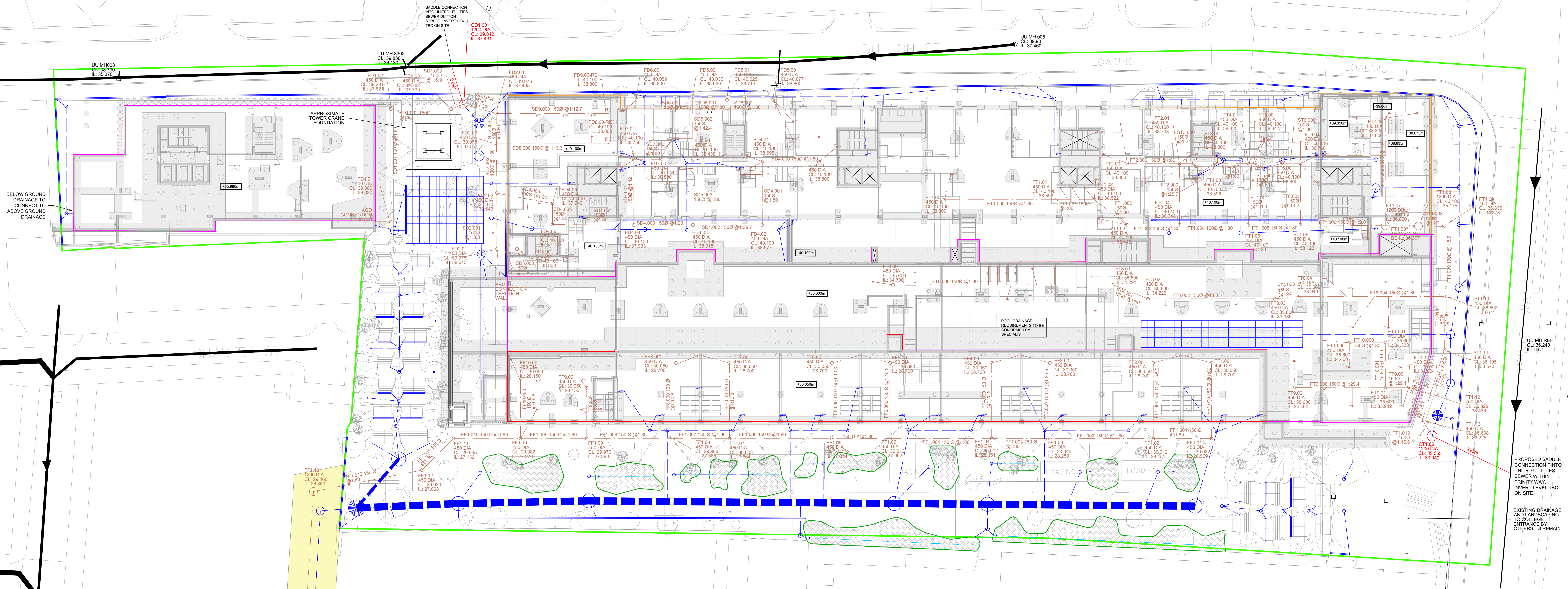




- DRAWING LEGEND**
- PLANNING BOUNDARY
  - PROPOSED SURFACE WATER DRAINAGE (150mm DIAMETER UNO)
  - PROPOSED FOUL WATER DRAINAGE (150mm DIAMETER UNO)
  - PROPOSED COMBINED SEWER
  - EXISTING UNITED UTILITIES COMBINED SEWER
  - GULLY
  - CHANNEL DRAIN TO LANDSCAPE ARCHITECTS SPECIFICATION UNO
  - RAINWATER PIPE/ SOIL VENT PIPE
  - PROPOSED BACKDROP MANHOLE
  - PROPOSED INLINE NO-RETURN VALVE
  - POLYPIPE ATTENUATION TANK TO CONTRACTOR DESIGN
  - BIO RETENTION AREA REFER TO DRAWING BRW-REN-ZZ-FN-DR-C-03105 FOR DETAILS
  - INDICATES EASEMENT ON DRAINAGE PASSING THROUGH ADJACENT PRIVATE LAND AS AGREED WITH LAND OWNER - EMAIL DATED 03/07/2023
- FLOOR LEVELS**
- INDICATES GROUND FLOOR LEVEL
  - INDICATES BASEMENT LEVEL 01
  - INDICATES BASEMENT LEVEL 02



**NOTES:**

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
- REFER TO DRAWING BRW-REN-ZZ-FN-DR-C-01101 FOR BELOW GROUND FOUL WATER DRAINAGE DETAILS.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE BELOW GROUND DRAINAGE SPECIFICATION SP-C-00050 AND DETAILS SHOWN ON DRAWINGS C-03101, C-03102, C-03103, C-03104 & C-03105.
- FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECTS DRAWINGS.
- ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C, DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN BS8 AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
- RWP, SVP, S&A AND FLOOR GULLIES ARE TO HAVE RODDABLE ACCESS POINTS ABOVE GROUND FLOOR TO BUILDING SERVICES DETAILS.
- THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN, ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
- THE CONTRACTOR IS TO KEEP A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND PROVIDE THIS TO RENAISSANCE UPON COMPLETION OF THE WORKS TO ALLOW FOR PRODUCTION OF A FINAL CONSTRUCTION ISSUE DRAWING.
- DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
- THE CHAMBER SIZE OF PCC MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BEINGS.
- MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.

- ALL INTERNAL COVERS TO BE RECESSED AND TRIPLE SEALED
- COVER SLABS MUST CARRY THE BS8 KITEMARK, WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
- ALL SEWERS TO BE BS8 KITEMARK (CERTIFIED TO WIS 4-35-01)
- ALL CONCRETE PIPES TO BE TO BS EN 1916 CLASS 120 (S4N/m).
- BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08002 (TABLE A2).
- IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:  
A BS8 KITEMARK (CERTIFIED TO BS EN 14010 AND WIS 4-35-01)  
B PIPES LESS THAN OR EQUAL TO 200mm DIA  
C BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08002 (TABLE A2)
- THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA: 40kN/m, 150mm DIA: 40kN/m, 225mm DIA: 45kN/m and 300mm DIA: 72kN/m.
- THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE: CLAS 180 TO EN 1916/BS8111-1:2002. PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN14746.
- SULPHATE RESISTANT CEMENT (C20/22) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
- SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.
- ALL FOUL AND SURFACE WATER BELOW GROUND SYSTEMS ARE TO BE VENTED WITHIN THE ABOVE GROUND DRAINAGE TO THE BUILDING SERVICES ENGINEERS DETAILS.

**CDM NOTES**

IN ADDITION TO THE NORMAL HAZARDS AND RISK NORMALLY ASSOCIATED WITH WORKS OF THIS NATURE, NOTE THE FOLLOWING ABNORMAL RISKS.

**SOIL CONTAMINATION**

HEAVY METAL, PAH AND ASBESTOS CONTAMINATION IDENTIFIED WITHIN THE MADE GROUND. MINOR HEAVY METAL AND NON-METAL CONTAMINATION IDENTIFIED WITHIN PERCHED GROUNDWATER.

**STAKING UXO OR BURIED SERVICES**

SITE ENABLING WORKS PACKAGE REQUIRED TO CLEAR LIVE SERVICES AND UXO RISK

**PERCHED WATER TABLE**

ALLOW FOR LOCALISED DEWATERING DURING ALL SUBSTRUCTURE WORKS.

REFERENCE SHOULD BE MADE TO BROWNFIELD SOLUTIONS LTD SITE INVESTIGATION FOR GROUND CONDITIONS AND PERCHED GROUND WATER TABLES. CONTRACTOR SHOULD MAKE ALLOWANCE FOR TEMPORARY DEWATERING TRENCH SUPPORT WORKS PRIOR TO CONSTRUCTION.



**RIBA STAGE 4:**

THIS DRAWING IS INTENDED TO COMMUNICATE THE INTERIM PROGRESS OF THE TECHNICAL DESIGN AND IS APPROPRIATE FOR RIBA STAGE 4. A DESIGN CONTINGENCY OF 10-15% IS RECOMMENDED TO ALLOW FOR DESIGN DEVELOPMENT DURING RIBA STAGE 4S (TECHNICAL DESIGN) AND TO REFLECT INPUT FROM THE CONTRACTOR DESIGNED PACKAGES.

**EXISTING ON-SITE PRIVATE DRAINAGE**

ALL EXISTING ON-SITE PRIVATE DRAINAGE IS TO BE GRUBBED UP AND SUITABLY CAPPED AT THE SITE BOUNDARY PRIOR TO DISCONNECT/ REMOVAL. THE DRAINAGE SHOULD BE SURVEYED TO CONFIRM IT IS REDUNDANT.

**SVP & RWP SETTING OUT AND CALCULATIONS**

SVP AND RWP LOCATIONS ARE INDICATIVE FOR DETAILED SETTING OUT REFER TO ARCHITECTS DRAWINGS. ALL UNDER SLAB DRAINAGE IS IN AVERAGE UNTIL SETTING OUT OF ALL SVPs, STAKES AND RWPs ARE CONFIRMED BY THE ARCHITECT AND MAE ENGINEERING. ALL CONNECTIONS BETWEEN ABOVE GROUND DRAINAGE TO BE SIZED TO SUIT ABOVE GROUND DRAINAGE. FOUL WATER DRAINAGE IS SUBJECT TO CHANGE UNTIL SVP DISCHARGE UNITS ARE CONFIRMED BY THE MAE ENGINEER.

**ATTENUATION TANK**

SUPPLIER TO UNDERTAKE DETAILED DESIGN OF ATTENUATION TANKS ALLOW FOR VENT PIPES AND INSPECTION CHAMBERS TO SUIT SUPPLIERS DETAILS AND REQUIREMENTS.

**COVER LEVELS**

LANDSCAPE ARCHITECT TO VALIDATE COVER LEVELS IN ALL EXTERNAL AREAS. ARCHITECT TO VALIDATE COVER LEVELS IN ALL INTERNAL AREAS.

**EXTERNAL WORKS AND DRAINAGE**

ALL EXTERNAL LEVELS, CHANNEL DRAINS, GULLIES ETC ARE TO BE CONFIRMED AND SET OUT BY THE LANDSCAPE ARCHITECT.

**COMMERCIAL UNIT DRAINAGE**

ANY FOOD AND BEVERAGE USE TO THE COMMERCIAL UNITS IS TO INCORPORATE GREASE TRAPS WITHIN THE ABOVE GROUND DRAINAGE NETWORK TO REDUCE THE RISKS OF BLOCKAGE WITHIN THE BELOW GROUND DRAINAGE NETWORKS.

**TREES**

THE DESIGN OF LANDSCAPING SHOULD BE UNDERTAKEN AT THE SAME TIME AS THE DESIGN OF THE DRAINAGE SO THAT THE IMPACT OF TREE ROOTS ON THE DRAINAGE CAN BE CONSIDERED. A SEWER OR LATERAL DRAIN SHOULD NOT BE LOCATED CLOSER TO TREES/BUSHES/SHRUBS THAN THE CANOPY WIDTH AT MATURE HEIGHT. EXCEPT WHERE SPECIAL PROTECTION MEASURES ARE PROVIDED, IN ACCORDANCE WITH 67.6 OF THE SEWER SECTOR GUIDANCE APPENDIX C, A TREE SHOULD NOT BE PLANTED DIRECTLY OVER SEWERS OR WHERE EXCAVATION ONTO THE SEWER WOULD REQUIRE REMOVAL OF THE TREE.

**SWIMMING POOL**

POOL SPECIALIST TO CONFIRM RISING MAIN LOCATIONS, POWER SUPPLIES AND ALARMS LOCATIONS WITH THE ARCHITECT AND BUILDING SERVICES ENGINEER.

**APPROVAL**

DRAINAGE DESIGN AND DRAWING IS PRELIMINARY. SUBJECT TO CONFIRMATION FROM UNITED UTILITIES AND MANCHESTER CITY COUNCIL ON ACCEPTANCE OF DISCHARGE RATES, CONNECTIONS AND SLOWS.

|     |               |          |    |    |
|-----|---------------|----------|----|----|
| P01 | STAGE 4 ISSUE | 13.09.23 | JB | PC |
|-----|---------------|----------|----|----|

|      |              |       |     |       |
|------|--------------|-------|-----|-------|
| Rev: | Description: | Date: | By: | Chkd: |
|------|--------------|-------|-----|-------|



**BODDINGTONS BREWERY, MANCHESTER**

Drawing Title:

**BELOW GROUND FOUL WATER DRAINAGE PLAN**

Status:

**STAGE 4**

|       |        |           |              |             |
|-------|--------|-----------|--------------|-------------|
| Size: | Date:  | Drawn by: | Designed by: | Checked by: |
| A0    | SEP 23 | JB        | JB           | PC          |

Scale: 1:200 Project No: 2211-11

Project - Originator - Volume - Level - Type - Role - Number - Revision:

BRW-REN-ZZ-FN-DR-C-01101 P01

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## **APPENDIX K**

# **PROPOSED SURFACE WATER RUN-OFF VOLUME CALCULATIONS**

|                                                          |                                         |                                                                                     |
|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                         | Page 1                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC         |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                        |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Trinity Way

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Trinity Way

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.261        | 4-8            | 0.089        |

Total Area Contributing (ha) = 0.350

Total Pipe Volume (m³) = 8.318

#### Network Design Table for Storm - Trinity Way

« - Indicates pipe capacity < flow

| 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 |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|----------------|
| ST1.000 | 15.946        | 0.106       | 150.0          | 0.044          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🔒              |
| ST1.001 | 18.054        | 0.120       | 150.0          | 0.006          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.002 | 8.989         | 0.608       | 14.8           | 0.006          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.003 | 13.773        | 0.092       | 150.0          | 0.114          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.004 | 4.171         | 0.213       | 19.6           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST2.000 | 10.641        | 0.071       | 150.0          | 0.038          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit | 🔒              |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| ST1.000 | 50.00           | 5.25           | 38.660       | 0.044            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 6.0           |
| ST1.001 | 50.00           | 5.53           | 38.554       | 0.050            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 6.8           |
| ST1.002 | 50.00           | 5.58           | 38.433       | 0.056            | 0.0                  | 0.0           | 0.0               | 3.42         | 136.0        | 7.6           |
| ST1.003 | 50.00           | 5.79           | 37.825       | 0.170            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 23.0          |
| ST1.004 | 50.00           | 5.81           | 37.734       | 0.170            | 0.0                  | 0.0           | 0.0               | 2.97         | 118.1        | 23.0          |
| ST2.000 | 50.00           | 5.22           | 38.650       | 0.038            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 5.1           |

|                                                          |                                         |                                                                                     |
|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                         | Page 2                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC         |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                        |                                                                                     |

Network Design Table for Storm - Trinity Way

### Network Results Table

|                                                          |                                         |                                                                                     |
|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                         | Page 3                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC         |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                        |                                                                                     |

#### Area Summary for Storm - Trinity Way

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.044           | 0.044          | 0.044           |
| 1.001       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.002       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.003       | -         | -         | 100      | 0.114           | 0.114          | 0.114           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.000       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 3.000       | -         | -         | 100      | 0.076           | 0.076          | 0.076           |
| 3.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.005       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 4.000       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.006       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.007       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.008       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 5.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.009       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.010       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 6.000       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.011       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.350           | 0.350          | 0.350           |

#### Free Flowing Outfall Details for Storm - Trinity Way

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| ST1.011             | ST           | 35.553       | 33.049       | 0.000            | 0        | 0      |

#### Simulation Criteria for Storm - Trinity Way

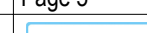
|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 18.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.360             |                       |        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                         |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------|----------------------------|------------|-----------------|------------|--|-------------------|-----|--|------------|------------|--|-----------|------------------------|--|-------------|---------|--|----------------|-----|--|---------------|----|--|------------------|--------|--|-----------------------------------|-----|--|---------------------------------|------|--|----------------|----------|------------|----------------|----------|------------|---------------------------|-------|-----|-----------|-------|-----|------------|-------|-----|---------------------------|---|-----|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|--|--|-------|-----|-------|-----|-------|-----|--|--|
| Renaissance Assoc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                         | Page 4                                                                              |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Designed by JB<br>Checked by PC         |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Network 2020.1.3                        |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| <div>Online Controls for Storm - Trinity Way</div> <div>Hydro-Brake® Optimum Manhole: ST1.11-FC, DS/PN: ST1.011, Volume (m³): 3.3</div> <table><tr><td>Unit Reference</td><td colspan="2">MD-SCL-0094-5400-1800-5400</td></tr><tr><td>Design Head (m)</td><td colspan="2">1.800</td></tr><tr><td>Design Flow (l/s)</td><td colspan="2">5.4</td></tr><tr><td>Flush-Flo™</td><td colspan="2">Calculated</td></tr><tr><td>Objective</td><td colspan="2">Minimise blockage risk</td></tr><tr><td>Application</td><td colspan="2">Surface</td></tr><tr><td>Sump Available</td><td colspan="2">Yes</td></tr><tr><td>Diameter (mm)</td><td colspan="2">94</td></tr><tr><td>Invert Level (m)</td><td colspan="2">33.070</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td colspan="2">150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td colspan="2">1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.800</td><td>5.4</td><td>Kick-Flo®</td><td>0.836</td><td>3.8</td></tr><tr><td>Flush-Flo™</td><td>0.375</td><td>5.0</td><td>Mean Flow over Head Range</td><td>-</td><td>4.5</td></tr></table> <p>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</p> <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>3.3</td><td>1.200</td><td>4.5</td><td>3.000</td><td>6.8</td><td>7.000</td><td>10.2</td></tr><tr><td>0.200</td><td>4.7</td><td>1.400</td><td>4.8</td><td>3.500</td><td>7.3</td><td>7.500</td><td>10.5</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.1</td><td>4.000</td><td>7.8</td><td>8.000</td><td>10.9</td></tr><tr><td>0.400</td><td>5.0</td><td>1.800</td><td>5.4</td><td>4.500</td><td>8.3</td><td>8.500</td><td>11.2</td></tr><tr><td>0.500</td><td>4.9</td><td>2.000</td><td>5.7</td><td>5.000</td><td>8.7</td><td>9.000</td><td>11.5</td></tr><tr><td>0.600</td><td>4.8</td><td>2.200</td><td>5.9</td><td>5.500</td><td>9.1</td><td>9.500</td><td>11.8</td></tr><tr><td>0.800</td><td>4.0</td><td>2.400</td><td>6.2</td><td>6.000</td><td>9.5</td><td></td><td></td></tr><tr><td>1.000</td><td>4.1</td><td>2.600</td><td>6.4</td><td>6.500</td><td>9.8</td><td></td><td></td></tr></table> |                                         |                                                                                     | Unit Reference            | MD-SCL-0094-5400-1800-5400 |            | Design Head (m) | 1.800      |  | Design Flow (l/s) | 5.4 |  | Flush-Flo™ | Calculated |  | Objective | Minimise blockage risk |  | Application | Surface |  | Sump Available | Yes |  | Diameter (mm) | 94 |  | Invert Level (m) | 33.070 |  | Minimum Outlet Pipe Diameter (mm) | 150 |  | Suggested Manhole Diameter (mm) | 1200 |  | Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) | Design Point (Calculated) | 1.800 | 5.4 | Kick-Flo® | 0.836 | 3.8 | Flush-Flo™ | 0.375 | 5.0 | Mean Flow over Head Range | - | 4.5 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 3.3 | 1.200 | 4.5 | 3.000 | 6.8 | 7.000 | 10.2 | 0.200 | 4.7 | 1.400 | 4.8 | 3.500 | 7.3 | 7.500 | 10.5 | 0.300 | 5.0 | 1.600 | 5.1 | 4.000 | 7.8 | 8.000 | 10.9 | 0.400 | 5.0 | 1.800 | 5.4 | 4.500 | 8.3 | 8.500 | 11.2 | 0.500 | 4.9 | 2.000 | 5.7 | 5.000 | 8.7 | 9.000 | 11.5 | 0.600 | 4.8 | 2.200 | 5.9 | 5.500 | 9.1 | 9.500 | 11.8 | 0.800 | 4.0 | 2.400 | 6.2 | 6.000 | 9.5 |  |  | 1.000 | 4.1 | 2.600 | 6.4 | 6.500 | 9.8 |  |  |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MD-SCL-0094-5400-1800-5400              |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.800                                   |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.4                                     |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Calculated                              |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Minimise blockage risk                  |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Surface                                 |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Sump Available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                     |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 94                                      |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Invert Level (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 33.070                                  |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Minimum Outlet Pipe Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 150                                     |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Suggested Manhole Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1200                                    |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Head (m)                                | Flow (l/s)                                                                          | Control Points            | Head (m)                   | Flow (l/s) |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.800                                   | 5.4                                                                                 | Kick-Flo®                 | 0.836                      | 3.8        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.375                                   | 5.0                                                                                 | Mean Flow over Head Range | -                          | 4.5        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Flow (l/s)                              | Depth (m)                                                                           | Flow (l/s)                | Depth (m)                  | Flow (l/s) | Depth (m)       | Flow (l/s) |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.3                                     | 1.200                                                                               | 4.5                       | 3.000                      | 6.8        | 7.000           | 10.2       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.7                                     | 1.400                                                                               | 4.8                       | 3.500                      | 7.3        | 7.500           | 10.5       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5.0                                     | 1.600                                                                               | 5.1                       | 4.000                      | 7.8        | 8.000           | 10.9       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5.0                                     | 1.800                                                                               | 5.4                       | 4.500                      | 8.3        | 8.500           | 11.2       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.9                                     | 2.000                                                                               | 5.7                       | 5.000                      | 8.7        | 9.000           | 11.5       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.8                                     | 2.200                                                                               | 5.9                       | 5.500                      | 9.1        | 9.500           | 11.8       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.0                                     | 2.400                                                                               | 6.2                       | 6.000                      | 9.5        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.1                                     | 2.600                                                                               | 6.4                       | 6.500                      | 9.8        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
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|                                                          |                                         |                                                                                     |
|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                         | Page 5                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC         |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                        |                                                                                     |

### Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Trinity Way

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| 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 |                                     |       |

### Synthetic Rainfall Details

|         |             |       |        |     |      |        |      | Water           | Surcharged | Flooded   |           |             |
|---------|-------------|-------|--------|-----|------|--------|------|-----------------|------------|-----------|-----------|-------------|
| PN      | US/MH Name  | Event |        |     |      |        |      | Duration (mins) | US/CL (m)  | Level (m) | Depth (m) | Volume (m³) |
| ST1.000 | ST1.00      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.051     | 38.698    | -0.187    | 0.000       |
| ST1.001 | ST1.01      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.039     | 38.595    | -0.184    | 0.000       |
| ST1.002 | ST1.02      | 360   | minute | 100 | year | Winter | I+0% | 360             | 39.992     | 38.459    | -0.200    | 0.000       |
| ST1.003 | ST1.03      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 37.904    | -0.146    | 0.000       |
| ST1.004 | ST1.04      | 360   | minute | 100 | year | Winter | I+0% | 360             | 39.060     | 37.792    | -0.167    | 0.000       |
| ST2.000 | ST2.00      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 38.691    | -0.109    | 0.000       |
| ST3.000 | ST3.00      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 38.810    | -0.165    | 0.000       |
| ST3.001 | ST3.01      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 38.772    | -0.186    | 0.000       |
| ST2.001 | ST2.01      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 38.567    | -0.162    | 0.000       |
| ST2.002 | ST2.02      | 360   | minute | 100 | year | Winter | I+0% | 360             | 40.100     | 38.407    | -0.113    | 0.000       |
| ST1.005 | ST1.05      | 360   | minute | 100 | year | Winter | I+0% | 360             | 39.060     | 36.254    | -0.171    | 0.000       |
| ST4.000 | ST4.00      | 360   | minute | 100 | year | Winter | I+0% | 360             | 37.876     | 36.539    | -0.137    | 0.000       |
| ST1.006 | ST1.06      | 360   | minute | 100 | year | Winter | I+0% | 360             | 37.501     | 35.030    | -0.158    | 0.000       |
| ST1.007 | ST1.07      | 360   | minute | 100 | year | Winter | I+0% | 360             | 36.836     | 34.520    | -0.167    | 0.000       |
| ST1.008 | ST1.08      | 360   | minute | 100 | year | Winter | I+0% | 360             | 36.677     | 34.241    | 0.407     | 0.000       |
| ST5.000 | ST5.00-TANK | 360   | minute | 100 | year | Summer | I+0% | 360             | 35.600     | 34.075    | 0.475     | 0.000       |
| ST1.009 | ST1.09      | 360   | minute | 100 | year | Winter | I+0% | 360             | 36.390     | 34.234    | 0.781     | 0.000       |
| ST1.010 | ST1.10      | 360   | minute | 100 | year | Winter | I+0% | 360             | 35.931     | 34.244    | 0.840     | 0.000       |
| ST6.000 | ST6.00      | 360   | minute | 100 | year | Winter | I+0% | 360             | 35.708     | 34.373    | -0.135    | 0.000       |
| ST1.011 | ST1.11-FC   | 360   | minute | 100 | year | Winter | I+0% | 360             | 35.697     | 34.245    | 1.025     | 0.000       |

|                                                          |                                         |                                                                                     |
|----------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                         | Page 6                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC         |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                        |                                                                                     |

Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Trinity Way

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| ST1.000 | ST1.00      | 0.07           |                   | 0.009               | 21.989                | 0.6                          |                              | 2.6                   | OK         |
| ST1.001 | ST1.01      | 0.08           |                   | 0.048               | 24.988                | 0.6                          |                              | 2.9                   | OK         |
| ST1.002 | ST1.02      | 0.03           |                   | 0.027               | 27.986                | 1.4                          |                              | 3.3                   | OK         |
| ST1.003 | ST1.03      | 0.27           |                   | 0.028               | 84.958                | 0.8                          |                              | 9.9                   | OK         |
| ST1.004 | ST1.04      | 0.15           |                   | 0.070               | 84.958                | 1.2                          |                              | 9.9                   | OK         |
| ST2.000 | ST2.00      | 0.17           |                   | 0.006               | 18.991                | 0.6                          |                              | 2.2                   | OK         |
| ST3.000 | ST3.00      | 0.16           |                   | 0.016               | 37.981                | 0.5                          |                              | 4.4                   | OK         |
| ST3.001 | ST3.01      | 0.07           |                   | 0.018               | 37.981                | 1.0                          |                              | 4.4                   | OK         |
| ST2.001 | ST2.01      | 0.17           |                   | 0.036               | 56.972                | 0.7                          |                              | 6.7                   | OK         |
| ST2.002 | ST2.02      | 0.14           |                   | 0.043               | 56.972                | 1.9                          |                              | 6.7                   | OK         |
| ST1.005 | ST1.05      | 0.13           |                   | 0.056               | 160.920               | 2.6                          |                              | 18.8                  | OK         |
| ST4.000 | ST4.00      | 0.02           |                   | 0.001               | 1.999                 | 0.4                          |                              | 0.2                   | OK         |
| ST1.006 | ST1.06      | 0.19           |                   | 0.022               | 164.917               | 2.0                          |                              | 19.3                  | OK         |
| ST1.007 | ST1.07      | 0.15           |                   | 0.019               | 166.916               | 2.4                          |                              | 19.5                  | OK         |
| ST1.008 | ST1.08      | 0.13           |                   | 0.998               | 168.915               | 1.4                          |                              | 19.5                  | SURCHARGED |
| ST5.000 | ST5.00-TANK | 0.12           |                   | 71.528              | 0.010                 | 0.6                          | 221                          | 9.8                   | SURCHARGED |
| ST1.009 | ST1.09      | 0.13           |                   | 3.102               | 170.895               | 0.5                          |                              | 8.1                   | SURCHARGED |
| ST1.010 | ST1.10      | 0.11           |                   | 1.708               | 172.893               | 0.4                          |                              | 6.5                   | SURCHARGED |
| ST6.000 | ST6.00      | 0.02           |                   | 0.002               | 1.999                 | 0.3                          |                              | 0.2                   | OK         |
| ST1.011 | ST1.11-FC   | 0.47           |                   | 1.604               | 174.891               | 0.7                          |                              | 5.0                   | SURCHARGED |

|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 1                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Francis Street

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Francis Street

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.177        | 4-8            | 0.181        |

Total Area Contributing (ha) = 0.358

Total Pipe Volume (m³) = 115.947

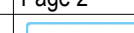
#### Network Design Table for Storm - Francis Street

« - Indicates pipe capacity < flow

| 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                                                                        |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| SF1.000 | 4.741         | 0.032       | 150.0          | 0.010          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.001 | 5.264         | 0.856       | 6.1            | 0.006          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.002 | 3.766         | 1.220       | 3.1            | 0.002          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.003 | 3.325         | 1.213       | 2.7            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.004 | 5.814         | 1.170       | 5.0            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.005 | 3.994         | 0.517       | 7.7            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SF1.000 | 50.00           | 5.10           | 33.688       | 0.010            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 1.4           |
| SF1.001 | 50.00           | 5.12           | 33.656       | 0.016            | 0.0                  | 0.0           | 0.0               | 4.09         | 72.3         | 2.2           |
| SF1.002 | 50.00           | 5.13           | 32.800       | 0.018            | 0.0                  | 0.0           | 0.0               | 5.78         | 102.1        | 2.4           |
| SF1.003 | 50.00           | 5.14           | 31.580       | 0.021            | 0.0                  | 0.0           | 0.0               | 6.13         | 108.4        | 2.8           |
| SF1.004 | 50.00           | 5.16           | 30.367       | 0.024            | 0.0                  | 0.0           | 0.0               | 4.55         | 80.4         | 3.2           |
| SF1.005 | 50.00           | 5.18           | 29.197       | 0.027            | 0.0                  | 0.0           | 0.0               | 3.65         | 64.5         | 3.7           |

|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 2                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

### Network Design Table for Storm - Francis Street

### Network Results Table

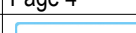
|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 3                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

Network Design Table for Storm - Francis Street

| 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                                                                        |
|----------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| SF9.000  | 9.190         | 0.061       | 150.0          | 0.007          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| SF9.001  | 11.091        | 0.222       | 50.0           | 0.013          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| SF1.011  | 10.480        | 0.026       | 400.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 1050        | Pipe/Conduit |    |
| SF10.000 | 5.809         | 0.359       | 16.2           | 0.012          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| SF1.012  | 3.459         | 0.009       | 384.3          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 1050        | Pipe/Conduit |    |
| SF11.000 | 4.870         | 0.268       | 18.2           | 0.029          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| SF1.013  | 1.519         | 0.004       | 379.8          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 1050        | Pipe/Conduit |    |
| SF12.000 | 8.487         | 0.084       | 100.9          | 0.013          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |    |
| SF12.001 | 10.735        | 0.238       | 45.2           | 0.007          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |   |
| SF1.014  | 17.254        | 0.043       | 401.3          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 1050        | Pipe/Conduit |  |
| SF13.000 | 3.982         | 0.265       | 15.0           | 0.018          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.015  | 0.946         | 0.002       | 473.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 1050        | Pipe/Conduit |  |
| SF14.000 | 9.694         | 0.065       | 150.0          | 0.013          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |

Network Results Table

| PN       | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|----------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SF9.000  | 50.00           | 5.19           | 28.850       | 0.007            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 0.9           |
| SF9.001  | 50.00           | 5.32           | 28.789       | 0.020            | 0.0                  | 0.0           | 0.0               | 1.43         | 25.2         | 2.7           |
| SF1.011  | 50.00           | 5.73           | 27.667       | 0.162            | 0.0                  | 0.0           | 0.0               | 1.72         | 1486.6       | 21.9          |
| SF10.000 | 50.00           | 5.04           | 28.900       | 0.012            | 0.0                  | 0.0           | 0.0               | 2.52         | 44.5         | 1.6           |
| SF1.012  | 50.00           | 5.77           | 27.641       | 0.174            | 0.0                  | 0.0           | 0.0               | 1.75         | 1516.8       | 23.6          |
| SF11.000 | 50.00           | 5.03           | 28.800       | 0.029            | 0.0                  | 0.0           | 0.0               | 2.37         | 42.0         | 3.9           |
| SF1.013  | 50.00           | 5.78           | 27.632       | 0.203            | 0.0                  | 0.0           | 0.0               | 1.76         | 1526.0       | 27.5          |
| SF12.000 | 50.00           | 5.14           | 28.850       | 0.013            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.7         | 1.8           |
| SF12.001 | 50.00           | 5.26           | 28.766       | 0.020            | 0.0                  | 0.0           | 0.0               | 1.50         | 26.5         | 2.7           |
| SF1.014  | 50.00           | 5.95           | 27.628       | 0.223            | 0.0                  | 0.0           | 0.0               | 1.71         | 1484.3       | 30.2          |
| SF13.000 | 50.00           | 5.03           | 28.750       | 0.018            | 0.0                  | 0.0           | 0.0               | 2.61         | 46.2         | 2.4           |
| SF1.015  | 50.00           | 5.96           | 27.585       | 0.241            | 0.0                  | 0.0           | 0.0               | 1.58         | 1366.2       | 32.6          |
| SF14.000 | 50.00           | 5.20           | 28.850       | 0.013            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 1.8           |

|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 4                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

### Network Design Table for Storm - Francis Street

### Network Results Table

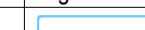
|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 5                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

Network Design Table for Storm - Francis Street

| 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                                                                      |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| SF1.019 | 5.400         | 0.054       | 100.0          | 0.007          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.020 | 38.898        | 0.389       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| SF1.021 | 28.953        | 0.290       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| SF1.022 | 4.607         | 0.795       | 5.8            | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |

Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SF1.019 | 50.00           | 6.50           | 27.466       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8«        | 48.5          |
| SF1.020 | 50.00           | 6.99           | 27.337       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.31         | 52.0         | 48.5          |
| SF1.021 | 50.00           | 7.36           | 26.948       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.31         | 52.0         | 48.5          |
| SF1.022 | 50.00           | 7.38           | 26.659       | 0.358            | 0.0                  | 0.0           | 0.0               | 5.47         | 217.6        | 48.5          |

|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 6                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

### Area Summary for Storm - Francis Street

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.010           | 0.010          | 0.010           |
| 1.001       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.002       | -         | -         | 100      | 0.002           | 0.002          | 0.002           |
| 1.003       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.004       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.005       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 2.000       | -         | -         | 100      | 0.016           | 0.016          | 0.016           |
| 1.006       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.000       | -         | -         | 100      | 0.008           | 0.008          | 0.008           |
| 1.007       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 4.000       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.008       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 5.000       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 5.001       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 1.009       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 6.000       | -         | -         | 100      | 0.005           | 0.005          | 0.005           |
| 7.000       | -         | -         | 100      | 0.053           | 0.053          | 0.053           |
| 1.010       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 8.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 9.000       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 9.001       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 1.011       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 10.000      | -         | -         | 100      | 0.012           | 0.012          | 0.012           |
| 1.012       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 11.000      | -         | -         | 100      | 0.029           | 0.029          | 0.029           |
| 1.013       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 12.000      | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 12.001      | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.014       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 13.000      | -         | -         | 100      | 0.018           | 0.018          | 0.018           |
| 1.015       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 14.000      | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 15.000      | -         | -         | 100      | 0.010           | 0.010          | 0.010           |
| 14.001      | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.016       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 16.000      | -         | -         | 100      | 0.011           | 0.011          | 0.011           |
| 1.017       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 17.000      | -         | -         | 100      | 0.014           | 0.014          | 0.014           |
| 1.018       | -         | -         | 100      | 0.026           | 0.026          | 0.026           |
| 18.000      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.001      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.002      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.003      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.004      | -         | -         | 100      | 0.002           | 0.002          | 0.002           |
| 18.005      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.006      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.007      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.019       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.020       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.021       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.022       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.358           | 0.358          | 0.358           |

|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 7                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

Free Flowing Outfall Details for Storm - Francis Street

| Outfall<br>Pipe Number | Outfall<br>Name | C. Level<br>(m) | I. Level<br>(m) | Min<br>I. Level<br>(m) | D,L<br>(mm) | W<br>(mm) |
|------------------------|-----------------|-----------------|-----------------|------------------------|-------------|-----------|
| SF1.022                | SF              | 28.580          | 25.864          | 0.000                  | 0           | 0         |

Simulation Criteria for Storm - Francis Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 0 | Number of Real Time Controls | 0 |

Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| 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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| Renaissance Assoc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                        | Page 8                                                                              |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Designed by JB<br>Checked by PC        |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Network 2020.1.3                       |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| <div>Online Controls for Storm - Francis Street</div> <div>Hydro-Brake® Optimum Manhole: SF1.19-FC, DS/PN: SF1.019, Volume (m³): 19.9</div> <table><tr><td>Unit Reference</td><td>MD-SCL-0094-5500-1856-5500</td></tr><tr><td>Design Head (m)</td><td>1.856</td></tr><tr><td>Design Flow (l/s)</td><td>5.5</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise blockage risk</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>94</td></tr><tr><td>Invert Level (m)</td><td>27.466</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.856</td><td>5.5</td><td>Kick-Flo®</td><td>0.836</td><td>3.8</td></tr><tr><td>Flush-Flo™</td><td>0.377</td><td>5.0</td><td>Mean Flow over Head Range</td><td>-</td><td>4.5</td></tr></table> <p>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</p> <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>3.3</td><td>1.200</td><td>4.5</td><td>3.000</td><td>6.9</td><td>7.000</td><td>10.2</td></tr><tr><td>0.200</td><td>4.7</td><td>1.400</td><td>4.8</td><td>3.500</td><td>7.4</td><td>7.500</td><td>10.6</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.1</td><td>4.000</td><td>7.9</td><td>8.000</td><td>10.9</td></tr><tr><td>0.400</td><td>5.0</td><td>1.800</td><td>5.4</td><td>4.500</td><td>8.3</td><td>8.500</td><td>11.2</td></tr><tr><td>0.500</td><td>4.9</td><td>2.000</td><td>5.7</td><td>5.000</td><td>8.7</td><td>9.000</td><td>11.5</td></tr><tr><td>0.600</td><td>4.8</td><td>2.200</td><td>5.9</td><td>5.500</td><td>9.1</td><td>9.500</td><td>11.8</td></tr><tr><td>0.800</td><td>4.1</td><td>2.400</td><td>6.2</td><td>6.000</td><td>9.5</td><td></td><td></td></tr><tr><td>1.000</td><td>4.1</td><td>2.600</td><td>6.4</td><td>6.500</td><td>9.9</td><td></td><td></td></tr></table> |                                        |                                                                                     | Unit Reference            | MD-SCL-0094-5500-1856-5500 | Design Head (m) | 1.856     | Design Flow (l/s) | 5.5 | Flush-Flo™ | Calculated | Objective | Minimise blockage risk | Application | Surface | Sump Available | Yes | Diameter (mm) | 94 | Invert Level (m) | 27.466 | Minimum Outlet Pipe Diameter (mm) | 150 | Suggested Manhole Diameter (mm) | 1200 | Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) | Design Point (Calculated) | 1.856 | 5.5 | Kick-Flo® | 0.836 | 3.8 | Flush-Flo™ | 0.377 | 5.0 | Mean Flow over Head Range | - | 4.5 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 3.3 | 1.200 | 4.5 | 3.000 | 6.9 | 7.000 | 10.2 | 0.200 | 4.7 | 1.400 | 4.8 | 3.500 | 7.4 | 7.500 | 10.6 | 0.300 | 5.0 | 1.600 | 5.1 | 4.000 | 7.9 | 8.000 | 10.9 | 0.400 | 5.0 | 1.800 | 5.4 | 4.500 | 8.3 | 8.500 | 11.2 | 0.500 | 4.9 | 2.000 | 5.7 | 5.000 | 8.7 | 9.000 | 11.5 | 0.600 | 4.8 | 2.200 | 5.9 | 5.500 | 9.1 | 9.500 | 11.8 | 0.800 | 4.1 | 2.400 | 6.2 | 6.000 | 9.5 |  |  | 1.000 | 4.1 | 2.600 | 6.4 | 6.500 | 9.9 |  |  |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MD-SCL-0094-5500-1856-5500             |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.856                                  |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.5                                    |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Calculated                             |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Minimise blockage risk                 |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Surface                                |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Sump Available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Yes                                    |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 94                                     |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Invert Level (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 27.466                                 |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Minimum Outlet Pipe Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 150                                    |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Suggested Manhole Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1200                                   |                                                                                     |                           |                            |                 |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Head (m)                               | Flow (l/s)                                                                          | Control Points            | Head (m)                   | Flow (l/s)      |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.856                                  | 5.5                                                                                 | Kick-Flo®                 | 0.836                      | 3.8             |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.377                                  | 5.0                                                                                 | Mean Flow over Head Range | -                          | 4.5             |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Flow (l/s)                             | Depth (m)                                                                           | Flow (l/s)                | Depth (m)                  | Flow (l/s)      | Depth (m) | Flow (l/s)        |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3.3                                    | 1.200                                                                               | 4.5                       | 3.000                      | 6.9             | 7.000     | 10.2              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.7                                    | 1.400                                                                               | 4.8                       | 3.500                      | 7.4             | 7.500     | 10.6              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5.0                                    | 1.600                                                                               | 5.1                       | 4.000                      | 7.9             | 8.000     | 10.9              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5.0                                    | 1.800                                                                               | 5.4                       | 4.500                      | 8.3             | 8.500     | 11.2              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.9                                    | 2.000                                                                               | 5.7                       | 5.000                      | 8.7             | 9.000     | 11.5              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.8                                    | 2.200                                                                               | 5.9                       | 5.500                      | 9.1             | 9.500     | 11.8              |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.1                                    | 2.400                                                                               | 6.2                       | 6.000                      | 9.5             |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4.1                                    | 2.600                                                                               | 6.4                       | 6.500                      | 9.9             |           |                   |     |            |            |           |                        |             |         |                |     |               |    |                  |        |                                   |     |                                 |      |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
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### Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Francis Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor          | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Hot Start (mins)                | 0     | MADD Factor * 10m <sup>3</sup> /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 |                                            |       |

### Synthetic Rainfall Details

|                                    |                                 |
|------------------------------------|---------------------------------|
| Margin for Flood Risk Warning (mm) | 200.0                           |
| Analysis Timestep                  | 2.5 Second Increment (Extended) |
| DTS Status                         | OFF                             |
| DVD Status                         | ON                              |
| Inertia Status                     | ON                              |

|          |               |       |        |     |      |        |      |                    | Water        | Surcharged   | Flooded      |                |
|----------|---------------|-------|--------|-----|------|--------|------|--------------------|--------------|--------------|--------------|----------------|
| PN       | US/MH<br>Name | Event |        |     |      |        |      | Duration<br>(mins) | US/CL<br>(m) | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |
| SF1.000  | SF1.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 34.738       | 33.710       | -0.128       | 0.000          |
| SF1.001  | SF1.01        | 360   | minute | 100 | year | Winter | I+0% | 360                | 34.574       | 33.668       | -0.139       | 0.000          |
| SF1.002  | SF1.02        | 360   | minute | 100 | year | Winter | I+0% | 360                | 33.850       | 32.811       | -0.139       | 0.000          |
| SF1.003  | SF1.03        | 360   | minute | 100 | year | Winter | I+0% | 360                | 32.630       | 31.593       | -0.137       | 0.000          |
| SF1.004  | SF1.04        | 360   | minute | 100 | year | Winter | I+0% | 360                | 31.417       | 30.382       | -0.135       | 0.000          |
| SF1.005  | SF1.05        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.247       | 29.215       | -0.132       | 0.000          |
| SF2.000  | SF2.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.042       | 28.871       | -0.129       | 0.000          |
| SF1.006  | SF1.06        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.953       | 28.418       | -0.412       | 0.000          |
| SF3.000  | SF3.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.913       | 28.911       | -0.139       | 0.000          |
| SF1.007  | SF1.07-JCT    | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.813       | 28.418       | -0.393       | 0.000          |
| SF4.000  | SF4.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.036       | 28.909       | -0.141       | 0.000          |
| SF1.008  | SF1.08-JCT    | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.992       | 28.418       | -0.364       | 0.000          |
| SF5.000  | SF5.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.037       | 28.873       | -0.127       | 0.000          |
| SF5.001  | SF5.01        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.049       | 28.796       | -0.121       | 0.000          |
| SF1.009  | SF1.09-JCT    | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.853       | 28.418       | -0.355       | 0.000          |
| SF6.000  | SF6.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.938       | 28.906       | -0.144       | 0.000          |
| SF7.000  | SF7.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.753       | 28.740       | -0.110       | 0.000          |
| SF1.010  | SF1.10        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.817       | 28.418       | -0.334       | 0.000          |
| SF8.000  | SF8.00        | 360   | minute | 100 | year | Summer | I+0% | 360                | 29.927       | 28.900       | -0.150       | 0.000          |
| SF9.000  | SF9.00        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.037       | 28.867       | -0.133       | 0.000          |
| SF9.001  | SF9.01        | 360   | minute | 100 | year | Winter | I+0% | 360                | 30.037       | 28.811       | -0.128       | 0.000          |
| SF1.011  | SF1.11        | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.820       | 28.418       | -0.299       | 0.000          |
| SF10.000 | SF10.00       | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.938       | 28.914       | -0.136       | 0.000          |
| SF1.012  | SF1.12-JCT    | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.845       | 28.418       | -0.272       | 0.000          |
| SF11.000 | SF11.00       | 360   | minute | 100 | year | Winter | I+0% | 360                | 29.822       | 28.822       | -0.128       | 0.000          |



Renaissance Assoc.

Carvers Warehouse

77 Dale Street

Manchester M1 2HG

Date 12/09/2023 18:52

File 230906 Drainage Model.MDX

BRWRY- FRANCIS ST

100 YR 6HR VOLUME

Designed by JB

Checked by PC

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Innovyze

Network 2020.1.3

Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Francis Street

| PN       | US/MH Name | Event                           | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|----------|------------|---------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SF1.013  | SF1.13-JCT | 360 minute 100 year Winter I+0% | 360             | 29.891    | 28.418          | -0.263               | 0.000               |
| SF12.000 | SF12.00    | 360 minute 100 year Winter I+0% | 360             | 30.037    | 28.871          | -0.129               | 0.000               |
| SF12.001 | SF12.01    | 360 minute 100 year Winter I+0% | 360             | 30.041    | 28.787          | -0.129               | 0.000               |
| SF1.014  | SF1.14-JCT | 360 minute 100 year Winter I+0% | 360             | 29.899    | 28.418          | -0.259               | 0.000               |
| SF13.000 | SF13.00    | 360 minute 100 year Winter I+0% | 360             | 29.788    | 28.768          | -0.132               | 0.000               |
| SF1.015  | SF1.15-JCT | 360 minute 100 year Winter I+0% | 360             | 29.644    | 28.418          | -0.216               | 0.000               |
| SF14.000 | SF14.00    | 360 minute 100 year Winter I+0% | 360             | 30.033    | 28.873          | -0.127               | 0.000               |
| SF15.000 | SF15.00    | 360 minute 100 year Winter I+0% | 360             | 30.027    | 28.868          | -0.132               | 0.000               |
| SF14.001 | SF14.01    | 360 minute 100 year Winter I+0% | 360             | 30.027    | 28.807          | -0.129               | 0.000               |
| SF1.016  | SF1.16-JCT | 360 minute 100 year Winter I+0% | 360             | 29.644    | 28.418          | -0.214               | 0.000               |
| SF16.000 | SF16.00    | 360 minute 100 year Winter I+0% | 360             | 29.728    | 28.715          | -0.135               | 0.000               |
| SF1.017  | SF1.17     | 360 minute 100 year Winter I+0% | 360             | 29.573    | 28.418          | -0.185               | 0.000               |
| SF17.000 | SF17.00    | 360 minute 100 year Winter I+0% | 360             | 29.846    | 28.716          | -0.134               | 0.000               |
| SF1.018  | SF1.18     | 360 minute 100 year Winter I+0% | 360             | 29.726    | 28.418          | -0.136               | 0.000               |
| SF18.000 | SF18.00    | 360 minute 100 year Winter I+0% | 360             | 38.521    | 37.373          | -0.148               | 0.000               |
| SF18.001 | SF18.01    | 360 minute 100 year Winter I+0% | 360             | 37.311    | 36.165          | -0.146               | 0.000               |
| SF18.002 | SF18.02    | 360 minute 100 year Winter I+0% | 360             | 36.089    | 34.944          | -0.145               | 0.000               |
| SF18.003 | SF18.03    | 360 minute 100 year Winter I+0% | 360             | 34.870    | 33.727          | -0.143               | 0.000               |
| SF18.004 | SF18.04    | 360 minute 100 year Winter I+0% | 360             | 33.654    | 32.512          | -0.142               | 0.000               |
| SF18.005 | SF18.05    | 360 minute 100 year Winter I+0% | 360             | 32.423    | 31.283          | -0.140               | 0.000               |
| SF18.006 | SF18.06    | 360 minute 100 year Winter I+0% | 360             | 31.197    | 30.058          | -0.139               | 0.000               |
| SF18.007 | SF18.07    | 360 minute 100 year Winter I+0% | 360             | 29.928    | 28.417          | 0.477                | 0.000               |
| SF1.019  | SF1.19-FC  | 360 minute 100 year Winter I+0% | 360             | 29.623    | 28.417          | 0.801                | 0.000               |
| SF1.020  | SF1.20     | 360 minute 100 year Winter I+0% | 360             | 29.460    | 27.385          | -0.177               | 0.000               |
| SF1.021  | SF1.21     | 360 minute 100 year Winter I+0% | 360             | 29.080    | 26.996          | -0.177               | 0.000               |
| SF1.022  | SF1.22     | 360 minute 100 year Winter I+0% | 360             | 28.570    | 26.688          | -0.196               | 0.000               |

| PN       | US/MH Name | Flow / Overflow Cap. | Maximum Vol (m³) | Discharge Vol (m³) | Maximum Velocity (m/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|----------|------------|----------------------|------------------|--------------------|------------------------|------------------------|-----------------|--------|
| SF1.013  | SF1.13-JCT | 0.00                 | 2.817            | 101.441            | 0.2                    |                        | 5.4             | OK*    |
| SF12.000 | SF12.00    | 0.05                 | 0.003            | 6.497              | 0.5                    |                        | 0.8             | OK     |
| SF12.001 | SF12.01    | 0.05                 | 0.011            | 9.995              | 0.8                    |                        | 1.2             | OK     |
| SF1.014  | SF1.14-JCT | 0.00                 | 1.686            | 111.435            | 0.2                    |                        | 6.1             | OK*    |
| SF13.000 | SF13.00    | 0.03                 | 0.002            | 8.995              | 0.9                    |                        | 1.1             | OK     |
| SF1.015  | SF1.15-JCT | 0.00                 | 11.766           | 120.432            | 0.2                    |                        | 5.6             | OK*    |
| SF14.000 | SF14.00    | 0.06                 | 0.003            | 6.497              | 0.4                    |                        | 0.8             | OK     |
| SF15.000 | SF15.00    | 0.04                 | 0.002            | 4.997              | 0.5                    |                        | 0.6             | OK     |
| SF14.001 | SF14.01    | 0.05                 | 0.017            | 11.494             | 0.9                    |                        | 1.3             | OK     |
| SF1.016  | SF1.16-JCT | 0.00                 | 1.432            | 131.926            | 0.2                    |                        | 6.3             | OK*    |
| SF16.000 | SF16.00    | 0.02                 | 0.002            | 5.497              | 0.9                    |                        | 0.6             | OK     |
| SF1.017  | SF1.17     | 0.01                 | 10.025           | 143.922            | 0.2                    |                        | 6.2             | OK     |
| SF17.000 | SF17.00    | 0.02                 | 0.002            | 6.996              | 1.0                    |                        | 0.8             | OK     |
| SF1.018  | SF1.18     | 0.01                 | 15.426           | 163.911            | 0.1                    |                        | 6.0             | OK     |
| SF18.000 | SF18.00    | 0.00                 | 0.000            | 1.498              | 0.4                    |                        | 0.2             | OK     |
| SF18.001 | SF18.01    | 0.01                 | 0.000            | 2.996              | 0.8                    |                        | 0.4             | OK     |
| SF18.002 | SF18.02    | 0.01                 | 0.000            | 4.493              | 1.2                    |                        | 0.5             | OK     |
| SF18.003 | SF18.03    | 0.01                 | 0.000            | 5.991              | 1.6                    |                        | 0.7             | OK     |
| SF18.004 | SF18.04    | 0.01                 | 0.001            | 6.990              | 1.8                    |                        | 0.8             | OK     |
| SF18.005 | SF18.05    | 0.01                 | 0.001            | 8.487              | 2.0                    |                        | 1.0             | OK     |
| SF18.006 | SF18.06    | 0.02                 | 0.001            | 9.985              | 2.2                    |                        | 1.2             | OK     |

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|                                                          |                                        |                                                                                     |
|----------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                        | Page 12                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:52<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC        |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                       |                                                                                     |

Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Francis Street

| PN       | US/MH Name | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|----------|------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| SF18.007 | SF18.07    | 0.01           |                   | 3.194               | 11.484                | 0.1                          |                              | 1.0                   | SURCHARGED |
| SF1.019  | SF1.19-FC  | 0.34           |                   | 14.073              | 178.893               | 0.9                          |                              | 5.0                   | SURCHARGED |
| SF1.020  | SF1.20     | 0.10           |                   | 0.049               | 178.893               | 0.8                          |                              | 5.0                   | OK         |
| SF1.021  | SF1.21     | 0.10           |                   | 0.079               | 178.893               | 0.8                          |                              | 5.0                   | OK         |
| SF1.022  | SF1.22     | 0.04           |                   | 0.043               | 178.892               | 1.7                          |                              | 5.0                   | OK         |

|                                                          |                                       |                                                                                     |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                       | Page 1                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC       |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                      |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Dutton Street

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Dutton Street

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.338        | 4-8            | 0.091        |

Total Area Contributing (ha) = 0.429

Total Pipe Volume (m³) = 3.574

#### Network Design Table for Storm - Dutton Street

# - Indicates pipe length does not match coordinates  
« - Indicates pipe capacity < flow

| 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                                                                        |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| SD1.000 | 2.913         | 0.138       | 21.1           | 0.103          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SD1.001 | 1.708#        | 0.012       | 142.3          | 0.025          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| SD2.000 | 3.845         | 0.384       | 10.0           | 0.097          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SD2.001 | 1.562#        | 0.010       | 150.0          | 0.042          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SD1.000 | 50.00           | 5.02           | 37.900       | 0.103            | 0.0                  | 0.0           | 0.0               | 2.20         | 38.9         | 13.9          |
| SD1.001 | 50.00           | 5.05           | 37.687       | 0.128            | 0.0                  | 0.0           | 0.0               | 1.09         | 43.5         | 17.3          |
| SD2.000 | 50.00           | 5.02           | 38.700       | 0.097            | 0.0                  | 0.0           | 0.0               | 3.20         | 56.6         | 13.1          |
| SD2.001 | 50.00           | 5.04           | 38.241       | 0.139            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 18.8          |

|                                                          |                                       |                                                                                     |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                       | Page 2                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC       |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                      |                                                                                     |

Network Design Table for Storm - Dutton Street

### Network Results Table

|                                                          |                                       |                                                                                     |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                       | Page 3                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC       |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                      |                                                                                     |

#### Area Summary for Storm - Dutton Street

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.103           | 0.103          | 0.103           |
| 1.001       | -         | -         | 100      | 0.025           | 0.025          | 0.025           |
| 2.000       | -         | -         | 100      | 0.097           | 0.097          | 0.097           |
| 2.001       | -         | -         | 100      | 0.042           | 0.042          | 0.042           |
| 3.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 4.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 4.001       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 3.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 5.000       | -         | -         | 100      | 0.024           | 0.024          | 0.024           |
| 5.001       | -         | -         | 100      | 0.005           | 0.005          | 0.005           |
| 5.002       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 3.002       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 3.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 6.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 6.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 7.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.429           | 0.429          | 0.429           |

#### Free Flowing Outfall Details for Storm - Dutton Street

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D, L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|-----------|--------|
| SD1.004             | SD           | 39.842       | 37.431       | 0.000            | 0         | 0      |

#### Simulation Criteria for Storm - Dutton Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 18.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.360             |                       |        |

|                                                          |                                       |                                                                                     |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                       | Page 4                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC       |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                      |                                                                                     |

Online Controls for Storm - Dutton Street

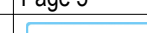
Hydro-Brake® Optimum Manhole: SD1.04-FC, DS/PN: SD1.004, Volume (m³): 4.5

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCL-0106-6600-1600-6600 |
| Design Head (m)                   | 1.600                      |
| Design Flow (l/s)                 | 6.6                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise blockage risk     |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 106                        |
| Invert Level (m)                  | 37.547                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 1.600    | 6.6        | Kick-Flo®                 | 0.864    | 5.0        |
| Flush-Flo™                | 0.381    | 6.6        | Mean Flow over Head Range | -        | 5.7        |

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     | 4.0        | 1.200     | 5.8        | 3.000     | 8.8        | 7.000     | 13.2       |
| 0.200     | 6.1        | 1.400     | 6.2        | 3.500     | 9.5        | 7.500     | 13.6       |
| 0.300     | 6.5        | 1.600     | 6.6        | 4.000     | 10.1       | 8.000     | 14.1       |
| 0.400     | 6.6        | 1.800     | 7.0        | 4.500     | 10.7       | 8.500     | 14.5       |
| 0.500     | 6.5        | 2.000     | 7.3        | 5.000     | 11.3       | 9.000     | 14.9       |
| 0.600     | 6.3        | 2.200     | 7.7        | 5.500     | 11.8       | 9.500     | 15.3       |
| 0.800     | 5.5        | 2.400     | 8.0        | 6.000     | 12.3       |           |            |
| 1.000     | 5.3        | 2.600     | 8.3        | 6.500     | 12.7       |           |            |

|                                                          |                                       |                                                                                     |
|----------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                       | Page 5                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>100 YR 6HR VOLUME |  |
| Date 12/09/2023 18:53<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC       |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                      |                                                                                     |

### Summary of Critical Results by Maximum Discharge Volume (Rank 1) for Storm - Dutton Street

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| 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 |                                     |       |

### Synthetic Rainfall Details

|         |               |       |        |     |      |             | Duration | US/CL  | Water        | Surcharged   | Flooded        |
|---------|---------------|-------|--------|-----|------|-------------|----------|--------|--------------|--------------|----------------|
| PN      | US/MH<br>Name | Event |        |     |      |             | (mins)   | (m)    | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |
| SD1.000 | SD-RWP        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.323 | 38.050       | 0.000        | 0.000          |
| SD1.001 | SD1.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.461 | 38.571       | 0.659        | 0.000          |
| SD2.000 | SD-RWP        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.997 | 38.738       | -0.112       | 0.000          |
| SD2.001 | SD2.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.943 | 38.572       | 0.106        | 0.000          |
| SD3.000 | SD3.00        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.779       | -0.121       | 0.000          |
| SD4.000 | SD4.00        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.807       | -0.118       | 0.000          |
| SD4.001 | SD4.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.782       | -0.111       | 0.000          |
| SD3.001 | SD3.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.689       | -0.119       | 0.000          |
| SD5.000 | SD5.00        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.035 | 38.682       | -0.118       | 0.000          |
| SD5.001 | SD5.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.025 | 38.581       | -0.003       | 0.000          |
| SD5.002 | SD5.02        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.580       | 0.061        | 0.000          |
| SD3.002 | SD3.02        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.577       | 0.125        | 0.000          |
| SD3.003 | SD3.03        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.573       | 0.308        | 0.000          |
| SD3.004 | SD3.04        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.955 | 38.572       | 0.664        | 0.000          |
| SD6.000 | SD6.00        | 360   | minute | 100 | year | Winter I+0% | 360      | 40.100 | 38.930       | -0.120       | 0.000          |
| SD6.001 | SD6.01        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.962 | 38.873       | -0.118       | 0.000          |
| SD1.002 | SD1.02-TANK   | 360   | minute | 100 | year | Winter I+0% | 360      | 39.938 | 38.571       | 0.671        | 0.000          |
| SD1.003 | SD1.03        | 360   | minute | 100 | year | Winter I+0% | 360      | 39.944 | 38.587       | 0.707        | 0.000          |
| SD7.000 | SD7.00        | 360   | minute | 100 | year | Summer I+0% | 360      | 39.961 | 38.464       | 0.314        | 0.000          |
| SD1.004 | SD1.04-FC     | 360   | minute | 100 | year | Winter I+0% | 360      | 39.942 | 38.591       | 0.894        | 0.000          |



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**APPENDIX L**  
**PROPOSED SURFACE WATER MICRODRAINAGE CALCULATIONS**

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 1                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Trinity Way

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Trinity Way

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.261        | 4-8            | 0.089        |

Total Area Contributing (ha) = 0.350

Total Pipe Volume (m³) = 8.318

#### Network Design Table for Storm - Trinity Way

« - Indicates pipe capacity < flow

| 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 |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|----------------|
| ST1.000 | 15.946        | 0.106       | 150.0          | 0.044          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🔒              |
| ST1.001 | 18.054        | 0.120       | 150.0          | 0.006          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.002 | 8.989         | 0.608       | 14.8           | 0.006          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.003 | 13.773        | 0.092       | 150.0          | 0.114          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST1.004 | 4.171         | 0.213       | 19.6           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| ST2.000 | 10.641        | 0.071       | 150.0          | 0.038          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit | 🔒              |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| ST1.000 | 50.00           | 5.25           | 38.660       | 0.044            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 6.0           |
| ST1.001 | 50.00           | 5.53           | 38.554       | 0.050            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 6.8           |
| ST1.002 | 50.00           | 5.58           | 38.433       | 0.056            | 0.0                  | 0.0           | 0.0               | 3.42         | 136.0        | 7.6           |
| ST1.003 | 50.00           | 5.79           | 37.825       | 0.170            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 23.0          |
| ST1.004 | 50.00           | 5.81           | 37.734       | 0.170            | 0.0                  | 0.0           | 0.0               | 2.97         | 118.1        | 23.0          |
| ST2.000 | 50.00           | 5.22           | 38.650       | 0.038            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 5.1           |

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 2                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

Network Design Table for Storm - Trinity Way

### Network Results Table

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 3                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

#### Area Summary for Storm - Trinity Way

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.044           | 0.044          | 0.044           |
| 1.001       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.002       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.003       | -         | -         | 100      | 0.114           | 0.114          | 0.114           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.000       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 3.000       | -         | -         | 100      | 0.076           | 0.076          | 0.076           |
| 3.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 2.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.005       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 4.000       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.006       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.007       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.008       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 5.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.009       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.010       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 6.000       | -         | -         | 100      | 0.004           | 0.004          | 0.004           |
| 1.011       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.350           | 0.350          | 0.350           |

#### Free Flowing Outfall Details for Storm - Trinity Way

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| ST1.011             | ST           | 35.553       | 33.049       | 0.000            | 0        | 0      |

#### Simulation Criteria for Storm - Trinity Way

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 18.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.360             |                       |        |

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 4                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

Online Controls for Storm - Trinity Way

Hydro-Brake® Optimum Manhole: ST1.11-FC, DS/PN: ST1.011, Volume (m³): 3.3

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCL-0094-5400-1800-5400 |
| Design Head (m)                   | 1.800                      |
| Design Flow (l/s)                 | 5.4                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise blockage risk     |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 94                         |
| Invert Level (m)                  | 33.070                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 1.800    | 5.4        | Kick-Flo®                 | 0.836    | 3.8        |
| Flush-Flo™                | 0.375    | 5.0        | Mean Flow over Head Range | -        | 4.5        |

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     | 3.3        | 1.200     | 4.5        | 3.000     | 6.8        | 7.000     | 10.2       |
| 0.200     | 4.7        | 1.400     | 4.8        | 3.500     | 7.3        | 7.500     | 10.5       |
| 0.300     | 5.0        | 1.600     | 5.1        | 4.000     | 7.8        | 8.000     | 10.9       |
| 0.400     | 5.0        | 1.800     | 5.4        | 4.500     | 8.3        | 8.500     | 11.2       |
| 0.500     | 4.9        | 2.000     | 5.7        | 5.000     | 8.7        | 9.000     | 11.5       |
| 0.600     | 4.8        | 2.200     | 5.9        | 5.500     | 9.1        | 9.500     | 11.8       |
| 0.800     | 4.0        | 2.400     | 6.2        | 6.000     | 9.5        |           |            |
| 1.000     | 4.1        | 2.600     | 6.4        | 6.500     | 9.8        |           |            |

| Renaissance Assoc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                             | Page 5                                                                              |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|-----------|-----------|----------------|-----------|-----------|----------------|-------|------|-----|-------|-----|-----|-------|------|-----|--|--|--|
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Designed by JB<br>Checked by PC             |                                                                                     |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Network 2020.1.3                            |                                                                                     |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| <p style="text-align: center;"><u>Storage Structures for Storm - Trinity Way</u></p> <p style="text-align: center;"><u>Cellular Storage Manhole: ST5.00-TANK, DS/PN: ST5.000</u></p> <p style="text-align: center;">Invert Level (m) 33.300 Safety Factor 2.0<br/>Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95<br/>Infiltration Coefficient Side (m/hr) 0.00000</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>96.0</td><td>0.0</td><td>1.601</td><td>0.0</td><td>0.0</td></tr><tr><td>1.600</td><td>96.0</td><td>0.0</td><td></td><td></td><td></td></tr></table> |                                             |                                                                                     | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | 0.000 | 96.0 | 0.0 | 1.601 | 0.0 | 0.0 | 1.600 | 96.0 | 0.0 |  |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Area (m²)                                   | Inf. Area (m²)                                                                      | Depth (m) | Area (m²) | Inf. Area (m²) |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 96.0                                        | 0.0                                                                                 | 1.601     | 0.0       | 0.0            |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| 1.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 96.0                                        | 0.0                                                                                 |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |                                                                                     |           |           |                |           |           |                |       |      |     |       |     |     |       |      |     |  |  |  |

|                                                          |                                             |                                                                                     |
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| Renaissance Assoc.                                       |                                             | Page 6                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Trinity Way

### Simulation Criteria

|                             |   |                              |   |                              |   |
|-----------------------------|---|------------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 1 | Number of Real Time Controls | 0 |

|                |                   |             |       |
|----------------|-------------------|-------------|-------|
| Rainfall Model | FSR               | Ratio R     | 0.360 |
| Region         | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm)     | 18.000            | Cv (Winter) | 0.840 |

|                          |                                |
|--------------------------|--------------------------------|
| Profile(s)               | Summer and Winter              |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360 |
| Return Period(s) (years) | 1, 2, 30, 100                  |
| Climate Change (%)       | 0, 0, 0, 40                    |

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 7                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

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

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| ST1.000 | ST1.00      | 0.14           |                   | 0.015               | 2.479                 | 0.7                          |                              | 5.2                   | OK         |
| ST1.001 | ST1.01      | 0.15           |                   | 0.072               | 2.817                 | 0.7                          |                              | 5.9                   | OK         |
| ST1.002 | ST1.02      | 0.06           |                   | 0.040               | 3.155                 | 1.6                          |                              | 6.5                   | OK         |
| ST1.003 | ST1.03      | 0.49           |                   | 0.043               | 9.577                 | 0.9                          |                              | 18.0                  | OK         |
| ST1.004 | ST1.04      | 0.28           |                   | 0.099               | 9.577                 | 1.4                          |                              | 18.0                  | OK         |
| ST2.000 | ST2.00      | 0.35           |                   | 0.009               | 2.141                 | 0.7                          |                              | 4.6                   | OK         |
| ST3.000 | ST3.00      | 0.33           |                   | 0.024               | 4.282                 | 0.6                          |                              | 9.1                   | OK         |
| ST3.001 | ST3.01      | 0.14           |                   | 0.027               | 4.282                 | 1.2                          |                              | 9.0                   | OK         |
| ST2.001 | ST2.01      | 0.36           |                   | 0.056               | 6.422                 | 0.9                          |                              | 13.6                  | OK         |
| ST2.002 | ST2.02      | 0.29           |                   | 0.067               | 6.422                 | 2.3                          |                              | 13.7                  | OK         |
| ST1.005 | ST1.05      | 0.25           |                   | 0.081               | 18.140                | 3.0                          |                              | 35.6                  | OK         |
| ST4.000 | ST4.00      | 0.04           |                   | 0.002               | 0.225                 | 0.4                          |                              | 0.5                   | OK         |
| ST1.006 | ST1.06      | 0.36           |                   | 0.031               | 18.591                | 2.3                          |                              | 36.4                  | OK         |
| ST1.007 | ST1.07      | 0.28           |                   | 0.027               | 18.816                | 2.8                          |                              | 36.6                  | OK         |
| ST1.008 | ST1.08      | 0.24           |                   | 0.178               | 19.042                | 1.7                          |                              | 36.6                  | OK         |
| ST5.000 | ST5.00-TANK | 0.06           |                   | 15.259              | -2.147                | 0.6                          | 40                           | 4.6                   | OK         |
| ST1.009 | ST1.09      | 0.19           |                   | 2.417               | 16.157                | 0.6                          |                              | 11.6                  | SURCHARGED |
| ST1.010 | ST1.10      | 0.13           |                   | 1.065               | 16.109                | 0.5                          |                              | 7.9                   | SURCHARGED |
| ST6.000 | ST6.00      | 0.04           |                   | 0.002               | 0.225                 | 0.3                          |                              | 0.5                   | OK         |
| ST1.011 | ST1.11-FC   | 0.47           |                   | 0.962               | 15.108                | 0.7                          |                              | 5.0                   | SURCHARGED |

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 8                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

### 2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Trinity Way

### Simulation Criteria

|                             |   |                              |   |                              |   |
|-----------------------------|---|------------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 1 | Number of Real Time Controls | 0 |

|                |                   |             |       |
|----------------|-------------------|-------------|-------|
| Rainfall Model | FSR               | Ratio R     | 0.360 |
| Region         | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm)     | 18.000            | Cv (Winter) | 0.840 |

|                          |                                |
|--------------------------|--------------------------------|
| Profile(s)               | Summer and Winter              |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360 |
| Return Period(s) (years) | 1, 2, 30, 100                  |
| Climate Change (%)       | 0, 0, 0, 40                    |

|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                             | Page 9                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Trinity Way

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| ST1.000 | ST1.00      | 0.18           |                   | 0.017               | 3.208                 | 0.7                          |                              | 6.8                   | OK         |
| ST1.001 | ST1.01      | 0.20           |                   | 0.084               | 3.646                 | 0.7                          |                              | 7.6                   | OK         |
| ST1.002 | ST1.02      | 0.08           |                   | 0.048               | 4.083                 | 1.7                          |                              | 8.4                   | OK         |
| ST1.003 | ST1.03      | 0.63           |                   | 0.056               | 12.394                | 1.0                          |                              | 23.3                  | OK         |
| ST1.004 | ST1.04      | 0.36           |                   | 0.116               | 12.394                | 1.5                          |                              | 23.4                  | OK         |
| ST2.000 | ST2.00      | 0.46           |                   | 0.011               | 2.771                 | 0.7                          |                              | 5.9                   | OK         |
| ST3.000 | ST3.00      | 0.43           |                   | 0.028               | 5.541                 | 0.7                          |                              | 11.8                  | OK         |
| ST3.001 | ST3.01      | 0.18           |                   | 0.032               | 5.541                 | 1.2                          |                              | 11.7                  | OK         |
| ST2.001 | ST2.01      | 0.46           |                   | 0.072               | 8.311                 | 0.9                          |                              | 17.7                  | OK         |
| ST2.002 | ST2.02      | 0.38           |                   | 0.078               | 8.311                 | 2.5                          |                              | 17.7                  | OK         |
| ST1.005 | ST1.05      | 0.32           |                   | 0.094               | 23.476                | 3.2                          |                              | 46.0                  | OK         |
| ST4.000 | ST4.00      | 0.05           |                   | 0.003               | 0.292                 | 0.4                          |                              | 0.6                   | OK         |
| ST1.006 | ST1.06      | 0.47           |                   | 0.037               | 24.060                | 2.5                          |                              | 47.1                  | OK         |
| ST1.007 | ST1.07      | 0.36           |                   | 0.031               | 24.351                | 3.0                          |                              | 47.4                  | OK         |
| ST1.008 | ST1.08      | 0.30           |                   | 0.245               | 22.002                | 1.8                          |                              | 47.1                  | OK         |
| ST5.000 | ST5.00-TANK | 0.08           |                   | 22.852              | -7.393                | 0.3                          | 48                           | 6.2                   | OK         |
| ST1.009 | ST1.09      | 0.20           |                   | 2.488               | 16.829                | 0.6                          |                              | 12.2                  | SURCHARGED |
| ST1.010 | ST1.10      | 0.15           |                   | 1.131               | 16.543                | 0.5                          |                              | 8.9                   | SURCHARGED |
| ST6.000 | ST6.00      | 0.06           |                   | 0.003               | 0.292                 | 0.4                          |                              | 0.6                   | OK         |
| ST1.011 | ST1.11-FC   | 0.47           |                   | 1.029               | 16.282                | 0.7                          |                              | 5.0                   | SURCHARGED |

### Simulation Criteria

Number of Input Hydrographs 0    Number of Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0

|                |                   |             |       |
|----------------|-------------------|-------------|-------|
| Rainfall Model | FSR               | Ratio R     | 0.360 |
| Region         | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm)     | 18.000            | Cv (Winter) | 0.840 |

|                          |                                |
|--------------------------|--------------------------------|
| Profile(s)               | Summer and Winter              |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360 |
| Return Period(s) (years) | 1, 2, 30, 100                  |
| Climate Change (%)       | 0, 0, 0, 40                    |

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|                                                          |                                             |                                                                                     |
|----------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|
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| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- TRINITY WAY<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:01<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC             |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

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

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| ST1.000 | ST1.00      | 0.34           |                   | 0.025               | 6.064                 | 0.9                          |                              | 12.9                  | OK         |
| ST1.001 | ST1.01      | 0.38           |                   | 0.123               | 6.891                 | 0.9                          |                              | 14.6                  | OK         |
| ST1.002 | ST1.02      | 0.15           |                   | 0.071               | 7.718                 | 2.0                          |                              | 16.4                  | OK         |
| ST1.003 | ST1.03      | 1.40           |                   | 0.191               | 23.428                | 1.3                          |                              | 51.8                  | SURCHARGED |
| ST1.004 | ST1.04      | 0.79           |                   | 0.278               | 23.428                | 1.8                          |                              | 51.4                  | OK         |
| ST2.000 | ST2.00      | 0.86           |                   | 0.017               | 5.237                 | 0.8                          |                              | 11.2                  | OK         |
| ST3.000 | ST3.00      | 0.80           |                   | 0.043               | 10.474                | 0.8                          |                              | 22.3                  | OK         |
| ST3.001 | ST3.01      | 0.35           |                   | 0.046               | 10.474                | 1.5                          |                              | 22.1                  | OK         |
| ST2.001 | ST2.01      | 0.87           |                   | 0.218               | 15.710                | 1.1                          |                              | 33.4                  | OK         |
| ST2.002 | ST2.02      | 0.71           |                   | 0.118               | 15.710                | 2.9                          |                              | 33.5                  | OK         |
| ST1.005 | ST1.05      | 0.67           |                   | 0.149               | 44.375                | 3.8                          |                              | 95.4                  | OK         |
| ST4.000 | ST4.00      | 0.09           |                   | 0.004               | 0.551                 | 0.5                          |                              | 1.2                   | OK         |
| ST1.006 | ST1.06      | 0.98           |                   | 0.075               | 45.478                | 2.9                          |                              | 98.0                  | OK         |
| ST1.007 | ST1.07      | 0.76           |                   | 0.060               | 46.029                | 3.6                          |                              | 99.3                  | OK         |
| ST1.008 | ST1.08      | 0.65           |                   | 0.690               | 41.582                | 1.7                          |                              | 99.8                  | SURCHARGED |
| ST5.000 | ST5.00-TANK | 0.12           |                   | 64.094              | 0.013                 | 0.6                          | 137                          | 9.7                   | SURCHARGED |
| ST1.009 | ST1.09      | 0.13           |                   | 2.834               | 98.195                | 0.5                          |                              | 8.2                   | SURCHARGED |
| ST1.010 | ST1.10      | 0.11           |                   | 1.437               | 99.343                | 0.4                          |                              | 6.5                   | SURCHARGED |
| ST6.000 | ST6.00      | 0.11           |                   | 0.004               | 0.551                 | 0.4                          |                              | 1.2                   | OK         |
| ST1.011 | ST1.11-FC   | 0.47           |                   | 1.335               | 100.490               | 0.7                          |                              | 5.0                   | SURCHARGED |

Renaissance Assoc.

Carvers Warehouse

77 Dale Street

Manchester M1 2HG

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File 230906 Drainage Model.MDX

BRWRY- TRINITY WAY

1, 2, 30, 100YR+40%CC

Designed by JB

Checked by PC

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Innovvze

Network 2020.1.3

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

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 Offline Controls

0

Number of Time/Area Diagrams

0

Number of Online Controls

1

Number of Storage Structures

1

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)

200.0

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

Return Period(s) (years)

1, 2, 30, 100

Climate Change (%)

0, 0, 0, 40

| PN      | US/MH Name  | Event                            | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---------|-------------|----------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| ST1.000 | ST1.00      | 15 minute 100 year Winter I+40%  | 15              | 40.051    | 38.790          | -0.095               | 0.000               |
| ST1.001 | ST1.01      | 15 minute 100 year Winter I+40%  | 15              | 40.039    | 38.730          | -0.049               | 0.000               |
| ST1.002 | ST1.02      | 15 minute 100 year Winter I+40%  | 15              | 39.992    | 38.689          | 0.030                | 0.000               |
| ST1.003 | ST1.03      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 38.663          | 0.613                | 0.000               |
| ST1.004 | ST1.04      | 15 minute 100 year Winter I+40%  | 15              | 39.060    | 38.264          | 0.306                | 0.000               |
| ST2.000 | ST2.00      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 39.132          | 0.332                | 0.000               |
| ST3.000 | ST3.00      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 39.171          | 0.196                | 0.000               |
| ST3.001 | ST3.01      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 39.109          | 0.151                | 0.000               |
| ST2.001 | ST2.01      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 39.006          | 0.277                | 0.000               |
| ST2.002 | ST2.02      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 38.748          | 0.227                | 0.000               |
| ST1.005 | ST1.05      | 15 minute 100 year Winter I+40%  | 15              | 39.060    | 37.958          | 1.533                | 0.000               |
| ST4.000 | ST4.00      | 15 minute 100 year Winter I+40%  | 15              | 37.876    | 36.730          | 0.054                | 0.000               |
| ST1.006 | ST1.06      | 15 minute 100 year Winter I+40%  | 15              | 37.501    | 36.723          | 1.535                | 0.000               |
| ST1.007 | ST1.07      | 15 minute 100 year Winter I+40%  | 15              | 36.836    | 35.666          | 0.979                | 0.000               |
| ST1.008 | ST1.08      | 180 minute 100 year Winter I+40% | 180             | 36.677    | 34.873          | 1.040                | 0.000               |
| ST5.000 | ST5.00-TANK | 180 minute 100 year Winter I+40% | 180             | 35.600    | 34.868          | 1.268                | 0.000               |
| ST1.009 | ST1.09      | 180 minute 100 year Winter I+40% | 180             | 36.390    | 34.870          | 1.417                | 0.000               |
| ST1.010 | ST1.10      | 180 minute 100 year Winter I+40% | 180             | 35.931    | 34.869          | 1.464                | 0.000               |
| ST6.000 | ST6.00      | 180 minute 100 year Winter I+40% | 180             | 35.708    | 34.867          | 0.359                | 0.000               |
| ST1.011 | ST1.11-FC   | 180 minute 100 year Winter I+40% | 180             | 35.697    | 34.869          | 1.649                | 0.000               |

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|                                                          |                                             |                                                                                     |
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| Innovyze                                                 | Network 2020.1.3                            |                                                                                     |

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

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| ST1.000 | ST1.00      | 0.62           |                   | 0.035               | 10.960                | 1.0                          |                              | 23.3                  | OK         |
| ST1.001 | ST1.01      | 0.68           |                   | 0.374               | 12.456                | 1.0                          |                              | 25.7                  | OK         |
| ST1.002 | ST1.02      | 0.28           |                   | 0.634               | 13.950                | 2.1                          |                              | 30.4                  | SURCHARGED |
| ST1.003 | ST1.03      | 2.31           |                   | 0.568               | 42.346                | 2.2                          |                              | 85.2                  | SURCHARGED |
| ST1.004 | ST1.04      | 1.31           |                   | 0.672               | 42.346                | 2.2                          |                              | 84.9                  | SURCHARGED |
| ST2.000 | ST2.00      | 1.49           |                   | 0.076               | 9.465                 | 1.1                          |                              | 19.3                  | SURCHARGED |
| ST3.000 | ST3.00      | 1.39           |                   | 0.118               | 18.931                | 1.0                          |                              | 38.5                  | SURCHARGED |
| ST3.001 | ST3.01      | 0.59           |                   | 0.182               | 18.931                | 1.6                          |                              | 37.8                  | SURCHARGED |
| ST2.001 | ST2.01      | 1.47           |                   | 0.725               | 28.398                | 1.4                          |                              | 56.5                  | SURCHARGED |
| ST2.002 | ST2.02      | 1.13           |                   | 0.872               | 28.398                | 3.0                          |                              | 53.6                  | SURCHARGED |
| ST1.005 | ST1.05      | 1.02           |                   | 2.124               | 80.209                | 3.9                          |                              | 144.5                 | SURCHARGED |
| ST4.000 | ST4.00      | 0.17           |                   | 0.032               | 0.997                 | 0.5                          |                              | 2.1                   | SURCHARGED |
| ST1.006 | ST1.06      | 1.47           |                   | 1.086               | 82.202                | 3.7                          |                              | 146.3                 | SURCHARGED |
| ST1.007 | ST1.07      | 1.13           |                   | 0.534               | 83.198                | 3.7                          |                              | 147.0                 | SURCHARGED |
| ST1.008 | ST1.08      | 0.30           |                   | 1.847               | 199.883               | 1.5                          |                              | 47.0                  | SURCHARGED |
| ST5.000 | ST5.00-TANK | 0.12           |                   | 144.815             | 0.475                 | 0.6                          | 277                          | 9.5                   | SURCHARGED |
| ST1.009 | ST1.09      | 0.14           |                   | 3.821               | 202.723               | 0.5                          |                              | 8.4                   | SURCHARGED |
| ST1.010 | ST1.10      | 0.11           |                   | 2.414               | 205.088               | 0.4                          |                              | 6.9                   | SURCHARGED |
| ST6.000 | ST6.00      | 0.06           |                   | 0.080               | 2.379                 | 0.4                          |                              | 0.6                   | SURCHARGED |
| ST1.011 | ST1.11-FC   | 0.50           |                   | 2.334               | 207.466               | 0.8                          |                              | 5.4                   | SURCHARGED |

|                                                          |                                            |                                                                                     |
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| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Francis Street

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Francis Street

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.177        | 4-8            | 0.181        |

Total Area Contributing (ha) = 0.358

Total Pipe Volume (m³) = 115.947

#### Network Design Table for Storm - Francis Street

« - Indicates pipe capacity < flow

| 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                                                                        |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| SF1.000 | 4.741         | 0.032       | 150.0          | 0.010          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.001 | 5.264         | 0.856       | 6.1            | 0.006          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.002 | 3.766         | 1.220       | 3.1            | 0.002          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.003 | 3.325         | 1.213       | 2.7            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.004 | 5.814         | 1.170       | 5.0            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.005 | 3.994         | 0.517       | 7.7            | 0.003          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SF1.000 | 50.00           | 5.10           | 33.688       | 0.010            | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 1.4           |
| SF1.001 | 50.00           | 5.12           | 33.656       | 0.016            | 0.0                  | 0.0           | 0.0               | 4.09         | 72.3         | 2.2           |
| SF1.002 | 50.00           | 5.13           | 32.800       | 0.018            | 0.0                  | 0.0           | 0.0               | 5.78         | 102.1        | 2.4           |
| SF1.003 | 50.00           | 5.14           | 31.580       | 0.021            | 0.0                  | 0.0           | 0.0               | 6.13         | 108.4        | 2.8           |
| SF1.004 | 50.00           | 5.16           | 30.367       | 0.024            | 0.0                  | 0.0           | 0.0               | 4.55         | 80.4         | 3.2           |
| SF1.005 | 50.00           | 5.18           | 29.197       | 0.027            | 0.0                  | 0.0           | 0.0               | 3.65         | 64.5         | 3.7           |

|                                                          |                                            |                                                                                     |
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| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

### Network Design Table for Storm - Francis Street

### Network Results Table



|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
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| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

### Network Design Table for Storm - Francis Street

### Network Results Table

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
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| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

Network Design Table for Storm - Francis Street

| 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                                                                      |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| SF1.019 | 5.400         | 0.054       | 100.0          | 0.007          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| SF1.020 | 38.898        | 0.389       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| SF1.021 | 28.953        | 0.290       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| SF1.022 | 4.607         | 0.795       | 5.8            | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |

Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SF1.019 | 50.00           | 6.50           | 27.466       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.00         | 17.8«        | 48.5          |
| SF1.020 | 50.00           | 6.99           | 27.337       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.31         | 52.0         | 48.5          |
| SF1.021 | 50.00           | 7.36           | 26.948       | 0.358            | 0.0                  | 0.0           | 0.0               | 1.31         | 52.0         | 48.5          |
| SF1.022 | 50.00           | 7.38           | 26.659       | 0.358            | 0.0                  | 0.0           | 0.0               | 5.47         | 217.6        | 48.5          |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
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| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

Area Summary for Storm - Francis Street

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.010           | 0.010          | 0.010           |
| 1.001       | -         | -         | 100      | 0.006           | 0.006          | 0.006           |
| 1.002       | -         | -         | 100      | 0.002           | 0.002          | 0.002           |
| 1.003       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.004       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.005       | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 2.000       | -         | -         | 100      | 0.016           | 0.016          | 0.016           |
| 1.006       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.000       | -         | -         | 100      | 0.008           | 0.008          | 0.008           |
| 1.007       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 4.000       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.008       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 5.000       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 5.001       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 1.009       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 6.000       | -         | -         | 100      | 0.005           | 0.005          | 0.005           |
| 7.000       | -         | -         | 100      | 0.053           | 0.053          | 0.053           |
| 1.010       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 8.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 9.000       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 9.001       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 1.011       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 10.000      | -         | -         | 100      | 0.012           | 0.012          | 0.012           |
| 1.012       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 11.000      | -         | -         | 100      | 0.029           | 0.029          | 0.029           |
| 1.013       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 12.000      | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 12.001      | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.014       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 13.000      | -         | -         | 100      | 0.018           | 0.018          | 0.018           |
| 1.015       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 14.000      | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 15.000      | -         | -         | 100      | 0.010           | 0.010          | 0.010           |
| 14.001      | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.016       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 16.000      | -         | -         | 100      | 0.011           | 0.011          | 0.011           |
| 1.017       | -         | -         | 100      | 0.013           | 0.013          | 0.013           |
| 17.000      | -         | -         | 100      | 0.014           | 0.014          | 0.014           |
| 1.018       | -         | -         | 100      | 0.026           | 0.026          | 0.026           |
| 18.000      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.001      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.002      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.003      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.004      | -         | -         | 100      | 0.002           | 0.002          | 0.002           |
| 18.005      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.006      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 18.007      | -         | -         | 100      | 0.003           | 0.003          | 0.003           |
| 1.019       | -         | -         | 100      | 0.007           | 0.007          | 0.007           |
| 1.020       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.021       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.022       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.358           | 0.358          | 0.358           |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 7                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

Free Flowing Outfall Details for Storm - Francis Street

| Outfall<br>Pipe Number | Outfall<br>Name | C. Level<br>(m) | I. Level<br>(m) | Min<br>I. Level<br>(m) | D,L<br>(mm) | W<br>(mm) |
|------------------------|-----------------|-----------------|-----------------|------------------------|-------------|-----------|
| SF1.022                | SF              | 28.580          | 25.864          | 0.000                  | 0           | 0         |

Simulation Criteria for Storm - Francis Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 0 | Number of Real Time Controls | 0 |

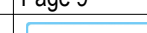
Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| 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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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                            |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------|----------------------------|------------|-----------------|------------|--|-------------------|-----|--|------------|------------|--|-----------|------------------------|--|-------------|---------|--|----------------|-----|--|---------------|----|--|------------------|--------|--|-----------------------------------|-----|--|---------------------------------|------|--|----------------|----------|------------|----------------|----------|------------|---------------------------|-------|-----|-----------|-------|-----|------------|-------|-----|---------------------------|---|-----|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|--|--|-------|-----|-------|-----|-------|-----|--|--|
| Renaissance Assoc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                            | Page 8                                                                              |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Designed by JB<br>Checked by PC            |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Network 2020.1.3                           |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| <div>Online Controls for Storm - Francis Street</div> <div>Hydro-Brake® Optimum Manhole: SF1.19-FC, DS/PN: SF1.019, Volume (m³): 19.9</div> <table><tr><td>Unit Reference</td><td colspan="2">MD-SCL-0094-5500-1856-5500</td></tr><tr><td>Design Head (m)</td><td colspan="2">1.856</td></tr><tr><td>Design Flow (l/s)</td><td colspan="2">5.5</td></tr><tr><td>Flush-Flo™</td><td colspan="2">Calculated</td></tr><tr><td>Objective</td><td colspan="2">Minimise blockage risk</td></tr><tr><td>Application</td><td colspan="2">Surface</td></tr><tr><td>Sump Available</td><td colspan="2">Yes</td></tr><tr><td>Diameter (mm)</td><td colspan="2">94</td></tr><tr><td>Invert Level (m)</td><td colspan="2">27.466</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td colspan="2">150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td colspan="2">1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.856</td><td>5.5</td><td>Kick-Flo®</td><td>0.836</td><td>3.8</td></tr><tr><td>Flush-Flo™</td><td>0.377</td><td>5.0</td><td>Mean Flow over Head Range</td><td>-</td><td>4.5</td></tr></table> <p>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</p> <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>3.3</td><td>1.200</td><td>4.5</td><td>3.000</td><td>6.9</td><td>7.000</td><td>10.2</td></tr><tr><td>0.200</td><td>4.7</td><td>1.400</td><td>4.8</td><td>3.500</td><td>7.4</td><td>7.500</td><td>10.6</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.1</td><td>4.000</td><td>7.9</td><td>8.000</td><td>10.9</td></tr><tr><td>0.400</td><td>5.0</td><td>1.800</td><td>5.4</td><td>4.500</td><td>8.3</td><td>8.500</td><td>11.2</td></tr><tr><td>0.500</td><td>4.9</td><td>2.000</td><td>5.7</td><td>5.000</td><td>8.7</td><td>9.000</td><td>11.5</td></tr><tr><td>0.600</td><td>4.8</td><td>2.200</td><td>5.9</td><td>5.500</td><td>9.1</td><td>9.500</td><td>11.8</td></tr><tr><td>0.800</td><td>4.1</td><td>2.400</td><td>6.2</td><td>6.000</td><td>9.5</td><td></td><td></td></tr><tr><td>1.000</td><td>4.1</td><td>2.600</td><td>6.4</td><td>6.500</td><td>9.9</td><td></td><td></td></tr></table> |                                            |                                                                                     | Unit Reference            | MD-SCL-0094-5500-1856-5500 |            | Design Head (m) | 1.856      |  | Design Flow (l/s) | 5.5 |  | Flush-Flo™ | Calculated |  | Objective | Minimise blockage risk |  | Application | Surface |  | Sump Available | Yes |  | Diameter (mm) | 94 |  | Invert Level (m) | 27.466 |  | Minimum Outlet Pipe Diameter (mm) | 150 |  | Suggested Manhole Diameter (mm) | 1200 |  | Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) | Design Point (Calculated) | 1.856 | 5.5 | Kick-Flo® | 0.836 | 3.8 | Flush-Flo™ | 0.377 | 5.0 | Mean Flow over Head Range | - | 4.5 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 3.3 | 1.200 | 4.5 | 3.000 | 6.9 | 7.000 | 10.2 | 0.200 | 4.7 | 1.400 | 4.8 | 3.500 | 7.4 | 7.500 | 10.6 | 0.300 | 5.0 | 1.600 | 5.1 | 4.000 | 7.9 | 8.000 | 10.9 | 0.400 | 5.0 | 1.800 | 5.4 | 4.500 | 8.3 | 8.500 | 11.2 | 0.500 | 4.9 | 2.000 | 5.7 | 5.000 | 8.7 | 9.000 | 11.5 | 0.600 | 4.8 | 2.200 | 5.9 | 5.500 | 9.1 | 9.500 | 11.8 | 0.800 | 4.1 | 2.400 | 6.2 | 6.000 | 9.5 |  |  | 1.000 | 4.1 | 2.600 | 6.4 | 6.500 | 9.9 |  |  |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MD-SCL-0094-5500-1856-5500                 |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.856                                      |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5.5                                        |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Calculated                                 |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Minimise blockage risk                     |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Surface                                    |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Sump Available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Yes                                        |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 94                                         |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Invert Level (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 27.466                                     |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Minimum Outlet Pipe Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 150                                        |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Suggested Manhole Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1200                                       |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Head (m)                                   | Flow (l/s)                                                                          | Control Points            | Head (m)                   | Flow (l/s) |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.856                                      | 5.5                                                                                 | Kick-Flo®                 | 0.836                      | 3.8        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.377                                      | 5.0                                                                                 | Mean Flow over Head Range | -                          | 4.5        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Flow (l/s)                                 | Depth (m)                                                                           | Flow (l/s)                | Depth (m)                  | Flow (l/s) | Depth (m)       | Flow (l/s) |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.3                                        | 1.200                                                                               | 4.5                       | 3.000                      | 6.9        | 7.000           | 10.2       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.7                                        | 1.400                                                                               | 4.8                       | 3.500                      | 7.4        | 7.500           | 10.6       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.0                                        | 1.600                                                                               | 5.1                       | 4.000                      | 7.9        | 8.000           | 10.9       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5.0                                        | 1.800                                                                               | 5.4                       | 4.500                      | 8.3        | 8.500           | 11.2       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.9                                        | 2.000                                                                               | 5.7                       | 5.000                      | 8.7        | 9.000           | 11.5       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.8                                        | 2.200                                                                               | 5.9                       | 5.500                      | 9.1        | 9.500           | 11.8       |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.1                                        | 2.400                                                                               | 6.2                       | 6.000                      | 9.5        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.1                                        | 2.600                                                                               | 6.4                       | 6.500                      | 9.9        |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                            |                                                                                     |                           |                            |            |                 |            |  |                   |     |  |            |            |  |           |                        |  |             |         |  |                |     |  |               |    |  |                  |        |  |                                   |     |  |                                 |      |  |                |          |            |                |          |            |                           |       |     |           |       |     |            |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 9                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Francis Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor          | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Hot Start (mins)                | 0     | MADD Factor * 10m <sup>3</sup> /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 |                                            |       |

### Synthetic Rainfall Details

| PN       | US/MH<br>Name | Event     |        |        |      |    | Duration<br>(mins) | US/CL<br>(m) | Water<br>Level<br>(m) | Surcharged<br>Depth<br>(m) | Flooded<br>Volume<br>(m³) |
|----------|---------------|-----------|--------|--------|------|----|--------------------|--------------|-----------------------|----------------------------|---------------------------|
| SF1.000  | SF1.00        | 15 minute | 1 year | Winter | I+0% | 15 | 34.738             | 33.721       | -0.117                | 0.000                      |                           |
| SF1.001  | SF1.01        | 15 minute | 1 year | Winter | I+0% | 15 | 34.574             | 33.674       | -0.133                | 0.000                      |                           |
| SF1.002  | SF1.02        | 15 minute | 1 year | Winter | I+0% | 15 | 33.850             | 32.817       | -0.133                | 0.000                      |                           |
| SF1.003  | SF1.03        | 15 minute | 1 year | Winter | I+0% | 15 | 32.630             | 31.598       | -0.132                | 0.000                      |                           |
| SF1.004  | SF1.04        | 15 minute | 1 year | Winter | I+0% | 15 | 31.417             | 30.387       | -0.131                | 0.000                      |                           |
| SF1.005  | SF1.05        | 15 minute | 1 year | Winter | I+0% | 15 | 30.247             | 29.222       | -0.125                | 0.000                      |                           |
| SF2.000  | SF2.00        | 15 minute | 1 year | Winter | I+0% | 15 | 30.042             | 28.882       | -0.118                | 0.000                      |                           |
| SF1.006  | SF1.06        | 60 minute | 1 year | Winter | I+0% | 60 | 29.953             | 27.872       | -0.958                | 0.000                      |                           |
| SF3.000  | SF3.00        | 15 minute | 1 year | Winter | I+0% | 15 | 29.913             | 28.917       | -0.133                | 0.000                      |                           |
| SF1.007  | SF1.07-JCT    | 60 minute | 1 year | Winter | I+0% | 60 | 29.813             | 27.872       | -0.939                | 0.000                      |                           |
| SF4.000  | SF4.00        | 15 minute | 1 year | Winter | I+0% | 15 | 30.036             | 28.916       | -0.134                | 0.000                      |                           |
| SF1.008  | SF1.08-JCT    | 60 minute | 1 year | Winter | I+0% | 60 | 29.992             | 27.872       | -0.910                | 0.000                      |                           |
| SF5.000  | SF5.00        | 15 minute | 1 year | Winter | I+0% | 15 | 30.037             | 28.884       | -0.116                | 0.000                      |                           |
| SF5.001  | SF5.01        | 15 minute | 1 year | Winter | I+0% | 15 | 30.049             | 28.807       | -0.110                | 0.000                      |                           |
| SF1.009  | SF1.09-JCT    | 60 minute | 1 year | Winter | I+0% | 60 | 29.853             | 27.872       | -0.901                | 0.000                      |                           |
| SF6.000  | SF6.00        | 15 minute | 1 year | Winter | I+0% | 15 | 29.938             | 28.913       | -0.137                | 0.000                      |                           |
| SF7.000  | SF7.00        | 15 minute | 1 year | Winter | I+0% | 15 | 29.753             | 28.759       | -0.091                | 0.000                      |                           |
| SF1.010  | SF1.10        | 60 minute | 1 year | Winter | I+0% | 60 | 29.817             | 27.872       | -0.880                | 0.000                      |                           |
| SF8.000  | SF8.00        | 15 minute | 1 year | Summer | I+0% | 15 | 29.927             | 28.900       | -0.150                | 0.000                      |                           |
| SF9.000  | SF9.00        | 15 minute | 1 year | Winter | I+0% | 15 | 30.037             | 28.875       | -0.125                | 0.000                      |                           |
| SF9.001  | SF9.01        | 15 minute | 1 year | Winter | I+0% | 15 | 30.037             | 28.820       | -0.119                | 0.000                      |                           |
| SF1.011  | SF1.11        | 60 minute | 1 year | Winter | I+0% | 60 | 29.820             | 27.872       | -0.845                | 0.000                      |                           |
| SF10.000 | SF10.00       | 15 minute | 1 year | Winter | I+0% | 15 | 29.938             | 28.919       | -0.131                | 0.000                      |                           |
| SF1.012  | SF1.12-JCT    | 60 minute | 1 year | Winter | I+0% | 60 | 29.845             | 27.872       | -0.819                | 0.000                      |                           |
| SF11.000 | SF11.00       | 15 minute | 1 year | Winter | I+0% | 15 | 29.822             | 28.833       | -0.117                | 0.000                      |                           |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 10                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

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

| PN       | US/MH<br>Name | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status |
|----------|---------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|--------|
| SF1.000  | SF1.00        | 0.11           |                   | 0.004               | 0.563                 | 0.4                          |                              | 1.2                   | OK     |
| SF1.001  | SF1.01        | 0.03           |                   | 0.007               | 0.901                 | 1.6                          |                              | 1.8                   | OK     |
| SF1.002  | SF1.02        | 0.03           |                   | 0.002               | 1.014                 | 1.9                          |                              | 2.0                   | OK     |
| SF1.003  | SF1.03        | 0.03           |                   | 0.002               | 1.183                 | 2.0                          |                              | 2.3                   | OK     |
| SF1.004  | SF1.04        | 0.04           |                   | 0.002               | 1.352                 | 2.0                          |                              | 2.6                   | OK     |
| SF1.005  | SF1.05        | 0.07           |                   | 0.004               | 1.521                 | 1.5                          |                              | 2.9                   | OK     |
| SF2.000  | SF2.00        | 0.10           |                   | 0.004               | 0.902                 | 0.7                          |                              | 1.9                   | OK     |
| SF1.006  | SF1.06        | 0.00           |                   | 0.300               | 4.108                 | 0.1                          |                              | 2.6                   | OK     |
| SF3.000  | SF3.00        | 0.03           |                   | 0.002               | 0.451                 | 0.9                          |                              | 1.0                   | OK     |
| SF1.007  | SF1.07-JCT    | 0.00           |                   | 0.170               | 4.872                 | 0.1                          |                              | 2.9                   | OK*    |
| SF4.000  | SF4.00        | 0.03           |                   | 0.002               | 0.394                 | 0.9                          |                              | 0.8                   | OK     |
| SF1.008  | SF1.08-JCT    | 0.00           |                   | 0.373               | 5.540                 | 0.1                          |                              | 3.2                   | OK*    |
| SF5.000  | SF5.00        | 0.12           |                   | 0.005               | 0.732                 | 0.5                          |                              | 1.6                   | OK     |
| SF5.001  | SF5.01        | 0.16           |                   | 0.033               | 1.465                 | 0.8                          |                              | 2.9                   | OK     |
| SF1.009  | SF1.09-JCT    | 0.00           |                   | 0.226               | 8.024                 | 0.2                          |                              | 4.7                   | OK*    |
| SF6.000  | SF6.00        | 0.02           |                   | 0.001               | 0.282                 | 0.9                          |                              | 0.6                   | OK     |
| SF7.000  | SF7.00        | 0.32           |                   | 0.009               | 2.986                 | 1.0                          |                              | 6.4                   | OK     |
| SF1.010  | SF1.10        | 0.01           |                   | 0.807               | 13.566                | 0.3                          |                              | 8.0                   | OK     |
| SF8.000  | SF8.00        | 0.00           |                   | 0.000               | 0.000                 | 0.0                          |                              | 0.0                   | OK     |
| SF9.000  | SF9.00        | 0.07           |                   | 0.003               | 0.394                 | 0.4                          |                              | 0.8                   | OK     |
| SF9.001  | SF9.01        | 0.10           |                   | 0.023               | 1.127                 | 0.8                          |                              | 2.2                   | OK     |
| SF1.011  | SF1.11        | 0.01           |                   | 1.212               | 15.478                | 0.3                          |                              | 8.3                   | OK     |
| SF10.000 | SF10.00       | 0.04           |                   | 0.002               | 0.676                 | 1.1                          |                              | 1.4                   | OK     |
| SF1.012  | SF1.12-JCT    | 0.01           |                   | 0.815               | 16.625                | 0.3                          |                              | 8.3                   | OK*    |
| SF11.000 | SF11.00       | 0.11           |                   | 0.004               | 1.634                 | 1.2                          |                              | 3.5                   | OK     |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 11                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Francis Street

|          |               |            |        |        |                    |              | Water        | Surcharged   | Flooded        |       |
|----------|---------------|------------|--------|--------|--------------------|--------------|--------------|--------------|----------------|-------|
| PN       | US/MH<br>Name | Event      |        |        | Duration<br>(mins) | US/CL<br>(m) | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |       |
| SF1.013  | SF1.13-JCT    | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.891       | 27.872       | -0.810         | 0.000 |
| SF12.000 | SF12.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 30.037       | 28.882       | -0.118         | 0.000 |
| SF12.001 | SF12.01       | 15 minute  | 1 year | Winter | I+0%               | 15           | 30.041       | 28.797       | -0.119         | 0.000 |
| SF1.014  | SF1.14-JCT    | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.899       | 27.872       | -0.806         | 0.000 |
| SF13.000 | SF13.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 29.788       | 28.775       | -0.125         | 0.000 |
| SF1.015  | SF1.15-JCT    | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.644       | 27.872       | -0.763         | 0.000 |
| SF14.000 | SF14.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 30.033       | 28.885       | -0.115         | 0.000 |
| SF15.000 | SF15.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 30.027       | 28.877       | -0.123         | 0.000 |
| SF14.001 | SF14.01       | 15 minute  | 1 year | Winter | I+0%               | 15           | 30.027       | 28.818       | -0.118         | 0.000 |
| SF1.016  | SF1.16-JCT    | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.644       | 27.872       | -0.761         | 0.000 |
| SF16.000 | SF16.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 29.728       | 28.720       | -0.130         | 0.000 |
| SF1.017  | SF1.17        | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.573       | 27.872       | -0.731         | 0.000 |
| SF17.000 | SF17.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 29.846       | 28.722       | -0.128         | 0.000 |
| SF1.018  | SF1.18        | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.726       | 27.872       | -0.682         | 0.000 |
| SF18.000 | SF18.00       | 15 minute  | 1 year | Winter | I+0%               | 15           | 38.521       | 37.375       | -0.146         | 0.000 |
| SF18.001 | SF18.01       | 15 minute  | 1 year | Winter | I+0%               | 15           | 37.311       | 36.168       | -0.143         | 0.000 |
| SF18.002 | SF18.02       | 15 minute  | 1 year | Winter | I+0%               | 15           | 36.089       | 34.949       | -0.140         | 0.000 |
| SF18.003 | SF18.03       | 15 minute  | 1 year | Winter | I+0%               | 15           | 34.870       | 33.733       | -0.137         | 0.000 |
| SF18.004 | SF18.04       | 15 minute  | 1 year | Winter | I+0%               | 15           | 33.654       | 32.519       | -0.135         | 0.000 |
| SF18.005 | SF18.05       | 15 minute  | 1 year | Winter | I+0%               | 15           | 32.423       | 31.289       | -0.134         | 0.000 |
| SF18.006 | SF18.06       | 15 minute  | 1 year | Winter | I+0%               | 15           | 31.197       | 30.063       | -0.134         | 0.000 |
| SF18.007 | SF18.07       | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.928       | 27.871       | -0.069         | 0.000 |
| SF1.019  | SF1.19-FC     | 60 minute  | 1 year | Winter | I+0%               | 60           | 29.623       | 27.871       | 0.255          | 0.000 |
| SF1.020  | SF1.20        | 180 minute | 1 year | Summer | I+0%               | 180          | 29.460       | 27.385       | -0.177         | 0.000 |
| SF1.021  | SF1.21        | 180 minute | 1 year | Winter | I+0%               | 180          | 29.080       | 26.996       | -0.177         | 0.000 |
| SF1.022  | SF1.22        | 120 minute | 1 year | Summer | I+0%               | 120          | 28.570       | 26.688       | -0.196         | 0.000 |

| PN       | US/MH Name | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status |
|----------|------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|--------|
| SF1.013  | SF1.13-JCT | 0.01           |                   | 0.473               | 19.396                | 0.3                          |                              | 9.8                   | OK*    |
| SF12.000 | SF12.00    | 0.10           |                   | 0.004               | 0.732                 | 0.6                          |                              | 1.6                   | OK     |
| SF12.001 | SF12.01    | 0.10           |                   | 0.018               | 1.127                 | 0.9                          |                              | 2.3                   | OK     |
| SF1.014  | SF1.14-JCT | 0.01           |                   | 0.348               | 21.308                | 0.4                          |                              | 10.6                  | OK*    |
| SF13.000 | SF13.00    | 0.07           |                   | 0.003               | 1.014                 | 1.1                          |                              | 2.2                   | OK     |
| SF1.015  | SF1.15-JCT | 0.01           |                   | 2.031               | 22.942                | 0.3                          |                              | 9.9                   | OK*    |
| SF14.000 | SF14.00    | 0.12           |                   | 0.005               | 0.732                 | 0.5                          |                              | 1.6                   | OK     |
| SF15.000 | SF15.00    | 0.08           |                   | 0.004               | 0.563                 | 0.6                          |                              | 1.2                   | OK     |
| SF14.001 | SF14.01    | 0.10           |                   | 0.028               | 1.296                 | 1.0                          |                              | 2.7                   | OK     |
| SF1.016  | SF1.16-JCT | 0.01           |                   | 0.382               | 25.096                | 0.3                          |                              | 11.0                  | OK*    |
| SF16.000 | SF16.00    | 0.04           |                   | 0.002               | 0.620                 | 1.0                          |                              | 1.3                   | OK     |
| SF1.017  | SF1.17     | 0.01           |                   | 2.424               | 27.069                | 0.2                          |                              | 10.5                  | OK     |
| SF17.000 | SF17.00    | 0.05           |                   | 0.003               | 0.789                 | 1.1                          |                              | 1.7                   | OK     |
| SF1.018  | SF1.18     | 0.01           |                   | 4.174               | 30.188                | 0.2                          |                              | 8.7                   | OK     |
| SF18.000 | SF18.00    | 0.01           |                   | 0.000               | 0.169                 | 0.8                          |                              | 0.4                   | OK     |
| SF18.001 | SF18.01    | 0.01           |                   | 0.000               | 0.338                 | 1.5                          |                              | 0.7                   | OK     |
| SF18.002 | SF18.02    | 0.01           |                   | 0.001               | 0.507                 | 1.9                          |                              | 1.0                   | OK     |
| SF18.003 | SF18.03    | 0.02           |                   | 0.001               | 0.675                 | 1.9                          |                              | 1.3                   | OK     |
| SF18.004 | SF18.04    | 0.02           |                   | 0.002               | 0.788                 | 1.9                          |                              | 1.5                   | OK     |
| SF18.005 | SF18.05    | 0.03           |                   | 0.002               | 0.957                 | 1.9                          |                              | 1.8                   | OK     |
| SF18.006 | SF18.06    | 0.03           |                   | 0.002               | 1.126                 | 2.1                          |                              | 2.1                   | OK     |



Renaissance Assoc.

Carvers Warehouse

77 Dale Street

Manchester M1 2HG

Date 12/09/2023 19:05

File 230906 Drainage Model.MDX

BRWRY- FRANCIS ST

1, 2, 30, 100YR+40%CC

Designed by JB

Checked by PC

Innovyze

Network 2020.1.3

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Francis Street

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 Offline Controls

0

Number of Time/Area Diagrams

0

Number of Online Controls

1

Number of Storage Structures

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)

200.0

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

Return Period(s) (years)

1, 2, 30, 100

Climate Change (%)

0, 0, 0, 40

| PN       | US/MH Name | Event                        | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|----------|------------|------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SF1.000  | SF1.00     | 15 minute 2 year Winter I+0% | 15              | 34.738    | 33.725          | -0.113               | 0.000               |
| SF1.001  | SF1.01     | 15 minute 2 year Winter I+0% | 15              | 34.574    | 33.676          | -0.131               | 0.000               |
| SF1.002  | SF1.02     | 15 minute 2 year Winter I+0% | 15              | 33.850    | 32.819          | -0.131               | 0.000               |
| SF1.003  | SF1.03     | 15 minute 2 year Winter I+0% | 15              | 32.630    | 31.601          | -0.130               | 0.000               |
| SF1.004  | SF1.04     | 15 minute 2 year Winter I+0% | 15              | 31.417    | 30.389          | -0.128               | 0.000               |
| SF1.005  | SF1.05     | 15 minute 2 year Winter I+0% | 15              | 30.247    | 29.227          | -0.121               | 0.000               |
| SF2.000  | SF2.00     | 15 minute 2 year Winter I+0% | 15              | 30.042    | 28.886          | -0.114               | 0.000               |
| SF1.006  | SF1.06     | 60 minute 2 year Winter I+0% | 60              | 29.953    | 27.943          | -0.887               | 0.000               |
| SF3.000  | SF3.00     | 15 minute 2 year Winter I+0% | 15              | 29.913    | 28.919          | -0.131               | 0.000               |
| SF1.007  | SF1.07-JCT | 60 minute 2 year Winter I+0% | 60              | 29.813    | 27.943          | -0.868               | 0.000               |
| SF4.000  | SF4.00     | 15 minute 2 year Winter I+0% | 15              | 30.036    | 28.918          | -0.132               | 0.000               |
| SF1.008  | SF1.08-JCT | 60 minute 2 year Winter I+0% | 60              | 29.992    | 27.943          | -0.839               | 0.000               |
| SF5.000  | SF5.00     | 15 minute 2 year Winter I+0% | 15              | 30.037    | 28.889          | -0.111               | 0.000               |
| SF5.001  | SF5.01     | 15 minute 2 year Winter I+0% | 15              | 30.049    | 28.813          | -0.104               | 0.000               |
| SF1.009  | SF1.09-JCT | 60 minute 2 year Winter I+0% | 60              | 29.853    | 27.943          | -0.830               | 0.000               |
| SF6.000  | SF6.00     | 15 minute 2 year Winter I+0% | 15              | 29.938    | 28.916          | -0.134               | 0.000               |
| SF7.000  | SF7.00     | 15 minute 2 year Winter I+0% | 15              | 29.753    | 28.768          | -0.082               | 0.000               |
| SF1.010  | SF1.10     | 60 minute 2 year Winter I+0% | 60              | 29.817    | 27.943          | -0.809               | 0.000               |
| SF8.000  | SF8.00     | 15 minute 2 year Summer I+0% | 15              | 29.927    | 28.900          | -0.150               | 0.000               |
| SF9.000  | SF9.00     | 15 minute 2 year Winter I+0% | 15              | 30.037    | 28.880          | -0.120               | 0.000               |
| SF9.001  | SF9.01     | 15 minute 2 year Winter I+0% | 15              | 30.037    | 28.824          | -0.115               | 0.000               |
| SF1.011  | SF1.11     | 60 minute 2 year Winter I+0% | 60              | 29.820    | 27.943          | -0.774               | 0.000               |
| SF10.000 | SF10.00    | 15 minute 2 year Winter I+0% | 15              | 29.938    | 28.922          | -0.128               | 0.000               |
| SF1.012  | SF1.12-JCT | 60 minute 2 year Winter I+0% | 60              | 29.845    | 27.943          | -0.748               | 0.000               |
| SF11.000 | SF11.00    | 15 minute 2 year Winter I+0% | 15              | 29.822    | 28.837          | -0.113               | 0.000               |

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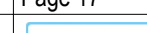
|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 15                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Francis Street

| PN       | US/MH Name | Event                         | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|----------|------------|-------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SF1.013  | SF1.13-JCT | 60 minute 2 year Winter I+0%  | 60              | 29.891    | 27.943          | -0.739               | 0.000               |
| SF12.000 | SF12.00    | 15 minute 2 year Winter I+0%  | 15              | 30.037    | 28.886          | -0.114               | 0.000               |
| SF12.001 | SF12.01    | 15 minute 2 year Winter I+0%  | 15              | 30.041    | 28.801          | -0.115               | 0.000               |
| SF1.014  | SF1.14-JCT | 60 minute 2 year Winter I+0%  | 60              | 29.899    | 27.943          | -0.735               | 0.000               |
| SF13.000 | SF13.00    | 15 minute 2 year Winter I+0%  | 15              | 29.788    | 28.780          | -0.120               | 0.000               |
| SF1.015  | SF1.15-JCT | 60 minute 2 year Winter I+0%  | 60              | 29.644    | 27.943          | -0.692               | 0.000               |
| SF14.000 | SF14.00    | 15 minute 2 year Winter I+0%  | 15              | 30.033    | 28.890          | -0.110               | 0.000               |
| SF15.000 | SF15.00    | 15 minute 2 year Winter I+0%  | 15              | 30.027    | 28.881          | -0.119               | 0.000               |
| SF14.001 | SF14.01    | 15 minute 2 year Winter I+0%  | 15              | 30.027    | 28.822          | -0.114               | 0.000               |
| SF1.016  | SF1.16-JCT | 60 minute 2 year Winter I+0%  | 60              | 29.644    | 27.943          | -0.689               | 0.000               |
| SF16.000 | SF16.00    | 15 minute 2 year Winter I+0%  | 15              | 29.728    | 28.723          | -0.127               | 0.000               |
| SF1.017  | SF1.17     | 60 minute 2 year Winter I+0%  | 60              | 29.573    | 27.943          | -0.660               | 0.000               |
| SF17.000 | SF17.00    | 15 minute 2 year Winter I+0%  | 15              | 29.846    | 28.725          | -0.125               | 0.000               |
| SF1.018  | SF1.18     | 60 minute 2 year Winter I+0%  | 60              | 29.726    | 27.943          | -0.611               | 0.000               |
| SF18.000 | SF18.00    | 15 minute 2 year Winter I+0%  | 15              | 38.521    | 37.376          | -0.145               | 0.000               |
| SF18.001 | SF18.01    | 15 minute 2 year Winter I+0%  | 15              | 37.311    | 36.170          | -0.141               | 0.000               |
| SF18.002 | SF18.02    | 15 minute 2 year Winter I+0%  | 15              | 36.089    | 34.952          | -0.137               | 0.000               |
| SF18.003 | SF18.03    | 15 minute 2 year Winter I+0%  | 15              | 34.870    | 33.736          | -0.134               | 0.000               |
| SF18.004 | SF18.04    | 15 minute 2 year Winter I+0%  | 15              | 33.654    | 32.521          | -0.133               | 0.000               |
| SF18.005 | SF18.05    | 15 minute 2 year Winter I+0%  | 15              | 32.423    | 31.291          | -0.132               | 0.000               |
| SF18.006 | SF18.06    | 15 minute 2 year Winter I+0%  | 15              | 31.197    | 30.065          | -0.132               | 0.000               |
| SF18.007 | SF18.07    | 60 minute 2 year Winter I+0%  | 60              | 29.928    | 27.943          | 0.003                | 0.000               |
| SF1.019  | SF1.19-FC  | 60 minute 2 year Winter I+0%  | 60              | 29.623    | 27.943          | 0.326                | 0.000               |
| SF1.020  | SF1.20     | 360 minute 2 year Summer I+0% | 360             | 29.460    | 27.385          | -0.177               | 0.000               |
| SF1.021  | SF1.21     | 360 minute 2 year Winter I+0% | 360             | 29.080    | 26.996          | -0.177               | 0.000               |
| SF1.022  | SF1.22     | 360 minute 2 year Winter I+0% | 360             | 28.570    | 26.688          | -0.196               | 0.000               |

| PN       | US/MH Name | Flow / Overflow Cap. | Maximum Vol (m³) | Discharge Vol (m³) | Maximum Velocity (m/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|----------|------------|----------------------|------------------|--------------------|------------------------|------------------------|-----------------|--------|
| SF1.013  | SF1.13-JCT | 0.01                 | 0.719            | 23.214             | 0.3                    |                        | 10.7            | OK*    |
| SF12.000 | SF12.00    | 0.13                 | 0.005            | 0.948              | 0.6                    |                        | 2.0             | OK     |
| SF12.001 | SF12.01    | 0.12                 | 0.020            | 1.458              | 0.9                    |                        | 2.9             | OK     |
| SF1.014  | SF1.14-JCT | 0.01                 | 0.497            | 25.455             | 0.4                    |                        | 11.9            | OK*    |
| SF13.000 | SF13.00    | 0.09                 | 0.004            | 1.313              | 1.1                    |                        | 2.8             | OK     |
| SF1.015  | SF1.15-JCT | 0.01                 | 3.121            | 26.749             | 0.3                    |                        | 11.0            | OK*    |
| SF14.000 | SF14.00    | 0.16                 | 0.006            | 0.948              | 0.5                    |                        | 2.0             | OK     |
| SF15.000 | SF15.00    | 0.10                 | 0.004            | 0.729              | 0.6                    |                        | 1.6             | OK     |
| SF14.001 | SF14.01    | 0.13                 | 0.033            | 1.677              | 1.1                    |                        | 3.5             | OK     |
| SF1.016  | SF1.16-JCT | 0.01                 | 0.509            | 29.303             | 0.3                    |                        | 12.4            | OK*    |
| SF16.000 | SF16.00    | 0.06                 | 0.003            | 0.802              | 1.0                    |                        | 1.7             | OK     |
| SF1.017  | SF1.17     | 0.01                 | 3.332            | 30.764             | 0.2                    |                        | 11.1            | OK     |
| SF17.000 | SF17.00    | 0.06                 | 0.003            | 1.021              | 1.2                    |                        | 2.2             | OK     |
| SF1.018  | SF1.18     | 0.01                 | 5.560            | 32.971             | 0.2                    |                        | 9.1             | OK     |
| SF18.000 | SF18.00    | 0.01                 | 0.000            | 0.219              | 1.1                    |                        | 0.5             | OK     |
| SF18.001 | SF18.01    | 0.01                 | 0.001            | 0.437              | 1.9                    |                        | 0.9             | OK     |
| SF18.002 | SF18.02    | 0.02                 | 0.001            | 0.656              | 1.9                    |                        | 1.3             | OK     |
| SF18.003 | SF18.03    | 0.02                 | 0.002            | 0.875              | 1.9                    |                        | 1.6             | OK     |
| SF18.004 | SF18.04    | 0.03                 | 0.002            | 1.021              | 1.9                    |                        | 1.9             | OK     |
| SF18.005 | SF18.05    | 0.03                 | 0.002            | 1.239              | 2.0                    |                        | 2.3             | OK     |
| SF18.006 | SF18.06    | 0.04                 | 0.002            | 1.458              | 2.2                    |                        | 2.7             | OK     |



|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 17                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

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

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| 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 |                                     |       |

### Synthetic Rainfall Details

|          |            |            |         |        |      |  | Duration | US/CL  | Water Level | Surcharged Depth | Flooded Volume |
|----------|------------|------------|---------|--------|------|--|----------|--------|-------------|------------------|----------------|
| PN       | US/MH Name |            | Event   |        |      |  | (mins)   | (m)    | (m)         | (m)              | (m³)           |
| SF1.000  | SF1.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 34.738 | 33.741      | -0.097           | 0.000          |
| SF1.001  | SF1.01     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 34.574 | 33.685      | -0.121           | 0.000          |
| SF1.002  | SF1.02     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 33.850 | 32.828      | -0.122           | 0.000          |
| SF1.003  | SF1.03     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 32.630 | 31.611      | -0.119           | 0.000          |
| SF1.004  | SF1.04     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 31.417 | 30.401      | -0.117           | 0.000          |
| SF1.005  | SF1.05     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.247 | 29.241      | -0.107           | 0.000          |
| SF2.000  | SF2.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.042 | 28.900      | -0.100           | 0.000          |
| SF1.006  | SF1.06     | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.953 | 28.254      | -0.576           | 0.000          |
| SF3.000  | SF3.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 29.913 | 28.928      | -0.122           | 0.000          |
| SF1.007  | SF1.07-JCT | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.813 | 28.254      | -0.557           | 0.000          |
| SF4.000  | SF4.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.036 | 28.925      | -0.125           | 0.000          |
| SF1.008  | SF1.08-JCT | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.992 | 28.254      | -0.528           | 0.000          |
| SF5.000  | SF5.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.037 | 28.905      | -0.095           | 0.000          |
| SF5.001  | SF5.01     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.049 | 28.836      | -0.081           | 0.000          |
| SF1.009  | SF1.09-JCT | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.853 | 28.254      | -0.519           | 0.000          |
| SF6.000  | SF6.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 29.938 | 28.920      | -0.130           | 0.000          |
| SF7.000  | SF7.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 29.753 | 28.803      | -0.047           | 0.000          |
| SF1.010  | SF1.10     | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.817 | 28.254      | -0.498           | 0.000          |
| SF8.000  | SF8.00     | 15 minute  | 30 year | Summer | I+0% |  | 15       | 29.927 | 28.900      | -0.150           | 0.000          |
| SF9.000  | SF9.00     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.037 | 28.890      | -0.110           | 0.000          |
| SF9.001  | SF9.01     | 15 minute  | 30 year | Winter | I+0% |  | 15       | 30.037 | 28.842      | -0.097           | 0.000          |
| SF1.011  | SF1.11     | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.820 | 28.254      | -0.463           | 0.000          |
| SF10.000 | SF10.00    | 15 minute  | 30 year | Winter | I+0% |  | 15       | 29.938 | 28.931      | -0.119           | 0.000          |
| SF1.012  | SF1.12-JCT | 120 minute | 30 year | Winter | I+0% |  | 120      | 29.845 | 28.254      | -0.437           | 0.000          |
| SF11.000 | SF11.00    | 15 minute  | 30 year | Winter | I+0% |  | 15       | 29.822 | 28.852      | -0.098           | 0.000          |







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

| Simulation Criteria             |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Areal Reduction Factor          | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Hot Start (mins)                | 0     | MADD Factor * 10m <sup>3</sup> /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 |                                            |       |

### Synthetic Rainfall Details

|                                    |                                 |
|------------------------------------|---------------------------------|
| Margin for Flood Risk Warning (mm) | 200.0                           |
| Analysis Timestep                  | 2.5 Second Increment (Extended) |
| DTS Status                         | OFF                             |
| DVD Status                         | ON                              |
| Inertia Status                     | ON                              |

| PN       | US/MH Name | Event                            | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|----------|------------|----------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SF1.000  | SF1.00     | 15 minute 100 year Winter I+40%  | 15              | 34.738    | 33.762          | -0.076               | 0.000               |
| SF1.001  | SF1.01     | 15 minute 100 year Winter I+40%  | 15              | 34.574    | 33.695          | -0.111               | 0.000               |
| SF1.002  | SF1.02     | 15 minute 100 year Winter I+40%  | 15              | 33.850    | 32.838          | -0.112               | 0.000               |
| SF1.003  | SF1.03     | 15 minute 100 year Winter I+40%  | 15              | 32.630    | 31.622          | -0.109               | 0.000               |
| SF1.004  | SF1.04     | 15 minute 100 year Winter I+40%  | 15              | 31.417    | 30.413          | -0.105               | 0.000               |
| SF1.005  | SF1.05     | 180 minute 100 year Winter I+40% | 180             | 30.247    | 29.300          | -0.048               | 0.000               |
| SF2.000  | SF2.00     | 180 minute 100 year Winter I+40% | 180             | 30.042    | 29.300          | 0.300                | 0.000               |
| SF1.006  | SF1.06     | 180 minute 100 year Winter I+40% | 180             | 29.953    | 29.299          | 0.469                | 0.000               |
| SF3.000  | SF3.00     | 180 minute 100 year Winter I+40% | 180             | 29.913    | 29.299          | 0.249                | 0.000               |
| SF1.007  | SF1.07-JCT | 180 minute 100 year Summer I+40% | 180             | 29.813    | 28.811          | 0.000                | 0.000               |
| SF4.000  | SF4.00     | 180 minute 100 year Winter I+40% | 180             | 30.036    | 29.299          | 0.249                | 0.000               |
| SF1.008  | SF1.08-JCT | 180 minute 100 year Summer I+40% | 180             | 29.992    | 28.782          | 0.000                | 0.000               |
| SF5.000  | SF5.00     | 180 minute 100 year Winter I+40% | 180             | 30.037    | 29.301          | 0.301                | 0.000               |
| SF5.001  | SF5.01     | 180 minute 100 year Winter I+40% | 180             | 30.049    | 29.301          | 0.384                | 0.000               |
| SF1.009  | SF1.09-JCT | 120 minute 100 year Summer I+40% | 120             | 29.853    | 28.773          | 0.000                | 0.000               |
| SF6.000  | SF6.00     | 180 minute 100 year Winter I+40% | 180             | 29.938    | 29.299          | 0.249                | 0.000               |
| SF7.000  | SF7.00     | 180 minute 100 year Winter I+40% | 180             | 29.753    | 29.300          | 0.450                | 0.000               |
| SF1.010  | SF1.10     | 180 minute 100 year Winter I+40% | 180             | 29.817    | 29.299          | 0.547                | 0.000               |
| SF8.000  | SF8.00     | 180 minute 100 year Winter I+40% | 180             | 29.927    | 29.299          | 0.249                | 0.000               |
| SF9.000  | SF9.00     | 180 minute 100 year Winter I+40% | 180             | 30.037    | 29.301          | 0.301                | 0.000               |
| SF9.001  | SF9.01     | 180 minute 100 year Winter I+40% | 180             | 30.037    | 29.300          | 0.362                | 0.000               |
| SF1.011  | SF1.11     | 180 minute 100 year Winter I+40% | 180             | 29.820    | 29.299          | 0.582                | 0.000               |
| SF10.000 | SF10.00    | 180 minute 100 year Winter I+40% | 180             | 29.938    | 29.300          | 0.250                | 0.000               |
| SF1.012  | SF1.12-JCT | 120 minute 100 year Summer I+40% | 120             | 29.845    | 28.691          | 0.000                | 0.000               |
| SF11.000 | SF11.00    | 180 minute 100 year Winter I+40% | 180             | 29.822    | 29.300          | 0.350                | 0.000               |

|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 22                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

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

| PN       | US/MH Name | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status      |
|----------|------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|-------------|
| SF1.000  | SF1.00     | 0.48           |                   | 0.011               | 2.491                 | 0.6                          |                              | 5.3                   | OK          |
| SF1.001  | SF1.01     | 0.15           |                   | 0.020               | 3.986                 | 2.4                          |                              | 8.7                   | OK          |
| SF1.002  | SF1.02     | 0.14           |                   | 0.006               | 4.484                 | 2.9                          |                              | 9.8                   | OK          |
| SF1.003  | SF1.03     | 0.17           |                   | 0.006               | 5.231                 | 3.0                          |                              | 11.5                  | OK          |
| SF1.004  | SF1.04     | 0.20           |                   | 0.007               | 5.978                 | 3.0                          |                              | 13.1                  | OK          |
| SF1.005  | SF1.05     | 0.08           |                   | 0.018               | 15.965                | 1.6                          |                              | 3.7                   | OK          |
| SF2.000  | SF2.00     | 0.11           |                   | 0.071               | 9.461                 | 0.8                          |                              | 2.2                   | SURCHARGED  |
| SF1.006  | SF1.06     | 0.01           |                   | 5.469               | 25.426                | 0.1                          |                              | 4.9                   | SURCHARGED  |
| SF3.000  | SF3.00     | 0.04           |                   | 0.063               | 4.731                 | 0.9                          |                              | 1.1                   | SURCHARGED  |
| SF1.007  | SF1.07-JCT | 0.00           |                   | 6.353               | 26.927                | 0.1                          |                              | 5.7                   | SURCHARGED* |
| SF4.000  | SF4.00     | 0.03           |                   | 0.063               | 4.139                 | 0.9                          |                              | 1.0                   | SURCHARGED  |
| SF1.008  | SF1.08-JCT | 0.01           |                   | 10.671              | 30.623                | 0.1                          |                              | 9.4                   | SURCHARGED* |
| SF5.000  | SF5.00     | 0.14           |                   | 0.071               | 7.688                 | 0.5                          |                              | 1.8                   | SURCHARGED  |
| SF5.001  | SF5.01     | 0.20           |                   | 0.297               | 15.375                | 0.8                          |                              | 3.6                   | SURCHARGED  |
| SF1.009  | SF1.09-JCT | 0.00           |                   | 3.884               | 39.650                | 0.1                          |                              | 5.1                   | SURCHARGED* |
| SF6.000  | SF6.00     | 0.02           |                   | 0.063               | 2.957                 | 1.0                          |                              | 0.7                   | SURCHARGED  |
| SF7.000  | SF7.00     | 0.37           |                   | 0.095               | 31.341                | 1.0                          |                              | 7.3                   | SURCHARGED  |
| SF1.010  | SF1.10     | 0.02           |                   | 12.073              | 83.966                | 0.2                          |                              | 11.5                  | SURCHARGED  |
| SF8.000  | SF8.00     | 0.00           |                   | 0.063               | 0.000                 | 0.0                          |                              | 0.0                   | SURCHARGED  |
| SF9.000  | SF9.00     | 0.08           |                   | 0.071               | 4.139                 | 0.4                          |                              | 1.0                   | SURCHARGED  |
| SF9.001  | SF9.01     | 0.12           |                   | 0.235               | 11.827                | 0.9                          |                              | 2.8                   | SURCHARGED  |
| SF1.011  | SF1.11     | 0.02           |                   | 16.082              | 95.793                | 0.2                          |                              | 14.6                  | SURCHARGED  |
| SF10.000 | SF10.00    | 0.04           |                   | 0.063               | 7.096                 | 1.2                          |                              | 1.7                   | SURCHARGED  |
| SF1.012  | SF1.12-JCT | 0.00           |                   | 9.075               | 82.134                | 0.2                          |                              | 6.9                   | SURCHARGED* |
| SF11.000 | SF11.00    | 0.12           |                   | 0.079               | 17.149                | 1.3                          |                              | 4.0                   | SURCHARGED  |



|                                                          |                                            |                                                                                     |
|----------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                            | Page 24                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- FRANCIS ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:05<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC            |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                           |                                                                                     |

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

| PN       | US/MH Name | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|----------|------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| SF18.007 | SF18.07    | 0.03           |                   | 6.279               | 13.597                | 0.1                          |                              | 2.5                   | SURCHARGED |
| SF1.019  | SF1.19-FC  | 0.38           |                   | 18.785              | 211.707               | 0.9                          |                              | 5.5                   | SURCHARGED |
| SF1.020  | SF1.20     | 0.11           |                   | 0.051               | 211.707               | 0.8                          |                              | 5.5                   | OK         |
| SF1.021  | SF1.21     | 0.11           |                   | 0.082               | 211.707               | 0.8                          |                              | 5.5                   | OK         |
| SF1.022  | SF1.22     | 0.04           |                   | 0.045               | 211.706               | 1.7                          |                              | 5.5                   | OK         |

|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 1                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm - Dutton Street

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 100    | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 18.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.360  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for Storm - Dutton Street

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.338        | 4-8            | 0.091        |

Total Area Contributing (ha) = 0.429

Total Pipe Volume (m³) = 3.574

#### Network Design Table for Storm - Dutton Street

# - Indicates pipe length does not match coordinates  
« - Indicates pipe capacity < flow

| 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 |
|---------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|----------------|
| SD1.000 | 2.913         | 0.138       | 21.1           | 0.103          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit | 🟢              |
| SD1.001 | 1.708#        | 0.012       | 142.3          | 0.025          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |
| SD2.000 | 3.845         | 0.384       | 10.0           | 0.097          | 5.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit | 🟢              |
| SD2.001 | 1.562#        | 0.010       | 150.0          | 0.042          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit | 🟢              |

#### Network Results Table

| PN      | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ 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) |
|---------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| SD1.000 | 50.00           | 5.02           | 37.900       | 0.103            | 0.0                  | 0.0           | 0.0               | 2.20         | 38.9         | 13.9          |
| SD1.001 | 50.00           | 5.05           | 37.687       | 0.128            | 0.0                  | 0.0           | 0.0               | 1.09         | 43.5         | 17.3          |
| SD2.000 | 50.00           | 5.02           | 38.700       | 0.097            | 0.0                  | 0.0           | 0.0               | 3.20         | 56.6         | 13.1          |
| SD2.001 | 50.00           | 5.04           | 38.241       | 0.139            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.4         | 18.8          |

|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 2                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

Network Design Table for Storm - Dutton Street

### Network Results Table

|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 3                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

#### Area Summary for Storm - Dutton Street

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.000       | -         | -         | 100      | 0.103           | 0.103          | 0.103           |
| 1.001       | -         | -         | 100      | 0.025           | 0.025          | 0.025           |
| 2.000       | -         | -         | 100      | 0.097           | 0.097          | 0.097           |
| 2.001       | -         | -         | 100      | 0.042           | 0.042          | 0.042           |
| 3.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 4.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 4.001       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 3.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 5.000       | -         | -         | 100      | 0.024           | 0.024          | 0.024           |
| 5.001       | -         | -         | 100      | 0.005           | 0.005          | 0.005           |
| 5.002       | -         | -         | 100      | 0.038           | 0.038          | 0.038           |
| 3.002       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 3.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 3.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 6.000       | -         | -         | 100      | 0.019           | 0.019          | 0.019           |
| 6.001       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.002       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.003       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 7.000       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.429           | 0.429          | 0.429           |

#### Free Flowing Outfall Details for Storm - Dutton Street

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| SD1.004             | SD           | 39.842       | 37.431       | 0.000            | 0        | 0      |

#### Simulation Criteria for Storm - Dutton Street

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 1.000 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /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 Offline Controls 0    Number of Time/Area Diagrams 0  
Number of Online Controls 1    Number of Storage Structures 1    Number of Real Time Controls 0

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 100               | Cv (Summer)           | 1.000  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 18.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.360             |                       |        |

|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 4                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
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| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

Online Controls for Storm - Dutton Street

Hydro-Brake® Optimum Manhole: SD1.04-FC, DS/PN: SD1.004, Volume (m³): 4.5

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCL-0106-6600-1600-6600 |
| Design Head (m)                   | 1.600                      |
| Design Flow (l/s)                 | 6.6                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise blockage risk     |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 106                        |
| Invert Level (m)                  | 37.547                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) | Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|---------------------------|----------|------------|
| Design Point (Calculated) | 1.600    | 6.6        | Kick-Flo®                 | 0.864    | 5.0        |
| Flush-Flo™                | 0.381    | 6.6        | Mean Flow over Head Range | -        | 5.7        |

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     | 4.0        | 1.200     | 5.8        | 3.000     | 8.8        | 7.000     | 13.2       |
| 0.200     | 6.1        | 1.400     | 6.2        | 3.500     | 9.5        | 7.500     | 13.6       |
| 0.300     | 6.5        | 1.600     | 6.6        | 4.000     | 10.1       | 8.000     | 14.1       |
| 0.400     | 6.6        | 1.800     | 7.0        | 4.500     | 10.7       | 8.500     | 14.5       |
| 0.500     | 6.5        | 2.000     | 7.3        | 5.000     | 11.3       | 9.000     | 14.9       |
| 0.600     | 6.3        | 2.200     | 7.7        | 5.500     | 11.8       | 9.500     | 15.3       |
| 0.800     | 5.5        | 2.400     | 8.0        | 6.000     | 12.3       |           |            |
| 1.000     | 5.3        | 2.600     | 8.3        | 6.500     | 12.7       |           |            |

|                                                          |                                           |                                                                                     |
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| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

Storage Structures for Storm - Dutton Street

Cellular Storage Manhole: SD1.02-TANK, DS/PN: SD1.002

Invert Level (m) 37.600 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 115.0                  | 0.0                         | 1.601     | 0.0                    | 0.0                         |
| 1.600     | 115.0                  | 0.0                         |           |                        |                             |

|                                                          |                                           |                                                                                     |
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| Renaissance Assoc.                                       |                                           | Page 6                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

### 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Dutton Street

### 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 Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 1 | 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) | 200.0                           |
| 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 |
| Return Period(s) (years) | 1, 2, 30, 100                  |
| Climate Change (%)       | 0, 0, 0, 40                    |

|         |               |           |           |        |        |      | Duration | US/CL  | Water        | Surcharged   | Flooded        |
|---------|---------------|-----------|-----------|--------|--------|------|----------|--------|--------------|--------------|----------------|
| PN      | US/MH<br>Name | Event     |           |        |        |      | (mins)   | (m)    | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |
| SD1.000 | SD-RWP        | 15 minute | 1 year    | Winter | I+0%   | 15   | 39.323   | 37.979 | -0.071       | 0.000        |                |
| SD1.001 | SD1.01        | 60 minute | 1 year    | Winter | I+0%   | 60   | 39.461   | 37.829 | -0.083       | 0.000        |                |
| SD2.000 | SD-RWP        | 15 minute | 1 year    | Winter | I+0%   | 15   | 39.997   | 38.756 | -0.094       | 0.000        |                |
| SD2.001 | SD2.01        | 15 minute | 1 year    | Winter | I+0%   | 15   | 39.943   | 38.359 | -0.107       | 0.000        |                |
| SD3.000 | SD3.00        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.792 | -0.108       | 0.000        |                |
| SD4.000 | SD4.00        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.821 | -0.104       | 0.000        |                |
| SD4.001 | SD4.01        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.799 | -0.095       | 0.000        |                |
| SD3.001 | SD3.01        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.702 | -0.107       | 0.000        |                |
| SD5.000 | SD5.00        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.035   | 38.696 | -0.104       | 0.000        |                |
| SD5.001 | SD5.01        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.025   | 38.486 | -0.098       | 0.000        |                |
| SD5.002 | SD5.02        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.449 | -0.069       | 0.000        |                |
| SD3.002 | SD3.02        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.315 | -0.137       | 0.000        |                |
| SD3.003 | SD3.03        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.105 | -0.160       | 0.000        |                |
| SD3.004 | SD3.04        | 60 minute | 1 year    | Winter | I+0%   | 60   | 39.955   | 37.829 | -0.079       | 0.000        |                |
| SD6.000 | SD6.00        | 15 minute | 1 year    | Winter | I+0%   | 15   | 40.100   | 38.943 | -0.107       | 0.000        |                |
| SD6.001 | SD6.01        | 15 minute | 1 year    | Winter | I+0%   | 15   | 39.962   | 38.888 | -0.103       | 0.000        |                |
| SD1.002 | SD1.02-TANK   | 60 minute | 1 year    | Winter | I+0%   | 60   | 39.938   | 37.829 | -0.071       | 0.000        |                |
| SD1.003 |               | SD1.03    | 60 minute | 1 year | Winter | I+0% | 60       | 39.944 | 37.844       | -0.036       | 0.000          |
| SD7.000 | SD7.00        | 15 minute | 1 year    | Summer | I+0%   | 15   | 39.961   | 38.000 | -0.150       | 0.000        |                |
| SD1.004 | SD1.04-FC     | 60 minute | 1 year    | Winter | I+0%   | 60   | 39.942   | 37.847 | -0.149       | 0.000        |                |

|                                                          |                                           |                                                                                     |
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| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

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

| PN      | US/MH Name  | Flow /<br>Cap. | Overflow<br>(l/s) | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     |
|---------|-------------|----------------|-------------------|---------------------|-----------------------|------------------------------|------------------------------|-----------------------|------------|
| SD1.000 | SD-RWP      | 0.53           |                   | 0.074               | 5.804                 | 1.3                          |                              | 12.3                  | OK*        |
| SD1.001 | SD1.01      | 0.28           |                   | 0.161               | 12.232                | 0.6                          |                              | 8.3                   | OK         |
| SD2.000 | SD-RWP      | 0.30           |                   | 0.052               | 5.467                 | 1.9                          |                              | 11.7                  | OK*        |
| SD2.001 | SD2.01      | 0.53           |                   | 0.129               | 7.833                 | 0.8                          |                              | 15.8                  | OK         |
| SD3.000 | SD3.00      | 0.17           |                   | 0.006               | 1.070                 | 0.6                          |                              | 2.3                   | OK         |
| SD4.000 | SD4.00      | 0.21           |                   | 0.007               | 1.070                 | 0.5                          |                              | 2.3                   | OK         |
| SD4.001 | SD4.01      | 0.29           |                   | 0.030               | 2.141                 | 0.7                          |                              | 4.2                   | OK         |
| SD3.001 | SD3.01      | 0.18           |                   | 0.060               | 3.211                 | 1.6                          |                              | 6.5                   | OK         |
| SD5.000 | SD5.00      | 0.20           |                   | 0.007               | 1.352                 | 0.6                          |                              | 2.8                   | OK         |
| SD5.001 | SD5.01      | 0.26           |                   | 0.046               | 1.634                 | 0.6                          |                              | 3.3                   | OK         |
| SD5.002 | SD5.02      | 0.56           |                   | 0.067               | 3.775                 | 0.7                          |                              | 7.2                   | OK         |
| SD3.002 | SD3.02      | 0.32           |                   | 0.026               | 8.056                 | 1.1                          |                              | 15.6                  | OK         |
| SD3.003 | SD3.03      | 0.19           |                   | 0.055               | 8.056                 | 1.6                          |                              | 15.6                  | OK         |
| SD3.004 | SD3.04      | 0.31           |                   | 0.069               | 13.665                | 0.7                          |                              | 9.2                   | OK         |
| SD6.000 | SD6.00      | 0.18           |                   | 0.006               | 1.070                 | 0.6                          |                              | 2.3                   | OK         |
| SD6.001 | SD6.01      | 0.21           |                   | 0.035               | 1.070                 | 0.5                          |                              | 2.3                   | OK         |
| SD1.002 | SD1.02-TANK | 0.13           |                   | 25.233              | 35.204                | 0.5                          | 48                           | 8.1                   | OK*        |
| SD1.003 | SD1.03      | 0.12           |                   | 0.586               | 35.046                | 0.4                          |                              | 7.1                   | OK         |
| SD7.000 | SD7.00      | 0.00           |                   | 0.000               | 0.000                 | 0.0                          |                              | 0.0                   | OK         |
| SD1.004 | SD1.04-FC   | 0.30           |                   | 0.739               | 34.819                | 1.4                          |                              | 6.5                   | SURCHARGED |

|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 8                                                                              |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

### 2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Dutton Street

### 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 Offline Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Online Controls   | 1 | Number of Storage Structures | 1 | 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) | 200.0                           |
| 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 |
| Return Period(s) (years) | 1, 2, 30, 100                  |
| Climate Change (%)       | 0, 0, 0, 40                    |

| PN      | US/MH Name  | Event                        | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---------|-------------|------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SD1.000 | SD-RWP      | 15 minute 2 year Winter I+0% | 15              | 39.323    | 37.993          | -0.057               | 0.000               |
| SD1.001 | SD1.01      | 60 minute 2 year Winter I+0% | 60              | 39.461    | 37.912          | 0.000                | 0.000               |
| SD2.000 | SD-RWP      | 15 minute 2 year Winter I+0% | 15              | 39.997    | 38.765          | -0.085               | 0.000               |
| SD2.001 | SD2.01      | 15 minute 2 year Winter I+0% | 15              | 39.943    | 38.380          | -0.085               | 0.000               |
| SD3.000 | SD3.00      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.798          | -0.102               | 0.000               |
| SD4.000 | SD4.00      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.828          | -0.097               | 0.000               |
| SD4.001 | SD4.01      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.807          | -0.086               | 0.000               |
| SD3.001 | SD3.01      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.708          | -0.100               | 0.000               |
| SD5.000 | SD5.00      | 15 minute 2 year Winter I+0% | 15              | 40.035    | 38.703          | -0.097               | 0.000               |
| SD5.001 | SD5.01      | 15 minute 2 year Winter I+0% | 15              | 40.025    | 38.494          | -0.090               | 0.000               |
| SD5.002 | SD5.02      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.464          | -0.054               | 0.000               |
| SD3.002 | SD3.02      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.328          | -0.124               | 0.000               |
| SD3.003 | SD3.03      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.114          | -0.150               | 0.000               |
| SD3.004 | SD3.04      | 60 minute 2 year Winter I+0% | 60              | 39.955    | 37.911          | 0.004                | 0.000               |
| SD6.000 | SD6.00      | 15 minute 2 year Winter I+0% | 15              | 40.100    | 38.949          | -0.101               | 0.000               |
| SD6.001 | SD6.01      | 15 minute 2 year Winter I+0% | 15              | 39.962    | 38.895          | -0.096               | 0.000               |
| SD1.002 | SD1.02-TANK | 60 minute 2 year Winter I+0% | 60              | 39.938    | 37.911          | 0.011                | 0.000               |
| SD1.003 | SD1.03      | 60 minute 2 year Winter I+0% | 60              | 39.944    | 37.924          | 0.044                | 0.000               |
| SD7.000 | SD7.00      | 15 minute 2 year Summer I+0% | 15              | 39.961    | 38.000          | -0.150               | 0.000               |
| SD1.004 | SD1.04-FC   | 60 minute 2 year Winter I+0% | 60              | 39.942    | 37.929          | 0.232                | 0.000               |

| Renaissance Assoc.                                                                                          |               |                |                                           |                     |                       | Page 9                                                                              |                              |                       |             |
|-------------------------------------------------------------------------------------------------------------|---------------|----------------|-------------------------------------------|---------------------|-----------------------|-------------------------------------------------------------------------------------|------------------------------|-----------------------|-------------|
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                    |               |                | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |                     |                       |  |                              |                       |             |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX                                                     |               |                | Designed by JB<br>Checked by PC           |                     |                       |                                                                                     |                              |                       |             |
| Innovyze                                                                                                    |               |                | Network 2020.1.3                          |                     |                       |                                                                                     |                              |                       |             |
| <u>2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Dutton Street</u> |               |                |                                           |                     |                       |                                                                                     |                              |                       |             |
| PN                                                                                                          | US/MH<br>Name | Flow /<br>Cap. | Overflow<br>(l/s)                         | Maximum<br>Vol (m³) | Discharge<br>Vol (m³) | Maximum<br>Velocity<br>(m/s)                                                        | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status      |
| SD1.000                                                                                                     | SD-RWP        | 0.69           |                                           | 0.088               | 7.511                 | 1.4                                                                                 |                              | 16.0                  | OK*         |
| SD1.001                                                                                                     | SD1.01        | 0.35           |                                           | 0.268               | 15.557                | 0.7                                                                                 |                              | 10.5                  | OK          |
| SD2.000                                                                                                     | SD-RWP        | 0.39           |                                           | 0.060               | 7.075                 | 2.1                                                                                 |                              | 15.1                  | OK*         |
| SD2.001                                                                                                     | SD2.01        | 0.68           |                                           | 0.155               | 10.137                | 0.8                                                                                 |                              | 20.5                  | OK          |
| SD3.000                                                                                                     | SD3.00        | 0.22           |                                           | 0.007               | 1.385                 | 0.6                                                                                 |                              | 2.9                   | OK          |
| SD4.000                                                                                                     | SD4.00        | 0.27           |                                           | 0.008               | 1.385                 | 0.5                                                                                 |                              | 3.0                   | OK          |
| SD4.001                                                                                                     | SD4.01        | 0.37           |                                           | 0.035               | 2.771                 | 0.8                                                                                 |                              | 5.4                   | OK          |
| SD3.001                                                                                                     | SD3.01        | 0.23           |                                           | 0.069               | 4.156                 | 1.7                                                                                 |                              | 8.4                   | OK          |
| SD5.000                                                                                                     | SD5.00        | 0.26           |                                           | 0.008               | 1.750                 | 0.7                                                                                 |                              | 3.7                   | OK          |
| SD5.001                                                                                                     | SD5.01        | 0.34           |                                           | 0.054               | 2.114                 | 0.7                                                                                 |                              | 4.3                   | OK          |
| SD5.002                                                                                                     | SD5.02        | 0.72           |                                           | 0.080               | 4.885                 | 0.8                                                                                 |                              | 9.3                   | OK          |
| SD3.002                                                                                                     | SD3.02        | 0.41           |                                           | 0.030               | 10.426                | 1.2                                                                                 |                              | 20.2                  | OK          |
| SD3.003                                                                                                     | SD3.03        | 0.24           |                                           | 0.063               | 10.426                | 1.8                                                                                 |                              | 20.2                  | OK          |
| SD3.004                                                                                                     | SD3.04        | 0.39           |                                           | 0.133               | 17.414                | 0.7                                                                                 |                              | 11.6                  | SURCHARGED  |
| SD6.000                                                                                                     | SD6.00        | 0.23           |                                           | 0.007               | 1.385                 | 0.6                                                                                 |                              | 3.0                   | OK          |
| SD6.001                                                                                                     | SD6.01        | 0.27           |                                           | 0.041               | 1.385                 | 0.5                                                                                 |                              | 2.9                   | OK          |
| SD1.002                                                                                                     | SD1.02-TANK   | 0.13           |                                           | 34.326              | 38.938                | 0.5                                                                                 | 54                           | 8.0                   | SURCHARGED* |
| SD1.003                                                                                                     | SD1.03        | 0.12           |                                           | 0.754               | 38.607                | 0.4                                                                                 |                              | 7.4                   | SURCHARGED  |
| SD7.000                                                                                                     | SD7.00        | 0.00           |                                           | 0.000               | 0.000                 | 0.0                                                                                 |                              | 0.0                   | OK          |
| SD1.004                                                                                                     | SD1.04-FC     | 0.31           |                                           | 0.900               | 38.208                | 1.4                                                                                 |                              | 6.6                   | SURCHARGED  |
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|                                                          |                                           |                                                                                     |
|----------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Renaissance Assoc.                                       |                                           | Page 10                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

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

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| 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 |                                     |       |

### Synthetic Rainfall Details

|         |               |            |         |        |      |     |        | Water              | Surcharged   | Flooded      |              |                |
|---------|---------------|------------|---------|--------|------|-----|--------|--------------------|--------------|--------------|--------------|----------------|
| PN      | US/MH<br>Name | Event      |         |        |      |     |        | Duration<br>(mins) | US/CL<br>(m) | Level<br>(m) | Depth<br>(m) | Volume<br>(m³) |
| SD1.000 | SD-RWP        | 15 minute  | 30 year | Summer | I+0% | 15  | 39.323 | 38.050             | 0.000        | 0.000        |              |                |
| SD1.001 | SD1.01        | 120 minute | 30 year | Winter | I+0% | 120 | 39.461 | 38.343             | 0.431        | 0.000        |              |                |
| SD2.000 | SD-RWP        | 15 minute  | 30 year | Winter | I+0% | 15  | 39.997 | 38.797             | -0.053       | 0.000        |              |                |
| SD2.001 | SD2.01        | 15 minute  | 30 year | Winter | I+0% | 15  | 39.943 | 38.535             | 0.070        | 0.000        |              |                |
| SD3.000 | SD3.00        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.818             | -0.082       | 0.000        |              |                |
| SD4.000 | SD4.00        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.857             | -0.068       | 0.000        |              |                |
| SD4.001 | SD4.01        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.845             | -0.048       | 0.000        |              |                |
| SD3.001 | SD3.01        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.732             | -0.076       | 0.000        |              |                |
| SD5.000 | SD5.00        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.035 | 38.726             | -0.074       | 0.000        |              |                |
| SD5.001 | SD5.01        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.025 | 38.627             | 0.043        | 0.000        |              |                |
| SD5.002 | SD5.02        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.600             | 0.082        | 0.000        |              |                |
| SD3.002 | SD3.02        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.390             | -0.062       | 0.000        |              |                |
| SD3.003 | SD3.03        | 120 minute | 30 year | Winter | I+0% | 120 | 40.100 | 38.344             | 0.080        | 0.000        |              |                |
| SD3.004 | SD3.04        | 120 minute | 30 year | Winter | I+0% | 120 | 39.955 | 38.342             | 0.435        | 0.000        |              |                |
| SD6.000 | SD6.00        | 15 minute  | 30 year | Winter | I+0% | 15  | 40.100 | 38.970             | -0.080       | 0.000        |              |                |
| SD6.001 | SD6.01        | 15 minute  | 30 year | Winter | I+0% | 15  | 39.962 | 38.919             | -0.073       | 0.000        |              |                |
| SD1.002 | SD1.02-TANK   | 120 minute | 30 year | Winter | I+0% | 120 | 39.938 | 38.342             | 0.442        | 0.000        |              |                |
| SD1.003 | SD1.03        | 120 minute | 30 year | Winter | I+0% | 120 | 39.944 | 38.356             | 0.477        | 0.000        |              |                |
| SD7.000 | SD7.00        | 120 minute | 30 year | Winter | I+0% | 120 | 39.961 | 38.362             | 0.212        | 0.000        |              |                |
| SD1.004 | SD1.04-FC     | 120 minute | 30 year | Winter | I+0% | 120 | 39.942 | 38.362             | 0.665        | 0.000        |              |                |

| Renaissance Assoc.                                                                                           |             |                      |                                           |                  | Page 11            |                                                                                     |                        |                 |             |
|--------------------------------------------------------------------------------------------------------------|-------------|----------------------|-------------------------------------------|------------------|--------------------|-------------------------------------------------------------------------------------|------------------------|-----------------|-------------|
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG                                                     |             |                      | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |                  |                    |  |                        |                 |             |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX                                                      |             |                      | Designed by JB<br>Checked by PC           |                  |                    |                                                                                     |                        |                 |             |
| Innovyze                                                                                                     |             |                      | Network 2020.1.3                          |                  |                    |                                                                                     |                        |                 |             |
| <u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Dutton Street</u> |             |                      |                                           |                  |                    |                                                                                     |                        |                 |             |
| PN                                                                                                           | US/MH Name  | Flow / Overflow Cap. | (l/s)                                     | Maximum Vol (m³) | Discharge Vol (m³) | Maximum Velocity (m/s)                                                              | Half Drain Time (mins) | Pipe Flow (l/s) | Status      |
| SD1.000                                                                                                      | SD-RWP      | 1.21                 |                                           | 0.263            | 12.674             | 1.6                                                                                 |                        | 28.1            | SURCHARGED* |
| SD1.001                                                                                                      | SD1.01      | 0.40                 |                                           | 0.777            | 36.748             | 0.6                                                                                 |                        | 11.9            | SURCHARGED  |
| SD2.000                                                                                                      | SD-RWP      | 0.73                 |                                           | 0.092            | 13.370             | 2.4                                                                                 |                        | 28.5            | OK*         |
| SD2.001                                                                                                      | SD2.01      | 1.39                 |                                           | 0.348            | 19.158             | 1.1                                                                                 |                        | 41.4            | SURCHARGED  |
| SD3.000                                                                                                      | SD3.00      | 0.42                 |                                           | 0.010            | 2.619              | 0.7                                                                                 |                        | 5.6             | OK          |
| SD4.000                                                                                                      | SD4.00      | 0.50                 |                                           | 0.012            | 2.619              | 0.6                                                                                 |                        | 5.6             | OK          |
| SD4.001                                                                                                      | SD4.01      | 0.79                 |                                           | 0.058            | 5.237              | 0.9                                                                                 |                        | 11.5            | OK          |
| SD3.001                                                                                                      | SD3.01      | 0.47                 |                                           | 0.107            | 7.855              | 2.0                                                                                 |                        | 17.0            | OK          |
| SD5.000                                                                                                      | SD5.00      | 0.50                 |                                           | 0.011            | 3.308              | 0.8                                                                                 |                        | 6.9             | OK          |
| SD5.001                                                                                                      | SD5.01      | 0.72                 |                                           | 0.328            | 3.997              | 0.6                                                                                 |                        | 9.2             | SURCHARGED  |
| SD5.002                                                                                                      | SD5.02      | 1.48                 |                                           | 0.202            | 9.233              | 1.1                                                                                 |                        | 19.1            | SURCHARGED  |
| SD3.002                                                                                                      | SD3.02      | 0.85                 |                                           | 0.115            | 19.707             | 1.4                                                                                 |                        | 41.3            | OK          |
| SD3.003                                                                                                      | SD3.03      | 0.17                 |                                           | 0.646            | 41.053             | 1.6                                                                                 |                        | 14.3            | SURCHARGED  |
| SD3.004                                                                                                      | SD3.04      | 0.47                 |                                           | 0.408            | 41.053             | 0.7                                                                                 |                        | 14.0            | SURCHARGED  |
| SD6.000                                                                                                      | SD6.00      | 0.44                 |                                           | 0.010            | 2.619              | 0.7                                                                                 |                        | 5.6             | OK          |
| SD6.001                                                                                                      | SD6.01      | 0.51                 |                                           | 0.061            | 2.619              | 0.6                                                                                 |                        | 5.5             | OK          |
| SD1.002                                                                                                      | SD1.02-TANK | 0.17                 |                                           | 81.875           | 123.161            | 0.5                                                                                 | 127                    | 10.3            | SURCHARGED* |
| SD1.003                                                                                                      | SD1.03      | 0.15                 |                                           | 1.525            | 123.161            | 0.4                                                                                 |                        | 8.7             | SURCHARGED  |
| SD7.000                                                                                                      | SD7.00      | 0.00                 |                                           | 0.057            | 0.007              | 0.1                                                                                 |                        | 0.0             | SURCHARGED  |
| SD1.004                                                                                                      | SD1.04-FC   | 0.31                 |                                           | 1.685            | 123.168            | 1.4                                                                                 |                        | 6.6             | SURCHARGED  |
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Renaissance Assoc.

Carvers Warehouse  
77 Dale Street  
Manchester M1 2HG

Date 12/09/2023 19:08  
File 230906 Drainage Model.MDX

BRWRY- DUTTON ST  
1, 2, 30, 100YR+40%CC

Designed by JB  
Checked by PC

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Innovyze

Network 2020.1.3

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

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 Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

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) 200.0

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

Return Period(s) (years) 1, 2, 30, 100

Climate Change (%) 0, 0, 0, 40

| PN      | US/MH Name  | Event                            | Duration (mins) | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---------|-------------|----------------------------------|-----------------|-----------|-----------------|----------------------|---------------------|
| SD1.000 | SD-RWP      | 15 minute 100 year Summer I+40%  | 15              | 39.323    | 38.050          | 0.000                | 0.000               |
| SD1.001 | SD1.01      | 180 minute 100 year Winter I+40% | 180             | 39.461    | 39.177          | 1.265                | 0.000               |
| SD2.000 | SD-RWP      | 15 minute 100 year Summer I+40%  | 15              | 39.997    | 38.850          | 0.000                | 0.000               |
| SD2.001 | SD2.01      | 180 minute 100 year Winter I+40% | 180             | 39.943    | 39.177          | 0.711                | 0.000               |
| SD3.000 | SD3.00      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.187          | 0.287                | 0.000               |
| SD4.000 | SD4.00      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.188          | 0.263                | 0.000               |
| SD4.001 | SD4.01      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.188          | 0.294                | 0.000               |
| SD3.001 | SD3.01      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.185          | 0.376                | 0.000               |
| SD5.000 | SD5.00      | 15 minute 100 year Winter I+40%  | 15              | 40.035    | 39.440          | 0.640                | 0.000               |
| SD5.001 | SD5.01      | 15 minute 100 year Winter I+40%  | 15              | 40.025    | 39.299          | 0.715                | 0.000               |
| SD5.002 | SD5.02      | 15 minute 100 year Winter I+40%  | 15              | 40.100    | 39.227          | 0.709                | 0.000               |
| SD3.002 | SD3.02      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.183          | 0.731                | 0.000               |
| SD3.003 | SD3.03      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.178          | 0.914                | 0.000               |
| SD3.004 | SD3.04      | 180 minute 100 year Winter I+40% | 180             | 39.955    | 39.177          | 1.269                | 0.000               |
| SD6.000 | SD6.00      | 180 minute 100 year Winter I+40% | 180             | 40.100    | 39.177          | 0.127                | 0.000               |
| SD6.001 | SD6.01      | 180 minute 100 year Winter I+40% | 180             | 39.962    | 39.176          | 0.185                | 0.000               |
| SD1.002 | SD1.02-TANK | 180 minute 100 year Winter I+40% | 180             | 39.938    | 39.176          | 1.276                | 0.000               |
| SD1.003 | SD1.03      | 240 minute 100 year Winter I+40% | 240             | 39.944    | 39.190          | 1.310                | 0.000               |
| SD7.000 | SD7.00      | 240 minute 100 year Winter I+40% | 240             | 39.961    | 39.193          | 1.043                | 0.000               |
| SD1.004 | SD1.04-FC   | 240 minute 100 year Winter I+40% | 240             | 39.942    | 39.192          | 1.495                | 0.000               |

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|                                                          |                                           |                                                                                     |
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| Renaissance Assoc.                                       |                                           | Page 13                                                                             |
| Carvers Warehouse<br>77 Dale Street<br>Manchester M1 2HG | BRWRY- DUTTON ST<br>1, 2, 30, 100YR+40%CC |  |
| Date 12/09/2023 19:08<br>File 230906 Drainage Model.MDX  | Designed by JB<br>Checked by PC           |                                                                                     |
| Innovyze                                                 | Network 2020.1.3                          |                                                                                     |

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

| PN      | US/MH Name  | Flow / Overflow Cap. (l/s) | Maximum Vol (m³) | Discharge Vol (m³) | Maximum Velocity (m/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status      |
|---------|-------------|----------------------------|------------------|--------------------|------------------------|------------------------|-----------------|-------------|
| SD1.000 | SD-RWP      | 2.04                       | 0.863            | 21.936             | 2.7                    |                        | 47.4            | SURCHARGED* |
| SD1.001 | SD1.01      | 0.53                       | 1.720            | 75.691             | 0.6                    |                        | 15.8            | SURCHARGED  |
| SD2.000 | SD-RWP      | 1.21                       | 0.538            | 21.575             | 2.7                    |                        | 46.8            | SURCHARGED* |
| SD2.001 | SD2.01      | 0.63                       | 1.110            | 82.196             | 0.8                    |                        | 18.8            | SURCHARGED  |
| SD3.000 | SD3.00      | 0.20                       | 0.069            | 11.235             | 0.6                    |                        | 2.6             | SURCHARGED  |
| SD4.000 | SD4.00      | 0.24                       | 0.065            | 11.235             | 0.5                    |                        | 2.6             | SURCHARGED  |
| SD4.001 | SD4.01      | 0.36                       | 0.145            | 22.471             | 0.8                    |                        | 5.2             | SURCHARGED  |
| SD3.001 | SD3.01      | 0.22                       | 0.482            | 33.706             | 1.6                    |                        | 7.9             | SURCHARGED  |
| SD5.000 | SD5.00      | 0.83                       | 0.125            | 5.978              | 0.8                    |                        | 11.5            | SURCHARGED  |
| SD5.001 | SD5.01      | 1.07                       | 0.702            | 7.223              | 0.8                    |                        | 13.7            | SURCHARGED  |
| SD5.002 | SD5.02      | 2.46                       | 0.302            | 16.688             | 1.8                    |                        | 31.6            | SURCHARGED  |
| SD3.002 | SD3.02      | 0.38                       | 0.535            | 84.560             | 1.1                    |                        | 18.7            | SURCHARGED  |
| SD3.003 | SD3.03      | 0.22                       | 0.964            | 84.560             | 1.6                    |                        | 18.2            | SURCHARGED  |
| SD3.004 | SD3.04      | 0.60                       | 0.643            | 84.560             | 0.6                    |                        | 18.1            | SURCHARGED  |
| SD6.000 | SD6.00      | 0.21                       | 0.043            | 11.235             | 0.6                    |                        | 2.6             | SURCHARGED  |
| SD6.001 | SD6.01      | 0.24                       | 0.200            | 11.235             | 0.5                    |                        | 2.6             | SURCHARGED  |
| SD1.002 | SD1.02-TANK | 0.16                       | 173.887          | 253.683            | 0.5                    | 294                    | 9.6             | SURCHARGED* |
| SD1.003 | SD1.03      | 0.13                       | 2.998            | 273.003            | 0.4                    |                        | 7.8             | SURCHARGED  |
| SD7.000 | SD7.00      | 0.00                       | 0.189            | 0.006              | 0.1                    |                        | 0.1             | SURCHARGED  |
| SD1.004 | SD1.04-FC   | 0.31                       | 3.153            | 273.009            | 1.4                    |                        | 6.6             | SURCHARGED  |

---

## APPENDIX M

### OVERLAND FLOOD FLOW ROUTES

NOTES:

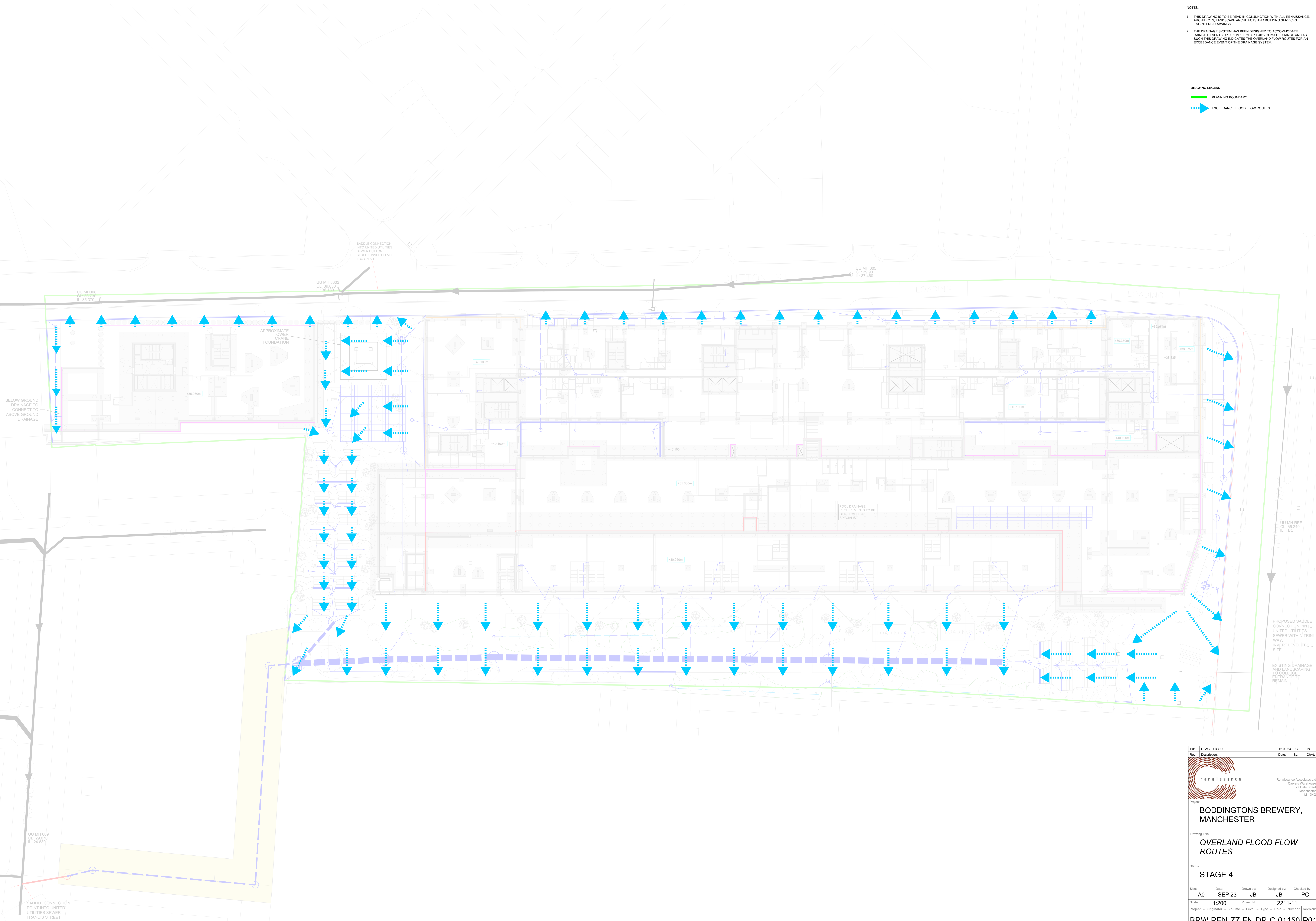
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING ENGINEERS DRAWINGS.

2. THE DRAINAGE SYSTEM HAS BEEN DESIGNED TO ACCOMMODATE RAINFALL EVENTS UP TO 1 IN 100 YEAR + 40% CLIMATE CHANGE AND AS SUCH THIS DRAWING INDICATES THE OVERLAND FLOW ROUTES FOR AN EXCEEDANCE EVENT OF THE DRAINAGE SYSTEM.

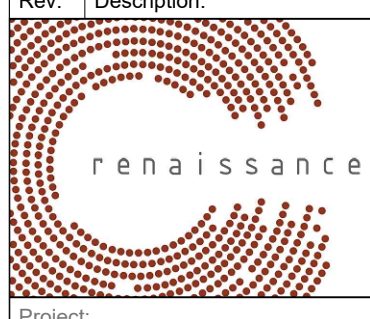
DRAWING LEGEND

PLANNING BOUNDARY

EXCEEDANCE FLOOD FLOW ROUTES



|      |               |          |     |       |
|------|---------------|----------|-----|-------|
| P01  | STAGE 4 ISSUE | 12.09.23 | JC  | PC    |
| Rev: | Description:  | Date:    | By: | Chkd: |



Project: **BODDINGTONS BREWERY, MANCHESTER**

Drawing Title: **OVERLAND FLOOD FLOW ROUTES**

Status: **STAGE 4**

|                     |                            |                     |                        |                       |
|---------------------|----------------------------|---------------------|------------------------|-----------------------|
| Size: <b>A0</b>     | Date: <b>SEP 23</b>        | Drawn by: <b>JB</b> | Designed by: <b>JB</b> | Checked by: <b>PC</b> |
| Scale: <b>1:200</b> | Project No: <b>2211-11</b> |                     |                        |                       |

Project – Originator – Volume – Level – Type – Role – Number: Revision:

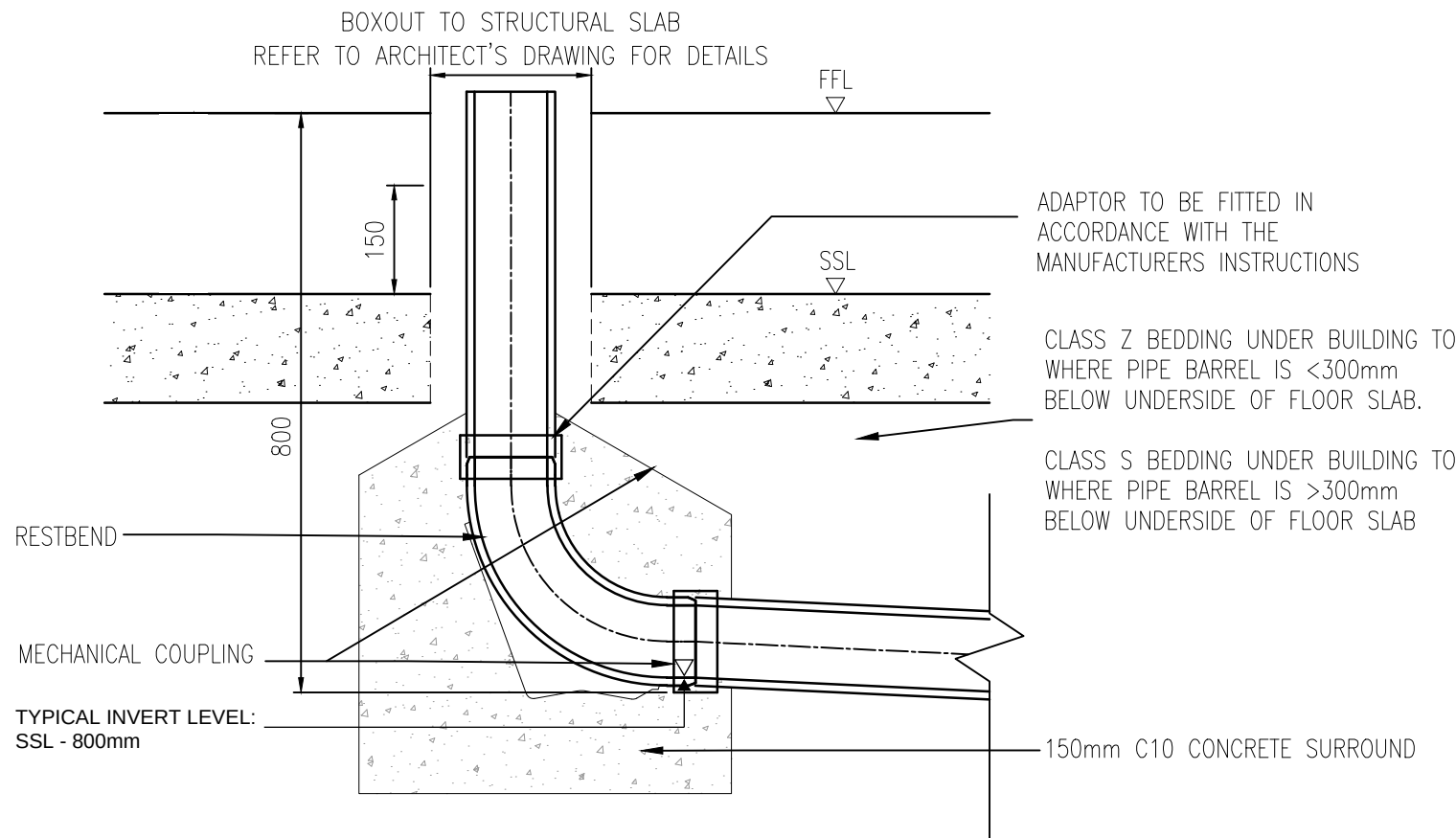
**BRW-REN-ZZ-FN-DR-C-01150 P01**

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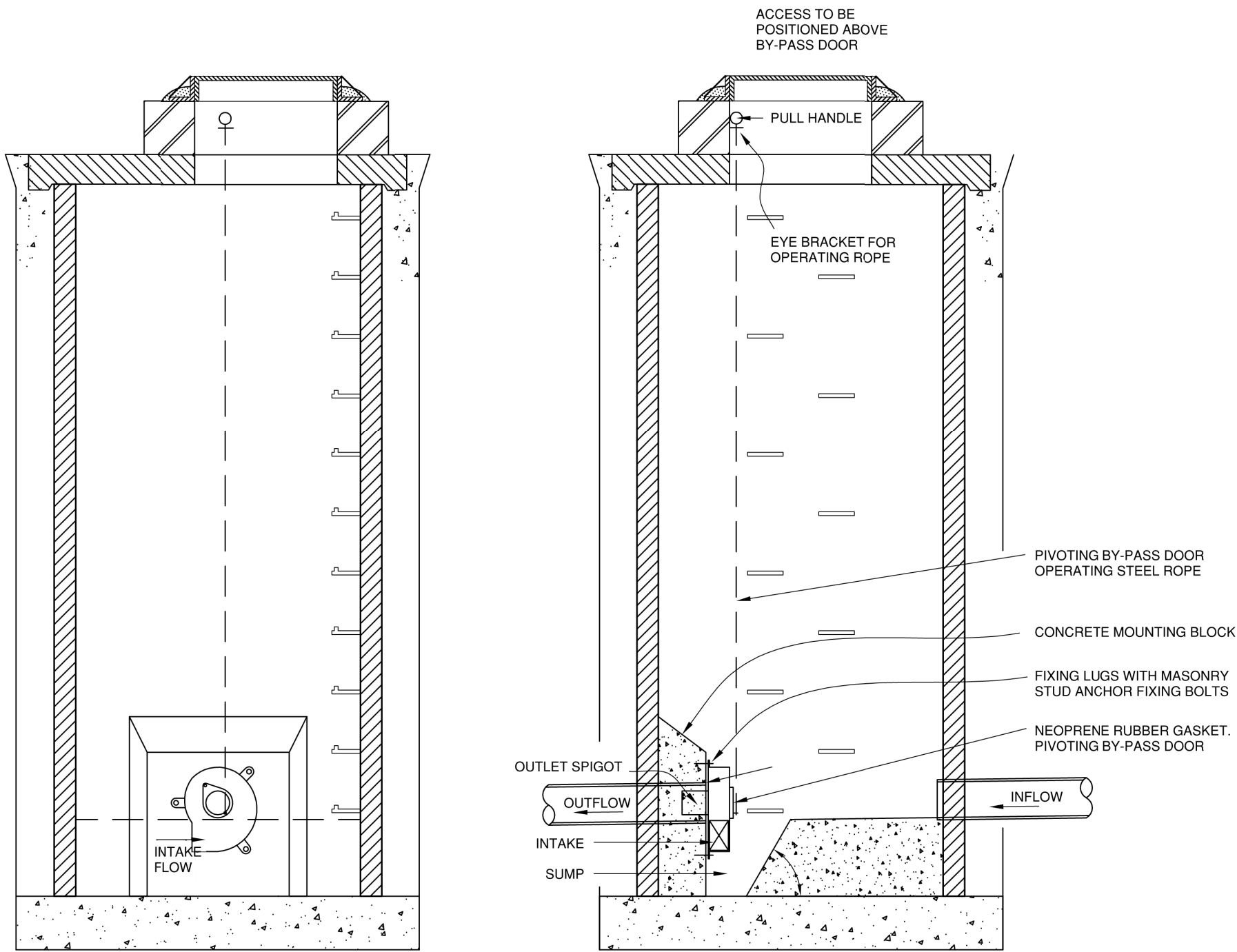
## APPENDIX N

### FLOW CONTROL AND SUDS DETAILS

- NOTES:
- FOR GENERAL NOTES REFER TO RENAISSANCE DRAWING BRW-REN-ZZ-FN-DR-C-01100. FOR DRAINAGE NOTES REFER TO BRW-REN-ZZ-FN-DR-C-03101.
  - DO NOT SCALE FROM THIS DRAWING. ANY AMBIGUITIES OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS TO BE CHECKED/ VERIFIED ON SITE.

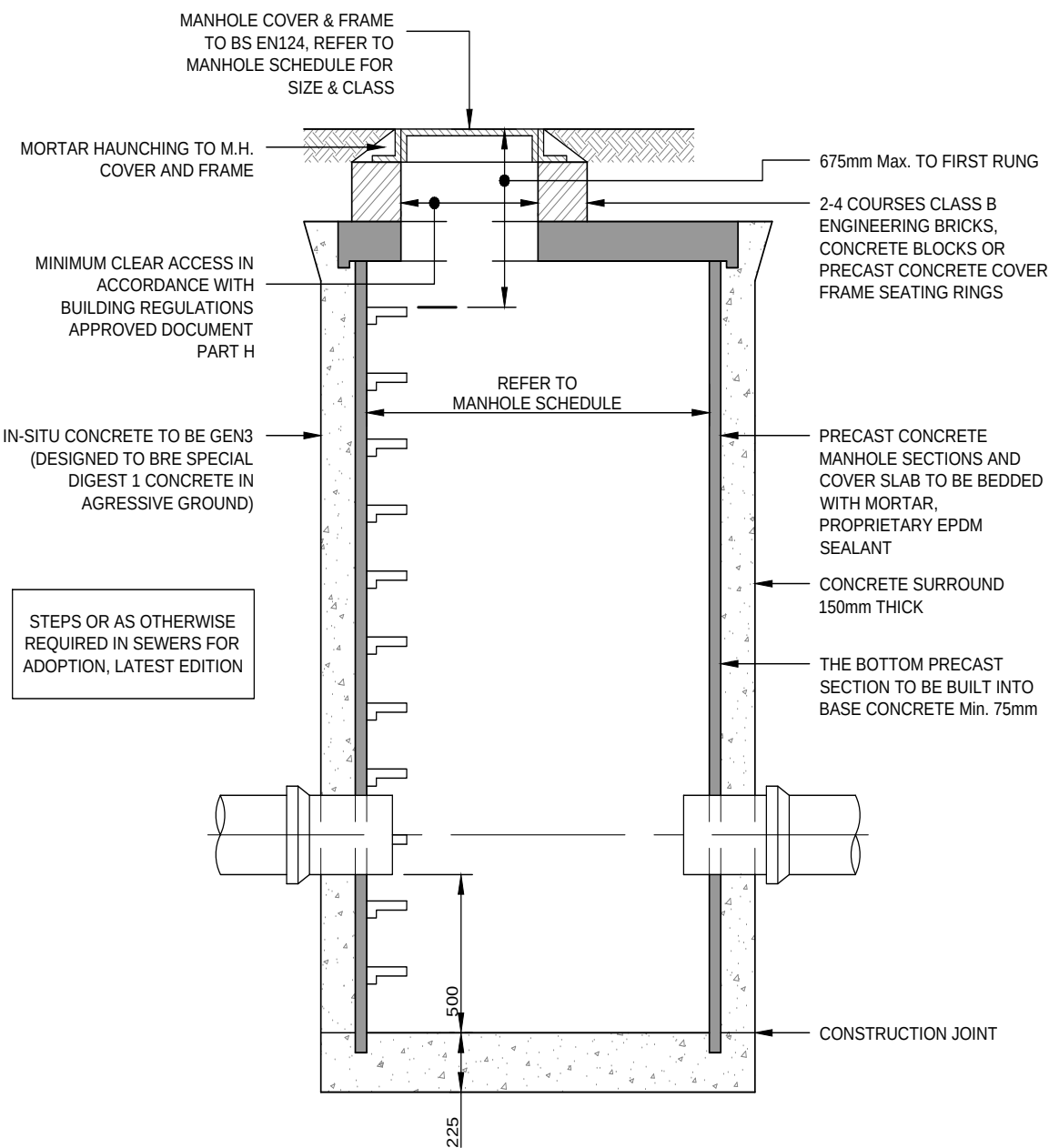


TYPICAL REST BEND DETAIL

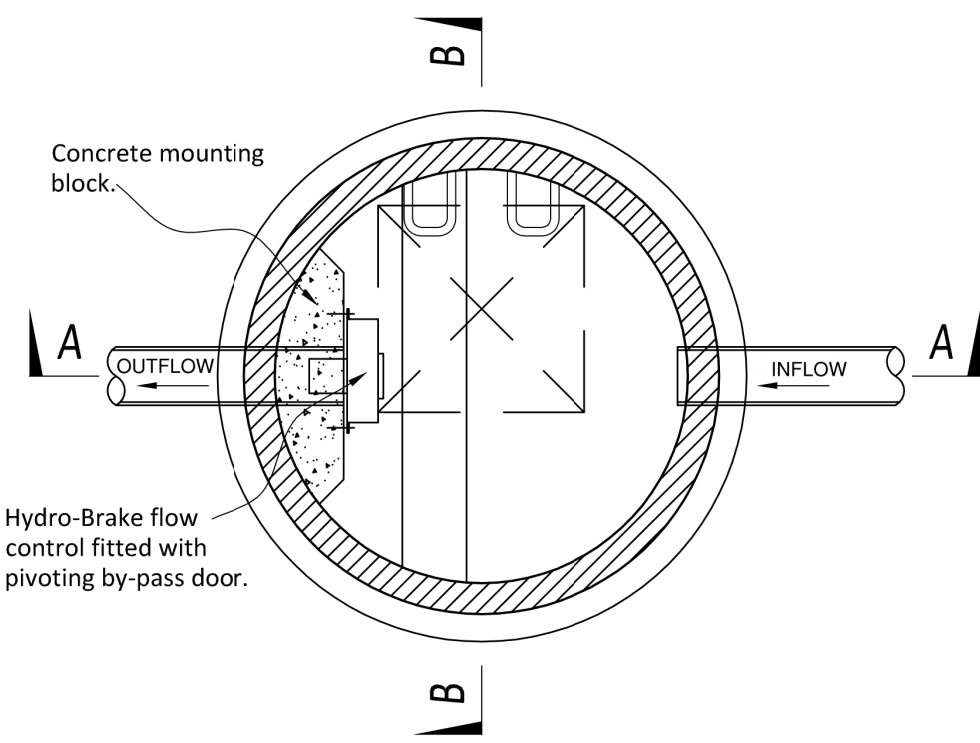


SECTION A-A

SECTION B-B



MANHOLE - SILT TRAP



TYPICAL PLAN OF HYDRO-BRAKE MANHOLE

|      |               |          |     |       |
|------|---------------|----------|-----|-------|
| P02  | STAGE 4 ISSUE | 12.09.23 | JB  | PC    |
| P01  | STAGE 3       | 30.06.23 | SA  | PC    |
| Rev: | Description:  | Date:    | By: | Chkd: |



Project:

**BRWRY  
MANCHESTER**

Drawing Title:

**BELOW GROUND DRAINAGE  
DETAILS SHEET 3**

Status:

**STAGE 4**

|       |        |           |              |             |
|-------|--------|-----------|--------------|-------------|
| Size: | Date:  | Drawn by: | Designed by: | Checked by: |
| A1    | JUN'23 | SA        | --           | PC          |

|         |            |             |         |      |      |         |           |
|---------|------------|-------------|---------|------|------|---------|-----------|
| Scale:  | NTS        | Project No: | 2211-11 |      |      |         |           |
| Project | Originator | Volume      | Level   | Type | Role | Number: | Revision: |

**BRW-REN-ZZ-FN-DR-C-03103 P02**

## Technical Specification

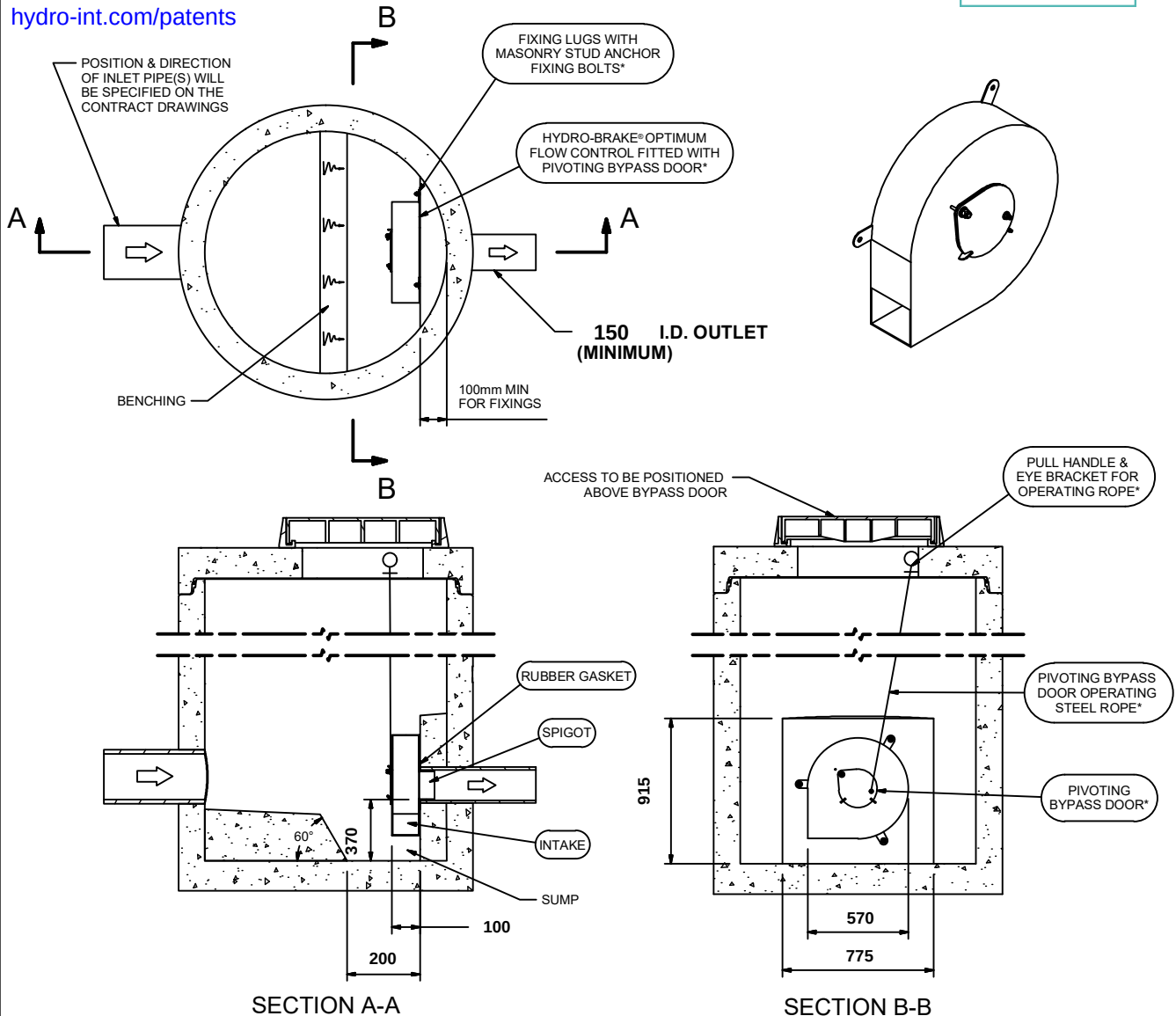
| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.800    | 5.400      |
| Flush-Flo™     | 0.375    | 5.008      |
| Kick-Flo®      | 0.836    | 3.791      |
| Mean Flow      |          | 4.473      |

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 20 kg



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### IMPORTANT:

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS  
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL  
ALL CIVIL AND INSTALLATION WORK BY OTHERS

\* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW  
CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

**THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.**

### DESIGN ADVICE



The head/flow characteristics of this SCL-0094-5400-1800-5400 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic.  
**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International®

DATE 12/09/2023 15:45

SITE BRWRY

DESIGNER Joe Bullough

REF ST1.11-FC

SCL-0094-5400-1800-5400

Hydro-Brake® Optimum

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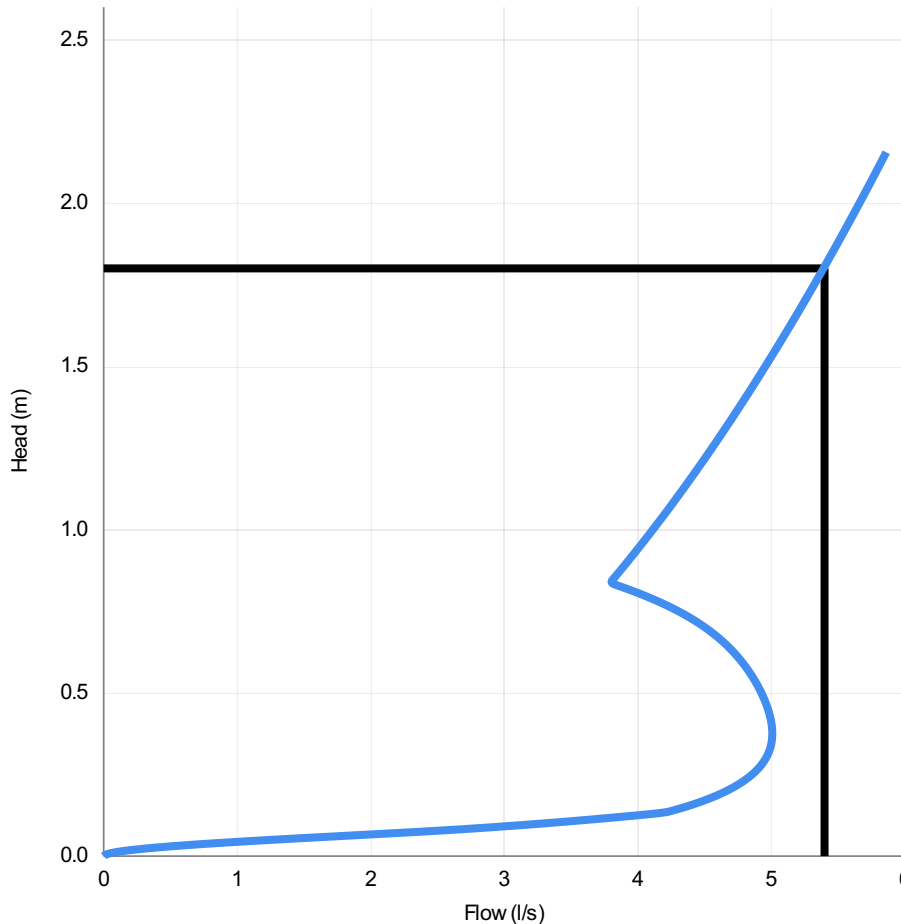
[joebullough@renaissance-ltd.com](mailto:joebullough@renaissance-ltd.com)

## Technical Specification

| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.800    | 5.400      |
| Flush-Flo      | 0.375    | 5.008      |
| Kick-Flo®      | 0.836    | 3.791      |
| Mean Flow      |          | 4.473      |



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| Head (m) | Flow (l/s) |
|----------|------------|
| 0.000    | 0.000      |
| 0.062    | 1.803      |
| 0.124    | 3.977      |
| 0.186    | 4.595      |
| 0.248    | 4.853      |
| 0.310    | 4.974      |
| 0.372    | 5.008      |
| 0.434    | 4.988      |
| 0.497    | 4.931      |
| 0.559    | 4.845      |
| 0.621    | 4.727      |
| 0.683    | 4.563      |
| 0.745    | 4.328      |
| 0.807    | 3.996      |
| 0.869    | 3.859      |
| 0.931    | 3.982      |
| 0.993    | 4.101      |
| 1.055    | 4.216      |
| 1.117    | 4.328      |
| 1.179    | 4.437      |
| 1.241    | 4.543      |
| 1.303    | 4.646      |
| 1.366    | 4.746      |
| 1.428    | 4.844      |
| 1.490    | 4.940      |
| 1.552    | 5.034      |
| 1.614    | 5.126      |
| 1.676    | 5.217      |
| 1.738    | 5.305      |
| 1.800    | 5.392      |

### DESIGN ADVICE



The head/flow characteristics of this SCL-0094-5400-1800-5400 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International

DATE 12/09/2023 15:45

Site BRWRY

DESIGNER Joe Bullough

Ref ST1.11-FC

SCL-0094-5400-1800-5400

Hydro-Brake Optimum®

## Technical Specification

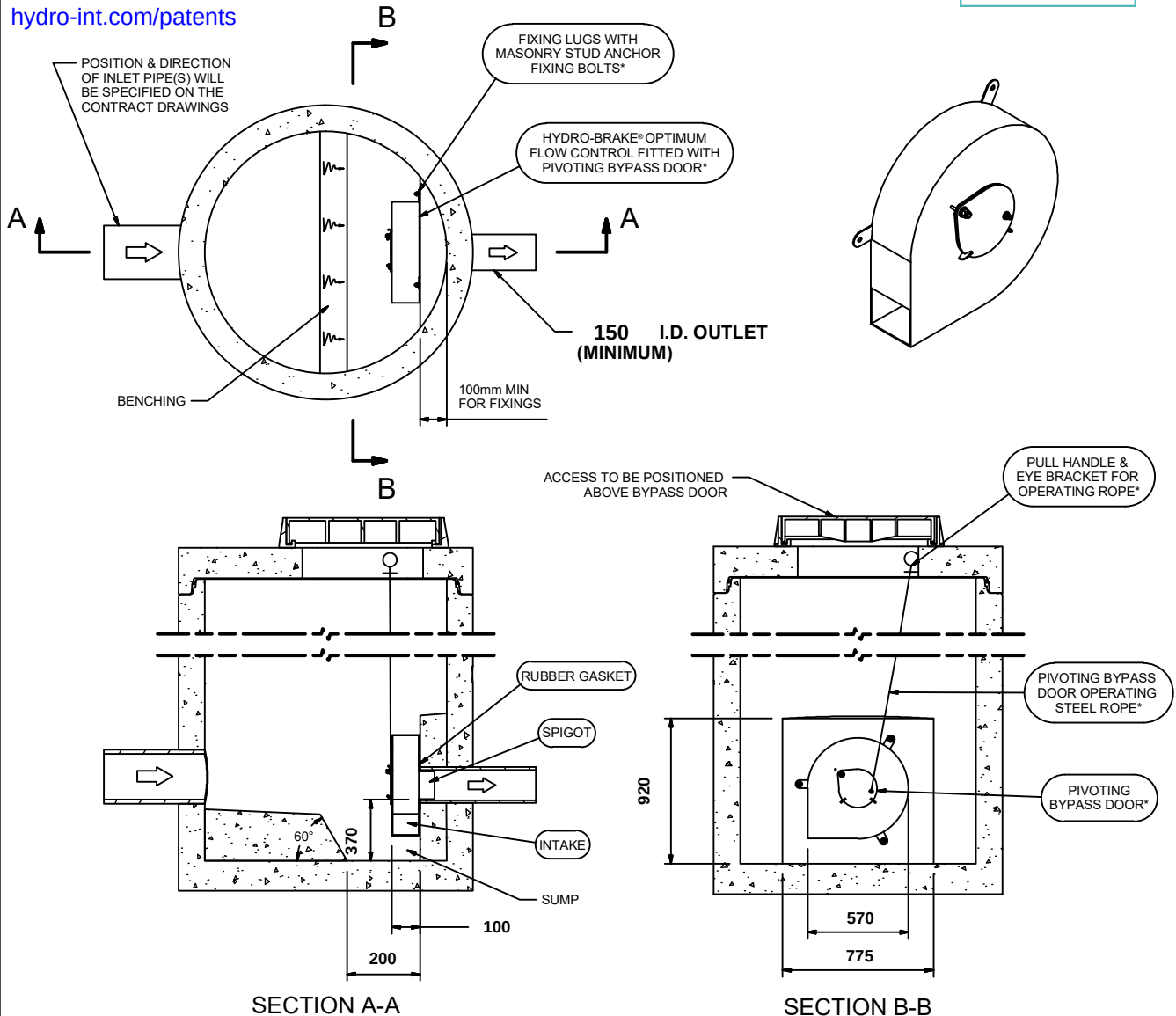
| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.856    | 5.500      |
| Flush-Flo™     | 0.377    | 5.022      |
| Kick-Flo®      | 0.836    | 3.806      |
| Mean Flow      |          | 4.519      |

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 20 kg



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**IMPORTANT:**

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS  
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL  
ALL CIVIL AND INSTALLATION WORK BY OTHERS

\* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

**THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.**

**DESIGN  
ADVICE**



The head/flow characteristics of this SCL-0094-5500-1856-5500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic.  
**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International®

DATE 12/09/2023 15:44

SITE BRWRY

DESIGNER Joe Bullough

REF SF1.19-FC

SCL-0094-5500-1856-5500

Hydro-Brake® Optimum

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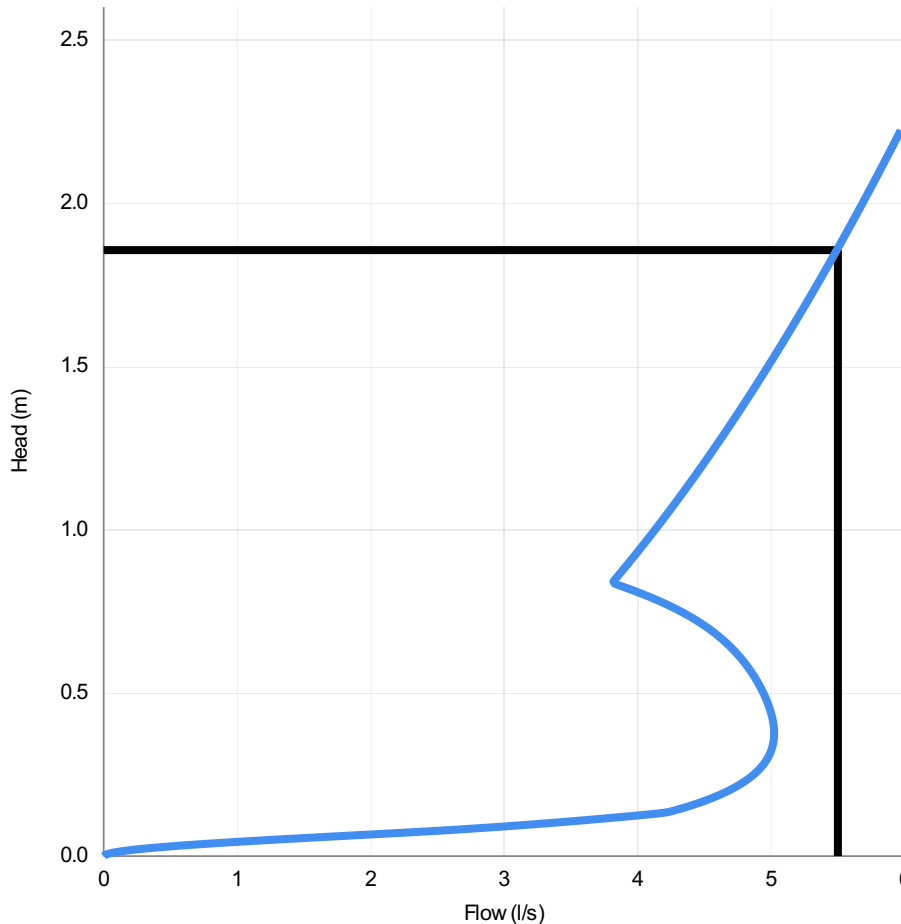
joebullough@renaissance-ltd.com

## Technical Specification

| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.856    | 5.500      |
| Flush-Flo      | 0.377    | 5.022      |
| Kick-Flo®      | 0.836    | 3.806      |
| Mean Flow      |          | 4.519      |



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| Head (m) | Flow (l/s) |
|----------|------------|
| 0.000    | 0.000      |
| 0.064    | 1.895      |
| 0.128    | 4.091      |
| 0.192    | 4.638      |
| 0.256    | 4.886      |
| 0.320    | 4.997      |
| 0.384    | 5.022      |
| 0.448    | 4.992      |
| 0.512    | 4.926      |
| 0.576    | 4.831      |
| 0.640    | 4.697      |
| 0.704    | 4.507      |
| 0.768    | 4.232      |
| 0.832    | 3.841      |
| 0.896    | 3.929      |
| 0.960    | 4.055      |
| 1.024    | 4.176      |
| 1.088    | 4.294      |
| 1.152    | 4.408      |
| 1.216    | 4.518      |
| 1.280    | 4.626      |
| 1.344    | 4.731      |
| 1.408    | 4.834      |
| 1.472    | 4.934      |
| 1.536    | 5.031      |
| 1.600    | 5.127      |
| 1.664    | 5.221      |
| 1.728    | 5.313      |
| 1.792    | 5.403      |
| 1.856    | 5.491      |

### DESIGN ADVICE



The head/flow characteristics of this SCL-0094-5500-1856-5500 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International

DATE 12/09/2023 15:44

Site BRWRY

DESIGNER Joe Bullough

Ref SF1.19-FC

SCL-0094-5500-1856-5500

Hydro-Brake Optimum®

## Technical Specification

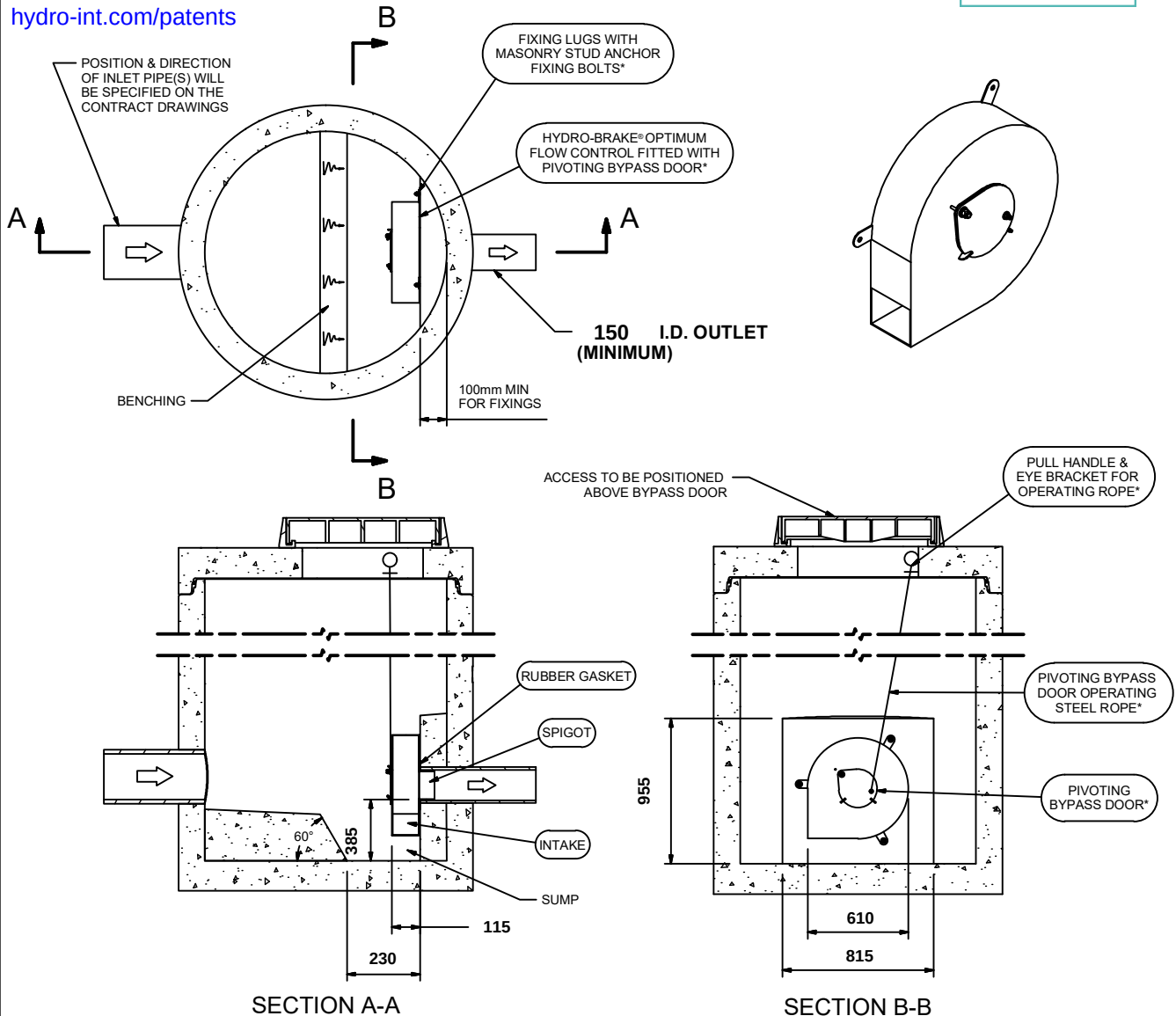
| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.600    | 6.600      |
| Flush-Flo™     | 0.381    | 6.590      |
| Kick-Flo®      | 0.864    | 4.963      |
| Mean Flow      |          | 5.698      |

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 20 kg



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### IMPORTANT:

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS  
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ALL CIVIL AND INSTALLATION WORK BY OTHERS

\* WHERE SUPPLIED

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**THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.**

### DESIGN ADVICE



The head/flow characteristics of this SCL-0106-6600-1600-6600 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic.  
**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International®

DATE 12/09/2023 15:44

SITE BRWRY

DESIGNER Joe Bullough

REF SD1.04-FC

SCL-0106-6600-1600-6600

Hydro-Brake® Optimum

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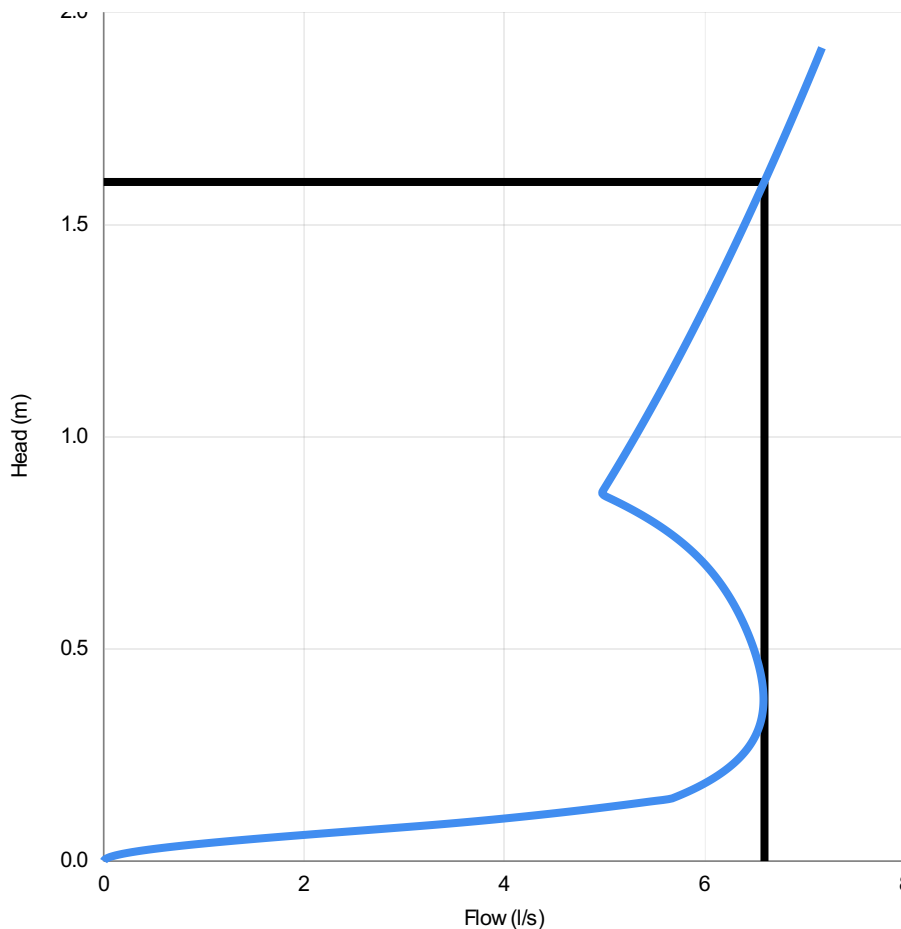
[joebullough@renaissance-ltd.com](mailto:joebullough@renaissance-ltd.com)

## Technical Specification

| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.600    | 6.600      |
| Flush-Flo      | 0.381    | 6.590      |
| Kick-Flo®      | 0.864    | 4.963      |
| Mean Flow      |          | 5.698      |



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| Head (m) | Flow (l/s) |
|----------|------------|
| 0.000    | 0.000      |
| 0.055    | 1.654      |
| 0.110    | 4.409      |
| 0.166    | 5.855      |
| 0.221    | 6.244      |
| 0.276    | 6.462      |
| 0.331    | 6.565      |
| 0.386    | 6.590      |
| 0.441    | 6.562      |
| 0.497    | 6.498      |
| 0.552    | 6.407      |
| 0.607    | 6.289      |
| 0.662    | 6.136      |
| 0.717    | 5.932      |
| 0.772    | 5.656      |
| 0.828    | 5.282      |
| 0.883    | 5.013      |
| 0.938    | 5.155      |
| 0.993    | 5.292      |
| 1.048    | 5.425      |
| 1.103    | 5.555      |
| 1.159    | 5.682      |
| 1.214    | 5.805      |
| 1.269    | 5.925      |
| 1.324    | 6.043      |
| 1.379    | 6.158      |
| 1.434    | 6.271      |
| 1.490    | 6.382      |
| 1.545    | 6.491      |
| 1.600    | 6.597      |

### DESIGN ADVICE



The head/flow characteristics of this SCL-0106-6600-1600-6600 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

**Hydro**  
International

DATE 12/09/2023 15:44

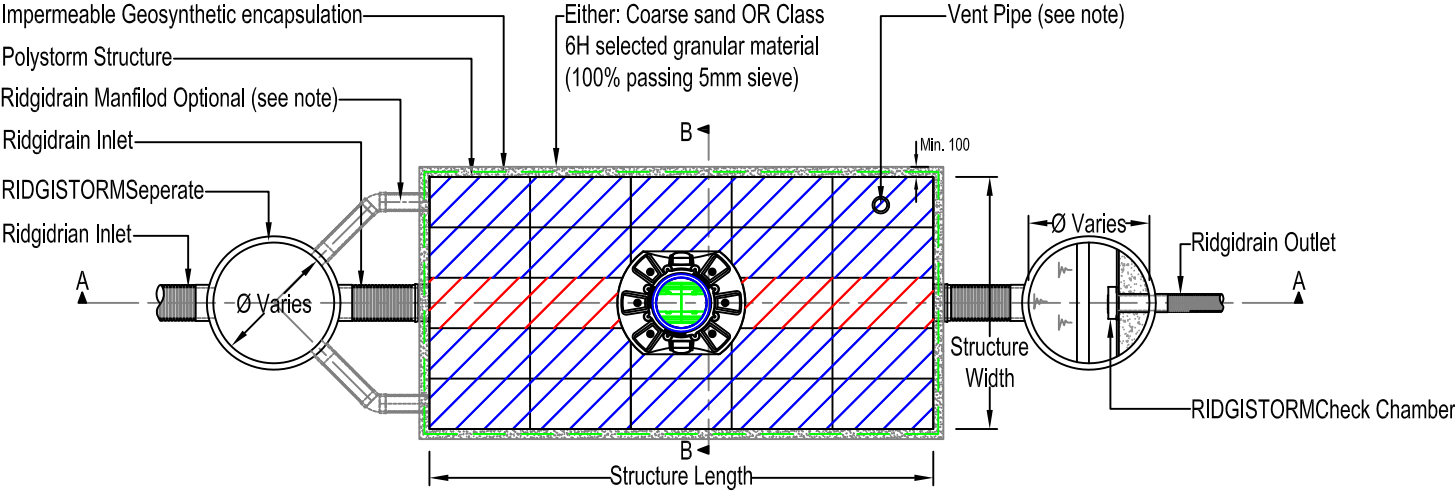
Site BRWRY

DESIGNER Joe Bullough

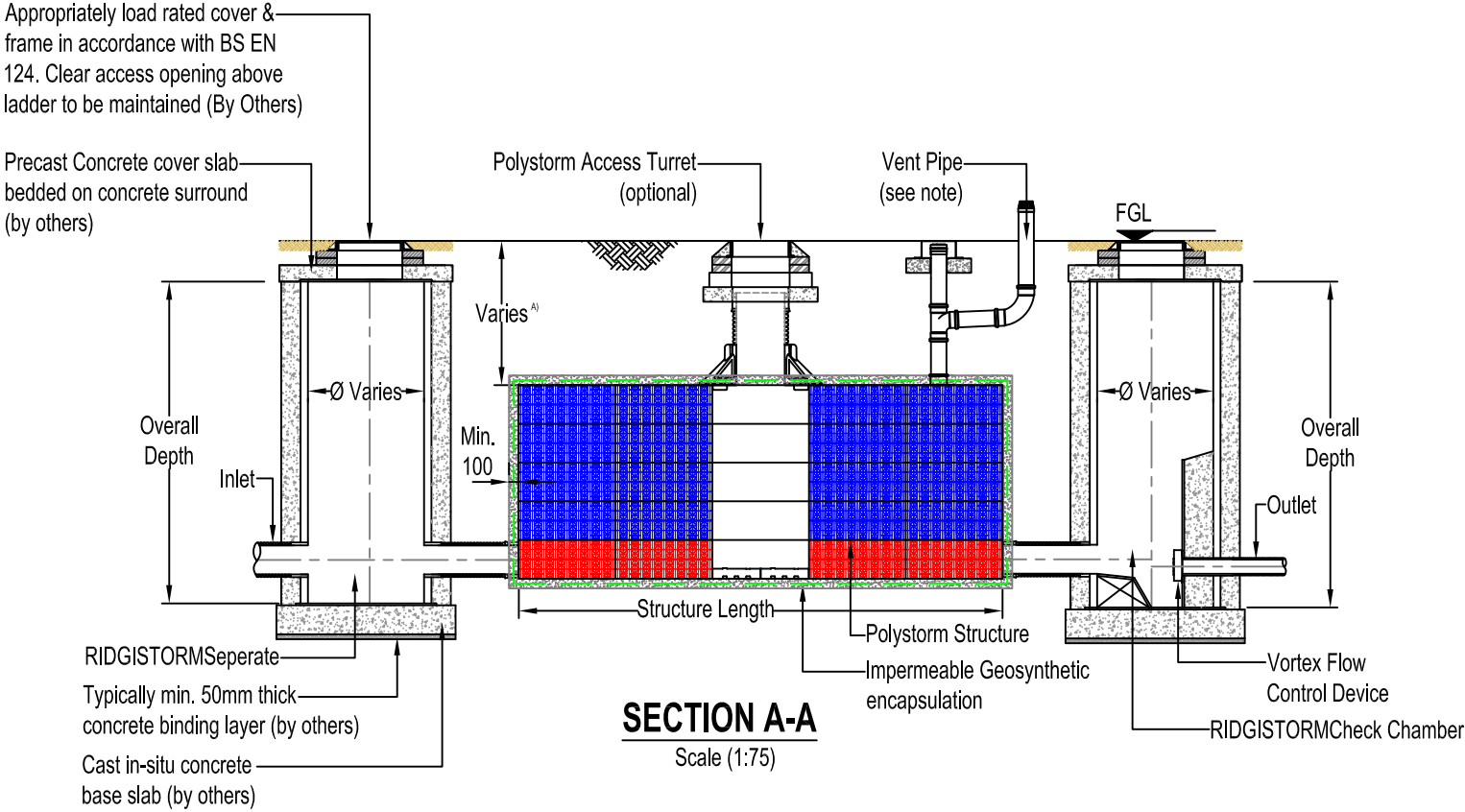
Ref SD1.04-FC

SCL-0106-6600-1600-6600

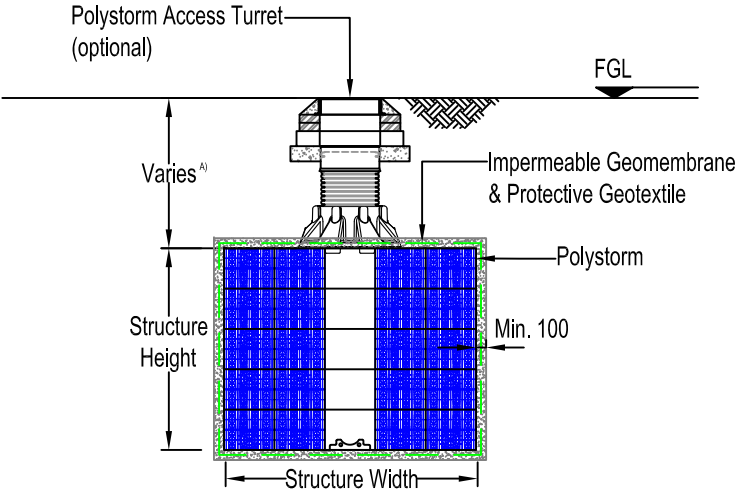
Hydro-Brake Optimum®



**TYPICAL ATTENUATION TANK PLAN**  
(Scale 1:75)

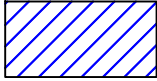


**SECTION A-A**  
Scale (1:75)



**SECTION B-B**  
Scale (1:75)

**KEY:**



POLYSTORM (PSM1, 1A & 2 CELL)



POLYSTORM (PSM4 CELL)

**POLYSTORM ACCESS NOTES**

1. Refer to Polypipe drawing No. PSM\_SD\_PSM\_004 for typical integration into Polystorm structure.

**VENTILATION NOTE**

For information on Ventilation Options please refer to drawing ref: PSM\_SD\_PSM\_002

**MANIFOLD NOTE**

Where single pipe hydraulic capacity is exceeded manifold detail may be required. For information on Manifold connections please refer to drawing ref: PSM\_SD\_008

**NOTE A**

For information on tank cover depths please refer to drawing ref: PSM\_SD\_PSM\_005 or alternatively contact the Technical Team:- 01509 61500

**NOTES**

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

The information in this document is of an illustrative nature and is supplied by Polypipe Civils without charge. This document does not form the whole or any part of a contract or intended contract with the user. The information within this document should not be solely relied upon to determine the suitability or installation requirements of our products for a proposed application and expected site conditions; expert advice should be sought in this respect. Final determination of the suitability of any information or material for the use contemplated and the manner of use is the sole responsibility of the user and the user must assume all risk and liability in connection therewith. Further information with regard to liabilities may be found at [www.polypipe.com/disclaimer](http://www.polypipe.com/disclaimer).



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Tel: 01509 615100  
Fax: 01509 615215  
[www.polypipe.com/civils](http://www.polypipe.com/civils)  
[www.polypipe.com/wms](http://www.polypipe.com/wms)

PROJECT

POLYSTORM STANDARD DETAILS

TITLE

POLYSTORM ATTENUATION DETAIL

STATUS

FOR INFORMATION

DATE

17/03/16

DRAWN BY

JL

ORIGINAL SIZE

A3

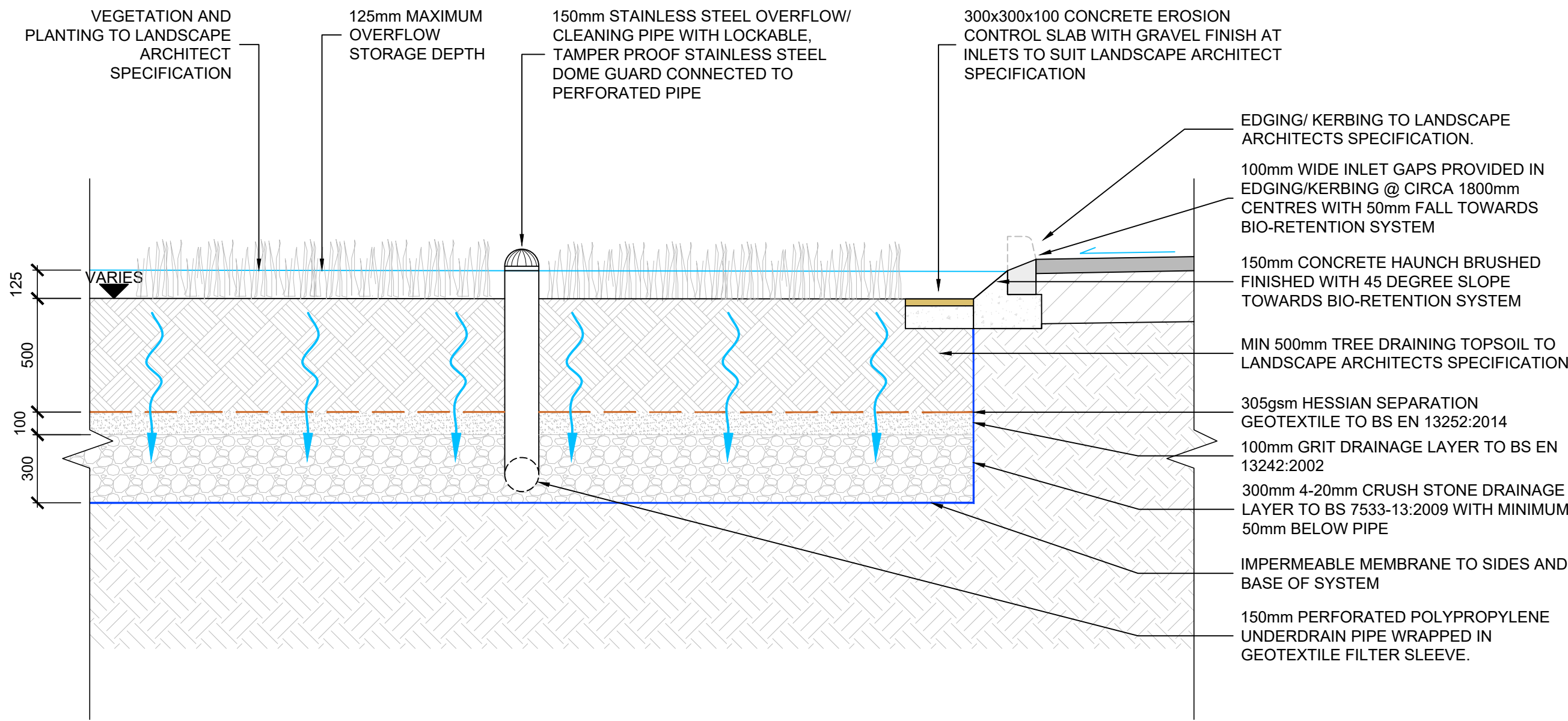
SCALE

AS SHOWN

DRAWING No.

PSM\_SD\_PSM\_001

REV.



**BIO-RETENTION DETAIL**  
SCALE 1:20

- NOTES:
1. FOR GENERAL NOTES REFER TO RENAISSANCE DRAWING BRW-REN-ZZ-FN-DR-C-01100. FOR DRAINAGE NOTES REFER TO BRW-REN-ZZ-FN-DR-C-03101.
  2. DO NOT SCALE FROM THIS DRAWING. ANY AMBIGUITIES OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS TO BE CHECKED/ VERIFIED ON SITE.

|                                                                                                                                                                 |              |             |              |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|--------------|-------------|
| P02                                                                                                                                                             | STAGE 4      | 13.09.23    | HW           | PC          |
| P01                                                                                                                                                             | STAGE 3      | 26.06.23    | SA           | PC          |
| Rev:                                                                                                                                                            | Description: | Date:       | By:          | Chkd:       |
| <div><div><div></div><div>renaissance</div></div><div>Renaissance Associates Ltd<br/>Carvers Warehouse<br/>77 Dale Street<br/>Manchester<br/>M1 2HG</div></div> |              |             |              |             |
| Project:<br><b>BODDINGTONS BREWERY,<br/>MANCHESTER</b>                                                                                                          |              |             |              |             |
| Drawing Title:<br><b><i>BELOW GROUND DRAINAGE<br/>DETAILS SHEET 5</i></b>                                                                                       |              |             |              |             |
| Status:<br><b>STAGE 4</b>                                                                                                                                       |              |             |              |             |
| Size:                                                                                                                                                           | Date:        | Drawn by:   | Designed by: | Checked by: |
| A1                                                                                                                                                              | JUN 23       | SA          | --           | PC          |
| Scale:                                                                                                                                                          | 1:20         | Project No: | 2211-11      |             |
| Project – Originator – Volume – Level – Type – Role – Number:                                                                                                   |              |             |              | Revision:   |
| BRW-REN-ZZ-FN-DR-C-03105                                                                                                                                        |              |             |              | P02         |

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## **APPENDIX P**

### **ADJACENT LANDOWNER CORRESPONDENCE**

JoeBullough

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**From:** Nick Russell <Nick.Russell@salboy.co.uk>  
**Sent:** 03 July 2023 09:28  
**To:** William Thorpe  
**Cc:** Henry Wilkinson; Ben Hughes; Paul Hawkins; Stuart Taylor; Geoff Danby; Darren Hughes; Paul Strutt; Patrick Clayton; Stephen Ward; ben@novo.eu.com; Sam Power; Tom Hogan  
**Subject:** Re: Proposed - Drainage Network route

Assuming it's adheres to the 5m easement then it's approved.

Kind regards

Nick Russell

Business Development Manager

Mobile: (+44)07592644409

Email: [nick.russell@salboy.co.uk](mailto:nick.russell@salboy.co.uk)

LinkedIn: [www.linkedin.com/in/nickrussell91](https://www.linkedin.com/in/nickrussell91)

Website: [www.salboy.co.uk](http://www.salboy.co.uk)



**United Kingdom:** Unit 3 | Birchwood One Business Park | Dewhurst Road | Birchwood | Warrington | WA3 7GB

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**From:** William Thorpe <William@artal.uk.com>  
**Sent:** Friday, June 30, 2023 14:19  
**To:** Nick Russell <Nick.Russell@salboy.co.uk>  
**Cc:** Henry Wilkinson <HenryWilkinson@renaissance-ltd.com>; Ben Hughes <benhughes@renaissance-ltd.com>; Paul Hawkins <paulhawkins@domisconstruction.co.uk>; Stuart Taylor <stuart@artal.uk.com>; Geoff Danby <geoffdanby@domisconstruction.co.uk>; Darren Hughes <darrenhughes@domisconstruction.co.uk>; Paul Strutt

<paulstrutt@domisconstruction.co.uk>; Patrick Clayton <patrickclayton@renaissance-ltd.com>; Stephen Ward <stephen.ward@salboy.co.uk>; ben@novo.eu.com <ben@novo.eu.com>; Sam Power <sam@studiopower.co.uk>; Tom Hogan <Tom@artal.uk.com>

**Subject:** Proposed - Drainage Network route

Afternoon Nick,

Please see attached below ground drainage plan showing proposed surface / foul drainage route toward Francis Street [SW].

**Note:** We have previously agreed 5m easement for drainage excavation / installation with TMC in this location.

As this land is under Salboy ownership – Renaissance have requested written confirmation / acceptance of proposed drainage run ahead of MCC review of drainage strategy.

**Please can you review and provide written acceptance**

Regards

**William R Thorpe**  
**MRICS MAPM MCIOB**  
Project Manager

**ARTAL**

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