



**URBAN SPLASH**

**OLD MILL STREET, MANCHESTER**

**SURFACE WATER DRAINAGE RATIONALE**

**NOVEMBER 2023**

**DATE ISSUED:** NOVEMBER 2023  
**JOB NUMBER:** GM12676  
**REPORT NUMBER:** 0003  
**VERSION:** V1.0  
**STATUS:** FINAL

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**NOVEMBER 2023**

**PREPARED BY:**

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WASTE RESOURCE MANAGEMENT

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| Appendix 2 | Quick Storage Attenuation Estimates                         |

## DRAWINGS

|             |                                               |
|-------------|-----------------------------------------------|
| GM12676-001 | Site Location Plan                            |
| GM12676-002 | Indicative Drainage Strategy                  |
| GM12676-003 | Typical Drainage Details (Sheet 1 of 2)       |
| GM12676-004 | Typical Drainage Details (Sheet 2 of 2)       |
| S11426-T    | Topographical Survey of Land at Lampwick Lane |

## **1 INTRODUCTION**

### **1.1 General**

- 1.1.1 Wardell Armstrong LLP (WA) has been commissioned by Urban Splash to prepare a Drainage Strategy Report for a proposed 6 no. storey apartment building, to be constructed on former industrial brownfield land on Old Mill Street, Manchester. The location of the site is shown on Drawing No GM12676-001 'Site Location Plan'.
- 1.1.2 This Drainage Strategy Report has been produced to provide a rationale for the management of surface water at the proposed development.
- 1.1.3 This report is an update to the 2016 Wardell Armstrong Surface Water Drainage Report (ref: LE13344-001 Rev 1) and the 2018 Wardell Armstrong Drainage Strategy Report (ref:MC10373-0002 Rev 2) produced based on previous proposed development layouts.

## **2 SURFACE WATER MANAGEMENT**

### **2.1 Existing Site Characteristics**

- 2.1.1 The 0.08ha site consists of a single rectangular area of land as shown on Drawing No GM12676-001 'Site Location Plan'.
- 2.1.2 The site is relatively flat with ground levels falling south-westwards from a maximum of 50.29mAOD adjacent to the north-eastern site boundary to 49.76mAOD at the south-western site boundary adjacent to Lampwick Lane. The topography is shown on Drawing No S11426-T 'S11426-T 'Topographical Survey of Land at Lampwick Lane'.
- 2.1.3 United Utilities sewer records (see Appendix 1) show public combined water sewers to be present in Lampwick Lane to the south-west of the site and Piercy Street to the north-east of the site. Both flow north-westwards to join the public combined water sewer in Old Mill Street, which flows south-westwards.
- 2.1.4 Historical mapping shows a rectory to have been present at the site until it was demolished sometime between 1965 and 1969 and, therefore, it is assumed that connections to the public sewer network were present at that time.

### **2.2 Proposed Surface Water Management**

- 2.2.1 The Planning Practice Guidance (PPG) stipulates a hierarchy for the disposal of surface water which should be followed as part of any surface water drainage design. This hierarchy is as follows:

- i. into the ground (infiltration);
  - ii. to a surface water body;
  - iii. to a surface water sewer, highway drain or another drainage system;
  - iv. to a combined sewer.
- 2.2.2 Based on the proposed architectural designs as shown on Drawing No 2450-GHA-ZZ-03-A(05)100-GA Plan it is proposed that the majority of the site area will be impermeable. The apartment building will be largely surrounded by hardstanding.
- 2.2.3 Due to the brownfield nature of the site, it is considered that there will be a significant volume of Made Ground at the site. The potential for contamination within this Made Ground means that the underlying ground is considered to be unsuitable for infiltration drainage without further investigation.
- 2.2.4 It is, therefore, proposed that surface water runoff from the roof areas and hardstanding is discharged to the public combined water sewer running north westwards in Lampwick Lane. Based on the proposed site layout and ground levels, it is proposed that discharge to the sewer network is by a new connection from the west of the site.
- 2.2.5 United Utilities confirmed, in response to the Pre-Development Enquiry submitted as part of this Surface Water Drainage Strategy Rationale (see Appendix 1) that it would be acceptable to discharge surface water to the combined sewer in Lampwick Lane at the maximum rate of 5 litres/second. Foul water can be discharged to the public combined sewer network at an unrestricted rate.
- 2.2.6 The Manchester City Council planning guidance for brownfield site developments states that these should provide *“surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates with an aim to reduce to Greenfield runoff rates wherever practicable”*.
- 2.2.7 Since any existing connection to the public sewer network has not been confirmed, any existing runoff rate is also unconfirmed. It is, therefore, proposed to restrict the runoff rate as close as practicable to the greenfield runoff rate for all storm events up to and including the 1 in 100 year event (plus 45% climate change allowance), with attenuation provided on site for all rates in excess of this. This scheme is, therefore, compliant with Manchester City Council and with the latest guidance from the

Environment Agency on the revised peak rainfall intensity allowance in small and urban catchments.

- 2.2.8 Based on Quick Storage Estimate calculations made using Causeway 'Flow' software (see Appendix 2), approximately 17m<sup>3</sup> of attenuation would be required on site for the 1 in 100 year storm event. These calculations assume that the full site area will be impermeable.

## 2.3 Proposed Drainage Rationale

- 2.3.1 An indicative drainage layout is shown on Drawing No GM12676-002 Indicative Drainage Strategy, with additional construction detail shown on Drawing No GM12676-003 and GM12676-004 Typical Drainage Details.

## 2.4 Surface Water Drainage

- 2.4.1 It is proposed that gullies and internal rainwater pipes discharge to surface water drains to the south of the apartment building. These will flow to a proposed new combined outfall to the south-west of the site. It is proposed to construct a geo cellular storage tank within the road in the southern area of the site, providing approximately 28.5m<sup>3</sup> of storage.
- 2.4.2 It is proposed to discharge surface water runoff to the public combined sewer in Lampwick Lane via a new connection. The rate of discharge will be restricted to 5 litres/second by a Hydrobrake flow control device installed in the outfall chamber. During storm events where flows are in excess of 5 litres/second, surface water will be retained within the on-site drainage network, backing up preferentially into the underground storage tank. Additional attenuation will be provided within the surface water drains.

### **Foul Drainage**

- 2.4.3 It is proposed that foul flows are discharged to the public combined sewer in Lampwick Lane via a shared new connection with the surface water. United Utilities confirmed in their response to the Developer Enquiry (see Appendix 1) that there is no objection to connecting to the public sewer off Lampwick Lane.

## 2.5 Management of Drainage Features

- 2.5.1 All surface water drains will be installed to provide a self-cleansing regime as outlined in Sewers for Adoption 7<sup>th</sup> Edition. A rodding eye will be installed at the top of each drainage run to allow for future maintenance. The underground surface water storage

tank will have a plastic inspection chamber installed upstream of the tank to allow this to be accessed.

### **3 CONCLUSION**

- 3.1.1 This Surface Water Drainage Rationale and indicative layout drawing have been prepared to support the planning application for the proposed development of apartments on Lampwick Lane, Manchester.
- 3.1.2 The proposed development is located on brownfield land, however existing connections and discharge rates to the public sewer network are currently unconfirmed.
- 3.1.3 It is proposed that surface water runoff is discharged to the public combined sewer in Lampwick Lane at the restricted rate of 5 litres/second, confirmed as acceptable by United Utilities, with attenuation provided within an underground surface water storage tank and the on-site drainage network for all flows in excess of this. Based on the proposed site layout, discharge to the public combined sewer will be via a new connection.
- 3.1.4 It is considered, subject to detailed design, that with this surface water drainage plan implemented this site will be suitable for its proposed use as a development of apartments.

## **APPENDICES**

## **APPENDIX 1**

### **United Utilities Sewer Records and Pre-Development Response**





## SEWER RECORDS

## Rowley, Helen

---

**From:** seweradoptions@uuplc.co.uk  
**Sent:** 16 June 2023 12:13  
**To:** McIntosh, Holly  
**Subject:** 04195927 Land off Old Mill Street, Manchester, M4 6BU

**CAUTION:** This email originated from outside the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good Afternoon Holly,

Thank you for your Pre Development Enquiry, please see our response below:

**UU REF – 04195927 Land off Old Mill Street, Manchester**

**Foul Connection:**

There is no objection to connecting to the public combined sewer within the local vicinity of the site

**Surface Water:**

Should SuDS systems be ruled out I would have expected the surface water to discharge to the nearby watercourse, however should it be proven that neither of the aforementioned options are not achievable then we have no objections to the proposed 5 l/s communicating with the combined system as shown on your drainage plan.

Regards

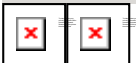
Anthony



**Anthony Laithwaite**

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## **APPENDIX 2**

### **Quick Storage Attenuation Estimates**

### Design Settings

|                       |                   |                                      |               |
|-----------------------|-------------------|--------------------------------------|---------------|
| Rainfall Methodology  | FSR               | Maximum Time of Concentration (mins) | 30.00         |
| Return Period (years) | 1                 | Maximum Rainfall (mm/hr)             | 50.0          |
| Additional Flow (%)   | 0                 | Minimum Velocity (m/s)               | 1.00          |
| FSR Region            | England and Wales | Connection Type                      | Level Soffits |
| M5-60 (mm)            | 17.000            | Minimum Backdrop Height (m)          | 0.200         |
| Ratio-R               | 0.400             | Preferred Cover Depth (m)            | 1.200         |
| CV                    | 0.750             | Include Intermediate Ground          | ✓             |
| Time of Entry (mins)  | 5.00              | Enforce best practice design rules   | ✓             |

### Nodes

| Name            | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) |
|-----------------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|
| RE_1            | 0.013        | 5.00             | 50.200                | 1200             | 548685.023     | 79414.820       | 1.300        |
| RE_2            | 0.013        | 5.00             | 50.200                | 1200             | 548673.013     | 79393.637       | 1.300        |
| RE_3            | 0.013        | 5.00             | 50.200                | 1200             | 548697.489     | 79393.639       | 1.300        |
| S3              | 0.013        | 5.00             | 50.200                | 1200             | 548684.863     | 79393.849       | 1.560        |
| 2               | 0.013        | 5.00             | 50.200                | 1200             | 548684.801     | 79390.412       | 1.594        |
| TANK 1          |              |                  | 50.200                | 1200             | 548678.896     | 79390.989       | 1.653        |
| HYDROBRAKE (S1) |              |                  | 49.900                | 1200             | 548673.304     | 79390.950       | 1.409        |

### Links

| Name  | US<br>Node | DS<br>Node      | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|-------|------------|-----------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000 | RE_1       | S3              | 20.972        | 0.600          | 48.900       | 48.690       | 0.210       | 100.0          | 100         | 5.45             | 44.9            |
| 3.000 | RE_2       | S3              | 11.852        | 0.600          | 48.900       | 48.690       | 0.210       | 56.4           | 100         | 5.19             | 45.9            |
| 2.000 | RE_3       | S3              | 12.628        | 0.600          | 48.900       | 48.690       | 0.210       | 60.1           | 100         | 5.21             | 45.8            |
| 1.001 | S3         | 2               | 3.438         | 0.600          | 48.640       | 48.606       | 0.034       | 100.0          | 150         | 5.51             | 44.7            |
| 1.002 | 2          | TANK 1          | 5.933         | 0.600          | 48.606       | 48.547       | 0.059       | 100.0          | 150         | 5.61             | 44.3            |
| 1.003 | TANK 1     | HYDROBRAKE (S1) | 5.592         | 0.600          | 48.547       | 48.491       | 0.056       | 100.0          | 150         | 5.70             | 44.0            |

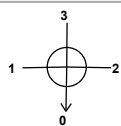
| Name  | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) | US<br>Depth<br>(m) | DS<br>Depth<br>(m) | Σ Area<br>(ha) | Σ Add<br>Inflow<br>(l/s) | Pro<br>Depth<br>(mm) | Pro<br>Velocity<br>(m/s) |
|-------|--------------|--------------|---------------|--------------------|--------------------|----------------|--------------------------|----------------------|--------------------------|
| 1.000 | 0.769        | 6.0          | 1.6           | 1.200              | 1.410              | 0.013          | 0.0                      | 35                   | 0.645                    |
| 3.000 | 1.027        | 8.1          | 1.6           | 1.200              | 1.410              | 0.013          | 0.0                      | 30                   | 0.798                    |
| 2.000 | 0.995        | 7.8          | 1.6           | 1.200              | 1.410              | 0.013          | 0.0                      | 31                   | 0.783                    |
| 1.001 | 1.005        | 17.8         | 6.3           | 1.410              | 1.444              | 0.052          | 0.0                      | 62                   | 0.921                    |
| 1.002 | 1.005        | 17.8         | 7.8           | 1.444              | 1.503              | 0.065          | 0.0                      | 69                   | 0.972                    |
| 1.003 | 1.005        | 17.8         | 7.8           | 1.503              | 1.259              | 0.065          | 0.0                      | 69                   | 0.972                    |

### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.000 | 20.972        | 100.0          | 100         | Circular     | 50.200       | 48.900       | 1.200           | 50.200       | 48.690       | 1.410           |
| 3.000 | 11.852        | 56.4           | 100         | Circular     | 50.200       | 48.900       | 1.200           | 50.200       | 48.690       | 1.410           |
| 2.000 | 12.628        | 60.1           | 100         | Circular     | 50.200       | 48.900       | 1.200           | 50.200       | 48.690       | 1.410           |
| 1.001 | 3.438         | 100.0          | 150         | Circular     | 50.200       | 48.640       | 1.410           | 50.200       | 48.606       | 1.444           |
| 1.002 | 5.933         | 100.0          | 150         | Circular     | 50.200       | 48.606       | 1.444           | 50.200       | 48.547       | 1.503           |
| 1.003 | 5.592         | 100.0          | 150         | Circular     | 50.200       | 48.547       | 1.503           | 49.900       | 48.491       | 1.259           |

| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | MH<br>Type | DS<br>Node      | Dia<br>(mm) | Node<br>Type | MH<br>Type |
|-------|------------|-------------|--------------|------------|-----------------|-------------|--------------|------------|
| 1.000 | RE_1       | 1200        | Manhole      | Adoptable  | S3              | 1200        | Manhole      | Adoptable  |
| 3.000 | RE_2       | 1200        | Manhole      | Adoptable  | S3              | 1200        | Manhole      | Adoptable  |
| 2.000 | RE_3       | 1200        | Manhole      | Adoptable  | S3              | 1200        | Manhole      | Adoptable  |
| 1.001 | S3         | 1200        | Manhole      | Adoptable  | 2               | 1200        | Manhole      | Adoptable  |
| 1.002 | 2          | 1200        | Manhole      | Adoptable  | TANK 1          | 1200        | Manhole      | Adoptable  |
| 1.003 | TANK 1     | 1200        | Manhole      | Adoptable  | HYDROBRAKE (S1) | 1200        | Manhole      | Adoptable  |

### Manhole Schedule

| Node            | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                                      | Link             | IL<br>(m)                        | Dia<br>(mm)                          |                          |
|-----------------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------------------|------------------|----------------------------------|--------------------------------------|--------------------------|
| RE_1            | 548685.023     | 79414.820       | 50.200    | 1.300        | 1200        | <div></div> | 0                | 1.000                            | 48.900                               | 100                      |
| RE_2            | 548673.013     | 79393.637       | 50.200    | 1.300        | 1200        | <div></div> | 0                | 3.000                            | 48.900                               | 100                      |
| RE_3            | 548697.489     | 79393.639       | 50.200    | 1.300        | 1200        | <div></div>  | 0                | 2.000                            | 48.900                               | 100                      |
| S3              | 548684.863     | 79393.849       | 50.200    | 1.560        | 1200        | <div></div>  | 1<br>2<br>3<br>0 | 3.000<br>2.000<br>1.000<br>1.001 | 48.690<br>48.690<br>48.690<br>48.640 | 100<br>100<br>100<br>150 |
| 2               | 548684.801     | 79390.412       | 50.200    | 1.594        | 1200        | <div></div>  | 1<br>0           | 1.001<br>1.002                   | 48.606<br>48.606                     | 150<br>150               |
| TANK 1          | 548678.896     | 79390.989       | 50.200    | 1.653        | 1200        | <div></div>  | 1<br>0           | 1.002<br>1.003                   | 48.547<br>48.547                     | 150<br>150               |
| HYDROBRAKE (S1) | 548673.304     | 79390.950       | 49.900    | 1.409        | 1200        | <div></div> | 1                | 1.003                            | 48.491                               | 150                      |

### Simulation Settings

|                      |                   |                                         |        |
|----------------------|-------------------|-----------------------------------------|--------|
| Rainfall Methodology | FSR               | Analysis Speed                          | Normal |
| FSR Region           | England and Wales | Skip Steady State                       | x      |
| M5-60 (mm)           | 17.000            | Drain Down Time (mins)                  | 240    |
| Ratio-R              | 0.400             | Additional Storage (m <sup>3</sup> /ha) | 20.0   |
| Summer CV            | 0.750             | Check Discharge Rate(s)                 | x      |
| Winter CV            | 0.840             | Check Discharge Volume                  | x      |

### Storm Durations

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

| Return Period<br>(years) | Climate Change<br>(CC %) | Additional Area<br>(A %) | Additional Flow<br>(Q %) |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 30                       | 0                        | 0                        | 0                        |
| 100                      | 0                        | 0                        | 0                        |
| 100                      | 40                       | 0                        | 0                        |

### Node HYDROBRAKE (S1) Online Hydro-Brake® Control

|                          |        |                         |                                |
|--------------------------|--------|-------------------------|--------------------------------|
| Flap Valve               | x      | Objective               | (HE) Minimise upstream storage |
| Replaces Downstream Link | ✓      | Sump Available          | ✓                              |
| Invert Level (m)         | 48.491 | Product Number          | CTL-SHE-0103-5000-1200-5000    |
| Design Depth (m)         | 1.200  | Min Outlet Diameter (m) | 0.150                          |
| Design Flow (l/s)        | 5.0    | Min Node Diameter (mm)  | 1200                           |

### Node TANK 1 Depth/Area Storage Structure

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 48.547 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.95 | Time to half empty (mins) | 43     |

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 15.0                      | 0.0                           | 0.500        | 15.0                      | 0.0                           | 0.501        | 0.0                       | 0.0                           |

### Other (defaults)

|                      |       |                       |       |                          |       |
|----------------------|-------|-----------------------|-------|--------------------------|-------|
| Entry Loss (manhole) | 0.250 | Entry Loss (junction) | 0.000 | Apply Recommended Losses | x     |
| Exit Loss (manhole)  | 0.250 | Exit Loss (junction)  | 0.000 | Flood Risk (m)           | 0.300 |

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.07%**

| Node Event       | US Node         | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|------------------|-----------------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute winter | RE_1            | 10          | 48.957    | 0.057     | 3.8          | 0.0754        | 0.0000     | OK         |
| 15 minute winter | RE_2            | 10          | 48.948    | 0.048     | 3.8          | 0.0639        | 0.0000     | OK         |
| 15 minute winter | RE_3            | 10          | 48.949    | 0.049     | 3.8          | 0.0650        | 0.0000     | OK         |
| 15 minute winter | S3              | 12          | 48.860    | 0.220     | 15.0         | 0.2850        | 0.0000     | SURCHARGED |
| 30 minute winter | 2               | 24          | 48.842    | 0.236     | 13.8         | 0.3056        | 0.0000     | SURCHARGED |
| 30 minute winter | TANK 1          | 25          | 48.834    | 0.287     | 13.2         | 4.4199        | 0.0000     | SURCHARGED |
| 30 minute winter | HYDROBRAKE (S1) | 25          | 48.828    | 0.337     | 5.4          | 0.3807        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node         | Link         | DS Node         | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|-----------------|--------------|-----------------|---------------|----------------|----------|---------------|--------------------|
| 15 minute winter               | RE_1            | 1.000        | S3              | 3.7           | 0.675          | 0.616    | 0.1298        |                    |
| 15 minute winter               | RE_2            | 3.000        | S3              | 3.8           | 0.824          | 0.465    | 0.0682        |                    |
| 15 minute winter               | RE_3            | 2.000        | S3              | 3.8           | 0.804          | 0.480    | 0.0733        |                    |
| 15 minute winter               | S3              | 1.001        | 2               | 13.2          | 0.815          | 0.742    | 0.0605        |                    |
| 30 minute winter               | 2               | 1.002        | TANK 1          | 13.2          | 1.067          | 0.745    | 0.1044        |                    |
| 30 minute winter               | TANK 1          | 1.003        | HYDROBRAKE (S1) | 5.4           | 0.505          | 0.305    | 0.0984        |                    |
| 30 minute winter               | HYDROBRAKE (S1) | Hydro-Brake® |                 | 5.0           |                |          |               | 11.3               |

**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.07%**

| Node Event       | US Node         | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|------------------|-----------------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute winter | RE_1            | 12          | 49.038    | 0.138     | 4.9          | 0.1842        | 0.0000     | SURCHARGED |
| 15 minute winter | RE_2            | 13          | 48.996    | 0.096     | 4.9          | 0.1278        | 0.0000     | OK         |
| 15 minute winter | RE_3            | 12          | 48.999    | 0.099     | 4.9          | 0.1320        | 0.0000     | OK         |
| 30 minute winter | S3              | 24          | 48.969    | 0.329     | 15.0         | 0.4270        | 0.0000     | SURCHARGED |
| 30 minute winter | 2               | 25          | 48.963    | 0.357     | 17.2         | 0.4620        | 0.0000     | SURCHARGED |
| 30 minute winter | TANK 1          | 26          | 48.955    | 0.408     | 16.4         | 6.2828        | 0.0000     | SURCHARGED |
| 30 minute winter | HYDROBRAKE (S1) | 26          | 48.949    | 0.458     | 5.7          | 0.5178        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node         | Link         | DS Node         | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|-----------------|--------------|-----------------|---------------|----------------|----------|---------------|--------------------|
| 15 minute winter               | RE_1            | 1.000        | S3              | 4.3           | 0.688          | 0.714    | 0.1641        |                    |
| 15 minute winter               | RE_2            | 3.000        | S3              | 4.5           | 0.829          | 0.552    | 0.0921        |                    |
| 15 minute winter               | RE_3            | 2.000        | S3              | 4.4           | 0.815          | 0.567    | 0.0987        |                    |
| 30 minute winter               | S3              | 1.001        | 2               | 13.4          | 0.772          | 0.757    | 0.0605        |                    |
| 30 minute winter               | 2               | 1.002        | TANK 1          | 16.4          | 1.075          | 0.923    | 0.1044        |                    |
| 30 minute winter               | TANK 1          | 1.003        | HYDROBRAKE (S1) | 5.7           | 0.530          | 0.323    | 0.0984        |                    |
| 30 minute winter               | HYDROBRAKE (S1) | Hydro-Brake® |                 | 5.0           |                |          |               | 14.8               |

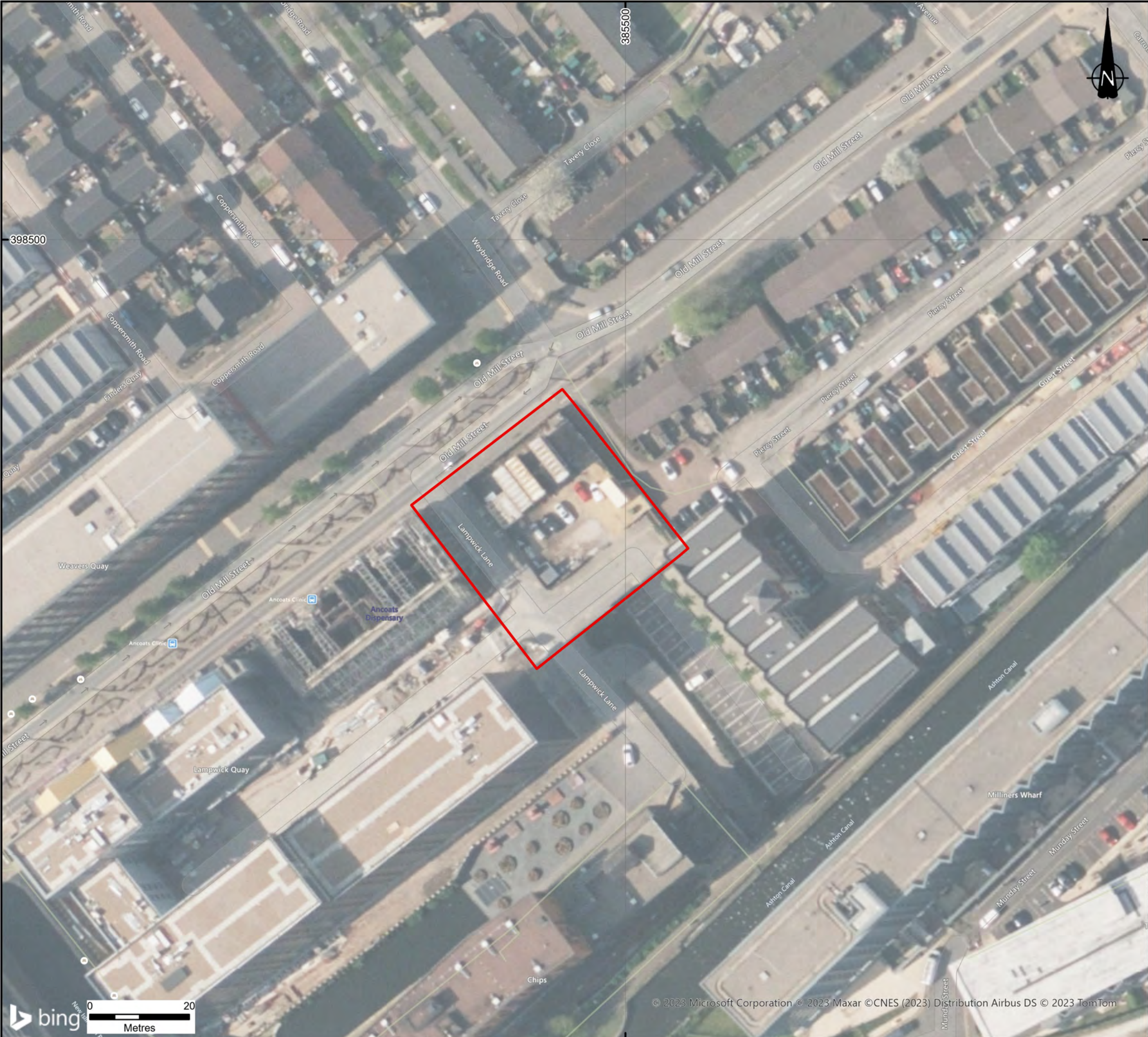
**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.07%**

| Node Event       | US Node         | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|------------------|-----------------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 30 minute winter | RE_1            | 29          | 49.444    | 0.544     | 5.3          | 0.7241        | 0.0000     | SURCHARGED |
| 30 minute winter | RE_2            | 29          | 49.442    | 0.542     | 5.3          | 0.7211        | 0.0000     | SURCHARGED |
| 30 minute winter | RE_3            | 29          | 49.442    | 0.542     | 5.3          | 0.7213        | 0.0000     | SURCHARGED |
| 30 minute winter | S3              | 30          | 49.439    | 0.799     | 17.4         | 1.0367        | 0.0000     | SURCHARGED |
| 30 minute winter | 2               | 30          | 49.436    | 0.830     | 20.7         | 1.0744        | 0.0000     | SURCHARGED |
| 30 minute winter | TANK 1          | 30          | 49.431    | 0.884     | 19.6         | 8.1319        | 0.0000     | SURCHARGED |
| 30 minute winter | HYDROBRAKE (S1) | 30          | 49.426    | 0.935     | 6.4          | 1.0572        | 0.0000     | OK         |

| Link Event<br>(Upstream Depth) | US Node         | Link         | DS Node         | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|-----------------|--------------|-----------------|---------------|----------------|----------|---------------|--------------------|
| 30 minute winter               | RE_1            | 1.000        | S3              | 4.2           | 0.691          | 0.693    | 0.1641        |                    |
| 30 minute winter               | RE_2            | 3.000        | S3              | 4.3           | 0.817          | 0.539    | 0.0927        |                    |
| 30 minute winter               | RE_3            | 2.000        | S3              | 4.3           | 0.798          | 0.556    | 0.0988        |                    |
| 30 minute winter               | S3              | 1.001        | 2               | 15.7          | 0.890          | 0.882    | 0.0605        |                    |
| 30 minute winter               | 2               | 1.002        | TANK 1          | 19.6          | 1.155          | 1.103    | 0.1044        |                    |
| 30 minute winter               | TANK 1          | 1.003        | HYDROBRAKE (S1) | 6.4           | 0.542          | 0.358    | 0.0984        |                    |
| 30 minute winter               | HYDROBRAKE (S1) | Hydro-Brake® |                 | 5.0           |                |          |               | 20.9               |

## **DRAWINGS**



**Notes:**

Boundaries are indicative. Aerial imagery shown for context purposes only.

|                            |         |            |       |             |
|----------------------------|---------|------------|-------|-------------|
|                            |         |            |       |             |
| REVISION                   | DETAILS | DATE       | DRAWN | CHKD        |
| CLIENT                     |         |            |       |             |
| URBAN SPLASH               |         |            |       |             |
| PROJECT                    |         |            |       |             |
| OLD MILL STREET MANCHESTER |         |            |       |             |
| DRAWING TITLE              |         |            |       |             |
| SITE LOCATION PLAN         |         |            |       |             |
| DRG No.                    |         | REV        |       |             |
| GM12676-001                |         | B          |       |             |
| DRG SIZE                   |         | SCALE      |       | DATE        |
| A3                         |         | 1:750      |       | 02/11/2023  |
| DRAWN BY                   |         | CHECKED BY |       | APPROVED BY |
| EK                         |         | BF         |       | DB          |







DO NOT SCALE FROM THIS DRAWING

## NOTES

- ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE.
- ALL PROPOSED DRAINAGE WORKS ARE TO COMPLY WITH THE REQUIREMENTS OF BS 752 : 1998 BUILDING DRAINAGE AND BUILDING REGULATIONS APPROVED DOCUMENT H.
- ALL MATERIALS, UNLESS SPECIFIED OTHERWISE, SHALL COMPLY WITH THE RELEVANT BRITISH STANDARD. SOURCES OF MATERIALS ARE TO BE AGREED WITH THE EMPLOYER'S REPRESENTATIVE/ENGINEER IN ADVANCE OF THE WORKS.
- THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND DETAILS AND CONTRACT DOCUMENTATION
- ANY DISCREPANCIES IN THE DETAILS SHOWN TO BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE/ENGINEER PRIOR TO CONSTRUCTION.
- LOCATION AND LEVELS OF EXISTING DRAINAGE RUNS ARE TO BE IDENTIFIED PRIOR TO THIS AND MUST BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
- ALL DRAINAGE AND FITTINGS TO BE CLAYWARE TO BS EN205 OR UPVC TO WIS NO 14-3.05.
- TYPICAL PIPE BEDDING TO DRAINAGE WHERE DEPTH TO SOFFIT IS GREATER THAN 600mm IN LANDSCAPED AREAS AND GREATER THAN 900mm IN TRAFFICKED AREAS IS TO BE CLASS 3 (L 10-15mm GRADED IMPORTED GRANULAR BED SURROUND FOR PIPES UP TO 525Ø AND 20-40mm GRADED IMPORTED GRANULAR BED SURROUND FOR PIPES GREATER THAN 525Ø)
- WHERE DEPTH TO SOFFIT OF DRAINAGE PIPEWORK IS LESS THAN 600mm IN LANDSCAPED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS THEN PIPEWORK IS TO BE BEDDED AND SURROUNDED IN 150mm MINIMUM GRADE ST2 CONCRETE. COMPRESSIBLE MATERIAL, FLEXCEL OR SIMILAR APPROXIMATELY 13mm THICK, TO BE PROVIDED AT EVERY PIPE JOINT.
1. BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE TYPE 1 OR NEXT PIPE (ROCKER PIPE) AWAY FROM THE RUBBISH AND ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. BACKFILL MATERIAL TO BE COMPACTED IN LAYERS NOT EXCEEDING 150mm THICK.
2. CONCRETE MIXES INDICATED ON THIS DRAWING ARE STANDARD MIXES IN ACCORDANCE WITH BS 5328 : 1997. MIX DESIGNATIONS SHALL BE DEPENDENT UPON THE PRESENCE OF ANY OTHER CLASSIFIED IN ACCORDANCE WITH TABLE 7 OF BS 5328 : PART 1.
3. A 10-15mm JAIL SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT, COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENT OF THE JOINT. A 10-15mm JAIL SHALL BE PROVIDED TO THE OUTSIDE FACE OF THE STRUCTURE SHALL BE AS SHOWN IN THE TABLE BELOW.

| NOMINAL DIAMETER (mm) | EFFECTIVE LENGTH (m) |
|-----------------------|----------------------|
| 150-600               | 0.6                  |
| 675-750               | 1.0                  |
| 825 AND OVER          | 1.25                 |

|   |             |          |    |    |
|---|-------------|----------|----|----|
| A | FIRST ISSUE | 23/11/23 | 00 | 30 |
|---|-------------|----------|----|----|

| REVISION | DETAILS | DATE | DRAWN | CHECKED |
|----------|---------|------|-------|---------|
|----------|---------|------|-------|---------|

## URBAN SPLASH

OLD MILL STREET,  
MANCHESTER

DRAWING TITLE  
TYPICAL DRAINAGE DETAILS  
SHEET 1 OF 2

|            |  |             |             |   |            |
|------------|--|-------------|-------------|---|------------|
| S No.      |  | GM12676-003 | REV         | A | SUIT. CODE |
| G SIZE     |  | A1          | SCALE       |   | AS SHOWN   |
| DRAWN BY   |  | DR          | DATE        |   | 26-06-23   |
| CHECKED BY |  | JG          | APPROVED BY |   | JG         |



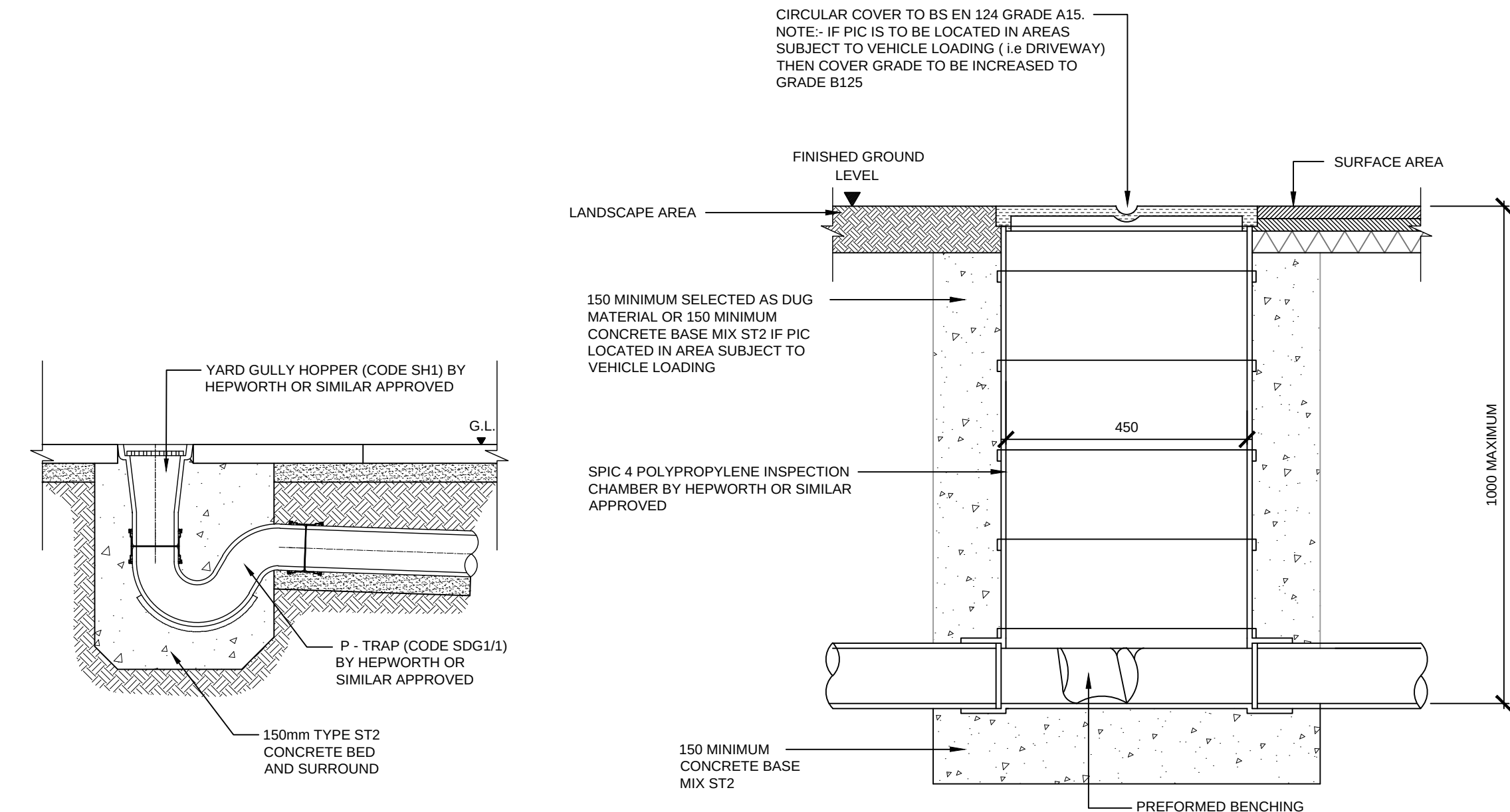
DO NOT SCALE FROM THIS DRAWING

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES UNLESS STATED OTHERWISE.
2. ALL PROPOSED DRAINAGE WORKS ARE TO COMPLY WITH THE REQUIREMENTS OF BS 732 : 1998 BUILDING DRAINAGE AND BUILDING REGULATIONS APPROVED DOCUMENT H.
3. ALL MATERIALS, UNLESS SPECIFIED OTHERWISE, SHALL COMPLY WITH THE RELEVANT BRITISH STANDARD. SOURCES OF MATERIALS ARE TO BE AGREED WITH THE EMPLOYER'S REPRESENTATIVE/ENGINEER IN ADVANCE OF THE WORKS.
4. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS AND DETAILS AND CONTRACT DOCUMENTATION.
5. ANY DISCREPANCIES IN THE DETAILS SHOWN TO BE REPORTED TO THE EMPLOYER'S REPRESENTATIVE/ENGINEER PRIOR TO CONSTRUCTION.
6. LOCATION AND LEVELS OF EXISTING DRAINAGE RUNS ARE BASED UPON SEWER RECORD PLANS AND MUST BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS.
7. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS WHERE NECESSARY PROTECTION OR DIMENSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.
8. ALL DRAINAGE AND FITTINGS TO BE CLAYWARE TO BS EN 855 OR UPVC TO BS EN 438.
9. TYPICAL PIPE BEDDING TO DRAINAGE WHERE DEPTH TO SOFFIT IS GREATER THAN 600mm IN LANDSCAPED AREAS AND GREATER THAN 900mm IN TRAFFICKED AREAS IS TO BE CLASSES 5 (I.E. 10-14mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES UP TO 525mm AND 20-40mm GRADED IMPORTED GRANULAR BED AND SURROUND FOR PIPES GREATER THAN 525mm).
10. WHERE DEPTH TO SOFFIT OF DRAINAGE PIPEWORK IS LESS THAN 600mm IN LANDSCAPED AREAS AND LESS THAN 900mm IN TRAFFICKED AREAS THEN PIPEWORK IS TO BE BEDDED AND SURROUNDED IN 150mm MINIMUM GRADE ST2 CONCRETE, COMPRESSIBLE MATERIAL, FLEXCELL OR SIMILAR APPROXIMATELY 10mm THICK, TO BE PROVIDED AT EVERY PIPE JOINT.
11. BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE FREE DRAINING READILY COMPATIBLE MATERIAL, FREE FROM RUBBISH AND ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. BACKFILL MATERIAL TO BE COMPACTED IN LAYERS NOT EXCEEDING 150mm THICK.
12. CONCRETE MINES INDICATED ON THIS DRAWING ARE STANDARD MINES IN ACCORDANCE WITH BS 5328 : 1997. MIX DESIGNATIONS SHALL BE DEPENDENT UPON THE PRESENCE OF SULPHATES CLASSIFIED IN ACCORDANCE WITH TABLE 7 OF BS 5328 : PART 1.
13. A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT, COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENT OF THE JOINT. THE LENGTH OF THE NEXT PIPE (ROCKER PIPE) AWAY FROM THE STRUCTURE SHALL BE AS SHOWN IN THE TABLE BELOW.

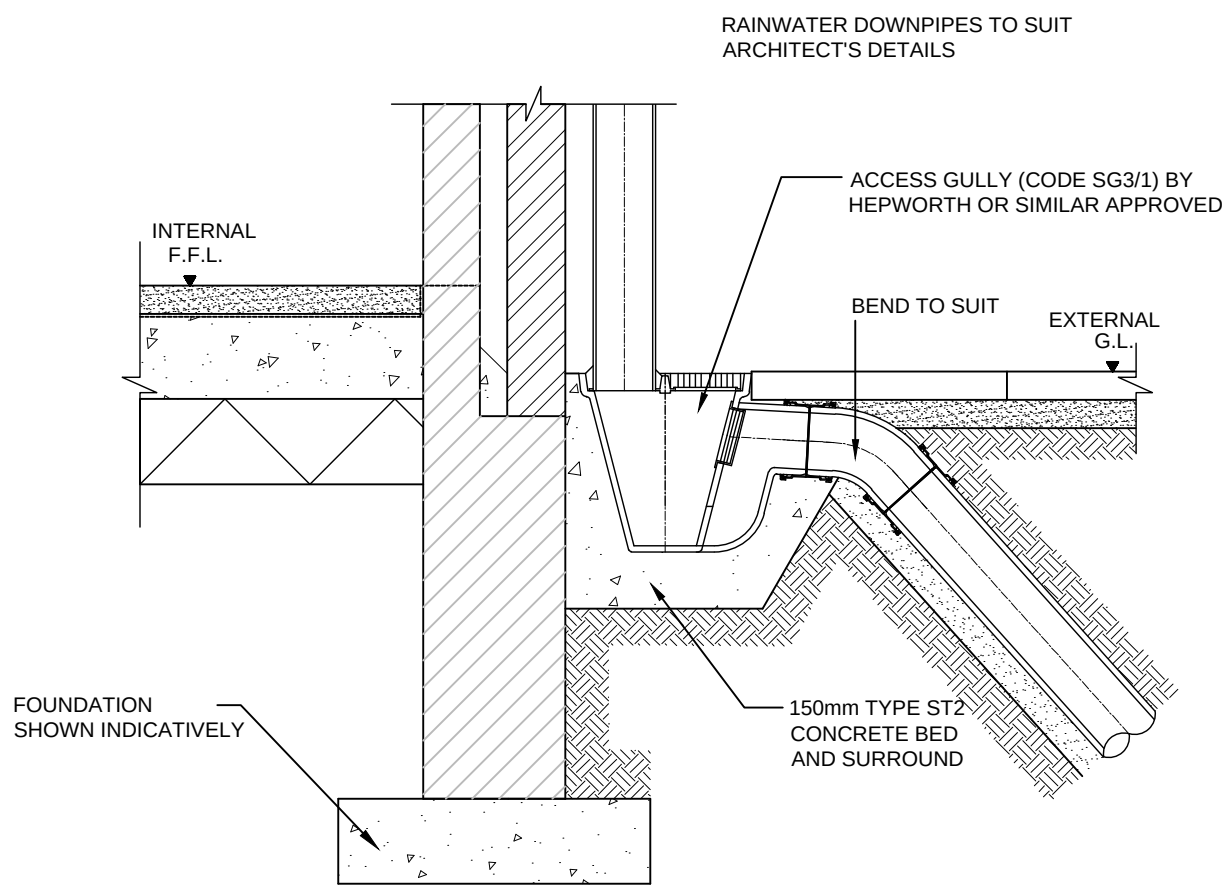
| NOMINAL DIAMETER (mm) | EFFECTIVE LENGTH (m) |
|-----------------------|----------------------|
| 150-400               | 0.6                  |
| 675-750               | 1.0                  |
| 825 AND OVER          | 1.25                 |

|               |                                       |            |          |                |
|---------------|---------------------------------------|------------|----------|----------------|
| A             | FIRST ISSUE                           | 23/11/23   | DS       | JS             |
| REVISION      | DETAILS                               | DATE       | ISSUED   | BY             |
| CLIENT        | URBAN SPLASH                          |            |          |                |
| PROJECT       | OLD MILL STREET, MANCHESTER           |            |          |                |
| DRAWING TITLE | TYPICAL DRAINAGE DETAILS SHEET 2 OF 2 |            |          |                |
| DRG No.       | GM12676-004                           | REV        | A        | SUIT. CODE     |
| DRG SIZE      | A1                                    | SCALE      | AS SHOWN | DATE 26-06-23  |
| DRAWN BY      | DR                                    | CHECKED BY | JG       | APPROVED BY JG |

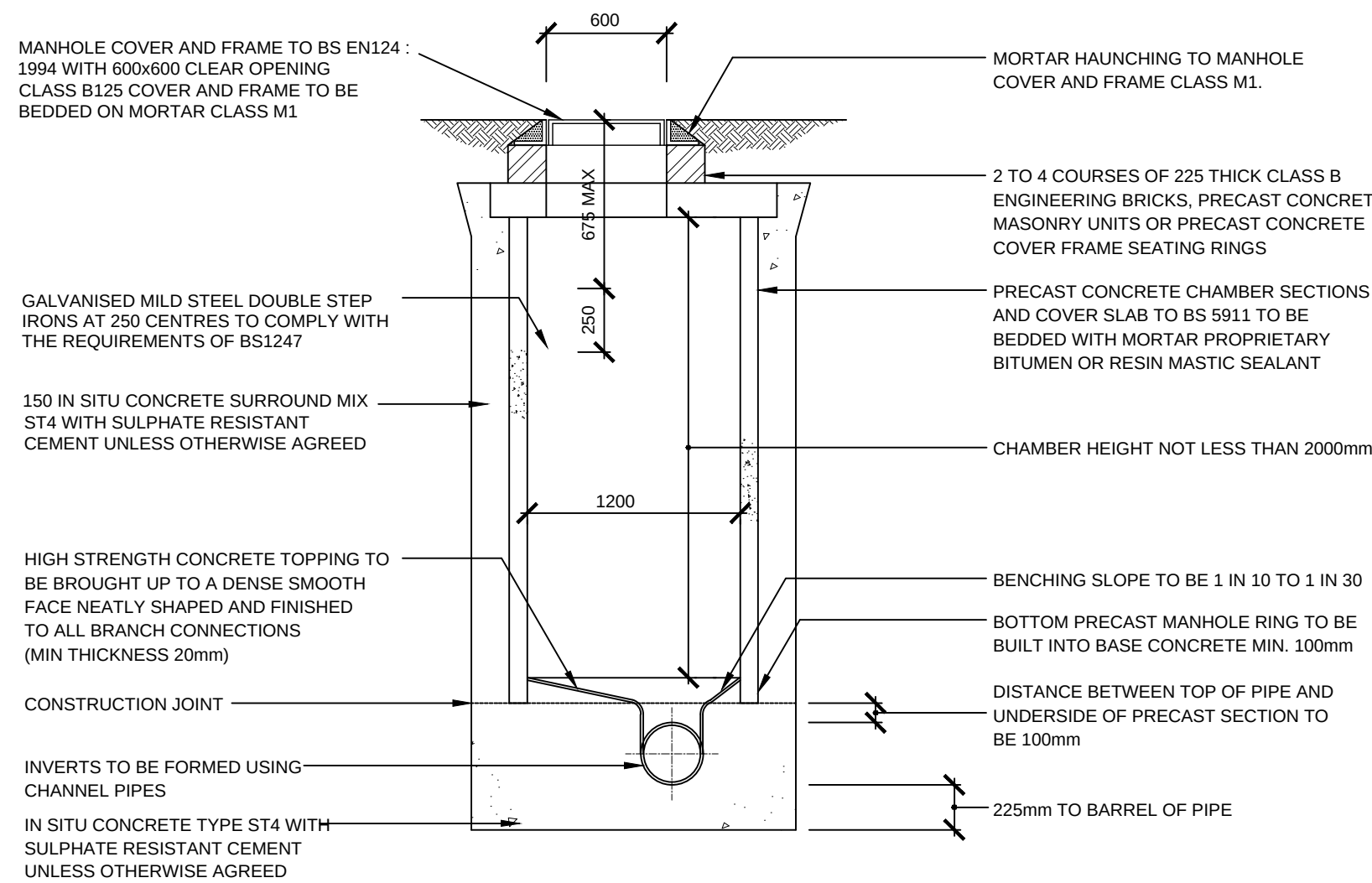


TYPICAL YARD GULLY DETAIL (YG)  
N.T.S.

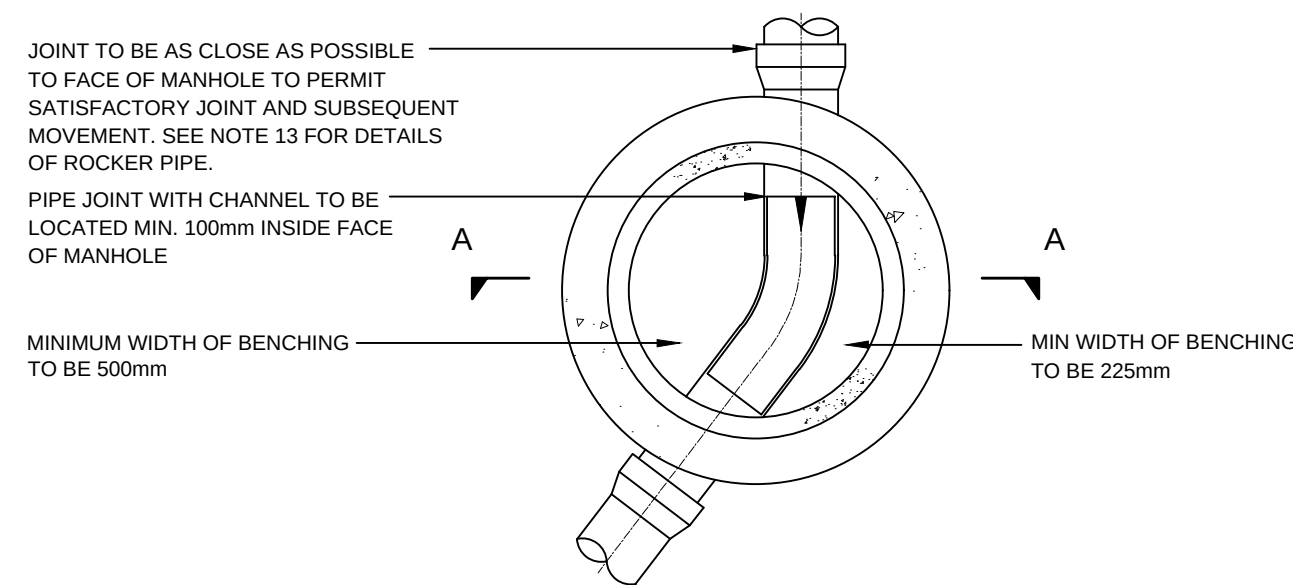
450mm DIAMETER POLYPROPYLENE INSPECTION  
CHAMBER (PIC)  
N.T.S.



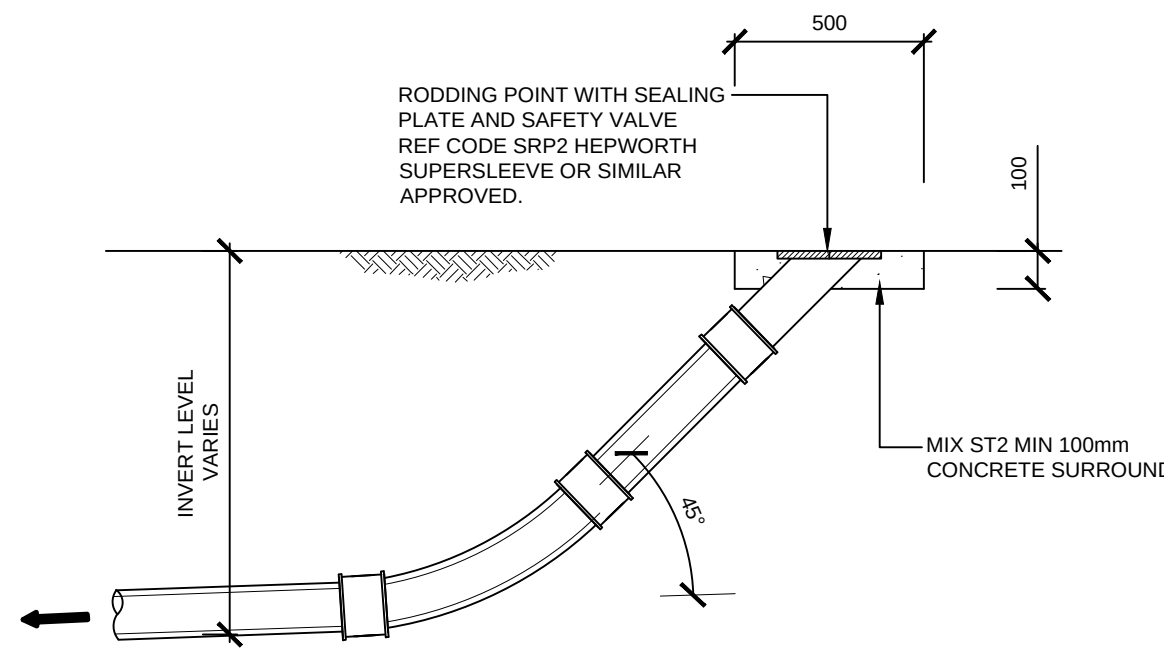
TYPICAL ACCESS GULLY TO RWP DETAIL  
NTS



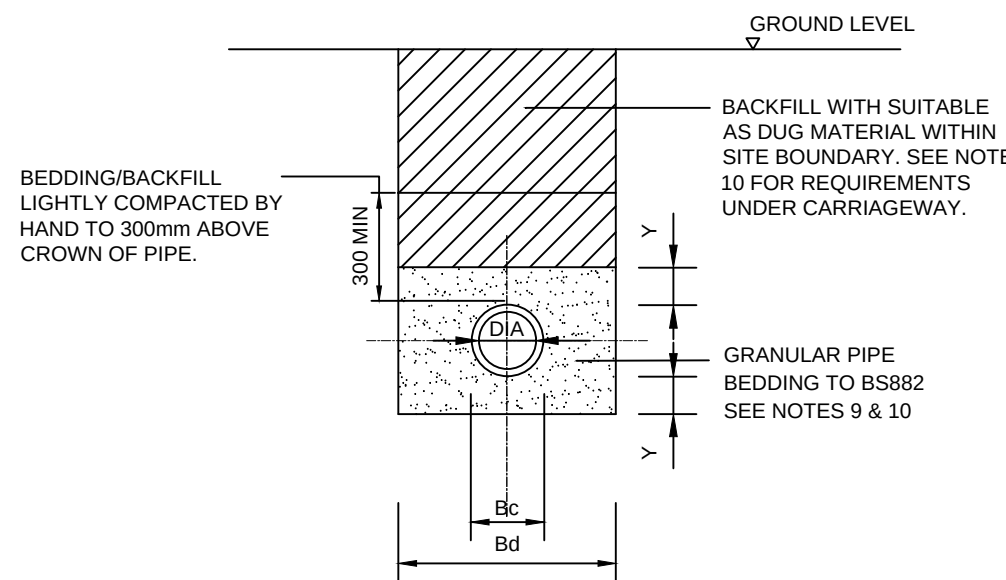
TYPICAL TYPE B MANHOLE  
N.T.S.



TYPICAL TYPE B MANHOLE  
DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE 1.45m TO 3m  
N.T.S.

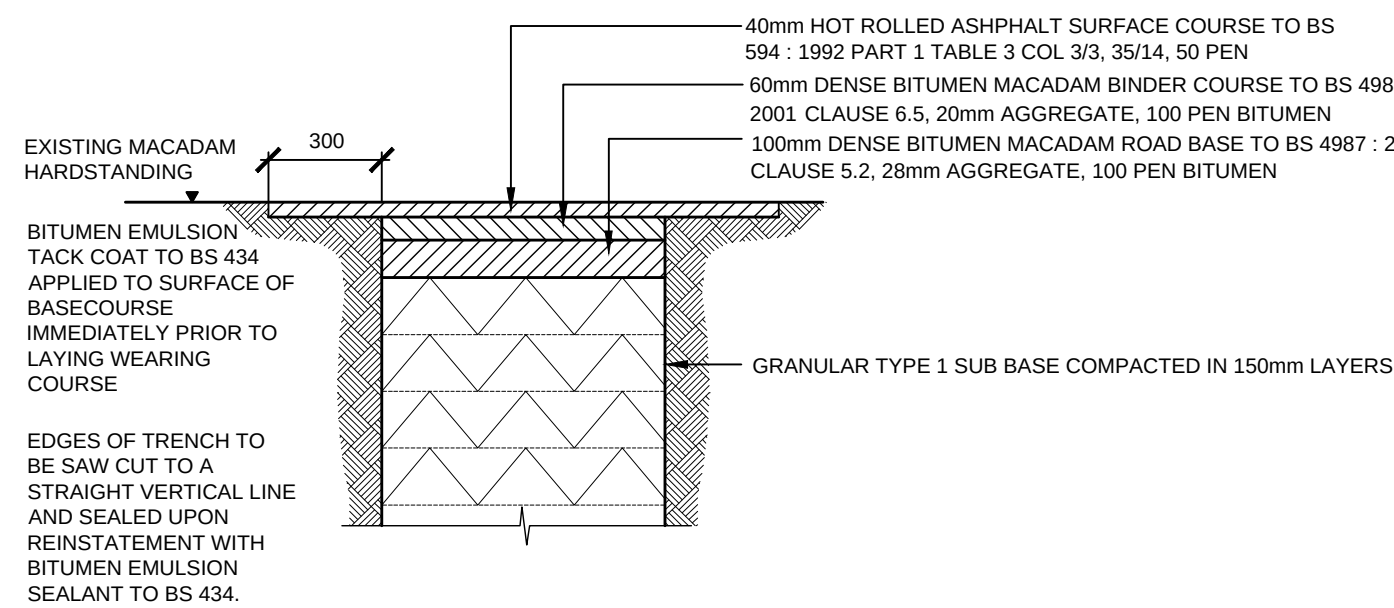


RODDING EYE (RE)  
N.T.S.

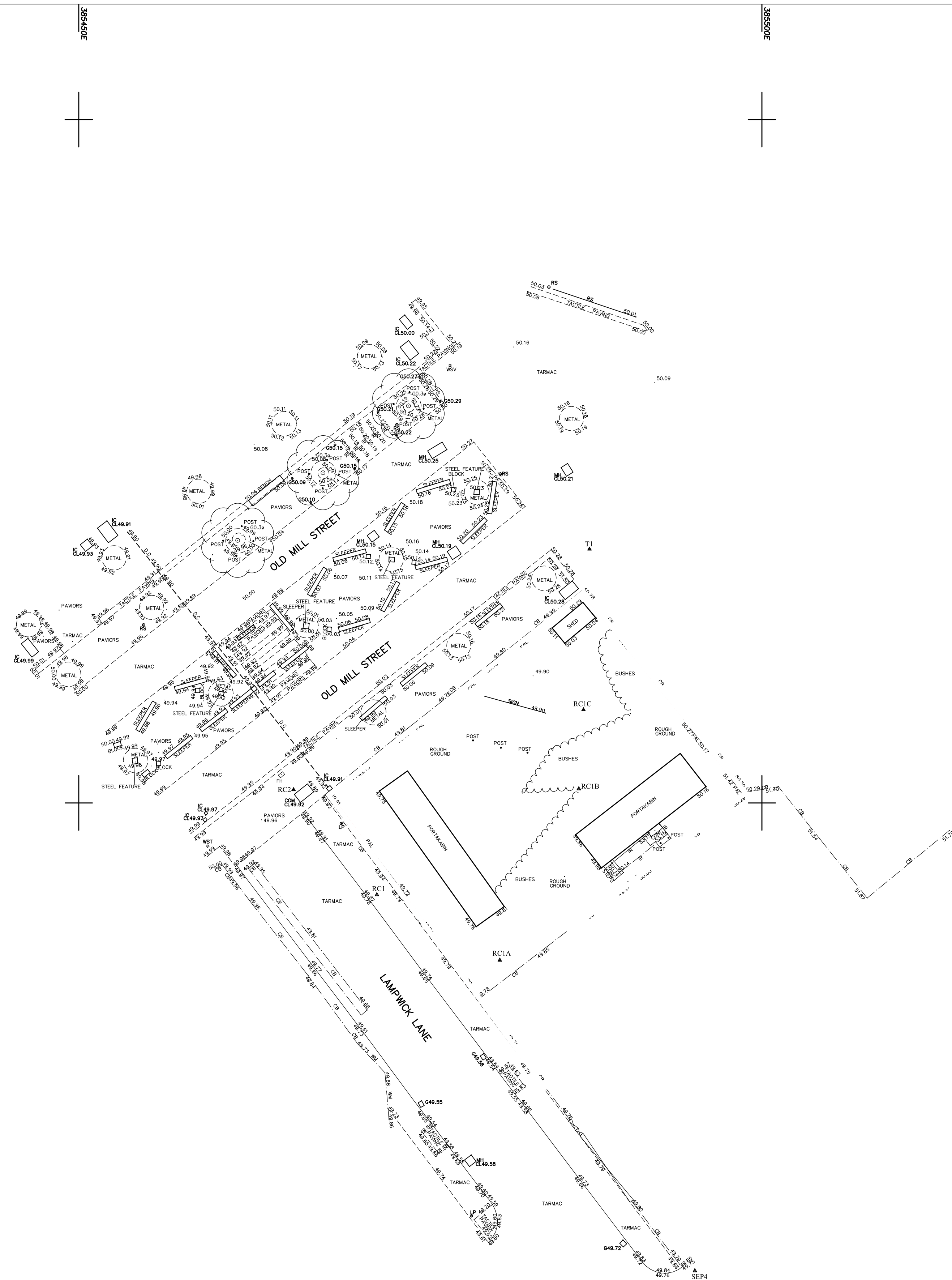


TYPICAL CROSS SECTION THROUGH DRAINAGE  
TRENCH  
N.T.S.

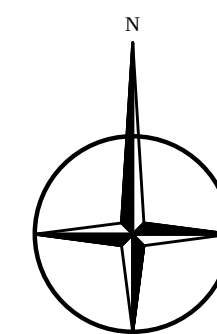
| TABLE APPLIES FOR TRENCHES UNDER CARRIAGEWAY AND IN LANDSCAPED AREAS |              |                      |                   |
|----------------------------------------------------------------------|--------------|----------------------|-------------------|
| PIPE DIA/TYPE                                                        | TRENCH WIDTH | APPROX. EXT PIPE DIA | BEDDING THICKNESS |
|                                                                      | Bd           | Y                    |                   |
| 150                                                                  | 600          | 190                  | 100               |



TRENCH REINSTATEMENT DETAIL IN EXISTING  
TARMACADAM AREAS  
SCALE 1:20



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PLAN GRID NORTH

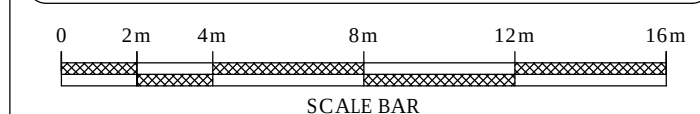
File Name: S11426-T.dwg

[illegible]

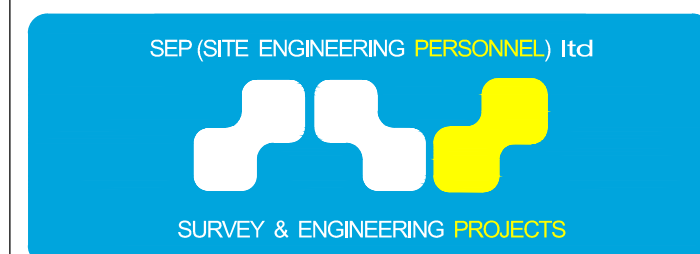
**NOTES:**  
All levels relate to O.S.(Newlyn) Datum, Established using network RTK  
Survey plotted on a plane local grid, orientated to National Grid.

| SURVEY STATIONS |            |            |          |
|-----------------|------------|------------|----------|
| Name            | Easting    |            | Northing |
| RC1             | 385471.821 | 398443.279 | 48.893   |
| RC1A            | 385480.813 | 398438.494 | 49.001   |
| RC1B            | 385486.601 | 398451.026 | 49.804   |
| RC1C            | 385486.941 | 398456.809 | 50.760   |
| SEP4            | 385465.721 | 398450.958 | 49.808   |
| T1              | 385495.095 | 398451.765 | 49.764   |
|                 | 385487.382 | 398468.572 | 50.275   |

SHEET LAYOUT



|     |      |             |
|-----|------|-------------|
|     |      |             |
| REV | DATE | DESCRIPTION |



Client  
Glenn Howells Architects Ltd  
321 Bradford Street  
Birmingham  
B5 6ET

Project Title  
Topographical Survey of Land at:  
Lampwick Lane  
Ancoats  
Manchester  
M4 6EE

|                         |               |                          |  |                     |            |           |
|-------------------------|---------------|--------------------------|--|---------------------|------------|-----------|
| Surveyed<br>R.Critchley |               | Drawn<br>G.Birchall      |  | Checked<br>D.Balmer |            |           |
| Scale<br>1:200          | Date<br>Sep15 | Drawing Ref.<br>S11426-T |  | No.<br>01           | Size<br>A1 | Rev<br>-- |

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