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# The Island Site

# Verification and Maintenance Strategy

Curtins Ref: TIS-CUR-00-XX-T-C-00001
Revision: V01
Issue Date: 16 August 2024

Client Name: B&K

Client Address: North-West Regional Office,
1st Floor, Altitude,
Atlas Business Park
Manchester
M22 5PR

Site Address: The Island Site, Land bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester

| Rev | Description | Issued by | Checked | Date |
|---|---|---|---|---|
| V01 | First Issue | CG | CG | 16 August 2024 |

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| Authorised | Signature | Date |
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# 1 Introduction

## 1.1 Project Background

Curtins have been appointed by B&K to provide a Verification and Drainage Maintenance Strategy for the proposed below ground drainage design for the Island Site, Manchester, which is bound by John Dalton Street, Ridgefield, Bow Street and South King Street, Manchester.

As some elements of the surface water attenuation are provided above ground, we have also included record for their installation as it forms a key part of the function of the overall drainage network. However above ground elements have been designed by others.

## 1.2 Scope of the Verification and Maintenance Strategy

This report demonstrates the below ground drainage which has been installed for the development site and provides product information to inform future maintenance requirements.

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

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


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# 2 Drainage Strategy

## 2.1 General

The drainage network on site is a private drainage network.

The drainage network is a separate foul and surface water system within the development. There are 4 No. Foul Outfalls and 1 No. Surface Water Outfall.

## 2.2 Foul Drainage

There are four foul outfalls from the building as follows:

One 100mm connection into Manhole 6208 (UU Ref) in South King Street.

Two 150mm connections into Manhole EXG 13 (no UU Ref) in South King Street.

One 100mm connection into Manhole 7213 (UU Ref) in Bow Street.

The Final Construction Drainage Drawings are enclosed in *Appendix A.*

## 2.3 Surface Water Drainage

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

Based on the nature of the development, a lifespan in excess of up to 60 years is anticipated. Therefore, the potential climate change allowance for 2070-2115 ranges between 20% for the central allowance and 40% for the upper end allowance. As such, an allowance of 40% for climate change on peak rainfall intensity has been included in the design.

Assessment was completed at preliminary design stage to confirm the most viable method of discharge was connection to the combined public sewer at a restricted rate.

The on-site surface water network is based on a pipe system serving the building with a flow restriction. There is one 150mm outfall connection into Manhole 6208 (UU Ref) in South King Street.

The surface water drainage outfall has been restricted to a maximum of 8.3 l/s. The proposed network on site requires attenuation to provide capacity to accommodate the volumes generated during the 1 in 100 year +40% design event whilst maintaining the maximum flow restriction of 8.3 l/s.

The flow restriction is achieved by an internal pump set from the attenuation tank and pumped up to below ground floor level before discharging by gravity north towards the public sewer in South King Street.

The attenuation is provided within an internal above ground tank located at Lower Ground Floor Level.

There are small areas of green roof areas which provide some source control retention locally.

The Final Construction Drainage Drawings are enclosed in *Appendix A*.

## 2.4 Approvals

The connection to the public sewers has been approved under a Section 106 Agreement. Each connection has been agreed under the following approval references:

One 150mm Surface Water connection into Manhole 6208 (UU Ref) in South King Street under Section 106 Approval 02809587.


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One 100mm Foul connection into Manhole 6208 (UU Ref) in South King Street under Section 106 Approval 02809587.

Two 150mm Foul connections into Manhole EXG 13 (no UU Ref) in South King Street under Section 106 Approval 03751790.

One 100mm Foul connection into Manhole 7213 (UU Ref) in Bow Street under Section 106 Approval 02809686.

The correspondence is enclosed in *Appendix B*.


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# 3 Verification

## 3.1 Introduction

The Verification section has been developed with reference to the drainage design details and philosophy provided in section 2 of this report. Manchester City Council requirements are to verify the installation of the Drainage and SuDS to confirm by Photographic record that this has been installed.

The following elements have been provided by the contractor:

- Attenuation Tank (above ground)
- Flow Control – pump (above ground)
- Green Roof (above ground)

## 3.2 As Built Drawings

The following Final Construction drawings, as confirmed by the contractor are included in *Appendix A.*

- TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout
- TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout
- TIS-CUR-XX-00-DR-C-5220-C03_S106 Proposed Manhole Details
- TIS-CUR-XX-ZZ-DR-C-5230-C03_Drainage Notes
- TIS-CUR-XX-ZZ-DR-C-5231-C04_Proposed Manhole Schedule
- TIS-CUR-XX-ZZ-DR-C-5232-C03_Drainage Details

## 3.3 Photographic Information

Attenuation Tank

The attenuation tank is located above ground at Lower Ground Floor (B1 level). This has been designed by NG Bailey and is installed as a Balmoral Tank with 54m3 capacity as indicated on NG Bailey drawing TIS-NGB-ZZ-B1-5200 and attenuation tank schedules enclosed in *Appendix C.*

The product is and Manufacturers information is also enclosed in *Appendix C.*

Tank Installation photograph is shown in Figures 1-3.


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***Figure 1 – Attenuation Tank Installation***




***Figures 2 & 3 – Attenuation Tank Installation***






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Flow Control

Flow control is achieved by a pump which is piped up to below ground floor level at a maximum of 8.3 l/s.

Installation photograph is shown in Figure 4.

***Figure 4 – Pump Flow Control Installation***



Green Roof

Green Roof Installation photographs are shown in Figures 5-7.

***Figure 5 – Green Roof Installation***





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***Figure 6 – Green Roof Installation***

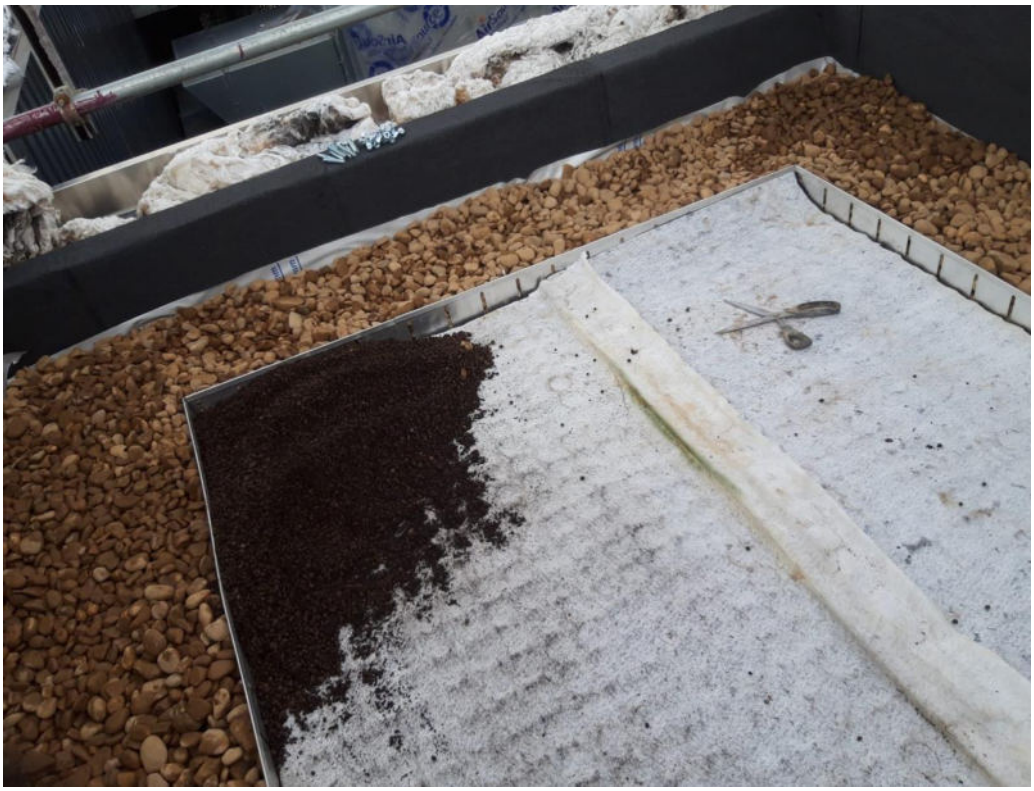


***Figure 7 – Green Roof Installation***




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# 4 Maintenance Recommendations

## 4.1 Components

The following components have been included within the drainage design for the proposed development:

- Inspection, Manhole and Catchpit Chambers
- Pipes
- Gullies / Sump, Outlet and Access Units
- Attenuation Tank
- Green Roof

## 4.2 General Maintenance

The maintenance of the drainage network within the ownership boundary will be the responsibility of the Building Owner.

The maintenance of the drainage network outside of the Ownership Boundary will be the responsibility of Manchester City Council and United Utilities.

A copy of the final construction drainage layout should be provided in the final Operations and Maintenance Manual. Reference should be made to the Final Construction drainage drawings, enclosed in *Appendix A.*

The maintenance scheduling should begin from the completion date.

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

## 4.3 Inspection, Manhole and Catchpit Chambers

The locations of the chambers are indicated on Curtins drainage drawings TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout and TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout

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

The appropriate barriers and signage should be installed during any opening of manholes to warn occupiers in the building.

When accessing chambers, the latest Health and Safety legislation should be adhered to.

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

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


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| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Initial inspection should be provided as post construction CCTV survey. | N/A |
| | Inspect for evidence of poor operation via water level in chambers. If required take remedial action. | 3-monthly, 48 hours after large storms. |
| Occasional maintenance | Check and remove large vegetation growth near pipe runs. | 6 monthly |
| Remedial actions | Rod through poorly performing runs as initial remediation. | As required. |
| | If continued poor performance jet and CCTV survey poorly performing runs. | As required. |
| | Seek advice as to remediation techniques suitable for the type of performance issue and location. | As required If above does not improve performance. |

## 4.4 Pipes

The locations of the pipes are indicated on Curtins drainage drawing TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout and TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout.

Pipes can be cleaned using drain cleaning rods or drain cleaning jets, accessed from inspection chambers and manholes.

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Initial inspection should be provided as post construction CCTV survey. | N/A |
| | Inspect for evidence of poor operation via water level in chambers. If required take remedial action. | 3-monthly, 48 hours after large storms. |
| Occasional maintenance | Check and remove large vegetation growth near pipe runs. | 6 monthly |
| Remedial actions | Rod through poorly performing runs as initial remediation. | As required. |
| | If continued poor performance jet and CCTV survey poorly performing runs. | As required. |
| | Seek advice as to remediation techniques suitable for the type of performance issue and location. | As required If above does not improve performance. |


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## 4.5 Gullies / Sump, Outlet and Access Units

The locations of the gullies or sump outlet units are indicated on Curtins drainage drawings TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout and TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout

Gullies and sump outlet units installed have removable covers to allow cleaning and clearing of debris and silt. The appropriate barriers and signage should be installed during any opening of gullies to warn pedestrians.

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

## 4.6 Attenuation Tank

The Attenuation System should be inspected and cleaned in accordance with the manufacturer's details – Balmoral Tanks - *Appendix C).*

Sectional tanks are bespoke products and therefore manufacturer's recommendations should be taken into consideration.

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

Typical attenuation maintenance isa s follows.

| **Maintenance Schedule** | **Required Action** | **Frequency** |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required) | Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required. | Monthly and after large storms. |
| | Check penstocks and other mechanical devices (if present). | Half yearly. |
| Regular maintenance\inspection | Inspect and identify any areas that are not operating correctly. If required, take remedial action. | Monthly for 3 months, then six monthly |
| | Debris removal from catchment surface (where may cause risks to performance) | Monthly |
| | Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary. | Monthly (and after large storms) |
| | Remove sediment from pre-treatment structures | Annually (or as required after heavy rainfall events) |
| Remedial actions | Repair/rehabilitation of inlets, outlet, overflows and vents. | As required. |


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## 4.7 Green Roof

The locations of the permeable pavements are indicated on Curtin's drainage drawings TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout and TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout.

Green roofs contain proprietary products and as such membranes/geotextiles and the manufacturer's recommendations should be followed. For the effective growing of the system, the manufacturer recommends:

An annual maintenance programme for wildflower living roofs is recommended, to include two visits per year, one in the Spring (remedial) and one in the Autumn (cutting), when vegetation should be strimmed after flowers have seeded. The substrate must be watered before and after planting and the system kept moist for **at least three months** after installation and as weather conditions require. Manufacturers information is enclosed in *Appendix D*.

Access for maintenance is provided as this is a surface feature only.

Regular inspection and maintenance is important for the effective operation of the green roof. Typical maintenance may include:

| Maintenance Schedule | Required Action | Frequency |
|---|---|---|
| Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required). | Initial Inspection | Monthly for three months after installation |
| | Inspect for evidence of poor operation. If required, take remedial action. | 3-monthly, 48 hours after large storms. |
| Regular maintenance\ inspection | Remedial and cutting | Two times/year spring and autumn as per manufacturers' recommendations. |


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## Appendix A

Below Ground Drainage Drawings:

- TIS-CUR-XX-B1-DR-C-5200-C06_Proposed Basement Drainage Layout
- TIS-CUR-XX-00-DR-C-5201-C05_Proposed Ground Floor Drainage Layout
- TIS-CUR-XX-00-DR-C-5220-C03_S106 Proposed Manhole Details
- TIS-CUR-XX-ZZ-DR-C-5230-C03_Drainage Notes
- TIS-CUR-XX-ZZ-DR-C-5231-C04_Proposed Manhole Schedule
- TIS-CUR-XX-ZZ-DR-C-5232-C03_Drainage Details


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KEY:

- SITE BOUNDARY
- PROPOSED OWNERSHIP BOUNDARY
- EXISTING DRAINAGE
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED PRIVATE FOUL DRAIN — SizeØ
- PROPOSED PRIVATE SURFACE DRAIN — SizeØ
- PROPOSED FOUL DRAINAGE TO BE CAST INTO RAFT FOUNDATION
- PROPOSED DRAINAGE TO BE CAST IN CONCRETE BELOW RAFT FOUNDATION
- PROPOSED SURFACE WATER ATTENUATION TANK TO BE DESIGNED BY OTHERS (INDICATIVELY SHOWN)
- PROPOSED SW RISING MAIN/OUTFALL BY OTHERS (INDICATIVELY SHOWN)
- PROPOSED FOUL PUMP CHAMBER BY OTHERS (INDICATIVELY SHOWN) — PC
- FOUL RISING MAIN BY OTHERS (INDICATIVELY SHOWN)
- PROPOSED FOUNDATIONS
- ARCHITECT SLAB OPENING

GENERAL NOTES:

1. FOR NOTES PLEASE SEE CURTINS DRAWING: TIS-CUR-XX-ZZ-DR-C-5230_DRAINAGE NOTES

FOUL PUMPING & STORAGE

FLOWS TAKEN FROM BRITISH WATER COP CHAPTER 3

PUMPED VOLUMES WILL BE BASED ON OCCUPANCY NUMBERS USING THE BASEMENT FACILITIES - TO BE CONFIRMED BY THE ARCHITECT/CLIENT.

ASSUMPTIONS: SHOWER, TOILET AND CHANGE FACILITY BASED ON CYCLIST USE - 70No.

**SHOWERS:**
CYCLE STORAGE HAS A CAPACITY FOR APPROX. 70;
ASSUMING FULL USE AND ALL SHOWER (AM ONLY)
WATER USE 40L/ USE.
VOLUME = 2,800 LITRES (2.8m³)

**TOILETS:**
ASSUMING USE AS PER SHOWERS (70)
WATER USE 10L/ USE.
VOLUME = 700 LITRES (0.70m³).

NO ALLOWANCE MADE FOR FLOOR GULLIES - IT IS ASSUMED THAT ANY WASHDOWN WOULD BE TEMPORARILY SUSPENDED DURING A PERIOD OF PUMP OUTAGE.

**NOTE:**
THE ASSUMPTIONS ABOVE HAVE BEEN USED AS CONFIRMED INFORMATION HAS NOT BEEN PROVIDED TO CURTINS. THE CONTRACTOR/ CLIENT AND PUMP DESIGNER SHOULD SATISFY THEMSELVES THAT THE ASSUMPTIONS ARE SUFFICIENTLY ROBUST.

FOUL

THE DESIGN RESPONSIBILITIES FOR THE FOUL PUMP SYSTEM ARE AS STATED BELOW:-

- PUMPING STATION DESIGN AND SPECIFICATION - **MANUFACTURER/SUPPLIER.**
- PUMPING STATION CIVIL WORKS - **MAIN CONTRACTOR.**
- SITE LAYOUT AND PUMPING STATION LOCATION - MAIN CONTRACTOR.
- PUMPING STATION INSTALLATION - **MANUFACTURER/SUPPLIER.**
- RISING MAIN, BREAK CHAMBER AND OUTFALL DESIGN AND SPECIFICATION - **MANUFACTURER/SUPPLIER.**
- RISING MAIN, BREAK CHAMBER AND INSTALLATION - **MAIN CONTRACTOR.**
- FABRICATION AND CONSTRUCTION DRAWINGS - **MANUFACTURE/SUPPLIER.**
- REVIEW OF LAYOUT AND LEVELS TO COMPLY WITH DRAINAGE DESIGN - **MAIN CONTRACTOR'S DESIGN (CURTINS).**
- REQUIREMENTS FOR APPROVAL OF PUMP STATIONS - **MANUFACTURE/SUPPLIER.**
- ACCEPTANCE AND APPROVAL FROM CONSTRUCTION - **MAIN CONTRACTOR**.
- APPROVAL OF TESTING REGIME - **MAIN CONTRACTOR.**

OTHER DISCIPLINE DRAWING REFERENCES

THE DESIGN OF THIS SCHEME HAS BEEN DESIGNED IN ACCORDANCE WITH THE BELOW DRAWINGS AND INFORMATION.

ARCHITECTS DRAWING REF:
TIS-CPA-ZZ-00-DR-A-2100_C02 RECEIVED 16.02.23

M&E DRAWING REF:
*AWAITING REVISED POP UP DRAWING*
ARCHIECTS SLAB OPENING DRAWING USED:
TIS-CPA-ZZ-B1-DR-A-2100_C06 RECEIVED 23.02.23

FOUNDATION LAYOUT:
REVIT DWG EXPORT 22.12.22

CCTV SURVEY REPORT AND DRAWING BY LAYER SURVEYS MARCH 2020

TOPOGRAPHICAL SURVEY BY SURVEY & ENGINEERING PROJECTS MARCH 2020

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C06 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C05 | UPDATED TO NEW MH LOCATIONS & B1 POP UPS | 01.03.23 | CG | CG |
| C04 | UPDATED TO SUIT NEW B1 POP UPS | 20.02.23 | CG | CG |
| C03 | MANHOLES F1 & F2 MOVED | 10.01.23 | CG | CG |
| C02 | STAGE 5 UPDATE | 25.11.22 | CS | MW |
| C01 | STAGE 5 | 30.08.22 | CS | CG |
| P02 | STAGE 3 | 23.06.21 | CS | CG |
| P01 | ISSUED FOR PLANNING | 26.03.21 | CG | CG |

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Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

Drg Title: PROPOSED DRAINAGE LAYOUT BASEMENT

| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
| A1 | 26.03.21 | CG | CG | CG |
| Scale: 1:250 | | | | |

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
|---|---|---|---|---|---|---|---|
| TIS | - CUR - | XX - | B1 - | DR - | C - | 5200 | - C06 |

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KEY:

- SITE BOUNDARY
- PROPOSED OWNERSHIP BOUNDARY
- EXISTING DRAINAGE
- EXISTING DRAINAGE TO BE ABANDONED
- PROPOSED PRIVATE FOUL DRAIN — SizeØ
- PROPOSED PRIVATE SURFACE DRAIN — SizeØ
- EXISTING COMBINED MANHOLE ON PUBLIC SEWER
- PROPOSED FOUL SEWER FOR ADOPTION
- PROPOSED BACKDROP — BD
- PROPOSED FOUNDATIONS

GENERAL NOTES:

1. FOR NOTES PLEASE SEE CURTINS DRAWING: TIS-CUR-XX-ZZ-DR-C-5230_DRAINAGE NOTES

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

OTHER DISCIPLINE DRAWING REFERENCES

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ARCHITECTS DRAWING REF:
TIS-CPA-ZZ-00-DR-A-2101 REV C02 RECEIVED 22.11.22

FOUNDATION LAYOUT:
REVIT DWG EXPORT 22.12.22

CCTV SURVEY REPORT AND DRAWING BY LAYER SURVEYS MARCH 2020

MH13 LOCATION B&K SURVEY 17.01.23
SKS OUTFALL B&K SURVEY 12.07.23

TOPOGRAPHICAL SURVEY BY SURVEY & ENGINEERING PROJECTS MARCH 2020

| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C05 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C04 | OUTFALL CONNECTIONS UPDATED | 13.07.23 | CG | CG |
| C03 | OUTFALL CONNECTIONS UPDATED | 01.03.23 | CG | CG |
| C02 | STAGE 5 UPDATE | 02.12.22 | CS | MW |
| C01 | STAGE 5 ISSUE | 30.08.22 | CS | CG |
| P03 | DRAWING NUMBER UPDATED | 18.03.22 | CS | CG |
| P02 | STAGE 3 | 23.06.21 | CS | CG |
| P01 | ISSUED FOR PLANNING | 26.03.21 | CG | CG |

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Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

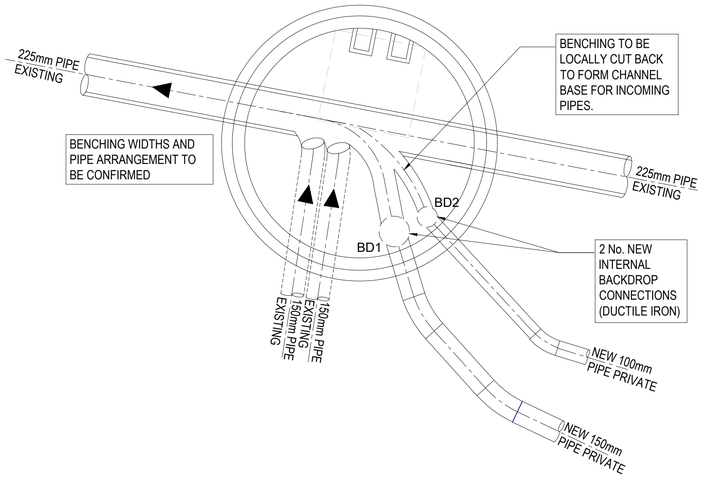
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| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
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Scale: 1:250

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
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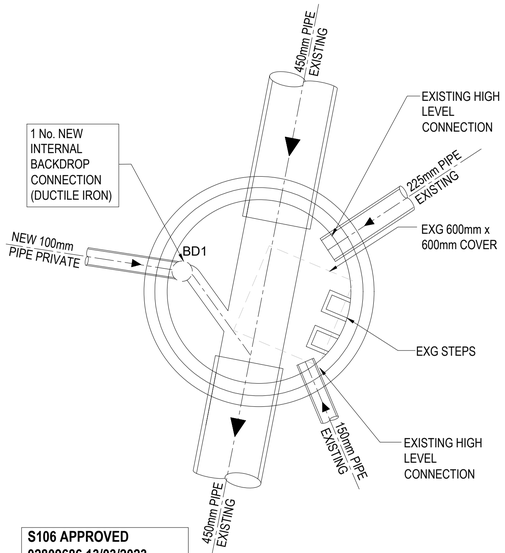
\\mp-fs-1\Projects\070001 - 071000\070298 - Island Site, Manchester\04-Production\4A-Models-Drawings\C\CAD\02\




**S106 APPROVED**
**02809587 19/10/22**
**AMENDMENTS MADE DURING SITE INSPECTION WITH UU 17/05/23**

| MANHOLE | EXG MH 14 (UUMH 6208) |
|---|---|
| MH DIAMETER | EXG 1500mm |
| COVER LEVEL | EXG 36.040 |
| INVERT LEVEL | EXG 32.790 |
| BACKDROP INVERT LEVEL | BD1: 34.770, BD2: 34.261 |
| MH TYPE | EXISTING TYPE 1 |
| DEPTH TO SOFFIT | 3.025m |
| DEPTH TO CUT-OUT RECESS | N/A |
| COVER SIZE | EXG 600 x 600 |
| COVER DEPTH | EXG 100 mm |
| COVER SPEC | EXG D400 |
| LADDER OR DOUBLE STEPS? | EXISTING DOUBLE STEPS |
| SAFETY CHAIN | NOT REQUIRED |
| SAFETY RAILS | NOT REQUIRED |
| INVERT ACCESS STEP | N/A |
| HOLE SIZE IN COVER SLAB | 750 x 600 EO |

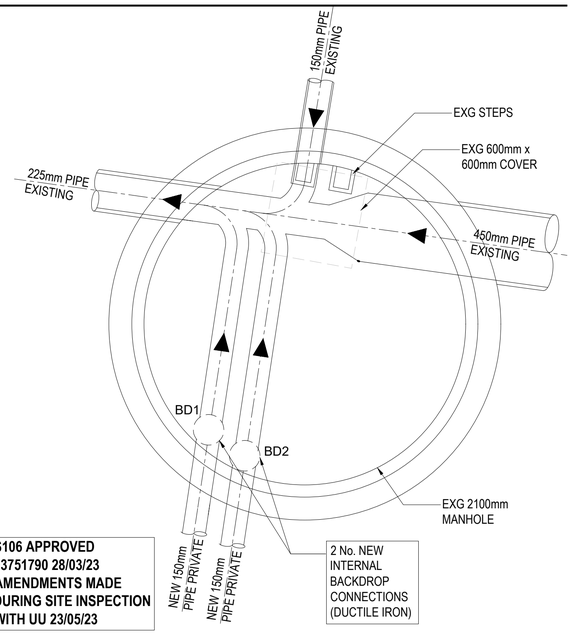
UUMH 6208 MANHOLE PLAN (SOUTH KING STREET)
LAYER SURVEY REFERENCE MH14
SCALE 1:20




**S106 APPROVED**
**02809686 13/03/2023**
**AMENDMENTS MADE DURING SITE INSPECTION WITH UU 28/06/23**

| MANHOLE | EXG UUMH 7213 |
|---|---|
| MH DIAMETER | EXG 1200mm |
| COVER LEVEL | EXG 36.290 |
| INVERT LEVEL | EXG 31.710 |
| BACKDROP INVERT LEVEL | BD 34.990 TBC |
| MH TYPE | EXISTING TYPE 1 |
| DEPTH TO SOFFIT | 4.580m |
| DEPTH TO CUT-OUT RECESS | N/A |
| COVER SIZE | EXG 600 x 600 |
| COVER DEPTH | EXG 100 mm |
| COVER SPEC | EXG D400 |
| LADDER OR DOUBLE STEPS? | EXISTING DOUBLE STEPS |
| SAFETY CHAIN | NOT REQUIRED |
| SAFETY RAILS | NOT REQUIRED |
| INVERT ACCESS STEP | N/A |
| HOLE SIZE IN COVER SLAB | 750 x 600 EO |

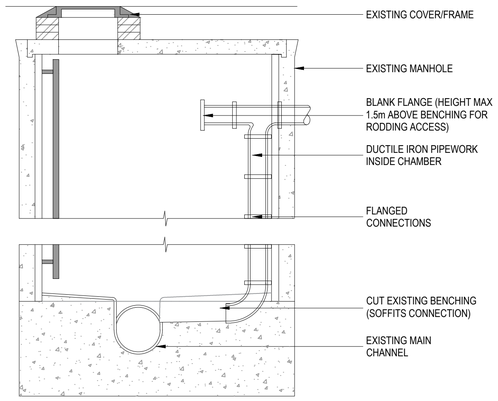
UUMH 7213 MANHOLE PLAN (BOW STREET)
SCALE 1:20



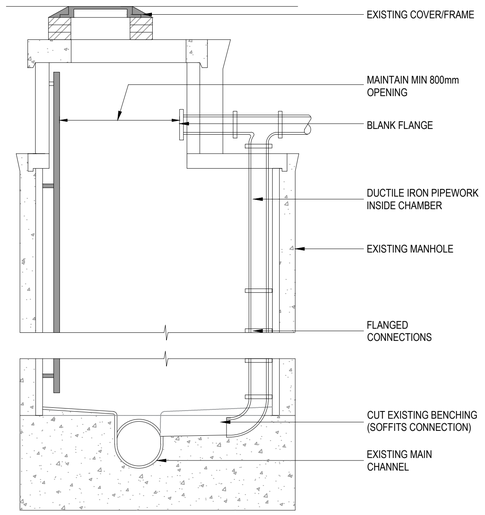

**S106 APPROVED**
**03751790 28/03/23**
**AMENDMENTS MADE DURING SITE INSPECTION WITH UU 23/05/23**

| MANHOLE | EXG MH 13 (UUMH 7201) |
|---|---|
| MH DIAMETER | EXG 2100mm |
| COVER LEVEL | EXG 36.180 |
| INVERT LEVEL | EXG 33.040 |
| BACKDROP INVERT LEVEL | BD1: 35.245, BD2: 35.250 |
| MH TYPE | EXISTING TYPE 2 |
| DEPTH TO SOFFIT | 2.915m |
| DEPTH TO CUT-OUT RECESS | N/A |
| COVER SIZE | EXG 600 x 600 |
| COVER DEPTH | EXG 100 mm |
| COVER SPEC | EXG D400 |
| LADDER OR DOUBLE STEPS? | EXISTING DOUBLE STEPS |
| SAFETY CHAIN | NOT REQUIRED |
| SAFETY RAILS | NOT REQUIRED |
| INVERT ACCESS STEP | N/A |
| HOLE SIZE IN COVER SLAB | 750 x 600 EO |

UUMH 7201 MANHOLE PLAN (SOUTH KING STREET)
SCALE 1:20




INTERNAL VERTICAL BACKDROP
FOR MANHOLES 6208 AND 7201




INTERNAL VERTICAL BACKDROP
FOR MANHOLES 7213

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
3. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
4. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
5. ALL ADOPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH "SEWERS FOR ADOPTION 7th EDITION" / DESIGN AND CONSTRUCTION GUIDANCE AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION" AND CONSTRUCTED TO THE RELEVANT STATUTORY UNDERTAKERS DETAILS.
6. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
7. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.
8. CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.
9. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
10. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
    - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
    - 375mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.
11. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
12. ALL NEW CONNECTIONS INTO EXISTING MANHOLES (OR INTO EXISTING SEWERS) TO BE 'SOFFITS LEVEL' UNLESS OTHERWISE NOTED.
13. ALL ADOPTABLE DRAINAGE PIPES WILL REQUIRE A MINIMUM OF 1200mm COVER, IN ACCORDANCE WITH SEWERAGE UNDERTAKERS REQUIREMENTS. WHERE THIS IS NOT ACHIEVED, IT WILL BE NECESSARY TO AGREE THE BED AND SURROUND DETAIL.
14. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.
15. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
    - B125 LOAD CLASS IN PEDESTRIAN AREAS
    - D400 LOAD CLASS IN VEHICULAR AREAS.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C03 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C02 | UPDATED MH 7213 BACKDROP CONNECTION | 13.07.23 | CG | CG |
| C01 | ISSUED FOR CONSTRUCTION | 10.07.23 | CG | CG |
| P04 | UUMH 6208 DETAILED / C01 MH REMOVED | 22.05.23 | CG | CG |
| P03 | UUMH's 7201 & 7213 DETAILED | 08.03.23 | CG | CG |
| P02 | ADDITIONAL CONNECTION IN TO C01 | 02.12.22 | CS | CG |
| P01 | ISSUED FOR APPROVAL | 02.09.21 | LK | CG |

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Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

Drg Title: S106 PROPOSED MANHOLE DETAIL

| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
| A1 | 31.08.22 | LK | CG | CG |
| Scale: 1:20 | | | | |

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
|---|---|---|---|---|---|---|---|
| TIS | - CUR - | XX - | 00 - | DR - | C - | 5220 | - C03 |

\\ma-fs-1\Projects\070001 - 071000\070298 - Island Site, Manchester\Q4-Production\4A-Models-Drawings\C\CAD\S2\

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

2. ALL ADOPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH "SEWERS FOR ADOPTION 7th EDITION" AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION" AND CONSTRUCTED TO THE RELEVANT STATUTORY UNDERTAKERS DETAILS.

3. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH CURTINS DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.

4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

5. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.

6. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

7. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.

8. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.

9. ALL INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON ARCHITECT AND M&E DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.

10. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.

11. ALL ACCESS FITTINGS, STACKS, RWP'S AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.

12. LARGE ACCESS FITTING REQUIRED ABOVE GROUND WHERE GREATER THAN 12M UP TO 22M TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12M TO A JUNCTION.

13. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.

14. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST 1NO WC, A MIN. FALL OF 1:80 APPLIES.

15. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.

16. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.

17. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.

18. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
- 100mm to 300mm DIA TO BE VITRIFIED CLAY.
- 375mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.

19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.

20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.

21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.

22. ALL NEW CONNECTIONS INTO EXISTING MANHOLES (OR INTO EXISTING SEWERS) TO BE 'SOFFITS LEVEL' UNLESS OTHERWISE NOTED.

23. ALL ADOPTABLE DRAINAGE PIPES WILL REQUIRE A MINIMUM OF 1200mm COVER, IN ACCORDANCE WITH SEWERAGE UNDERTAKERS REQUIREMENTS. WHERE THIS IS NOT ACHIEVED, IT WILL BE NECESSARY TO AGREE THE BED AND SURROUND DETAIL.

24. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 1200mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.

25. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE LOWER GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.

26. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.

27. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.

28. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.

29. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150MM FROM FACE OF CONCRETE.

30. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.

31. ALL MANHOLE COVERS IN BLOCK/SLAB AND EXTERNAL PAVING AREAS TO HAVE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT ARCHITECT'S PAVING PROPOSAL.

32. ALL INTERNAL COVERS TO HAVE MECHANICALLY JOINTED CORNERS AND DOUBLE SEALED WITH RECESSED TRAY TO ALLOW FOR FINISHES.

33. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
- B125 LOAD CLASS IN PEDESTRIAN AREAS
- D400 LOAD CLASS IN VEHICULAR AREAS.

34. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

35. GREASE TRAPS SHOULD BE PROVIDED ABOVE GROUND WITHIN AN ENZYME TREATMENT SYSTEM, BY APPROPRIATE SPECIALIST DESIGNER.

36. ATTENUATION TANK IS ABOVE GROUND AND SIZE/LOCATION HAS BEEN SHOWN INDICATIVELY ONLY, ABOVE GROUND DRAINAGE INCLUDING TANK TO BE DESIGNED BY OTHERS.

37. SURFACE WATER OUTLET/PUMP AND RISING MAIN FROM THE ATTENUATION TANK TO BE DESIGNED BY OTHERS. ROUTE SHOWN INDICATIVELY ONLY. DESIGNER SHOULD CONSIDER THE MAINTENANCE REQUIREMENTS AND CONFIRM IF THERE IS A DRAIN DOWN POINT REQUIRED TO ALLOW ACCESS INTO THE TANK IN CASE OF OUTLET/PUMP FAILURE.

38. FOUL RISING MAIN FROM THE PUMP CHAMBER TO BE DETAILED BY OTHERS. ROUTE SHOWN INDICATIVELY ONLY.

39. FURTHER SURVEYS ARE REQUIRED TO DETERMINE EXISTING SERVICES WITHIN SURROUNDING HIGHWAYS TO CONFIRM SPACE FOR CONSTRUCTION OF NEW DRAINAGE OUTFALLS WITHIN THE PUBLIC HIGHWAY.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C03 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C02 | STAGE 5 UPDATE | 02.12.22 | CS | CG |
| C01 | STAGE 5 | 30.08.22 | CS | CG |
| P01 | STAGE 3 | 23.06.21 | CS | CD |

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Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

Drg Title: DRAINAGE NOTES

| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
| A1 | 26.03.21 | CG | CG | CG |
| Scale: 1:250 | | | | |

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
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| TIS | - CUR - | XX - | ZZ - | DR - | C - | 5230 | - C03 |

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GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
3. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
4. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
5. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
6. FOR DRAINAGE LAYOUT PLEASE SEE CURTINS DRAWING: TIS-CUR-XX-B1-DR-C-5200_PROPOSED BASEMENT DRAINAGE LAYOUT, TIS-CUR-XX-00-DR-C-5201_PROPOSED GROUND FLOOR DRAINAGE LAYOUT.

**Manhole schedule**

| MH REF | CL (mAOD) | IL (mAOD) | DEPTH TO SOFFIT (m) | DS PIPE DIA (mm) | MH DIA (mm) | MH TYPE | COVER SIZE (mm) | COVER CLASS | COVER TYPE | RECESSED | RESTRICTED ACCESS | BACK DROP | EASTINGS | NORTHINGS | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 32.900 | 31.620 | 1.13 | 150 | 450 | TYPE 3 PPIC | 430 | B125 | DOUBLE SEALED | Y | N | | 383717.404 | 398243.863 | |
| F2 | 32.900 | 31.500 | 1.25 | 150 | 450 | TYPE 3 PPIC | 430 | B125 | DOUBLE SEALED | Y | Y | | 383722.047 | 398243.889 | RESTRICTED ACCESS MAX 350 OPENING |
| F3 | 32.900 | 31.190 | 1.56 | 150 | 450 | TYPE 3 PPIC | 430 | B125 | DOUBLE SEALED | Y | Y | | 383725.186 | 398268.378 | RESTRICTED ACCESS MAX 350 OPENING |
| F4 | 32.900 | 31.750 | 1.00 | 150 | 450 | TYPE 3 PPIC | 430 | B125 | DOUBLE SEALED | Y | N | | 383706.167 | 398260.233 | |
| F5 | 32.900 | 30.970 | 1.78 | 150 | 450 | TYPE 3 PPIC | 430 | B125 | DOUBLE SEALED | Y | Y | | 383708.221 | 398272.361 | RESTRICTED ACCESS MAX 350 OPENING |
| F6 | 32.900 | 30.730 | 2.02 | 150 | TO PUMP SPECIALIST | TO PUMP SPECIALIST | TO PUMP SPECIALIST | TO PUMP SPECIALIST | DOUBLE SEALED | Y | N | | 383718.128 | 398270.972 | BY PUMP SUPPLIER PROVIDING 24 HOUR STORAGE. INVERT LEVEL SHOWN REFERENCES LOWEST INLET PIPE LEVEL. |
| F7 | OMITTED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| SW1 | OMITTED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| C01 | OMITTED | | | | | | | | | | | | | | |
| C02 | OMITTED | | | | | | | | | | | | | | |

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| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C04 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C03 | MANHOLES F1 & F2 MOVED, F7 NOW PRIVATE | 10.01.23 | CG | CG |
| C02 | STAGE 5 UPDATE | 02.12.22 | CS | MW |
| C01 | STAGE 5 | 30.08.22 | CS | CG |
| P02 | DRAWING NUMBER UPDATED | 18.03.22 | CS | CG |
| P01 | STAGE 3 | 23.06.21 | CS | CD |

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Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

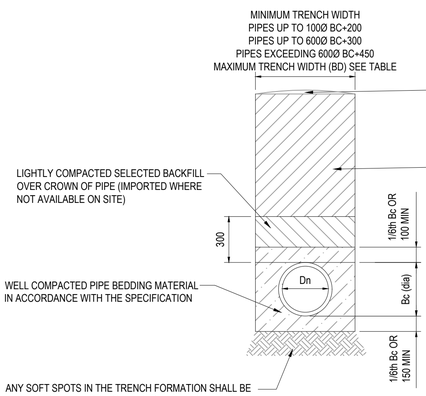
Drg Title: PROPOSED MANHOLE SCHEDULE

| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
| A1 | 26.03.21 | CG | CG | CG |

Scale: 1:250

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
|---|---|---|---|---|---|---|---|
| TIS | - CUR - | XX - | ZZ - | DR - | C - | 5231 | - C04 |

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CLASS S - 360° GRANULAR SURROUND PIPE BEDDING DETAIL

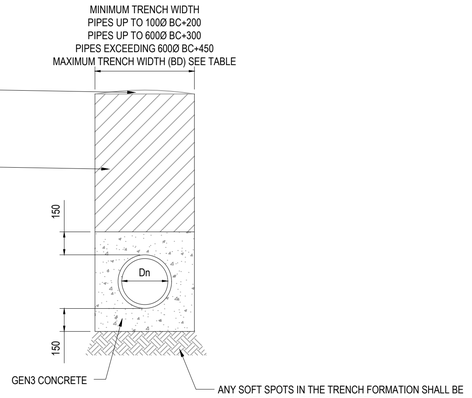
SOFT LANDSCAPE AREAS
IN SOFT LANDSCAPING AREAS TRENCH FILL ABOVE PIPES IS TO BE MOUNDED TO A MAXIMUM DEPTH OF 50MM TO ALLOW FOR FUTURE SETTLEMENT.

HARDSTANDING AREAS
SHW TYPE 1 GRANULAR MATERIAL
SOFT LANDSCAPE AREAS
SELECTED BACKFILL MATERIAL UP TO UNDERSIDE OF TOP-SOIL

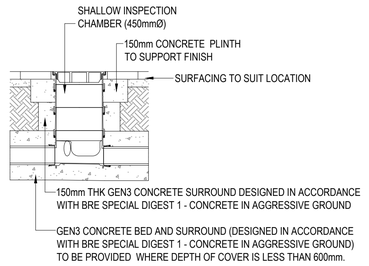
THE FLEXIBLE JOINTS IN THE PIPES SHALL BE MAINTAINED AT THE END OF EACH PIPE WITH COMPRESSIBLE SHEET CUT ACCURATELY TO FIT THE PIPE PROFILE TO BREAK THE CONCRETE SURROUND

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

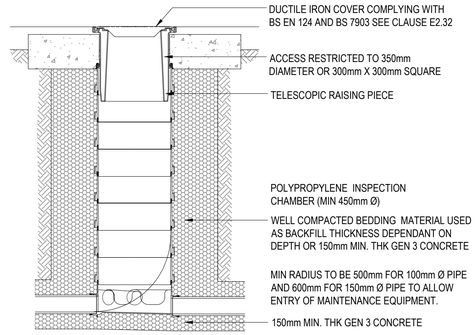
MAXIMUM TRENCH WIDTH




CLASS Z - CONCRETE BED AND SURROUND PIPE BEDDING DETAIL
( COVER < 900mm IN VEHICULAR LOADING AND OPEN FIELD.
COVER <600mm ELSEWHERE EXCEPT UNDER BUILDINGS. )

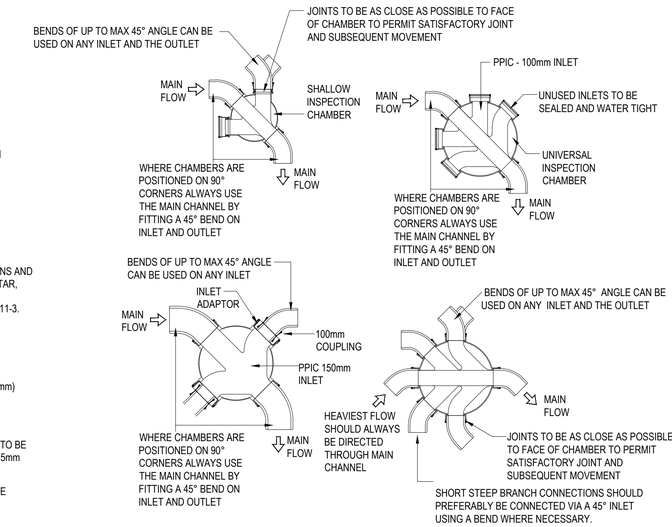



SHALLOW INSPECTION CHAMBER
MAX DEPTH 0.6m




DEEP INSPECTION CHAMBER
DEPTHS BETWEEN 1.2m AND 3.0m

TYPICAL INSPECTION CHAMBER DETAILS - PPIC




INSPECTION CHAMBER BASE DETAILS



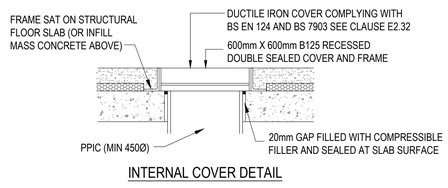

NOTE: OPENING TO BE LOCATED CENTRALLY OVER 900mm SHAFT AND OFFSET APPROXIMATELY 200mm FOR 1200mm DIAMETER SHAFT WITH LADDER.

TYPICAL MANHOLE DETAIL - TYPE 1B
(DEPTH FROM COVER TO SOFFIT OF PIPE 3m TO 6m)




MANHOLE COVERS WITHIN TRAFFICKED PAVED AREAS TO BE D400 RECESSED COVERS.

TYPICAL MANHOLE DETAIL - TYPE 2
(MAXIMUM DEPTH FROM COVER TO SOFFIT OF PIPE 3.0 m)




INTERNAL COVER DETAIL

## GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL WORKS AND MATERIALS TO BE IN ACCORDANCE WITH CURRENT BRITISH STANDARDS AND BUILDING REGULATIONS.

CONSTRUCTION RECORD - FINAL CONSTRUCTION

THE INFORMATION IS BASED ON CONFIRMATION FROM THE CONTRACTOR OF THE INSTALLED WORKS. THERE MAY BE VARIATIONS ON SITE WHICH ARE NOT REFLECTED ON THIS DRAWING AND HAS NOT BEEN VERIFIED BY CURTINS.

| Rev: | Description: | Date: | By: | Chkd: |
|---|---|---|---|---|
| C032 | FINAL CONSTRUCTION ISSUE | 13.08.24 | CG | CG |
| C02 | STAGE 5 UPDATE | 02.12.22 | CS | CG |
| C01 | STAGE 5 | 30.08.22 | CS | CG |
| P02 | DRAWING NAME UPDATED | 18.03.22 | CS | CG |
| P01 | STAGE 3 | 23.06.21 | CS | CD |

curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 236 2394
manchester@curtins.com
www.curtins.com
Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: FINAL CONSTRUCTION

Project: THE ISLAND SITE MANCHESTER

Drg Title: DRAINAGE DETAILS SHEET 1 OF 2

| Size: | Date: | Drawn By: | Designed By: | Checked By: |
|---|---|---|---|---|
| A1 | 08.06.21 | CS | CS | CD |
| Scale: NTS | | | | |

| Project No: | Originator: | Volume: | Level: | Type: | Role: | Category / Number: | Rev: |
|---|---|---|---|---|---|---|---|
| TIS | - CUR - | XX - | ZZ - | DR - | C - | 5232 | - C03 |

\\ma-fs-1\Projects\070001 - 071000\070398 - Island Site, Manchester\Q4-Production\A-Models-Drawings\C\CAD\20

# Appendix B

Section 106 United Utilities Approvals


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# S106 Part 1 'Application to connect to a public sewer' Approval Notice

| | |
|---|---|
| | **02809587** |
| **Applicant details** | |
| Applicant name | **J ENNIFER WOOD** |
| Applicant address *(including postcode)* | **BOWMER AND KIRKLAND**<br>**1ST FLOOR, ALTITUDE, ATLAS BUSINESS PARK**<br>**M22 5PR** |
| Applicant email | **J.WOOD@BANDK.CO.UK** |
| **Site details:** The site / property which is proposed for connection to the public sewer | |
| | **The Island Site, John Dalton Street, Manchester, M2 6FW**<br><br>**PROPOSED MANHOLE C01 Foul and SW** |

# APPROVED

**Your application for connection to the public sewer has been approved, to be made via a new connection:**

| | | |
|---|---|---|
| **To a private drain** | ☐ | You may appoint your contractor and advise your appointed building control body (who should inspect the work).<br>United Utilities should be advised when this work is complete. |
| **Direct to the public sewer** | ☒ | **Further action required**<br><br>You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer.<br>(The S106 Part 2 application form **'Request for permission to work on a public sewer'** is available on our website; unitedutilities.com). |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mode of connection approved | **New manhole** | | | | | |
| Sewer connection type | Foul | ☒ | Surface water | ☒ | Combined | ☐ |

This approval is valid for 12 months from the date below.
This approval does not grant access to third party land, permission should be sought if required between applicant and land owner
If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.

**Comments**

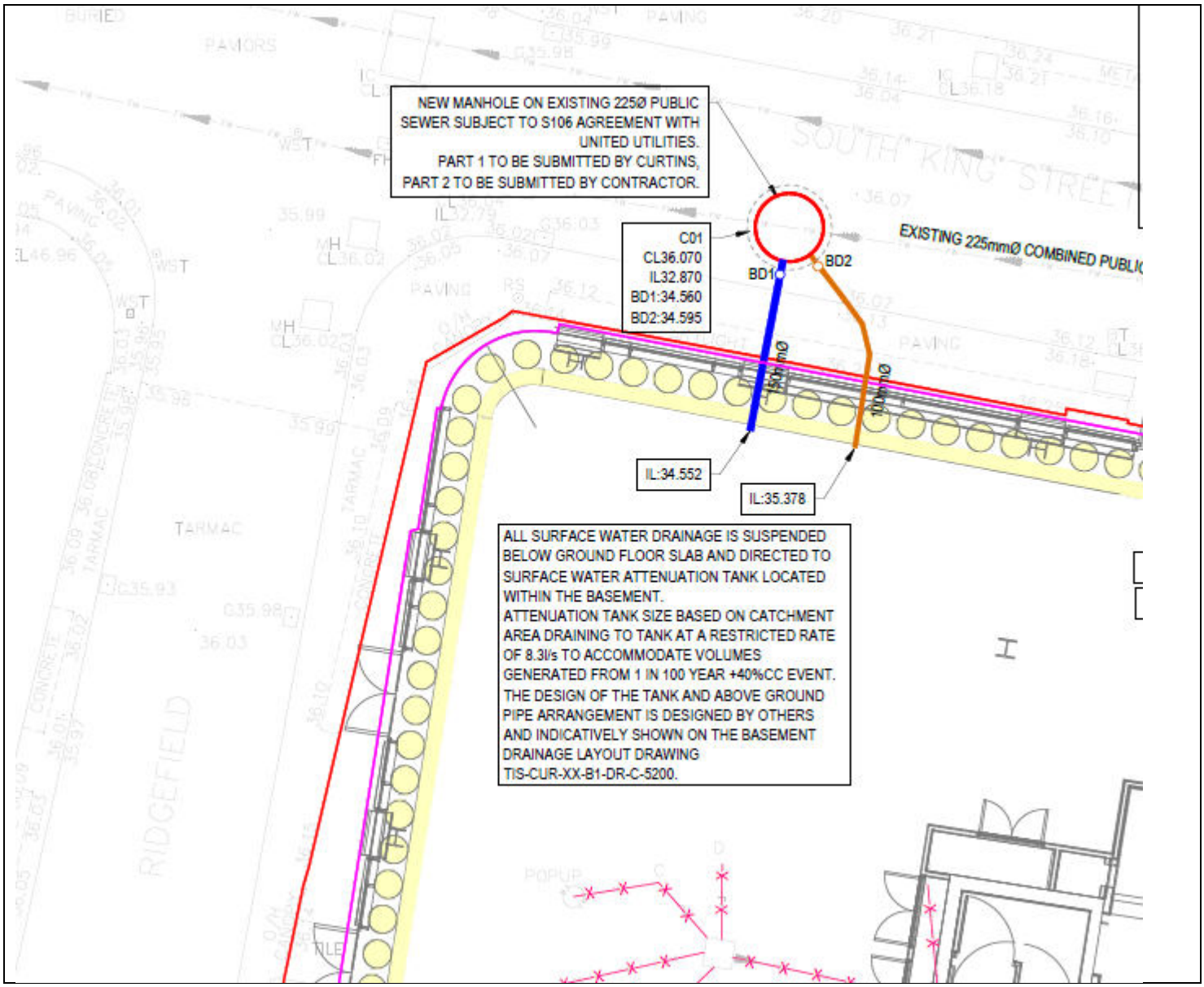
Approval for the 100mm foul connection and the 150mm surface water connection to the existing 300mm combined sewer in South King Street via a new manhole indicated a C01 on your drainage below

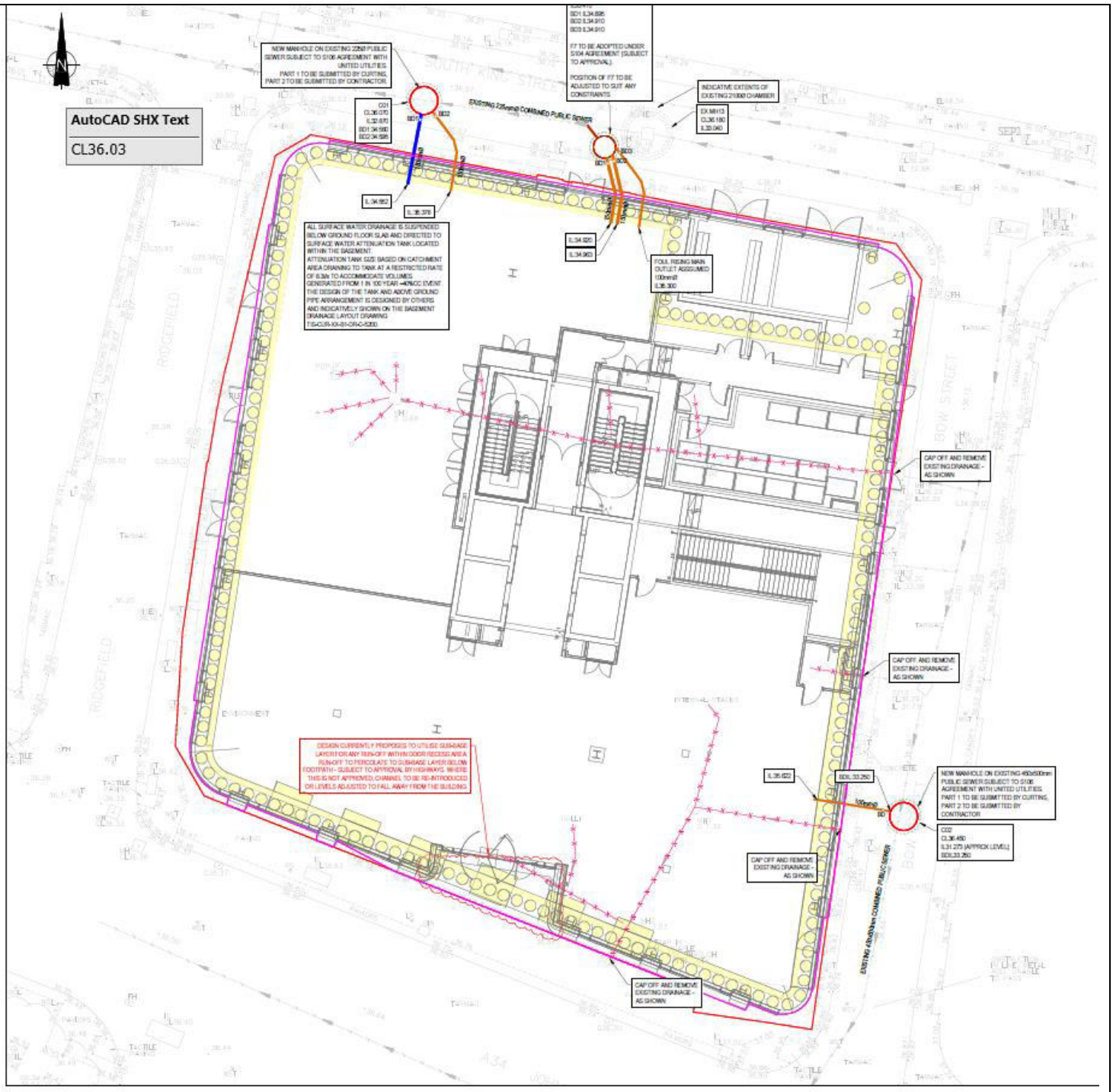
Surface water flow control restricted to 8.3l/s

The new manhole must be constructed in line with United Utilities standard details with the appropriate openings, ring size, benching/pipe configuration, channels and landing. Please ensure a plan of your proposals is submitted with your contractors Part 2 application

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developers responsibility to confirm that it communicates with the Public Sewer
Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.


NEW MANHOLE ON EXISTING 225Ø PUBLIC SEWER SUBJECT TO S106 AGREEMENT WITH UNITED UTILITIES.
PART 1 TO BE SUBMITTED BY CURTINS,
PART 2 TO BE SUBMITTED BY CONTRACTOR.
C01
CL36.070
IL32.870
BD1:34.560
BD2:34.595
BD1
BD2
EXISTING 225mmØ COMBINED PUBLIC
150mmØ
100mmØ
IL:34.552
IL:35.378
ALL SURFACE WATER DRAINAGE IS SUSPENDED BELOW GROUND FLOOR SLAB AND DIRECTED TO SURFACE WATER ATTENUATION TANK LOCATED WITHIN THE BASEMENT.
ATTENUATION TANK SIZE BASED ON CATCHMENT AREA DRAINING TO TANK AT A RESTRICTED RATE OF 8.3l/s TO ACCOMMODATE VOLUMES GENERATED FROM 1 IN 100 YEAR +40%CC EVENT.
THE DESIGN OF THE TANK AND ABOVE GROUND PIPE ARRANGEMENT IS DESIGNED BY OTHERS AND INDICATIVELY SHOWN ON THE BASEMENT DRAINAGE LAYOUT DRAWING TIS-CUR-XX-B1-DR-C-5200.
SOUTH KING STREET
TARMAC
RIDGEFIELD




| | |
|---|---|
| **Development Support Technician** | **Lynne Berry** |
| **Contact number** | **07881 034558** |
| **Date** | **19/10/2022** |

# S106 Part 1 'Application to connect to a public sewer' Approval Notice

| | |
|---|---|
| | **02809686** |
| **Applicant details** | |
| Applicant name | **J ENNIFER WOOD** |
| Applicant address *(including postcode)* | **BOWMER AND KIRKLAND**<br>**1ST FLOOR, ALTITUDE, ATLAS BUSINESS PARK**<br>**M22 5PR** |
| Applicant email | **J.WOOD@BANDK.CO.UK** |
| **Site details:** The site / property which is proposed for connection to the public sewer | |
| | **The Island Site, John Dalton Street, Manchester, M2 6FW**<br><br>**CONNECTION MANHOLE C02 Foul only** |

# APPROVED

**Your application for connection to the public sewer has been approved, to be made via a new connection:**

| | | |
|---|---|---|
| **To a private drain** | ☐ | You may appoint your contractor and advise your appointed building control body (who should inspect the work).<br>United Utilities should be advised when this work is complete. |
| **Direct to the public sewer** | ☒ | **Further action required**<br><br>You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer.<br>(The S106 Part 2 application form **'Request for permission to work on a public sewer'** is available on our website; unitedutilities.com). |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mode of connection approved | **New manhole** | | | | | |
| Sewer connection type | Foul | ☒ | Surface water | ☐ | Combined | ☐ |

This approval is valid for 12 months from the date below.
This approval does not grant access to third party land, permission should be sought if required between applicant and land owner
If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.

**Comments**

Approval for the 100mm foul only connection to the existing 450mm combined sewer in Bow Street via a new manhole

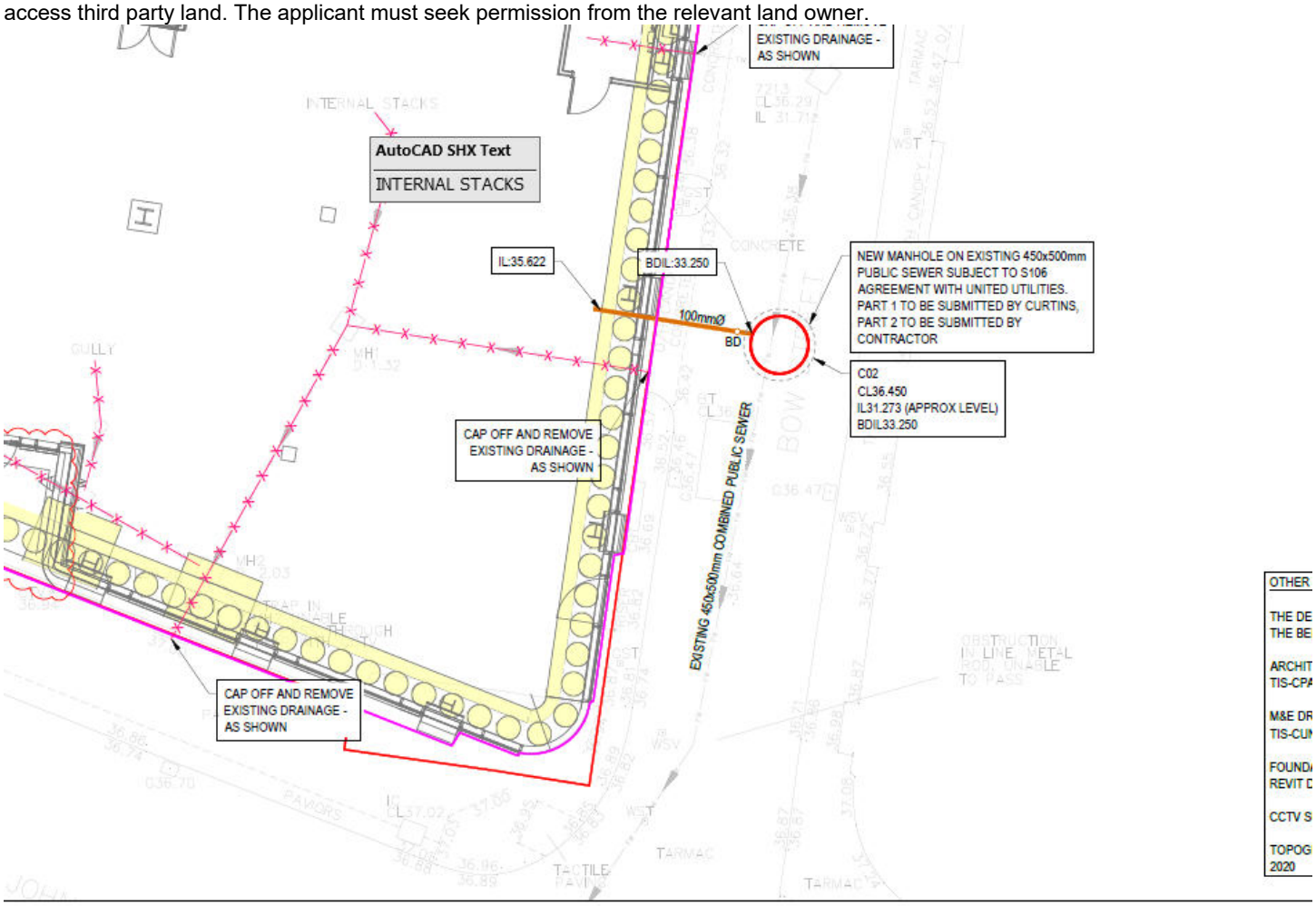
Indicated as C02 on your drainage plan below

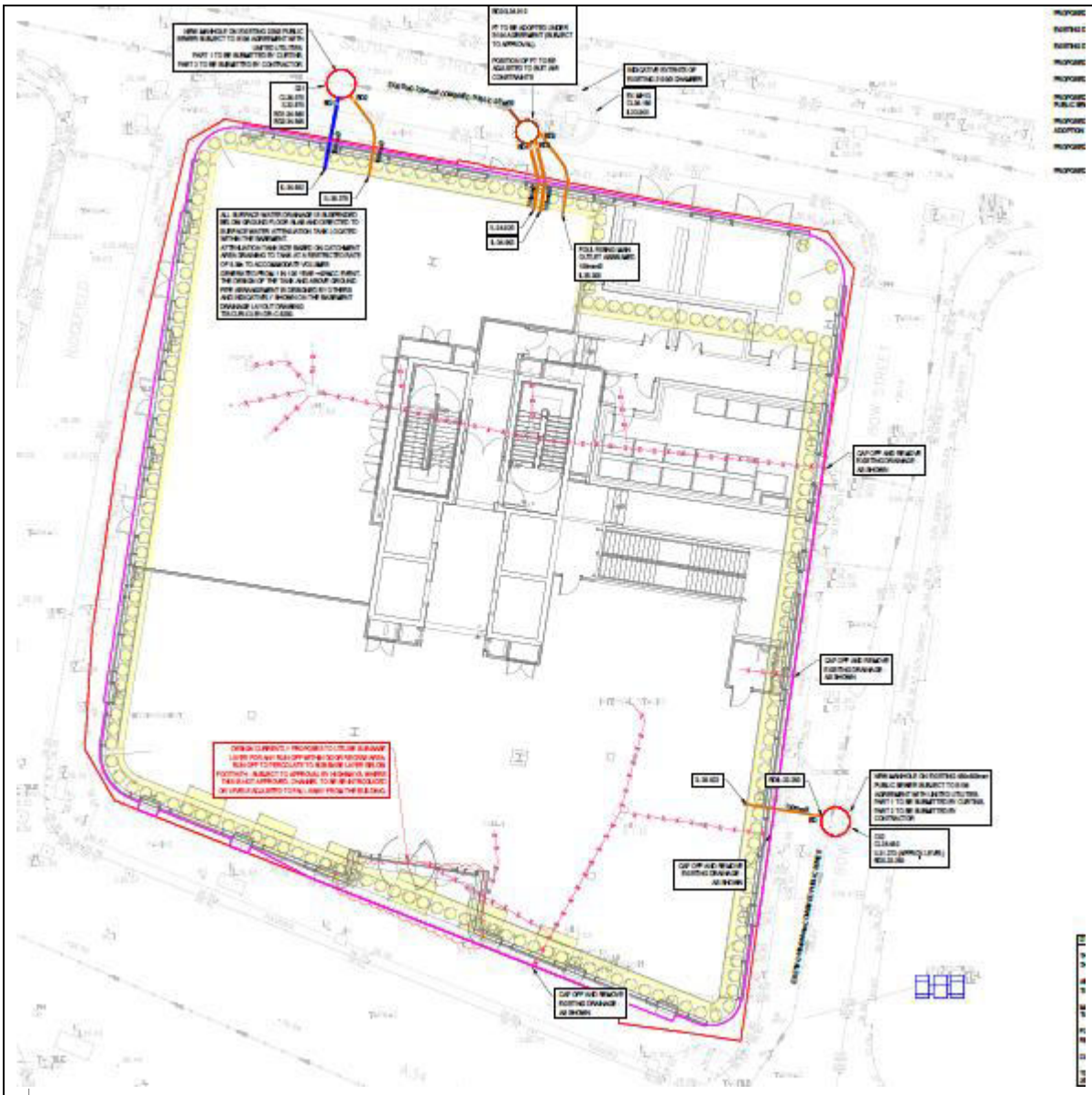
The new manhole must be constructed in line with United Utilities standard details with the appropriate openings, ring size, benching/pipe configuration, channels and landing. Please ensure a plan of your proposals is submitted with your contractors Part 2 application

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developers responsibility to confirm that it communicates with the Public Sewer

Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.





| | |
|---|---|
| **Development Support Technician** | **Lynne Berry** |
| **Contact number** | **07881 034558** |
| **Date** | **19/10/2022** |

# S106 Part 1 'Application to connect to a public sewer' Approval Notice

| | |
|---|---|
| **United Utilities Reference Number:** | **03751790** |
| **Applicant details** | |
| Applicant name | **JENNIFER WOOD** |
| Applicant address *(including postcode)* | **BOWMER AND KIRKLAND**<br>**1st Floor, Altitude**<br>**Atlas Business Park**<br>**M22 5PR** |
| Applicant email | **J.WOOD@BANDK.CO.UK** |
| **Site details:** The site / property which is proposed for connection to the public sewer | |
| Site address *(including postcode)* | **The Island Site, John Dalton Street, Manchester, M2 6FW**<br>**CONNECTION VIA EXG MH13** |

# APPROVED

**Your application for connection to the public sewer has been approved, to be made via a new connection:**

| | | |
|---|---|---|
| **To a private drain** | ☐ | You may appoint your contractor and advise your appointed building control body (who should inspect the work).<br>United Utilities should be advised when this work is complete. |
| **Direct to the public sewer** | ☒ | **Further action required**<br><br>You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer.<br>(The S106 Part 2 application form **'Request for permission to work on a public sewer'** is available on our website; unitedutilities.com). |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mode of connection approved | **Connection into existing manhole** | | | | | |
| Sewer connection type | Foul | ☒ | Surface water | ☐ | Combined | ☐ |

This approval is valid for 12 months from the date below.
This approval does not grant access to third party land, permission should be sought if required between applicant and land owner
If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.

**Comments**

Approval granted for 2x150mm foul connections to the existing 300mm combined sewer in South King Street via an existing UUMH 7201 referenced as MH13 on your drainage plan below referenced – TIS-CUR-XX-00-DR-C-5201-C03

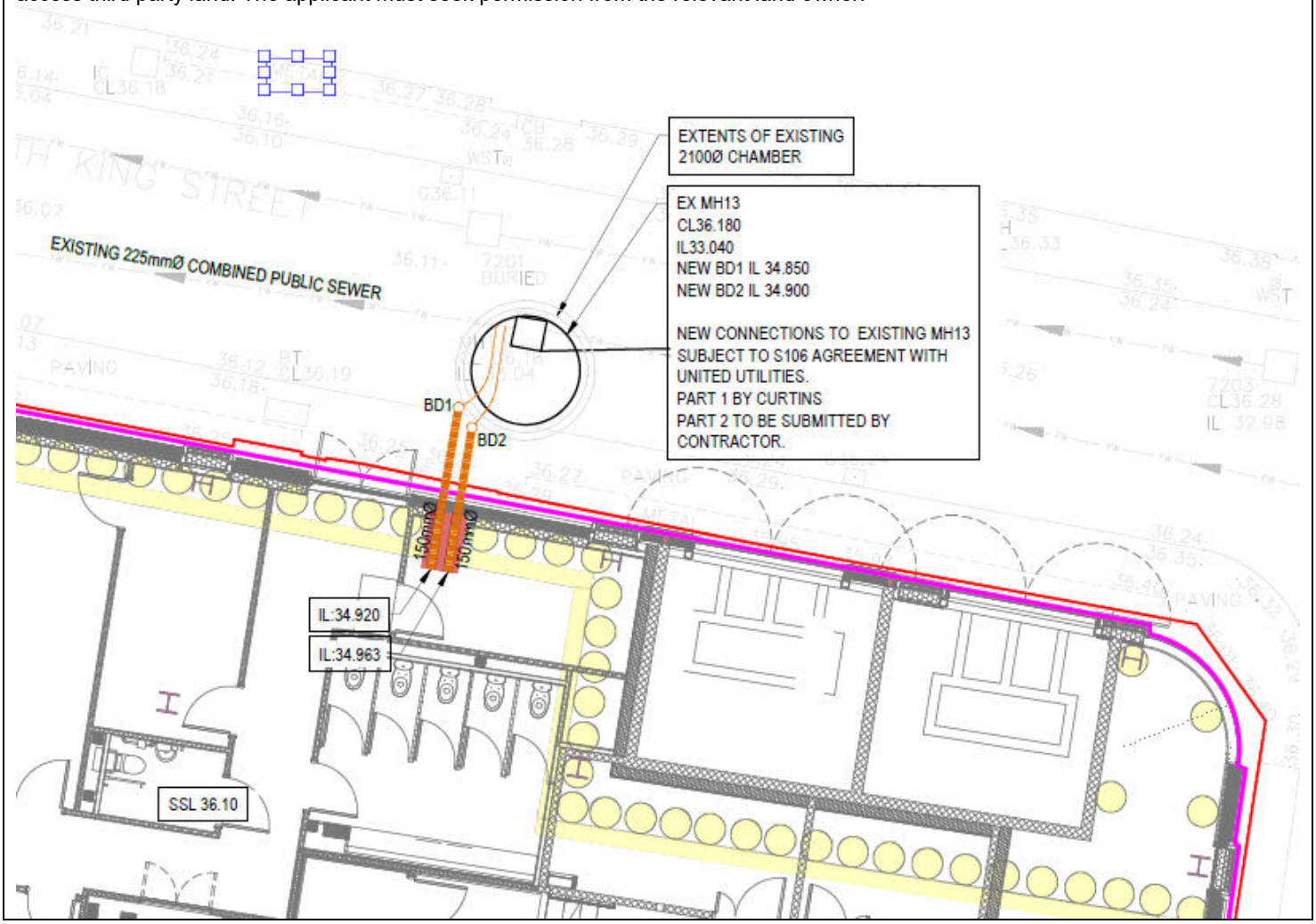
(the sewer is indicated as a 225mm combined on the submitted drainage plan UU sewer records have this mapped as a 300mm )

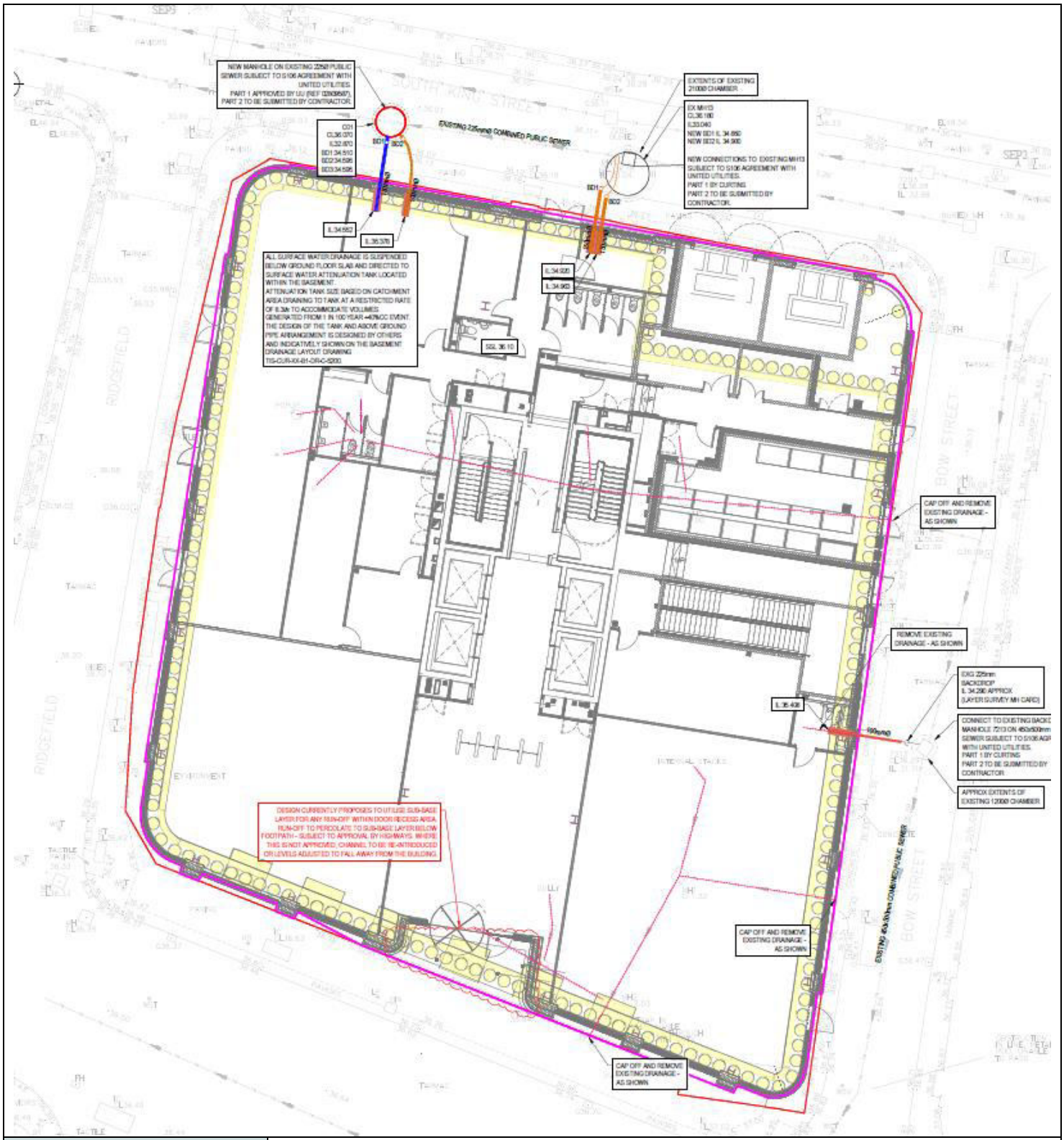
Please ensure there is a good swept bend into the manhole due to the angle of the connections.

Any connection to an existing manhole should be made soffit to soffit, with a swept bend in the direction of flow. The connection must not be made in the landing area. The exact condition, location and depth of the existing manhole and surrounding services should be established as early as possible to avoid site delays. If the existing manhole is in poor condition but otherwise the connection would be acceptable, the applicant should be aware they may have to rebuild/renew the manhole if it deteriorates as a result of your contractor working on or near it.

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developer's responsibility to confirm that it communicates with the Public Sewer.
Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.






| | |
|---|---|
| **Developer Services Inspector** | **Lynne Berry** |
| **Contact number** | **07881 034558** |
| **Date** | **28/03/2023** |

# United Utilities Inspection Notice

***This form is to confirm a new connection has been made to an existing public sewer under Section 106 of the Water Industry Act 1991***

Water for the North West

| **Site details:** Details of the site or premise that have been connected to the public sewer | |
|---|---|
| United Utilities notification reference (EC/NC/SC/WC) | 3929817 |
| Site address | THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW |
| Development type | New property |

| Contractor Details | | | |
|---|---|---|---|
| Contractor name / Company Name | PP O'CONNOR | | |
| Contractor Email Addess | STEVE.FITZSIMONS@PPOCONNOR.CO.UK | | |
| Works Supervisor | STEPHEN FITZSIMONS | | |
| Confirm sewer 'log on' & 'log off' procedure followed | Yes ☑ | No ☐ | |

| Principal Contractor Details (if applicable) | |
|---|---|
| Company name (if applicable) | BOWMER & KIRKLAND |
| Name of Contact for Project | DANIEL JAMISON |
| Email Address | D.JAMISON@BANDK.CO.UK |
| Number of site inspections conducted by United Utilities | 1 |

| Connection details | | | |
|---|---|---|---|
| Sewer connection type | Foul & Surface water | | |
| Foul sewer pipesize diameter | 100mm | | |
| Connecting into: | exisitng manhole | Existing Sewer Type | Combined |
| Connecting to asset: | combined sewer | | |
| Surface Water sewer pipesize diameter | 150mm | | |
| Connecting into: | exisitng manhole | Existing Sewer Type | Combined |
| Connecting to asset: | combined sewer | | |
| Connection Location | THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW | | |

| Outcome | |
|---|---|
| Connection status | Satisfactory |

**Comments**

I can confirm that the Foul Sewer connection is SATISFACTORY - 100mm Foul Sewer connecting into the exisitng manhole Combined connected via combined sewer in THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW

I can confirm that the Surface Water Sewer connection is SATISFACTORY - 150mm Surface Water Sewer connecting into the exisitng manhole Combined connected via combined sewer in THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW

Approved: I confirm the sewer connection detailed above has been satifactorily completed and inspected

| | |
|---|---|
| Developer Services Inspector | Marcus Jones |
| Date of Inspection | 23/06/2023 |

# United Utilities Inspection Notice

***This form is to confirm a new connection has been made to an existing public sewer under Section 106 of the Water Industry Act 1991***

Water for the North West

| **Site details:** Details of the site or premise that have been connected to the public sewer | |
|---|---|
| United Utilities notification reference (EC/NC/SC/WC) | 3929498 |
| Site address | THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW |
| Development type | New property |

| **Contractor Details** | | | |
|---|---|---|---|
| Contractor name / Company Name | PP O'CONNOR | | |
| Contractor Email Addess | STEVE.FITZSIMONS@PPOCONNOR.CO.UK | | |
| Works Supervisor | STEPHEN FITZSIMONS | | |
| Confirm sewer 'log on' & 'log off' procedure followed | Yes ☑ | No ☐ | |

| **Principal Contractor Details (if applicable)** | |
|---|---|
| Company name (if applicable) | BOWMER & KIRKLAND |
| Name of Contact for Project | DANIEL JAMISON |
| Email Address | D.JAMISON@BANDK.CO.UK |
| Number of site inspections conducted by United Utilities | 1 |

| **Connection details** | | | |
|---|---|---|---|
| Sewer connection type | Foul | | |
| Foul sewer pipesize diameter | 2x150mm | | |
| Connecting into: | exisitng manhole 7201 | Existing Sewer Type | Combined |
| Connecting to asset: | combined sewer | | |
| Connection Location | THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW | | |

| **Outcome** | |
|---|---|
| Connection status | Satisfactory |

| **Comments** |
|---|
| I can confirm that the Foul Sewer connection is SATISFACTORY - 2x150mm Foul Sewer connecting into the exisitng manhole 7201 Combined connected via combined sewer in THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW |

Approved: I confirm the sewer connection detailed above has been satifactorily completed and inspected

| | |
|---|---|
| Developer Services Inspector | Marcus Jones |
| Date of Inspection | 23/06/2023 |

# United Utilities Inspection Notice

***This form is to confirm a new connection has been made to an existing public sewer under Section 106 of the Water Industry Act 1991***

Water for the North West

| **Site details:** Details of the site or premise that have been connected to the public sewer | |
|---|---|
| United Utilities notification reference (EC/NC/SC/WC) | 3929988 |
| Site address | THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW |
| Development type | New property |

| **Contractor Details** | | | |
|---|---|---|---|
| Contractor name / Company Name | PP O'CONNOR | | |
| Contractor Email Addess | STEVE.FITZSIMONS@PPOCONNOR.CO.UK | | |
| Works Supervisor | STEPHEN FITZSIMONS | | |
| Confirm sewer 'log on' & 'log off' procedure followed | Yes ☑ | No ☐ | |

| **Principal Contractor Details (if applicable)** | |
|---|---|
| Company name (if applicable) | BOWMER & KIRKLAND |
| Name of Contact for Project | DANIEL JAMISON |
| Email Address | D.JAMISON@BANDK.CO.UK |
| Number of site inspections conducted by United Utilities | 1 |

| **Connection details** | | | |
|---|---|---|---|
| Sewer connection type | Foul | | |
| Foul sewer pipesize diameter | 100mm | | |
| Connecting into: | combined sewer | Existing Sewer Type | Combined |
| Connecting to asset: | Existing manhole 7213 | | |
| Connection Location | BOW STREET THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW | | |

| **Outcome** | |
|---|---|
| Connection status | Satisfactory |

| **Comments** |
|---|
| I can confirm that the Foul Sewer connection is SATISFACTORY - 100mm Foul Sewer connecting into the combined sewer Combined connected via Existing manhole 7213 in BOW STREET THE ISLAND, JOHN DALTON ST, MANCHESTER, M2 6FW |

Approved: I confirm the sewer connection detailed above has been satifactorily completed and inspected

| | |
|---|---|
| Developer Services Inspector | Marcus Jones |
| Date of Inspection | 28/07/2023 |

# Appendix C

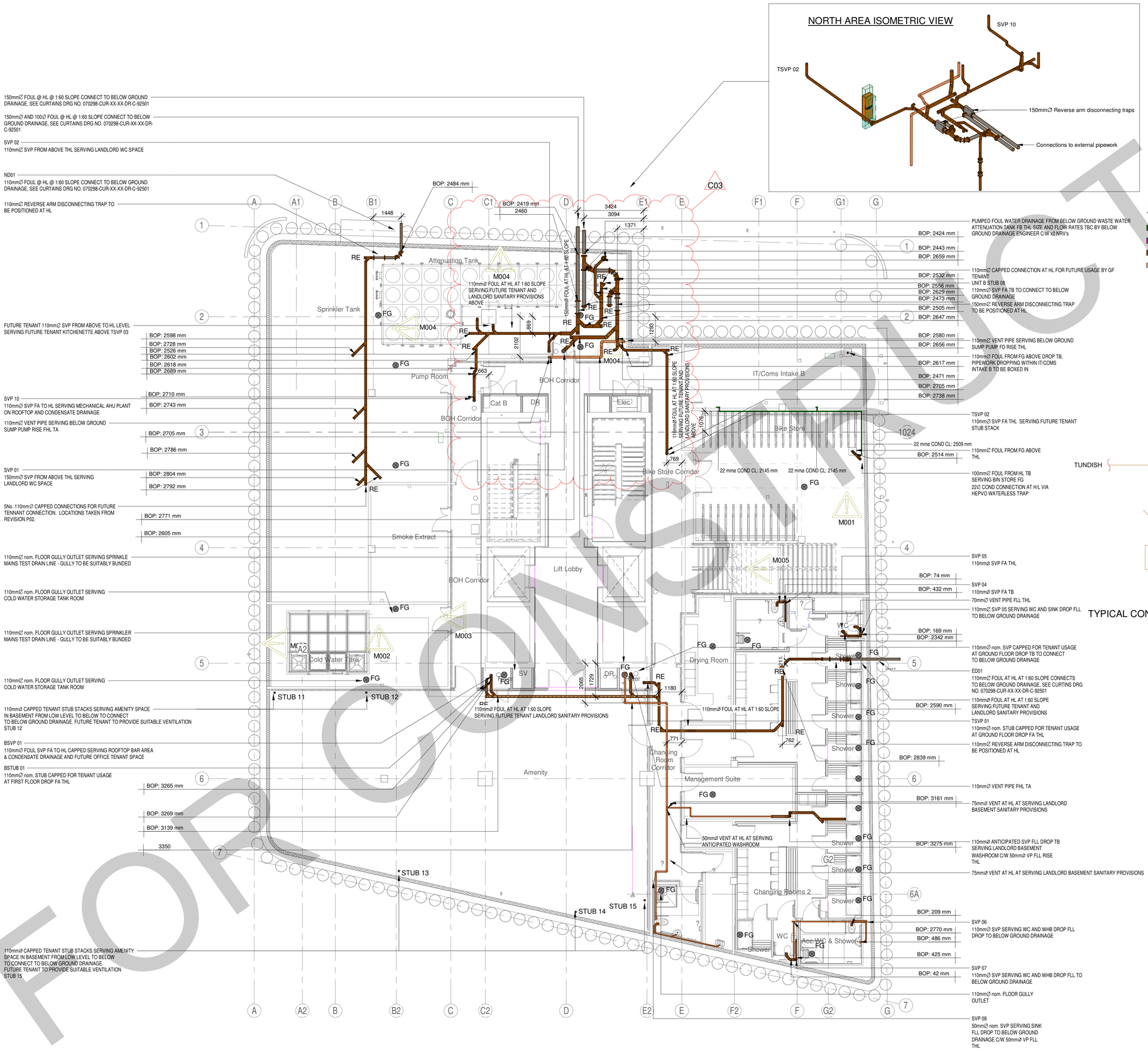
Attenuation Tank Details


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Rev C03

Drawing No. TIS-NGB-ZZ-B1-DR-P-5200

16/05/2024 13:37:59 Autodesk Docs://The Island/TIS-NGB-00-XX-M3-N-0001_Latest.rvt




## DRAINAGE LEGEND

- COND
- RWP
- FOUL
- VP

## PIPEWORK ABBREVIATIONS

| | |
|---|---|
| COND | CONDENSATE |
| RWP | RAINWATER |
| SAN | SANITARY |
| VP | VENT |
| SVP | SOIL VENT PIPE |
| STUB | STUB STACK |
| FA | FROM ABOVE |
| FHL | FROM HIGH LEVEL |
| FB | FROM BELOW |
| TA | TO ABOVE |
| THL | TO HIGH LEVEL |
| TB | TO BELOW |
| FG | FLOOR GULLY |
| RE | RODDING EYE |
| BOP | BOTTOM OF PIPE |




TYPICAL CONDENSATE ARRANGEMENT

bsi. BIM Design and Construction KITEMARK™ KM 674832

SAFETY First & Foremost

## SAFETY, HEALTH & ENVIRONMENTAL INFORMATION

For details of site wide and general risks to be read in conjunction with these notes, refer to the following documents:

No specific SHE risks have been identified for the contents of this drawing.

1. 1.THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL, ARCHITECTURAL AND CONSULTANTS INFORMATION AND DRAWINGS.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE SERVICES DESCRIPTION.
3. DO NOT SCALE FROM THIS DRAWING.
4. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE FOUL DRAINAGE SCHEMATIC FOR P1 THE ISLAND SITE.
5. ALL DIMENSIONS IN mm., UNLESS OTHERWISE STATED.
6. THIS DRAWING ILLUSTRATES THE CONCEPT ENGINEERING SERVICES INSTALLATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DEVELOP AND PRODUCE DETAILED WORKING AND CO-ORDINATED DRAWINGS.
7. THE INSTALLATION SHALL INCORPORATE SUITABLE MEASURES TO ACCOMMODATE THERMAL MOVEMENT AND EXPANSION.
8. AIR ADMITTANCE VALVES TO BE MOUNTED AT 1250mm min AFFL OR ABOVE THE LEVEL OF THE HIGHEST FITTING SERVED FLOOD LEVEL, THE VALVES SHALL COMPLY WITH BS EN 12380-A1 CLASSIFICATION, AND ARE PERMITTED IN THEIR USE WHERE TRADITIONAL VENTILATION DISCHARGING TO ATMOSPHERE IS NOT INCORPORATED INTO THE SYSTEM.
9. WHERE AIR ADMITTANCE VALVES ARE INSTALLED WITHIN SANITARY FITTING BACKPANELLING, PROVISION SHALL BE MADE FOR VENTILATION OF THE SANITARYWARE MOUNTING PANEL.
10. ALL FLOOR GULLIES ARE TO BE PROVIDED WITH REMOVABLE BASKETS FOR CLEANING AND MAINTENANCE.
11. ALL METALLIC SYSTEMS WILL BE CONTINUITY BONDED OR MECHANICAL COUPLINGS SUPPLIED WITH INTEGRAL ELECTRICAL CONTINUITY NIBS AND TESTED TO ENSURE EARTH CONTINUITY IN ACCORDANCE WITH THE BRITISH STANDARD AND THIS SPECIFICATION.
12. ALL TRAPS MUST RETAIN NOT LESS THAN 25mm OF SEAL WHEN SUBJECTED TO THE APPROPRIATE DISCHARGE TESTS, BS EN 12056 NG.3.2.1 GENERAL REFERS.
13. WHERE OPEN ENDS OF PIPE, FITTINGS ETC., ARE LEFT EXPOSED DURING THE PROGRESS OF WORK AND PRIOR TO COMPLETION, THEN A SUITABLE PLUG OR CAP WILL BE TEMPORARILY BUT FIRMLY FIXED TO SUCH OPEN ENDS AS TO PREVENT THE INGRESS OF ANY FOREIGN MATTER.
14. VENTILATING PIPES WHICH WILL FINALLY TERMINATE TO ATMOSPHERE WILL TERMINATE WITH A VENT COWL OR BALLOON GUARD, 900mm VERTICALLY AND/OR 3000mm HORIZONTALLY FROM THE NEAREST OPENING INTO THE BUILDING OR FRESH AIR INTAKE IN ACCORDANCE WITH THE BUILDING REGULATIONS AND BS EN 12056.
15. PROVIDE AND INSTALL ON ALL PLASTIC PIPEWORK PASSING THROUGH FIRE COMPARTMENT FLOORS OR WALLS AND EXCEEDING 40mm INTERNAL DIAMETER A 2 HOUR RATED INTUMESCENT FIRESLEEVE HAVING AN APPROPRIATE AGRÉMENT CERTIFICATE AND FIRE RATING COMPATIBLE WITH THE WALL, FLOOR OR CAVITY BARRIER TO WHICH IT IS FITTED.
16. ACCESS PANELS ARE TO BE PROVIDED ON ALL SVP/WASTE STACKS AT EACH FLOOR LEVEL ABOVE SPILL OVER LEVEL OF THE SANITARY FITTINGS BEING SERVED; THESE SHOULD BE A MIN OF 1350mm AFFL.
17. RODDING EYES ARE TO BE PROVIDED AT ENDS OF ALL DRAIN PIPE RUNS AND AT CHANGES IN DRAINAGE PIPEWORK DIRECTION.
18. WHERE DRAINAGE PIPEWORK IS CONCEALED WITHIN SERVICE DUCTS/WALLS, ACCESS PANELS ARE TO BE PROVIDED FOR FULL ACCESS TO RODDING EYES.
19. SHOWER GULLIES TO BE TRAPPED TOP ACCESS TYPES.
20. REFER TO STRUCTURES/CIVILS DRAWINGS FOR DETAILS, SETTING OUT AND SPECIFICATION OF CAST-IN FLOOR GULLIES AND CHANNELS.

| Rev | Description | Date |
|---|---|---|
| C03 | Changes to suit height of external drainage pipes | 16/05/24 |
| C02 | Management Suite/All Gender WC Incorporated | 27/11/23 |
| C01 | CONTRACT ISSUE | 09/06/23 |


NG Bailey

6th Floor, 5 Exchange Quay, Salford, M5 3EF.
Tel: 0161 872 0171


Client: THE ISLAND SITE (GENERAL PARTNER) LIMITED

Contract: The Island Site

Design Manager:

Checked By: M Brannick

Title: Above Ground Drainage Layout Level B1

Drawn By: S Mitchell

Issue Date: 16/05/24

Status: A3 - Approved & Accepted

Scale: 1 : 100

Sheet Size: A1

Rev: C03

Drawing No. TIS-NGB-ZZ-B1-DR-P-5200

[Project Code] [Originator] [Zone] [Level] [Type] [Role] [Number]


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FOR CONSTRUCTION

| | | | |
|---|---|---|---|
| **Project Title** | The Island Site- HBD | | |
| **Project Number** | 1020044 | | |
| **Schedule Title** | Attenuators | **Page no.** | 1 of 2 |

| Revision | Date | Stage/ Purpose of issue |
|---|---|---|
| **P01** | 09/12/2022 | Stage 4 100% Issue |
| **C01** | 25/10/2023 | Contract Issue |
| | | |
| | | |

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| | |
|---|---|
| **Schedule Number** | TIS-NGB-ZZ-XX-SH-M-2002 |

| **Preferred equipment manufacturers** |
|---|
| www.allawayacoustics.co.uk |
| www.iac-noisecontrol.com |
| www.caice.co.uk |
| www.troxuk.co.uk |
| |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Reference** | | | **AT-A1-01** | **AT-A1-02** | **AT-A1-03** | **AT-A1-04** | **AT-A2-01** | **AT-A2-02** | **AT-A2-03** | **AT-A2-04** |
| **General** | Number required | # | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Ass. AHU Reference | | AHU.01 | AHU.01 | AHU.01 | AHU.01 | AHU.02 | AHU.02 | AHU.02 | AHU.02 |
| | Ass. CAV/VAV Reference | | | | | | | | | |
| | Location | | Roof | Roof | Roof | Roof | Roof | Roof | Roof | Roof |
| **Sourcing** | Manufacturer | *(Note 3)* | Caice | Caice | Caice | Caice | Caice | Caice | Caice | Caice |
| **Type** | Shape | | R | R | R | R | R | R | R | R |
| | Room/ atmos./ xtalk | *R/A/X* | A | A | R | R | A | A | R | R |
| | Internal/ external | *I/E* | E | E | E | E | E | E | E | E |
| **Dimensions** | Length | *mm* | 1800 | 1800 | 2100 | 2100 | 1800 | 1800 | 2100 | 2100 |
| | Width (dia) | *mm* | 2800 | 2800 | 1700 | 1625 | 1075 | 3000 | 1625 | 1625 |
| | Height | *mm* | 1600 | 1600 | 1550 | 1575 | 1975 | 1600 | 1325 | 1275 |
| | Operating weight | *kg* | | | | | | | | |
| **Duty** | Air volume | *$m^3/s$* | 8.7 | 8.4 | 8.7 | 8.4 | 7.05 | 6.8 | 7.05 | 6.8 |
| | Max. pressure drop | *Pa* | | | | | | | | |
| **Noise Levels** | Room noise level | *NR* | | | 38 | 38 | | | 38 | 38 |
| | External noise level | *NR* | 46 | 46 | | | 46 | 46 | | |
| | | *(Note 5)* | | | | | | | | |
| **Dyn. Insertion Loss** *(mid-octave band)* | 63Hz/ 125Hz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm |
| | 250Hz/ 50Hz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm |
| | 1kHz/ 2kHz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm |
| | 4kHz/ 8kHz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm |
| **Materials** | Casing | | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel |
| | Pods | | N | N | N | N | N | N | N | N |
| | Splitters | | Y | Y | Y | Y | Y | Y | Y | Y |
| | Pressure & leakage class. | | Y | Y | Y | Y | Y | Y | Y | Y |
| **Special Features** | Melinex lined | *Y/N* | Y | Y | Y | Y | Y | Y | Y | Y |
| | Protective finish to external casing | *Y/N* | Y | Y | Y | Y | Y | Y | Y | Y |
| | Aerodynamic bull-nose splitter | *Y/N* | N | N | N | N | N | N | N | N |
| **Air Conditions** | Maximum temperature | *°C* | | | | | | | | |
| | Minimum temperature | *°C* | | | | | | | | |
| | Condition | | | | | | | | | |
| **Comments/ other** | Fire rated | *Y/N* | N | N | N | N | N | N | N | N |

**Notes:**

1) Contractor to verify final manufacturer's dimensions, interfaces and access requirements against site constraints for installation and co-ordination of maintenance access before placing any order.
2) Read and apply this schedule with all relevant project documentation.
3) System designs are based upon the listed manufacturer. If alternatives are proposed the contractor is to re-select , making allowance for the re-design of associated plant and equipment, including calculation of SFPs and the like.
4) Contractor to re-select using working drawings and final manufacturer of all selected central plant to achieve noise criteria for each room. Contractor to refer to specification for details.
5) Noise levels quoted are for guidance only and should be verified by reference to the specification and/or acoustic report. Note in particular that where more than one room/area is served by a system the room noise level may vary.
6) Kitchen attenuators (supply & extract) to be Melinex lined and suitable for grease laden air
7) Schedules are superseded by Tech Subs
8) Attenuators to be manufactured to DW144, classification as stated in schedule.

FOR CONSTRUCTION

Cundall Johnston & Partners LLP
4th Floor, 15 Colmore Row, Birmingham, B3 2BH, United Kingdom, Tel:+44 (0)121 262 2720
Asia Australia Europe MENA UK and Ireland
www.cundall.com

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| | |
|---|---|
| **Project Title** | The Island Site- HBD |
| **Project Number** | 1020044 |
| **Schedule Title** | Attenuators |
| **Page no.** | 2 of 2 |

| Revision | Date | Stage/ Purpose of issue |
|---|---|---|
| P01 | 09/12/2022 | Stage 4 100% Issue |
| C01 | 25/10/2023 | Contract Issue |
| | | |
| | | |

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| | |
|---|---|
| **Schedule Number** | TIS-NGB-ZZ-XX-SH-M-2002 |

| **Preferred equipment manufacturers** |
|---|
| www.allawayacoustics.co.uk |
| www.iac-noisecontrol.com |
| www.caice.co.uk |
| www.troxuk.co.uk |
| |

| **Reference** | | | **AT-A3-01** | **AT-A3-02** | **AT-A3-03** | **AT-A3-04** | **AT-EF1-01** | **AT-EF1-02** | **CT-L1-01 - CT-L9-01** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **General** | Number required | # | 1 | 1 | 1 | 1 | 1 | 1 | 9 | |
| | Ass. AHU Reference | | AHU.03 | AHU.03 | AHU.03 | AHU.03 | EF.01 | EF.01 | | |
| | Ass. CAV/VAV Reference | | | | | | | | | |
| | Location | | Roof | Roof | Roof | Roof | Roof | Roof | | |
| **Sourcing** | Manufacturer | *(Note 3)* | Caice | Caice | Caice | Caice | Caice | Caice | Caice | |
| **Type** | Shape | | R | R | R | R | R | R | C | |
| | Room/ atmos./ xtalk | *R/A/X* | A | A | R | R | A | R | R | |
| | Internal/ external | *I/E* | E | E | E | E | E | E | I | |
| **Dimensions** | Length | *mm* | 1200 | 1200 | 1200 | 1200 | 900 | 1200 | 600 | |
| | Width (dia) | *mm* | 1975 | 1975 | 1200 | 1200 | 575 | 350 | 300 | |
| | Height | *mm* | 600 | 600 | 975 | 975 | 350 | 575 | | |
| | Operating weight | *kg* | | | | | | | | |
| **Duty** | Air volume | *m³/s* | 2.5 | 2.5 | 2.5 | 2.5 | 0.64 | 0.64 | 0.06 | |
| | Max. pressure drop | *Pa* | | | | | | | | |
| **Noise Levels** | Room noise level | *NR* | | | 50 | 50 | | 50 | 45 | |
| | External noise level | *NR* | 46 | 46 | | | 46 | | | |
| | | *(Note 5)* | | | | | | | | |
| **Dyn. Insertion Loss** *(mid-octave band)* | 63Hz/ 125Hz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | |
| | 250Hz/ 50Hz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | |
| | 1kHz/ 2kHz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | |
| | 4kHz/ 8kHz | *dB* | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | Manufacturer to confirm | |
| **Materials** | Casing | | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | Galvanised Steel | |
| | Pods | | N | N | N | N | N | N | N | |
| | Splitters | | Y | Y | Y | Y | Y | Y | Y | |
| | Pressure & leakage class. | | Y | Y | Y | Y | Y | Y | Y | |
| **Special Features** | Melinex lined | *Y/N* | Y | Y | Y | Y | Y | Y | Y | |
| | Protective finish to external casing | *Y/N* | Y | Y | Y | Y | Y | Y | Y | |
| | Aerodynamic bull-nose splitter | *Y/N* | N | N | N | N | N | N | N | |
| **Air Conditions** | Maximum temperature | *°C* | | | | | | | | |
| | Minimum temperature | *°C* | | | | | | | | |
| | Condition | | | | | | | | | |
| **Comments/ other** | Fire rated | *Y/N* | N | N | N | N | N | N | N | N |

**Notes:**

1) Contractor to verify final manufacturer's dimensions, interfaces and access requirements against site constraints for installation and co-ordination of maintenance access before placing any order.
2) Read and apply this schedule with all relevant project documentation.
3) System designs are based upon the listed manufacturer. If alternatives are proposed the contractor is to re-select , making allowance for the re-design of associated plant and equipment, including calculation of SFPs and the like.
4) Contractor to re-select using working drawings and final manufacturer of all selected central plant to achieve noise criteria for each room. Contractor to refer to specification for details.
5) Noise levels quoted are for guidance only and should be verified by reference to the specification and/or acoustic report. Note in particular that where more than one room/area is served by a system the room noise level may vary.
6) Kitchen attenuators (supply & extract) to be Melinex lined and suitable for grease laden air
7) Schedules are superseded by Tech Subs
8) Attenuators to be manufactured to DW144, classification as stated in schedule.

FOR CONSTRUCTION

Cundall Johnston & Partners LLP
4th Floor, 15 Colmore Row, Birmingham, B3 2BH, United Kingdom, Tel:+44 (0)121 262 2720
Asia Australia Europe MENA UK and Ireland
www.cundall.com

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| | | | |
|---|---|---|---|
| **Project Title** | The Island Site - HBD | | |
| **Project Number** | 1020044 | | |
| **Schedule Title** | Rain water attenuation Storage Tank | **Page no.** | 1 of 1 |

| Revision History | | |
|---|---|---|
| **Revision** | **Date** | **Stage/ Purpose of issue** |
| **P01** | 25/11/2022 | Stage 4 Issue |
| **P02** | 09/12/2022 | Stage 4 Issue |
| **C01** | 25/10/2023 | Contract Issue |
| | | |

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| | |
|---|---|
| **Schedule Number** | TIS-NGB-ZZ-XX-SH-P-2512 |

| **Reference** | | | **TIS-RWAST-01** |
|---|---|---|---|
| **General** | Number | # | 1 |
| | System | | Rainwater drainage |
| | Location | | Rainwater attenuation Tank Room |
| | | | |
| **Sourcing** | Manufacturer | *(Note 3)* | |
| | | | |
| **Performance** | Nominal capacity | *Litres* | 64,000 |
| | Min. effective capacity | *Litres* | 54,000 |
| | Effective capacity fill time | *Hours* | N/A |
| | | | |
| **Performance** | Dimensions | *L/W/H (mm)* | (4000/4000/2000 + 8000/2000/2000) |
| | Plate size | *mm* | 1000 x 1000 |
| | Internal division plate | *Y/N* | N |
| | | | |
| **Connections** *(Note 10)* | Inlet connection | *Dia (mm)* | 300 |
| | Flood suction connection | *Dia (mm)* | 2 x 150 |
| | Hard overflow connection to sewer | *Dia (mm)* | 150 |
| | Screened warning pipe | *Dia (mm)* | N/A |
| | Washout | *Dia (mm)* | 2 x 50 |
| | Screened ventilation cowl | *Y/N* | N |
| | Balance pipe | *Y/N* | N |
| | | | |
| **Access** | External access ladder | *Y/N* | Y |
| | Internal access ladder | *Y/N* | Y |
| | | | |

| **Reference** | | | **TIS-RWAST-01** |
|---|---|---|---|
| **Access** *(Note 10)* | Access manhole - 600mm minimum diameter | *Y/N* | Y |
| **Bases & Sides** | Mounted on steel frame above booster set | *Y/N* | N/A |
| | Internally flanged base, mounted on flat base | *Y/N* | Y |
| | Externally flanged base on piers/bearers | *Y/N* | N |
| | Flanged sides | *INT / EXT* | EXT |
| | | | |
| **Alarms & Guages** *(Note 10)* | 0-30º temperature gauge | *Y/N* | N |
| | BMS temperature sensor | *Y/N* | N |
| | Constant read contents guage | *Y/N* | Y |
| | BMS wired high level alarm | *Y/N* | Y |
| | User adjustable low level alarm wired to BMS | *Y/N* | Y |
| | Pump cut out wired to pump package | *Y/N* | Y |
| | | | |
| **Water Quality** | Chlorine dioxide dosing set | *Y/N* | N |

| **Reference** | | | **TIS-RWAST-01** |
|---|---|---|---|
| **Float Valves** *(Note 10)* | Keraflo delayed action float valve - Type K | *SF, HF, RB* | N/A |
| | Keraflo delayed action float valve - Type KAX | *SF, HF, RB* | N/A |
| | Keraflo delayed action float valve - Type KB | *SF, HF, RB* | N/A |
| **Float Valve Boxes** *(Note 10)* | 180mm float valve access box - 54mm dia | *Y/N* | N/A |
| | 300-500mm float valve access box - 65-80mm dia | *Y/N* | N/A |
| | 500mm high side access | *Y/N* | N/A |

**Proposed Product**



| **Preferred equipment manufacturers** |
|---|
| www.deweywaters.co.uk |
| www.braithwaite.co.uk |
| www.balmoralltanks.com |
| |
| |

**Unit Specific Notes**

**Notes:**

1) Contractor to verify final manufacturer's dimensions, interfaces and access requirements against site constraints for installation and co-ordination of maintenance access before placing any order.
2) This schedule is to be read and applied with all relevant project documentation.
3) System designs are based upon the listed manufacturer. If alternatives are proposed the contractor is to re-select , making allowance for the re-design of associated plant and equipment.
4) Ladders are to be provided in accordance with BS 4211:2005 with hooped ladders provided on all tanks where the overall height is 2.5m or over from slab of plantroom to top of tank. Tank to be provided with handrail around top perimiter when tank height is 2.5m or over from plantroom slab.
5) Manufacturers production drawings and technical submittal to be submitted to Cundall for comment prior to manufacture.
6) Constant read contents gauges to give reading in litres. Contents gauges to also state the maximum effective water volume in litres when the tank is full. Temperature gauges to have secondary pointer that permanently indicates maximum previously registered temperature with manual reset to zero.
7) Pump cut out level switch to be compatible with pump package manufacturer.
8) All information provided on alarms, gauges, float valves, access and connections are for each tank compartment and should be read as such.
9) Tank to be constructed from pre-insulated hot pressed GRP panels & be fully compliant with 'The Water Supply (Water Fittings) Regulations 1999' & manufactured to BSEN 13280:2001. Insulation must comply with the project environmental assessment criteria (i.e. BREEAM, LEAD, etc.)
10) Cover panels to be of internally flanged heavy weight duty suitable for pedestrian loading. All flange fixings & internal stay supports to be stainless steel to Grade 216.
11) Schedules are superseded by tech subs.
12) External access ladder to be constructed from hot dipped galvanised steel. Internal access ladder to be constructed from stainless steel or GRP.

FOR CONSTRUCTION

| | | | |
|---|---|---|---|
| **Project Title** | The Island Site - HBD | | |
| **Project Number** | 1020044 | | |
| **Schedule Title** | Rainwater Attenuation Booster Set | **Page no.** | 1 of 1 |

| Revision History | | |
|---|---|---|
| **Revision** | **Date** | **Stage/ Purpose of issue** |
| **C01** | 09/06/2023 | Contract Issue |
| **C02** | 25/10/2023 | Contract Issue |
| | | |
| | | |

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| | |
|---|---|
| **Schedule Number** | TIS-NGB-ZZ-XX-SH-P-2513 |

| **Preferred equipment manufacturers** |
|---|
| www.armstrongfluidtechnology.com/ |
| www.grundfos.com |
| www.arrowvalves.co.uk |
| |
| |



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Reference** | | | **TIS-RWP-01** | | | | | | | |
| **General** | Pumps per set | # | 2 | | | | | | | |
| | System | | RWP | | | | | | | |
| | Location | | asement Rainwater Attenuation Tank Roor | | | | | | | |
| **Sourcing** | Manufacturer | *(Note 3)* | Grundfos | | | | | | | |
| | Range | | EF30.50.09.2.50B | | | | | | | |
| **Duty (per set)** | Maximum flow rate | *l/s* | 8.3 | | | | | | | |
| | Required flow rate | *l/s* | 8.3 | | | | | | | |
| | Pressure set point | *bar* | 4.042 | | | | | | | |
| **Water Supply** | Softened | *Y/N* | N/A | | | | | | | |
| | Hardness | *mg/l $CaCO_3$* | TBC | | | | | | | |
| | Chlorine dioxide treated | *Y/N* | N | | | | | | | |
| **Pump Configuration** | Jockey/duty/ assist/ standby | *J/D/A/S* | D/A | | | | | | | |
| | Variable speed pump | *Y/N* | Y (See Note 4) | | | | | | | |
| | Maximum flow per pump | *l/s* | 10.9 | | | | | | | |
| | Minimum flow per pump | *l/s* | TBC by manufacturer | | | | | | | |
| | Accumulator Vessel | *Litres* | TBC by manufacturer | | | | | | | |
| **Electrical Supply** | Voltage | *V* | 3 x 400-415 | | | | | | | |
| | Phase | *Ph* | 3 | | | | | | | |
| | Frequency | *Hz* | 50 | | | | | | | |
| | Pump motor rating | *kW* | 2.3 | | | | | | | |
| | Maximum rating per set | *kW* | TBC by manufacturer | | | | | | | |
| | Maximum current | *Start* | TBC by manufacturer | | | | | | | |
| | Maximum current | *Run* | TBC by manufacturer | | | | | | | |
| **Dimensions** | Overall skid length | *mm* | 218 | | | | | | | |
| | Overall skid width | *mm* | 252 | | | | | | | |
| | Overall skid height | *mm* | 494 | | | | | | | |
| | Suction header Ø | *mm* | TBC by manufacturer | | | | | | | |
| | Delivery header Ø | *mm* | TBC by manufacturer | | | | | | | |
| **Maximum Closed Valve Head** | Normal operation | *bar* | TBC by manufacturer | | | | | | | |
| **Maximum Variance from Duty Set Point** | Normal operation | *+/- bar* | TBC by manufacturer | | | | | | | |
| **Maximum Potential Pressure Developed** | Fault condition | *bar* | TBC by manufacturer | | | | | | | |
| **Comments** | | | | | | | | | | |

**Notes:**

1) Contractor to verify final manufacturer's dimensions, interfaces and access requirements against site constraints for installation and co-ordination of maintenance access before placing any order.
2) This schedule is to be read and applied with all relevant project documentation.
3) System designs are based on the listed manufacturer. If alternatives are proposed the contractor is to re-select, making allowance for the re-design of associated plant and equipment.
4) Flow restrictors to be applied to assure flow rate does not succeed 8.3 L/s when discharging to below ground drainage.
5) Pipework to be copper tube to BS EN 1057 or stainless steel to BS EN 4151 304 where the pumped fluid is softened water or rainwater.
6) Pump set to be provided with "soft fill" mode to prevent hydraulic shock when refilling system after power failure and installed complete with an air release & vacuum breaker valve in conjunction with "soft fill" controls, anti-surge valves to be installed at the top of all pressure boosted risers.
7) Level switches to be provided for low water cut-out in each section of the associated storage tank. Switches to be wired to pump set controls and linked to the BMS.
8) Provide all BMS facilities as required in BMS Specification, including on/off and common fault. Additional provision as required.
9) Pump set control panel to provide minimum functionality as follows: auto-rotation of duty pump, auto-reset following power failure, system pressure gauge, lamps for pump run, fault (per pump), tank low level water, common alarm switches for hand/ off/ auto for each pump.
10) Selection data used for design development based upon the peak design flow rate and must be verified by contractor prior to placement of order.
11) Final selection duty to include contingencies for construction design development and commissioning to the order of +10% volume and + 21% pressure. Contractor to allow for +10% spare motor capacity.
12) Manufacturer's production drawings to be submitted to Contract Administrator for comment prior to manufacture.
13) Schedules are superseded by tech subs.

FOR CONSTRUCTION

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Asia Australia Europe MENA UK and Ireland
www.cundall.com

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**NG BAILEY**
**The Island**
Technical Submission
TIS-NGB-ZZ-ZZ-TS-M-0009
Attenuators







BOWMER + KIRKLAND

NG Bailey

FOR CONSTRUCTION

# TECHNICAL SUBMISSION FOR – Attenuators

## SUMMARY

| | |
|---|---|
| **Technical Submission No.** | TIS-NGB-ZZ-ZZ-TS-M-0009 |
| **Revision:** | C01 |
| **Package Description:** | Attenuators |
| **Package Equipment:** | Attenuators |
| **Proposed Supplier:** | Caice Acoustic Air Movement Ltd. |
| **Supplier Address:** | Riverside House,<br>3 Winnersh Fields,<br>Gazelle Close,<br>Winnersh,<br>Wokingham,<br>RG41 5QS. |
| **Building Locations:** | All Levels & Roof |
| **Compliance with Specification:** | Yes |
| **NGB Contact:** | Martin Edwards |
| **NGB Contact Tel:** | 07971 157798 |
| **NGB Contact E-mail:** | Martin.edwards2@ngbailey.co.uk |
| **Raised By:** | Martin Edwards |
| **Date Raised:** | 20/07/2023 |
| **Response Required By:** | |

FOR CONSTRUCTION

# OVERVIEW

| DESCRIPTION: |
|---|
| This technical submittal is for the proposed Attenuators Units for The Island, Manchester.<br><br>The Cundall MEP Stage 3 Specification "1020044-SPC-MEP-001 MEP Stage 3 Performance Specification_B" Section 5.4.1 details the requirements for the Attenuation;<br><br>Cundall Appendix A- Mechanical Services Providers & Equipment Manufacturers List also states that for Supply of Attenuators Dampers, Caice are a preferred manufacturer. |

# SUPPORTING DOCUMENTS

| DOCUMENTS: |
|---|
| Appendix 1 - Caice Attenuator Technical Submittal |

| | |
|---|---|
| **LIST OF ATTACHMENTS:** | Y |
| **SAMPLE INCLUDED (Y/N):** | Y |
| **COMPLIANT WITH SPECIFICATION (Y/N):** | Y |
| **COMMENTS:** | 1. confirmed that latest acoustic report on 4P was used to select attenuators and are compliant<br>2. attenuators would not be provided as a sample. |

# APPROVAL STATUS

| CLIENT T/A COMMENTS: |
|---|
| |

| | | | | |
|---|---|---|---|---|
| **STATUS:** | A | B | C | (Please Circle) |
| **MADE BY:** | | | | |

FOR CONSTRUCTION

| DATE: | |
|---|---|

STATUS KEY

A – Approved

B – Approved with comments

C – Rejected with comments

FOR CONSTRUCTION

caicedesign
The complete acoustic design service

caice

Ng Bailey Ltd
Floor 6 Building 5
Exhange Quay
Salford
Salford
Greater Manchester
United Kingdom
M5 3EF

**Our Reference**
06052/2/6/2

**Subject**
The Island Site John Dalton Street

07 February 2023

For the attention of Martin Edwards,

Further to your recent enquiry with regard to the above project, we have pleasure in submitting our Attenuator technical submittal for your consideration.

**Enquiry Data**

Our selections are based generally upon the following information provided to us by yourselves:

| | | |
|---|---|---|
| Specification sections | : | Not issued |
| Schedule numbers | : | Not issued |
| Drawing numbers | : | TIS-NGB-ZZ-09-DR-M-5710 REV P02<br>TIS-NGB-ZZ-B1-DR-M-5710 REV P02<br>TIS-NGB-ZZ-00-DR-M-5710 REV P02<br>TIS-NGB-ZZ-08-DR-M-5710 REV P02 |

We trust the enclosed meets with your approval, however should you require any further details or clarification then please do not hesitate to contact us.

Yours faithfully,

Frazer Robinson
**Sales Manager**
Direct Dial 01756 699508
Mobile 07585 441669
E-Mail frazer.robinson@caice.co.uk

FOR CONSTRUCTION

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Registered office and head office

Company Registration Number
2790667
VAT Registration Number
GB614683632

# Attenuator Schedule

**Notes**

1. Attenuators supplied by Caice.
2. Pressure losses are stated in accordance with ISO 7235, which is based on laminar airflow conditions. The system designer shall make allowance for increased attenuator pressure losses where turbulent airflow conditions exist on the attenuator entry or exit.
3. Unless stated otherwise all attenuators shall be constructed as follows: Galvanised sheet steel casings with 30mm profile flanges that are fully compliant with DW/TM1 at a high pressure rating (+2000/-750Pa). Profile flanges shall be compatible with Doby, Mez & Metu flanging systems. Elements shall be installed in the vertical plane, with side elements provided as standard, and all elements shall have aerodynamic inlet and outlet fairings. Element facings shall be constructed from expanded galvanised steel mesh with fibre glass tissue bonded to the inner face. Mineral wool infill shall be overpacked to minimise voids due to settlement. Attenuator ends shall be protectively wrapped, and all attenuators shall be delivered to site on pallets and individually labelled.

| Ref. | Description | Type and Model Code | Dimensions (mm) | | | Vol ($m^3/s$) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|
| | | | W | H | L | | | | |
| AT-A1-01 | FAI AHU-01<br>Atmosphere side | Modular<br>MG02H/3C/L/S | 2800 | 1600 | 1200 | 8.70 | 26 | 1 | Horizontal elements. Unit delivered in 2 sections, split 2 in width. |
| AT-A1-02 | EXH AHU-01<br>Atmosphere side | Modular<br>MG04H/3C/L/S | 2800 | 1600 | 1800 | 8.40 | 21 | 1 | Horizontal elements. Unit delivered in 4 sections, split 2 in width and 2 in length. |
| AT-A1-03 | SUP AHU-01<br>Room side | Rectangular<br>SG01V/2C/L/S | 1700 | 1550 | 1200 | 8.70 | 44 | 1 | Medium pressure rating (+1000/-750Pa). |
| AT-A1-04 | EXT AHU-01<br>Room side | Rectangular<br>SG01V/2C/L/S | 1625 | 1575 | 1200 | 8.40 | 18 | 1 | Medium pressure rating (+1000/-750Pa). |
| | | | | | | | | | |
| AT-A2-01 | FAI AHU-02<br>Atmosphere side | Rectangular<br>SG01H/3C/L/S | 1075 | 1975 | 1200 | 7.05 | 22 | 1 | Horizontal elements. |
| AT-A2-02 | EXH AHU-02<br>Atmosphere side | Modular<br>MG02H/3C/L/S | 3000 | 1600 | 1050 | 6.80 | 11 | 1 | Horizontal elements. Unit delivered in 2 sections, split 2 in width. |
| AT-A2-03 | SUP AHU-02<br>Room side | Rectangular<br>SG01V/3C/L/S | 1625 | 1325 | 1200 | 7.05 | 26 | 1 | |
| AT-A2-04 | EXT AHU-02<br>Room side | Rectangular<br>SG02V/3C/L/S | 1625 | 1275 | 1500 | 6.80 | 34 | 1 | Unit delivered in 2 sections, split in length. |
| | | | | | | | | | |
| AT-A3-01 | FAI AHU-03<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 1975 | 600 | 1200 | 2.50 | 15 | 1 | |

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# Attenuator Schedule

| Ref. | Description | Type and Model Code | Dimensions (mm) W | H | L | Vol (m³/s) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|
| AT-A3-02 | EXH AHU-03<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 1975 | 600 | 1200 | 2.50 | 7 | 1 | |
| AT-A3-03 | SUP AHU-03<br>Room side | Rectangular<br>SG01H/3C/L/S | 1200 | 975 | 1200 | 2.50 | 8 | 1 | Horizontal elements. |
| AT-A3-04 | EXT AHU-03<br>Room side | Rectangular<br>SG01H/3C/L/S | 1200 | 975 | 1200 | 2.50 | 6 | 1 | Horizontal elements. |
| | | | | | | | | | |
| AT-A4-01 | AHU B1 04 FAI<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 450 | 450 | 600 | 1.02 | 31 | 1 | |
| AT-A4-02 | AHU B1 04 EXHAUST<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 450 | 450 | 600 | 1.02 | 31 | 1 | |
| AT-A4-03 | AHU B1 04 SUPPLY<br>Room side | Rectangular<br>LG01H/3C/L/S | 550 | 350 | 1050 | 1.02 | 26 | 1 | Horizontal elements. |
| AT-A4-04 | AHU B1 04 EXTRACT<br>Room side | Rectangular<br>LG01H/3C/L/S | 550 | 350 | 1050 | 1.02 | 26 | 1 | Horizontal elements. |
| | | | | | | | | | |
| AT-E1-01 | EXH EF-01<br>Atmosphere side | Rectangular<br>LG01V/3C/L/S | 575 | 350 | 900 | 0.64 | 48 | 1 | |
| AT-E1-02 | EXT EF-01<br>Room side | Rectangular<br>LG01H/3C/L/S | 350 | 575 | 1200 | 0.64 | 50 | 1 | Horizontal elements. |
| | | | | | | | | | |
| CT-L1-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L2-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L3-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L4-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L5-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |

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# Attenuator Schedule

| Ref. | Description | Type and Model Code | Dimensions (mm) | | | Vol ($m^3/s$) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|
| | | | W | H | L | | | | |
| CT-L6-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L7-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L8-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L9-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |

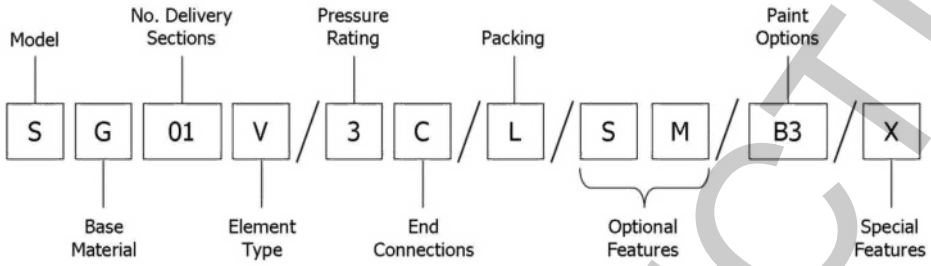
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# Attenuator Construction Code Definitions

**Project:** The Island Site John Dalton Street **Date:** 07/02/2023

## Sample Construction Code Format Diagram




## Construction Code Definitions

| Code Section | Code | Description |
|---|---|---|
| Model | C | CIRCULAR attenuator with spiral wound casing |
| | L | Rectangular attenuator with LINING elements |
| | M | Rectangular attenuator made in MODULES with splitter elements |
| | S | Rectangular attenuator with SPLITTER elements |
| Base material | G | Standard gauge galvanised sheet steel |
| No. delivery sections | 01 upwards | This number confirms how many sections will be delivered to site for each attenuator or splitter. For 02 or above assembly will be required by others |
| Element type | H | Elements installed in the horizontal plane |
| | U | Un-podded (circular attenuators only) |
| | V | Elements installed in the vertical plane |
| Pressure rating | 2 | Medium pressure (+1000/-750Pa) |
| | 3 | High pressure (+2000/-750Pa) |
| End connections | C | 30mm profile flanges (profile flanges are compatible with Doby, Mez & Metu flanges) |
| | K | 40mm long circular spigots (circular attenuators only) |
| Packing | L | Lightweight pallet wrapping on casing ends (EG/IG units are palletised and wrapped on the pallet) |
| Optional features | S | Side elements (for EG/IG units these are supplied with steel backing) |

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# Attenuator Schedule

**Notes**

1. All attenuators shall be supplied by Caice or equal and approved.
2. The Contractor shall order the attenuators scheduled below, and shall send finalised drawings and equipment noise levels to the attenuator supplier to check the selections prior to manufacture.
3. The attenuator supplier shall then undertake acoustic calculations to ensure that the attenuators achieve the specified noise criteria, based upon the finalised information.
4. A Technical Submittal comprising acoustic calculations and a finalised schedule of attenuators shall then be issued to the Consultant for final approval.
5. If an alternative attenuator supplier is proposed then the Contractor shall allow for them to undertake witnessed tests to prove their claimed insertion loss performance in a UKAS accredited BS EN ISO 7235: 2009 test facility, for two sample units. This shall be undertaken prior to order.
6. Pressure losses are stated in accordance with ISO 7235, which is based on laminar airflow conditions. The system designer shall make allowance for increased attenuator pressure losses where turbulent airflow conditions exist on the attenuator entry or exit.
7. Unless stated otherwise all attenuators shall be constructed as follows: Galvanised sheet steel casings with 30mm profile flanges that are fully compliant with DW/TM1 at a high pressure rating (+2000/-750Pa). Profile flanges shall be compatible with Doby, Mez & Metu flanging systems. Elements shall be installed in the vertical plane, with side elements provided as standard, and all elements shall have aerodynamic inlet and outlet fairings. Element facings shall be constructed from expanded galvanised steel mesh with fibre glass tissue bonded to the inner face. Mineral wool infill shall be overpacked to minimise voids due to settlement. Attenuator ends shall be protectively wrapped, and all attenuators shall be delivered to site on pallets and individually labelled.

| Ref. | Description | Type and Model Code | Dimensions (mm) W | H | L | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|---|
| AT-A1-01 | FAI AHU-01<br>Atmosphere side | Modular<br>MG02H/3C/L/S | 2800 | 1600 | 1200 | 25 | 8.70 | 26 | 1 | Horizontal elements. Unit delivered in 2 sections, split 2 in width. |
| AT-A1-02 | EXH AHU-01<br>Atmosphere side | Modular<br>MG04H/3C/L/S | 2800 | 1600 | 1800 | 27.5 | 8.40 | 21 | 1 | Horizontal elements. Unit delivered in 4 sections, split 2 in width and 2 in length. |
| AT-A1-03 | SUP AHU-01<br>Room side | Rectangular<br>SG01V/2C/L/S | 1700 | 1550 | 1200 | 30 | 8.70 | 44 | 1 | Medium pressure rating (+1000/-750Pa). |
| AT-A1-04 | EXT AHU-01<br>Room side | Rectangular<br>SG01V/2C/L/S | 1625 | 1575 | 1200 | 42.5 | 8.40 | 18 | 1 | Medium pressure rating (+1000/-750Pa). |
| | | | | | | | | | | |
| AT-A2-01 | FAI AHU-02<br>Atmosphere side | Rectangular<br>SG01H/3C/L/S | 1075 | 1975 | 1200 | 40 | 7.05 | 22 | 1 | Horizontal elements. |
| AT-A2-02 | EXH AHU-02<br>Atmosphere side | Modular<br>MG02H/3C/L/S | 3000 | 1600 | 1050 | 27.5 | 6.80 | 11 | 1 | Horizontal elements. Unit delivered in 2 sections, split 2 in width. |
| AT-A2-03 | SUP AHU-02<br>Room side | Rectangular<br>SG01V/3C/L/S | 1625 | 1325 | 1200 | 37.5 | 7.05 | 26 | 1 | |

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# Attenuator Schedule

| Ref. | Description | Type and Model Code | Dimensions (mm) W | H | L | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|---|
| AT-A2-04 | EXT AHU-02<br>Room side | Rectangular<br>SG02V/3C/L/S | 1625 | 1275 | 1500 | 35 | 6.80 | 34 | 1 | Unit delivered in 2 sections, split in length. |
| | | | | | | | | | | |
| AT-A3-01 | FAI AHU-03<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 1975 | 600 | 1200 | 32.5 | 2.50 | 15 | 1 | |
| AT-A3-02 | EXH AHU-03<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 1975 | 600 | 1200 | 42.5 | 2.50 | 7 | 1 | |
| AT-A3-03 | SUP AHU-03<br>Room side | Rectangular<br>SG01H/3C/L/S | 1200 | 975 | 1200 | 42.5 | 2.50 | 8 | 1 | Horizontal elements. |
| AT-A3-04 | EXT AHU-03<br>Room side | Rectangular<br>SG01H/3C/L/S | 1200 | 975 | 1200 | 47.5 | 2.50 | 6 | 1 | Horizontal elements. |
| | | | | | | | | | | |
| AT-A4-01 | AHU B1 04 FAI<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 450 | 450 | 600 | 45 | 1.02 | 31 | 1 | |
| AT-A4-02 | AHU B1 04 EXHAUST<br>Atmosphere side | Rectangular<br>SG01V/3C/L/S | 450 | 450 | 600 | 45 | 1.02 | 31 | 1 | |
| AT-A4-03 | AHU B1 04 SUPPLY<br>Room side | Rectangular<br>LG01H/3C/L/S | 550 | 350 | 1050 | 57.5 | 1.02 | 26 | 1 | Horizontal elements. |
| AT-A4-04 | AHU B1 04 EXTRACT<br>Room side | Rectangular<br>LG01H/3C/L/S | 550 | 350 | 1050 | 57.5 | 1.02 | 26 | 1 | Horizontal elements. |
| | | | | | | | | | | |
| AT-E1-01 | EXH EF-01<br>Atmosphere side | Rectangular<br>LG01V/3C/L/S | 575 | 350 | 900 | 30 | 0.64 | 48 | 1 | |
| AT-E1-02 | EXT EF-01<br>Room side | Rectangular<br>LG01H/3C/L/S | 350 | 575 | 1200 | 30 | 0.64 | 50 | 1 | Horizontal elements. |
| | | | | | | | | | | |
| CT-L1-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L2-01 | SUP MAKE UP | Circular<br>CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |

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# Attenuator Schedule

| Ref. | Description | Type and Model Code | Dimensions (mm) | | | Free Area | Vol (m³/s) | PL (Pa) | Qty | Features |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | W | H | L | | | | | |
| CT-L3-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L4-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L5-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L6-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L7-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L8-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |
| CT-L9-01 | SUP MAKE UP | Circular CG01U/2K/L | 300 | dia | 600 | 100 | 0.06 | 0 | 1 | Un-podded. 40mm long spigots. Medium pressure rating (+1000/-750Pa). |

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# Attenuator Drawings

**Project:** The Island Site John Dalton Street **Date:** 07/02/2023

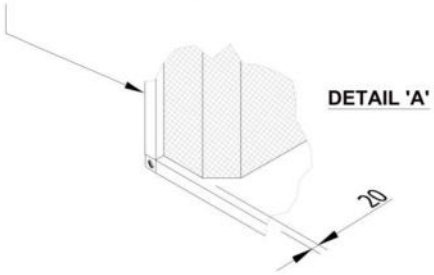
Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## LG lining attenuator - with profile flanges

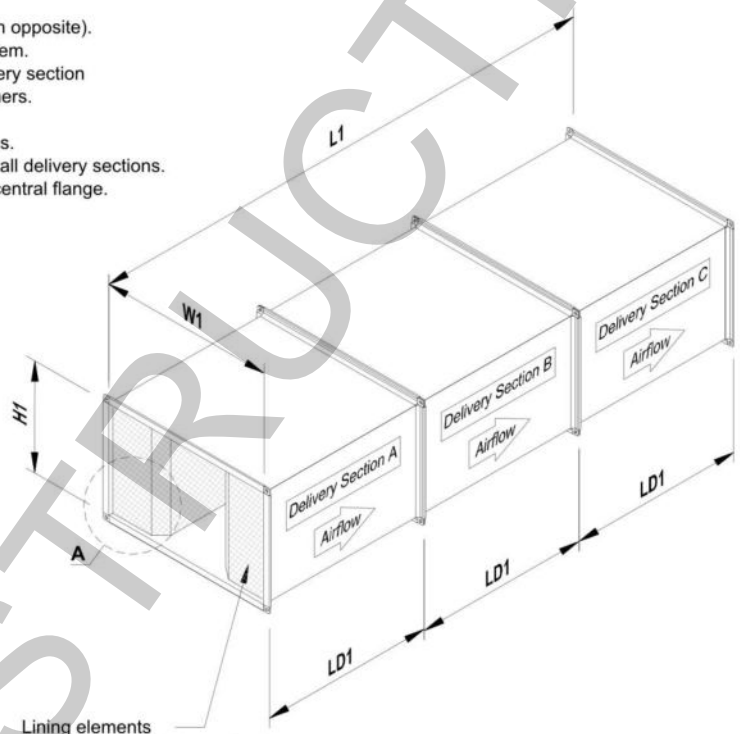
**Notes:**

1. Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown opposite).
2. See **NDL** in table below for number of delivery sections in length per item.
3. Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.
4. Nuts, bolts, flange clamps and gasket between flanges by others.
5. Delivery section and airflow labels only provided on multiple piece items.
6. Identification labels stating item reference and description provided on all delivery sections.
7. Where **LD1** exceeds 1250 each delivery section has an intermediate central flange.
8. All dimensions in mm.
9. Tolerances on **W1** & **H1** +/- 2mm.
10. Tolerances on **LD1** +/- 3mm

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table below for flange size.




Lining elements set back in casing by 20mm and provided with aerodynamic fairings on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Model Code Definitions for details.




Lining elements shown installed in the vertical plane. Refer to item Model Code for actual orientation.

| Ref. | Construction Code | Primary Dimensions W1 | H1 | L1 | Delivery Data LD1 | NDL | Flange Size | Paint Colour | Wt (Kg) | No. Off |
|---|---|---|---|---|---|---|---|---|---|---|
| AT-A4-03 | LG01H/3C/L/S | 550 | 350 | 1050 | 1050 | 1 | 30mm | | 30 | 1 |
| AT-A4-04 | LG01H/3C/L/S | 550 | 350 | 1050 | 1050 | 1 | 30mm | | 30 | 1 |
| AT-E1-01 | LG01V/3C/L/S | 575 | 350 | 900 | 900 | 1 | 30mm | | 27 | 1 |
| AT-E1-02 | LG01H/3C/L/S | 350 | 575 | 1200 | 1200 | 1 | 30mm | | 34 | 1 |

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# Attenuator Drawings

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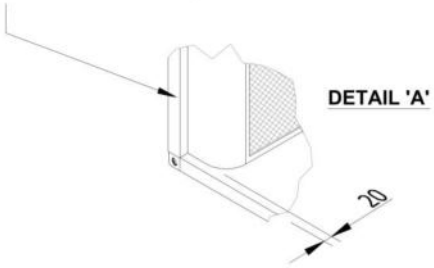
Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

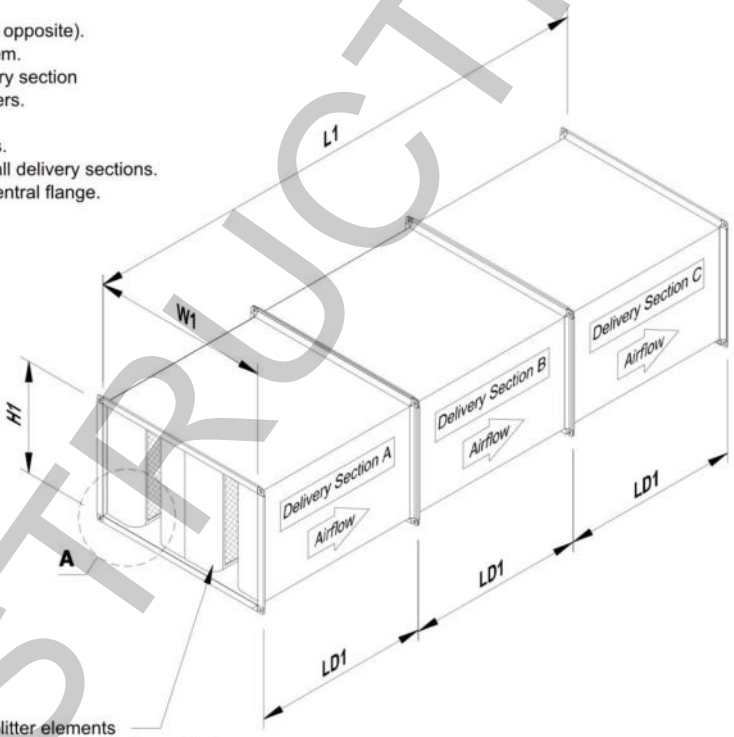
## SG splitter attenuator - with profile flanges

**Notes:**

1. Attenuators may be delivered in 1, 2, 3 or 4 sections in length (3 shown opposite).
2. See **NDL** in table below for number of delivery sections in length per item.
3. Assembly of multiple piece items must be in accordance with the delivery section and airflow label layouts, typically as shown opposite. Assembly by others.
4. Nuts, bolts, flange clamps and gasket between flanges by others.
5. Delivery section and airflow labels only provided on multiple piece items.
6. Identification labels stating item reference and description provided on all delivery sections.
7. Where **LD1** exceeds 1250 each delivery section has an intermediate central flange.
8. All dimensions in mm.
9. Tolerances on **W1** & **H1** +/- 2mm.
10. Tolerances on **LD1** +/- 3mm

Profile flanges suitable for MEZ, DOBY or METU flanging systems. See table below for flange size.




Splitter elements set back in casing by 20mm and provided with aerodynamic bullnoses on inlet and outlet as shown. However if item has non-standard elements refer to Attenuator Model Code Definitions for details.

Splitter elements shown installed in the vertical plane. Refer to item Model Code for actual orientation.

| Ref. | Construction Code | Primary Dimensions W1 | H1 | L1 | Delivery Data LD1 | NDL | Flange Size | Paint Colour | Wt (Kg) | No. Off |
|---|---|---|---|---|---|---|---|---|---|---|
| AT-A1-03 | SG01V/2C/L/S | 1700 | 1550 | 1200 | 1200 | 1 | 30mm | | 235 | 1 |
| AT-A1-04 | SG01V/2C/L/S | 1625 | 1575 | 1200 | 1200 | 1 | 30mm | | 229 | 1 |
| AT-A2-01 | SG01H/3C/L/S | 1075 | 1975 | 1200 | 1200 | 1 | 30mm | | 221 | 1 |
| AT-A2-03 | SG01V/3C/L/S | 1625 | 1325 | 1200 | 1200 | 1 | 30mm | | 223 | 1 |
| AT-A2-04 | SG02V/3C/L/S | 1625 | 1275 | 1500 | 750 | 2 | 30mm | | 312 | 1 |
| AT-A3-01 | SG01V/3C/L/S | 1975 | 600 | 1200 | 1200 | 1 | 30mm | | 147 | 1 |
| AT-A3-02 | SG01V/3C/L/S | 1975 | 600 | 1200 | 1200 | 1 | 30mm | | 139 | 1 |
| AT-A3-03 | SG01H/3C/L/S | 1200 | 975 | 1200 | 1200 | 1 | 30mm | | 117 | 1 |
| AT-A3-04 | SG01H/3C/L/S | 1200 | 975 | 1200 | 1200 | 1 | 30mm | | 113 | 1 |
| AT-A4-01 | SG01V/3C/L/S | 450 | 450 | 600 | 600 | 1 | 30mm | | 24 | 1 |
| AT-A4-02 | SG01V/3C/L/S | 450 | 450 | 600 | 600 | 1 | 30mm | | 24 | 1 |

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# Attenuator Drawings

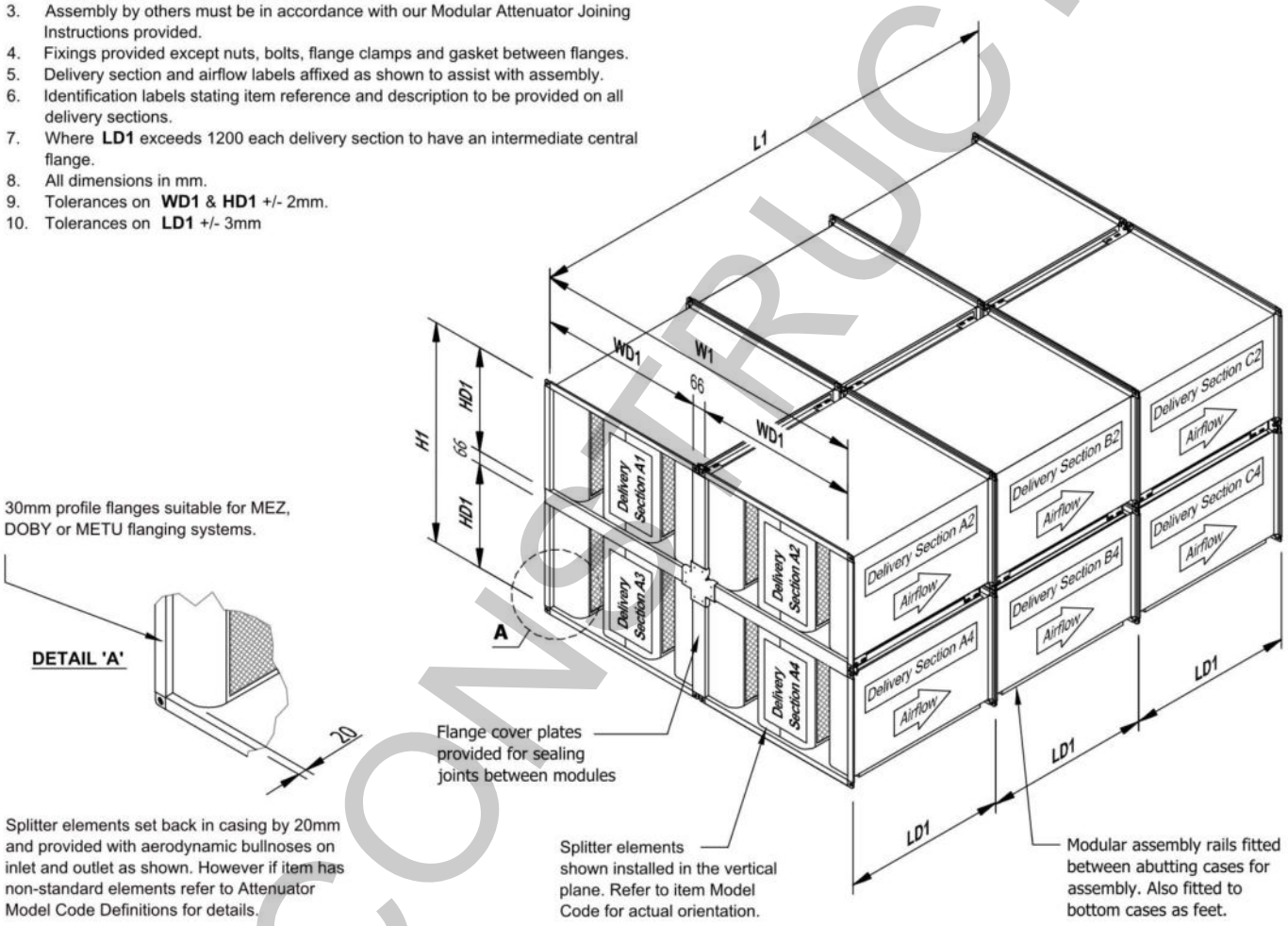
**Project:** The Island Site John Dalton Street **Date:** 07/02/2023

Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## MG modular attenuator

**Notes:**

1. Attenuators may be delivered in any number of sections (12 shown below).
2. See **NDW, NDH** and **NDL** in table below for number of delivery sections in width,height and length respectively per item.
3. Assembly by others must be in accordance with our Modular Attenuator Joining Instructions provided.
4. Fixings provided except nuts, bolts, flange clamps and gasket between flanges.
5. Delivery section and airflow labels affixed as shown to assist with assembly.
6. Identification labels stating item reference and description to be provided on all delivery sections.
7. Where **LD1** exceeds 1200 each delivery section to have an intermediate central flange.
8. All dimensions in mm.
9. Tolerances on **WD1** & **HD1** +/- 2mm.
10. Tolerances on **LD1** +/- 3mm




| Ref. | Construction Code | Primary Dims W1 | H1 | L1 | Delivery Data WD1 | HD1 | LD1 | NDW | NDH | NDL | Paint Colour | Wt (Kg) | No. Off |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AT-A1-01 | MG02H/3C/L/S | 2800 | 1600 | 1200 | 1367 | 1600 | 1200 | 2 | 1 | 1 | | 452 | 1 |
| AT-A1-02 | MG04H/3C/L/S | 2800 | 1600 | 1800 | 1367 | 1600 | 900 | 2 | 1 | 2 | | 699 | 1 |
| AT-A2-02 | MG02H/3C/L/S | 3000 | 1600 | 1050 | 1467 | 1600 | 1050 | 2 | 1 | 1 | | 465 | 1 |

FOR CONSTRUCTION


Document Package 106052/2/6/2
Direct Telephone 01756 699508
Direct E-Mail frazer.robinson@caice.co.uk

# Attenuator Drawings

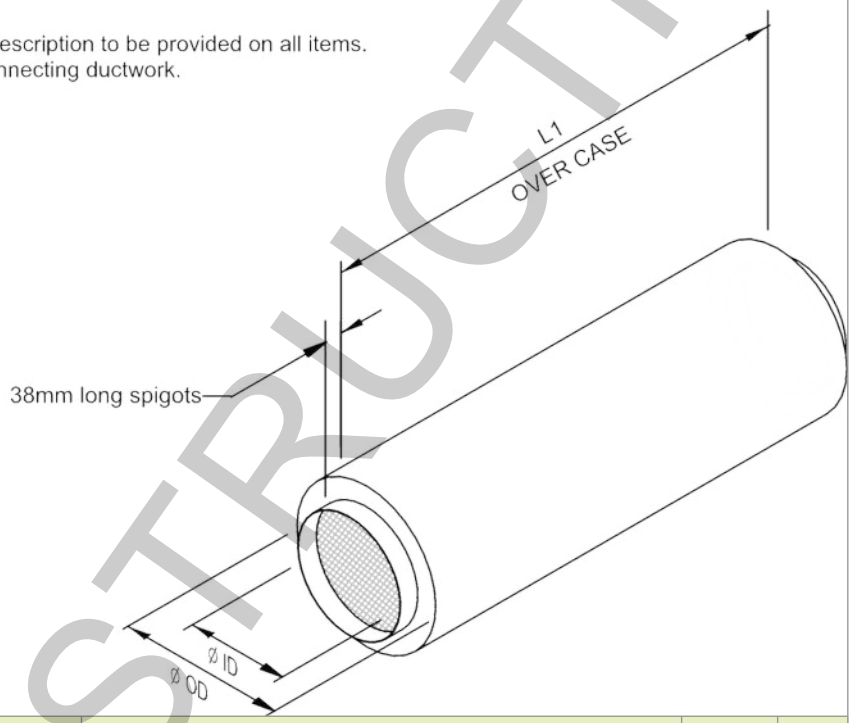
**Project:** The Island Site John Dalton Street **Date:** 07/02/2023

Construction Codes confirm the physical properties of each item. This drawing must therefore be read in conjunction with the Construction Code Definitions.
Dimensions W1, H1, W2, H2, WD1, HD1 are always shown as "inside-duct". Dimensions L1, L2, LD1 are always shown as "over connections".

## CG circular attenuator with spiral wound casing - with spigot ends

**Notes:**

1. Identification labels stating item reference and description to be provided on all items.
2. Attenuator spigots shall be slip jointed inside connecting ductwork.
3. All dimensions in mm.
4. Tolerance on L1 +/- 2mm
5 Tolerance on ID +/- 2mm




| Ref. | Construction Code | Primary Dimensions ID | OD | L1 | Paint Colour | Wt (Kg) | No. Off |
|---|---|---|---|---|---|---|---|
| CT-L1-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L2-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L3-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L4-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L5-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L6-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L7-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L8-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |
| CT-L9-01 | CG01U/2K/L | 300 | 405 | 600 | | 11 | 1 |

FOR CONSTRUCTION


Direct Telephone 01756 699508
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BALMORAL TANKS

# GRP SECTIONAL TANK STANDARD SPECIFICATION

UK Designed and manufactured

BALMORAL

www.balmoraltanks.com

## 1 General

1.1 The manufacture and design of Balmoral (Hot Press Moulded GRP Sectional Water Storage Tanks) shall be to the quality standard requirements of (BS EN ISO 9001) and shall comply with (BSEN13280:2001) glassfibre reinforced plastic cisterns for cold water storage.

## 2 Process Requirements

2.1 Cisterns shall be manufactured by the Hot Press Moulded method, glass reinforced plastic, moulded at temperatures up to 150°C using polyester resins which conform to ISO 472, UV stabilised and 'E' glassfibre reinforcement, colour grey(RAL7004).

2.2 The cistern design shall incorporate 1x1m pillow panels to the walls of cisterns with provision for flat panels for connections and fittings. Purpose made cover panels 1x1m and 1x0.5m flat panels positioned to give free draining channels.

2.3 Base panels available internally flanged (IFB) with 1x1m flat panels, fasteners internal (stainless steel Grade 1.4401), or externally flanged (EFB) with 1x 1m flat panels and one pillow sump panel, fasteners external (Galvanised). Alternetively stainless steel fastners throughout can be requested.

2.4 All surfaces of the panels shall be smooth and crevice free to provide hygienic finish and be dimensionally accurate with sharply defined profiles.

2.5 Float valve chambers can be provided with central hinged or lift off lockable ABS lid, with options of 180mm, 300mm and 500mm depth, where appropriate provision for Type AB air gap in compliance with BSEN13077:2008.

2.6 Man access 600mm diameter screwed, hinged or lift off lockable ABS lid available.

2.7 All tanks deeper than 1.5m shall be fitted to client requirements with internal stainless or GRP and external standard duty aluminium access ladders: to BS4211 with hooped safety cage.

2.8 Handrail is offered as an option and should be considered to meet particular contract needs.

## 3 Steelwork

3.1 Panels to be rigidly supported by a combination of stainless steel tie rods internally and galvanised box section externally.

3.2 Steelwork designed to EN 10088-3:1995. Internal stainless steel 1.4401 (316/A4) grade and external mild steel galvanised to BSEN ISO 1461:2009. Cisterns to incorporate external wall bracing on depths 1.5m and greater and tie rods 2m and greater.

## 4 Insulation (Encapsulated)

4.1 Panels shall be factory insulated either on the top, sides and base as required, using 40mm thick CFC/HFC expanded polystyrene.

4.2 Panels to be insulated within a profiled face covering the maximum surface area and to be encapsulated with an external weather skin made from ultraviolet stabilised material providing protection against weathering.

4.3 Connections to be site fitted on flat insulated panels, and all holes shall be sealed with a recessed plastic section from the outer surface of the insulation skin to the cistern panel.

## 5 Foundation

5.1 All cisterns to be installed on either flat continuous foundation, close centre beams, pier walls or bearer beams conforming to manufacturer's specification of flatness and deflection and to be provided by the client. Refer to BSTL 1693-004 to BSTL-1693-012.

## 6 Partitions

6.1 Where partitions are required, they will be full height using standard panels. Each compartment will be capable of supporting water on either side with one side empty.

6.2 Where tank walls require external reinforce-ment, then partition walls shall be similarly reinforced in grade 316 stainless steel.

## 7 Connections

7.1 All connections supplied to be site installed.

7.2 Connections 54mm and below, plain/BSP threaded, 67mm and above flanged to PN16 unless otherwise stated.

7.3 Standard flanged connections as Balmoral 'BSTL' range, spool piece with internal support flange, external stub flange with loose galvanised ring.

7.4 All connections to be installed in accordance with WRAS/current water byelaws. Tank manufacturer has WRAS approval for compliance with BS EN 13077 installations.

## 8 Installation

8.1 To be carried out by Balmoral approved installers, for warranty to be valid.

8.2 BALSEAL high density foam/butyl sealing strip to be used covering full width of panel flange providing a watertight seal.

## 9 Commissioning and Testing

9.1 Testing shall be carried out on completion of installation by a mechanical contractor and should be completed within ten working days of assembly. This shall include the final setting of float valves level switches and any other connection which requires setting.

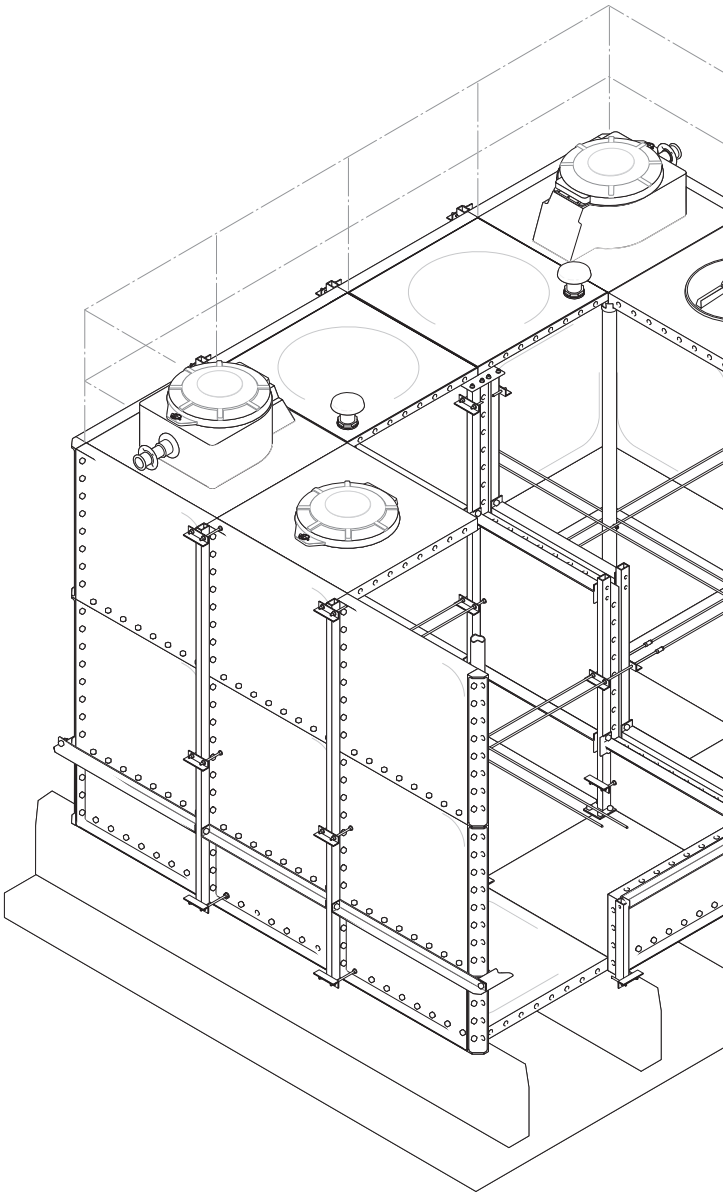
9.2 The testing and compliance of panels, sealant , conections and fixings shall be as listed in WRAS Water Fittings and Materials Directory and current water regulations.

## 10 Mechanical properties

| | |
|---|---|
| Method of manufacture | Hot Press Moulded |
| Specific gravity | 1.84 ± 0.2 g/cm“ |
| Tensile strength | >100Mpa |
| Flexural strength | >200Mpa |
| Flexural modulus | >11500 Mpa |
| Impact strength | 90 Kj/m |
| Shore hardness | Barcol:54 |
| Shear strength | 94.1 Mpa |
| Glass content % | 30% ± 2 |
| Thermal expansion | 16.10^(-6)m/(m.k) |
| Thermal conductivity | 0.3W/(m.k) |
| Overall heat transmission | 0.6 W/m2 K |
| Water absorption % | <0.3% |
| Light transmission | <0.2 % Transmission |
| Insulation thickness | 40mm Expanded Polystyrene |
| Insulation cover | ABS |

## 11 Approvals

- M100 WRc approved, capacities to 4.00m deep -Listing 0706068.
- M100-B30 WRc approved, capacities to 4.00m deep - Listing 0706067.



BALMORAL

**BALMORAL SECTIONAL TANKS LTD**

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2-089-DOC-REV2-0511

# Appendix D

Green Roof Details


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# AXTER
# Q37 HYDRO-BIODIVERSE

**PROJECT NAME**
834 JOHN DALTON STREET

**PROJECT ID**
15215

**SPECIFICATION REF.**
15215-2/32/MS

# AXTER
# Q37 HYDRO-BIODIVERSE

| ROOF AREA | ROOF STRUCTURE | DATE | |
|---|---|---|---|
| Level 10 Bio-diverse brown roof zones | Wilotekt-Plus over concrete | 4th March 2022 | |

| PREPARED BY | | EMAIL | |
|---|---|---|---|
| Matthew Saunders | | msaunders@axterltd.co.uk | |

## HYDROPACK BIODIVERSE LIVING ROOF FINISH

Create a space for habitat to flourish by choosing a specially designed biodiverse roof that includes specific plants and soil to benefit the local environment.

# Q37 LIVING ROOF COVERING

To be read with Preliminaries/ General Conditions.

## GENERAL BIODIVERSE GREEN ROOF SYSTEM

### 130A EXTENSIVE LIVING ROOF COVERING

To be read with Section J31 WILOTEKT-PLUS Inverted roof specifications for Living Roofs.

**HYDRO-BIODIVERSE BROWN**

Hydro-Biodiverse Brown living roof system comprising a water retention and drainage layer, integral filtration membrane and engineered growing medium designed to replicate the biodiversity of the original brownfield site. Additional planting options, Hydroseed bio-diverse seed mixes and/or micro-habitat creation, can also be supplied to enhance biodiversity.

Installation of Axter living roof systems is carried out by accredited Axtershield Installers / approved living roof installation teams. All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.

System manufacturer: Axter Ltd, West Road, Ransomes Euro Park, Ipswich, IP3 9SX , Tel: 01473 724056, Fax 01473 723263, email info@axterltd.co.uk, internet www.axter.co.uk

- Roof Type and thermal insulation as per J41/ J31
- Moisture control layers: HYDRODRAIN 20
- Filter layer: as per HYDRODRAIN 20
- Growing medium: Axter HYDROSOIL substrate, above the HYDRODRAIN 20.
  - Depth: 100mm
- Vegetation (option): Axter HYDROSOIL SEED comprises of seed mix to suit – Refer to clause no 400E. Refer to designated area/s on landscape architects design.
- Installation as clause 801A.

**IMPORTANT DESIGN NOTES:**

- Maintenance and irrigation strategy designed in accordance with Axter Living Roof maintenance guide and implemented by Axter Ltd maintenance partners and /or the building owner or facilities maintenance operator.
- Watering points must be provided to all living Roof areas.
- Roof Access strategy must be determined by the project architect

**ACCESSORIES**

- AXTER RETAINING ANGLE 120mm perforated edge retaining profile, corners and connectors.
- AXTER Rainwater Outlet Inspection Chambers.
- 20 mm to 40 mm rounded washed river gravel to all abutments, perimeters and protrusions (maintain a minimum 500mm wide sterile margin).
- 500 x 500mm square micro habitat areas to be created in 20mm to 40mm rounded washed river gravel / shingle to same depth as brown roof system

# PERFORMANCE

## 210 GENERAL DESIGN

- Green roof and associated features: Complete the detailed design.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.
- Performance criteria: as required.
- Installation of Axter living roof systems is carried out by accredited Axtershield Installers. All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.

## 255 MAXIMUM PERMITTED GREEN ROOF LOADS:

- Dead loads:
  - Total Saturated weight: ***(brown) 125 kg/m²*** kg/m²

## PRODUCTS

### 340A DRAINAGE/ MOISTURE CONTROL LAYER

- Manufacturer: Axter Ltd.
  - Product reference: HYDRODRAIN 20.
- Material: Recycled HDPE.
  - Capacity: 5.5 litres/m²
  - Depth: 20mm

### 390 GROWING MEDIUM

- Manufacturer: Axter Ltd.
  - Product reference: Axter HYDROSOIL substrate.
- Material: Recycled crushed brick/mineral and composted green waste (certified PAS 100)
- Depth: 100mm
- Weight (dry): approx. 790kg/$m^3$
- Weight (saturated): approx. 970kg/$m^3$

### 400A BIO-DIVERSE SEED SYSTEM – where required

- Manufacturer: Axter Ltd.
  - Product reference: HYDRO-BIODIVERSE SEED
- Planting mix: mixed seed of sedum, wildflowers, alpines and sedum shoots to encourage biodiversity. Standard seed mix is London Wildflower Seed Mix. 36 species of native wildflowers and sedums and is designed to encourage biodiversity on extensive, intensive and podium living roofs. Mix includes *Agrimonia Eupatoria, Lotus Corniculatus, Silene Vulgaris, Linaria Vulgaris, Primula Veris, Plantago Media, Anthyllis Vulneraria, Galium Verum, Leucanthemum Vulgare, Hypericum Perforatum, Sanguisorba Minor, Prunella Vulgaris, Echium Vulgare, Papaver Rhoeas, Campanula Glomerata, Centaurea Nigra, Ranunculus Arvensis, Centaurea Cyanus, Chrysanthemum Segetum, Knautia Arvensis, Hippocrepis Comosa, Origanum Vulgare, Ranunculus Bulbosus, Leontodon Autumnalis, Malva Moschata, Ranunculus Acris, Reseda Lutea, Sedum Acre, Sedum Album, Centranthus Ruber, Adonis Annua, Agrostemma Githago, Anagallis Arvensis, Anthemsis Arvensis, Matricaria Recutita, Mysotis Arvensis.*
- Substrate base: 75mm – 150mm biodiverse contoured growing medium
- Density: 3g / m²
- Best sown in late Autumn to early Spring.

### 420 EDGE RETAINING PROFILE (to exposed edges of greening)

- All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.
- Manufacturer: Axter Ltd.
  - Product reference: Axter edge profile.
- Material: Aluminium.
- Height: 120mm

### 430 INSPECTION CHAMBERS (to all internal rainwater outlets)

- Manufacturer: Axter Ltd.
  - Product reference: Axter inspection chamber.
- Material: Polyester powder coated steel.
- Size: 300 x 300 mm.
  - Depth: To suit planting.
  - The lid of the chamber must be level with, or higher than, the surrounding landscaping. For landscaping exceeding 100mm, additional height adaptor units (available in 50mm or 100mm depths) must be used to achieve the required chamber depth, with the chamber lid at least level with the surrounding landscaping or higher.
- Access covers: integral into the unit.
- Features: perforated base.

## 460 SUPPORT PEDESTALS (for paving slabs)

- Manufacturer: Axter Ltd.
  - Product reference: Axter adjustable paving slab supports.
- Type: Screw jack pedestal.
- Material: Recycled polypropylene.
- Size: (Fixed Height) 8mm / 20mm
- Size: (Adjustable) 25-40mm / 40-60mm / 60-90mm / 90-150mm / 150-260mm
- Additional pedestals: Adjacent to perimeters.
- Accessories: Not required.

## 470 STONE BALLAST TO MARGINS AND FIRE BREAKS

- All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.
- Condition of substrate: Clean.
- Type: Washed, round aggregate.
- Supplier: Contractor's choice.
- Size: Graded 20-40mm, free from fines and sharps.
- Previously laid materials: Protect during laying of ballast.
- Laying: Spread evenly. Do not pile to excessive heights.
  - Depth (minimum): to suit green roof system
  - Width (minimum): 300mm to 500mm
  - A 500mm fire break is required where the green roof is adjacent to: opening roof lights, opening doors, opening windows.

# EXECUTION GENERALLY

## 710 INSTALLATION GENERALLY

- Preparation: Clear all surfaces of debris.
  - Timing: After certification of waterproof membrane integrity.
  - Surface condition: Visually inspect waterproof membrane, report any damage.
- Faults in waterproof membrane: Report and remediate as in accordance with Axter's QA /Guarantee requirements prior to covering. Evidence of all remedial works to be provided to Axter Ltd.
- Contamination: Do not use materials detrimental to healthy plant growth.
- Storage: Do not overload.
  - Point loads: Avoid.
- Outlets: Do not block.
  - Outlet grilles: Installed.
- Installation of Axter living roof systems is carried out by accredited Axtershield Installers. All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.

## 715 QUALITY AUDIT INSPECTIONS

Quality audit inspections are required to demonstrate that the installation has been completed in compliance with the project specification.

**Inspections:** To obtain an Axter Silvershield, Goldshield or Platinum Guarantee, Quality Audit (QA) inspections must be completed by Axter QA Management during the installation process and in accordance with the system specific QA sequence procedure. QA inspections must be completed with the roofing contractor (Accredited Installer) in attendance to ensure the installation is proceeding in accordance with Axter's specification, guarantee requirements and relevant codes of practice. A structured QA report combined with supporting photographs will be issued to the roofing contractor following each inspection. QA reports will seek to identify good and bad practice and monitor the works progression. QA Reports will, where appropriate, make recommendations for remedial works that the roofing contractor must complete in order to satisfy Axter system guarantee requirements. QA inspections are not required to obtain an Axter Bronzeshield Guarantee or material Warranty, but are mandatory to obtain all other guarantee types.

**Self-Certification:** On small projects (projects with a combined total area <50m2) that require a Silvershield Guarantee it may not be practical for Axter to complete QA inspections. In such instances the roofing contractor may apply to Axter to self-certify the installation. Self-certification applications must be received in writing from the roofing contractor, and client approval should be obtained in writing by the roofing contractor prior to commencement of the works. Silvershield guarantees on self-certified projects will not be issued without a self-certification form having been successfully completed and issued to Axter by the roofing contractor. It is the responsibility of the roofing contractor to comply with Axter's self-certification process. Failure to comply will result in a Bronzeshield guarantee or a material warranty being issued.

**Planning inspections:** The roofing contractor must assist in the planning of all QA inspections and ensure their representatives are available to accompany Axter QA Management on the day of inspection.

**Guarantee:** Sequential and final QA inspections are mandatory on all Silvershield, Goldshield and Platinum guaranteed works. Depending on the size (>50m$^2$) and complexity of the roof Silvershield, Goldshield and Platinum guarantees are required to be electronically tested. Silvershield, Goldshield and Platinum guarantees will not be issued without a sequential QA record and a final QA inspection report having been successfully completed. On projects >50m$^2$ electronic test reports must also be provided to Axter as part of the guarantee application.

## 715A FINAL QUALITY AUDIT INSPECTIONS

**Timing of final inspection:** Once practical completion of the waterproofing works has been achieved all areas should be clear of stored material, site operations and all protection. A thorough visual and recorded inspection of all areas must be carried out by Axter QA with representation from the accredited installer (roofing contractor), main contractor, developer and/or client in attendance.
**Conditions:** All non-compliant items must be resolved or recorded as a reserved matter within the final QA report. Reserved matters are items that are removed from guaranteed works. Please refer to Axter Guarantee information sheets for further reference.

## 720 ADVERSE WEATHER

- Unfinished work: Secure from damage and wind uplift.
- Conditions: Do not install or work with frozen materials
- Do not install during periods of drought or frost and/or any other extreme weather conditions.

## 790 GROWING MEDIUM INSTALLATION

- Handling: Minimize
  - Conditions: Handle in the driest condition possible. Do not handle or install when wet or frozen or during extreme heat or drought.
- Layers:
  - Depth: 100mm or as determined by the landscaping consultant.
  - Sequence: Gently firm each layer before spreading the next.

## 791 BIODIVERSITY DESIGN REQUIREMENTS

- Give notice of 7 days for approval of proposals in line with this clause
- Submit proposals for areas that will be left to naturally colonise with indigenous flora and fauna.
- Submit proposals if graded shingle is also be incorporated. These areas can be designed to provide raised mounds within the broad design and should be of varying height.
- They should constitute at least one fifth of any roof area where required.
- Submit proposals for wooden elements (e.g. dry logs 100mm x 500mm x 1000mm) to provide an important rotting wood ecological niche for rare invertebrates.
- Weight loadings for any surface landscaping items, such as rocks, logs, undulating areas of growing medium and fully established planting /vegetation, making up the biodiversity landscaping are subject to a structural engineer's approval.

## 801B SEED SYSTEM INSTALLATION

- Density: 3g/m²
- Preparation: Growing medium must be free of weeds, have reasonable texture and structure and can retain moisture. A depth of 80 -100mm or more is best for supporting the widest range of plant species.
- Sowing: Seeds are best sown in the autumn or spring but can be sown at other times of the year if there is sufficient warmth and moisture. On shallow growing medium, irrigation may be needed to maintain establishment through dry periods.
- For further information please contact Axter Ltd.
- Watering: Thorough, immediately after laying and dressing.

# SURFACING

## 820 EDGE RETAINING PROFILE INSTALLATION

- Installation of Axter living roof systems is carried out by accredited Axtershield Installers. All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.
- Cutting: Neat, accurate and without spalling.
  - Junctions: vertical, secured using proprietary connectors.
- Position: True to line and level. Smooth continuous lines.
- Fixing: Overlapped by roof coating.

## 830 INSPECTION CHAMBER INSTALLATION

- Location: Install centrally over drain outlet.
  - Orientation: Align parallel with adjacent features.
- Bedding: Proprietary support base.
- Backfill: Ballast.
- Surround: Growing medium.

## 840A PEDESTAL INSTALLATION

- Ensure that surface to accept pedestals is clean and free of debris.
- Setting out: Mark centre-point of pedestal on substrate surface, with perpendicular guidelines to ensure square layout.
  - Orientation: Align parallel with adjacent features.
  - Spacing: To suit paving material and dimensions.
- Overall movement tolerance (maximum): 3 mm.

## 840B LAYING STONE BALLAST AND FIRE BREAKS

- Installation of Axter living roof systems is carried out by accredited Axtershield Installers. All system components are specified and installed to ensure compatibility, single source responsibility, and compliance with Axter recommendations and the Green Roof Organisation (GRO) Code.
- Condition of substrate: Clean.
- Gravel guards: Fit to outlets.
- Laying: Spread evenly. Do not pile to excessive heights.
  - Depth (minimum): 50mm
  - Width (minimum): 300-500mm

# COMPLETION

## 910 INSPECTION

- Timing: Before handover.
- Final roof inspections by AXTER Quality Assurance (QA) personnel are mandatory for guarantee application.
- Inspections to be completed in accordance with AXTER QA Sequence documentation.
- Inspections should be completed with the Roofing Contractor (Ai) and Main Contractor/Developer/Client representative in attendance.
- Submit completed reports to Axtershield Installer (Ai) and all relevant parties as agreed at project pre-start.
- Living roof installation must not commence until Axter Ltd QA have carried out a final inspection to the waterproofing and have passed this as suitable for guarantee. It is the responsibility of the roofing contractor to advise and organise this inspection with Axter Ltd. Please note that we cannot guarantee any waterproofing that has been landscaped without this inspection having been carried out and passed as acceptable.
  - Give notice (minimum): 5 working days.

## 910A ESTABLISHMENT WATERING REQUIREMENTS

- For vegetation blankets, it will be necessary to keep the blanket substrate damp for a period of at least 10 weeks (subject to type and time of year) during the period of vegetation establishment. It should be established at tender stage, whom should carry out this task and that they have all relevant information available regarding watering requirements.
- It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water and ensure that the planted growing medium is thoroughly irrigated immediately after installation.
- An adequate mains water supply of sufficient pressure must be available and operational prior to the planting being delivered and installed. Initial watering must be by surface mounted sprinklers. For larger roofs this will likely entail more than one watering point at roof level.

## 920 COMPLETION

- General: Leave the works in a clean, tidy condition.
- Surfaces: Clean immediately before handover.
- Outlets: Clean and clear of obstructions.
- Completed green roof: Protect from adjacent or high level working.

## 920A ROOF WATERPROOFING INTEGRITY TEST

Waterproofing integrity testing is required to demonstrate the integrity of the waterproof membrane at practical completion.

**Testing authority:** Integrity testing must be undertaken by a suitably qualified and experienced third party certified test agency who is independent of the roofing contractor. Waterproofing integrity testing methods that are not in accordance with The Roofing and Waterproofing Test Association https://rawta.org.uk/ recommendations for the type of waterproof membrane installed must not be used as these may damage the waterproofing and invalidate Axter system guarantees. Guidance on waterproofing integrity test methods and their application can be found on The Roofing and Waterproofing Test Association website https://rawta.org.uk/.

**Timing of test:** As required, prior to installation of all roof finishes and prior to completion of Axter's final QA inspection.

**Testing:** The waterproof membrane should be visually inspected, and tested for defects at practical completion. Any defects should be repaired by the accredited installer (roofing contractor), retested, and left in a satisfactory condition. Waterproof membranes on flat roofs, terraces, and balconies greater than 50m$^2$ must be subject to visual and recorded inspection by Axter QA Management, and an appropriate integrity test undertaken by a suitably qualified and experienced third party certified test agency who is independent of the roofing contractor. Waterproof membranes under 50m$^2$, or roofs which are difficult to access (e.g buildings over 3 storeys), or those unsuitable for electronic testing (e.g. foil-faced bitumen membranes) may be checked for integrity by visual and recorded inspection only. This visual and recorded inspection should be completed by Axter QA Management and include inspection of all membrane laps and seams with suitable probes. On self-certified projects visual and recorded inspection should be completed by the roofing contractor.

**Condition of roof prior to testing:** Waterproof membrane complete to a stage where system integrity can be tested.

**Surface:** Clean, clear of all stored roofing material, site operations and protection.

**Test results:** The testing service provider should provide in their report:

- Date of test
- Project name, address and reference number
- Name, Address and Contact of testing agency
- Description and efficacy of the waterproofing installation.
- Experience and training of test operative.
- Membership of an appropriate trade association, that sets a code of conduct for the service.
- Details and provision of large, clear photographs, of defects identified (When applicable)
- Number of tests undertaken.
- Confirmation of result of testing.

The test report must be sent to Axter prior to guarantee application. The test report should also be made available to the Warranty surveyor (NHBC/LABC) prior to handover where applicable.

**Additional testing**: May be required if defects have occurred as a result of damage from follow on trades, or the completed waterproofing membrane has been used for storage without adequate protection.

**Guarantee:** Waterproofing integrity testing is required to obtain Silvershield, Goldshield and Platinum system guarantees. All test reports must be provided to Axter prior to starting a guarantee application. Testing must take place at practical completion (prior to handover), and before the waterproofing works are covered by insulation and roof finishes are installed. Failure by the roofing contractor to provide a detailed test report will prevent Axter's guarantee from being issued. NB - Waterproofing integrity testing is not compulsory to obtain an Axter Bronzeshield Guarantee or a material Warranty.

## 930 DOCUMENTATION

- Timing: Submit at handover.
- Contents:
  - Growing medium declaration of analysis.
  - Manufacturers' guarantees and warranties.
  - Procedures for maintenance of the green roof.
  - Record drawings showing the location of planting and associated features.
- Number of copies: as required.

## Disclaimer

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Bitumen Waterproofing
Hot Melt Waterproofing
Liquid Waterproofing

# Product Data Sheet

## HYDRO-BIODIVERSE SEED LIVING ROOF

### Comprising a water retention and drainage layer with bonded filter fleece, contoured growing medium and biodiverse seed mix

Axter's living or green roof systems are designed to accommodate the most varied ecological and environmental requirements. The combination of long-term system performance with horticultural expertise ensures full compliance with national, local and project specific environmental biodiversity and attenuation criteria.

A living roof, as well as being an aesthetically pleasing addition to a building, offers many other advantages:

- Increased biodiversity, creating habitat for birds, bees and invertebrates
- More usable space on the roof (e.g. for gardens, amenity, play and educational areas)
- Less urban heat island effect
- Reduced rainwater run off flow rates
- Better air filtration
- Increased sound insulation and thermal efficiency



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**Biodiverse living roofs** are designed to create a habitat for a specific requirement of flora and fauna and are generally designed as part of an extensive green roof. Also referred to as brown roofs sometimes, they are often designed to replicate the original footprint of the building or are created to enhance the pre-development habitat with additional plant species. The growing medium is purposely selected to allow indigenous plant species to cover the roof over time.

## Key benefits

- Landscaped areas with different contour levels attract different wildlife
- Increases indigenous biodiversity of the development site
- Logs provide habitat for invertebrates
- Wetland areas and ponds provide ecosystems for wildlife
- Using seeds or plug plants of species that are indigenous to the locality
- Reclaimed or recycled materials from the building site itself can be used

Axter supplies specialist growing medium to suit the requirements of the planting regime but in many cases soil and spoil from the development site can be recycled and used on the roof. Various habitats can be created by contouring the soil, providing different substrates, soil, rocks, sand, gravel, crushed concrete and by adding features such as rotting wood and ponds. The aim is to develop a number of different environments on the roof, each favouring different species and increasing biodiversity.

## Hydro-biodiverse Living Roof options:

HYDRO-BIODIVERSE WILDFLOWER

HYDRO-BIODIVERSE SEED

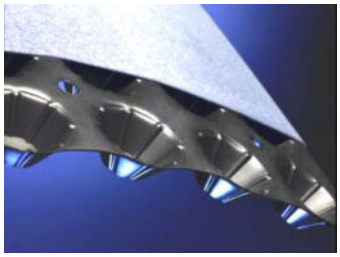
HYDRO-BIODIVERSE PLUG PLANT

## HYDRO-BIODIVERSE SEED LIVING ROOF

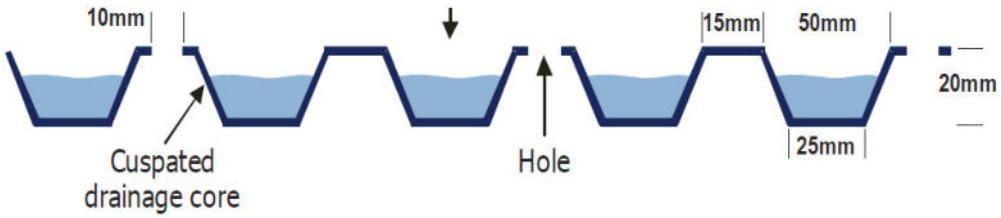
- Water retention and drainage layer (20mm)
- Filter layer (1mm)
- Biodiverse substrate layer 100mm (substrate surface contour +/- 20mm) fauna biodiversity
- Biodiverse seed (broadcast rate 2–3 g/m$^2$) for biodiverse extensive living roof system
- Microhabitat creation



## Water retention and drainage layer (20mm)



High compressive strength, rigid HDPE board acting as both drainage and water retention layer, with a geotextile filter layer bonded to one side. The board contains high capacity dimples (height approx. 20mm) for water retention and perforations to drain surplus water. It is resistant to root penetration and to chemicals.




| Drainage sheet (cuspated, perforated) | Test Standard | Units | Value |
|---|---|---|---|
| Polymer | High Density Polyethylene | | |
| Cuspate height | | mm | 20 |
| Compressive strength | EN ISO 25619-2 | kPa | 115 |
| Tensile strength (MD/CMD) | EN ISO 10319 | kN/m | 17 |
| Static Puncture (CBR) | EN ISO 12236 | kN | 2.6 |
| Perforations per $m^2$ | | | 49 |
| Perforations diameter | | mm | 10 |
| Thickness @ 2kPa | EN ISO 9863-1 | mm | 21 |
| Water flow through perforations | EN ISO 11058 | l/($m^2$.s) | 24 |
| Water storage capacity | | l/$m^2$ | 4 |
| Roll dimensions | | m | 0.97 x 50 |
| Roll diameter (approx.) | | m | 1.1 |
| Roll weight (approx.) | | kg | 60 |

| Geotextile | | | |
|---|---|---|---|
| Polymer | Polypropylene | | |
| Water permeability ($V_{H50}$) | EN ISO 11058 | l/($m^2$.s) | 100 |
| Apparent opening size | EN ISO 12956 | µm | 80 |

## Filter layer (1mm)



Fleece filter layer for use on all sedum and biodiverse living roof systems. Manufactured using UV stabilised polypropylene, it provides high tensile properties and excellent durability. Its high density and strength, resulting from re-orientation of the molecules within the fibres during manufacturing, increase its environmental resistance and mechanical properties. It is resistant to root penetration and to chemicals.

The filter layer should be covered within one month of installation.

Expected durable service life of the material is up to 50 years in soils with $4 \leq pH \leq 9$ and soil temperatures $\leq 25$°C, based on a durability assessment.

| Physical properties | |
|---|---|
| Composition | Non-woven geotextile made from 100% virgin polypropylene high tenacity fibres, heat treated, needle punched, containing UV inhibitor |
| Weight (g/m$^2$) | 123 |
| Colour | White |
| Unit supplied | Rolls: Unit width (lm) 1.13 x Unit length (lm) 100 |
| Roll weight (kg) | 14 |
| Thickness @ 2kPa (mm) | 0.8 |
| | |

| Technical properties | Value | Standard |
|---|---|---|
| Tensile strength (kN/m) – MD/CMD | 9.0 – 9.8 | EN ISO 10319 |
| Elongation at max load (%) MD/CMD | 60 / 65 | EN ISO 10319 |
| CBR static puncture (kN) | 1.4 | EN ISO 12236 |
| Cone drop penetration (mm) | 32 | EN ISO 13433 |
| Apparent opening size (µm) | 80 | EN ISO 12956 |
| Water permeability (l/m$^2$.s) | 100 | EN ISO 11058 |
| Weathering 50 Mj/m$^2$ (1 month) | >90% retained strength | EN ISO 12224 |

## Substrate layer (100mm)

Moisture retentive, low nutrient, free draining when saturated, allows root penetration. A special mix of organic material with clean and screened aggregates recycled from certifiable building industry waste products. Suitable for use on extensive wildflower and biodiverse roof systems. Green waste meets PAS 100 standards.

| Physical properties | |
|---|---|
| Composition | Recycled crushed brick/mineral and composted green waste (certified PAS 100) |
| Brick grading | Various sizes of graded brick to promote a more biodiverse environment |
| Colour | Dark brown |
| Suggested depth | 80 - 150 mm |
| Sizes | 25 litre sacks and bulk bags |

| Technical properties | |
|---|---|
| Weight (dry) | 790 kg/$m^3$ |
| Weight (saturated) | 970 kg/$m^3$ |
| Compaction | Approx 15% (+/-3%) |
| pH | 7.5 – 8.5 |

Recommended minimum substrate depth is 100mm.
Hydro-Biodiverse Seed with 100mm substrate is 125kg/$m^2$ wet.

## Biodiverse Seed

Our London Wildflower Seed Mix* contains 36 species of native wildflowers and sedums (no grasses) and is designed to encourage biodiversity on extensive, intensive and podium living roofs. The mix has been created to combine natural plant life found in London in particular and the South East of England in general. The plants provide a variety of colour and habitat to attract pollinators and a long flowering season from Spring to late Autumn.

They are also wind, frost and drought tolerant and will gradually provide an even cover of vegetation across the roof area.

Seed is cast at 3g/$m^2$ on to contoured 75-150mm biodiverse growing medium. The seeds are best sown in late Autumn or early Spring when optimum germination conditions occur.

*Other seed mixes are available to suit local ecological requirements; contact Axter for more information.

| Physical properties | |
|---|---|
| Material | Seeds as described above.<br>Best sown in late Autumn or early Spring months, to benefit from optimum warmth and moisture. |
| Unit size | Seed size depends on species/genus. |
| Substrate depth | 75-150mm contoured, sufficient depth to support the established plant. |
| Density | Approx. 3g / $m^2$ |
| Colour | Seasonal variation |

## Wildflower species – London Seed Mix

36 wildflower species native to the UK are sown (subject to seasonal variations):

Agrimony (Agrimonia Eupatoria),
Bird's Foot Trefoil (Lotus Corniculatus)
Bladder Campion (Silene Vulgaris)
Common Toadflax (Linaria Vulgaris)
Cowslip (Primula Veris)
Hoary Plantain (Plantago Media)
Kidney Vetch (Anthyllis vulneraria)
Lady's Bedstraw (Galium Verum)
Ox-Eye Daisy (Leucanthemum Vulgare)
Perforate St John's Wort (Hypericum Perforatum)
Salad Burnett (Sanguisorba minor)
Self Heal (Prunella vulgaris)
Vipers Bugloss (Echium vulgare)
Common Poppy (Papaver rhoeas)
Cluster Bellflower (Campanula glomerata)
Common Knapweed (Centaurea nigra)
Corn Buttercup (Ranunculus arvensis)
Cornflower (Centaurea cyanus)
Corn Marigold (Chrysanthemum segetum)
Field Scabious (Knautia arvensis)
Horseshoe Vetch (Hippocrepis comosa)
Wild Marjoram (Origanum vulgare)
Bulbous Buttercup (Ranunculus bulbosus)
Autumn Hawkbit (Leontodon autumnalis)
Musk Mallow (Malva Moschata)
Meadow Buttercup (Ranunculus acris)
Wild Mignonette (Reseda lutea)
Biting Stonecrop (Sedum acre)
White Stonecrop (Sedum album)
Red Valerian (Centranthus ruber)
Pheasant's Eye (Adonis annua)
Corn Cockle (Agrostemma githago)
Scarlet Pimpernel (Anagallis arvensis)
Corn Chamomile (Anthemsis arvensis)
Corn Mayweed (Matricaria recutita)
Common Forget-me-not (Mysotis arvensis)

## Microhabitat Creation

Seasoned logs, rocks and a variety of substrates (sand, gravel, crushed concrete, etc) used to create different roof top environments each supporting a different species, to maximise biodiversity.

## Maintenance

An annual maintenance programme for wildflower living roofs is recommended, to include two visits per year, one in the Spring (remedial) and one in the Autumn (cutting), when vegetation should be strimmed after flowers have seeded.

The substrate must be watered before and after planting and the system kept moist for at least three months after installation and as weather conditions require. Further information is available in the Axter Living Roof Maintenance Guide.

## Design Considerations

A living roof calls for a robust waterproofing system able to withstand the increased loads and suitable for the building structure.

The waterproofing for biodiverse and brown roofs can be either of a warm or inverted construction. Recommended Axter BBA / ETA certified, high performance waterproofing systems designed to fulfil this function are Cityflor and Wilotekt-Plus.

Each living roof is different, so we design bespoke solutions drawing on our many waterproofing options and including in the specification the planting selections best suited to the environment to ensure all roof and surrounding area criteria are met.

The following points must be included in the living roof design:

- Roof to be capable of supporting the design load
- Adequate provision to drain excess rainwater
- Safe access for maintenance
- Robust and durable roof waterproofing
- Root resistant membranes must be considered

For further assistance with living roof design, specification, installation and maintenance, contact Axter.

Axter Ltd reserves the right to make changes without notice at any time to the above products. The values given are indicative and correspond to nominal results obtained in laboratories and testing institutes. Any additional installations must be discussed with Axter prior to their installation.
Final determination of the suitability of any information is the sole responsibility of the user. Consult Axter to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.