



Drainage Strategy Report

Palatine Road, Didsbury M20 2WF Marco Living 3 Ltd

05/12/2024

**21724-CCL-XX-XX-RP-C-00500
Rev. 00**

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Document Origin

Revision	Date	Revision Description		Name	Signature
00	05-12-24	First Issue	Prepared	W Wright	
			Checked	C Dawson	
			Approved	C Bebbington	

Development Proposals:

The proposed scheme involves the demolition of three existing residential buildings containing 22 apartments. The redevelopment of the site will create 70 new dwellings split between a mixed apartment block and traditional houses.

The new 5 story apartment building will comprise 54 one-, two- and three-bedroom apartments with 16 five-bedroom houses in both semi-detached and townhouse arrangement. The proposal includes 48 parking spaces associated with the apartment buildings, 8 of which are located within the front curtilage adjacent to Palatine Road, the remaining 40 spaces in a lower ground parking area to the rear of the site. In addition, the houses will all have garages, also at lower ground floor level.

A landscaped amenity space, on a podium deck above the lower ground parking, is to be created at the rear of the site between the semi-detached houses and the townhouses.

The total site area, all of which is subject to redevelopment, is 5,966m², 0.597Ha.

Site location:

The site is located adjacent to Palatine Road, B5617, towards the southern edge of Didsbury, close to its border with Northenden. It is approximately 7.00km south of Manchester city centre and 100m west of the River Mersey.

Immediately north of the site is the Britannia Country House Hotel with associated parking and open land. To the south is Brookside, an age exclusive housing project. Across Palatine Road to the east is Withington golf course.

The full site address is:
232 – 236 Palatine Road
Didsbury
Manchester
M20 2WF

Grid Reference:
SJ 835909
E 383588; N 390961

Site Overview:

The site is rectangular in shape, approximately 105m deep (east to west) and 57m wide (north to south). It is generally flat north to south with a gentle fall of between 0.90m-1.70m from east to west, from Palatine Road towards the River Mersey. A topographical survey of the site can be found in **Appendix 1**.

There are 22 existing apartments spread over three large, detached dwellings on the site totalling 673m². Between the three buildings there is tarmacked access and parking areas totalling 1,587m². The remaining 3,706m² of the site is made up of gardens and landscaping.

The new development is to consist of 3 residential blocks, the 54 unit 5-story apartment block fronting Palatine Road, a terraced block of 8 townhouses to the rear, north of the podium deck, and 8 semi-detached townhouses to the south of the podium deck.

The proposed layout with landscaping is in **Appendix 2**.

Flood Risk

Flood Risk Assessment

The development site is located in **EA Flood Zone 3**.

A Flood Risk Assessment (FRA) has been carried out by Fairhurst, document 159923/01. Reference should be made to that document where the sources of flood risk are identified and recommendations made to mitigate against the risks identified.

The flood risk identified in the FRA is fluvial flooding from the River Mersey with EA flooding modelling providing 100yr+30% storm event defended levels. Other sources of potential flooding (Coastal/Tidal, Groundwater, Overland Flow & Drainage) have all been discounted as a source of flood risk within the FRA.

The FRA recommends **minimum ground floor slab levels of 30.690mAOD** for the residential areas with associated flood resilient materials and construction techniques, as well as providing safe egress routes for any uninhabited basement/lower ground floor level areas below the modelled flood levels.

North West SUDS Pro-forma

In addition to the FRA report all major development sites (above 10 dwellings) within the Manchester City Council area are required to complete and submit the North West SUDS Pro-forma.

The completed proforma can be found in **Appendix 3** and its findings and requirements are reflected in this report.

Local Flood Risk Management Strategy

The drainage of the developed site needs to be carried out in accordance with the principles laid out in the Local Flood Risk Management Strategy document which has been carried out for Manchester City Council, Salford City Council and Trafford Council.

Contained within this document is Policy 6 which sets out measures to ensure that local flood risk is properly considered for new development proposals.

For brownfield redevelopment sites Policy 6 advises that sites within the Critical Drainage Areas, and consistent with Core Strategy policy EN14 Flood Risk, developers should aim to minimise surface water runoff from developments by means of a 50% runoff rate reduction for brownfield sites, with an aim of reducing runoff rates up to a 1 in 100 year storm event, including consideration of climate change.

In the FRA a 41% climate change factor is suggested to be used for flow calculations and storm simulations for 100 year storm events. The climate change allowance for peak rainfall within the Upper Mersey Management Catchment, in which the site is located, taken from DEFRA Hydrology mapping (**Appendix 4**) is given as 45% for the upper end allowance for developments with a lifetime of between 2061 and 2125 which would be relevant to this site.

As such **a climate change factor of 45% is to be used**.

Existing Drainage

The United Utilities (UU) public sewer records can be found in **Appendix 5**.

The public sewer records show a 300dia increasing to 600dia combined sewer running southwest to northeast in the far side lane of Palatine Road. In addition to this there is 525dia increasing to 600dia surface water sewer draining northeast to southwest in the nearside lane of Palatine Road. This sewer discharges into a section of culverted unnamed watercourse approximately 100m southwest of the site entrance. This watercourse then discharges to the River Mersey approximately 150m further downstream.

An assessment of the existing sewers on site and pre-development hard standing areas is shown on drawing 21724-CCL-XX-XX-DR-C-00505 and found **Appendix 6**. This drawing includes the conjectured point of connection from the site into the public sewer network.

The existing stie is served by a private combined drainage system which appears to drain to the United Utilities 600dia combined sewer in Palatine Road. The area drained to the sewers is 1,901m² (673m² from the houses and 1,228m² from the tarmacked parking areas. A further 359m² of tarmacked areas appears to have no formal drainage provision and just sheds to ground.

By modelling the on-site drainage network (**Appendix 7**), using the survey information and established contributing areas, and simulated using the Wallingford methodology in MicroDrainage the peak discharge rate, discharging to the public sewer in Palatine Road can be determined.

Worst Case 1yr Storm event flow	20.8 L/sec
Worst Case 2yr Storm event flow	26.2 L/sec
Worst Case 30yr Storm event flow	47.4 L/sec
Worst Case 100yr Storm event flow with 0% Climate Change	54.9 L/sec

The 100yr 360min discharge volume, discharging to the public sewer network can also be determined.

$$100\text{yr } 360\text{min Volume discharge to sewer} = 93.1 \text{ m}^3$$

SUDS Hierarchy

Infiltration

The site Investigation report found the development to be underlain with made ground and sandy clays. Groundwater strikes were consistently made at shallow depths making the site unsuitable to an infiltration-based drainage solution.

The drainage assessment of the existing site has established that there are no existing soakaways on the site.

Based on this evidence, and with the site being in Flood Zone 3, the use of an infiltration-based approach to draining the works can largely be discounted.

Partial infiltration is proposed to be used in the SUDS products selected to attenuate and slow down the discharge rate and volume of the developed site, however, these products will ultimately discharge to the public sewer network (see below). These permeable but tanked/lined SUDS features include a Blue Roof to the apartment block, a landscaped Green/Blue Roof amenity space on the podium decking and permeable paving to some parking areas.

Local Watercourse

The nearest watercourse is approximately 100m away into which the public surface water sewer in Palatine Road discharges. This watercourse then discharges to the River Mersey

A connection to the watercourse, via the public sewer network, can therefore be considered.

Surface Water Sewers

It has been determined that the existing site is served by a combined sewer network that discharges into the United Utilities combined public sewer in Palatine Road.

Where possible development sites should connect into a local surface water sewer where it is a deliverable alternative to an existing connection into a combined sewer. This is as laid out in policy 6 of the Local Flood Risk Management Strategy and in accordance with United Utilities policy.

This is the option used in this report and a new connection to the public surface water sewer in Palatine Road is considered deliverable.

Combined Sewers & Highway Drains

The surface water element of the existing discharge to the combined public sewer in Palatine Road is being removed and directed at a restricted Q_{BAR} discharge rate into the adjacent surface water sewer.

There are no known highway drains in the immediate vicinity of the site, and it is a Manchester City Council policy to not accept surface water flows into the highway drainage network.

Drainage Proposals

Surface Water Drainage

The existing site drains via private combined sewers into the combined public sewer network in Palatine Road. It is proposed that the developed site is served by a separate surface water network draining to the public surface water sewer in Palatine Road. The new separate foul network will continue to drain to the public combined sewer in Palatine Road.

With the new surface water connection being into the public surface water sewer, instead of retaining the existing combined sewer outfall, it is determined that flows should be limited to the 2yr Q_{BAR} greenfield run-off rates for all storm events up to 100yr + climate change storms (See section on NW SUDS Proforma and **Appendix 3** for justification of implementation)..

The 2yr Q_{BAR} discharge rate has been calculated as 5.20 L/sec and is shown in **Appendix 8**.

Dialogue is to be sought with United Utilities (UU) with respect to accepting the new flow into the surface water network in the location suggested in Palatine Road in accordance with the principles of the SUDS hierarchy and UU's own policy of removing surface water flows for combined networks. Whilst it is now proposed to discharge the surface water sewer instead of the combined sewer the overall discharge rate to the UU network is significantly reduced (see next page).

Drawing 21724-CCL-XX-XX-DR-C-00506 in **Appendix 9** shows the drained surfaces and areas directed to the public sewer outfall in Palatine Road.

A preliminary drainage strategy design is shown on drawings 21724-CCL-XX-00-DR-C-00501 and 21724-CCL-XX-XX-DR-C-00503 in **Appendix 10** with supporting calculations in **Appendix 11**.

In accordance with the Local Flood Risk Management Strategy surface water flows from redeveloped brownfield sites should be reduced by a minimum of 50% for all storm events up to, and including, 100yr events with the relevant climate change factor applied. Whilst being directed to an alternative sewer outfall the betterment to flow rates is significant with a 75% reduction in peak 1 yr flow rates increasing to over 90% for peak 100yr + CC worst case events.

With the developed site introducing additional drained areas to the public sewer network a number of SUDS features are to be included to mitigate against the additional run-off volume and increase the time of entry to the public sewer network.

Podium Deck & Houses

The 16 houses at the rear of the site and the podium deck above the lower ground floor parking level are to drain through a Blue/Green infiltration system within a planted amenity space on the podium deck. Using shallow geocellular attenuation units below the entire podium deck the system permanently stores a percentage of the captured water as part of the landscaped space whilst providing the necessary attenuation volume to store the rainwater at source and control surface water runoff. Flows are controlled using an orifice optimised to a discharge rate designed be most efficient for the attenuation capacity available.

In addition to this, the time lag from the rainfall event to the point of discharge to the public sewer network, is significantly increased from a traditional rainwater attenuation system. The worst case storm events retained within the attenuation medium are designed with a half-drain time of 24hrs thus slowing down the discharge to the public sewer.

Apartment Block

Similar to the podium deck the apartment block is to be provided with a Blue Roof attenuation system which limits the flow rates via an orifice and attenuates the water at source (i.e. roof level) before discharging through a rain water pipe to the ground level network. The roof will not be planted but there will be a drainage medium, slowing down entry into the attenuation below, thus extending the discharge times into the sewer network at ground level and minimising flows and discharge volumes during peak run-off times.

Parking Areas

The site entrance and access through the building to the lower parking level will be tarmacked with rainwater picked up using linear ACO drains. This rainwater will be directed to cellular attenuation cells with a separate flow control before discharging to the public sewer.

Overall Discharging Flow Rates

Whilst connecting to the surface water public sewer instead of the combined public sewer the flow rates from the development will now be limited to the following:

	Pre-Development	Post-Development	Betterment
Worst Case 1yr Storm event flow	20.8 L/sec	5.20 L/sec	75%
Worst Case 2yr Storm event flow	26.2 L/sec	5.20 L/sec	80%
Worst Case 30yr Storm event flow	47.4 L/sec	5.20 L/sec	89%
Worst Case 100yr Storm event flow	54.9 L/sec (0% Climate Ch.)	5.20 L/sec (45% Climate Ch.)	91%

Lower Ground Floor Drainage

Whilst largely covered to the elements by the podium deck it is recognised that a small volume of surface water run off may collect at lower ground floor level, this includes any run-off from the tarmacked access route down through the apartment block and some uncovered parking bays (approx. 200m²).

In addition to this there is an external turning area that also houses the foul pumping station serving the terraced houses (157m²). This is to be made up of a permeable surfacing material.

In front of each of the terraced houses there is a void at podium deck level which will allow some rainwater to fall directly on the parking area below.

To cover these areas, plus any rain that might blow under the podium deck or be transfer in off vehicles, it is proposed that porous paving be used for the covered parking areas.

While the site is not considered suitable for a wider infiltration-based drainage solution it is considered that there will be sufficient volume within the voids in the foundations under the parking to hold any such rainwater that might be introduced into the area. Any water percolating through the porous paving will be held at source until such a time that it soaks into the ground beneath.

Drawing 21724-CCL-XX-B1-DR-C-00502 (**Appendix 12**) shows the drainage provision at lower ground floor level.

This drawing includes a preliminary design for a permeable parking area with very poor infiltration rate (0.00001m/hr) and a contributing area of 600m². This would cover the exposed surfaces at lower ground floor level plus an allowance of 20% of the covered parking area being subject to rainfall. Based on back-to-back 100yr+45% events taking place this would require an attenuation volume of 168.6m³. This is the equivalent of 940m² of attenuation with a sub-base depth of 600mm and a void ratio of 30% which would be found within the voids between foundations.

Connection into UU Surface Water Sewer

The proposed connection into the public sewer network, with a new 1800dia manhole, will be subject to a Sewer Connection application to United Utilities.

The depth of the receiving sewer is approximately 3.50m and as such the sewer connection will be made using a 1.20m backdrop.

It is normal practice to simulate the outfall of any on-site network with the receiving sewer running with a +1.00m surcharge. With the connection height being above the 1.00m surcharge level the application of the surcharge has been discounted from the preliminary design process.

Foul Drainage

Foul drainage from the development will connect into the 600dia UU public combined sewer in Palatine Road, via a new connection.

The proposed layout is shown on drainage strategy drawing 21724-CCL-XX-00-DR-C-00501 in **Appendix 10**.

The apartment block and 8 semi-detached houses can drain via gravity to the northeastern corner of the site, within the site entrance, where a connection to the public sewer network can be made.

The foul drainage for the 8 terraced houses will drain to a pumping station at the lower ground floor level which then discharges to the gravity network serving the other dwellings within the site.

It is recognised that the pumping station will be below the flood level of the site and as such it will need to be design with sufficient additional capacity such that it can be shut down for 48hrs in flood event. All the telemetry and any venting should be above the flood level identified in the FRA.

All foul manholes are to have sealed covers to prevent any possible ingress of fluvial flood waters with non-return valves being fitted on all incoming pipes, ensuring no possible flood water can back up within the system and into properties.

The total foul flow rate from the 70 residential properties is 3.2 L/sec.

Drainage Maintenance & Management

All onsite SUDS and drainage systems will be privately maintained and a specialist management company will be appointed to oversee the maintenance of these in accordance with the individual manufactures' guidelines for each OEM product used.

A long-term maintenance regime will be implemented for the lifetime of the development.

NW SUDS Proforma – Supporting Statements

Section 1 – Application & Development Details

This document supports all fields within this section. The pre-development site has been modelling in MicroDrainage based on the survey information available.

Section 2 – Impermeable Area and Existing Drainage

Drawing 21724-CCL-XX-XX-DR-C-00505 (**Appendix 6**) shows the pre-development drainage layout and impermeable areas. The existing impermeable area is 2,260m², of which 1,901m² discharge to the Combined UU public sewer and 359m² discharges toward the gardens and soft landscaping. The remaining 3,706m² of the site is gardens and soft landscaping which discharges to ground.

The public sewer records (**Appendix 5**) are contained within this report.

The developed site is a mixture of surfaces as shown in drawing 21724-CCL-XX-XX-DR-C-00506 (**Appendix 9**). This includes:

- Impermeable hardstanding that drains to the public sewer network – 607m²
- Impermeable house roofs that drains to the public sewer via the Green/Blue Podium Deck – 1,227m²
- Permeable Blue roof that drains to the public sewer network – 977m²
- Permeable Green/Blue Podium Deck that drains to the public sewer network – 1,212m²

Whilst the impermeable drained area is 1,834m² the total area that ultimately drains to the public sewer is 4,023m².

Drainage Design Approach 1 - With the increase in area drained to the public sewer network, and the surface water drainage now discharging to the public surface water sewer rather than the public combined sewer, it is not possible to implement a long term storage strategy for the additional run-off. Having said that the additional volume will be largely mitigated by the use of permeable surfacing draining the roof tops and the podium decking together with the use of permeable paving in some of the trafficked areas. For this reason an attenuation only approach is required.

Drainage Design Approach 2 – It is proposed to limit the surface water flows for the development to the 2yr Q_{BAR} discharge rate of 5.20 L/sec (**Appendix 8**). The attenuation volume will provide sufficient storage volume for all storm events up to and including the 100yr + Climate Change worst case events.

With the development site being located in Flood Zone 3 any on-site exceedance event would coincide with the lower parts of the site being flooded by the River Mersey. Any additional volume created by the site would dissipate back overland to the River Mersey as the river levels recede following a flood event.

Section 3 – Peak Runoff Rates

MicroDrainage software has been used to model the existing networks based on the existing impermeable areas. The Wallingford method has then been used for simulation to generate the flow rates (**Appendix 6 & 7**).

The existing 2yr 50mm/hr discharge rate from the site is 25.7 L/sec and the 1 in 30yr event peak flow from the existing sewer network is 47.5L/sec (**Appendix 6 & 7**)

The peak flow from the developed site, for all storm events up to 100yr + Climate Change will be limited to the 2yr Q_{BAR} rate of 5.20 L/sec.

Section 4 – Discharge Volume

Due to the increase in area drained to the public sewer, and new connection to the surface water network, it is not possible to reduce the volume drained for the 100yr 6-hour event. However, the delay in attenuated volume discharging to the public sewer network is significantly extended by the use of porous surfacing materials.

Section 5 - Storage

Climate change of 45% is to be used (**Appendix 4**). The site is to be developed to 100% and urban creep can be discounted. Drainage calculations have been done in MicroDrainage and can be found in **Appendix 11**.

Attenuation for both 30yr and 100yr+CC events will be contained within the attenuation features on site. The Podium deck provides 198m³ of attenuation volume, the apartment roof 100m³, the cellular storage 20m³ plus the storage medium within the porous paving subbase.

Section 6 – Water Quality Protection

The risk from residential development and associated parking is categorised as low to very low.

The parking courtyards are to include areas of permeable paving which will act as a pollution control medium as well as providing some additional attenuation to the surface water networks.

Section 7 – Details of Sustainable Drainage System

- 7a Source control is provided on the Green/Blue podium Deck, the Blue Roof to the apartment block and the porous paving to some of the trafficked areas.
- 7b Refer to contents of this report
- H1 Whilst infiltration is part of the SUDS feature provided the rainwater ultimately drains to the public sewer network
 - H2 To a surface water body – the site ultimately drains to the River Mersey via a short section of surface water sewer and short watercourse.
 - H3 To a surface water sewer – the site drains to the adjacent public surface water sewer before discharge to the River Mersey via a short watercourse.
 - H4 To a combined sewer – The existing outfall to the public combined sewer in Palatine Road is to be discontinued with a new surface water connection being made to the adjacent public surface water sewer.
- 7c Attenuation provided on site in the Blue Roof serving the apartment block and the Green/Blue Podium Deck. In addition to this there is a section of porous paving and cellular storage serving the site entrance and car parking area to the front of the site.

Section 8 – Operation & Maintenance

A suitably qualified Management Company will be appointed for the duration of the development lifetime to ensure all aspects of the drainage network are maintained to an appropriate standard. A Drainage Maintenance and Management plan can be found in **Appendix 13**.

Conclusion

- The site is Flood Risk Zone 3 and is at risk of flooding from the River Mersey, other sources of flood risk have been discounted (see FRA for further information).
- Infiltration based drainage and a direct connection to a watercourse has been discounted as undeliverable.
- The existing site currently drains via private combined sewers into the public combined sewer network in Palatine Road. This is to be replaced by separate surface water and foul drainage networks on site with a new surface water connection being provided to the sewer in Palatine Road.
- Surface Water flows from the site is to be limited to the 2yr Q_{BAR} discharge rate for all storm events up to 100yr+45% Climate Change.
- The drained area of the site is increased meaning there is potentially an increased risk of flooding from the site. This is mitigated by the use of Green/Blue and Blue Roof SUDS systems plus the inclusion of sections of porous paving.
- Surface Water will be attenuated on site within the above proprietary systems plus the inclusion of a cellular storage unit with a fitted flow control device.
- Calculations demonstrate that up to approximately 320m³ of attenuation will be needed to achieve the required reduction in discharge rates.
- The foul drainage will discharge to the UU public combined sewer network. A section of the foul network will need to be pumped. All foul manholes to be sealed to prevent ingress of fluvial flood waters with non-return valves being provided on all incoming pipes to ensure no possible flood water can back up into properties.
- Acceptance of all connections to the public sewer networks need to be confirmed by United Utilities by means of a pre-development enquiry prior to the undertaking of any detailed design. Any variation in allowable flows rates, that are lower than the rates advised in this report, would take precedence and must be taken into account at detailed design stage.

Appendix 1

Topographical Survey

Appendix 2

Layout & Landscaping Proposals

SURFACE TREATMENTS

- Paving Flag 1**
300 x 150/200/300 x 30mm flags - Magna granite appearance. To be laid rectified bond.
Supplied by www.magnagranite.co.uk or similar approved manufacturer
- Paving Flag 2**
400 x 400 Concrete flag colour Magna. To be laid rectified bond. Supplied by www.magnagranite.co.uk or similar approved manufacturer
- Basin Solid Gravel - Winter Fuel**
6mm radial aggregate resin bound gravel in winter gravel colour. Supplied by www.sureest.co.uk or similar approved manufacturer
- Decking**
Dorminal - Reveal 180 solid teak decking or similar approved
- Blotch**
- T1**
Paving system with grass seeded Kifli
www.kifli.co.uk or similar approved
- T2**
Paving system with gravel Kifli
www.kifli.co.uk or similar approved
- Area of Road bridge construction**
- Concrete Blocks**
200 x 100 concrete permeable blocks laid in herringbone pattern
- EDGES**
- Curbs**
Curbs - Reveal decking. Supplied by Kifli
www.kifli.co.uk or similar approved
- FEATURES**
- Reclaimed Bench**
Reclaimed beam seat. Supplied by Woodstock
www.woodstock.co.uk or similar approved
- Cube Seat**
Solid timber cube seat. Supplied by Woodstock
www.woodstock.co.uk or similar approved
- Curbs**
Curbs - Reveal decking. Supplied by Kifli
www.kifli.co.uk or similar approved
- Timber Pergola Arches**
Pressure and fire retardant treated hardwood timber.
- Ecological enhancement**
Big house or other enhancement as recommended by ecologist
- Boundary Treatments**
- Timber boundary fence**
200mm high fence and gravel timber fence with 300mm high inset
- Bollards**
1100mm high steel vertical bar bollards
- 1.8m high wall with 1.5 m high timber fence top**
- 1.8m high wall with 0.8 m high timber fence top**
- Building low stone wall repaired and retained as necessary**

SOFTWORKS

- Multispecies Trees**
Multispecies tree species to be planted as 9m high Multi-stemmed specimens. Trees to be planted in large pots.
- Proposed Medium/ Large Trees**
Native and Pollard/ Broadleaf Trees to be planted as 14-16m high trees in large pots. To be planted and secured in place with double timber stakes, cross bar and tree ties.
- Small native Trees**
Native trees to be planted as 10-12m high. Select Broadleaf within the development. Trees to be planted and secured in place with double timber stakes, cross bar and tree ties.
- Rear Garden Fruit Trees**
Trees to be planted and secured in place with double timber stakes, cross bar and tree ties.
- Proposed Specimen Shrubs**
Native and Ornamental shrubs to be planted as 10m pots.
- Ornamental Shrubs**
Rotted plants and shrubs to be planted with a mixture of shrubs in 10 pots of 1 year old, grasses and herbaceous perennials in 10 pots of 1 year old and 20 specimens to be planted in the back to provide instant height and interest. All shrubs to be matched with a small grasses and shrubs.
- Proposed Wildflower Tuff**
Areas to be laid with wildflower turf (e.g. Celandine) purpose meadow mixture. To be regularly maintained.
- Proposed Single Species**
Areas to be planted with blocks of single species - native and ornamental.
- Single Species Ornamental Hedge**
- Native Hedge**
- Clippers**
To be laid up the perimeter and on the wall and planted as 20 pots supplied as a cone.
- Amenity grass**
- Artificial turf**



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Client

XX

Project

Palatine Road

Description

Draft Ground Level Landscape Proposals

Status

XX

Scale

1 : 200@A1

Drawn

BH

Job number

5592

Drawing number

02

Date

14.10.24

Revision

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All levels and dimensions to be checked on site by contractor prior to commencement. Any variations to be reported to the client. This drawing is to be read in conjunction with all others relating to the project and all information derived accordingly. Any anomalies to be reported to the client. Do not scale from this drawing. Use figured dimensions only. Work shown on this drawings to be carried out in accordance with current British Standards and Codes of Practice.

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Appendix 3

North West SUDS Pro-Forma

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development¹.

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#) and any necessary adoption standards.

HOW TO COMPLETE

Blue Box	Instruction/ Question
Orange Box	Evidence Required
White Box	To be completed by Developer / Consultant

1. Complete ALL white boxes
2. Submit this pro-forma to the Local Planning Authority, along with:
 - Sustainable Drainage Strategy
 - Site Specific Flood Risk Assessment (if required)
 - Minimum supporting evidence, as indicated in orange boxes of this pro-forma.

GUIDANCE TO SUPPORT YOU

The pro-forma should be completed in conjunction with 'Completing your SuDS Pro Forma Guide.'

The pro-forma can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or appropriate industry standard surface water management design software.

¹ as defined in Section 2 of [Statutory Instrument 2015 No. 595](#) or on sites of 0.5 hectares in Critical Drainage Areas.

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference <i>(if available)</i>	TBC	
State type of planning application <i>i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters*</i> <i>*Information only required if drainage is to be considered as part of reserved matters application</i>	TBC	
Developer(s) Name:	Marco Living 3 Ltd	
Consultant(s) Name:	Clancy Consulting Ltd	
Development Address <i>(including postcode)</i>	232-236 Palatine Road, Didsbury, M20 2WF	
Development Grid Reference <i>(Eastings/Northings)</i>	383588, 390961	
Total Development Site Area (Ha)	0.597	
Drained Area (Ha)* of Development	0.4038	
Please indicate the flood zone that your development is in. Tick all that apply. <i>Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).</i>	Flood Zone 1 ☐ Flood Zone 2 ☐ Flood Zone 3a ☐ Flood Zone 3b ☒	
What is the surface water risk of the site? Tick all that apply. <i>Based on the Environment Agency Surface Water Flood Map.</i>	High ☒ Medium ☐ Low ☐	
Have you submitted a Site Specific Flood Risk Assessment (FRA)? <i>See separate guidance notes for clarification on when a FRA is required</i>	Yes ☒ No ☐	
Have you submitted a Sustainable Drainage Strategy?	Yes ☒ No ☐	
Does your drainage proposal provide multi-functional benefits via SuDS?	Yes ☒ No ☐	
Expected Lifetime of Development <i>(years)</i> <i>Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026</i>	100	
Residential 54 Apartments Development Type: 16 Houses 70 units in total	State Proposed Number of Residential Units / Quantum of commercial floorspace	
Greenfield Site <ul style="list-style-type: none"> Site is wholly undeveloped, and a new drainage system will be installed 	☐	
Previously Developed/ Brownfield Site <ul style="list-style-type: none"> Site is already developed, and the <u>entirety</u> of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable); OR Where records of the previously developed system are not available so that the hydraulic characteristics of the system cannot be determined or where the drainage system is not in reasonable working order i.e. broken, blocked or no longer operational for other reasons, then one of the approaches outlined in Section 24.5 of The SuDS Manual (C753) should be adopted. 	☒	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.

See Drainage Strategy document

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0.2259	0.1834	-0.0425
Evidence Required: Plans showing development layout of site with existing and proposed impermeable areas.			☒

Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?	Yes ☒ No ☐ Don't Know ☐
Evidence Required: Plan(s) showing existing layout to include all: <ul style="list-style-type: none"> Watercourses, open and culverted Water bodies – ponds, swales etc. Sewers, including manholes Highway drains, include manholes, gullies etc. Infiltration features - soakaways, filter drains etc. 	☒

Drainage Design <u>Outline planning applications</u> should be able to demonstrate that a suitable drainage system is achievable. <u>All other type of planning application</u> should provide full details or reference to previous planning application where drainage details have been submitted or approved.		
Select which design approach you are taking to manage water quantity (refer to Section 3.3 SuDS Manual)		
Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5) <ul style="list-style-type: none"> The attenuated runoff volume for the 1 in 100 year 6 hour event (plus climate change allowance) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate The discharge rate for the critical duration 1 in 100 year event (plus climate change allowance) is restricted to the 1 in 100 year greenfield runoff rate 	☐	
Approach 2 – Qbar (Technical Standards S6) <ul style="list-style-type: none"> Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is greater. 	☒	
Evidence Required: Plans showing: <ul style="list-style-type: none"> Existing flow routes and flood risks Modified flow routes Contributing and impermeable areas Current (if any) and proposed 'source control' and 'management train' locations of sustainable drainage components (C753 Chapter 7) Details of drainage ownership Details of exceedance routes (Technical Standards S9) Topographic survey Locations and number of existing and proposed discharge points 		☒

Note consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 2.

SECTION 3: PEAK RUNOFF RATES – TECHNICAL STANDARDS S2, S3 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application</i>
Qbar (Approach 2)	25.7 (2yr 50mm/hr)	5.2	5.2
1 in 1 Year Event (Approach 1)			
1 in 30 Year Event	47.5	5.2	5.2
1 in 100 Year Event* (Approach 1)			
<p>* Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. The climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.</p>			
Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified. Impermeable areas plan, supported by topographical survey confirming positive drainage. Hydraulic calculations and details of software used.			☒ ☒ ☒

State the hydraulic method used in your calculations
(Refer to Table 24.1 of The SuDS Manual)

HR Wallingford (MicroDrainage)

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.

Drawings 1-21724-502 & 503

SECTION 4: DISCHARGE VOLUME – TECHNICAL STANDARDS S4, S5 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)
1 in 100 Year 6 Hour Event (Approach 1)			
Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)			Yes ☒ No ☐
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified Methodology used to calculate discharge volume clearly stated and justified. Hydraulic calculations and details of software used.			☒ ☒ ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 4.	Drainage Strategy Report & Drawings
--	-------------------------------------

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	45
State housing density (houses per ha)	16 houses and 54 Flats
State urban creep allowance used (%)	0 - Site developed to 100%
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒

State storage volume required (m³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep</i>	100m ³ in blue roof, 198m ³ in podium deck, 20m ³ in cellular attenuation + permeable paving
Have you incorporated interception into your design? <i>(Refer to Chapter 24 of The SuDS Manual C753)</i> <i>Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.</i>	Yes ☒ No ☐
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☒

Summarise how storage will be provided for 1 in 30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (plus climate change allowance) event.</i>	Green/Blue podium decking, Blue roof, porous paving, cellular attenuation
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. <i>Where storage above the 1 in 30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site</i>	As above, all storage is provided for all storm events up and including 100yr + CC
Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 5.	Drawing 1-21724-501 + design calcs
--	------------------------------------

SECTION 6: WATER QUALITY PROTECTION

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☐	No ☒
<ul style="list-style-type: none"> If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters though the mobilisation of contaminants and/or creation of new pollution pathways. 		

Confirm the Pollution Hazard Level of the proposed development - Tick ALL that apply		
Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.		
Pollution Hazard Level Tick ALL that apply	Surface water run-off from the proposed development will drain from:	
VERY LOW	☒	<ul style="list-style-type: none"> Residential roofs
LOW	☒	<ul style="list-style-type: none"> Other roofs (typically commercial/industrial roofs) Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	<ul style="list-style-type: none"> Commercial yard and delivery areas Non-residential car parking with frequent change (e.g. hospitals, retail) All roads except low traffic roads and trunk roads/motorways²
HIGH	☐	<ul style="list-style-type: none"> Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured Industrial sites Trunk roads and motorways¹

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☒	No ☐
<ul style="list-style-type: none"> If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual (C753). 		

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐	No ☒
<ul style="list-style-type: none"> If the proposed development has a high polluting potential, a detailed risk assessment <i>will</i> be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 170 of the National Planning Policy Framework. If the proposed development has a medium polluting potential, a detailed risk assessment <i>may</i> be required depending on the nature, scale and location of the development. 		

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐	No ☒
If YES, provide details:		

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.	Drawing 1-21724-501 + drainage strategy document
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² Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

SECTION 7: DETAILS OF YOUR SUSTAINABLE DRAINAGE SYSTEM

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource)?	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	
Do your proposals promote source control to manage rainfall close to where it falls? (e.g. promoting natural losses through soakage, infiltration and evapotranspiration)	Yes ☒ No ☐
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	Landscaped podium decking, blue roof and porous paving
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	Drawing 1-21724-501 + drainage strategy document

b) Hierarchy of Drainage Options – Planning Practice Guidance

The proposed method of discharge are set out within order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☒	
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐	A. Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: <ul style="list-style-type: none"> The methodology within BRE 365 (2016), OR Falling head permeability tests BS EN ISO 22282-2: 2012
☐	B. British Geological Survey (BGS) Infiltration SuDS Map	☐	B. NOTE: where an applicant is unable to access a site to undertake testing, e.g. where unable to access a site for an outline application, they can submit a SuDS GeoReport or similar.
☐	C. Infiltration testing to BRE 365 (2016) or falling head permeability tests to BS EN ISO 2228-2: 2012 (optional for outline)	☐	C. Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality.
☐	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon further site specific ground investigation e.g. to consider seasonal variations to groundwater.	☐	D. Geotechnical advice from a competent person* which determines that infiltration of water to ground would pose an unacceptable risk of geohazards to the site and/or local area. <i>*Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).</i>

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 2: To a surface water body (<i>select type</i>) NOTE: Consent from LLFA or Permit from Environment Agency may be required – refer to guidance		Yes	No ✓ N/A
		☐ Main river ☐ Ordinary watercourse	☐ Canal ☐ Other water body
If YES - Evidence Required		If NO – Evidence Required Tick <u>ALL</u> that apply	
☐	Surface water body / watercourse survey and report	☒	Plan showing nearby watercourses and waterbodies AND ☒ Statement providing justification in your Sustainable Drainage Strategy Note: Where third party land is cited as a barrier, you should provide visibility of discussions held to date with the riparian landowner of the waterbody.

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer. N.B. Trafford will not accept surface water drainage to a highway drain		Yes ✓	No N/A
		☒ Surface water sewer	
If YES - Evidence Required		If NO – Evidence Required Tick <u>ALL</u> that apply	
☐	Written correspondence from Water and Sewerage Company regarding proposed connection.	☒	Plan showing nearby sewers AND ☒ Statement providing justification in your Sustainable Drainage Strategy

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 4: To combined sewer		Yes ☐	No ☒ N/A ☐
If YES - Evidence Required		If NO – Evidence Required	
☐	Written correspondence from Water and Sewerage Company	N/A	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7b.	N/A
--	-----

c) Proposed SuDS Component Types

	Tick ALL that apply				
Within property boundary	☐ Rainwater harvesting	☒ Green/ blue roofs	☒ Pervious pavements [Type: A ☐ B ☐ C ☐	☐ Soakaway	☐ Bio retention systems

	Tick ALL that apply				
Within development site boundary (not property)	☐ Infiltration system [Type: ☒ Surface level ☐ Below ground]		☐ Filter strips	☐ Filter drains	☐ Swales
	☐ Bio retention system	☐ Detention basins	☐ Ponds and wetlands	☒ Attenuation tanks/ Oversized pipes	☐ Other (state below)
	If 'Other' please state:				

Off site (not within the boundary of the proposed development)	Please state:
--	---------------

I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☒
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7c.	Drawing 1-21724-501 + drainage strategy document
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<p>Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.</p>	<p>See drainage strategy document</p>
--	---------------------------------------

DECLARATION AND SUBMISSION

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

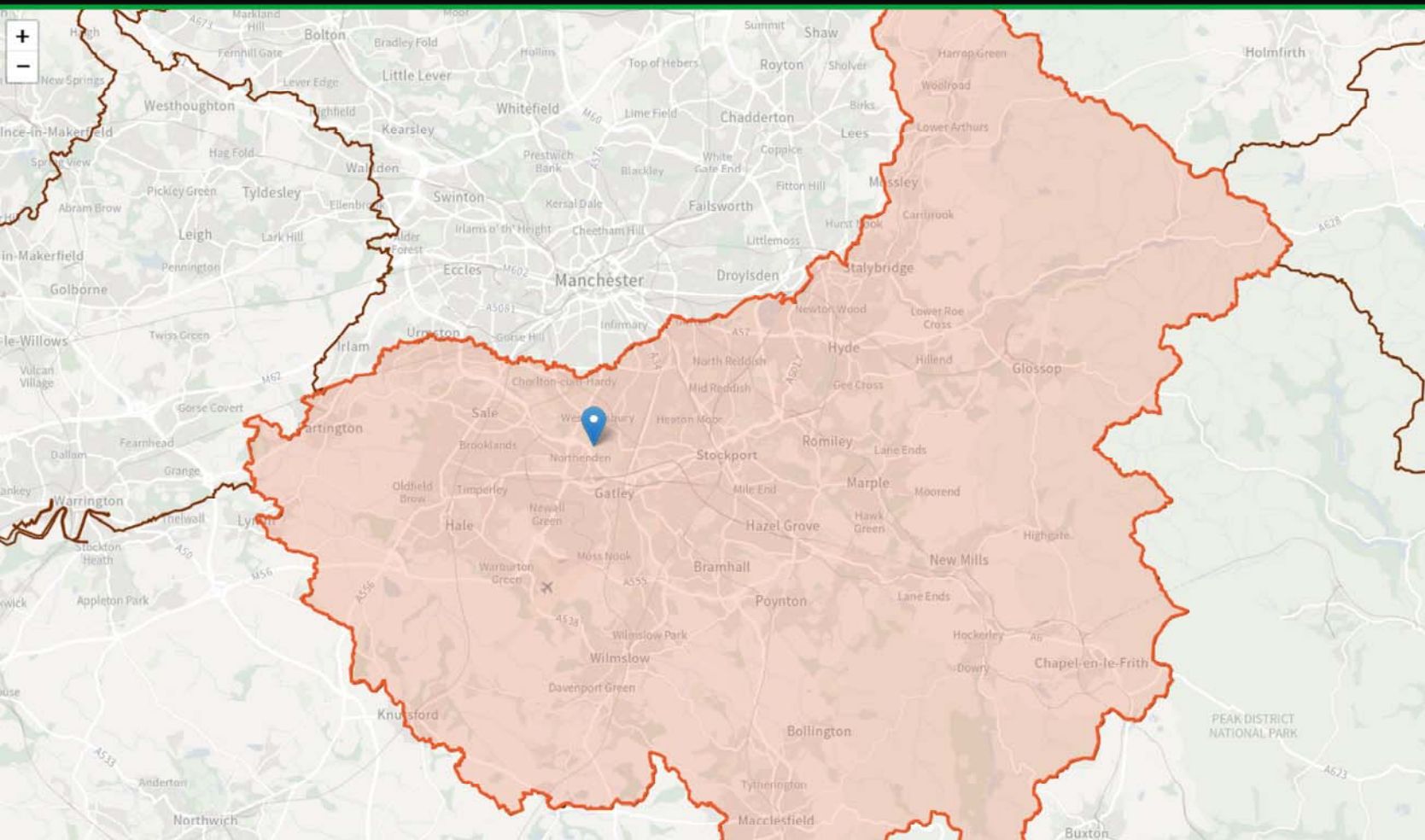
The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Agent Details			
Completed by	Will Wright	Email Address	will.wright@clancy.co.uk
		Telephone Number(s)	07795 282 740
Signed off by	Carl Bebbington	Accreditation(s) and/or Qualification(s) of Signatory	BSc (Hons), MSc, CEND, MIStructE
Date (dd/mm/yyyy)	05/12/2024	Company	Clancy Consulting Ltd

Client Details			
Name		Company	Marco Living 3 Ltd

Appendix 4

DEFRA Climate Change Map



Upper Mersey Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	20%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch

	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up to 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

Appendix 5

United Utilities Public Sewer Records

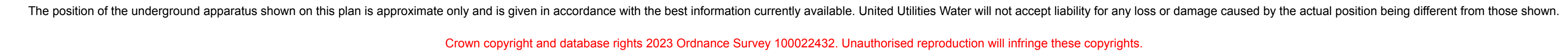


Figure 1 is a schematic diagram illustrating the flow of water from various sources into a combined sewer system. The diagram is organized into four main categories of water sources at the top: Abandoned, Foul, Surface Water, and Combined. Below these categories, the flow paths are shown as lines with arrows, leading to a central 'Public Sewer' line. The flow paths are color-coded: brown for Abandoned, green for Foul, blue for Surface Water, and red for Combined. The flow paths lead to a central 'Public Sewer' line, which then branches out to 'Private Sewer', 'Section 104', 'Rising Main', 'Sludge Main', 'Overflow', 'Water Course', and 'Highway Drain'.

All point assets follow the standard colour convention:

red	- combined	blue	- surface water
brown	- foul	purple	- overflow

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

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

APARTMENT 1 234 PALATINE ROAD,
MANCHESTER,
M20 2WF

Printed by: Property Searches



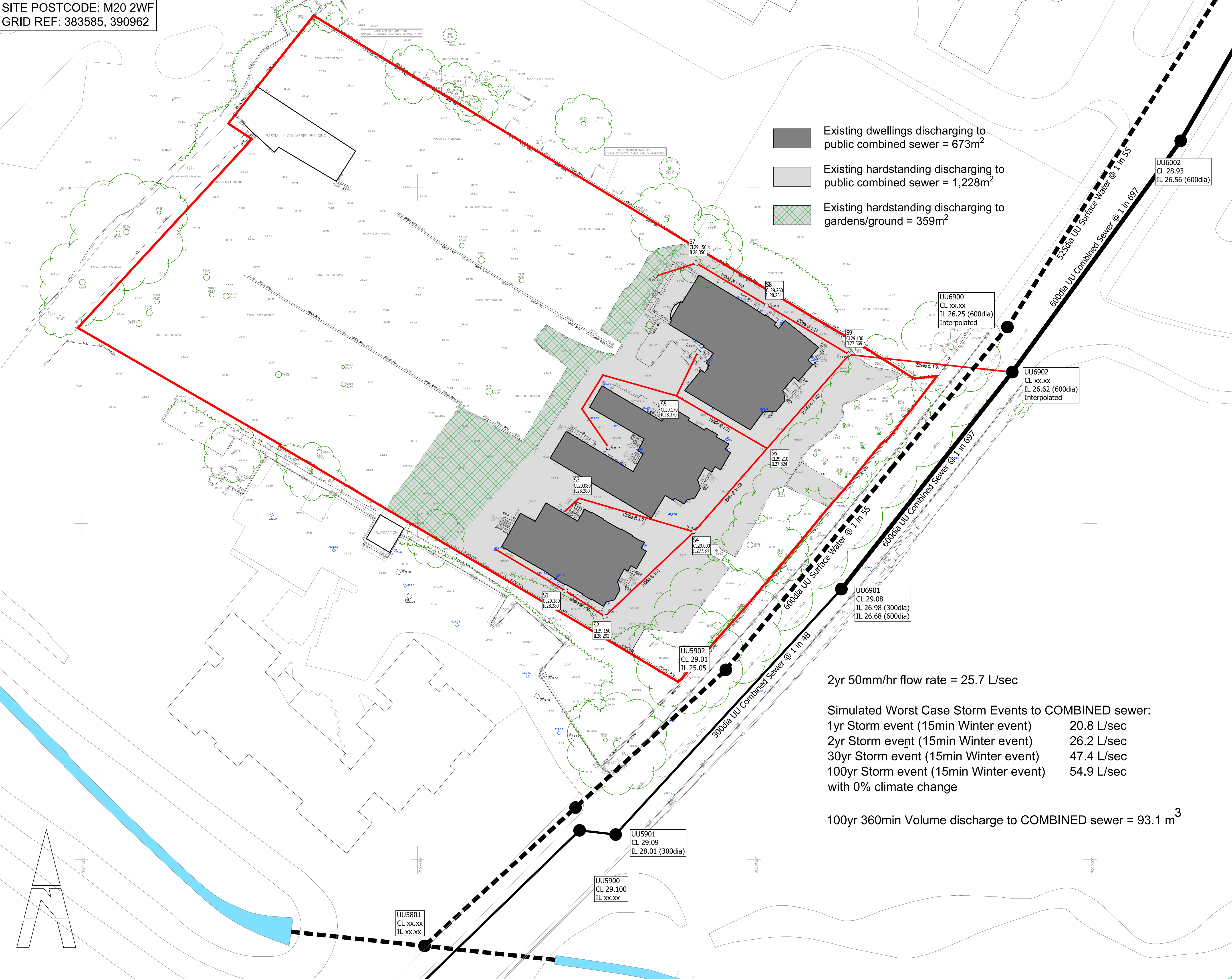
United Utilities
Water for the North West

Appendix 6

Existing Drainage Layout

Drawing 21724-CCL-XX-XX-DR-C-00505

SITE POSTCODE: M20 2WF
GRID REF: 383585, 390962



- Existing dwellings discharging to public combined sewer = 673m²
- Existing hardstanding discharging to public combined sewer = 1,228m²
- Existing hardstanding discharging to gardens/ground = 359m²

2yr 50mm/hr flow rate = 25.7 L/sec

Simulated Worst Case Storm Events to COMBINED sewer:

1yr Storm event (15min Winter event) 20.8 L/sec
2yr Storm event (15min Winter event) 26.2 L/sec
30yr Storm event (15min Winter event) 47.4 L/sec
100yr Storm event (15min Winter event) 54.9 L/sec
with 0% climate change

100yr 360min Volume discharge to COMBINED sewer = 93.1 m³

NOTES:

ALL EXISTING STREET FURNITURE AFFECTED BY SITE WORKS TO BE ADJUSTED AND RE-LEVELLED AS REQUIRED

VISIBILITY SPLAYS TO BE PROVIDED IN ACCORDANCE WITH HIGHWAYS AUTHORITY REQUIREMENTS.

CONTRACTOR TO MAKE ALLOWANCE FOR ANY POTENTIAL ALTERATIONS TO THE HIGHWAYS STREET LIGHTING INFRASTRUCTURE FOR NEW JUNCTION ARRANGEMENT

ALL WORKS TO FORM NEW ENTRANCE TO DEVELOPMENT SITE TO BE CARRIED OUT IN ACCORDANCE WITH LOCAL HIGHWAYS DEPARTMENT REQUIREMENTS. CONTRACTOR TO MAKE ALLOWANCE FOR OBTAINING ALL NECESSARY ROAD OPENING PERMITS ASSOCIATED WITH OFF SITE WORKS.

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE & WITHIN THE FOOTWAYS SUFFICIENTLY FAR AHEAD OF WORKS. ANY DIVERSIONS OR ADJUSTMENTS OF SERVICES TO BE AGREED BY THE PRINCIPAL CONTRACTOR WITH THE UTILITIES PROVIDER

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE SUFFICIENTLY FAR AHEAD OF LAYING PIPEWORK IN ORDER THAT ANY REQUIREMENT TO ADJUST LINE AND LEVEL OF THE PROPOSED WORKS CAN BE ACCOMMODATED. THE ENGINEER SHOULD BE INFORMED OF ANY DISCREPANCIES.

ALL EXTERNAL PATHS TO BE LAID WITH FALLS AWAY FROM THE BUILDING IN LINE WITH BUILDING REGULATIONS

THE BUILDING FOOTPRINT AND ALL DRAINAGE OR EXTERNAL WORKS FEATURED ON THIS DRAWING IS INDICATIVE ONLY AND SHOULD NOT BE USED FOR ACTUAL SETTING OUT AND CONSTRUCTION ON SITE. REFER TO ARCHITECTS DRAWINGS.

DEPTHS OF SEWERS NOTED HAVE BEEN CONJECTURED USING SURVEYED INFORMATION, UNITED UTILITIES SEWER RECORDS AND ASSUMPTIONS BASED ON INFORMATION PROVIDED. ALL CARRIED OUT TO LOCAL DATUM. ALL LEVELS/DEPTHS MUST BE CHECKED AND CONFIRMED PRIOR TO COMMENCEMENT OF DETAILED DESIGN

GROUND WATER ENCOUNTERED ON SITE DURING DEVELOPMENT SHALL BE DEALT WITH BY THE CONTRACTOR ON AN AREA BY AREA BASIS. SHOULD RUN-OFF BE EXTENSIVE THE CONTRACTOR MUST MAKE ALLOWANCE TO INSTALL THE NECESSARY CUT-OFF LAND DRAINAGE WITH CONNECTIONS TAKEN INTO BEDDING MATERIAL OF PRIVATE DRAINAGE. A DIRECT CONNECTION OF LAND DRAINAGE INTO THE PIPED NETWORK WILL NOT BE ACCEPTED

ALL RWP'S AND SVPS INDICATED ON THIS DRAWING ARE INDICATIVE ONLY. FOR ACTUAL POSITIONS OF RWP'S AND SVPS REFER TO ARCHITECTS DRAWINGS ALL RWP'S AND SVPS TO BE TRAPPED AND FITTED WITH RODDING ACCESS AT OR ABOVE GROUND LEVEL.

THE EXISTING ON-SITE PRIVATE DRAINAGE NETWORK SHOWN IS TAKEN FROM A SITE WALKOVER AND THE INFORMATION FOUND ON THE TOPOGRAPHICAL SURVEY. A FULL DRAINAGE SURVEY WILL BE REQUIRED TO CONFIRM LAYOUT, LEVELS AND POINT(S) OF CONNECTION TO THE PUBLIC SEWER NETWORK IN PALATINE ROAD.

Rev	Date	Description	WW	CD	CB
P1	05.12.24	Preliminary Issue			

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Clancy Project No.	1_21724
Client	MARCO LIVING 3 LTD
Project	Palatine Road, Didsbury Manchester, M20 2WF
Office	Altrincham
Discipline	Civil
Title	Existing Drainage Layout

Scale @ A1	1:250	Status	Preliminary
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Project No.	Originator	Zone/Volume	Level
21724	CCL	XX	XX
Type	Discipline	Drawing No.	Revision
DR	C	00505	P1

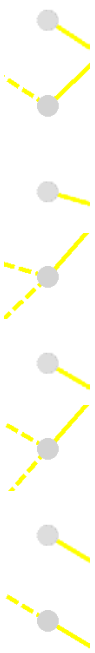
Appendix 7

Existing On-site Drainage Network Calculations

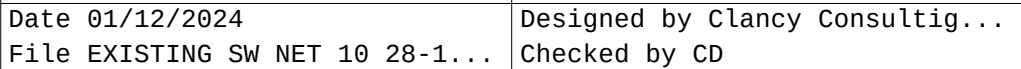
			Page 3
		Palatine Road Didsbury Existing Drainage	
Date 01/12/2024 File EXISTING SW NET 10 28-1...		Designed by Clancy Consultig... Checked by CD	
XP Solutions		Network 2020.1.3	

Manhole Schedules for EXISTING SW NET 10 28-11-24.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	29.180	0.800	Open Manhole	600	1.000	28.380	100				
2	29.150	0.858	Open Manhole	600	1.001	28.292	100	1.000	28.292	100	
3	29.080	0.800	Open Manhole	600	2.000	28.280	100				
4	29.090	1.106	Open Manhole	600	1.002	27.984	150	1.001	28.034	100	
								2.000	28.034	100	
5	29.170	0.800	Open Manhole	600	3.000	28.370	100				
6	29.210	1.386	Open Manhole	600	1.003	27.824	150	1.002	27.824	150	
								3.000	27.874	100	
7	29.150	0.800	Open Manhole	600	4.000	28.350	100				
8	29.260	1.029	Open Manhole	600	4.001	28.231	100	4.000	28.231	100	
9	29.130	1.561	Open Manhole	600	1.004	27.569	225	1.003	27.644	150	
								4.001	27.694	100	
10	29.250	1.950	Open Manhole	1800		OUTFALL		1.004	27.300	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	383571.967	390940.001	383571.967	390940.001	Required	
2	383577.844	390936.160	383577.844	390936.160	Required	
3	383573.999	390953.756	383573.999	390953.756	Required	
4	383591.102	390948.753	383591.102	390948.753	Required	
5	383588.490	390968.969	383588.490	390968.969	Required	
6	383601.967	390961.157	383601.967	390961.157	Required	
7	383591.441	390988.725	383591.441	390988.725	Required	
8	383601.938	390982.436	383601.938	390982.436	Required	

	Palatine Road
	Didsbury
	Existing Drainage



```
File EXISTING SW NET 10 28-1...
```

Checked by CD

Network 2020.1.3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
9	383614.185	390975.106	383614.185	390975.106	Required	
10	383638.412	390972.501			No Entry	

		Page 5
	Palatine Road Didsbury Existing Drainage	
Date 01/12/2024 File EXISTING SW NET 10 28-1...	Designed by Clancy Consultig... Checked by CD	
XP Solutions	Network 2020.1.3	

PIPELINE SCHEDULES for EXISTING SW NET 10 28-11-24.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	I*W
1.000	o	100	1	29.180	28.380	0.700	Open Manhole		600
1.001	o	100	2	29.150	28.292	0.758	Open Manhole		600
2.000	o	100	3	29.080	28.280	0.700	Open Manhole		600
1.002	o	150	4	29.090	27.984	0.956	Open Manhole		600
3.000	o	100	5	29.170	28.370	0.700	Open Manhole		600
1.003	o	150	6	29.210	27.824	1.236	Open Manhole		600
4.000	o	100	7	29.150	28.350	0.700	Open Manhole		600
4.001	o	100	8	29.260	28.231	0.929	Open Manhole		600
1.004	o	225	9	29.130	27.569	1.336	Open Manhole		600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	I*W
1.000	7.021	79.8	2	29.150	28.292	0.758	Open Manhole		600
1.001	18.287	70.9	4	29.090	28.034	0.956	Open Manhole		600
2.000	17.820	72.4	4	29.090	28.034	0.956	Open Manhole		600
1.002	16.489	103.1	6	29.210	27.824	1.236	Open Manhole		600
3.000	15.577	31.4	6	29.210	27.874	1.236	Open Manhole		600
1.003	18.543	103.0	9	29.130	27.644	1.336	Open Manhole		600
4.000	12.236	102.8	8	29.260	28.231	0.929	Open Manhole		600
4.001	14.273	26.6	9	29.130	27.694	1.336	Open Manhole		600
1.004	24.367	90.6	10	29.250	27.300	1.725	Open Manhole		1800

Free Flowing Outfall Details for EXISTING SW NET 10 28-11-24.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	10	29.250	27.300	0.000	1800	0

		Page 6
	Palatine Road Didsbury Existing Drainage	
Date 01/12/2024 File EXISTING SW NET 10 28-1...	Designed by Clancy Consultig... Checked by CD	
XP Solutions	Network 2020.1.3	

Simulation Criteria for EXISTING SW NET 10 28-11-24.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.376		

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				Page 7							
				Palatine Road Didsbury Existing Drainage							
Date 01/12/2024 File EXISTING SW NET 10 28-1...				Designed by Clancy Consultig...				Checked by CD			
XP Solutions				Network 2020.1.3							
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for EXISTING SW NET 10 28-11-24.SWS</u>											
Simulation Criteria											
Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000											
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000											
Hot Start Level (mm) 0 Inlet Coefficient 0.800											
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000											
Foul Sewage per hectare (l/s) 0.000											
Number of Input Hydrographs 0 Number of Storage Structures 0											
Number of Online Controls 0 Number of Time/Area Diagrams 0											
Number of Offline Controls 0 Number of Real Time Controls 0											
Synthetic Rainfall Details											
Rainfall Model FSR Ratio R 0.380											
Region England and Wales Cv (Summer) 0.750											
M5-60 (mm) 18.000 Cv (Winter) 0.840											
Margin for Flood Risk Warning (mm) 450.0 DVD Status ON											
Analysis Timestep Fine Inertia Status OFF											
DTS Status ON											
Profile(s) Summer and Winter											
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960											
Return Period(s) (years) 1, 2, 30, 100											
Climate Change (%) 0, 0, 0, 0											
US/MH Return Climate First (X) First (Y) First (Z) Overflow											
PN	Name	Storm	Period	Change	Surchage	Flood	Overflow	Act.			
1.000	1	15 Winter	1	+0%	30/15 Summer	100/15 Summer					
1.001	2	15 Winter	1	+0%	30/15 Summer						
2.000	3	15 Winter	1	+0%	30/15 Summer						
1.002	4	15 Winter	1	+0%	30/15 Summer						
3.000	5	15 Winter	1	+0%	100/15 Summer						
1.003	6	15 Winter	1	+0%	2/15 Winter						
4.000	7	15 Winter	1	+0%	30/15 Summer						
4.001	8	15 Winter	1	+0%	30/15 Summer						
1.004	9	15 Winter	1	+0%	100/15 Summer						
Water Surcharged Flooded Half Drain Pipe											
US/MH Level Depth Volume Flow / Overflow Time Flow Level											
PN Name (m) (m) (m³) Cap. (l/s) (mins) (l/s) Status Exceeded											
1.000	1	28.424	-0.056	0.000	0.40			2.4	OK	3	
1.001	2	28.352	-0.040	0.000	0.65			4.5	OK		
2.000	3	28.322	-0.058	0.000	0.35			2.4	OK		
1.002	4	28.064	-0.070	0.000	0.55			9.0	OK		
3.000	5	28.403	-0.067	0.000	0.24			2.4	OK		
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					Palatine Road Didsbury Existing Drainage			Page 8		
Date 01/12/2024 File EXISTING SW NET 10 28-1...					Designed by Clancy Consultig... Checked by CD					
XP Solutions					Network 2020.1.3					
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for EXISTING SW NET 10 28-11-24.SWS</u>										

		Page 10
	Palatine Road Didsbury Existing Drainage	
Date 01/12/2024 File EXISTING SW NET 10 28-1...	Designed by Clancy Consultig... Checked by CD	
XP Solutions	Network 2020.1.3	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for EXISTING SW NET 10 28-11-24.SWS

		Water	Surcharged	Flooded			Half Drain	Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status
1.003	6	27.979	0.005	0.000	1.02			16.8	SURCHARGED
4.000	7	28.404	-0.046	0.000	0.56			3.1	OK
4.001	8	28.283	-0.048	0.000	0.52			5.8	OK
1.004	9	27.685	-0.109	0.000	0.52			26.2	OK

PN	US/MH Name	Level Exceeded
1.000	1	3
1.001	2	
2.000	3	
1.002	4	
3.000	5	
1.003	6	
4.000	7	
4.001	8	
1.004	9	

Palatine Road
Didsbury
Existing Drainage



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Date 01/12/2024
File EXISTING SW NET 10 28-1...
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Designed by Clancy Consulting
Checked by CD

XP Solutions

Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EXISTING SW NET 10 28-11-24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.380
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

```
Margin for Flood Risk Warning (mm) 450.0      DVD Status  ON
      Analysis Timestep  Fine Inertia Status OFF
      DTS Status      ON
```

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 0

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow Act.
	Name	Storm			Surcharge		Flood		Overflow		
1.000	1	15 Winter	100	+0%	30/15	Summer	100/15	Summer			
1.001	2	15 Winter	100	+0%	30/15	Summer					
2.000	3	15 Winter	100	+0%	30/15	Summer					
1.002	4	15 Winter	100	+0%	30/15	Summer					
3.000	5	15 Winter	100	+0%	100/15	Summer					
1.003	6	15 Winter	100	+0%	2/15	Winter					
4.000	7	15 Winter	100	+0%	30/15	Summer					
4.001	8	15 Winter	100	+0%	30/15	Summer					
1.004	9	15 Winter	100	+0%	100/15	Summer					

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
1.000	1	29.180	0.700	0.400	1.15			7.1	FLOOD
1.001	2	29.143	0.751	0.000	1.53			10.6	FLOOD RISK
2.000	3	29.002	0.622	0.000	0.95			6.5	FLOOD RISK
1.002	4	28.814	0.680	0.000	1.24			20.1	FLOOD RISK
3.000	5	28.755	0.285	0.000	0.64			6.6	FLOOD RISK

Appendix 8

Q_{BAR} Greenfield Run-off Rate

		Page 1																								
	Palatine Road Didsbury Greenfield Runoff																									
Date 01/12/2024 File	Designed by Clancy Consultin... Checked by CB																									
XP Solutions	Source Control 2020.1.3																									
<p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <table><tr><td>Return Period (years)</td><td>2</td><td>Soil</td><td>0.450</td></tr><tr><td>Area (ha)</td><td>0.597</td><td>Urban</td><td>0.380</td></tr><tr><td>SAAR (mm)</td><td>816</td><td>Region Number</td><td>Region 10</td></tr></table> <p style="text-align: center;">Results l/s</p> <table><tr><td>QBAR Rural</td><td>3.1</td></tr><tr><td>QBAR Urban</td><td>5.3</td></tr><tr><td>Q2 years</td><td>5.2</td></tr><tr><td>Q1 year</td><td>4.6</td></tr><tr><td>Q30 years</td><td>8.3</td></tr><tr><td>Q100 years</td><td>9.4</td></tr></table>			Return Period (years)	2	Soil	0.450	Area (ha)	0.597	Urban	0.380	SAAR (mm)	816	Region Number	Region 10	QBAR Rural	3.1	QBAR Urban	5.3	Q2 years	5.2	Q1 year	4.6	Q30 years	8.3	Q100 years	9.4
Return Period (years)	2	Soil	0.450																							
Area (ha)	0.597	Urban	0.380																							
SAAR (mm)	816	Region Number	Region 10																							
QBAR Rural	3.1																									
QBAR Urban	5.3																									
Q2 years	5.2																									
Q1 year	4.6																									
Q30 years	8.3																									
Q100 years	9.4																									
<p style="text-align: center;">©1982-2020 Innovyze</p>																										

Appendix 9

Proposed Drained Areas

Drawing 21724-CCL-XX-XX-DR-C-00506

SITE POSTCODE: M20 2WF
GRID REF: 383585, 390962

NOTES:

ALL EXISTING STREET FURNITURE AFFECTED BY SITE WORKS TO BE ADJUSTED AND RE-LEVELLED AS REQUIRED

VISIBILITY SPLAYS TO BE PROVIDED IN ACCORDANCE WITH HIGHWAYS AUTHORITY REQUIREMENTS.

CONTRACTOR TO MAKE ALLOWANCE FOR ANY POTENTIAL ALTERATIONS TO THE HIGHWAYS STREET LIGHTING INFRASTRUCTURE FOR NEW JUNCTION ARRANGEMENT

ALL WORKS TO FORM NEW ENTRANCE TO DEVELOPMENT SITE TO BE CARRIED OUT IN ACCORDANCE WITH LOCAL HIGHWAYS DEPARTMENT REQUIREMENTS. CONTRACTOR TO MAKE ALLOWANCE FOR OBTAINING ALL NECESSARY ROAD OPENING PERMITS ASSOCIATED WITH OFF SITE WORKS.

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE & WITHIN THE FOOTWAYS SUFFICIENTLY FAR AHEAD OF WORKS. ANY DIVERSIONS OR ADJUSTMENTS OF SERVICES TO BE AGREED BY THE PRINCIPAL CONTRACTOR WITH THE UTILITIES PROVIDER

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE SUFFICIENTLY FAR AHEAD OF LAYING PIPEWORK IN ORDER THAT ANY REQUIREMENT TO ADJUST LINE AND LEVEL OF THE PROPOSED WORKS CAN BE ACCOMMODATED. THE ENGINEER SHOULD BE INFORMED OF ANY DISCREPANCIES.

ALL EXTERNAL PATHS TO BE LAID WITH FALLS AWAY FROM THE BUILDING IN LINE WITH BUILDING REGULATIONS

THE BUILDING FOOTPRINT AND ALL DRAINAGE OR EXTERNAL WORKS FEATURES ON THIS DRAWING IS INDICATIVE ONLY AND SHOULD NOT BE USED FOR ACTUAL SETTING OUT AND CONSTRUCTION ON SITE. REFER TO ARCHITECTS DRAWINGS.

DEPTHS OF SEWERS NOTED HAVE BEEN CALCULATED USING SURVEYED INFORMATION, UNITED UTILITIES SEWER RECORDS AND ASSUMPTIONS BASED ON INFORMATION PROVIDED. ALL CARRIED OUT TO LOCAL DATUM. ALL LEVELS/DEPTHS MUST BE CHECKED AND CONFIRMED PRIOR TO COMMENCEMENT OF DETAILED DESIGN

GROUND WATER ENCOUNTERED ON SITE DURING DEVELOPMENT SHALL BE DEALT WITH BY THE CONTRACTOR ON AN AREA BY AREA BASIS. SHOULD RUN-OFF BE EXTENSIVE THE CONTRACTOR MUST MAKE ALLOWANCE TO INSTALL THE NECESSARY CUT-OFF LAND DRAINAGE WITH CONNECTIONS TAKEN INTO BEDDING MATERIAL OF PRIVATE DRAINAGE. A DIRECT CONNECTION OF LAND DRAINAGE INTO THE PIPED NETWORK WILL NOT BE ACCEPTED

ALL RWPS AND SVP'S INDICATED ON THIS DRAWING ARE INDICATIVE ONLY. FOR ACTUAL POSITIONS OF RWPS AND SVP'S REFER TO ARCHITECTS DRAWINGS. ALL RWPS AND SVP'S TO BE TRAPPED AND FITTED WITH RODDING ACCESS AT OR ABOVE GROUND LEVEL.

- 607m² Hard Surface to Sewer
- 977m² Apartment Blue Roof to sewer
- 1,212m² Podium Green/Blue Deck to sewer
- 1,227m² Roof to Podium Deck to sewer
- Total Draining to Sewer = 4,038m²**
of which 3,416m² passes through SUDS feature
- 130m² Hard Surface Drain to ground
- 498m² Paths & Decking drain to ground
- 156m² Porous surfacing drain to ground
- 1,159m² Grass/Gardens/Landscaping drain to ground
- Total Draining to Ground = 1,943m²**
- Root Protection Zone

P1	05.12.24	Preliminary Issue	WW	CD	CB
Rev	Date	Description	By	Check	App

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Clancy Project No. 1_21724

Client
MARCO LIVING 3 LTD

Project
Palatine Road, Didsbury
Manchester, M20 2WF

Office
Altrincham

Discipline
Civil

Title
Proposed Drained Areas

Scale @ A1
1:250

Status
Preliminary



www.clancy.co.uk

Project No.	Originator	Zone/Volume	Level
21724	CCL	XX	XX
Type	Discipline	Drawing No.	Revision
DR	C	00506	P1

Birmingham 0121 260 7850, Leeds 0114 428 3434, London 020 3077 5300, Newcastle 0161 613 8800, Nottingham 0115 221 1732, Liverpool 0151 227 1732, Glasgow 0141 222 1732, Manchester 0161 613 8800, Newcastle 0161 613 8800, Nottingham 0115 221 1732, Reading 0118 941 1988

Appendix 10

Preliminary Drainage Layout – Ground Floor

Drawing 21724-CCL-XX-00-DR-C-00501

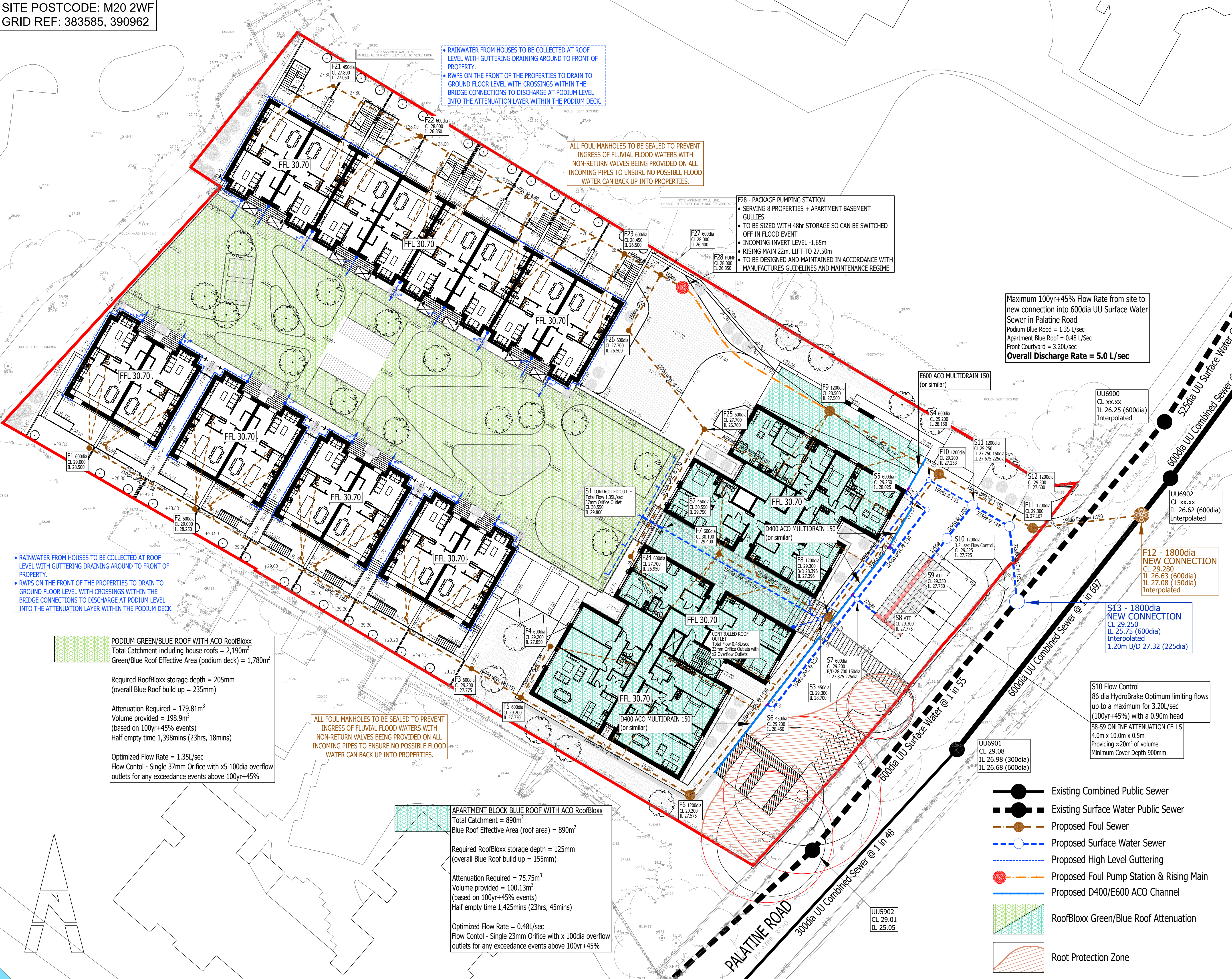
Preliminary Drainage Schedules

Drawing 21724-CCL-XX-XX-DR-C-00503

Preliminary Drainage Details

Drawing 21724-CCL-XX-XX-DR-C-00510

SITE POSTCODE: M20 2WF
GRID REF: 383585, 390962



NOTES:
ALL EXISTING STREET FURNITURE AFFECTED BY SITE WORKS TO BE ADJUSTED AND RE-LEVELLED AS REQUIRED
VISIBILITY SPLAYS TO BE PROVIDED IN ACCORDANCE WITH HIGHWAYS AUTHORITY REQUIREMENTS.
CONTRACTOR TO MAKE ALLOWANCE FOR ANY POTENTIAL ALTERATIONS TO THE HIGHWAYS STREET LIGHTING INFRASTRUCTURE FOR NEW JUNCTION ARRANGEMENT
ALL WORKS TO FORM NEW ENTRANCE TO DEVELOPMENT SITE TO BE CARRIED OUT IN ACCORDANCE WITH LOCAL HIGHWAYS DEPARTMENT REQUIREMENTS. CONTRACTOR TO MAKE ALLOWANCE FOR OBTAINING ALL NECESSARY ROAD OPENING PERMITS ASSOCIATED WITH OFF SITE WORKS.
IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE & WITHIN THE FOOTWAYS SUFFICIENTLY FAR AHEAD OF WORKS. ANY DIVERSIONS OR ADJUSTMENTS OF SERVICES TO BE AGREED BY THE PRINCIPAL CONTRACTOR WITH THE UTILITIES PROVIDER.
IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO EXPOSE EXISTING SERVICES ACROSS THE SITE SUFFICIENTLY FAR AHEAD OF LAYING PIPEWORK IN ORDER THAT ANY REQUIREMENT TO ADJUST LINE AND LEVEL OF THE PROPOSED WORKS CAN BE ACCOMMODATED. THE ENGINEER SHOULD BE INFORMED OF ANY DISCREPANCIES.
ALL EXTERNAL PATHS TO BE LAID WITH FALLS AWAY FROM THE BUILDING IN LINE WITH BUILDING REGULATIONS
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DEPTHS OF SEWERS NOTED HAVE BEEN CALCULATED USING SURVEYED INFORMATION. UNITED UTILITIES SEWER RECORDS AND ASSUMPTIONS BASED ON INFORMATION PROVIDED, ALL CARRIED OUT TO LOCAL DATUM. ALL LEVELS/DEPTHS MUST BE CHECKED AND CONFIRMED PRIOR TO COMMENCEMENT OF DETAILED DESIGN
GROUND WATER ENCOUNTERED ON SITE DURING DEVELOPMENT SHALL BE DEALT WITH BY THE CONTRACTOR ON AN AREA BY AREA BASIS. SHOULD RUN-OFF BE EXTENSIVE THE CONTRACTOR MUST MAKE ALLOWANCE TO INSTALL THE NECESSARY CUT-OFF LAND DRAINAGE WITH CONNECTIONS TAKEN INTO BEDDING MATERIAL OF PRIVATE DRAINAGE. A DIRECT CONNECTION OF LAND DRAINAGE INTO THE PIPED NETWORK WILL NOT BE ACCEPTED
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Rev	Date	Description	WW	CD	CB
P1	05.12.24	Preliminary Issue			

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Clancy Project No. 1_21724

Client

MARCO LIVING 3 LTD

Project

Palatine Road, Didsbury

Manchester, M20 2WF

Office

Altrincham

Discipline

Civil

Title

Preliminary Drainage Layout

Ground Floor

Scale at A1

1:250

Status

Preliminary



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Project No.	Originator	Zone/Volume	Level
1-21724	CCL	XX	00
Type	Discipline	Drawing No.	Revision
DR	C	00501	P1

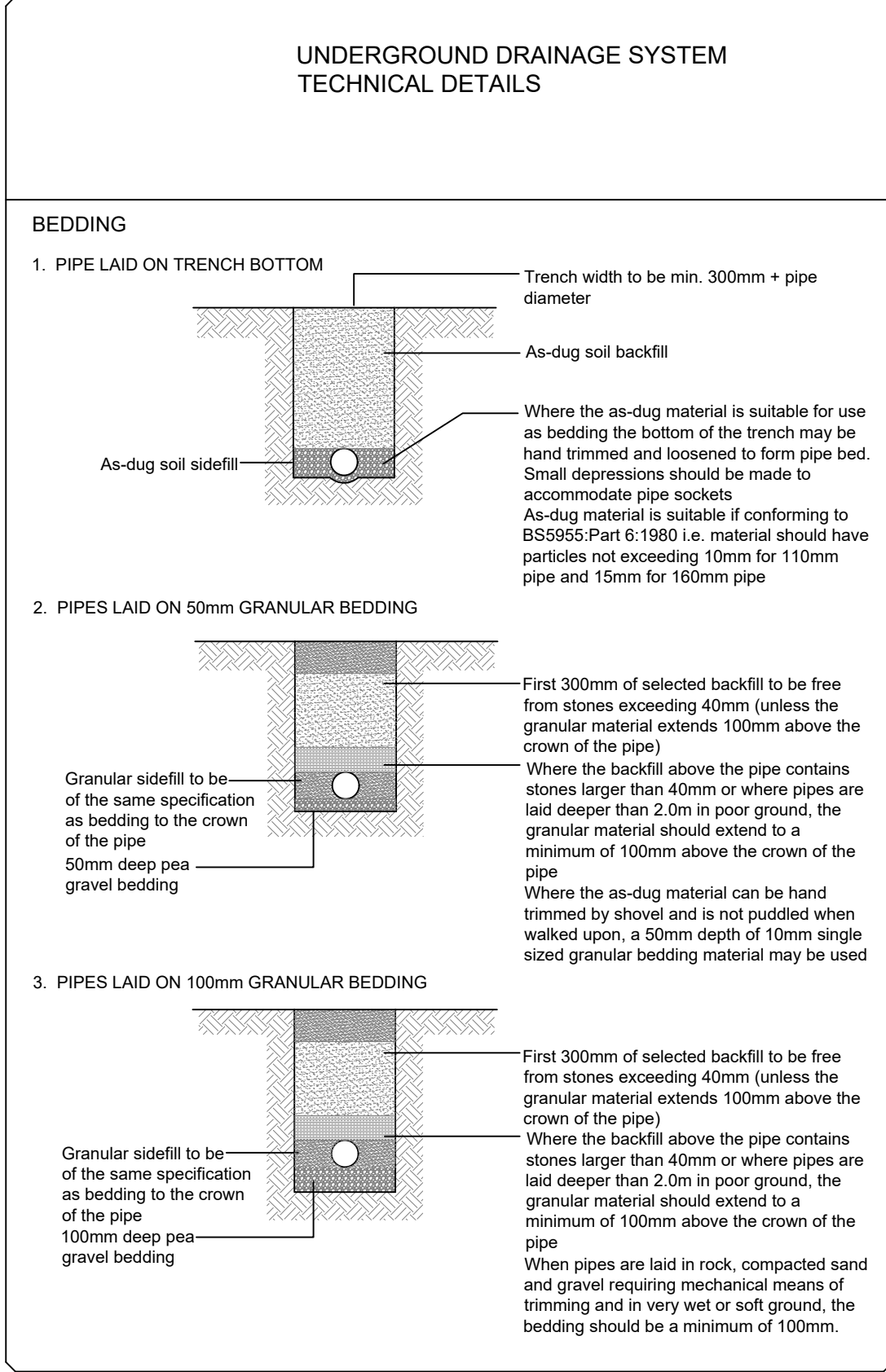
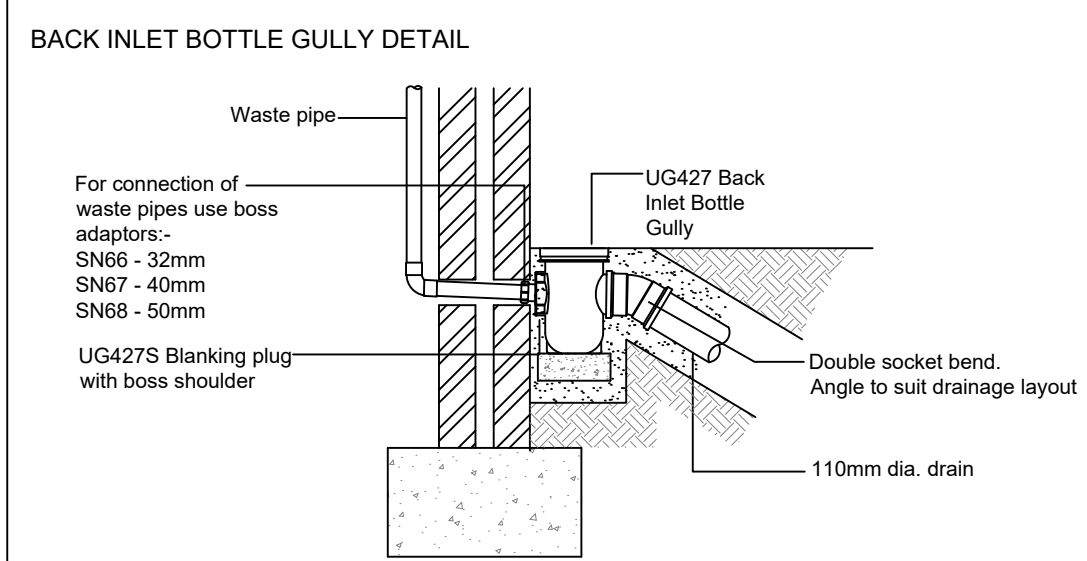
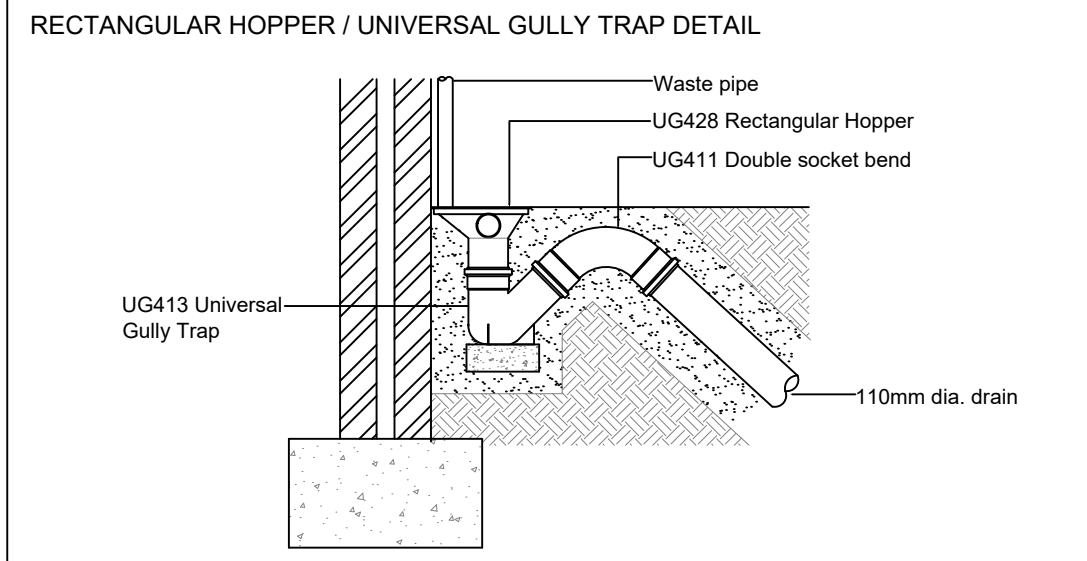
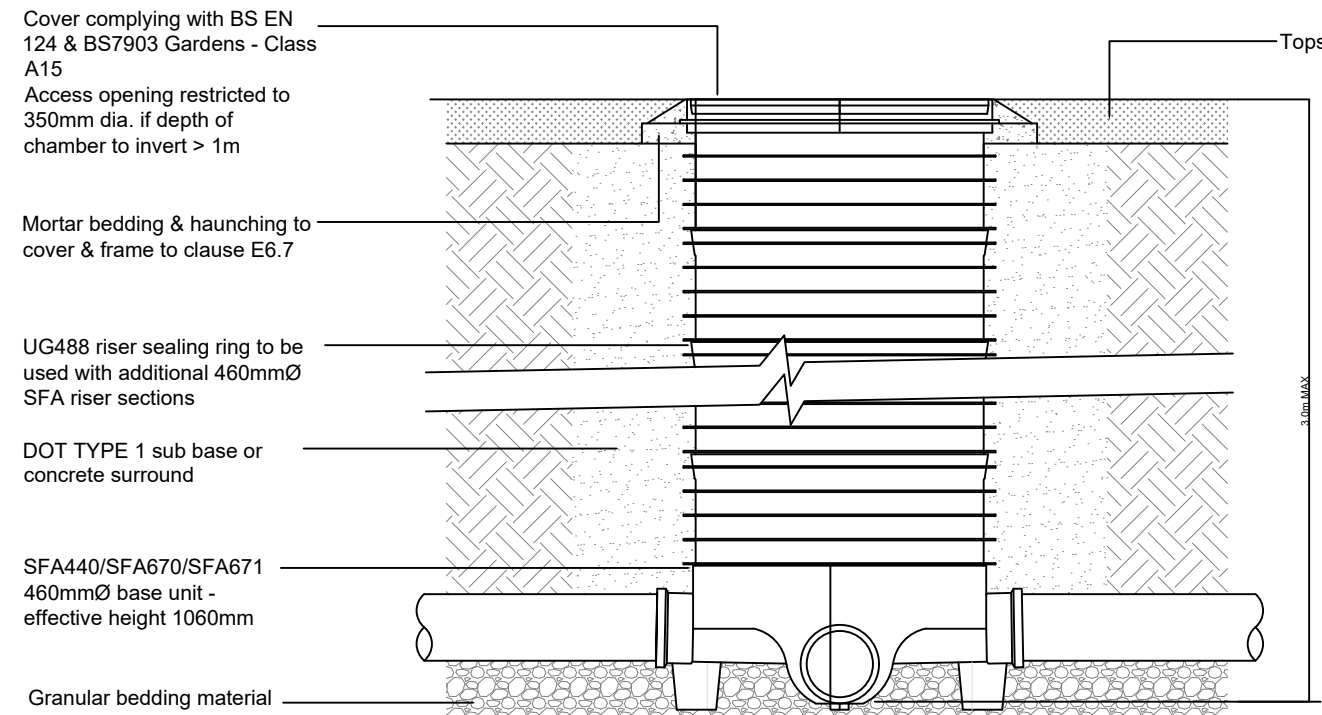
Manhole Number	Cover Level	Connections	Pipe			Manhole Size	Types	
Coordinates	Depth To Soffit		Code	Inverts	Diams		Manhole	Cover
F1	29.000		0	1.000	28.500	150	600	PPIC
E. 384148.073	0.350							
N. 392800.087								
F2	29.000		1	1.000	28.250	150	600	PPIC
E. 384160.631	0.600							
N. 392792.837			0	1.001	28.250	150		
F3	29.200		1	1.001	27.775	150	600	PPIC
E. 384193.540	1.275							
N. 392773.837			0	1.002	27.775	150		
F4	29.200		0	2.000	27.850	150	600	PPIC
E. 384202.929	1.200							
N. 392776.499								
F5	29.200		1	2.000	27.730	150	600	PPIC
E. 384199.429	1.320							
N. 392770.437			0	1.003	27.730	150		
F6	29.200		1	1.003	27.575	150	1350	DCG Type C Figure B 15
E. 384219.564	1.475							
N. 392758.812			0	1.004	27.575	150		
F7	30.100		0	3.000	29.400	150	600	PPIC
E. 384222.981	0.550							
N. 392787.501								
F8	29.300		1	2.000	1.0m B/D 28.396	150	1200	DCG Type B Figure B 10
E. 384235.972	1.754							
N. 392780.001			0	1.005	27.396	150		
F9	28.500		0	4.000	27.500	150	1350	DCG Type C Figure B 15
E. 384236.145	0.850							
N. 392804.501								
F10	29.200		1	2.000	27.253	150	1200	DCG Type B Figure B 10
E. 384249.135	1.797							
N. 392797.001			0	1.006	27.253	150		
F11	29.300		1	1.006	27.167	150	1200	DCG Type B Figure B 10
E. 384260.281	1.983							
N. 392790.565			0	1.007	27.167	150		

FOUL NETWORK 1 - GRAVITY										
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert	Cover
1.000	150	58	uPVC	14.500	F1	28.500	29.000	F2	28.250	29.000
1.001	150	80	uPVC	38.000	F2	28.250	29.000	F3	27.775	29.200
1.002	150	151	uPVC	6.800	F3	27.775	29.200	F5	27.730	29.200
1.003	150	150	uPVC	23.250	F5	27.730	29.200	F6	27.575	29.200
1.004	150	150	uPVC	26.800	F6	27.575	29.200	F8	27.396	29.300
1.005	150	150	uPVC	21.500	F8	27.396	29.200	F10	27.253	29.200
1.006	150	150	uPVC	12.871	F10	27.253	29.200	F11	27.167	29.300
1.007	150	150	ESVC	13.045	F11	27.167	29.300	F12 SEWER CONNECTION	27.080	29.280
2.000	150	58	uPVC	7.000	F4	27.850	29.200	F5	27.730	29.200
3.000	150	15	uPVC	15.000	F7	30.100	29.300	F8	B/D 28.396	29.300
4.000	150	61	uPVC	15.000	F9	27.500	28.500	F10	27.253	29.200

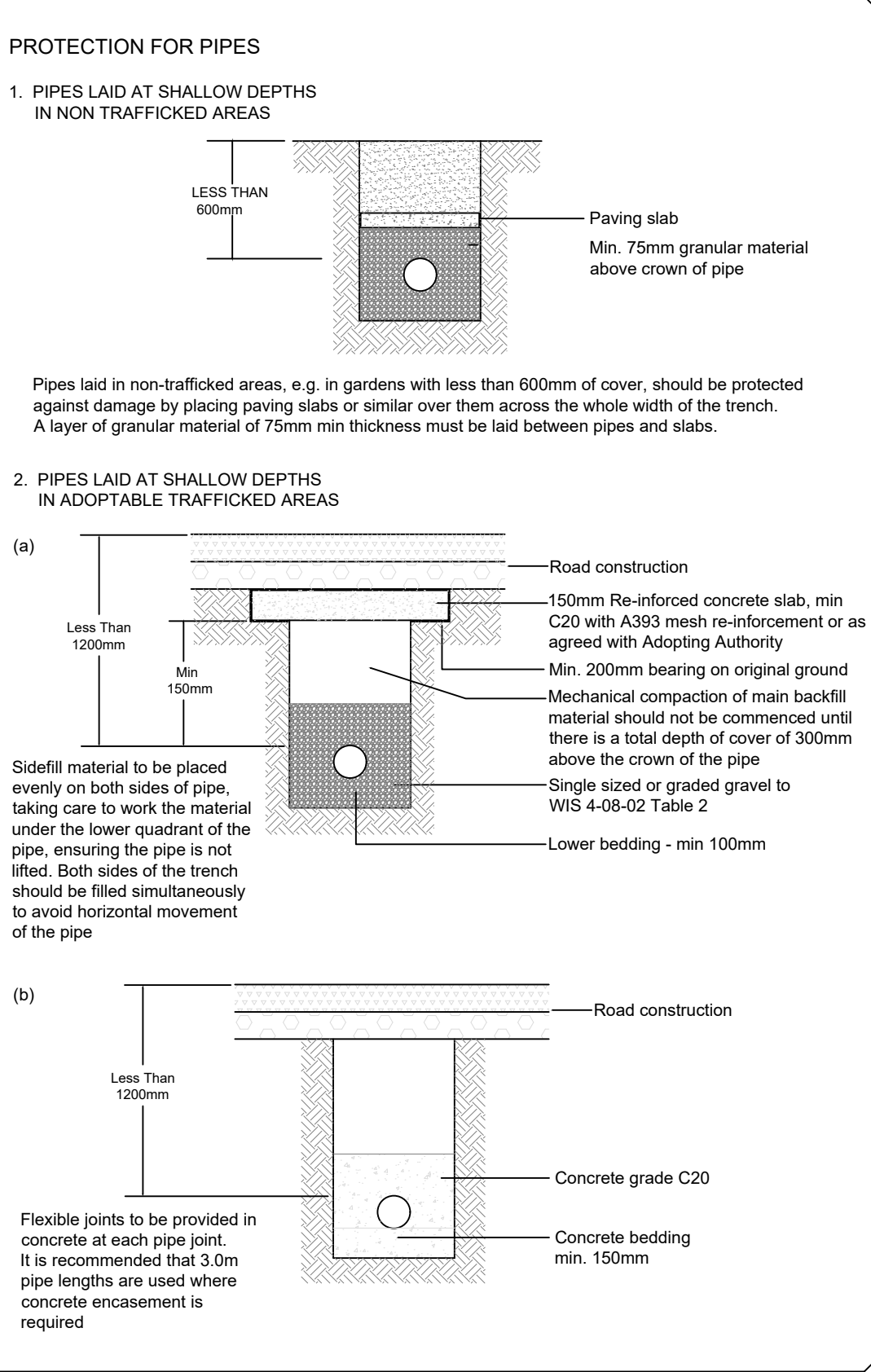
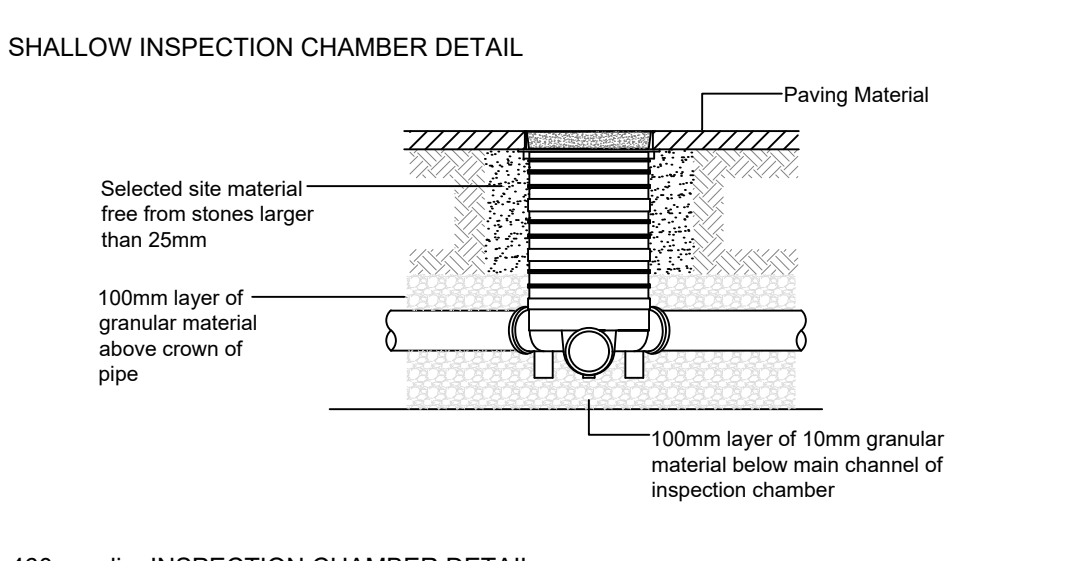
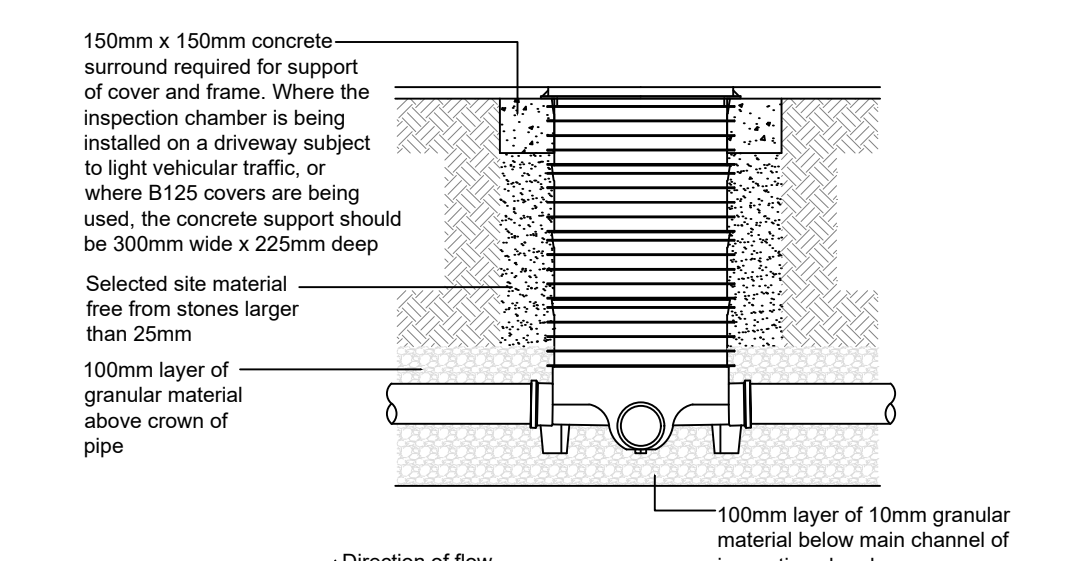
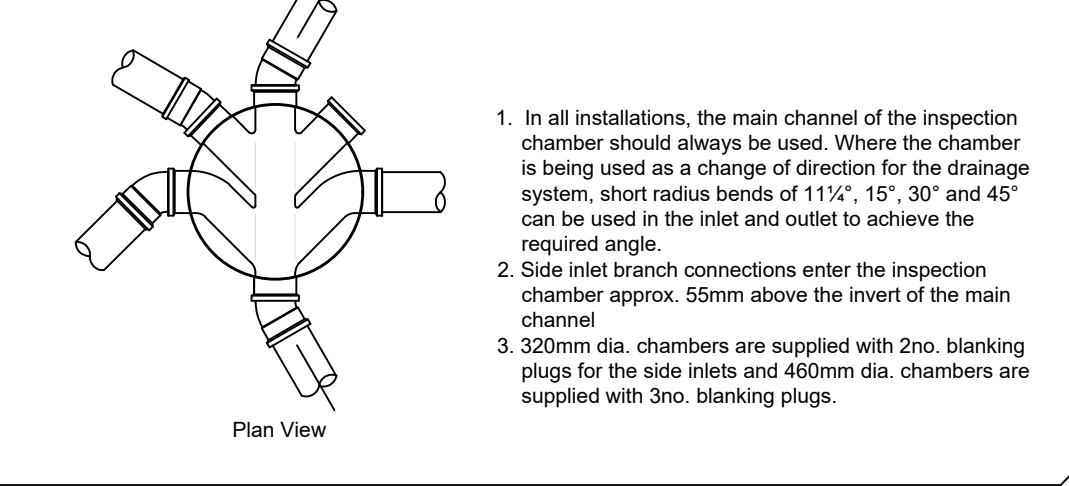
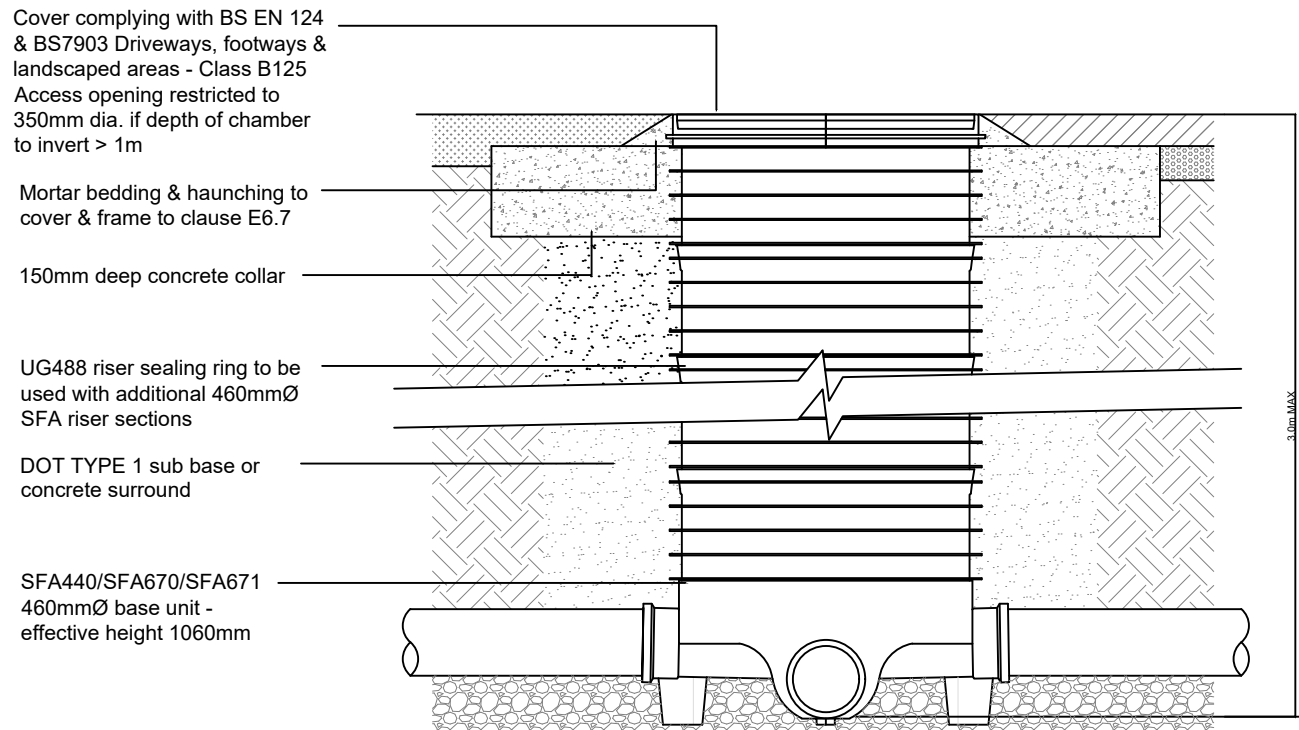
Manhole Number	Cover Level	Connections	Pipe			Manhole Size	Types	
Coordinates	Depth To Soffit		Code	Inverts	Diams		Manhole	Cover
F12	29.280		1	1.007	27.080	150	1800	DCG Type B Figure B 10
E. 384273.234	2.050							
N. 392792.109			UU	EXISTING	26.630 TBC	600 TBC		
F21	27.800		0	1.000	27.050	150	450	PPIC
E. 384177.083	0.600							
N. 392843.197								
F22	28.000		1	1.000	26.850	150	600	PPIC
E. 384187.476	1.000							
N. 392837.197			0	1.001	26.850	150		
F23	28.450		1	1.001	26.500	150	600	PPIC
E. 384211.724	1.800							
N. 392823.197			0	1.002	26.500	150		
F24	27.700		0	2.000	26.950	150	600	PPIC
E. 384212.486	0.600							
N. 392787.180								
F25	27.700		1	2.000	26.700	150	600	PPIC
E. 384221.236	0.850							
N. 392802.336			0	2.001	26.700	150		
F26	27.700		1	2.001	26.500	150	600	PPIC
E. 384212.230	1.050							
N. 392814.073			0	2.002	26.500	150		
F27	28.000		1	2.002	26.400	150	600	PPIC
E. 384216.054	1.450							
N. 392820.697			0	1.003	26.400	150		
F28	28.000		1	1.003	26.350	150	PACKAGE PUMPING STATION SERVING 8 PROPERTIES + APARTMENT BASEMENT GULLIES	TO BE SIZED WITH 48hr STORAGE SO CAN BE SWITCHED OFF IN FLOOD EVENT
E. 384218.652	1.500							
N. 392819.197								
S1	30.550		0	1.000	29.800	150	PODIUM DRAINAGE OUTLETS	
E. 384213.865	0.600							
N. 392791.920								
S2	30.550		1	1.000	29.750	150	450	PPIC
E. 384216.463	0.650							
N. 392790.420			0	1.001	29.750	150		

FOUL NETWORK 2 - PUMPED										
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert	Cover
1.000	150	60	uPVC	12.000	F21	27.050	27.800	F22	26.850	28.000
1.001	150	80	uPVC	28.000	F22	26.850	28.000	F23	26.500	28.450
1.002	150	50	uPVC	5.000	F23	26.500	28.450	F24	26.350	28.000
1.003	150	15	uPVC	3.000	F24	26.350	28.000	F25	26.200	27.700
2.000	150	70	uPVC	17.500	F25	26.200	27.700	F26	26.500	27.700
2.001	150	74	uPVC	14.795	F26	26.500	27.700	F27	26.400	28.000
2.002	150	76	uPVC	7.649	F27	26.400	28.000			

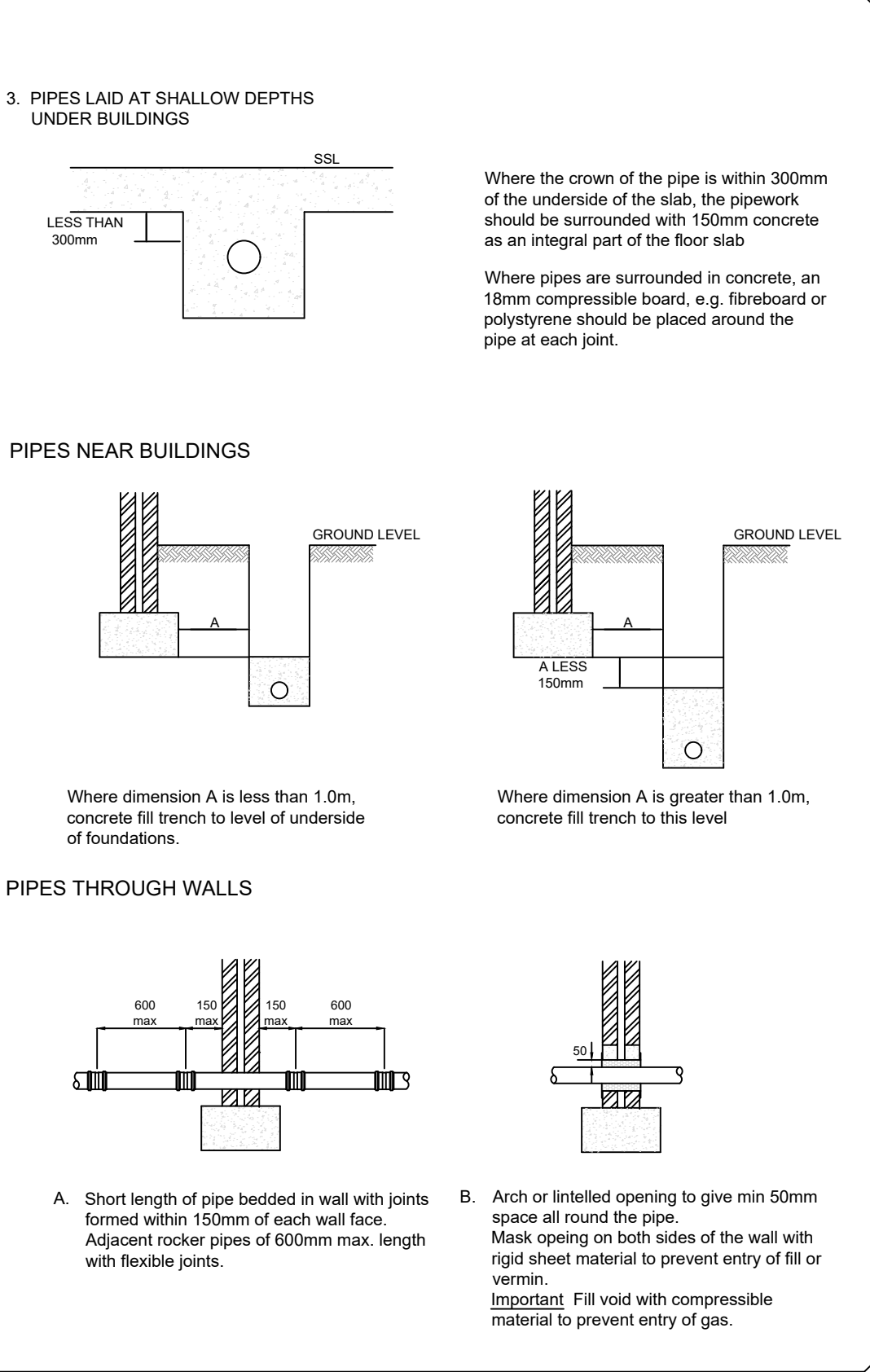
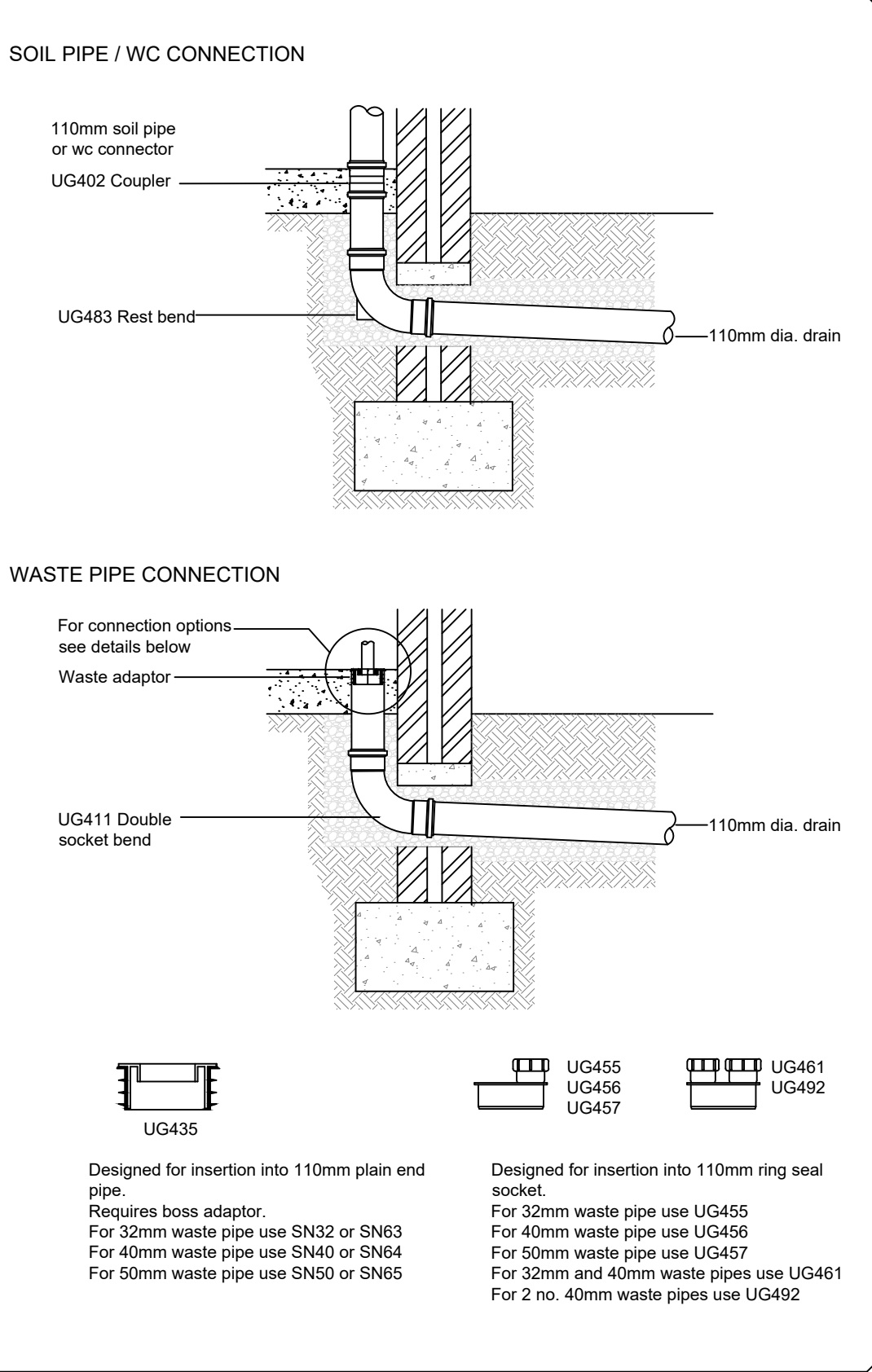
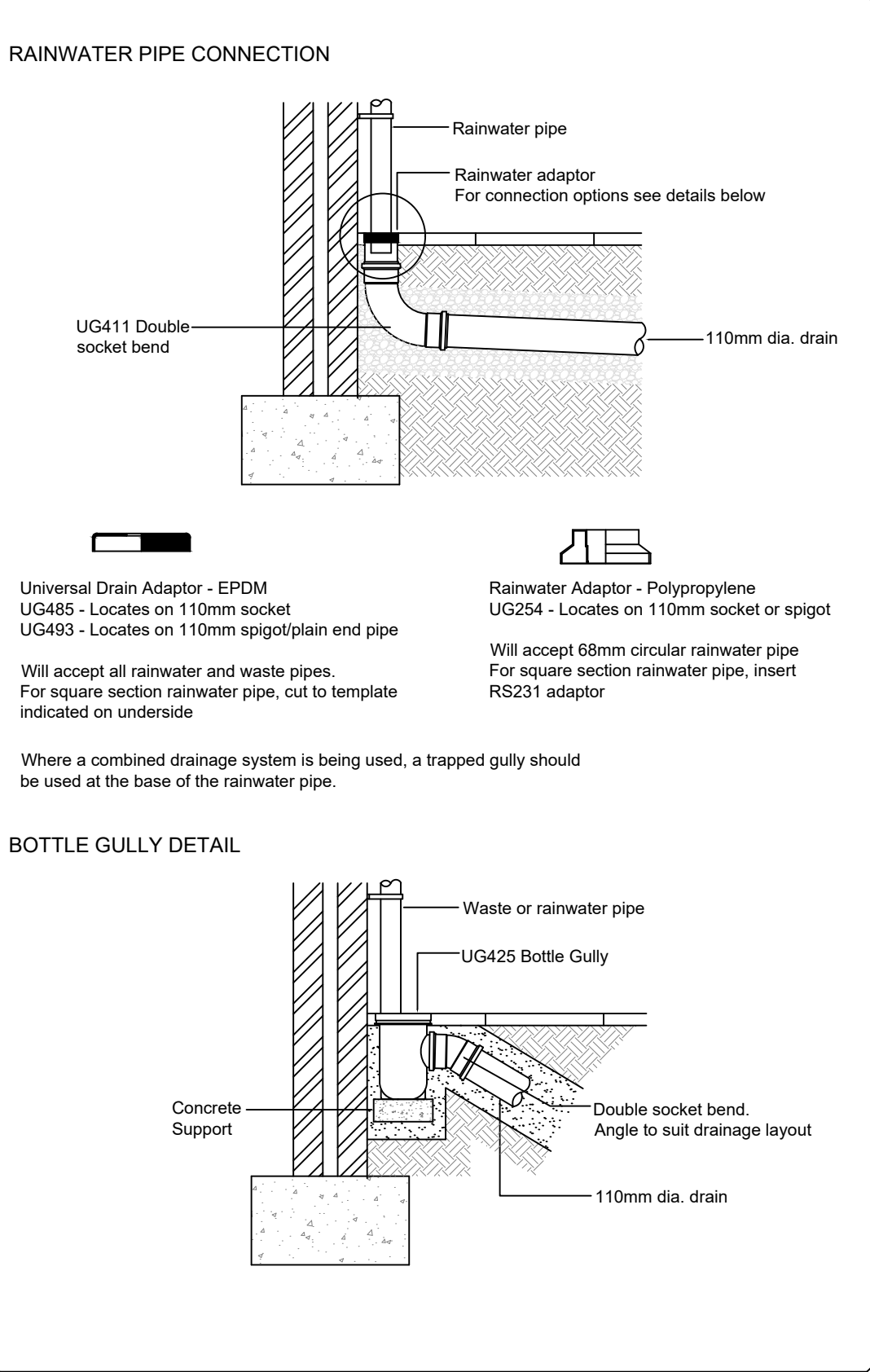
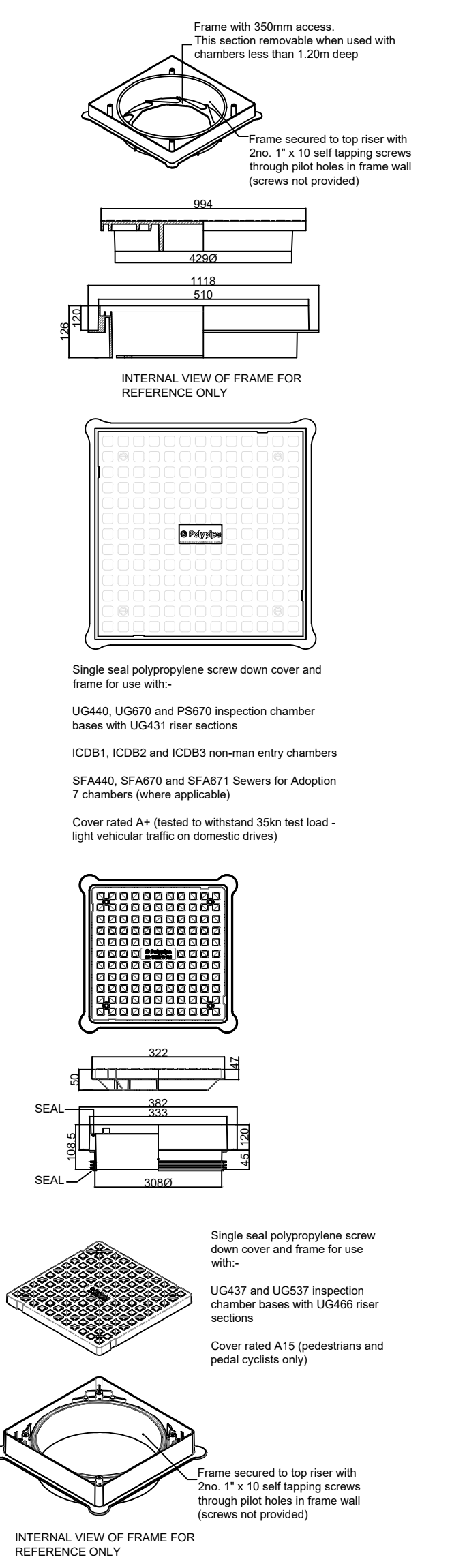
Manhole Number	Cover Level	Connections	Pipe			Manhole Size	Types		
Coordinates	Depth To Soffit		Code	Inverts	Diams		Manhole	Cover	
S3	29.300		1	1.001	28.700	150	450	PPIC	450 D400
E. 384235.083	0.450								
N. 392779.670			0	1.002	28.700	150			
S4	29.200		1	1.002	28.150	150	600	PPIC	600 D400
E. 384247.956	0.900								
N. 392796.296			0	1.003	28.150	150			
S5	29.250						600	PPIC	600 D400
E. 384247.694	1.000								
N. 392792.780			0	2.000	28.025	225			
S6	29.200						450	PPIC	450 D400
E. 384224.735	0.600								
N. 392763.129			0	3.000	28.450	150			
S7	29.200		1	2.000	27.875	225	600	PPIC	600 D400
E. 384239.429	1.100		2	3.000	27.950	150			
N. 392782.106			0	2.001	27.875	225			
S8 ATTENUATION	29.300		1	2.001	27.775	225	ONLINE ATTENUATION CELLS 4.0m x 10.0m x 0.5m Providing ≈20m³ of volume Minimum Cover Depth 900mm		
E. 384242.591	1.300								
N. 392779.657			0	2.002	27.775				
S9 ATTENUATION	29.350		1	2.002	27.750		Flow Control 86 dia HydroBrake Optimum limiting flows up to a maximum for 3.20L/sec (100yr+45%) with a 0.90m head		
E. 384248.255	1.375								
N. 392786.970			0	2.003	27.750	225			
S10 Flow Control	29.350		1	2.003	27.725	225	1350	DCG Type C Figure B 15	1220 x 685 D400
E. 384250.091	1.400								
N. 392789.342	+450mm SUMP		0	2.004	27.725	225			
S11	29.250		1	1.003	27.750	150	1350	DCG Type C Figure B 15	1220 x 685 D400
E. 384253.153	1.350		2	2.004	27.675	225			
N. 392793.296			0	1.004	27.675	225			
S12	29.300		1	1.004	27.600	225	1350	DCG Type C Figure B 15	1220 x 685 D400
E. 384257.555	1.475								
N. 392790.754			0	1.005	27.600	225			
S13 UU Sewer Connection	29.250		1	1.005	27.320	225	1800	DCG Type B Figure B 10	600 x 600 D400
E. 384258.429	2.900		UU	EXISTING	25.750 TBC	600 TBC			
N. 392781.847			UU	EXISTING	25.750 TBC	600 TBC			



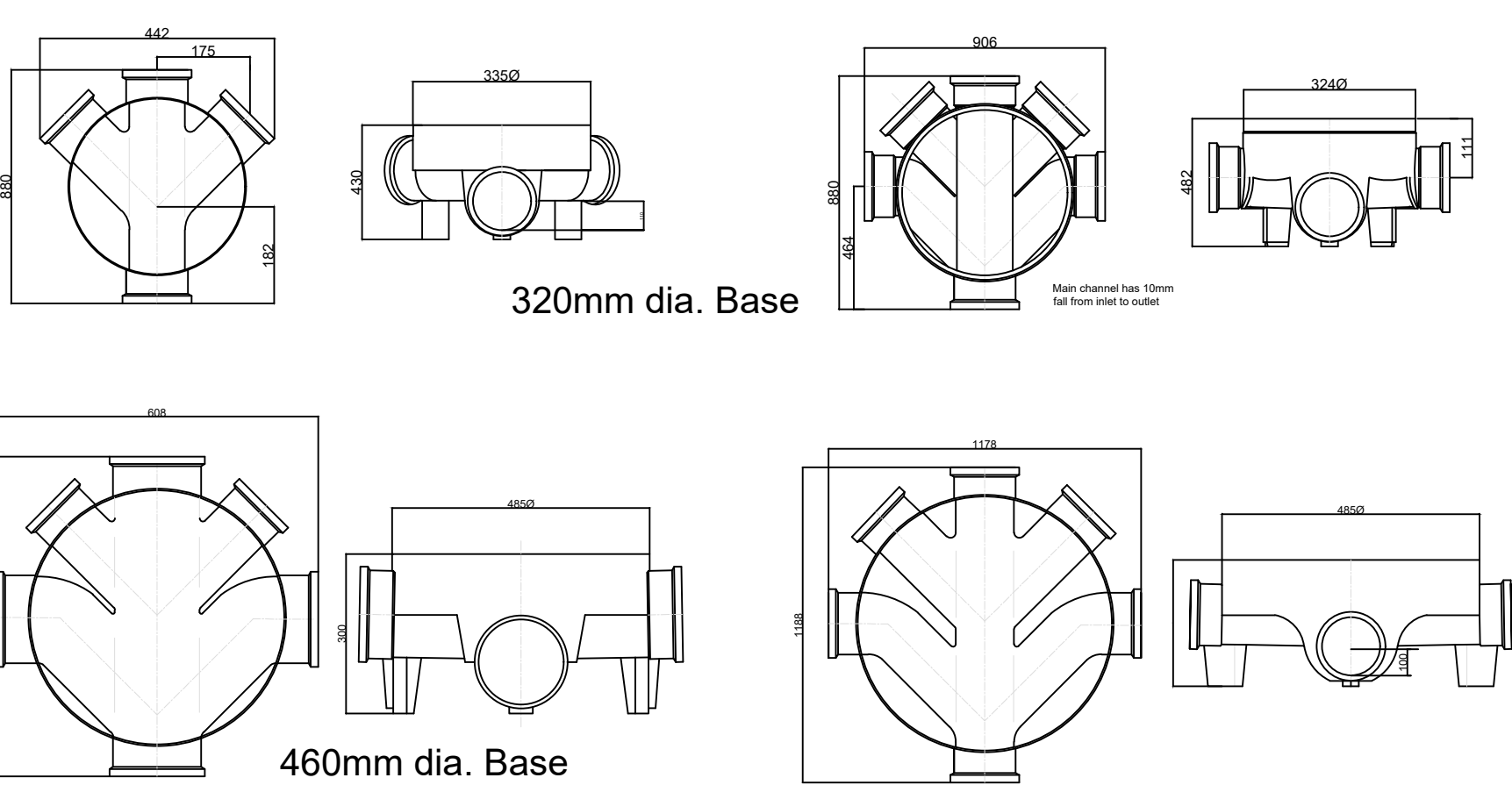
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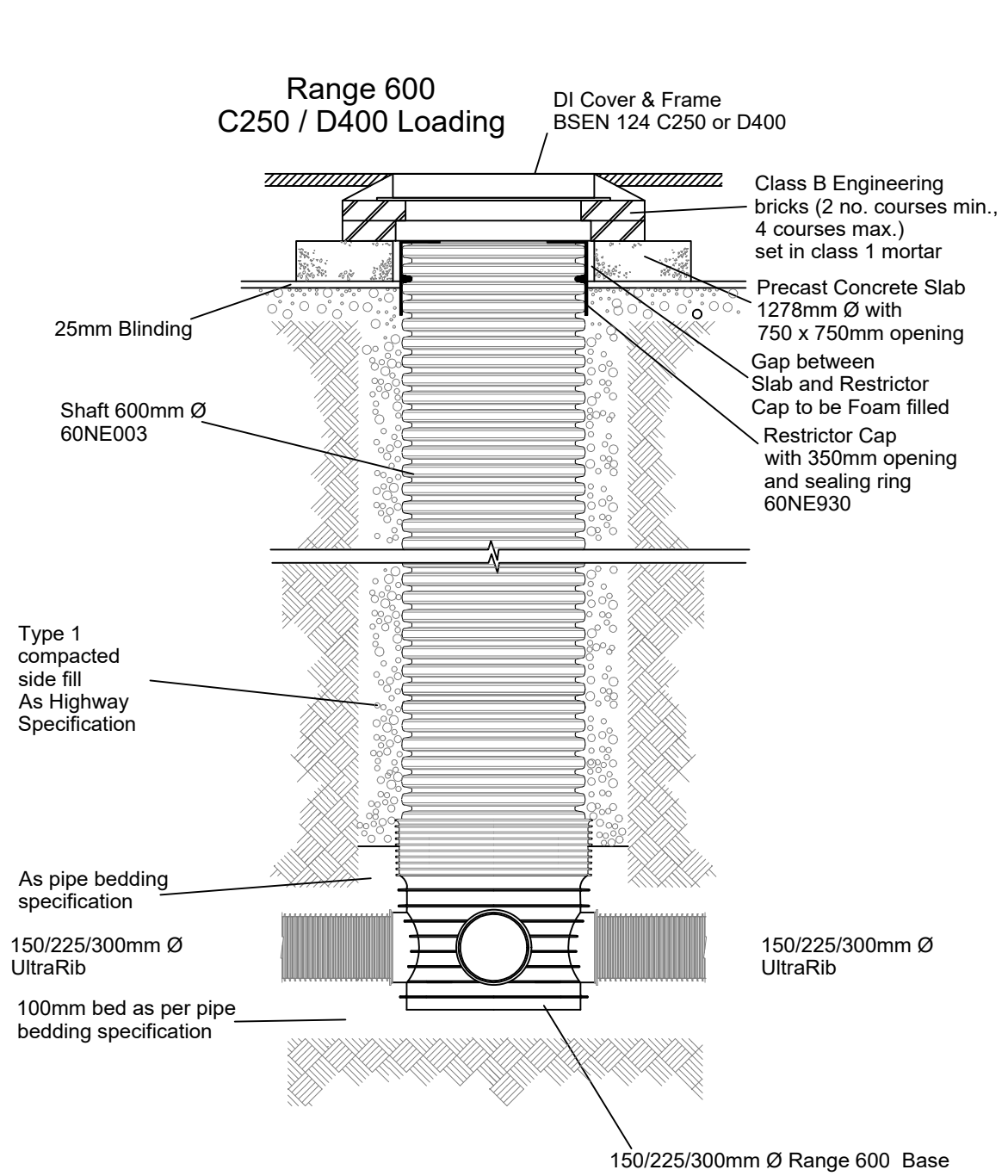
Sfa7 TYPE 3 460mm dia. CHAMBER INSTALLATION SITED IN DRIVEWAYS/FOOTWAYS/PAVED AREAS



Sfa7 TYPE 4 320mm dia. CHAMBER INSTALLATION SITED IN LANDSCAPED



Sfa7 TYPE 4 320mm dia. CHAMBER INSTALLATION SITED IN DRIVEWAYS/FOOTWAYS/PAVED AREAS



WAVIN OSMADRAIN 600DIA CHAMBER FOR 225/300DIA PIPES

Rev	Date	Description	WW	CD	CB
P1	05.12.24	Preliminary Issue			
Rev			By	Check	App
Copyright: THE COPYRIGHT OF THIS DRAWING IS VESTED IN CLANCY CONSULTING. IT SHALL NOT BE USED WITHOUT PERMISSION BY ANYONE FOR ANY PURPOSE. DO NOT SCALE THIS DRAWING ELECTRONICALLY OR MANUALLY. WORK TO FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE. THIS DRAWING WAS PRODUCED USING REVIT. IT IS NOT TO BE EXPORTED AND USED IN AUTOCAD. ANY EXPORTED AUTOCAD DRAWINGS PRODUCED FROM THIS SHEET ARE TO BE USED FOR INFORMATION PURPOSES ONLY.					
Clancy Project No. 1_21724					
Client					
MARCO LIVING 3 LTD					
Project					
Palatine Road, Didsbury Manchester, M20 2WF					
Office					
Altrincham					
Discipline					
Civil					
Title					
Preliminary Drainage Details					
Scale @ A1			Status		
NTS			Preliminary		



Project No.	Originator	Zone/Volume	Level
21724	CCL	XX	XX
Type	Discipline	Drawing No.	Revision
DR	C	00510	P1

Appendix 11

Proposed Drainage Strategy Network Calculations

		Page 1
	Palatine Road Didsbury Surface Water Network	
Date 01/12/2024 File SW 28-11-24.MDX	Designed by Clancy Consultin... Checked by CD	
XP Solutions	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW 28-11-24.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.376	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for SW 28-11-24.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.038	4-8	0.022

Total Area Contributing (ha) = 0.060

Total Pipe Volume (m³) = 3.274

Network Design Table for SW 28-11-24.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	3.000	0.050	60.0	0.000	5.00	1.3	0.600	o	150	Pipe/Conduit	
1.001	21.500	1.050	20.5	0.000	0.00	0.5	0.600	o	150	Pipe/Conduit	
1.002	21.027	0.550	38.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	6.000	0.400	15.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	13.500	0.150	90.0	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	47.69	5.04	29.800	0.000	1.3	0.0	0.0	1.30	23.0	1.3
1.001	47.05	5.20	29.750	0.000	1.8	0.0	0.0	2.24	39.5	1.8
1.002	46.22	5.41	28.700	0.000	1.8	0.0	0.0	1.63	28.9	1.8
1.003	46.08	5.45	28.150	0.000	1.8	0.0	0.0	2.61	46.2	1.8
2.000	47.19	5.16	28.125	0.035	0.0	0.0	0.0	1.38	54.8	4.5

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		Palatine Road Didsbury Surface Water Network	
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XP Solutions		Network 2020.1.3	

Network Design Table for SW 28-11-24.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	24.000	0.100	240.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	4.000	0.200	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	9.250	0.025	370.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.003	3.000	0.025	120.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.004	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	5.083	0.075	67.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	8.950	0.280	32.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	45.46	5.62	28.800	0.025	0.0	0.0	0.0	0.64	11.4	3.1
2.001	45.38	5.64	27.975	0.060	0.0	0.0	0.0	2.94	116.9	7.4
2.002	44.57	5.87	27.775	0.060	0.0	0.0	0.0	0.67	26.8	7.4
2.003	44.42	5.91	27.750	0.060	0.0	0.0	0.0	1.19	47.4	7.4
2.004	44.21	5.98	27.725	0.060	0.0	0.0	0.0	1.31	52.0	7.4
1.004	44.03	6.03	27.675	0.060	1.8	0.0	0.0	1.59	63.3	9.0
1.005	43.81	6.10	27.600	0.060	1.8	0.0	0.0	2.32	92.3	9.0

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Date 01/12/2024 File SW 28-11-24.MDX		Designed by Clancy Consultin... Checked by CD	
XP Solutions		Network 2020.1.3	

Manhole Schedules for SW 28-11-24.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	30.550	0.750	Open Manhole	225	1.000	29.800	150				
2	30.550	0.800	Open Manhole	450	1.001	29.750	150	1.000	29.750	150	
3	29.300	0.600	Open Manhole	450	1.002	28.700	150	1.001	28.700	150	
4	29.200	1.050	Open Manhole	600	1.003	28.150	150	1.002	28.150	150	
5	29.250	1.125	Open Manhole	600	2.000	28.125	225				
6	29.250	0.450	Open Manhole	225	3.000	28.800	150				
7	29.200	1.225	Open Manhole	600	2.001	27.975	225	2.000	27.975	225	
								3.000	28.700	150	650
8	29.300	1.525	Open Manhole	500	2.002	27.775	225	2.001	27.775	225	
9	29.350	1.600	Open Manhole	500	2.003	27.750	225	2.002	27.750	225	
10	29.350	1.625	Open Manhole	1200	2.004	27.725	225	2.003	27.725	225	
11	29.250	1.575	Open Manhole	1200	1.004	27.675	225	1.003	27.750	150	
								2.004	27.675	225	
12	29.300	1.700	Open Manhole	1200	1.005	27.600	225	1.004	27.600	225	
13	29.250	1.930	Open Manhole	1800		OUTFALL		1.005	27.320	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	384213.865	392791.920	384213.865	392791.920	Required	
2	384216.463	392790.420	384216.463	392790.420	Required	
3	384235.083	392779.670	384235.083	392779.670	Required	
4	384247.956	392796.296	384247.956	392796.296	Required	
5	384247.694	392792.780	384247.694	392792.780	Required	
6	384224.735	392763.130	384224.735	392763.130	Required	
7	384239.429	392782.106	384239.429	392782.106	Required	

			Palatine Road Didsbury Surface Water Network			Page 4 																																																	
Date 01/12/2024 File SW 28-11-24.MDX			Designed by Clancy Consultin... Checked by CD																																																				
XP Solutions			Network 2020.1.3																																																				
<p style="text-align: center;"><u>Manhole Schedules for SW 28-11-24.SWS</u></p> <table><tr><th>MH Name</th><th>Manhole Easting (m)</th><th>Manhole Northing (m)</th><th>Intersection Easting (m)</th><th>Intersection Northing (m)</th><th>Manhole Access</th><th>Layout (North)</th></tr><tr><td>8</td><td>384242.591</td><td>392779.657</td><td>384242.591</td><td>392779.657</td><td>Required</td><td></td></tr><tr><td>9</td><td>384248.255</td><td>392786.970</td><td>384248.255</td><td>392786.970</td><td>Required</td><td></td></tr><tr><td>10</td><td>384250.091</td><td>392789.342</td><td>384250.091</td><td>392789.342</td><td>Required</td><td></td></tr><tr><td>11</td><td>384253.153</td><td>392793.296</td><td>384253.153</td><td>392793.296</td><td>Required</td><td></td></tr><tr><td>12</td><td>384257.555</td><td>392790.754</td><td>384257.555</td><td>392790.754</td><td>Required</td><td></td></tr><tr><td>13</td><td>384258.429</td><td>392781.847</td><td></td><td></td><td>No Entry</td><td></td></tr></table>							MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)	8	384242.591	392779.657	384242.591	392779.657	Required		9	384248.255	392786.970	384248.255	392786.970	Required		10	384250.091	392789.342	384250.091	392789.342	Required		11	384253.153	392793.296	384253.153	392793.296	Required		12	384257.555	392790.754	384257.555	392790.754	Required		13	384258.429	392781.847			No Entry	
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)																																																	
8	384242.591	392779.657	384242.591	392779.657	Required																																																		
9	384248.255	392786.970	384248.255	392786.970	Required																																																		
10	384250.091	392789.342	384250.091	392789.342	Required																																																		
11	384253.153	392793.296	384253.153	392793.296	Required																																																		
12	384257.555	392790.754	384257.555	392790.754	Required																																																		
13	384258.429	392781.847			No Entry																																																		
©1982-2020 Innovyze																																																							

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	Palatine Road Didsbury Surface Water Network	
Date 01/12/2024 File SW 28-11-24.MDX	Designed by Clancy Consultin... Checked by CD	
XP Solutions	Network 2020.1.3	

PIPELINE SCHEDULES for SW 28-11-24.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	o	150	1	30.550	29.800	0.600	Open Manhole		225
1.001	o	150	2	30.550	29.750	0.650	Open Manhole		450
1.002	o	150	3	29.300	28.700	0.450	Open Manhole		450
1.003	o	150	4	29.200	28.150	0.900	Open Manhole		600
2.000	o	225	5	29.250	28.125	0.900	Open Manhole		600
3.000	o	150	6	29.250	28.800	0.300	Open Manhole		225
2.001	o	225	7	29.200	27.975	1.000	Open Manhole		600
2.002	o	225	8	29.300	27.775	1.300	Open Manhole		500
2.003	o	225	9	29.350	27.750	1.375	Open Manhole		500
2.004	o	225	10	29.350	27.725	1.400	Open Manhole		1200
1.004	o	225	11	29.250	27.675	1.350	Open Manhole		1200
1.005	o	225	12	29.300	27.600	1.475	Open Manhole		1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	3.000	60.0	2	30.550	29.750	0.650	Open Manhole		450
1.001	21.500	20.5	3	29.300	28.700	0.450	Open Manhole		450
1.002	21.027	38.2	4	29.200	28.150	0.900	Open Manhole		600
1.003	6.000	15.0	11	29.250	27.750	1.350	Open Manhole		1200
2.000	13.500	90.0	7	29.200	27.975	1.000	Open Manhole		600
3.000	24.000	240.0	7	29.200	28.700	0.350	Open Manhole		600
2.001	4.000	20.0	8	29.300	27.775	1.300	Open Manhole		500
2.002	9.250	370.0	9	29.350	27.750	1.375	Open Manhole		500
2.003	3.000	120.0	10	29.350	27.725	1.400	Open Manhole		1200
2.004	5.000	100.0	11	29.250	27.675	1.350	Open Manhole		1200
1.004	5.083	67.8	12	29.300	27.600	1.475	Open Manhole		1200
1.005	8.950	32.0	13	29.250	27.320	1.705	Open Manhole		1800

Free Flowing Outfall Details for SW 28-11-24.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	13	29.250	27.320	0.000	1800	0

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<div>Simulation Criteria for SW 28-11-24.SWS</div> <div><div>Volumetric Runoff Coeff 0.750</div><div>Additional Flow - % of Total Flow 0.000</div><div>Areal Reduction Factor 1.000</div><div>MADD Factor * 10m³/ha Storage 2.000</div><div>Hot Start (mins) 0</div><div>Inlet Coeffiecient 0.800</div><div>Hot Start Level (mm) 0</div><div>Flow per Person per Day (l/per/day) 0.000</div><div>Manhole Headloss Coeff (Global) 0.500</div><div>Run Time (mins) 60</div><div>Foul Sewage per hectare (l/s) 0.000</div><div>Output Interval (mins) 1</div><div>Number of Input Hydrographs 0</div><div>Number of Storage Structures 1</div><div>Number of Online Controls 1</div><div>Number of Time/Area Diagrams 0</div><div>Number of Offline Controls 0</div><div>Number of Real Time Controls 0</div></div> <div>Synthetic Rainfall Details</div> <div><div><div>Rainfall Model</div><div>Return Period (years)</div><div>Region England and Wales</div><div>M5-60 (mm)</div><div>Ratio R</div></div><div><div>FSR</div><div>1</div><div>18.000</div><div>0.376</div></div><div><div>Profile Type Summer</div><div>Cv (Summer) 0.750</div><div>Cv (Winter) 0.840</div><div>Storm Duration (mins) 30</div></div></div>		
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Online Controls for SW 28-11-24.SWS

Hydro-Brake® Optimum Manhole: 10, DS/PN: 2.004, Volume (m³): 1.9

Unit Reference	MD-SHE-0086-3200-0900-3200
Design Head (m)	0.900
Design Flow (l/s)	3.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	86
Invert Level (m)	27.725
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	3.2
Flush-Flo™	0.266	3.2
Kick-Flo®	0.570	2.6
Mean Flow over Head Range	-	2.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.6	1.200	3.7	3.000	5.6	7.000	8.3
0.200	3.2	1.400	3.9	3.500	6.0	7.500	8.6
0.300	3.2	1.600	4.2	4.000	6.4	8.000	8.9
0.400	3.1	1.800	4.4	4.500	6.8	8.500	9.1
0.500	2.9	2.000	4.6	5.000	7.1	9.000	9.4
0.600	2.7	2.200	4.8	5.500	7.4	9.500	9.6
0.800	3.0	2.400	5.0	6.000	7.8		
1.000	3.4	2.600	5.2	6.500	8.1		

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	Palatine Road Didsbury Surface Water Network																			
Date 01/12/2024 File SW 28-11-24.MDX	Designed by Clancy Consultin... Checked by CD																			
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<p><u>Storage Structures for SW 28-11-24.SWS</u></p> <p><u>Cellular Storage Manhole: 8, DS/PN: 2.002</u></p> <p>Invert Level (m) 27.775 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>40.0</td><td>40.0</td><td>0.501</td><td>0.0</td><td>52.7</td></tr><tr><td>0.500</td><td>40.0</td><td>52.6</td><td></td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	40.0	40.0	0.501	0.0	52.7	0.500	40.0	52.6			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	40.0	40.0	0.501	0.0	52.7															
0.500	40.0	52.6																		
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW 28-11-24.SWS</u>								
Simulation Criteria								
Areal Reduction Factor 1.000		Additional Flow - % of Total Flow 0.000						
Hot Start (mins) 0		MADD Factor * 10m³/ha Storage 2.000						
Hot Start Level (mm) 0		Inlet Coeffiecient 0.800						
Manhole Headloss Coeff (Global) 0.500		Flow per Person per Day (l/per/day) 0.000						
Foul Sewage per hectare (l/s) 0.000								
Number of Input Hydrographs 0 Number of Storage Structures 1								
Number of Online Controls 1 Number of Time/Area Diagrams 0								
Number of Offline Controls 0 Number of Real Time Controls 0								
Synthetic Rainfall Details								
Rainfall Model		FSR	Ratio R 0.376					
Region England and Wales Cv (Summer) 0.750								
M5-60 (mm)		18.000 Cv (Winter)	0.840					
Margin for Flood Risk Warning (mm)		450.0						
Analysis Timestep 2.5 Second Increment (Extended)								
DTS Status		ON						
DVD Status		ON						
Inertia Status		OFF						
Profile(s)		Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080						
Return Period(s) (years)		1, 2, 30, 100						
Climate Change (%)		0, 0, 0, 45						
Water								
US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN Name Storm Period Change Surcharge Flood Overflow Act.							(m)	
1.000	1 15 Winter	1	+0%					29.831
1.001	2 15 Winter	1	+0%					29.771
1.002	3 15 Winter	1	+0%					28.725
1.003	4 15 Winter	1	+0%					28.172
2.000	5 15 Winter	1	+0%					28.171
3.000	6 15 Winter	1	+0%	100/15 Winter				28.854
2.001	7 15 Winter	1	+0%	100/60 Winter				28.026
2.002	8 30 Winter	1	+0%	100/15 Winter				27.841
2.003	9 30 Winter	1	+0%	100/15 Winter				27.827
2.004	10 30 Winter	1	+0%	30/30 Winter				27.826
1.004	11 30 Winter	1	+0%					27.725
1.005	12 30 Winter	1	+0%					27.635
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW 28-11-24.SWS

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Flow (l/s)		
1.000	1	-0.119	0.000	0.09			1.3		OK	
1.001	2	-0.129	0.000	0.05			1.8		OK	
1.002	3	-0.125	0.000	0.07			1.8		OK	
1.003	4	-0.128	0.000	0.05			1.8		OK	
2.000	5	-0.179	0.000	0.09			4.3		OK	
3.000	6	-0.096	0.000	0.28			3.0	FLOOD	RISK	
2.001	7	-0.174	0.000	0.12			7.3		OK	
2.002	8	-0.159	0.000	0.13		20	2.6		OK	
2.003	9	-0.148	0.000	0.08			2.5		OK	
2.004	10	-0.124	0.000	0.08			2.5		OK	
1.004	11	-0.175	0.000	0.11			4.3		OK	
1.005	12	-0.190	0.000	0.06			4.3		OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW 28-11-24.SWS

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Flow (l/s)		
1.000	1	-0.119	0.000	0.09			1.3		OK	
1.001	2	-0.129	0.000	0.05			1.8		OK	
1.002	3	-0.125	0.000	0.07			1.8		OK	
1.003	4	-0.128	0.000	0.05			1.8		OK	
2.000	5	-0.174	0.000	0.12			5.5		OK	
3.000	6	-0.087	0.000	0.36			3.9	FLOOD	RISK	
2.001	7	-0.167	0.000	0.15			9.4		OK	
2.002	8	-0.139	0.000	0.15		19	3.0		OK	
2.003	9	-0.119	0.000	0.09			2.8		OK	
2.004	10	-0.096	0.000	0.08			2.6		OK	
1.004	11	-0.174	0.000	0.12			4.5		OK	
1.005	12	-0.190	0.000	0.06			4.4		OK	

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		Palatine Road Didsbury Surface Water Network						
Date 01/12/2024 File SW 28-11-24.MDX	Designed by Clancy Consultin... Checked by CD							
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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW 28-11-24.SWS</u>								
Simulation Criteria								
Areal Reduction Factor 1.000		Additional Flow - % of Total Flow 0.000						
Hot Start (mins) 0		MADD Factor * 10m³/ha Storage 2.000						
Hot Start Level (mm) 0		Inlet Coeffiecient 0.800						
Manhole Headloss Coeff (Global) 0.500		Flow per Person per Day (l/per/day) 0.000						
Foul Sewage per hectare (l/s) 0.000								
Number of Input Hydrographs 0 Number of Storage Structures 1								
Number of Online Controls 1 Number of Time/Area Diagrams 0								
Number of Offline Controls 0 Number of Real Time Controls 0								
Synthetic Rainfall Details								
Rainfall Model		FSR	Ratio R 0.376					
Region England and Wales		Cv (Summer)	0.750					
M5-60 (mm)		18.000 Cv (Winter)	0.840					
Margin for Flood Risk Warning (mm)		450.0						
Analysis Timestep		2.5 Second Increment (Extended)						
DTS Status		ON						
DVD Status		ON						
Inertia Status		OFF						
Profile(s)		Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080						
Return Period(s) (years)		1, 2, 30, 100						
Climate Change (%)		0, 0, 0, 45						
Water								
US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN Name Storm Period Change Surcharge Flood Overflow Act.							(m)	
1.000	1 15 Winter	30	+0%					29.831
1.001	2 15 Winter	30	+0%					29.771
1.002	3 15 Winter	30	+0%					28.725
1.003	4 15 Winter	30	+0%					28.172
2.000	5 15 Winter	30	+0%					28.197
3.000	6 15 Winter	30	+0%	100/15 Winter				28.893
2.001	7 15 Winter	30	+0%	100/60 Winter				28.057
2.002	8 60 Winter	30	+0%	100/15 Winter				27.958
2.003	9 60 Winter	30	+0%	100/15 Winter				27.965
2.004	10 60 Winter	30	+0%	30/30 Winter				27.965
1.004	11 30 Winter	30	+0%					27.728
1.005	12 60 Winter	30	+0%					27.638
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Palatine Road
Didsbury
Surface Water Network



Date	01/12/2024
File	SW 28-11-24.MDX

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Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 28-11-24.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.376
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	OFF

Profile(s)	Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 30, 100
Climate Change (%)	0, 0, 0, 45

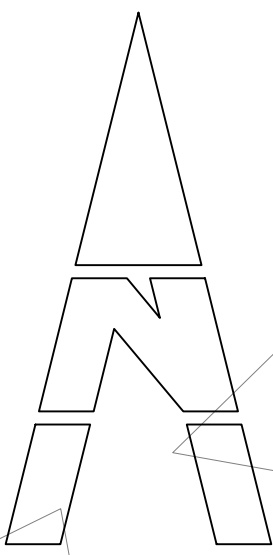
									Water
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)
1.000	1	15 Winter	100	+45%					29.831
1.001	2	15 Winter	100	+45%					29.771
1.002	3	15 Winter	100	+45%					28.725
1.003	4	15 Winter	100	+45%					28.172
2.000	5	15 Winter	100	+45%					28.226
3.000	6	15 Winter	100	+45%	100/15 Winter				29.010
2.001	7	60 Winter	100	+45%	100/60 Winter				28.210
2.002	8	60 Winter	100	+45%	100/15 Winter				28.209
2.003	9	60 Winter	100	+45%	100/15 Winter				28.266
2.004	10	60 Winter	100	+45%	30/30 Winter				28.289
1.004	11	15 Winter	100	+45%					27.728
1.005	12	30 Winter	100	+45%					27.638

Appendix 12

Preliminary Drainage Layout - Basement

Drawing 21724-CCL-XX-B1-DR-C-00502

SITE POSTCODE: M20 2WF
GRID REF: 383585, 390962



Porous Paving Design for area under Podium

Quick Design : Infiltration Systems

Variables

Rainfall and Runoff

FSR Rainfall

Return Period (years) 100

Region England and Wales

Map M5-60 (mm) 18.000

Ratio R 0.381

Infiltration Structure

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00001

Safety Factor 2.0

Porosity 0.30

Cv (Summer) 0.750

Cv (Winter) 0.840

Impermeable Area (ha) 0.060

Climate Change (%) 45

With Outflow

Maximum Discharge (l/s) 0.0

Analyse OK Cancel Help

Enter Infiltration Coefficient Base between 0.00000 and 100000.00000

Lowest possible infiltration rate

Contributing Area - 357m² from outside podium then assume 20% of under podium is exposed to rainfall (1,155m² x 20%) = 588m² use 600m²

Quick Design : Infiltration Systems