 2 3 4 5 6 7 8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.47m bgl upon which a metal obstruction (flat surface) was encountered. Perched water encountered at 0.46m bgl, described as a slow seepage. Exploratory hole location terminated at 0.47m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384978.95 - 395583.56

Hole Type
WS

Location: Manchester

Level: 38.62

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15	ES		0.25	38.37		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite, broken glass and ceramic. Cobbles are subangular of brick. MADE GROUND: Black tarmac underlain by concrete. End of borehole at 0.26 m	1
					0.26	38.36			2
									3
									4
									5
									6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.26m bgl upon which a concrete obstruction was encountered. No groundwater encountered. Exploratory hole location terminated at 0.26m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384979.00 - 395586.00

Hole Type
WS

Location: Manchester

Level: 38.62

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.21 0.22	38.41 38.40		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite, broken glass and ceramic. Cobbles are subangular of brick. MADE GROUND: Black tarmac underlain by concrete. End of borehole at 0.22 m	1
									2
									3
									4
									5
									6
									7
									8

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.22m bgl upon which a concrete obstruction was encountered. No groundwater encountered. Exploratory hole location terminated at 0.22m bgl.



Project Name: Ropemaker

Project No.
B088474

Co-ords: 384978.00 - 395585.00

Hole Type
WS

Location: Manchester

Level: 38.62

Scale
1:40

Client: Ropemaker Propco Ltd

Dates: 12/02/2026 - 12/02/2026

Logged By
LW

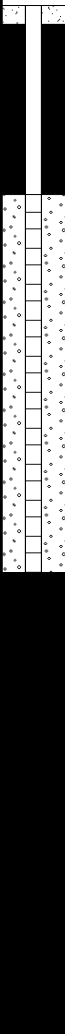
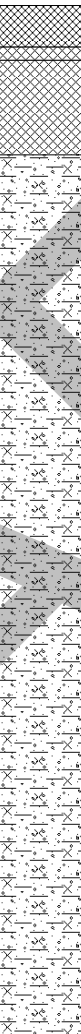
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.32 0.33	38.30 38.29		MADE GROUND TOPSOIL: Grass over black slightly clayey gravelly sand with frequent rootlets and a low cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular of brick, slate, quartzite, broken glass and ceramic. Cobbles are subangular of brick. MADE GROUND: Black tarmac underlain by concrete. End of borehole at 0.33 m	1
									2
									3
									4
									5
									6
									7
									8

Remarks

Position GPR cleared by specialist subcontractor prior to excavation. Hand excavated to 0.33m bgl upon which a concrete obstruction was encountered. No groundwater encountered. Exploratory hole location terminated at 0.33m bgl.



Project Name: Ropemaker
Project No. B088474
Co-ords: 384993.52 - 395659.20
Location: Manchester
Level: 38.04
Client: Ropemaker Propco Ltd
Dates: 12/02/2026 - 12/02/2026

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.22	37.82		MADE GROUND: Black/dark grey tarmac.	
					0.29	37.75		MADE GROUND: Yellowish grey sandy gravel underlain by a geotextile membrane. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of limestone.	
		0.50	ES					MADE GROUND: Brown sandy gravelly clay with a medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded of brick, slate, ceramic, charcoal and broken glass. Cobbles are subangular of ceramic and whole brick.	1
		1.20		N=14 (2,2/3,3,4,4)				Stiff brown mottled grey slightly sandy slightly gravelly slightly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, subrounded of sandstone, mudstone, coal and quartz.	
		1.20 - 1.65	D						
		2.00		N=20 (2,3/4,5,5,6)					2
		3.00		N=20 (2,3/4,5,5,6)					
		3.00 - 3.45	D						3
		4.00		N=27 (3,4/5,6,7,9)					4
		5.00		N=25 (4,5/5,6,6,8)					5
					5.45	32.59		End of borehole at 5.45 m	6
									7
									8

Remarks
Position GPR cleared by specialist subcontractor prior to excavation. Ground surface broken via breaker. Hand excavated pit beneath the hardstanding to 1.20m bgl. Perched water encountered at 0.75m bgl, described as a slow seepage. Borehole completed at 5.45m bgl.



Appendix D – Flood Map for Planning

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
384966/395632

Created
9 March 2026 14:48

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)

384966/395632

Scale

1:2,500

Created

9 Mar 2026 14:48

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



0 20 40 60m

Appendix E– United Utilities PDE Response

Marta Wolska

From: seweradoptions@uuplc.co.uk
Sent: 12 February 2026 10:35
To: Marta Wolska
Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Hi Martha,

Yes, the additional 5 l/s is acceptable.

Regards,



James Darlington
Developer Engineer
Developer Services & Metering
T: 07917096253
unitedutilities.com

If you have received a great service today why not tell us?

Visit: [//unitedutilities.com/wow](http://unitedutilities.com/wow)

If you are happy with the service we have provided, please consider submitting a nomination in the following link – this only takes a moment and would be greatly appreciated: unitedutilities.com/wow

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

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 05/02/2026 13:23
To: marta.wolska@curtins.com
Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good Afternoon

Your enquiry has been logged and sent to our engineer James Darlington. Our service Level agreement is to respond to you within 10 working days.

Many thanks



Laura Owens
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

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



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

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

From: Marta Wolska [marta.wolska@curtins.com]

Sent: 05/02/2026 10:09

To: seweradoptions@uuplc.co.uk

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Hi James

Just to clarify

The connection is to an existing private combined drainage system located after the existing surface water hydrobrake, which restricts flow to 86 l/s. The development will contribute an additional 5 l/s to this flow as new drainage with attenuation will be connected downstream of the existing private surface water drainage. Is that acceptable?

Kind regards

Marta Wolska
Principal Civil Engineer

Tel: 0161 236 2394
Mob: 07842 414 675
marta.wolska@curtins.com
curtins.com

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>

Sent: 05 February 2026 08:35

To: Marta Wolska <marta.wolska@curtins.com>

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good morning Martha,

The flow rate of 5 l/s for the new extension is acceptable as you are adding it to the existing sewers on site.

Regards,

[Image is no longer available]

James Darlington
Developer Engineer
Developer Services & Metering
T: 01925 429095
unitedutilities.com

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Visit: [//unitedutilities.com/wow](http://unitedutilities.com/wow)

If you are happy with the service we have provided, please consider submitting a nomination in the following link – this only takes a moment and would be greatly appreciated: unitedutilities.com/wow

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

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 28/01/2026 16:50

To: marta.wolska@curtins.com

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good Afternoon

Your enquiry has been logged and sent to our engineer James Darlington. Our service Level agreement is to respond to you within 10 working days.

Many thanks



Laura Owens
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

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



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

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

From: Marta Wolska [marta.wolska@curtins.com]

Sent: 28/01/2026 16:04

To: seweradoptions@uuplc.co.uk

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Dear Sir/ Madam

I need further clarification on surface water acceptable flow rates

Existing drainage and new building above car park- already existing flow restriction 86l/s

I have used the archived drainage drawing for a preliminary surface water assessment. The existing site currently discharges surface water at 86 l/s. The proposed new building is located above the existing car park above the ex-surface water pipe and the existing two 900 mm attenuation pipes. The attenuation volume will be relocated, but our plan is to maintain the existing flow rates from the already restricted areas

New impermeable areas 5l/s

The gym and external patio area represent additional impermeable surfaces that will require attenuation. The existing private drainage system may not have sufficient capacity to accommodate these new areas, Therefore, it is proposed that surface water from the new gym be discharged to the permeable pavement subbase, where it will be attenuated, with a flow restriction installed before discharge into the existing private combined drainage system. So it is proposed to discharge 5l/s for new impermeable areas to public sewer.

Could you please let me know if that would be acceptable?

Marta Wolska
Principal Civil Engineer

Tel: 0161 236 2394
Mob: 07842 414 675
marta.wolska@curtins.com
curtins.com

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 14 January 2026 10:41
To: Jacob Collin <Jacob.Collin@curtins.com>
Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good morning Jacob,

Please find attached the PDE response and guidance.

Regards,

[Image is no longer available]

James Darlington
Developer Engineer
Developer Services & Metering
T: 01925 429095
unitedutilities.com

If you have received a great service today why not tell us?
Visit: [//unitedutilities.com/wow](http://unitedutilities.com/wow)

If you are happy with the service we have provided, please consider submitting a nomination in the following link – this only takes a moment and would be greatly appreciated: unitedutilities.com/wow

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

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 12/01/2026 09:48
To: jacob.collin@curtins.com
Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good Morning,

PROPOSED PRE DEVELOPMENT AT 500 Moss Ln E, Manchester, M14 4PL - UU Ref – 08648433.

Thank you for your **bacs** payment for £565.55 received 09.01.25. Your application has now been processed and passed to our Engineer.

We will respond within the next 10 working days, please feel free to contact us if you need anything.

Kind regards



Laura Owens
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

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



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

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

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 05/01/2026 09:02

To: jacob.collin@curtins.com

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Hi Jacob

Please see attached as requested.

Kind Regards,



Laura Owens
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

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



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

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

From: Jacob Collin [jacob.collin@curtins.com]

Sent: 05/01/2026 08:53

To: seweradoptions@uuplc.co.uk

Subject: RE: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good morning,

Could you please provide me with a payment request letter I can pass onto our payments team?

Kind regards,

Jacob Collin
Civil Engineer

Tel: 0161 236 2394
jacob.collin@curtins.com
curtins.com

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>

Sent: 24 December 2025 08:15

To: Jacob Collin <Jacob.Collin@curtins.com>

Cc: Philip Barrett <Philip.Barrett@curtins.com>

Subject: UU REF: 08648433 - Pre-development Enquiry - 500 Moss Ln E, Manchester, M14 4PL

Good Morning,

PRE DEVELOPMENT APPLICATION AT: 500 Moss Ln E, Manchester, M14 4PL – UU Ref 08648433.

Thank you for your application submitted on 23.12.25 for the above development. We have now

logged this on our system under reference 08648433. Please use this reference in any future correspondence.

I have reviewed your application and attachments and can confirm we have received all necessary documents.

Before we can proceed with passing this to our Engineering Team, we kindly ask that you submit a payment of £565.55. This can be made via BACS to the account below, using reference 08648433.

NatWest Sort Code: 01-09-17
NatWest Account Number: 58934014
Account Name: UUW Sundry Debtors Receipts

Alternatively, please call us on 0345 026 8989 to make payment over the phone.

Please note that until payment is received your application will not be progressed.

If you have any questions, feel free to reach out.

Kind regards



Laura Owens
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 0345 026 8989
unitedutilities.com

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



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

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

From: Jacob Collin [jacob.collin@curtins.com]
Sent: 23/12/2025 15:54
To: wastewaterdeveloperservices@uuplc.co.uk

Cc: philip.barrett@curtins.com

Subject: Pre-development Enquiry - Ropemaker, M14 4PL

Good afternoon,

I am currently working on a brownfield site at Ropemaker Student Accommodation, 500 Moss Ln E, Manchester, M14 4PL, (x: 384946, y: 395637). See attached location plan for exact location.

The current proposals are for the renovation and extension of an existing student accommodation. The site area is approximately 0.48 Hectares.

Could you please respond to below queries so that we will be able to progress the design.

Surface Water Proposals

The existing building currently discharges via a hydrobrake at an unknown restricted discharge rate with on-site attenuation for additional flows.

The existing impermeable area is 3156m². The proposals are to increase the impermeable area by 334m² (increase of 10%).

The increase in impermeable area does not pose any flood risk.

It is proposed to maintain the existing outfall and restricted discharge rate. The on-site attenuation will be increased to accommodate additional flows.

Foul Water Proposals

It is proposed to reuse the existing private foul network and connection to the public combined sewer. Foul water is to discharge at an unrestricted rate.

Both the foul and surface water networks discharge to the public combined sewer within Heald Grove.

Could you please advise whether the above proposals are acceptable?

A pre-development enquiry has also been sent to Manchester City Council acting as the LLFA.

Please see attached the Pre-Development Enquiry form, Existing Drainage Plan, Proposed Drainage Strategy, Site Location Plan, Topographical Survey and GPR Survey.

Should you have any questions, please do not hesitate to contact me.

Kind regards,

Jacob Collin

Civil Engineer

Tel: 0161 236 2394
jacob.collin@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester, M1 5WG
curtins.com

[Image is no longer available]

[Image is no longer available] [Image is no longer available]

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

14.01.26

Dear Jacob

Pre-Development Enquiry for 500 Moss Ln E, Manchester, M14 4PL, UU Reference Number:
08648433

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

Modelled Flood Risk

[Please see the image on page 3 for details](#)

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

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

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

Asset Protection

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

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

Foul Water

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

Our preferred point of discharge would be to the existing drainage on site of your proposed development at an unrestricted rate.

[Please see the images on page 3 for clarification](#)

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

WASTEWATER PRE-DEVELOPMENT ENQUIRY



Appendix F – Proposed Drainage Strategy



- DESIGN PHILOSOPHY**
SURFACE WATER DESIGN
 THE DESIGN PROVIDES CAPACITY UP TO THE 100 YEAR 45% CLIMATE CHANGE EVENT.
 LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.
 INFILTRATION IS NOT CONSIDERED APPROPRIATE FOR THIS SCHEME.
- SW FLOW RATE:**
- SYSTEM A NEW PAVILION LOCATED WITHIN EXISTING CAR PARK, CONNECTED TO EXISTING FLOW CONTROL,
 - SYSTEM B- GYM -NEW EXTERNALS SUS (AGREED WITH UU)
 STORAGE REQUIREMENT: PERMEABLE PAVING SUB-BASE
 OUTFALL TO PRIVATE COMBINED DRAINAGE ON SITE
 POLLUTION TREATMENT: PERMEABLE PAVING
 SUSTAINABLE DRAINAGE: PERMEABLE PAVING
- FOUL WATER DESIGN**
 FW PEAK FLOW RATE: TBC
 OUTFALL: PRIVATE COMBINED DRAINAGE ON SITE
 LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

<p>"RESIDUAL HAZARD REGISTER (RELATES TO CIVIL/STRUCTURAL MATTERS ONLY)" MUST BE READ IN CONJUNCTION WITH CURTINS RESIDUAL HAZARD REGISTER XXXXX-CUR-ZZ-XX-HA-X-00001. HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS."</p>			
Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Mitigation
2.00 Side Wide Issues			
2.01	Existing buildings	Damage to existing buildings or disruption to building occupants during construction	Liaison between contractor and neighbouring building owners and users. Contractor to agree working hours and method statements. Contractor to erect appropriate barriers and hoardings to protect occupants against interaction with works. additional access routes to be considered to separate occupants and construction staff. the principal contractor must ensure that existing land/assets are not undermined during construction.
3.00 Existing Buried & Overhead Services			
3.01	Unknown buried services	Existing Live Services - particularly if services are to be retained through development.	Carry out additional surveys and investigations to locate and protect the services in co-ordination with Services Engineer/Statutory Undertakers.
5.00 Excavations and Foundations			
5.01	Presence of foundations to demolished structures	Unknown size and location presents risk during substructure works	Carry our trial pits to existing facades

Manhole schedule - Combined																
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	D5 PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS
C01	38.38	36.65	1.43	300	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;
C02	38.17	37.25	0.82	300	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;
Manhole schedule - Foul																
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	D5 PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS
F01	38.50	37.50	0.90	300	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;
Manhole schedule - Surface Water																
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (mAOD)	D5 PIPE DIA (mm)	MH DIA (mm)	MH TYPE	CATCHPIT	CATCHPIT DEPTH (mm)	COVER SIZE (mm)	COVER CLASS	COVER TYPE	RECESSED	BACK DROP	Back drop IL (m)	RESTRICTED ACCESS	COMMENTS
S1	38.17	37.15	0.72	300	600	PPIC	N	N/A	600x600	C250	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;
S2	38.38	37.09	0.79	300	600	PPIC	N	N/A	600x600	C250	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;
S3	38.18	36.61	1.27	300	600	PPIC	N	N/A	600x600	C250	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;
S4	38.48	37.30	1.23	150	1500	TYPE C	Y	TBC BY MANUFACTURER	1200X675	C250	SINGLE SEALED	Y	N	N/A	N	RESTRICTED ACCESS: FLOW CONTROL MANHOLE
S4a	38.50	37.40	0.95	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;
S4b	38.52	37.63	0.74	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;
S4c	38.52	37.46	0.91	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	N	UNRESTRICTED;
S4d	38.52	37.35	1.02	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	N	N	N/A	N	UNRESTRICTED;
S4e	38.52	37.25	1.12	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;
S4f	38.52	37.15	1.22	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	Y	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;
S5	38.46	36.86	1.45	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;
S5a	38.46	36.91	1.40	150	450	PPIC	N	N/A	450x450	C250	SINGLE SEALED	N	N	N/A	Y	RESTRICTED ACCESS: 80mm DIA MAX;

- | | | | | |
|------|---|----------|-----|----------|
| P05 | SMA EXTENTS ADDED | 14/05/26 | JC | ATL |
| P04 | DRAINAGE UPDATED TO AVOID ROOT PROTECTION AREAS | 01/05/26 | ATL | PB |
| P03 | STAGE 3 ISSUE | 10/04/26 | ATL | PB |
| P02 | ISSUED FOR PLANNING | 17/03/26 | JC | MW |
| P01 | ISSUED FOR COMMENTS | 11/03/26 | JC | MW |
| Rev. | Description: | Date: | By: | Checked: |

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

ROPEMAKER

PROPOSED DRAINAGE STRATEGY

Drawn By JC	Designed By MW	Checked By MW
	Date 30/01/2026	Scales @ A1 1:250

088474 - CUR - XX - XX- D - C- 92500	P05
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Appendix G – Existing drainage model

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
EXSW06	0.149	5.00	38.580	1200	384963.148	395580.457	1.120	37.460
EXSW05	0.060	5.00	38.430	1200	384954.052	395658.381	2.100	36.330
EXSWIC01	0.025	5.00	38.180	450	385001.038	395668.814	0.780	37.400
EXSW01	0.025	5.00	38.170	600	384998.597	395665.285	1.100	37.070
EXSW02	0.000		38.140	1200	384989.880	395664.096	1.460	36.680
EXJ1	0.000		38.140		384986.257	395664.710	1.983	36.157
EXSW03	0.027	5.00	38.180	1200	384970.119	395662.683	2.040	36.140
EXCAPP	0.000	5.00	38.180		384985.125	395662.779	2.060	36.120
EXSW04	0.014	5.00	38.190	1800	384967.625	395660.607	2.100	36.090
EXCW06	0.000	5.00	38.260	450	384962.349	395669.812	0.490	37.770
EXCW03	0.011	5.00	38.300	1200	384964.890	395670.774	1.190	37.110
EXCW01	0.000		38.330	1200	384964.589	395661.855	2.140	36.190
EXCW04	0.048	5.00	38.460	450	384961.449	395644.277	0.620	37.840
EXCW02	0.026	5.00	38.300	1200	384961.077	395655.029	2.220	36.080
EXBURIED MH	0.000		38.300	1200	384936.589	395652.826	2.466	35.834
EXOUTFALL (APPROX)	0.000		38.300	1200	384922.044	395651.537	2.612	35.688

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	EXSW06	EXSW05	78.453	0.600	37.460	36.330	1.130	69.4	300	5.69	50.0
1.001	EXSW05	EXSW04	13.754	0.600	36.330	36.284	0.046	300.0	300	5.95	50.0
2.000	EXSWIC01	EXSW01	4.291	0.600	37.400	37.080	0.320	13.4	100	5.03	50.0
2.001	EXSW01	EXSW02	8.798	0.600	37.070	36.730	0.340	25.9	100	5.13	50.0
2.002	EXSW02	EXJ1	3.675	0.600	36.680	36.657	0.023	159.8	150	5.21	50.0
2.003	EXJ1	EXSW03	16.265	0.600	36.157	36.140	0.017	956.8	1050	5.45	50.0
2.004	EXSW03	EXSW04	3.245	0.600	36.140	36.090	0.050	64.9	300	5.48	50.0
3.000	EXCAPP	EXSW04	17.634	0.600	36.120	36.090	0.030	587.8	1050	5.21	50.0
1.002	EXSW04	EXCW02	8.602	0.600	36.090	36.080	0.010	860.2	450	6.16	50.0
4.000	EXCW06	EXCW03	2.717	0.600	37.770	37.160	0.610	4.5	100	5.01	50.0
4.001	EXCW03	EXCW01	8.924	0.600	37.110	36.190	0.920	9.7	150	5.06	50.0
4.002	EXCW01	EXCW02	7.676	0.600	36.190	36.080	0.110	69.8	150	5.16	50.0
5.000	EXCW04	EXCW02	10.758	0.600	37.840	36.280	1.560	6.9	100	5.06	50.0

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	1.889	133.5	20.2	0.820	1.800	0.149	0.0
1.001	0.902	63.8	28.3	1.800	1.606	0.209	0.0
2.000	2.121	16.7	3.4	0.680	0.990	0.025	0.0
2.001	1.523	12.0	6.8	1.000	1.310	0.050	0.0
2.002	0.792	14.0	6.8	1.310	1.333	0.050	0.0
2.003	1.105	957.2	6.8	0.933	0.990	0.050	0.0
2.004	1.954	138.1	10.4	1.740	1.800	0.077	0.0
3.000	1.414	1224.2	0.0	1.010	1.050	0.000	0.0
1.002	0.685	108.9	40.7	1.650	1.770	0.300	0.0
4.000	3.690	29.0	0.0	0.390	1.040	0.000	0.0
4.001	3.254	57.5	1.5	1.040	1.990	0.011	0.0
4.002	1.205	21.3	1.5	1.990	2.070	0.011	0.0
5.000	2.963	23.3	6.5	0.520	1.920	0.048	0.0

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)
1.003	EXCW02	EXBURIED MH	24.587	0.600	36.080	35.834	0.246	100.0	300	6.42	50.0
1.004	EXBURIED MH	EXOUTFALL (APPROX)	14.602	0.600	35.834	35.688	0.146	100.0	300	6.57	50.0

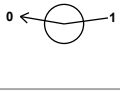
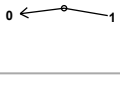
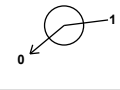
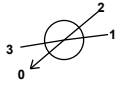
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.003	1.572	111.1	52.2	1.920	2.166	0.385	0.0
1.004	1.572	111.1	52.2	2.166	2.312	0.385	0.0

Pipeline Schedule

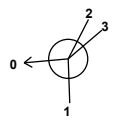
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	78.453	69.4	300	Circular	38.580	37.460	0.820	38.430	36.330	1.800
1.001	13.754	300.0	300	Circular	38.430	36.330	1.800	38.190	36.284	1.606
2.000	4.291	13.4	100	Circular	38.180	37.400	0.680	38.170	37.080	0.990
2.001	8.798	25.9	100	Circular	38.170	37.070	1.000	38.140	36.730	1.310
2.002	3.675	159.8	150	Circular	38.140	36.680	1.310	38.140	36.657	1.333
2.003	16.265	956.8	1050	Circular	38.140	36.157	0.933	38.180	36.140	0.990
2.004	3.245	64.9	300	Circular	38.180	36.140	1.740	38.190	36.090	1.800
3.000	17.634	587.8	1050	Circular	38.180	36.120	1.010	38.190	36.090	1.050
1.002	8.602	860.2	450	Circular	38.190	36.090	1.650	38.300	36.080	1.770
4.000	2.717	4.5	100	Circular	38.260	37.770	0.390	38.300	37.160	1.040
4.001	8.924	9.7	150	Circular	38.300	37.110	1.040	38.330	36.190	1.990
4.002	7.676	69.8	150	Circular	38.330	36.190	1.990	38.300	36.080	2.070
5.000	10.758	6.9	100	Circular	38.460	37.840	0.520	38.300	36.280	1.920
1.003	24.587	100.0	300	Circular	38.300	36.080	1.920	38.300	35.834	2.166
1.004	14.602	100.0	300	Circular	38.300	35.834	2.166	38.300	35.688	2.312

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	EXSW06	1200	Manhole	Adoptable	EXSW05	1200	Manhole	Adoptable
1.001	EXSW05	1200	Manhole	Adoptable	EXSW04	1800	Manhole	Adoptable
2.000	EXSWIC01	450	Manhole	Adoptable	EXSW01	600	Manhole	Adoptable
2.001	EXSW01	600	Manhole	Adoptable	EXSW02	1200	Manhole	Adoptable
2.002	EXSW02	1200	Manhole	Adoptable	EXJ1		Junction	
2.003	EXJ1		Junction		EXSW03	1200	Manhole	Adoptable
2.004	EXSW03	1200	Manhole	Adoptable	EXSW04	1800	Manhole	Adoptable
3.000	EXCAPP		Junction		EXSW04	1800	Manhole	Adoptable
1.002	EXSW04	1800	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
4.000	EXCW06	450	Manhole	Adoptable	EXCW03	1200	Manhole	Adoptable
4.001	EXCW03	1200	Manhole	Adoptable	EXCW01	1200	Manhole	Adoptable
4.002	EXCW01	1200	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
5.000	EXCW04	450	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
1.003	EXCW02	1200	Manhole	Adoptable	EXBURIED MH	1200	Manhole	Adoptable
1.004	EXBURIED MH	1200	Manhole	Adoptable	EXOUTFALL (APPROX)	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
EXSW06	384963.148	395580.457	38.580	1.120	1200				
						0	1.000	37.460	300
EXSW05	384954.052	395658.381	38.430	2.100	1200		1	1.000	36.330
						0	1.001	36.330	300
EXSWIC01	385001.038	395668.814	38.180	0.780	450		0	2.000	37.400
EXSW01	384998.597	395665.285	38.170	1.100	600		1	2.000	37.080
						0	2.001	37.070	100
EXSW02	384989.880	395664.096	38.140	1.460	1200		1	2.001	36.730
						0	2.002	36.680	150
EXJ1	384986.257	395664.710	38.140	1.983			1	2.002	36.657
						0	2.003	36.157	1050
EXSW03	384970.119	395662.683	38.180	2.040	1200		1	2.003	36.140
						0	2.004	36.140	300
EXCAPP	384985.125	395662.779	38.180	2.060			0	3.000	36.120
						1	3.000	36.090	1050
EXSW04	384967.625	395660.607	38.190	2.100	1800		2	2.004	36.090
						3	1.001	36.284	300
						0	1.002	36.090	450
EXCW06	384962.349	395669.812	38.260	0.490	450		0	4.000	37.770
						1	4.000	37.160	100
EXCW03	384964.890	395670.774	38.300	1.190	1200		0	4.001	37.110
EXCW01	384964.589	395661.855	38.330	2.140	1200		1	4.001	36.190
						0	4.002	36.190	150
EXCW04	384961.449	395644.277	38.460	0.620	450		0	5.000	37.840
									100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
EXCW02	384961.077	395655.029	38.300	2.220	1200		1	5.000	36.280	100
							2	4.002	36.080	150
							3	1.002	36.080	450
							0	1.003	36.080	300
EXBURIED MH	384936.589	395652.826	38.300	2.466	1200		1	1.003	35.834	300
							0	1.004	35.834	300
EXOUTFALL (APPROX)	384922.044	395651.537	38.300	2.612	1200		1	1.004	35.688	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	18.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.356	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node EXOUTFALL (APPROX) Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to 100yr+45% CC 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 minute storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.300	300	1.300	600	1.300	900	1.300	1200	1.300
60	1.300	360	1.300	660	1.300	960	1.300	1260	1.300
120	1.300	420	1.300	720	1.300	1020	1.300	1320	1.300
180	1.300	480	1.300	780	1.300	1080	1.300	1380	1.300
240	1.300	540	1.300	840	1.300	1140	1.300	1440	1.300

Node EXSW04 Online Hydro-Brake® Control

Flap Valve	x	Objective (HE)	Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	36.090	Product Number	CTL-SHE-0361-8600-1800-8600
Design Depth (m)	1.800	Min Outlet Diameter (m)	0.375
Design Flow (l/s)	86.0	Min Node Diameter (mm)	0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	EXSW06	11	37.533	0.073	18.1	0.2757	0.0000	OK
15 minute winter	EXSW05	11	36.464	0.134	24.7	0.2274	0.0000	OK
15 minute winter	EXSWIC01	10	37.429	0.029	3.0	0.0230	0.0000	OK
15 minute winter	EXSW01	10	37.123	0.053	6.0	0.0391	0.0000	OK
15 minute winter	EXSW02	10	36.751	0.071	6.0	0.0806	0.0000	OK
15 minute winter	EXJ1	14	36.379	0.222	5.9	0.0000	0.0000	OK
15 minute winter	EXSW03	14	36.378	0.238	6.3	0.3327	0.0000	OK
15 minute winter	EXCAPP	14	36.381	0.261	7.1	0.0000	0.0000	OK
15 minute winter	EXSW04	14	36.379	0.289	27.2	0.7730	0.0000	OK
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
15 minute winter	EXCW03	11	37.126	0.016	1.3	0.0206	0.0000	OK
15 minute winter	EXCW01	11	36.215	0.025	1.3	0.0284	0.0000	OK
15 minute winter	EXCW04	10	37.875	0.035	5.8	0.0600	0.0000	OK
15 minute winter	EXCW02	13	36.190	0.110	29.8	0.1500	0.0000	OK
15 minute winter	EXBURIED MH	13	35.947	0.113	29.6	0.1279	0.0000	OK
15 minute winter	EXOUTFALL (APPROX)	13	35.793	0.105	29.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	17.5	0.854	0.131	1.7049	
15 minute winter	EXSW05	1.001	EXSW04	23.9	0.854	0.375	0.3853	
15 minute winter	EXSWIC01	2.000	EXSW01	3.0	1.185	0.179	0.0109	
15 minute winter	EXSW01	2.001	EXSW02	6.0	1.465	0.498	0.0358	
15 minute winter	EXSW02	2.002	EXJ1	5.9	0.741	0.422	0.0293	
15 minute winter	EXJ1	2.003	EXSW03	5.0	0.229	0.005	2.2715	
15 minute winter	EXSW03	2.004	EXSW04	6.4	0.417	0.046	0.2103	
15 minute winter	EXCAPP	3.000	EXSW04	-7.1	-0.166	-0.006	3.1660	
15 minute winter	EXSW04	1.002	EXCW02	23.8	0.722	0.218	0.2967	
15 minute summer	EXCW06	4.000	EXCW03	0.0	0.000	0.000	0.0000	
15 minute winter	EXCW03	4.001	EXCW01	1.3	0.937	0.023	0.0130	
15 minute winter	EXCW01	4.002	EXCW02	1.3	0.212	0.061	0.0589	
15 minute winter	EXCW04	5.000	EXCW02	5.7	2.398	0.247	0.0258	
15 minute winter	EXCW02	1.003	EXBURIED MH	29.6	1.244	0.267	0.5857	
15 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	29.5	1.281	0.266	0.3366	21.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	EXSW06	10	37.576	0.116	44.2	0.4405	0.0000	OK
15 minute winter	EXSW05	13	36.604	0.274	60.9	0.4669	0.0000	OK
15 minute winter	EXSWIC01	11	37.467	0.067	7.4	0.0535	0.0000	OK
15 minute winter	EXSW01	11	37.376	0.306	14.5	0.2258	0.0000	SURCHARGED
15 minute winter	EXSW02	11	36.802	0.122	13.8	0.1381	0.0000	OK
15 minute winter	EXJ1	13	36.587	0.430	13.7	0.0000	0.0000	OK
15 minute winter	EXSW03	13	36.585	0.445	19.8	0.6217	0.0000	SURCHARGED
15 minute winter	EXCAPP	13	36.585	0.465	11.2	0.0000	0.0000	OK
15 minute winter	EXSW04	13	36.583	0.493	66.2	1.3204	0.0000	SURCHARGED
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
15 minute winter	EXCW03	10	37.134	0.024	3.3	0.0321	0.0000	OK
15 minute winter	EXCW01	12	36.277	0.087	3.3	0.0986	0.0000	OK
15 minute winter	EXCW04	10	37.900	0.060	14.3	0.1028	0.0000	OK
15 minute winter	EXCW02	12	36.276	0.196	74.5	0.2675	0.0000	OK
15 minute winter	EXBURIED MH	13	36.036	0.202	74.7	0.2281	0.0000	OK
15 minute winter	EXOUTFALL (APPROX)	13	35.866	0.178	75.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	43.1	1.051	0.323	3.5089	
15 minute winter	EXSW05	1.001	EXSW04	55.4	1.039	0.868	0.9482	
15 minute winter	EXSWIC01	2.000	EXSW01	7.1	1.228	0.427	0.0287	
15 minute winter	EXSW01	2.001	EXSW02	13.8	1.762	1.152	0.0688	
15 minute winter	EXSW02	2.002	EXJ1	13.7	0.945	0.982	0.0534	
15 minute winter	EXJ1	2.003	EXSW03	15.0	0.275	0.016	5.5351	
15 minute winter	EXSW03	2.004	EXSW04	16.6	0.458	0.120	0.2285	
15 minute summer	EXCAPP	3.000	EXSW04	-11.6	-0.184	-0.009	6.3569	
15 minute winter	EXSW04	1.002	EXCW02	58.2	0.865	0.534	0.6198	
15 minute summer	EXCW06	4.000	EXCW03	0.0	0.000	0.000	0.0000	
15 minute winter	EXCW03	4.001	EXCW01	3.3	1.186	0.057	0.0545	
15 minute winter	EXCW01	4.002	EXCW02	2.9	0.264	0.137	0.1083	
15 minute winter	EXCW04	5.000	EXCW02	14.2	2.989	0.609	0.0510	
15 minute winter	EXCW02	1.003	EXBURIED MH	74.7	1.512	0.673	1.2151	
15 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	75.1	1.596	0.676	0.6864	52.7

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 90.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	EXSW06	20	37.980	0.520	65.7	1.9718	0.0000	SURCHARGED
30 minute winter	EXSW05	20	37.856	1.526	86.7	2.5975	0.0000	SURCHARGED
30 minute winter	EXSWIC01	18	38.180	0.780	11.0	0.6240	1.7360	FLOOD
30 minute winter	EXSW01	20	38.170	1.100	17.5	0.8107	0.2039	FLOOD
30 minute winter	EXSW02	20	37.953	1.273	35.9	1.4396	0.0000	FLOOD RISK
30 minute winter	EXJ1	19	38.140	1.983	344.6	0.0000	0.0000	FLOOD RISK
60 minute winter	EXSW03	36	38.180	2.040	1283.2	2.8478	29.3049	FLOOD
30 minute summer	EXCAPP	20	38.180	2.060	172.2	0.0000	0.0000	FLOOD RISK
15 minute winter	EXSW04	13	37.903	1.813	1358.2	4.8544	0.0000	FLOOD RISK
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
30 minute summer	EXCW03	21	37.408	0.298	7.5	0.3918	0.0000	SURCHARGED
30 minute summer	EXCW01	21	37.372	1.182	6.0	1.3371	0.0000	SURCHARGED
15 minute winter	EXCW04	11	38.460	0.620	26.6	1.0583	0.5625	FLOOD
30 minute winter	EXCW02	21	37.374	1.294	97.4	1.7661	0.0000	SURCHARGED
30 minute winter	EXBURIED MH	21	37.142	1.308	93.1	1.4788	0.0000	SURCHARGED
15 minute summer	EXOUTFALL (APPROX)	1	36.988	1.300	78.9	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	80.7	1.293	0.604	5.5246	
15 minute winter	EXSW05	1.001	EXSW04	91.4	1.299	1.434	0.9685	
15 minute winter	EXSWIC01	2.000	EXSW01	9.0	1.230	0.541	0.0336	
15 minute winter	EXSW01	2.001	EXSW02	18.1	2.314	1.514	0.0688	
60 minute winter	EXSW02	2.002	EXJ1	-47.1	-2.674	-3.363	0.0647	
60 minute winter	EXJ1	2.003	EXSW03	1088.0	1.261	1.137	14.0308	
60 minute summer	EXSW03	2.004	EXSW04	-250.7	-3.561	-1.815	0.2285	
15 minute winter	EXCAPP	3.000	EXSW04	866.3	1.004	0.708	15.2117	
15 minute winter	EXSW04	1.002	EXCW02	73.0	0.461	0.670	1.3629	
15 minute summer	EXCW06	4.000	EXCW03	0.0	0.000	0.000	0.0106	
60 minute summer	EXCW03	4.001	EXCW01	8.3	0.819	0.145	0.1571	
15 minute winter	EXCW01	4.002	EXCW02	8.1	0.460	0.380	0.1351	
15 minute winter	EXCW04	5.000	EXCW02	19.6	2.853	0.844	0.0842	
30 minute winter	EXCW02	1.003	EXBURIED MH	93.1	1.322	0.838	1.7314	
30 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	91.9	1.305	0.827	1.0283	72.4

Appendix H – Proposed drainage model calculations

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
EXSW06	0.149	5.00	38.580	1200	384963.148	395580.457	1.120	37.460
EXSW05	0.060	5.00	38.430	1200	384954.052	395658.381	2.100	36.330
EXSWIC01	0.025	5.00	38.180	450	385001.038	395668.814	0.780	37.400
S1	0.000		38.170	600	384999.225	395666.161	1.016	37.154
S2	0.028	5.00	38.180	600	384999.059	395659.282	1.095	37.085
S3	0.000		38.180	600	384970.641	395656.392	1.571	36.609
EXSW03	0.027	5.00	38.180	1200	384970.119	395662.683	2.040	36.140
EXSW04	0.014	5.00	38.190	1800	384967.625	395660.607	2.100	36.090
S4a	0.012	5.00	38.520	450	384977.548	395604.693	0.750	37.770
S4b	0.012	5.00	38.520	450	384975.679	395618.899	0.893	37.627
S4c	0.012	5.00	38.520	450	384969.142	395618.470	1.057	37.463
S4	0.012	5.00	38.500	1200	384967.351	395619.636	1.350	37.150
S5	0.018	5.00	38.460	450	384963.634	395643.754	1.554	36.906
EXCW06	0.000	5.00	38.260	450	384962.349	395669.812	0.490	37.770
EXCW03	0.011	5.00	38.300	1200	384964.890	395670.774	1.190	37.110
EXCW01	0.000		38.330	1200	384964.589	395661.855	2.140	36.190
EXCW04	0.032	5.00	38.460	450	384961.449	395644.277	0.620	37.840
EXCW02	0.026	5.00	38.300	1200	384961.077	395655.029	2.220	36.080
EXBURIED MH	0.000		38.300	1200	384936.589	395652.826	2.466	35.834
EXOUTFALL (APPROX)	0.000		38.300	1200	384922.044	395651.537	2.612	35.688

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	EXSW06	EXSW05	78.453	0.600	37.460	36.330	1.130	69.4	300	5.69	50.0
1.001	EXSW05	EXSW04	13.754	0.600	36.330	36.284	0.046	300.0	300	5.95	50.0
2.000	EXSWIC01	S1	3.213	0.600	37.400	37.354	0.046	69.9	100	5.06	50.0
2.001	S1	S2	6.881	0.600	37.154	37.085	0.069	100.0	300	5.13	50.0
2.002	S2	S3	28.565	0.600	37.085	36.609	0.476	60.0	300	5.37	50.0
2.003	S3	EXSW04	5.183	0.600	36.609	36.090	0.519	10.0	300	5.38	50.0
3.000	EXSW03	EXSW04	3.245	0.600	36.140	36.090	0.050	64.9	300	5.03	50.0
1.002	EXSW04	EXCW02	8.602	0.600	36.090	36.080	0.010	860.2	375	6.18	50.0
4.000	S4a	S4b	14.328	0.600	37.770	37.627	0.143	100.0	150	5.24	50.0
4.001	S4b	S4c	6.551	0.600	37.627	37.463	0.164	40.0	150	5.31	50.0
4.002	S4c	S4	2.137	0.600	37.463	37.300	0.163	13.1	150	5.32	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.889	133.5	20.2	0.820	1.800	0.149	0.0	78	1.372
1.001	0.902	63.8	28.3	1.800	1.606	0.209	0.0	140	0.876
2.000	0.922	7.2	3.4	0.680	0.716	0.025	0.0	48	0.906
2.001	1.572	111.1	3.4	0.716	0.795	0.025	0.0	35	0.712
2.002	2.033	143.7	7.2	0.795	1.271	0.053	0.0	45	1.076
2.003	5.002	353.6	7.2	1.271	1.800	0.053	0.0	29	2.011
3.000	1.954	138.1	3.7	1.740	1.800	0.027	0.0	33	0.850
1.002	0.610	67.3	41.1	1.725	1.845	0.303	0.0	212	0.639
4.000	1.005	17.8	1.6	0.600	0.743	0.012	0.0	31	0.628
4.001	1.596	28.2	3.3	0.743	0.907	0.024	0.0	34	1.066
4.002	2.797	49.4	4.9	0.907	1.050	0.036	0.0	32	1.795

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)
4.003	S4	S5	24.403	0.600	37.150	36.906	0.244	100.0	150	5.72	50.0
4.004	S5	EXCW02	11.561	0.600	36.906	36.250	0.656	17.6	150	5.80	50.0
5.000	EXCW06	EXCW03	2.717	0.600	37.770	37.160	0.610	4.5	100	5.01	50.0
5.001	EXCW03	EXCW01	8.924	0.600	37.110	36.190	0.920	9.7	150	5.06	50.0
5.002	EXCW01	EXCW02	7.676	0.600	36.190	36.080	0.110	69.8	150	5.16	50.0
6.000	EXCW04	EXCW02	10.758	0.600	37.840	36.080	1.760	6.1	100	5.06	50.0
1.003	EXCW02	EXBURIED MH	24.587	0.600	36.080	35.834	0.246	100.0	300	6.44	50.0
1.004	EXBURIED MH	EXOUTFALL (APPROX)	14.602	0.600	35.834	35.688	0.146	100.0	300	6.60	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
4.003	1.005	17.8	6.5	1.200	1.404	0.048	0.0	63	0.929
4.004	2.411	42.6	8.9	1.404	1.900	0.066	0.0	47	1.915
5.000	3.690	29.0	0.0	0.390	1.040	0.000	0.0	0	0.000
5.001	3.254	57.5	1.5	1.040	1.990	0.011	0.0	17	1.398
5.002	1.205	21.3	1.5	1.990	2.070	0.011	0.0	27	0.691
6.000	3.147	24.7	4.3	0.520	2.120	0.032	0.0	29	2.378
1.003	1.572	111.1	59.4	1.920	2.166	0.438	0.0	156	1.597
1.004	1.572	111.1	59.4	2.166	2.312	0.438	0.0	156	1.597

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	78.453	69.4	300	Circular	38.580	37.460	0.820	38.430	36.330	1.800
1.001	13.754	300.0	300	Circular	38.430	36.330	1.800	38.190	36.284	1.606
2.000	3.213	69.9	100	Circular	38.180	37.400	0.680	38.170	37.354	0.716
2.001	6.881	100.0	300	Circular	38.170	37.154	0.716	38.180	37.085	0.795
2.002	28.565	60.0	300	Circular	38.180	37.085	0.795	38.180	36.609	1.271
2.003	5.183	10.0	300	Circular	38.180	36.609	1.271	38.190	36.090	1.800
3.000	3.245	64.9	300	Circular	38.180	36.140	1.740	38.190	36.090	1.800
1.002	8.602	860.2	375	Circular	38.190	36.090	1.725	38.300	36.080	1.845
4.000	14.328	100.0	150	Circular	38.520	37.770	0.600	38.520	37.627	0.743
4.001	6.551	40.0	150	Circular	38.520	37.627	0.743	38.520	37.463	0.907
4.002	2.137	13.1	150	Circular	38.520	37.463	0.907	38.500	37.300	1.050
4.003	24.403	100.0	150	Circular	38.500	37.150	1.200	38.460	36.906	1.404

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	EXSW06	1200	Manhole	Adoptable	EXSW05	1200	Manhole	Adoptable
1.001	EXSW05	1200	Manhole	Adoptable	EXSW04	1800	Manhole	Adoptable
2.000	EXSWIC01	450	Manhole	Adoptable	S1	600	Manhole	Adoptable
2.001	S1	600	Manhole	Adoptable	S2	600	Manhole	Adoptable
2.002	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
2.003	S3	600	Manhole	Adoptable	EXSW04	1800	Manhole	Adoptable
3.000	EXSW03	1200	Manhole	Adoptable	EXSW04	1800	Manhole	Adoptable
1.002	EXSW04	1800	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
4.000	S4a	450	Manhole	Adoptable	S4b	450	Manhole	Adoptable
4.001	S4b	450	Manhole	Adoptable	S4c	450	Manhole	Adoptable
4.002	S4c	450	Manhole	Adoptable	S4	1200	Manhole	Adoptable
4.003	S4	1200	Manhole	Adoptable	S5	450	Manhole	Adoptable

Pipeline Schedule

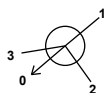
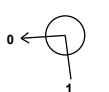
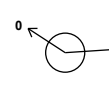
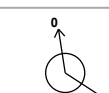
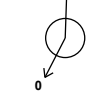
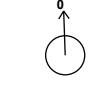
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
4.004	11.561	17.6	150	Circular	38.460	36.906	1.404	38.300	36.250	1.900
5.000	2.717	4.5	100	Circular	38.260	37.770	0.390	38.300	37.160	1.040
5.001	8.924	9.7	150	Circular	38.300	37.110	1.040	38.330	36.190	1.990
5.002	7.676	69.8	150	Circular	38.330	36.190	1.990	38.300	36.080	2.070
6.000	10.758	6.1	100	Circular	38.460	37.840	0.520	38.300	36.080	2.120
1.003	24.587	100.0	300	Circular	38.300	36.080	1.920	38.300	35.834	2.166
1.004	14.602	100.0	300	Circular	38.300	35.834	2.166	38.300	35.688	2.312

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.004	S5	450	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
5.000	EXCW06	450	Manhole	Adoptable	EXCW03	1200	Manhole	Adoptable
5.001	EXCW03	1200	Manhole	Adoptable	EXCW01	1200	Manhole	Adoptable
5.002	EXCW01	1200	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
6.000	EXCW04	450	Manhole	Adoptable	EXCW02	1200	Manhole	Adoptable
1.003	EXCW02	1200	Manhole	Adoptable	EXBURIED MH	1200	Manhole	Adoptable
1.004	EXBURIED MH	1200	Manhole	Adoptable	EXOUTFALL (APPROX)	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
EXSW06	384963.148	395580.457	38.580	1.120	1200		0	1.000	37.460	300
EXSW05	384954.052	395658.381	38.430	2.100	1200		1	1.000	36.330	300
							0	1.001	36.330	300
EXSWIC01	385001.038	395668.814	38.180	0.780	450		0	2.000	37.400	100
S1	384999.225	395666.161	38.170	1.016	600		1	2.000	37.354	100
							0	2.001	37.154	300
S2	384999.059	395659.282	38.180	1.095	600		1	2.001	37.085	300
							0	2.002	37.085	300
S3	384970.641	395656.392	38.180	1.571	600		1	2.002	36.609	300
							0	2.003	36.609	300
EXSW03	384970.119	395662.683	38.180	2.040	1200		0	3.000	36.140	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
EXSW04	384967.625	395660.607	38.190	2.100	1800		1	3.000	36.090	300
							2	2.003	36.090	300
							3	1.001	36.284	300
							0	1.002	36.090	375
S4a	384977.548	395604.693	38.520	0.750	450		0	4.000	37.770	150
S4b	384975.679	395618.899	38.520	0.893	450		1	4.000	37.627	150
S4c	384969.142	395618.470	38.520	1.057	450		0	4.001	37.627	150
							1	4.001	37.463	150
S4	384967.351	395619.636	38.500	1.350	1200		0	4.002	37.463	150
							1	4.002	37.300	150
S5	384963.634	395643.754	38.460	1.554	450		0	4.003	37.150	150
							1	4.003	36.906	150
EXCW06	384962.349	395669.812	38.260	0.490	450		0	4.004	36.906	150
							1	5.000	37.770	100
EXCW03	384964.890	395670.774	38.300	1.190	1200		0	5.000	37.160	100
							1	5.001	37.110	150
EXCW01	384964.589	395661.855	38.330	2.140	1200		0	5.001	36.190	150
							1	5.002	36.190	150
EXCW04	384961.449	395644.277	38.460	0.620	450		0	6.000	37.840	100
							1	6.000	36.080	100
EXCW02	384961.077	395655.029	38.300	2.220	1200		2	5.002	36.080	150
							4	1.002	36.080	375
							0	1.003	36.080	300
							3	4.004	36.250	150
							1	1.003	35.834	300
EXBURIED MH	384936.589	395652.826	38.300	2.466	1200		0	1.004	35.834	300
							1	1.004	35.688	300
EXOUTFALL (APPROX)	384922.044	395651.537	38.300	2.612	1200		1	1.004	35.688	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	18.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.356	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node EXOUTFALL (APPROX) Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to 100yr+45% CC 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 minute storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.300	300	1.300	600	1.300	900	1.300	1200	1.300
60	1.300	360	1.300	660	1.300	960	1.300	1260	1.300
120	1.300	420	1.300	720	1.300	1020	1.300	1320	1.300
180	1.300	480	1.300	780	1.300	1080	1.300	1380	1.300
240	1.300	540	1.300	840	1.300	1140	1.300	1440	1.300

Node S4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	37.150	Product Number	CTL-SHE-0092-5000-2000-5000
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node EXSW04 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	36.090	Product Number	CTL-SHE-0361-8600-1800-8600
Design Depth (m)	1.800	Min Outlet Diameter (m)	0.375
Design Flow (l/s)	86.0	Min Node Diameter (mm)	0

Node EXSW04 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	36.110
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	30.0	0.0	1.200	30.0	0.0	1.201	0.0	0.0

Node S4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.050	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	11	Depth (m)	0.300
Safety Factor	2.0	Width (m)	17.500	Inf Depth (m)	
Porosity	0.33	Length (m)	17.500		

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	EXSW06	11	37.533	0.073	18.1	0.2756	0.0000	OK
15 minute winter	EXSW05	11	36.464	0.134	24.7	0.2273	0.0000	OK
15 minute winter	EXSWIC01	10	37.449	0.049	3.0	0.0396	0.0000	OK
15 minute winter	S1	10	37.189	0.035	3.0	0.0098	0.0000	OK
15 minute winter	S2	10	37.131	0.046	6.4	0.0368	0.0000	OK
15 minute winter	S3	11	36.637	0.028	6.3	0.0078	0.0000	OK
30 minute winter	EXSW03	22	36.374	0.234	3.1	0.3263	0.0000	OK
30 minute winter	EXSW04	22	36.371	0.281	26.9	8.1952	0.0000	OK
15 minute winter	S4a	10	37.799	0.029	1.5	0.0140	0.0000	OK
15 minute winter	S4b	10	37.662	0.035	3.0	0.0149	0.0000	OK
15 minute winter	S4c	12	37.546	0.083	4.5	0.0320	0.0000	OK
15 minute winter	S4	13	37.534	0.384	9.0	0.5024	0.0000	SURCHARGED
15 minute winter	S5	11	36.946	0.040	6.2	0.0157	0.0000	OK
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
15 minute winter	EXCW03	11	37.126	0.016	1.3	0.0206	0.0000	OK
15 minute winter	EXCW01	11	36.215	0.025	1.3	0.0284	0.0000	OK
15 minute winter	EXCW04	10	37.867	0.027	3.9	0.0320	0.0000	OK
30 minute winter	EXCW02	21	36.192	0.112	30.6	0.1522	0.0000	OK
30 minute winter	EXBURIED MH	22	35.949	0.115	30.5	0.1300	0.0000	OK
30 minute winter	EXOUTFALL (APPROX)	22	35.794	0.106	30.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	17.5	0.854	0.131	1.7045	
15 minute winter	EXSW05	1.001	EXSW04	23.9	0.854	0.375	0.3853	
15 minute winter	EXSWIC01	2.000	S1	3.0	0.823	0.411	0.0116	
15 minute winter	S1	2.001	S2	3.0	0.524	0.027	0.0392	
15 minute winter	S2	2.002	S3	6.3	1.264	0.044	0.1445	
15 minute winter	S3	2.003	EXSW04	6.2	0.600	0.018	0.1827	
15 minute summer	EXSW03	3.000	EXSW04	5.7	0.363	0.041	0.1942	
30 minute winter	EXSW04	1.002	EXCW02	21.1	0.698	0.314	0.2689	
15 minute winter	S4a	4.000	S4b	1.5	0.543	0.083	0.0393	
15 minute winter	S4b	4.001	S4c	3.1	1.046	0.108	0.0407	
15 minute winter	S4c	4.002	S4	8.2	1.437	0.167	0.0295	
15 minute winter	S4	4.003	S5	4.1	0.956	0.232	0.1109	
15 minute winter	S5	4.004	EXCW02	6.2	1.681	0.145	0.0425	
15 minute summer	EXCW06	5.000	EXCW03	0.0	0.000	0.000	0.0000	
15 minute winter	EXCW03	5.001	EXCW01	1.3	0.938	0.023	0.0130	
15 minute winter	EXCW01	5.002	EXCW02	1.3	0.221	0.061	0.0591	
15 minute winter	EXCW04	6.000	EXCW02	3.9	0.895	0.157	0.0509	
30 minute winter	EXCW02	1.003	EXBURIED MH	30.5	1.253	0.274	0.5980	
30 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	30.5	1.293	0.274	0.3442	32.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	EXSW06	10	37.576	0.116	44.3	0.4405	0.0000	OK
15 minute winter	EXSW05	13	36.622	0.292	60.9	0.4966	0.0000	OK
15 minute winter	EXSWIC01	11	37.509	0.109	7.4	0.0872	0.0000	SURCHARGED
15 minute winter	S1	11	37.210	0.056	7.1	0.0158	0.0000	OK
15 minute winter	S2	10	37.157	0.072	15.3	0.0572	0.0000	OK
15 minute winter	S3	11	36.651	0.042	15.1	0.0119	0.0000	OK
15 minute winter	EXSW03	13	36.598	0.458	8.0	0.6398	0.0000	SURCHARGED
15 minute winter	EXSW04	13	36.597	0.507	80.6	15.2639	0.0000	SURCHARGED
15 minute winter	S4a	12	38.085	0.315	5.1	0.1511	0.0000	SURCHARGED
15 minute winter	S4b	12	38.083	0.456	6.7	0.1951	0.0000	SURCHARGED
15 minute winter	S4c	12	38.073	0.610	9.0	0.2356	0.0000	SURCHARGED
30 minute winter	S4	25	38.070	0.920	9.8	2.3518	0.0000	SURCHARGED
15 minute winter	S5	10	36.956	0.050	9.3	0.0194	0.0000	OK
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
15 minute winter	EXCW03	10	37.134	0.024	3.3	0.0321	0.0000	OK
15 minute winter	EXCW01	12	36.284	0.094	3.3	0.1064	0.0000	OK
15 minute winter	EXCW04	10	37.883	0.043	9.5	0.0512	0.0000	OK
15 minute winter	EXCW02	12	36.283	0.203	78.6	0.2772	0.0000	OK
15 minute winter	EXBURIED MH	13	36.043	0.209	78.3	0.2360	0.0000	OK
15 minute winter	EXOUTFALL (APPROX)	13	35.872	0.184	78.7	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	43.2	1.051	0.323	3.5853	
15 minute winter	EXSW05	1.001	EXSW04	56.2	1.082	0.881	0.9649	
15 minute winter	EXSWIC01	2.000	S1	7.1	0.966	0.985	0.0240	
15 minute winter	S1	2.001	S2	7.2	0.656	0.064	0.0753	
15 minute winter	S2	2.002	S3	15.1	1.630	0.105	0.2707	
15 minute winter	S3	2.003	EXSW04	15.2	0.806	0.043	0.1980	
15 minute winter	EXSW03	3.000	EXSW04	8.3	0.518	0.060	0.2285	
15 minute winter	EXSW04	1.002	EXCW02	58.5	0.911	0.868	0.5771	
15 minute winter	S4a	4.000	S4b	3.3	0.656	0.186	0.2522	
15 minute winter	S4b	4.001	S4c	6.1	1.100	0.218	0.1153	
15 minute winter	S4c	4.002	S4	9.1	1.380	0.183	0.0376	
15 minute winter	S4	4.003	S5	4.2	0.999	0.234	0.1233	
15 minute winter	S5	4.004	EXCW02	9.2	1.872	0.217	0.0571	
15 minute summer	EXCW06	5.000	EXCW03	0.0	0.000	0.000	0.0000	
15 minute winter	EXCW03	5.001	EXCW01	3.3	1.186	0.057	0.0590	
15 minute winter	EXCW01	5.002	EXCW02	2.9	0.276	0.137	0.1122	
15 minute winter	EXCW04	6.000	EXCW02	9.5	1.472	0.383	0.0594	
15 minute winter	EXCW02	1.003	EXBURIED MH	78.3	1.522	0.704	1.2640	
15 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	78.7	1.612	0.708	0.7125	60.1

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.42%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	EXSW06	22	38.177	0.717	65.7	2.7176	0.0000	SURCHARGED
30 minute winter	EXSW05	22	38.058	1.728	88.3	2.9412	0.0000	SURCHARGED
30 minute winter	EXSWIC01	22	38.076	0.676	11.0	0.5406	0.0000	FLOOD RISK
30 minute winter	S1	22	38.013	0.859	10.7	0.2430	0.0000	FLOOD RISK
30 minute winter	S2	22	38.012	0.927	23.4	0.7360	0.0000	FLOOD RISK
30 minute winter	S3	22	38.005	1.396	21.0	0.3951	0.0000	FLOOD RISK
30 minute winter	EXSW03	22	38.003	1.863	11.9	2.6013	0.0000	FLOOD RISK
30 minute winter	EXSW04	22	38.003	1.913	93.0	39.3514	0.0000	FLOOD RISK
15 minute winter	S4a	11	38.212	0.442	7.7	0.2118	0.0000	SURCHARGED
15 minute winter	S4b	11	38.190	0.563	12.8	0.2409	0.0000	SURCHARGED
15 minute winter	S4c	12	38.142	0.679	19.1	0.2622	0.0000	SURCHARGED
60 minute winter	S4	48	38.134	0.984	14.1	8.7071	0.0000	SURCHARGED
30 minute winter	S5	22	37.581	0.675	11.3	0.2640	0.0000	SURCHARGED
15 minute summer	EXCW06	1	37.770	0.000	0.0	0.0000	0.0000	OK
30 minute winter	EXCW03	22	37.549	0.439	6.0	0.5782	0.0000	SURCHARGED
30 minute winter	EXCW01	22	37.545	1.355	5.7	1.5329	0.0000	SURCHARGED
15 minute winter	EXCW04	12	38.020	0.180	17.8	0.2146	0.0000	SURCHARGED
30 minute winter	EXCW02	22	37.541	1.461	112.8	1.9939	0.0000	SURCHARGED
30 minute winter	EXBURIED MH	22	37.211	1.377	112.9	1.5573	0.0000	SURCHARGED
15 minute summer	EXOUTFALL (APPROX)	1	36.988	1.300	82.2	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	EXSW06	1.000	EXSW05	79.7	1.276	0.597	5.5246	
15 minute winter	EXSW05	1.001	EXSW04	85.6	1.216	1.342	0.9685	
15 minute winter	EXSWIC01	2.000	S1	13.4	1.716	1.854	0.0251	
15 minute winter	S1	2.001	S2	13.4	0.818	0.120	0.4846	
15 minute winter	S2	2.002	S3	28.5	1.758	0.198	2.0115	
15 minute summer	S3	2.003	EXSW04	24.0	0.893	0.068	0.3650	
15 minute winter	EXSW03	3.000	EXSW04	10.1	0.570	0.073	0.2285	
30 minute winter	EXSW04	1.002	EXCW02	84.2	0.764	1.251	0.9488	
15 minute winter	S4a	4.000	S4b	6.3	0.632	0.354	0.2522	
15 minute winter	S4b	4.001	S4c	12.6	1.041	0.445	0.1153	
15 minute winter	S4c	4.002	S4	18.7	1.460	0.379	0.0376	
30 minute winter	S4	4.003	S5	5.3	0.901	0.301	0.4296	
15 minute winter	S5	4.004	EXCW02	12.3	1.785	0.289	0.2035	
15 minute summer	EXCW06	5.000	EXCW03	0.0	0.000	0.000	0.0106	
15 minute winter	EXCW03	5.001	EXCW01	6.1	1.153	0.106	0.1571	
30 minute summer	EXCW01	5.002	EXCW02	-7.7	-0.438	-0.362	0.1351	
15 minute winter	EXCW04	6.000	EXCW02	16.8	2.163	0.680	0.0842	
30 minute winter	EXCW02	1.003	EXBURIED MH	112.9	1.604	1.016	1.7314	
30 minute winter	EXBURIED MH	1.004	EXOUTFALL (APPROX)	113.0	1.605	1.017	1.0283	105.9