

|                                |                         |                     |                    |             |              |
|--------------------------------|-------------------------|---------------------|--------------------|-------------|--------------|
| <b>Project No. &amp; Name:</b> | 10939 – St Vincent's    | <b>Prepared by:</b> | <b>Checked by:</b> | <b>Rev:</b> | <b>Date:</b> |
| <b>Document Ref:</b>           | LCNP-WML-00-XX-RP-D-053 | Daniel Baker        | Loughlin O'Gorman  | P03         | August 2024  |

## Background

1. The below Drainage Strategy Report has been created by WML to support and inform detailed Planning Conditions for the St Vincent's development, located within the existing Loreto College grounds.
2. The proposed scheme involves the demolition of an existing single storey building and the construction of another which will provide administration, meeting space, eatery and a covered seating area.

## Surface Water Drainage Strategy

3. Reference should be made to the Flood Risk Assessment – WML Consulting, April 2023, Phase 1: Desk Top Study Report – WML Consulting, February 2023 and Phase 2: Ground Investigation Report – WML Consulting, April 2023.
4. The proposed drainage strategy for this site will incorporate the principles of, and where appropriate demonstrate compliance with the NPPF and the SUDS manual.
5. The proposed drainage system should be designed in accordance with BS EN 752 and Building Regulations Part H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from the new development sites, firstly discharge via infiltration, secondly discharge via watercourse and lastly discharge to sewer.
6. These options are discussed in further detail below.
7. **Surface water discharge via infiltration:** A review of the Phase 2: Ground Investigation Report by WML Consulting has confirmed that ground conditions on the site comprise made ground underlain by glacial deposits to a depth of circa 11mbgl and weathered sandstone of the Chester Pebble Bed Formation to a maximum depth of 12mbgl. These ground conditions are considered suitable for some infiltration techniques; however, it is noted that special consideration should be given to areas of deeper made ground and proximity with the existing brick surface water culvert immediately to the south.
8. **Surface water discharge via watercourse:** A review of the Ordnance Survey mapping around the site has confirmed the presence of Corn Brook Culvert which passes directly to the south of the development building and is understood to follow the line of the original watercourse.
9. A survey of the existing culvert undertaken by Survey Operations, March 2024, confirmed the route of the 3.7m x 1.45m Corn Brook Culvert as it passes through the site at a depth of approximately 2.5mbgl. A copy of the survey drawing can be found appended to this report.
10. **Surface water discharge via public sewer:** A review of the United Utilities (UU) public sewer records indicate that there are existing combined water sewers located within the adjacent Chichester Rd (south) and Moss Lane (west).
11. As-built drainage records for the previous development and a CCTV survey undertaken by Blocked Drains Northwest, April 2024 has confirmed that the existing building is served by a private combined drainage system which connects into the wider college drainage network before ultimately discharging to the UU public combined sewer located within Moss Lane.

**Surface Water Drainage Proposals**

12. Reference should be made to WML drawing LCNP-WML-00-FN-DR-D-5201.
13. In consideration of the above drainage hierarchy, the surface water proposals outlined within this report are based upon disposal of all surface water from the proposed development via a combination of both infiltration and a connection to the existing Corn Brook Culvert.
14. As noted within section 7, the findings of the Phase 2 Ground Investigation Report suggested that infiltration might be a viable solution for this development, however careful consideration should be given to presence of varying depths of made ground and the proximity to the existing surface water culvert.
15. It is understood that Corn Brook Culvert is of brick construction and therefore concentrated infiltration techniques such as cellular soakaways in the vicinity of the existing culvert could result in a weakening/wash out of the existing mortar or softening of the adjacent ground which could ultimately lead to structural failure.
16. It is therefore proposed to incorporate infiltration for new areas of hardstanding only i.e., footpaths where a permeable construction can be utilised to disperse of captured surface water runoff over a larger area and mitigate any risk associated with the structure of the existing culvert.
17. The permeable paving construction will include a stone sub-base layer which will act as storage for the captured surface water runoff prior to its percolation into the sub-strata.
18. In the absence of site-specific percolation test results, a nominal infiltration rate of  $1 \times 10^{-6}$  m/s has been utilised to determine the depth of sub-base required to store and disperse captured surface water runoff for all storm durations up to and including the critical 100-year event plus a 45% climate change allowance.
19. The intention is to dispose of surface water runoff from the remainder of the site (new building roof) via a new piped connection to the existing culvert.
20. The site is currently developed and comprises an existing structure along with a mixture of hardstanding (to be retained) interspersed with areas of soft landscaping. The site is classified as a 'Brownfield' site; thus, any new development requires a minimum 50% reduction in surface water runoff rate leaving the development site as outlined within the SFRA.
21. It is understood that LLFA policy is that any new development should aim to discharge surface water runoff at Greenfield runoff rates therefore a further assessment has been undertaken using MicroDrainage software which concluded the following flow rates;

| Return Period | Flow (l/s) |
|---------------|------------|
| 1 in 1 year   | 0.4        |
| 1 in 30 year  | 0.7        |
| 1 in 100 year | 0.8        |

22. A copy of the MicroDrainage calculations can be found appended to this report.
23. It should be noted that the above greenfield flow rates exclude the areas of proposed infiltration described in the above sections.
24. Due to the limitations of restricting forward flows to less than 1 l/s, and in agreement with the LLFA the proposals for the new development intend to discharge all remaining surface water runoff from the site to 5 l/s for all critical storm durations up to and including the critical 100-year event plus a 45% climate change allowance.
25. It is proposed to collect roof water via a traditional roof drainage system and discharge via a new below ground drainage network located around the building footprint.
26. Oversized pipework has been incorporated within the new below ground drainage system to provide storage for all captured surface water runoff (excluding infiltration areas) where it can be then released via a flow chamber at a controlled/restricted flow rate to suit the allowable Greenfield flow rates noted above.
27. Given the limited area of retained hardstanding is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals do include pollution/treatment controls which are discussed later in this report.

### **Residual Flood Risk Mitigation**

28. As identified with the Flood Risk Assessment (FRA) – WML Consulting, April 2023, there is a low residual risk of flooding from all sources with the exception of flooding from Corn Brook Culvert which is considered as having a medium residual flood risk.
29. The FRA includes a series of modelled flood scenarios provided by the Environment Agency which offer a theoretical flood water level at 4 node points across/adjacent to the development site.
30. The most notable flood water levels are shown at node 2 located on the junction of Chichester Rd (south) and Moss Ln (west) which recorded the following levels;
  - 33.010m AOD during a simulated 0.1% probability (1:1000-year event) + 30% climate change allowance.
  - 32.630m AOD during a simulated 1% probability (1:100-year event) + 75% climate change allowance.
31. The FRA noted that the higher figure of 33.010 was the result of an extreme event with an annual exceedance probability (AEP) of 0.1%.
32. Given that there are no historic records of flooding in the vicinity of the proposed development it is considered that the following flood risk mitigation measures will be based upon the more probable flood water level of 32.630 which has an AEP of 1% i.e., a 10x greater chance of occurring in a given year.
33. In accordance with the recommendations outlined within the FRA, the new building's finished floor level (FFL) should be set to provide a sufficient freeboard above the theoretical flood water level noted above.
34. In addition, external ground levels should be designed as such to direct any overland flow routes resulting from extreme rainfall away from the new building.
35. Given the above it is considered that the mitigation of residual risk identified within the FRA has been satisfied and is acceptable with regards to flood risk.

### **Waste Water Drainage Strategy**

36. As noted in sections 10 & 11, it is understood that there is an existing private drainage system currently serving the existing building which ultimately discharges to the UU public sewer network.
37. It is therefore proposed to collect waste water from the proposed development via traditional soil stacks & SVPs prior and discharge via the existing site drainage system to the public sewerage network located to the east, subject to UU approval.

## SUDs Review

38. In accordance with current policies and guidelines, SUDs techniques have been considered for the development site's drainage proposals. The suitability of various SUDs techniques has been reviewed and are discussed below.
39. Storing water for later use could be a viable option for this site. Blue/green roof systems were considered as part of the design for the building however as the retail building is a lightweight long span building, the implications of including a green or blue roof system would add significant embodied carbon to the supporting structure & building foundations.
40. Given the above, the incorporation of blue/green roof systems within the drainage proposals for this site was considered not to be a sustainable solution, however the addition of a rainwater harvesting tank could allow captured rainwater to be reused for onsite operations such as cistern flushes etc. and should be discussed with the client during detailed design.
41. Above ground SUDs features such as storage basins and swales were deliberated during the drainage design for this site, however due to the limited area of soft landscaping available across the development to implement such features especially given the proximity to existing structures such as Corn Brook Culvert, they have been considered to be not a practical solution for this project.
42. Permeable paving construction has been incorporated within the drainage proposals for new external hardstanding areas across the site (footpaths), which will provide both an element of storage and treatment of captured surface water runoff.
43. The quality of surface water runoff prior to discharge from the site should also be considered when reviewing potential SUDs options for the development works and this is reviewed in further detail below.

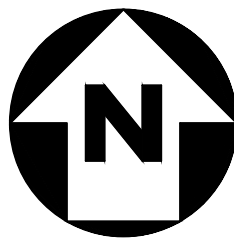
## Water Treatment

44. As discussed within the above strategies, due to the limited potential for vehicle movements across the site it is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals include pollution/treatment controls to promote improvements in water quality leaving the site.
45. From table 26.2 of the SUDs manual, the proposed roof area is deemed to have a "low" pollution hazard level. i.e. TSS = 0.3, Metals = 0.2, Hydrocarbons = 0.05.
46. Unfortunately, due to the site limitations it has not been possible to incorporate traditional SUDs treatment features (as discussed in the above SUDs review) and therefore it has been necessary to incorporate alternative proprietary systems to ensure water quality is achieved.
47. Gully traps, sump units and catch pits have been incorporated within the drainage proposals to remove contaminants/pollutants from all surface water runoff prior to disposal from the site.
48. In addition to the above a vortex separator has also been integrated into the drainage network prior the final connection with the Corn Brook Culvert to remove any remaining sediments etc. that have not already been captured by the above.
49. Finally, the permeable paving sub-base incorporates a stone filtration layer which will provide mitigation indices of TSS = 0.4, Metals = 0.4, Hydrocarbons = 0.4. Though these figures are halved in line with the guidance provided in the SUDs manual.

## **Maintenance Plan**

50. It is understood that the new drainage network will be privately owned and maintained by the client or an appointed maintenance company on their behalf and will not be offered up for adoption by United Utilities.
51. The proposed drainage system has been designed in accordance with the current standards and guidelines to achieve a minimum self-cleansing velocity, however excessive debris in the system could still result in loss of performance.
52. The proposed drainage design will consists of traditional manholes, pipes and channels.
53. It is proposed to check the underground drainage system and lift manhole/inspection chamber covers to ensure that the pipework associated with each chamber is operating correctly twice yearly and ensure drainage channels are free from debris.
54. Any problems encountered should be investigated by CCTV survey if required and any remedial works necessary carried out in a timely manner.
55. It is recommended that the biannual inspections take place in spring and autumn where there is additional risk of blockage from debris associated with fallen leaves etc.
56. Attenuation has been provided in the form of oversized pipework therefore it is considered that maintenance of this element is captured as part of the general drainage maintenance requirements noted above.
57. Flow restriction has been achieved through the incorporation of a hydrobrake flow control. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris.
58. Lastly, permeable paving construction has been incorporated within the drainage proposals for this site. It is proposed to check and clean the permeable surfaces regularly to ensure that surface water runoff is not prevented from draining into the sub-base layer, especially during the autumn period where a build-up leaves could occur and result in a loss of performance.

**Proposed Drainage GA  
LCNP-WML-00-FN-DR-D-5201**



**LEGEND**

- SW — SW — SW — EXISTING ADOPTED SURFACE WATER SEWER
- CW — CW — CW — EXISTING ADOPTED COMBINED WATER SEWER
- FW — FW — FW — EXISTING PRIVATE SURFACE WATER DRAIN
- FW — FW — FW — EXISTING PRIVATE FOUL WATER DRAIN
- FW — FW — FW — EXISTING PRIVATE COMBINED WATER DRAIN
- FW — FW — FW — EXISTING PRIVATE DRAINAGE TO BE REMOVED
- FW — FW — FW — EXISTING SURFACE WATER CULVERT
- FW — FW — FW — EXISTING SURFACE WATER CULVERT - 7m EASEMENT
- FW — FW — FW — PROPOSED PRIVATE SURFACE WATER SEWER
- FW — FW — FW — PROPOSED PRIVATE WASTE WATER SEWER
- FW — FW — FW — PROPOSED ATTENUATION TANK
- FW — FW — FW — PROPOSED PERMEABLE SURFACING
- FW — FW — FW — DENOTES RETAINING WALL
- FW — FW — FW — SITE BOUNDARY

**DRAINAGE NOTES**

REFERENCE SHOULD BE MADE TO THE DRAINAGE STRATEGY DOCUMENT REF: LCNP-WML-00-XV-RP-D-053.

THE EXISTING DRAINAGE SHOWN ON THIS DRAWING IS BASED UPON THE UNITED UTILITIES (U) SEWER RECORDS, CCTV SURVEY UNDERTAKEN BY BLOCKED DRAINS NORTHWEST (APRIL 2024) AND AS-BUILT DRAINAGE RECORDS.

THE LOCATION OF THE EXISTING SURFACE WATER CULVERT IS SHOWN INDICATIVE ONLY AND IS BASED UPON SURVEY INFORMATION UNDERTAKEN BY MALCOLM HUGHES CHARTERED SURVEYORS- APRIL 2023.

ALL DRAINAGE LEVELS SHOWN ARE FOR INFORMATION PURPOSES ONLY AND ARE BASED UPON THE EXISTING TOPOGRAPHICAL SURVEY. PROPOSED FINISHED LEVELS ARE TO BE PROVIDED BY 10 ARCHITECTS PRIOR TO DETAILED DESIGN.

THE ARCHITECT IS RESPONSIBLE FOR CONFIRMING ALL MANHOLE COVER LEVELS PRIOR TO CONSTRUCTION.

THE PROPOSED DRAINAGE DESIGN INFORMATION SHOWN ON THIS DRAWING IS FOR INFORMATION PURPOSES ONLY AND IS SUBJECT TO DETAILED DESIGN.

RAIN WATER PIPES AND SLAB PENETRATIONS ARE SHOWN INDICATIVE ONLY. ARCHITECT/MEP ENGINEER IS TO CONFIRM FINAL SETTING OUT INFORMATION PRIOR TO CONSTRUCTION.

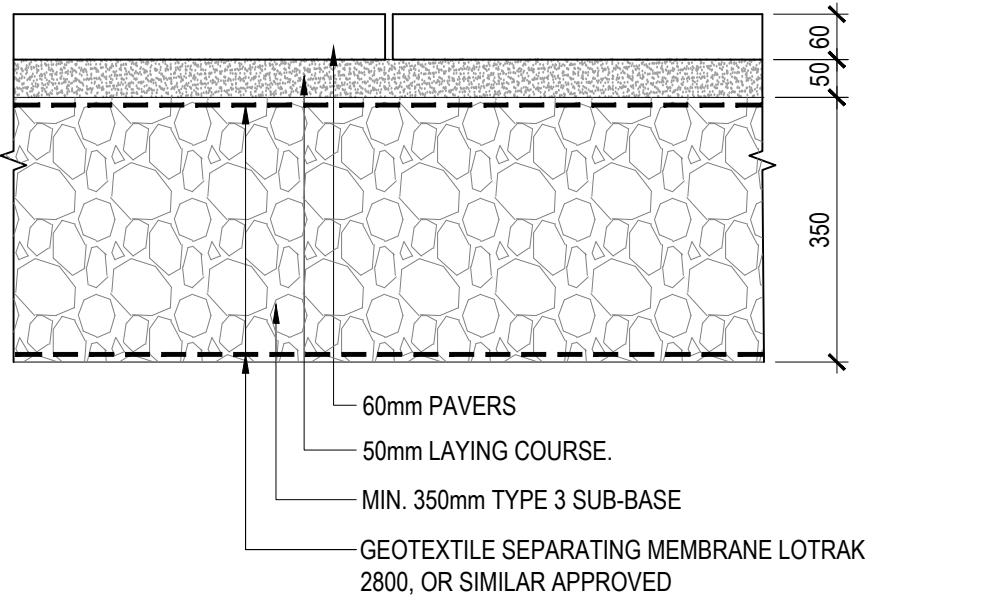
(BD) DENOTES EXTERNAL BACKDROP

(CP) DENOTES 'CATCH PIT' WITH 500mm DEEP SUMP BELOW OUTGOING INVERT LEVEL

(FC) DENOTES FLOW CONTROL CHAMBER

(PVD) DENOTES PERMAVOID DIFFUSER UNITS

(VC) DENOTES VENTED COVER



ALL WORKS TO BE IN ACCORDANCE WITH BS7533-3 GENERALLY.

PAVER: THICKNESS 60mm

MATERIAL: AS SPECIFIED BY ARCHITECT

LAYING COURSE: THICKNESS 50mm

MATERIAL: IN ACCORDANCE WITH Q24/455A

ROADBASE: NON REQUIRED.

MATERIAL: NA

GRANULAR SUB-BASE AS SECTION Q20 OF WML SPECIFICATION THICKNESS 350 mm (SHW803 TYPE 3 GSB - MINIMUM 30% VOID RATIO).

JOINTING: NARROW JOINTS TO ARCHITECTS DETAIL

MATERIAL: IN ACCORDANCE WITH Q24/510A

LAYING PATTERN: AS SPECIFIED BY ARCHITECT.

ASSUMED CBR: 5% (SUBJECT TO CONFIRMATION OF CBR TESTS BY SITE INVESTIGATION SPECIALIST AFTER SITE STRIP)

ADDITIONAL FILLING REQUIRED TO RAISE SURFACE LEVEL FOLLOWING SITE STRIP TO BE IN ACCORDANCE WITH Q20, (SH803 TYPE 3 GSB).

ALL MATERIAL WITHIN 450MM OF SURFACE LEVEL TO BE NON-FROST SUSCEPTIBLE. IF ENCOUNTERED NOTIFY WML. REPLACEMENT FILL TO BE GRADE #P2 OR #P3 UNLESS AGREED OTHERWISE.

**TYPICAL DETAIL PERMEABLE BRICK / BLOCK PAVING TO FOOTPATHS**

(SCALE 1:10)

**GENERAL NOTES**

DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.

NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.

ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.

THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH WML DRAINAGE DETAIL DRAWINGS FOR DETAILS OF MATERIALS AND WORKMANSHIP REFER TO THE SPECIFICATION.

THE CONTRACTOR IS RESPONSIBLE FOR CHECKING INVERT LEVELS AND POSITIONS OF ALL EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES SHOWN ON THIS DRAWING IMMEDIATELY ON SITE ESTABLISHMENT. ANY DISCREPANCIES MUST BE REPORTED TO WML CONSULTING IMMEDIATELY.

WHERE THE NEW SITE DRAINAGE CONNECTS IN TO EXISTING MANHOLES IN CARRIAGEWAYS AND/OR EXISTING ADOPTED SEWERS, THE CONTRACTOR IS RESPONSIBLE FOR ALL LIAISON WITH THE RELEVANT STATUTORY UNDERTAKER AND LOCAL AUTHORITY WITH REGARD TO ROAD CLOSURES, TRAFFIC MANAGEMENT, PERMITS TO WORK, SUBMISSION OF CONTRACTORS METHOD STATEMENTS AND RISK ASSESSMENTS AND OTHER DOCUMENTATION AND CORRESPONDENCE ASSOCIATED WITH THE SITE STAGE (PART 2) ELEMENT OF THE WORKS.

ROCKER PIPES TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES.

PROVIDE ADEQUATE PROTECTION TO MAINTAIN MINIMUM COVER TO DRAINS DURING THE CONSTRUCTION PERIOD.

COVER LEVELS ON THIS DRAWING ARE FOR INFORMATION PURPOSES ONLY.

THE LAYOUT OF DRAINAGE ON THIS DRAWING IS FOR INFORMATION PURPOSES ONLY.

U.N.O SURFACE WATER DRAINAGE PIPES OVER 0100mm TO BE TWIN WALLED STRUCTURED PLASTIC APPROVED BY THE ENGINEER.

U.N.O FOUL WATER DRAINAGE PIPES TO BE SUPERSLEVE VITRIFIED CLAY PIPES OR SIMILAR.

ALL COVERS AND RODDING ACCESS POINTS TO BE SEALED AND SCREWED TIGHT.

ALL INTERNAL MANHOLE COVERS TO BE DOUBLE SEALED, LOCKABLE AND RECESSED TO ACCEPT FLOOR FINISHES WHERE APPLICABLE.

SETTING OUT OF ALL INTERNAL GULLY/PLUMBING CONNECTIONS TO BE CO-ORDINATED BETWEEN THE SERVICE ENGINEERS AND THE ARCHITECT.

ALL INTERNAL GULLIES, PLUMBING CONNECTIONS, SOIL STACKS, SVPS AND ALL OTHER CONNECTIONS OF FOUL AND SURFACE WATER DRAINS TO BELOW GROUND TO BE FITTED WITH ACCESSIBLE RODDING POINTS ABOVE SLAB LEVEL.

ALL SURFACE WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:80 UNLESS NOTED OTHERWISE.

ALL FOUL WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:40 UNLESS NOTED OTHERWISE.

ALL CONNECTIONS TO BE MADE IN ACCORDANCE WITH STANDARD DETAIL DRAWINGS.

ALL PIPEWORK TO BE INSTALLED WITH SOFFITS LEVEL (E.G. AT CHANGES IN PIPE SIZE) U.N.O.

FOR DETAILS OF GREASE TRAP/MACERATOR REQUIREMENTS ASSOCIATED WITH KITCHENS REFER TO SERVICE ENGINEER.

ON COMPLETION OF DRAINAGE WORKS, THE NEW DRAINAGE SYSTEM IS TO BE THOROUGHLY CLEANED AND A CCTV SURVEY CARRIED OUT TO CONFIRM NO CONSTRUCTION DEBRIS OR BLOCKAGES REMAIN.

CONNECTIONS TO CARRIER DRAINS ARE TO BE 'Y' JUNCTIONS.

ALL PRIVATE DRAINAGE IS TO COMPLY WITH BS EN 752 AND BUILDING REGS. PART H.

PIPE GRADIENTS ARE INDICATIVE MINIMUMS.

SURFACE CHANNEL DRAINS TO BE ACO MULTIDRAIN OR SIMILAR.

**MANHOLES:**

ALL PROPOSED NEW MANHOLES TO BE PRECAST RING MANHOLES TYPE B UNLESS NOTED OTHERWISE. INTERNAL DIAMETERS OF MANHOLES TO BE 1050mm WHERE DEPTH TO PIPE SOFFIT IS LESS THAN 1.5m AND 1200mm Ø ELSEWHERE UNLESS NOTED OTHERWISE. IC - DENOTES POLYPROPYLENE INSPECTION CHAMBER BY HEPWORTHY OR SIMILAR APPROVED INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

**MANHOLE COVERS:**

CARRIAGEWAYS GENERAL - EN124 CLASS D400

CARRIAGEWAYS WITHIN 0.5m OF KERB - EN124 CLASS C250

SLOW MOVING HGV (S8) - EN 124 CLASS B125 SLOW MOVING

GLV (V10), EN 124 CLASS B125 SLOW MOVING PRIVATE CARS - EN124 CLASS B125.

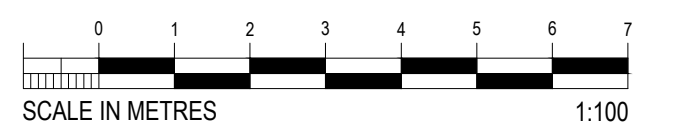
INTERNAL - JONES OF OSWESTRY - SUPRASTEEL DOUBLE SEALED WITH NEOPRENE GASKET AND COVER GREASE OR SIMILAR APPROVED.

REFER TO ARCHITECTS DRAWINGS FOR DETAILS OF ANY MANHOLE COVERS WHICH REQUIRE INSET PANELS.

|                                                                                                                                                                                                                                                               |                                |          |          |            |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------|----------|------------|--|
|                                                                                                                                                                                                                                                               |                                |          |          |            |  |
| P03                                                                                                                                                                                                                                                           | REVISED TO SUIT LLFA COMMENTS. | 17.08.24 | DB       | LoG        |  |
| P02                                                                                                                                                                                                                                                           | PLANNING ISSUE.                | 16.05.24 | DB       | LoG        |  |
| P01                                                                                                                                                                                                                                                           | PRELIMINARY ISSUE.             | 16.05.24 | DB       | LoG        |  |
| Rev.                                                                                                                                                                                                                                                          | Amendment                      | Date     | By       | Chkd       |  |
| Project<br>St VINCENT'S,<br>LORETO COLLEGE                                                                                                                                                                                                                    |                                |          |          |            |  |
| ARCHCLIENT<br><b>CaddickConstruction.</b>                                                                                                                                                                                                                     |                                |          |          |            |  |
| Title<br>PROPOSED DRAINAGE GA                                                                                                                                                                                                                                 |                                |          |          |            |  |
| WML Job No.                                                                                                                                                                                                                                                   | Drawn                          | Checked  | Date     | Scale      |  |
| 10939                                                                                                                                                                                                                                                         | DB                             | LoG      | MAY 2024 | 1:100 @ A0 |  |
| <b>WML CONSULTING</b><br>Civil, Structural & Geotechnical Engineers<br>No.8 Oak Green<br>East Road<br>Barnley Green Business Park<br>Chesham Bucks G2L<br>Tel: 01494 682 000<br>Fax: 01494 682 010<br>e-mail: info@wmlconsulting.com<br>www.wmlconsulting.com |                                |          |          |            |  |
| Drawing No.<br>Project Originator Volume Level Type Role Number Rev                                                                                                                                                                                           |                                |          |          |            |  |
| LCNP - WML - 00 - FN - DR - D - 5201 P03                                                                                                                                                                                                                      |                                |          |          |            |  |

**SUBJECT TO APPROVAL FROM LOCAL PLANNING AUTHORITY**

**PRELIMINARY**



**Surface Water Drainage Calculations  
10939-WML-00-XX-CA-C-0002**

# Surface Water Drainage Calculations

For a site referred to as

**St Vincent's**

Undertaken on behalf of

**Loreto College**

**WML Job No: 10939**

**Document No: 10939-WML-ZZ-XX-CA-C-0002**

**Date: August 2024**

|                                |                           |                |                     |             |              |
|--------------------------------|---------------------------|----------------|---------------------|-------------|--------------|
| <b>Project No. &amp; Name:</b> | 10939 – St Vincent’s      | <b>Status:</b> | <b>Prepared by:</b> | <b>Rev:</b> | <b>Date:</b> |
| <b>Document Ref:</b>           | 10939-WML-ZZ-XX-CA-C-0002 | Preliminary    | Daniel Baker        | P02         | August 2024  |

## General Notes

1. The calculations within this document have been undertaken using MicroDrainage Software version 2020.
2. This document is to be read in conjunction with the following documents;
  - a. LCNP-WML-00-FN-DR-D-5201 – Proposed Drainage GA
  - b. LCNP-WML-00-XX-RP-D-053 – Drainage Strategy Document

## Summary of Results

1. The following summary demonstrates that the outgoing flow rates for the new development works are less than or equal to the 5 l/s allowable flow rate described within the drainage strategy document.

| Proposed Site Runoff<br>Rate – Manhole S6 (l/s) |
|-------------------------------------------------|
| 1: 3.5                                          |
| 30: 5.0                                         |
| 100+45%: 5.0                                    |

## **Existing Greenfield Runoff Rates**

|                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| WML Consulting Ltd                                                                                                                                                                                                                                                                                                       |                                  | Page 1                                                                              |
| No. 8 Oak Green<br>Stanley Green Business Park<br>Earl Rd, Cheadle Hulme, SK8 6QL                                                                                                                                                                                                                                        |                                  |  |
| Date 15/05/2024 07:34<br>File                                                                                                                                                                                                                                                                                            | Designed by DBaker<br>Checked by |                                                                                     |
| Innovyze                                                                                                                                                                                                                                                                                                                 | Source Control 2020.1.3          |                                                                                     |
| <div>ICP SUDS Mean Annual Flood</div> <div>Input</div> <div>Return Period (years)1Soil0.450<br/>Area (ha) 0.035Urban0.750<br/>SAAR (mm)860Region NumberRegion 10</div> <div>Results1/s</div> <div>QBAR Rural 0.2<br/>QBAR Urban 0.5<br/><br/>Q1 year 0.4<br/><br/>Q1 year 0.4<br/>Q30 years 0.7<br/>Q100 years 0.8</div> |                                  |                                                                                     |
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## **Proposed Surface Water Network Calculation**

|                                                                                   |                                  |                                                                                     |
|-----------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| WML Consulting Ltd                                                                |                                  | Page 1                                                                              |
| No. 8 Oak Green<br>Stanley Green Business Park<br>Earl Rd, Cheadle Hulme, SK8 6QL |                                  |  |
| Date 16/08/2024 17:14<br>File 10939 - Surface Water -...                          | Designed by DBaker<br>Checked by |                                                                                     |
| Innovyze                                                                          | Network 2020.1.3                 |                                                                                     |

## STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Designed with Level Soffits

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|---------------------------------------------------------------------------------------|
| S1.000 | 12.502        | 0.125       | 100.0          | 0.010          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |
| S2.000 | 18.500        | 0.125       | 148.0          | 0.010          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |
| S1.001 | 4.500         | 0.050       | 90.0           | 0.014          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |
| S1.002 | 15.000        | 0.075       | 200.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| S1.003 | 4.000         | 0.100       | 40.0           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |
| S1.004 | 7.592         | 0.200       | 38.0           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |      |  |

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | E I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.000 | 46.01           | 5.21           | 31.525       | 0.010            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8         | 1.3           |
| S2.000 | 45.39           | 5.37           | 31.525       | 0.010            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.6         | 1.2           |
| S1.001 | 45.13           | 5.45           | 31.400       | 0.034            | 0.0                  | 0.0           | 0.0               | 1.06         | 18.7         | 4.2           |
| S1.002 | 44.44           | 5.64           | 31.125       | 0.034            | 0.0                  | 0.0           | 0.0               | 1.28         | 141.1        | 4.2           |
| S1.003 | 44.29           | 5.68           | 31.050       | 0.034            | 0.0                  | 0.0           | 0.0               | 1.60         | 28.2         | 4.2           |
| S1.004 | 44.03           | 5.76           | 30.950       | 0.034            | 0.0                  | 0.0           | 0.0               | 1.64         | 29.0         | 4.2           |

|                                                                                   |                                  |                                                                                     |
|-----------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| WML Consulting Ltd                                                                |                                  | Page 2                                                                              |
| No. 8 Oak Green<br>Stanley Green Business Park<br>Earl Rd, Cheadle Hulme, SK8 6QL |                                  |  |
| Date 16/08/2024 17:14<br>File 10939 - Surface Water -...                          | Designed by DBaker<br>Checked by |                                                                                     |
| Innovyze                                                                          |                                  | Network 2020.1.3                                                                    |

Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN     | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | PN     | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|--------|---------------------------|------------------------|--------|---------------------------|------------------------|---------------|
| S1      | 32.350    | 0.825        | Open Manhole  | 450                | S1.000 | 31.525                    | 150                    |        |                           |                        |               |
| S2      | 32.350    | 0.825        | Open Manhole  | 450                | S2.000 | 31.525                    | 150                    |        |                           |                        |               |
| S3      | 32.350    | 0.950        | Open Manhole  | 450                | S1.001 | 31.400                    | 150                    | S1.000 | 31.400                    | 150                    |               |
|         |           |              |               |                    |        |                           |                        | S2.000 | 31.400                    | 150                    |               |
| S4      | 32.300    | 1.175        | Open Manhole  | 1500               | S1.002 | 31.125                    | 375                    | S1.001 | 31.350                    | 150                    |               |
| S5      | 32.300    | 1.250        | Open Manhole  | 1500               | S1.003 | 31.050                    | 150                    | S1.002 | 31.050                    | 375                    |               |
| S6      | 32.300    | 1.350        | Open Manhole  | 1050               | S1.004 | 30.950                    | 150                    | S1.003 | 30.950                    | 150                    |               |
| S       | 32.300    | 1.550        | Open Manhole  | 0                  |        | OUTFALL                   |                        | S1.004 | 30.750                    | 150                    |               |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| S1      | 383275.093          | 396053.346           | 383275.093               | 396053.346                | Required       |  |
| S2      | 383292.974          | 396039.973           | 383292.974               | 396039.973                | Required       |                                                                                       |
| S3      | 383286.903          | 396057.448           | 383286.903               | 396057.448                | Required       |                                                                                       |
| S4      | 383291.154          | 396058.925           | 383291.154               | 396058.925                | Required       |                                                                                       |
| S5      | 383296.077          | 396044.756           | 383296.077               | 396044.756                | Required       |                                                                                       |
| S6      | 383298.080          | 396041.294           | 383298.080               | 396041.294                | Required       |                                                                                       |
| S       | 383301.884          | 396034.723           |                          |                           | No Entry       |                                                                                       |

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No. 8 Oak Green  
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PIPELINE SCHEDULES for Storm

Upstream Manhole

| PN     | Hyd Sect | Diam (mm) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|--------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| S1.000 | o        | 150       | S1      | 32.350      | 31.525      | 0.675       | Open Manhole  | 450                |
| S2.000 | o        | 150       | S2      | 32.350      | 31.525      | 0.675       | Open Manhole  | 450                |
| S1.001 | o        | 150       | S3      | 32.350      | 31.400      | 0.800       | Open Manhole  | 450                |
| S1.002 | o        | 375       | S4      | 32.300      | 31.125      | 0.800       | Open Manhole  | 1500               |
| S1.003 | o        | 150       | S5      | 32.300      | 31.050      | 1.100       | Open Manhole  | 1500               |
| S1.004 | o        | 150       | S6      | 32.300      | 30.950      | 1.200       | Open Manhole  | 1050               |

Downstream Manhole

| PN     | Length (m) | Slope (1:X) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|--------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| S1.000 | 12.502     | 100.0       | S3      | 32.350      | 31.400      | 0.800       | Open Manhole  | 450                |
| S2.000 | 18.500     | 148.0       | S3      | 32.350      | 31.400      | 0.800       | Open Manhole  | 450                |
| S1.001 | 4.500      | 90.0        | S4      | 32.300      | 31.350      | 0.800       | Open Manhole  | 1500               |
| S1.002 | 15.000     | 200.0       | S5      | 32.300      | 31.050      | 0.875       | Open Manhole  | 1500               |
| S1.003 | 4.000      | 40.0        | S6      | 32.300      | 30.950      | 1.200       | Open Manhole  | 1050               |
| S1.004 | 7.592      | 38.0        | S       | 32.300      | 30.750      | 1.400       | Open Manhole  | 0                  |

Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| S1.004              | S            | 32.300       | 30.750       | 0.000            | 0        | 0      |

Simulation Criteria for Storm

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow   | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m³/ha Storage       | 2.000 |
| Hot Start (mins)                | 0     | Inlet Coefficient                   | 0.800 |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day) | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                     | 60    |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)              | 1     |
| Number of Input Hydrographs     | 0     | Number of Storage Structures        | 0     |
| Number of Online Controls       | 1     | Number of Time/Area Diagrams        | 0     |
| Number of Offline Controls      | 0     | Number of Real Time Controls        | 0     |

Synthetic Rainfall Details

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                                                                     |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|----------------|-----|--------------|--------|-----------------------|---|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|--|--|
| WML Consulting Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    | Page 4                                                                              |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| No. 8 Oak Green<br>Stanley Green Business Park<br>Earl Rd, Cheadle Hulme, SK8 6QL                                                                                                                                                                                                                                                                                                                                                                         |                    |  |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Date 16/08/2024 17:14                                                                                                                                                                                                                                                                                                                                                                                                                                     | Designed by DBaker |                                                                                     |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| File 10939 - Surface Water -...                                                                                                                                                                                                                                                                                                                                                                                                                           | Checked by         |                                                                                     |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Network 2020.1.3   |                                                                                     |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| <div>Synthetic Rainfall Details</div> <table><tr><td>Rainfall Model</td><td>FSR</td><td>Profile Type</td><td>Summer</td></tr><tr><td>Return Period (years)</td><td>1</td><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>0.840</td></tr><tr><td>M5-60 (mm)</td><td>18.000</td><td>Storm Duration (mins)</td><td>30</td></tr><tr><td>Ratio R</td><td>0.360</td><td></td><td></td></tr></table> |                    |                                                                                     | Rainfall Model | FSR | Profile Type | Summer | Return Period (years) | 1 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 18.000 | Storm Duration (mins) | 30 | Ratio R | 0.360 |  |  |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                            | FSR                | Profile Type                                                                        | Summer         |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                  | Cv (Summer)                                                                         | 0.750          |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                    | England and Wales  | Cv (Winter)                                                                         | 0.840          |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                | 18.000             | Storm Duration (mins)                                                               | 30             |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.360              |                                                                                     |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
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|                                                                                   |  |                                                                                     |
|-----------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|
| WML Consulting Ltd                                                                |  | Page 5                                                                              |
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| Date 16/08/2024 17:14<br>File 10939 - Surface Water -...                          |  |                                                                                     |
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| Innovyze                                                                          |  | Network 2020.1.3                                                                    |

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S5, DS/PN: S1.003, Volume (m³): 3.7

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SHE-0105-5000-1000-5000 |
| Design Head (m)                   | 1.000                      |
| Design Flow (l/s)                 | 5.0                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise upstream storage  |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 105                        |
| Invert Level (m)                  | 31.050                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.000    | 5.0        |
| Flush-Flo™                | 0.296    | 5.0        |
| Kick-Flo®                 | 0.637    | 4.1        |
| Mean Flow over Head Range | -        | 4.3        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 3.6        | 1.200     | 5.4        | 3.000     | 8.4        | 7.000     | 12.5       |
| 0.200     | 4.8        | 1.400     | 5.8        | 3.500     | 9.0        | 7.500     | 12.9       |
| 0.300     | 5.0        | 1.600     | 6.2        | 4.000     | 9.6        | 8.000     | 13.3       |
| 0.400     | 4.9        | 1.800     | 6.6        | 4.500     | 10.1       | 8.500     | 13.7       |
| 0.500     | 4.7        | 2.000     | 6.9        | 5.000     | 10.6       | 9.000     | 14.1       |
| 0.600     | 4.3        | 2.200     | 7.2        | 5.500     | 11.1       | 9.500     | 14.5       |
| 0.800     | 4.5        | 2.400     | 7.5        | 6.000     | 11.6       |           |            |
| 1.000     | 5.0        | 2.600     | 7.8        | 6.500     | 12.1       |           |            |

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No. 8 Oak Green  
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor \* 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 0

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

| PN     | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|--------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| S1.000 | S1         | 15 Winter | 1             | +0%            | 100/15 Summer   |                 |                    |               | 31.553          |
| S2.000 | S2         | 15 Winter | 1             | +0%            | 100/15 Summer   |                 |                    |               | 31.555          |
| S1.001 | S3         | 15 Winter | 1             | +0%            | 100/15 Summer   |                 |                    |               | 31.454          |
| S1.002 | S4         | 15 Winter | 1             | +0%            | 100/15 Summer   |                 |                    |               | 31.176          |
| S1.003 | S5         | 15 Winter | 1             | +0%            | 30/15 Summer    |                 |                    |               | 31.150          |
| S1.004 | S6         | 15 Winter | 1             | +0%            |                 |                 |                    |               | 30.988          |

| Surcharged Flooded |            |           |             |             | Half Drain     | Pipe        |            |                |
|--------------------|------------|-----------|-------------|-------------|----------------|-------------|------------|----------------|
| PN                 | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | Time (mins) | Flow (l/s) | Level Exceeded |
| S1.000             | S1         | -0.122    | 0.000       | 0.08        |                |             | 1.2        | OK             |
| S2.000             | S2         | -0.120    | 0.000       | 0.08        |                |             | 1.2        | OK             |
| S1.001             | S3         | -0.096    | 0.000       | 0.27        |                |             | 3.8        | OK             |
| S1.002             | S4         | -0.324    | 0.000       | 0.04        |                |             | 3.8        | OK             |
| S1.003             | S5         | -0.050    | 0.000       | 0.18        |                |             | 3.5        | OK             |
| S1.004             | S6         | -0.112    | 0.000       | 0.14        |                |             | 3.5        | OK             |

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Micro Drainage

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)  
for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor \* 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 0

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

| PN     | US/MH Name | Storm  | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|--------|------------|--------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| S1.000 | S1 15      | Winter | 30            | +0%            | 100/15          | Summer          |                    |               | 31.569          |
| S2.000 | S2 15      | Winter | 30            | +0%            | 100/15          | Summer          |                    |               | 31.572          |
| S1.001 | S3 15      | Winter | 30            | +0%            | 100/15          | Summer          |                    |               | 31.497          |
| S1.002 | S4 15      | Winter | 30            | +0%            | 100/15          | Summer          |                    |               | 31.333          |
| S1.003 | S5 15      | Winter | 30            | +0%            | 30/15           | Summer          |                    |               | 31.331          |
| S1.004 | S6 15      | Winter | 30            | +0%            |                 |                 |                    |               | 30.995          |

| PN     | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status     | Level Exceeded |
|--------|------------|-----------|-------------|-------------|----------------|------------------------|-----------------|------------|----------------|
| S1.000 | S1         | -0.106    | 0.000       | 0.19        |                |                        | 3.0             | OK         |                |
| S2.000 | S2         | -0.103    | 0.000       | 0.21        |                |                        | 2.8             | OK         |                |
| S1.001 | S3         | -0.053    | 0.000       | 0.73        |                |                        | 10.2            | OK         |                |
| S1.002 | S4         | -0.167    | 0.000       | 0.09        |                |                        | 9.2             | OK         |                |
| S1.003 | S5         | 0.131     | 0.000       | 0.25        |                |                        | 5.0             | SURCHARGED |                |
| S1.004 | S6         | -0.105    | 0.000       | 0.20        |                |                        | 5.0             | OK         |                |

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor \* 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 0

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

Water

Level

(m)

US/MH

Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

PN

S1

30 Winter

100

+45%

100/15 Summer

S2.000

S2

30 Winter

100

+45%

100/15 Summer

S1.001

S3

30 Winter

100

+45%

100/15 Summer

S1.002

S4

30 Winter

100

+45%

100/15 Summer

S1.003

S5

30 Winter

100

+45%

30/15 Summer

S1.004

S6

120 Winter

100

+45%

Surcharged

Flooded

Half Drain

Pipe

US/MH

Depth

Volume

Flow /

Overflow

Time

Flow

Status

Level

Exceeded

PN

Name

(m)

(m³)

Cap.

(l/s)

(mins)

(l/s)

S1.000

S1

0.270

0.000

0.28

4.5 SURCHARGED

S2.000

S2

0.271

0.000

0.32

4.3 SURCHARGED

S1.001

S3

0.388

0.000

1.00

14.0 SURCHARGED

S1.002

S4

0.429

0.000

0.11

11.5 SURCHARGED

S1.003

S5

0.726

0.000

0.25

5.0 SURCHARGED

S1.004

S6

-0.105

0.000

0.20

5.0 OK

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## **LLFA Pre-Consent Enquiry Comments**

|                                   |                                                                                                                                                              |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Case Ref:</b>                  | LOR/M15/A/LDC                                                                                                                                                |
| <b>Site Name:</b>                 | Loreto College                                                                                                                                               |
| <b>Associated Planning Ref:</b>   | 140110/FO/2024                                                                                                                                               |
| <b>Proposal:</b>                  | <input checked="" type="checkbox"/> <b>Connection</b><br><input type="checkbox"/> <b>Diversion</b><br><input type="checkbox"/> <b>Other: &lt;specify&gt;</b> |
| <b>Information Considered:</b>    |                                                                                                                                                              |
| <b>Planning Portal uploads:</b>   | 24/05/2024                                                                                                                                                   |
| <b>Further submission emails:</b> | NA                                                                                                                                                           |
| <b>Pre-App Advice:</b>            | LOR/M15/A/PRE                                                                                                                                                |

### **LLFA Comments 12/07/2024**

We have carried out an assessment of your pre-consent enquiry which is based on the information provided. This advice is valid for 12 months.

Where required, you must obtain Planning permission for your site and discharge Planning Conditions. Your drainage strategy will be reviewed by competent authorities during the Planning process.

#### **Connection**

We confirm connection agreement in principle to the 3.7m x 1.45 m diameter ordinary watercourse culvert within the site boundary at a pass forward flow up to 5 l/s.

#### **Consent Application**

Although we may discuss and agree discharge points and rates in principle, please be aware that you must apply for and obtain Land Drainage Consent (LDC) before connection can be made.

Land Drainage Consent is a technical approvals process where we assess detailed design, the method of construction and control methods to safeguard the asset and properties.

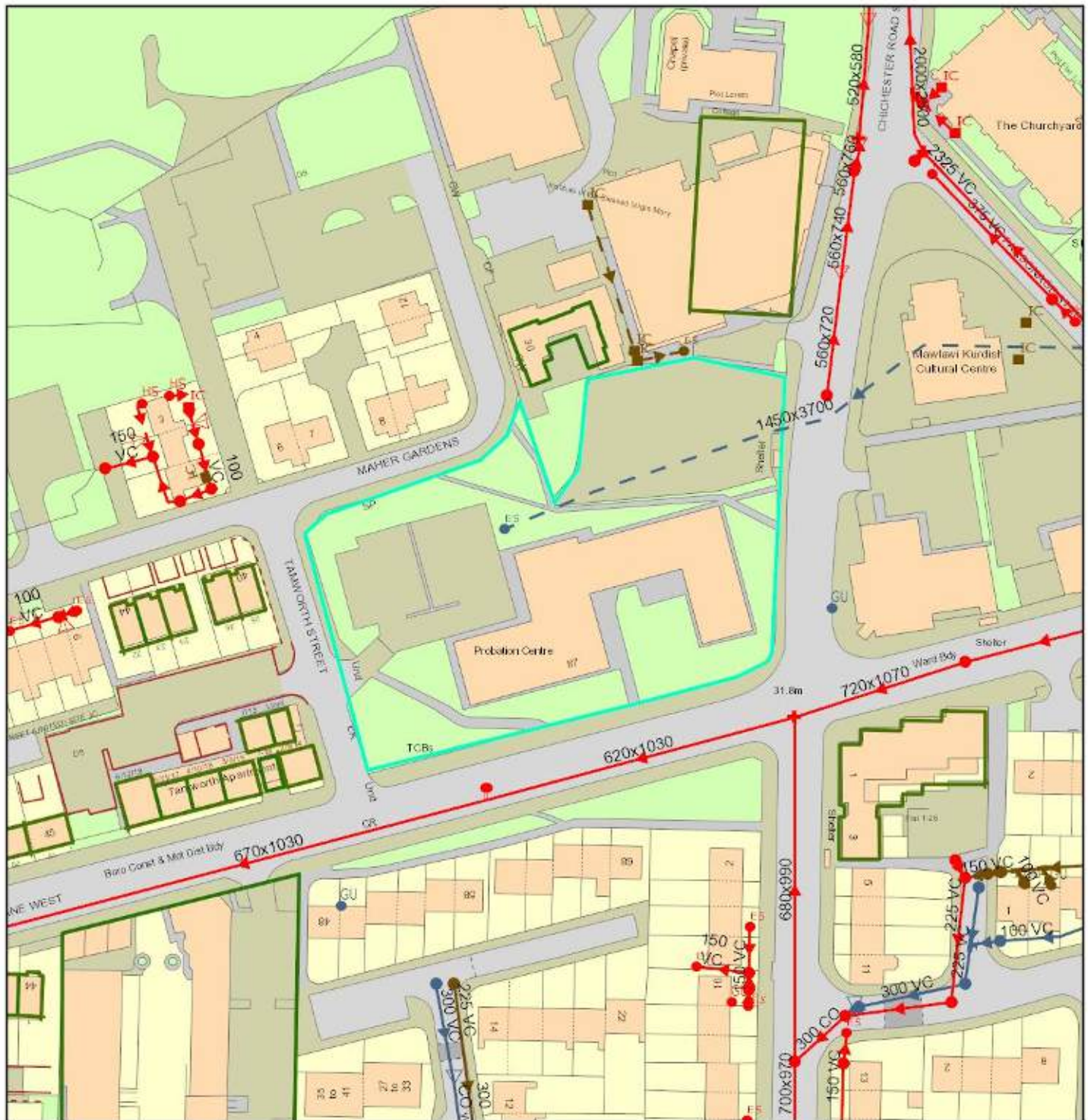
Please submit your LDC application with this agreement in principle attached. Details of the application process and required information can be obtained by contacting [floodriskmanagement@manchester.gov.uk](mailto:floodriskmanagement@manchester.gov.uk).

**Construction cannot begin until the Land Drainage Consent has been approved. Manchester City Council LLFA does not issue retrospective Land Drainage Consents.**

**United Utilities Sewer Records**

SEWER RECORD

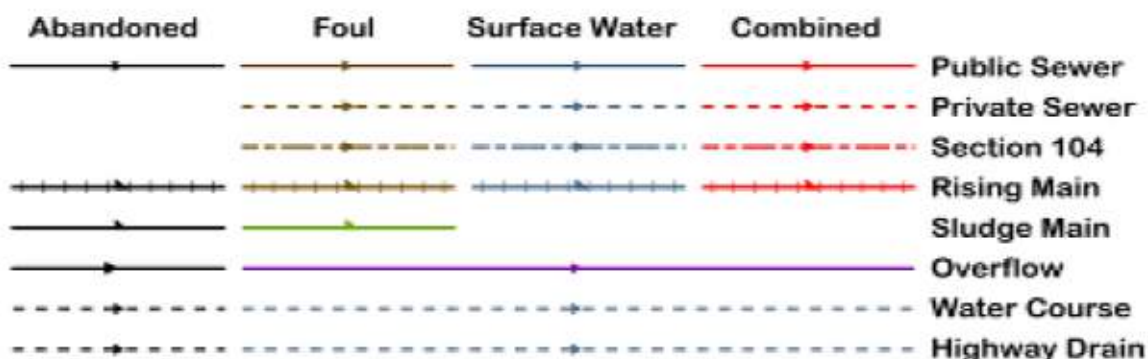
Former Moss Side Probation Offices 87 Moss Lane West Moss Side Manchester M15 5PE



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

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## Wastewater Symbolology



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

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

## **Corn Brook Culvert Survey Drawings**

