

VIADUX PHASE 2, MANCHESTER

PLOT 2A (BLOCKS C, D & E)
DRAINAGE STRATEGY

Project No: 2209-01

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1. INTRODUCTION

1.1 Project Description

The Site is located in Manchester city centre. It is bounded by the Manchester Central Conference Complex and Great Northern Warehouse to the north, Albion Street to the east, the Deansgate Castlefield Metrolink station and Deansgate Locks to the south, and the Beetham Tower to the west. It extends to 1.49 ha.

The Proposed Development will be delivered across two plots comprising the following principal uses:

Plot A: A hotel with residential apartments above.

Plot B: Affordable homes.

Together with these principal uses, the Proposed Development comprises residential amenities; secure cycle parking; public realm improvements and new green landscaping; and associated works to the public highway.

Plot 2a is located immediately east of the recently completed Phase 1 building, on land partially comprising the grade II listed Castlefield Viaduct. This plot will deliver a 76-storey mixed use tower comprising a hotel (Use Class C1) with associated bar and restaurant and residential units above comprising 1, 2 and 3 bed, and penthouse apartments (Use Class C3) with associated residential amenity spaces. Secure cycle spaces, serving this and the Phase 1 building, are provided at the ground floor level. At viaduct level, a redesigned service yard for the conference centre is enclosed by a new podium structure with residents' external amenity space above. A section of the Great Bridgewater Street bridge (deck) is removed to bring light into the street below.

Plot 2b, located at the western-most section of the Site between the viaduct and Beetham Tower, consists of a 23-storey residential building accommodating affordable 1-, 2-, and 3-bed apartments (Use Class C3), secure cycle parking spaces, flexible commercial units (Use Class E) opening onto the viaduct, and public realm enhancements on Great Bridgewater Street.

For Further information of the proposed development refer to Appendix E.

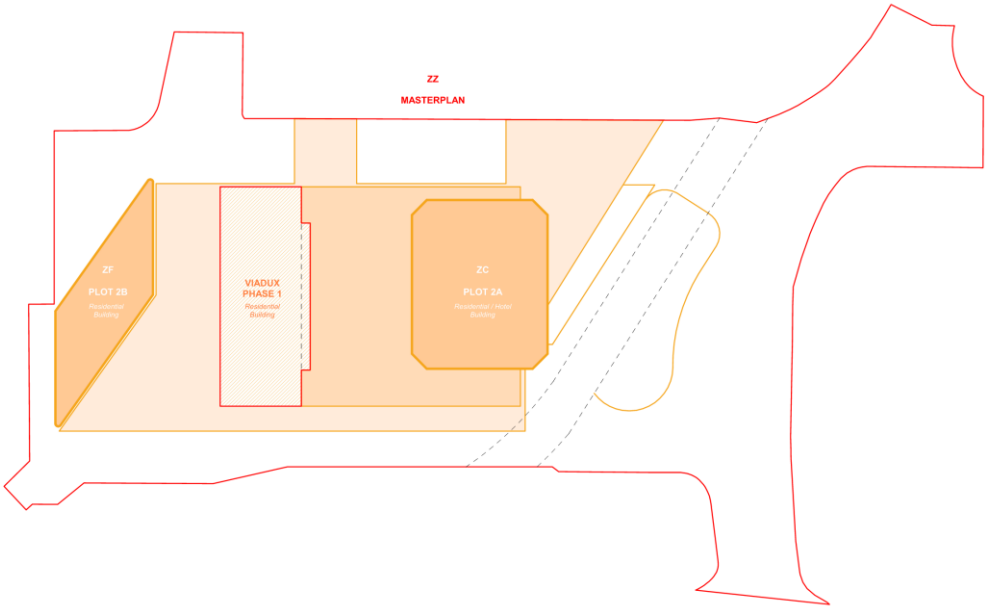


Figure 1.1: Development Phasing Plan

1.2 Purpose of this Report

This Outline Drainage Strategy has been prepared for the proposed Block C, D & E (Plot 2A) of the Viadux development in Manchester.

The assessment includes a summary of the site, an estimate of the existing and proposed surface water discharge rates, an infiltration assessment, a SuDS assessment, and outline drainage proposals and performance criteria.

This report should be read in conjunction with the following planning documents produced by renaissance:

- Sitewide Flood Risk Assessment (document ref: V2B-REN-XX-XX-RP-C-00001)
- Drainage Strategy report for Block F (Plot 2a) (document ref: V2B-REN-FF-XX-RP-C-00002)

The proposals within this report are intended to demonstrate the feasibility of the overarching drainage strategy to support the planning application.

The proposals within this report are inline with Policy JP-S4: Flood Risk and the Water Environment of the Greater Manchester Combined Authority Places for Everyone Joint Development Plan.

2. THE SITE

2.1 Site Location

The proposed development site is located off Albion Street, Manchester.

The site location is described below:

- Post Code M1 5LH
- OS X (Easting) 383550
- OS Y (Northing) 397630
- Nat. Grid SJ835976

The site location is illustrated in Figure 2.1 below.



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Figure 2.1: Indicative Site Location

2.2 Site Description

The overall Viadux site (Figure 2.1) is circa 0.820 Ha which excludes adopted areas i.e. highways. The site currently comprises a Grade II listed masonry viaduct and the 40 storey tower associated with Phase 1 of the development. The Upper Deck (Level 01) of the Grade II listed masonry viaduct is currently used as a service yard. The western portion of the Viaduct Lower Deck (Ground Level) is being constructed as part of the Phase 1 works and the eastern portion used as storage. Both levels to the viaduct are generally flat, with access to the upper deck provided by a ramp along Trafford Street.

The Metrolink Tram line crosses the eastern portion of the site. The site boundary is formed by Trafford Street to the south, Hilton Hotel to the west, Great Bridgewater Street and Manchester Central building (former GMEX) to the north, and Albion Street to the east. The Rochdale canal is located within close proximity to the south, and the surrounding land use is predominantly commercial and residential.

For further details of the existing site, refer to topographical survey in Appendix A. For further details of the existing site, refer to topographical survey in Appendix A.

2.3 Existing Site Drainage

CCTV and Utility Surveys have been carried out to trace the existing drainage of the overall Viadux site and the eastern area of the site.

The existing surface water drainage network associated with the existing viaduct upper deck and within the undercroft is indicated to discharge to the west of the site and has been addressed within the Phase 1 drainage. The ground floor level drainage to the west of the viaduct has been traced and discharges beneath the Metrolink Tram Viaduct to the east and into Trafford Street.

The Surface water from the site is therefore assumed to discharge into the combined sewer beneath Trafford Street

Refer to Appendix B for the United Utilities sewer records, Appendix C for the final construction Drainage Information from Phase 1 of the development.

2.4 Geology

British Geological Survey information indicates made ground deposits on site. The site is indicated to be underlain by superficial Glaciofluvial Sheet Deposits, typically comprising of sands and gravels and bedrock of the Chester Formation which typically comprises sandstone.

The Envirocheck Report (included within the Brownfields Phase 1 report) and the Coal Authority's online interactive mapping confirms that the site is situated in a coal mining referral area. No evidence of mining was noted within the historical mapping within the site, or the area immediately surrounding the site. Therefore, the likelihood of encountering relic mining features on site is considered to be unlikely and therefore has not been considered further.

2.5 Hydrogeology & Hydrology

The site is underlain by superficial Glaciofluvial Sheet Deposits (Secondary A Aquifer) and bedrock of Chester Pebble (Principle Aquifer).

Secondary (A) Aquifers are classified as are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Principle Aquifers are classified as Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.

The nearest surface water feature is the Rochdale Canal 26m south of the site which flows from east to west. No water quality data is available for this feature. There are no surface water abstractions within 1 km of the site.

The site is not located within an area from rivers or seas but is not located within a zone of limited potential for groundwater flooding, and the south and east boundaries are at Low (1 in 1000-year event) and Medium (1 in 100-year event) risk of surface water flooding.

2.6 Proposed Development

The proposed Blocks C, D & E (Plot 2a) site is to include a 76-storey tower with landscaped podium at level 03 above the existing viaduct. The areas of the viaduct upper deck to the south along Trafford Street is to be landscaped. The triangular area of viaduct upper deck to the east is to be repaved and extended to the east, repaved and is to remain as a service yard. The remaining area to this ground floor level is to be hard landscaped and provides an easement for GMPTE to access their asset.

The Plot 2a site is separated from the rest of the Viadux Phase 2 development by the Metrolink viaduct and Viadux Phase 1 and is effectively an island site with its own self-contained drainage system.

Refer to Appendix D for further details of the proposed development.

3. EXISTING & PROPOSED SURFACE WATER DISCHARGE RATES

3.1 Pre-Development Surface Water Run-Off Rates

A review of the topographical survey and aerial images indicated that the existing site area associated with the Block C, D & E works is circa 0.409 ha and consists of approximately 100% hard standing (Refer to Appendix E for existing impermeable areas plan).

The existing site run-off rates and volume have been calculated as brownfield and greenfield to provide a comparison that will inform the proposed design.

3.1.1 Existing Brownfield Run-Off Rates

The brownfield run off rates for the area of the site associated with block C, D & E have been calculated using the Modified Rational Method using the rainfall profile provided in Appendix F.

Modified Rational Method: $\boldsymbol{Q = 2.78 C i_{(peak)} A}$

$$\boldsymbol{C = C_V C_R}$$

$$\boldsymbol{C = 0.84 \times 1.3}$$

Return Period	$I_{(peak)}$ (mm/hr)	Area (ha)	Peak Runoff (l/s)
1 in 1 Year	13.445	0.409	16.7
1 in 2 Year	16.404	0.409	20.4
1 in 30 Year	29.920	0.409	37.1
1 in 100 Year	38.913	0.409	48.3

Table 3.1: Brownfield Run-Off Rates

3.1.2 Existing Brownfield Run-Off Volume

The existing brownfield run off volume expected for a site of this size for a 100-year 6-hour storm has been calculated using the modified rational method.

$$\boldsymbol{Runoff\ Volume = 10C \times i_{(average)} \times A \times storm\ duration}$$

$$\boldsymbol{Runoff\ Volume = 10 \times 0.84 \times 9.927 \times 0.409 \times 6}$$

$$\boldsymbol{Runoff\ Volume = 204.6 m^3}$$

3.1.3 Existing Greenfield Run-Off Rates

The greenfield run-off for the site has been calculated using the MicroDrainage ICP SUDS method. This method utilises the IH124 method and linearly interpolates for sites less than 50 hectares. Due to the urban environment that the site is situated in and given that a large proportion is urbanised (100% hard standing) it is considered appropriate to apply an urban factor to Qbar of 0.75. Q bar has a return period of approximately 2.3 years. Refer to Appendix G for MicroDrainage Greenfield Run-Off Rate Output.

Return Period	Q (l/s)
1 in 1 Year	5.0
1 in 2 Year	5.8
1 in 30 Year	8.3
1 in 100 Year	9.0
$Q_{bar\ (Rural)}$	2.3
$Q_{bar\ (Urban)}$	5.7

Table 3.2: Greenfield Run-Off Rates

3.1.4 Existing Greenfield Run-Off Volume

The existing greenfield run off volume expected for the entire development site of this size for a 100-year 6-hour storm has been calculated using the Greenfield Volume calculator within MicroDrainage assuming an urbanised catchment ratio of 0.75. The Greenfield Runoff Volume is calculated to be **132 m^3**. Refer to Appendix H for Micro Drainage Greenfield Run-Off Volume calculation.

Due to the constrained site, with the Grade II listed viaduct structure, Metrolink Tram viaduct and easements; infiltration is not feasible. The limited space available for attenuation also means that it is not possible to restrict the additional surface water run-off to Greenfield volume of 2/l/s/Ha.

3.2 Proposed Surface Water Discharge Rates

As per the Strategic Flood Risk Assessment (SFRA) for Manchester City Council and National Planning Policy, the drainage strategy submitted as part of the original planning submission should reduce the discharge rates at least 50% compared to the existing brownfield rates with an aim to reduce to greenfield run-off rates wherever possible.

It is proposed that the total runoff from the area associated with Block C and D is limited $Q_{BAR\ URBAN}$ which is equivalent to 5.7 l/s

Reducing the discharge to the rates proposed above would be a 83% reduction from the existing rates and is therefore in line with the requirements of the Strategic Flood Risk Assessment for Manchester City Council and National Planning Policy.

A predevelopment enquiry was submitted to United Utilities (UU) for the plot 2A site (Blocks C, D and E) and a total discharge rate of 6.6 l/s was accepted by United Utilities. The proposed discharge rate of 5.7l/s therefore considered to be acceptable as it provides a 0.9l/s betterment of the agreed rate.

3.3 Attenuation Requirements

The works associated with Blocks C and D results in approximately 3990m^2 of impermeable area. (refer to Appendix I for Proposed Impermeable areas plan)

The post development discharge rates will include for an increase in the rainfall intensity of 40% and 45% for the 1 in 30-year and 1 in 100-year storm events respectively to allow for climate change. This is consistent with a design life for the development of 100 years, as outlined by the National Planning Practice Framework (NPPF).

A quick storage estimate for the 1 in 100 year +45% allowance for climate change in MicroDrainage indicates that the approximate attenuation volumes shown in table 3.4 are required to limit the peak surface water discharge to 4.6 l/s. The MicroDrainage output for the quick storage estimate can be seen in Appendix J.

RETURN PERIOD	DEVELOPMENT AREA (ha)	SURFACE WATER ATTENUATION ESTIMATE (m^3)
1:100 Year +45% CC	0.399	184-266

Table 3.4 – Surface Water Attenuation Estimate

4. SURFACE WATER DISCHARGE & SUDS ASSESSMENT

4.1 Surface Water Discharge Assessment

In accordance with the National Planning Practice Guidance (PPG), the following hierarchy of surface water drainage options has been considered:

- Discharge into the ground (infiltration);
- Discharge to a surface water body;
- Discharge to a surface water sewer, highway drain, or another drainage system;
- Discharge to a combined sewer.

4.1.1 Discharge to Ground (Infiltration)

Opportunities to infiltrate into the ground have been considered. Due to the potential contamination risk posed given the presence of made ground on site, close proximity to multiple adjacent structures and highways surrounding the site it is not considered feasible to dispose of surface water from the development through infiltration.

4.1.2 Connection to a Watercourse

Opportunities to discharge to a watercourse have also been considered. The closest watercourse is the Rochdale Canal 26m south of the site. All routes to the river would require passing through third party land or constructing new surface water drainage in the extremely congested City centre highways. As such this option is discounted.

4.1.3 Connection to a Sewer

A 1500mm combined public sewer is indicated to be present to the north of the site within Great Bridgewater Street and it is proposed that the Surface water from the area of the site associated with block C and D is to discharge into it. Refer to section 3.2 for further details of the proposed discharge rate.

4.1.4 Sustainable Drainage Systems (SuDS) Assessment

The table below provides a summary of typical SuDS outlined within CIRIA guide C753 ‘The SuDS Manual’. It provides an assessment of the various above and below ground SuDS that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated into this development. The purpose of this assessment is to set out the options that can be considered within the final drainage network and do not mean that all suitable features need to be incorporated into the final design.

SuDS Technique	Description	Suitability for development site	
Rainwater Harvesting	Collection of rainwater run-off for use	Large impermeable area and limited usage deems this unsuitable. Running and maintenance costs would not be acceptable to the client	×
Green Roof	Vegetated roof area that reduces runoff and increases time of concentration.	Suitable to Blocks C and D	✓
Blue Roof	Roof area designed to store and reduce peak runoff rates during intense storms.	Suitable to Blocks C and D	✓
Infiltration systems	Systems that collect and storage runoff allowing it to infiltrate into the ground.	The large depths of made ground and shallow groundwater mean infiltration is not viable.	×
Proprietary treatment systems	Underground structures designed to provide treatment to runoff	The site has a low pollution hazard rating so does not require a proprietary treatment system	×
Filter Strips	Grass strips that promote sedimentation and filtration as runoff is conveyed over the surface	Urban nature of the development means there are no large grass strips	×
Filter Drains	Granular filled Linear drains / soakaway with either granular fill and perforated pipe, or dense vegetation that treat runoff from adjacent impermeable areas	Not suitable due to known ground conditions	×
Swales	Shallow landscape channels that treat and convey runoff.	Urban nature of the development means this is not a viable option.	×
Bioretention systems	Shallow landscape depressions that allow runoff to pond temporarily on the surface, before filtering through vegetation and underling soils. Can either infiltrate or convey via perforated pipes.	Maybe suitable as a lined system with perforated pipes	✓
Trees	Tress within soil filled pits or permeable paving that can collect, store and treat run off	Maybe suitable subject to detailing.	✓
Pervious Paving	Granular build-up beneath permeable paving systems that can be used to either store runoff (lined system) and increase time of concentration or allow percolation into the ground.	Not suitable due to known ground conditions	×
Attenuation Storage tanks/ large diameter pipes	Large underground voided spaces used to storage runoff before infiltration or controlled discharge	Suitable to store and convey surface water run off	✓
Ponds and wetlands	Permanent pools of water used to treat run-off and provide attenuation above normal water level	Urban nature of the development means this is not a viable option.	×
Detention Basins	Dry basins that are designed to temporarily store runoff providing water quality treatment. Can either be positively drained or infiltrate or both.	Urban nature of the development means this is not a viable option.	×

× Not suitable ? Potentially suitable subject to further investigation ✓ Suitable

Table 4.1: SuDS Techniques & Suitability for Development Site

4.2 Water Quality Assessment

To assess the water quality consideration will be given to the guidance with the National Standard for Sustainable Urban Drainage (NSSUD) and CIRIA Guide C753. The pollution hazard levels for difference land uses are presented in table 4.2 and are based on the definitions in the NSSUD and C753.

Pollution Hazard Level	Land Use
Very Low	Residential roofs
Low	Individual property driveways, non-residential roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (e.g. Schools, offices)
Medium	Commercial yards and delivery areas, non-residential car parking with frequent change (e.g. hospital, retail), minor roads
High	Site with heavy pollution (e.g. Haulage yards, lorry parks, waste sites, sites with chemical and fuels are delivered, handled, stored etc.)

Table 4.2: Pollution Hazard Levels

The majority of the runoff from the site will be from building roofs and external landscaped areas; predominately used by pedestrians with infrequent use of emergency, refuse and delivery vehicles.

A small portion of the service yard at level 01 of the Viaduct will be exposed to rainwater landing on the site.

The pollution hazard level should be based on the highest level of pollution within the site and as such, the pollution hazard level is considered to be medium. Given surface water runoff from the development is to discharge into the surrounding combined sewers no treatment is required, however, a Hydrodynamic Vortex Separator has been provisionally adopted to provide treatment to the surface water. The use of silt traps and SuDS will also provide inherent treatment.

4.3 SuDS Maintenance and Management Plan

The SuDS and below ground drainage networks are to be maintained by the property owners or a maintenance company employment on their behalf. They will be required to maintain the SuDS in line with the recommendations set out within the ‘The SuDS Manual C753’ and the suppliers’ requirements.

The following operation and maintenance requirements for the SuDS that may be incorporated into the development are to be adopted by the Building Management Company. These requirements are general and have been extracted from ‘The SuDS Manual C753’.

- Table 18.3 – Operation and maintenance requirements for bioretention systems
- Table 19.3 – Operation and maintenance requirements for Trees
- Table 21.3 – Operation and maintenance requirements for Attenuation storage tanks
- Table 12.5 – Operation and maintenance requirements for Blue/Green Roofs

The contractor delivering the development is to produce a verification report of the installed SuDS which should include any product specification requirements, and this should form part of the Operation & Maintenance Manual for the development.

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess pants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular Maintenance	Remove litter, surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosions protection if required	As required
	Repair minor accumulation of silt by raking away surface mulch scarifying surface of medium and replacing mulch.	As required
Remedial Actions	Remove and replace filter medium and vegetation above	As required but likely to be >20 years

Table 4.1 - Operation and Maintenance requirements for Bio-Retention Systems (Table 18.3 'The SuDS Manual C753)

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets and outlets	Inspect monthly
Occasional Maintenance	Check tree health and manage tree appropriately	Annually
	Remove silt build-up from inlets and surface and replace mulch as necessary	Annually, or as required
	Water	As required (in periods of drought)
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Table 4.2 - Operation and Maintenance requirements for Trees (Table 19.3 'The SuDS Manual C753)

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial Actions	Repair/ rehabilitate inlets, outlets, overflows and vents	As required
Monitoring	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tanks for sediment build-up and remove if necessary	Every 5 years or as required

Table 4.3 - Operation and Maintenance requirements for Attenuation Storage Tanks (Table 21.3 'The SuDS Manual C753)

Maintenance Schedule	REQUIRED ACTION	TYPICAL FREQUENCY
Regular Inspections	Inspect all components for proper operation, integrity to waterproofing and structural stability.	Annually and after severe storms.
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storm events
	Inspect drain inlets to ensure unrestricted runoff from the drainage later to the conveyance or roof drain system.	Annually and after severe storms.
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Remedial Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth.	Six monthly and annually or as required.
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of the manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planning (if appropriate) as required -clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial Actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Table 4.4 - Operation and Maintenance requirements for Blue / Green roofs (Table 12.5 'The SuDS Manual C753')

5. DRAINAGE STRATEGY

5.1 Surface Water System

The works relating to each of the plots are spread across the site; separated by the existing Metrolink Tram Line and the Viadux 1 development. It is therefore proposed that the three phases comprising the Viadux 2 development adopt separate surface (and foul) water networks which will collect the runoff from the building roofs and external hard landscaping. Each system will connect to the combined sewers within the surrounding highways via separate new connections.

The surface water below ground drainage for Blocks C, D & E will be split over two different levels; level 01 service yard and ground floor level.

The surface water discharge from the area of the site associated with Blocks C, D & E will be restricted by a vortex flow control to the rates proposed in section 3.2 of this report at the final surface water manhole before discharging to the 1050mm combined public sewer within Great Bridgewater Street. The connection into the combined sewer will require a S106 application with UU.

Surface water attenuation will be provided by a Blue Roof system to the tower and level 03 podium. A below ground Geo-cellular tank will also be used to attenuate surface water from the service yard, single storey extension and ground floor landscaped areas. The feasibility of adopting Bio-retention systems will be reassessed at the next stage of the design.

The blue roof system will provide attenuation at roof level and restrict the surface water outflow from the roof into the below ground drainage network below. This will reduce the volume of below ground storage required to achieve the discharge rates outlined in section 3.2 whilst providing an element of source control. Figure 5.1 below shows an indicative blue roof detail for reference.

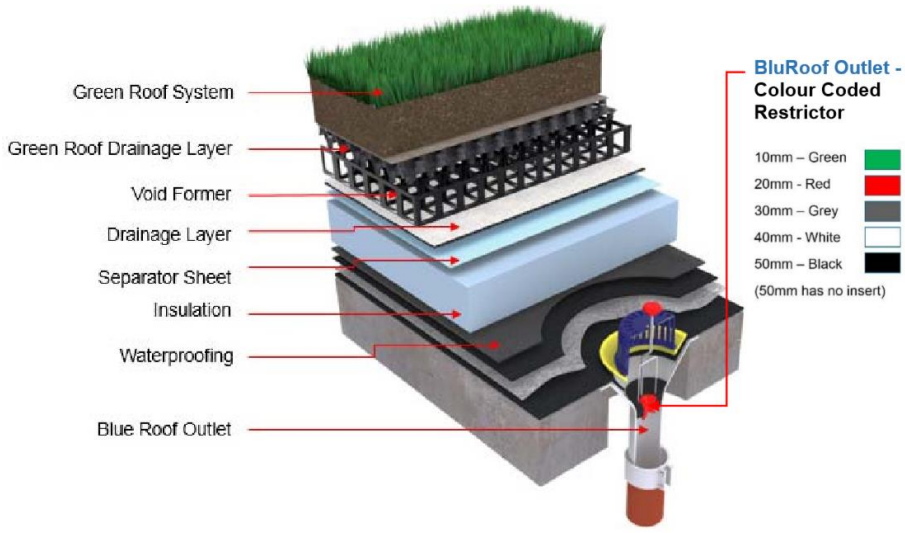


Figure 5.1 – Green & Blue Roof Indicative Detail

As detailed within Section 4.0, no surface water treatment is required prior to discharging into the public combined sewer however, the adoption of silt traps, catchpit manholes and SuDS will provide inherent treatment.

The surface water drainage network serving the area associated with Blocks C and D are to be designed and constructed in accordance with Building Regulations Part H, BS EN 752 and the Sewerage Sector Guidance (SSG). In addition the following requirements will also be adopted in

accordance with the Non-Statutory Technical Standards for Sustainable Drainage, National Planning Policy Framework and Planning Practice Guidance:

- Foul and surface water are to be drained via separate systems.
- The below ground drainage system will be designed to ensure flooding does not occur on site for the 1 in 30 year events and no internal flooding for the 1 in 100 year events.
- The surface water system is to be designed to accommodate the 1, 2, 30 and 100 year events with a 45% climate change allowance for the 100 year event.
- The system will be designed for a maximum storm duration of 6 hours.

Refer to Appendix K for the Below Ground Drainage drawings for Block C, D & E.

Refer to Appendix L for supporting surface water MicroDrainage calculations.

Refer to Appendix M for Overland Flow Routes

Refer to Appendix N for the Northwest SuDS Proforma

5.2 Foul Water System

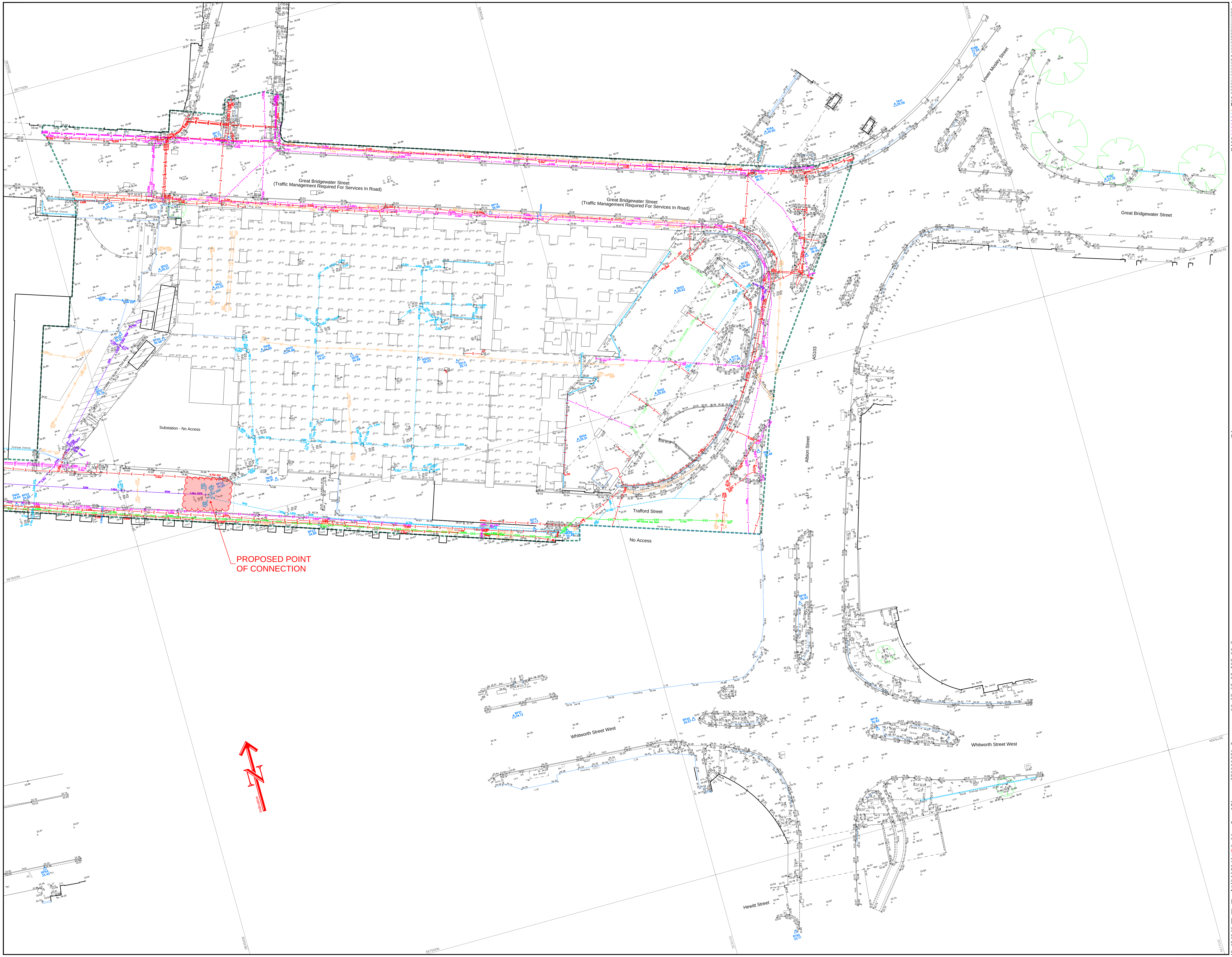
Similarly to the surface water design, the overall phase 2 development is to have 2 separate foul water networks (1 for each of the 2 plots) that collect the foul water associated with the residential apartments and retail spaces. Each network will have a separate connection to the combined sewers that surround the development and require separate S106 applications with UU.

The below ground foul network associated with Blocks C, D & E is split over three levels: level 01, ground floor and basement. The below ground foul drainage from each floor will be collected at ground level and will combine with the surface water network at the final manhole before discharging into the 1050mm diameter UU sewer within Great Bridgewater Street.

The foul networks are to be designed and constructed in accordance with Building Regulations Part H, BS EN 752 and the Sewerage Sector Guidance (SSG).

APPENDIX A

TOPOGRAPHICAL SURVEY



Topographical Survey Legend

B	Bollard	h	Height	RWP	Rain Water Pipe		Level Prefix Descriptions
BS	Bus Stop	Hyd	Hydrant	SP	Soil Pipe	AL	Arch Level
BT	Telecommunications IC	IC	Inspection Cover	SPS	Stone Paving Slabs	BL	Bed Level
CPS	Concrete Paving Slabs	JB	Junction Box	ST	Stop Tap	CL	Cover Level
CTV	Cable Television Cover	KO	Kerb Outlet	Stay	Cable Stay	EL	Eaves Level
DP	Downpipe	LB	Letter Box	SV	Stop Valve	FL	Floor Level
DR	Drain	LP	Lamp Post	TCB	Telephone Call Box	IL	Invert Level
Elec	Electrical IC	Mkr	Utility Marker	TL	Traffic Light	OL	Overhead Cable Level
EP	Elec. Pole	MP	Mile Post	TP	Telegraph Pole	PL	Parapet Level
ER	Earth Rod	NP	Name Plate	TPS	Tactile Paving Slabs	RL	Roof/ridge Level
FP	Flagpole	P	Post	VP	Vent Pipe	SL	Soffit Level
FT	Floodlight	PM	Parking Meter	WM	Water Meter	Spr	Arch Springing Level
G	Gully	RE	Rodding Eye	WO	Water Outlet	TF	Top Of Fence Level
GP	Gate Post	RS	Road Sign	UTL	Unable To Lift	TW	Top Of Wall Level
GV	Gas Valve	RTW	Retaining Wall			Thr	Threshold Level
						WL	Water Level

Fence Annotation

- B/W Barbed Wire
- C/B Closed Boarded
- C/I Corrugated Iron
- C/L Chain Link
- C/P Concrete Panel
- H/R Hand Rail
- I/R Iron Railings
- O/B Open Boarded
- P/C Post & Chain
- P/R Post & Rail
- P/W Post & Wire
- W/M Wire Mesh

C/L Fence; Safety Barrier; Gate; Stile; Hedge; Limit of Foliage & Tree Canopy; 50.00 Spot Level; SSL1 50.00 Survey Control Station (coordinated point); Tree, MT Multi Trunk

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

Drainage/Services Legend

- Foul
- Surface
- Combined
- Drainage (unspecified)
- BT British telecom
- T Telecom
- FO Fibre optics
- CATV CATV
- CCTV CCTV
- E Electric
- SL Street lighting
- TM Traffic management
- GAS Gas
- W Water
- F Fuel
- UK Unknown / misc
- Ducting
- d Service depth (m)
- ø Pipe diameter (mm)
- EOT End of trace
- UTT Unable to trace
- Utility Survey Boundary

Drainage pipe size data has been determined from the surface, in order to comply with confined spaces health and safety legislation. Please regard this data as approximate.

Survey Station Coordinates

STN	EASTINGS	NORTHINGS	LEVEL
TN01	383571.563	397649.717	43.517
TN02	383530.169	397648.659	43.320
TN03	383529.166	397666.232	43.289
TN04	383477.538	397615.506	34.637
TN05	383532.250	397605.986	34.915
TN06	383536.592	397633.215	34.855
TN07	383555.589	397629.172	34.969
TNX3	383529.930	397663.805	43.271
SP01	383500.524	397634.801	35.337
SP02	383508.435	397644.583	35.513
SP03	383520.107	397655.409	35.572
SP04	383524.736	397669.440	35.570
RP13	383541.717	397678.639	35.727
RP14	383591.196	397648.580	35.847
RP15	383647.322	397642.366	36.097
RP16	383653.658	397622.021	36.944
RP17	383632.750	397584.526	36.483
R17B	383589.017	397579.052	35.446
RP24	383521.711	397610.047	42.059
RP25	383498.335	397617.024	42.586
SP2A	383516.991	397641.143	35.483
RP18	383632.680	397551.014	35.931
RP19	383641.526	397520.912	34.828
RP20	383604.275	397533.248	34.568
RP21	383567.565	397543.886	34.120
RP5A	383462.768	397539.232	33.397
RP05	383430.740	397559.090	33.056
RP04	383445.045	397580.270	34.521
RP03	383458.957	397621.271	34.461
RP02	383478.714	397615.275	34.652
RP06	383393.144	397555.006	32.384
RP07	383366.139	397555.078	32.344
RP08	383411.196	397614.969	33.559
RP01	383422.663	397644.486	34.321
RP09	383433.568	397673.824	34.981
RP10	383441.031	397690.878	35.339
RP11	383464.975	397702.338	35.380
RP12	383512.243	397671.322	35.490
R13A	383550.920	397712.566	35.767
R16A	383652.170	397649.457	35.901
16A1	383680.297	397647.818	35.589
R16B	383699.438	397653.655	37.549
R16C	383719.249	397620.486	37.322
R17A	383632.098	397604.655	37.261
R17C	383639.362	397623.299	36.941
SH03	383624.716	397621.894	35.619
SH04	383596.361	397596.972	35.510
SH02	383614.897	397602.001	35.645
RP23	383538.514	397594.353	34.851
RP22	383520.691	397609.309	34.946
001A	383582.396	397581.218	35.132
R19A	383613.236	397483.896	33.708
TN1A	383543.964	397619.685	43.289
TN1B	383585.039	397593.280	43.192
RP27	383611.186	397636.749	43.539
RP28	383611.798	397659.265	43.445
R26C	383585.571	397667.220	43.540
RP26	383568.031	397674.912	43.546
R26A	383576.292	397705.067	43.303
R26B	383587.196	397697.530	43.342
R28A	383620.378	397659.169	43.342
JS01	383494.376	397618.307	34.794

Sheet Layout

1 2

Drawing caveats, please note:

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Depth data is limited by the accuracy of the detection equipment. Average accuracy is +/- 10% of depth with GPR and +/- 5% of the depth with electromagnetic technologies.

It is SSL's procedure to use statutory undertakers plans prior to and during the survey as a guide for the survey team.

In accordance with British Telecom (BT) national policy, SSL are not permitted to raise BT inspection chamber covers.

Drainage routes between manholes, if not able to be traced by SSL's methodologies, are assumed to be direct direct lines between manholes.

SSL advise that excavations in the vicinity of services shown are carried out with due diligence, please refer HSG47.

Please note:

Any discrepancy found between an Ordnance Survey benchmark and an OSGM02 computed orthometric height is likely to be due to bench mark subsidence or uplift and, assuming precise GPS survey has been carefully carried out, the orthometric height given by OSGM02 should be considered correct in preference to archive benchmark heights. OSGM02 converts GPS ellipsoid heights to orthometric heights above mean sea level.

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Fax 01625 526815
mail@survsys.co.uk
www.survsys.co.uk

Levels are related to **OSGM02**
Value **n/a**

Coordinates are related to **National Grid (GPS)**

Scale **1:250**

0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 metres

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Client Curtins

Title
Topographical & Utility Survey Lower Level Manchester Central

Surveyed	RP SP CM AT JDS	Drawn	GAT AG
Date	October 2016	Checked	AG MT
File name	1468R-Lower	Revision No.	Sheet size A0

Drawing No. **SSL:1468R:250:2:2:LOWER**

SURVEYsystems

Topographical Survey Legend

B	Bollard	h	Height	RWP	Rain Water Pipe	Level Prefix Descriptions	
BS	Bus Stop	Hyd	Hydrant	SP	Soil Pipe	AL	Arch Level
BT	Telecommunications BC	IC	Inspection Cover	SPS	Stone Paving Slabs	BL	Bed Level
CP	Concrete Paving Slabs	JB	Junction Box	SS	Sign Stand	CL	Cill Level
CTV	Cable Television Cover	KO	Kerb Outlet	TCo	Cable Stay	EL	Eaves Level
DP	Downpipe	LB	Letter Box	SV	Stop Valve	FL	Floor Level
DR	Drain	LP	Lamp Post	TCB	Telephone Call Box	IL	Invert Level
Elec	Electrical IC	MH	Utility Marker	TL	Traffic Light	OL	Overhead Cable Lev
EP	Ext. Power	NP	Name Plate	TP	Tactile Paving Slabs	PL	Parapet Level
ER	Earth Rod	NP	Name Plates	TPS	Tactile Paving Slabs	RL	Roof/ridge Level
FP	Flagpole	P	Post	VP	Vent Pipe	SL	Soffit Level
FT	Floodlight	PM	Parking Meter	WM	Water Meter	Spr	Arch Springing Level
G	Gully	RE	Rodding Eye	WO	Water Outlet	TF	Top Of Fence Level
GP	Guard Post	RS	Road Sign	UTL	Unable To Lift	TW	Top Of Wall Level
GV	Gas Valve	RTB	Retaining Wall			Thr	Threshold Level
						WL	Water Level

Fence Annotation

B/W	Barbed Wire		Fence
C/B	Closed Boarded		Safety Barrier
C/I	Corrugated Iron		Gate
C/L	Chain Link		
H/R	Hand Railed		Stile
H/R	Hand Rail		
I/R	Iron Railings		Hedge
O/B	Open Boarded		
P/C	Post & Chain		
P/R	Post & Rail		Limit of Foliage & Tree Canopy
P/W	Post & Wire		
W/M	Wire Mesh		

Spot Level: 50.00

Survey Control Stats (coordinated point): SDL1 50.00

Tree: MT Multi Trunk

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

Survey Station Coordinates

STN	EASTINGS	NORTHINGS	LEVEL
TN01	383571.563	397649.717	43.517
TN02	383530.169	397648.659	43.320
TN03	383529.166	397666.232	43.289
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TN05	383532.250	397605.986	34.915
TN06	383536.592	397633.215	34.805
TN07	383555.589	397629.172	34.969
TN13	383529.930	397663.805	43.271
SP01	383500.524	397634.801	35.337
SP02	383508.435	397644.583	35.513
SP03	383520.107	397655.409	35.572
SP04	383524.736	397669.440	35.570
RP13	383541.717	397678.639	35.727
RP14	383591.196	397648.580	35.847
RP15	383647.322	397642.366	36.097
RP16	383653.658	397622.021	36.944
RP17	383632.750	397584.526	36.483
R17B	383589.017	397579.052	35.446
RP24	383521.711	397610.047	42.059
RP25	383498.335	397617.024	42.586
SP2A	383516.991	397641.143	35.483
RP18	383632.680	397551.014	35.931
RP19	383641.526	397520.912	34.828
RP20	383604.275	397533.248	34.568
RP21	383567.565	397543.886	34.120
RP3A	383462.768	397539.232	33.397
RP05	383430.740	397559.090	33.056
RP04	383445.045	397580.270	34.521
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RP02	383478.714	397615.275	34.652
RP06	383393.144	397555.006	32.384
RP07	383366.139	397555.078	32.344
RP08	383411.196	397614.969	33.559
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RP10	383441.031	397690.878	35.339
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RP12	383512.243	397671.322	35.490
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R16A	383652.170	397649.457	35.901
16A1	383680.297	397647.818	35.589
R16B	383699.438	397653.655	37.549
R16C	383719.249	397629.486	37.322
R17A	383632.098	397604.655	37.261
R17C	383639.362	397623.299	36.941
SH03	383624.716	397621.894	35.619
SH04	383596.381	397596.972	35.510
SH02	383614.897	397602.001	35.645
RP23	383538.514	397594.353	34.851
RP22	383520.691	397609.309	34.946
O01A	383582.396	397581.218	35.132
R19A	383613.236	397483.896	33.708
TN1A	383543.964	397619.685	43.289
TN1B	383585.039	397593.280	43.192
RP27	383611.186	397636.749	43.539
RP28	383611.798	397659.265	43.445
R26C	383585.571	397687.220	43.540
RP26	383568.031	397674.912	43.546
R26A	383576.292	397705.067	43.303
R26B	383587.196	397697.530	43.342
R28A	383620.378	397659.169	43.342
JS01	383494.376	397618.307	34.784

Please note:

Any discrepancy found between an Ordnance Survey benchmark and an OSGB15 computed orthometric height is likely to be due to bench mark subsidence or uplift and, assuming precise GPS survey has been carefully carried out, the orthometric height given by OSGB15 should be considered correct in preference to archive benchmark heights. OSGB15 converts GPS ellipsoid heights to orthometric heights above mean sea level.

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www.survsys.co.uk

Levels are related to **OSGB15**
Value **n/a**

Coordinates are related to **National Grid** (GPS)

Scale **1:250**

0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 metres

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Client: Curtins

Title:

Topographical Survey
Upper Level
Manchester Central

Surveyed: RP SP CM | Drawn: GAT AG

Date: October 2016 | Checked: AG

File name: 1468R-UPPER | Revision No. | Sheet size: A0

Drawing No.: **SSL:1468R:250:1:1:UPPER**

SURVEYsystems

Topographical Survey Legend

B	Bollard	h	Height	FWP	Rain Water Pipe	Level Prefix Descriptions	
BS	Bus Stop	HydI	Hydrant	SP	Soil Pipe	AL	Arch Level
BT	Telecommunications IC	IC	Inspection Cover	SPS	Stone Paving Slabs	BL	Bed Level
CCTV	CCTV Surveying Station	KO	Kerb Outlet	SW	Soil Vent	CL	Cover Level
CTV	Cable Television Cover	LO	Kerb Outlet	SVy	Spy Valve	EL	Eaves Level
DP	Downpipe	LB	Letter Box	SV	Stop Valve	FL	Floor Level
DR	Drain	LP	Lamp Post	TCB	Telephone Call Box	IL	Invert Level
Elec	Electrical IC	MH	Utility Marker	TL	Traffic Light	OL	Overhead Cable Lev
EP	Ele. Post	MP	Mile Post	TP	Tactile Paving	PL	Parapet Level
ER	Earth Rod	NP	Name Plate	TPS	Tactile Paving Slabs	RL	Roofridge Level
FP	Flagpole	P	Post	VP	Vent Pipe	SL	Soffit Level
FT	Floodlight	PM	Parking Meter	WM	Water Meter	SpI	Arch Springing Level
G	Gully	RE	Rodding Eye	WO	Water Outlet	TF	Top Of Fence Level
GP	Guard Post	RS	Road Sign	UTL	Unable To Lift	TW	Top Of Wall Level
GV	Gas Valve	RTW	Retaining Wall			Thr	Threshold Level
						WL	Water Level

Fence Annotation

B/W Barbed Wire
C/B Closed Boarded
C/I Corrugated Iron
C/L Chain Link
M/P Metal Panel
H/R Hand Rail
I/R Iron Railings
O/B Open Boarded
P/C Post & Chain
P/R Post & Rail
P/W Post & Wire
W/M Wire Mesh

Fence
Safety Barrier
Gate
Stile
Hedge
Limit of Foliage & Tree Canopy
Spot Level
Survey Control Stats (coordinated point)
Tree
Multi Trunk

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

Drainage/Services Legend

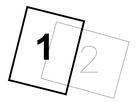
Foul	CCTV	CCTV	Ducting		
Surface	E	Electric			
Combined	SL	Street lighting	d	Service depth (m)	
Drainage (unspecified)	TM	Traffic management	ø	Pipe diameter (mm)	
BT British telecom	GAS	Gas	EOT	End of trace	
T Telecom	W	Water	UTT	Unable to trace	
FO Fibre optics	F	Fuel		Utility Survey Boundary	
CATV CATV	UK	Unknown / misc			

Drainage pipe size data has been determined from the surface, in order to comply with confined spaces health and safety legislation. Please regard this data as approximate.

Survey Station Coordinates

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TN03	383529.166	397660.252	43.289
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R17A	383632.098	397604.655	37.261
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RP22	383520.691	397609.309	34.946
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R19A	383613.236	397483.896	33.708
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RP28	383611.798	397659.265	43.445
R26C	383585.571	397667.220	43.540
RP26	383568.031	397674.912	43.546
R26A	383576.292	397700.067	43.303
R26B	383587.196	397697.530	43.342
R28A	383620.376	397659.169	43.342
JS01	383494.376	397618.307	34.794

Sheet Layout



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mail@survsys.co.uk
www.survsys.co.uk

Levels are related to **OSGB15**
Value **n/a**

Coordinates are related to **National Grid** (GPS)

Scale **1:250**

0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5
metres

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Client: Curtins

Title:

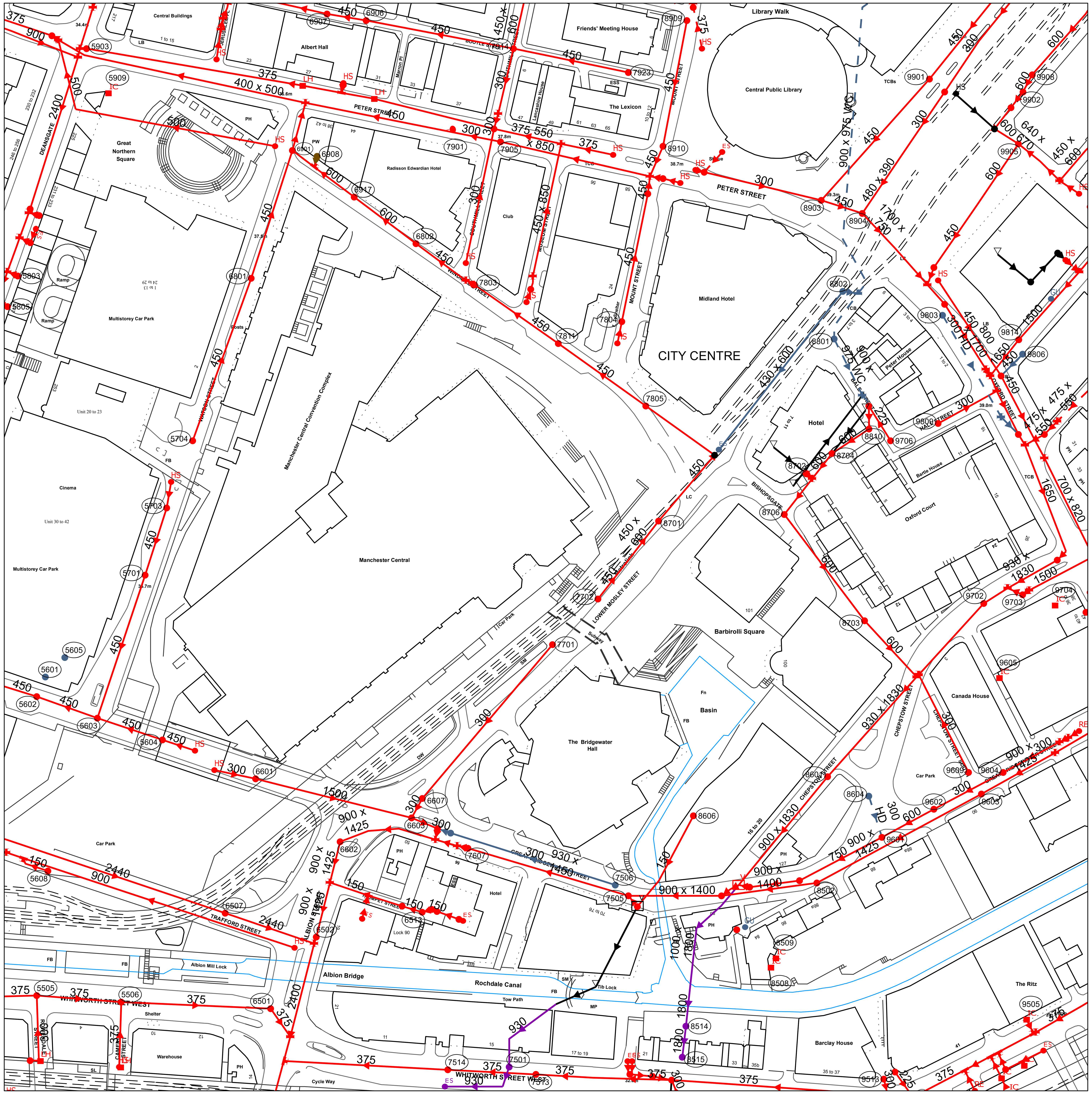
Topographical & Utility Survey Lower Level Manchester Central

Surveyed	RP SP CM AT JDS	Drawn	GAT AG
Date	October 2016	Checked	AG MT
File name	1468R-Lower	Revision No.	Sheet size A0
Drawing No.	SSL:1468R:250:1:2:LOWER		

SURVEYsystems

APPENDIX B

UNITED UTILITIES SEWER MAP



OS Sheet No: SJ8397NE

Scale: 1:1250 Date: 25/11/2016

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
5503	33.4	CO	30.67	300		CI	VC	34.02	8
5505	33.83	CO							
5506	34.08	CO							
5601	36.03	SW							
5602	35.48	CO	31.92	450		CI	CO	80.65	
5603	35.59	CO	0	450		CI	CO	29.73	
5604	35.71	CO	32.67	450		CI	CO	31.62	
5605	35.76	SW							
5608		CO		150		CI	VC	13.54	
5701	35.76	CO							
5703	17.87	CO	0	450		CI	CO	32.57	
5704		CO	0	450		CI	CO	79.71	
5801		CO		0		CI	VC	5.41	
5803		CO		0		CI	VC	5.16	
5805		CO		0		CI	VC	5.45	
5901	34.79	CO	21.81	2400		CI	BR	70.23	780
5902	34.19	CO							
5903	34.5	CO							
5909		CO							
5912		CO		0		CI	VC	4.98	
6501	34.91	CO	0	375		CI	VC	15.81	
6502	36.02	CO	22.59	2400		CI	BR	3.16	
6505	35.94	CO		150		CI	VC	35.13	
6507	9.01	CO	0	2440		CI	CO	43.32	
6513		CO		150		CI	VC	9.62	
6514		CO		150		CI	VC	4.65	
6515		CO		150		CI	VC	2.51	
6601	35.88	CO							
6602	36.37	CO	22.74	900	1425	EG	BR	19.4	129
6603	37.02	CO							
6607	38.01	CO	0	300		CI	CO	10.3	
6801		CO	0	450		CI	CO	61.98	
6802	18.46	CO	14.43	600		CI	CO	35.73	
6901	36.94	CO							
6906	18.09	CO	0	450		CI	VC	18.25	
6907	27.13	CO	0	450		CI	VC	22.56	
6908		FO		150		CI	VC	5.12	
6910		CO							
6917		CO							
7501	33.14	OV	27.68	900	1330	EG	BR	9.49	
7505	37.28	CO							
7506	37.31	SW	34.55	300		CI	CO	79.7	347
7507	32.51	CO		225		CI	UN	10.5	
7508		CO		150		CI	VC	10.77	
7512	32.37	CO		225		CI	UN	8.97	
7513		CO		375		CI	VC	40.74	
7514		CO		375		CI	VC	75.83	
7516		CO							
7607	37.09	CO	23.12	900	1425	EG	BR	5.1	
7608	37.09	SW	34.32	300		CI	CO	6.32	1
7609	37.12	CO							
7701	39	CO	35.54	300		CI	CO	92.96	
7702		CO	0	450		CI	CO	22.8	
7801	39.53	CO							
7803	39.37	CO	34.88	450		CI	CO	4.47	
7804	39.52	CO							
7805	40.87	CO							
7811		CO							
7901		CO	34.09	450		CI	VC	66.29	
7905	37.89	CO							
7907	37.82	CO	30.14	375		CI	VC	191.71	342
7911		CO							
7914	38.51	CO							
7923		CO	0	450		CI	VC	54.13	
8502	36.36	CO							
8503	36.47	CO	31.55	750		CI	CO	23.19	63
8504	36.93	CO	28.16	525		CI	CO	5.2	
8505	32.34	CO							
8506	36.98	CO	23.44	900	1400	EG	BR	42.95	226
8508		CO							
8509		CO							
8510		CO							
8514		OV	0	1800		CI	BR	14.41	
8515		OV							
8601	36.5	CO	27.8	900	1830	EG	BR	64.73	141
8604	35.93	SW	33.35	300		CI	VC	19.92	25
8606		CO	0	150		CI	VC	49.49	
8701	39.37	CO							
8702	37.28	CO	34.68	600		CI	CO	3.8	
8703	36.76	CO	28.96	600		CI	CO	35.38	
8704	37.6	CO							
8706	37.42	CO	32.92	600		CI	CO	61.4	16
8801	39.34	SW							
8802	39.51	SW	35.59	600		CI	VC	7.07	
8803	37.76	CO							
8810	37.6	CO	34	600		CI	CO	20.52	47
8901	38.88	CO	35.32	550	850	EG	BR	6.08	
8902	39.04	CO	33.7	300		CI	VC	55.54	40
8903	39.45	CO							
8904	39.55	CO	30.92	1700	750	EG	CO	21.93	
8905	39.82	CO							
8909		CO	0	450		CI	VC	59.03	
8910		CO	0	450		CI	VC	15.23	
9502		CO	0	225		CI	VC	8.67	
9505		CO							
9512		CO		225		CI	UN	14.29	
9513		CO		300		CI	VC	7.63	
9514		CO							
9514		CO							
9601	36.54	CO							
9602	36.14	CO	32.73	600		CI	CO	27.29	161
9603	36.26	CO							
9604	36.45	CO							
9605	0	CO							
9609	36.22	CO	29.73	300		CI	VC	50.54	
9701		CO		150		CI	VC	6.17	
9702	38.08	CO							
9703	38.33	CO	29.42	1500		CI	CO	7.62	
9704		CO							
9705	38.49	CO	28.14	930	1830	EG	BR	39.46	
9706	37.71	CO	36.36	225		CI	VC	18.87	70
9801	39.33	CO	31	450		CI	CI	8.54	
9802	39.35	CO							
9803	39.23	SW	35.83	300		CI	VC	54.2	
9806	39.32	SW	36.1	450		CI	VC	14.14	28
9808	39.09	CO							
9809	38.17	CO	30.88	300		CI	VC	30.89	
9814		CO	0	1650		CI	CO	21.31	
9820	39.27	CO	37.25	550		CI	BR	10.3	
9822	38.93	CO							
9901	39.86	CO	33.36	450		CI	VC	75.07	70
9902	40.37	CO	36.65	600		CI	CO	9.04	452
9903	40.42	CO	36.63	600		CI	VC	25.39	77
9905	40.25	CO							
9906	39.99	CO							
9908		CO		600		CI	CO	9.08	
5606		CO	0	450		CI	CO	15.81	
5607		CO	0	300		CI	PVC	19.42	
5610		CO	0	2440		CI	CO	106.57	
5702		CO	0	450		CI	CO	12.17	
5904		CO	0	939		CI	CO	14.14	
5908		CO	0	500		CI	BR	32.98	
5911		CO	0	900		CI	BR	35.47	
6503		CO	0	900		CI	BR	140.09	
6512		CO							
6904		CO							
6905		CO							
6914		CO							
6915		CO	0	500		CI	CO	93.56	
7502		OV	0	930		CI	BR	39.9	
7503		CO							
7515		OV							
7703		CO							
7802		CO	0	450	850	EG	BR	3	
7808		CO	0	300		CI	VC	63.35	
7812		CO	0	470	800	FT	BR	6.32	
7815		CO	0	450		CI	VC	10.2	
7920		CO	0	375		CI	VC	24.52	
8501		CO	25.57	300		CI	CO	5	3
8511		OV	0	1800		CI	BR	20.32	

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
8512		SW							
8809		SW							
8906		CO	0	850		CI	VC	8.25	
8907		CO	0	300		CI	VC	4.12	
8908		CO		375		CI	VC	19.42	
8911		CO							
9501		CO	0	375		CI	VC	24.19	
9507		CO		150		CI	UN	8.96	
9510		CO							
9515		CO							
9710		CO							
9804		CO	0	800	1700	EG	CO	34.71	
9805		SW							
9813		CO							
9815		CO							
9818		CO	0	450		CI	VC	52.7	
9909		CO							
9912		CO	0	450	600	EG	BR	10.82	
9914		CO	33.64	450		CI	CI	35.23	13
9915		CO	0	640	670	RE	BR	12.81	
5502		CO							
5508		CO							
5609		CO							
5611		CO							
5802		CO							
5804		CO							
5905		CO							
5906		CO	0	2400		CI	BR	97.42	
5907		CO							
5910		CO							
5913		CO							
6504		CO							
6506		CO							
6508		CO	22.74	900	1425	EG	BR	25.96	173
6509		CO							
6510		CO							
6606		CO	0	900	1425	EG	BR	45.68	
6902		CO							
6903		CO							
6909		CO							
6911		CO							
6912		CO							
6913		CO							
6916		CO							
7611		CO	0	900	1425	EG	BR	10.44	
7809		CO	0	450		CI	CO	28.6	
7813		CO							
7921		CO							
7922		CO	0	300		CI	VC	7.28	
7930		CO	0	550	850	EG	BR	70.83	
8705		CO	0	600		CI	CO	20.96	
8804		SW		900	975	EG	BR	2.83	
8807		SW							
9503		CO							
9504		CO							
9506		CO							
9508		CO							
9509		CO							
9516		CO							
9612		CO							
9613		CO							
9615		CO	0	300		CI	CO	29.53	
9616		CO	0	900	1425	EG	BR	38.95	
9617		CO	0	300		CI	CO	4.47	
9708		CO							
9709		CO	0	1500		CI	CO	3.61	
9711		CO							
9712		CO							
9807		CO							
9811		SW	0	300		CI	VC	11.31	
9812		CO							
9817		CO							
9823		CO							
9825		CO							
9827		CO	0	475	550	EG	BR	8.49	
9910		CO							
7504		CO							
7508		OV							
8707		SW							
8709		CO							
8710	39.43	CO							
8811		CO							
9805		CO							
9810		CO							
9819		CO							
9904	40.27	CO							
9907		CO							
8507		CO							

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul Surface Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- T Junction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

Foul Surface Combined Overflow

- Screen Chamber
- Discharge Point
- Outfall

- Control Kiosk
- Unspecified

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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

SEWER MATERIAL

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

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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OS Sheet No: SJ8397NE

Scale: 1:1250 Date: 25/11/2016

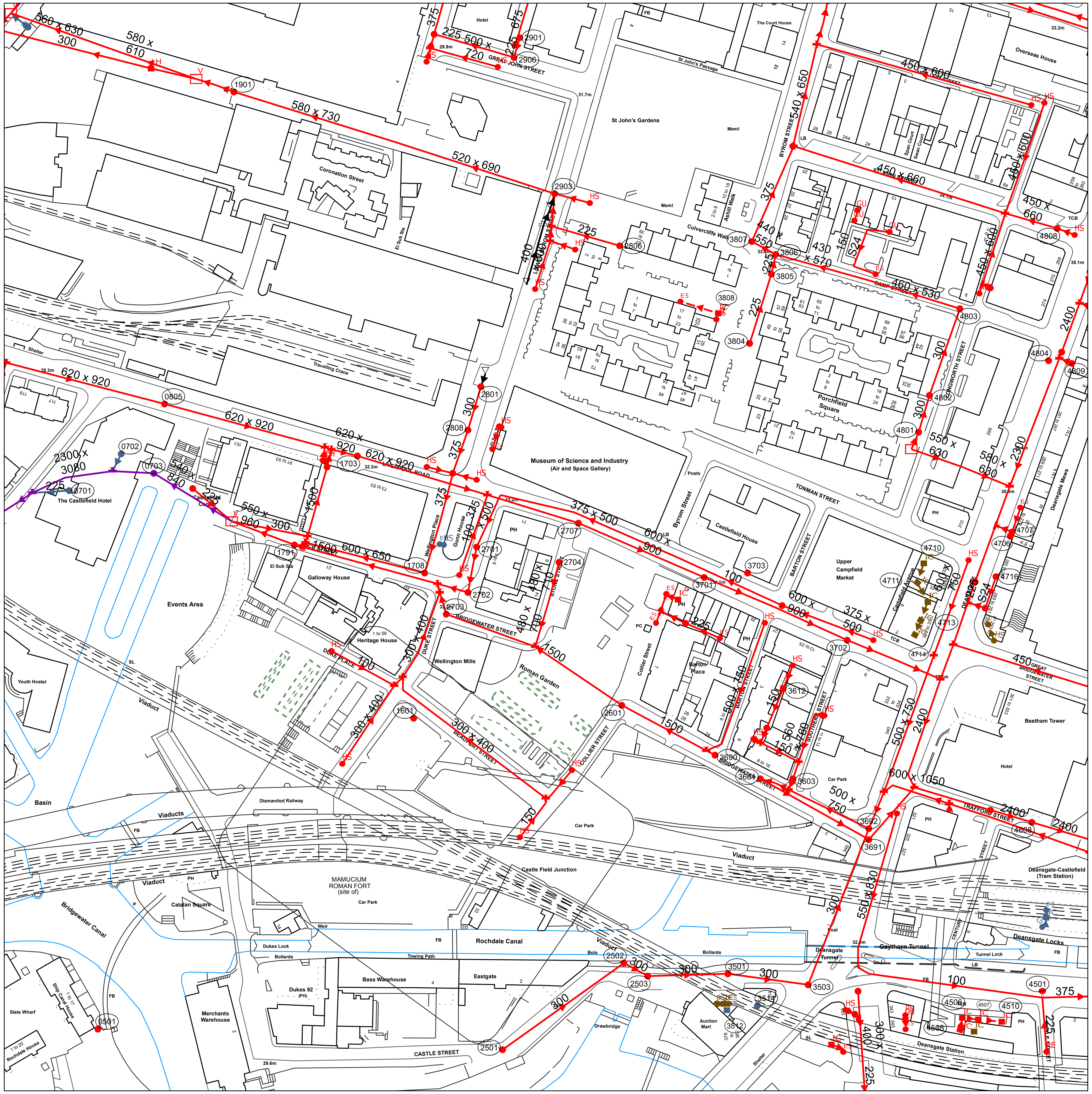
238 Nodes

Sheet 1 of 1

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SEWER RECORDS

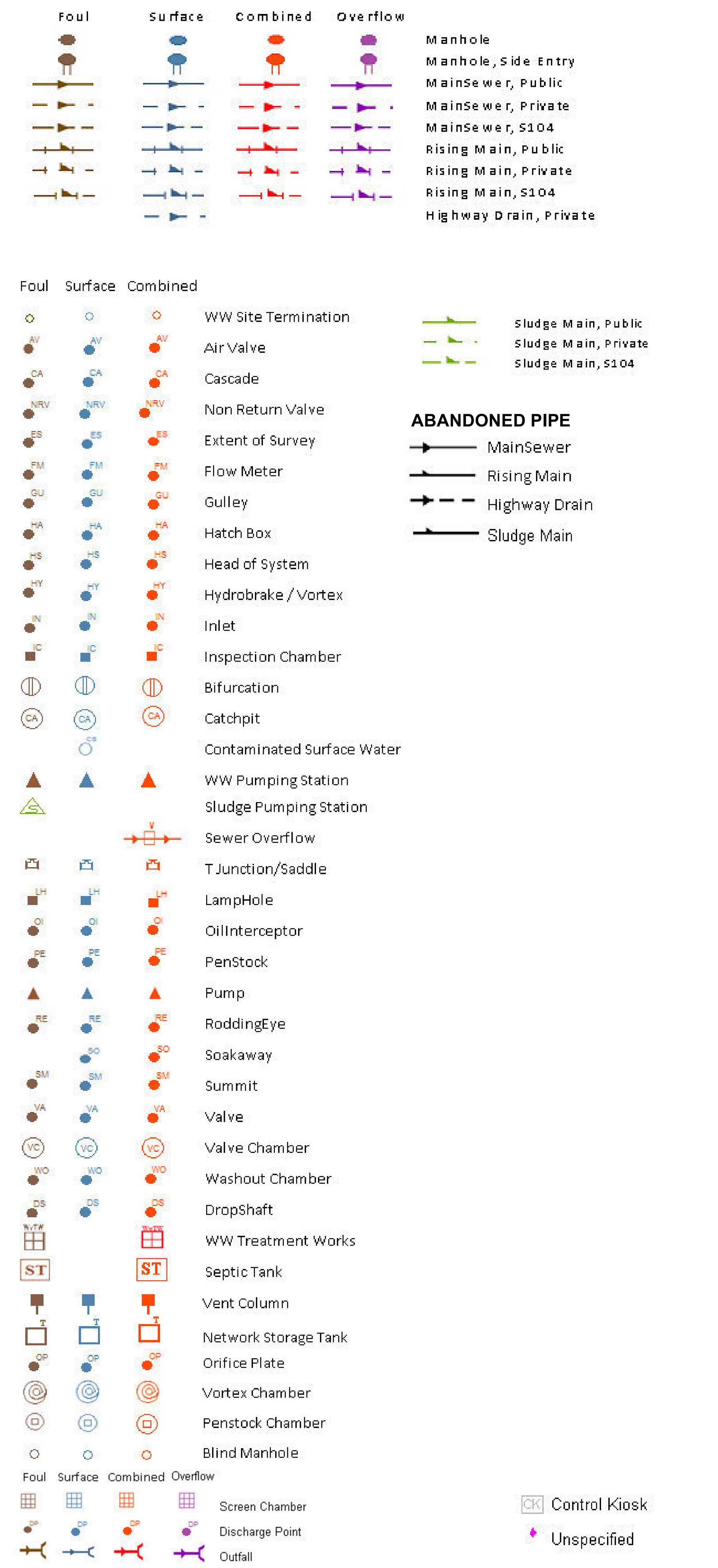
Printed By: Property Searches



Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
0501		CO							
0701	25.6	SW	24.47	225		CI	VC	17.03	
0702	25.59	SW	24.74	225		CI	VC	8.94	
0703	25.81	OV	22.78	2300	3080	UN	BR	128.36	
0704	26.25	CO	23.77	225		CI	VC	23.54	81
0805	29.54	CO							
0901	26.68	SW	23.4	400		CI	VC	5	26
1601	33.23	CO							
1703	31.99	CO	22.21	620	920	EG	BR	106.61	
1708	32.57	CO							
1709	31.39	CO							
1791	29.37	CO							
1901	28.95	CO							
1906		CO							
2501	31.09	CO	24.95	300		CI	VC	68.82	299
2502	29.53	CO							
2503	32.16	CO							
2601	33.75	CO	26.77	1500		CI	CO	91.92	919
2701	33.05	CO	28.12	300		CI	BR	10.2	
2702	33.12	CO	25.87	1500		CI	CO	14.56	
2703	33.04	CO	25.9	1500		CI	CO	14.56	
2704	33.44	CO	30.36	480	710	FT	BR	19.65	
2706	32.91	CO	29.87	375		CI	CO	23.77	
2707	33.5	CO	22.19	600	900	EG	BR	63.16	1263
2801	33.17	CO	30.67	300		CI	BR	20.88	54
2802		CO		150		CI	VC	10.86	
2806	33.42	CO	31.38	225		CI	VC	32.7	
2808		CO	30.28	375		CI	CO	21.19	54
2901		CO		225		CI	VC	9.54	
2902		CO	0	675		CI	VC	66.76	
2903	32.21	CO							
2906		CO		225		CI	VC	38.34	
3501	32.11	CO							
3502		CO							
3503	32.24	CO							
3504	31.9	CO	30	300	400	EG	VC	30.07	15
3505		CO		100		CI	VC	3.08	
3512		SW							
3513	0	FO							
3514		SW							
3601	34.38	CO	26.9	375		CI	VC	28.65	
3603		CO	0	560	760	UN	BR	5.39	
3605		CO							
3612		CO							
3690	34.2	CO	27.14	1500		CI	CO	48.77	139
3691	33.4	CO							
3692	33.74	CO	0	500	750	UN	BR	41.15	
3701	34.12	CO							
3702	34.7	CO							
3703	34.32	CO							
3707	34.62	CO							
3710		CO		225		CI	VC	12.82	
3711		CO							
3804	34.07	CO	33.04	225		CI	VC	33.53	17
3805	33.63	CO	31.01	225		CI	VC	9.22	33
3806	33.49	CO							
3807	33.44	CO							
3808		CO							
3901	33.28	CO	29.58	540	650	FT	BR	48.27	
4501	33.52	CO							
4506		CO							
4507		CO							
4508		CO							
4509		FO							
4510		CO							
4512		SW							
4608		CO	0	2400		CI	BR	27.9	
4609		CO		2400		CI	BR	19.89	
4704	35.36	CO							
4706		CO		150		CI	VC	2.11	
4707		CO							
4710		FO							
4711		FO							
4712		FO							
4713		FO							
4714		FO							
4715		CO							
4716		CO		225		CI	VC	15.41	
4801	34.39	CO							
4802	34.21	CO							
4803	34.44	CO	31.43	460	530	UN	BR	43.97	92
4804	35.23	CO							
4805	35.27	CO							
4808	35.15	CO	31.85	450	660	UN	BR	25	
4809		CO		0		CI	VC	6.15	
4812		CO		225		CI	VC	4.05	
9026		CO	0	600	750	UN	CO	16.81	
3100		CO		150		CI	VC	11.49	
0708		OV	0	540	840	UN	BR	21.1	
0905		SW	23.21	500	700	UN	BR	5.11	27
0906		CO	23.89	560	630	UN	BR	45.54	52
0907		CO	24.9	570	640	FT	BR	9.79	98
1602		CO	0	300	400	UN	CO	48.92	
1702		CO	0	450		CI	CO	12.37	
1704		CO	0	100		CI	CO	33.12	
1902		CO	0	500	750	UN	VC	6.42	
1904		CO							
1905		CO							
2602		CO	0	150		CI	VC	20	
2603		CO	0	150		CI	VC	15.62	
2605		CO	0	400		CI	VC	2.24	
2606		CO							
2705		SW							
2708		CO							
2710		CO	0	100		CI	VC	39.22	
2711		CO	0	450		CI	CO	11.4	
2713		CO	30.62	1500		CI	CO	11.18	
2714		CO							
2715		CO	31.22	600	650	UN	CO	24.04	
2800		CO	0	400	600	UN	CO	12.28	
2803		CO							
2807		CO	0	400	600	UN	CO	23.22	
2904		CO	0	500	720	UN	VC	32.35	
3506		CO	0	100		CI	VC	80.75	
3507		CO	27.93	225		CI	VC	30.07	15
3509		CO		100		CI	VC	4.71	
3511		CO							
3600		CO	0	150		CI	VC	3.78	
3604		CO	0	560	760	UN	VC	31.62	
3607		CO							
3608		CO							
3611		CO							
3704		CO	0	500	750	UN	CO	67.08	
3705		CO	22.11	600	900	EG	BR	36.25	3625
3706		CO							
3708		CO	0	100		CI	VC	22.47	
3715		CO							
3801		CO							
3802		CO							
3904		CO							
3905		CO							
3906		CO							
4505		CO							
4511		SW							
4514		SW							
4603		CO	0	550	830	UN	VC	79.39	
4604		CO							
4605		CO	0	600	1050	UN	BR	53.38	
4606		CO							
4703		CO	0	375	500	UN	VC	22.47	
4705		CO	0	580	630	UN	BR	23.77	
4719		FO							
4792		CO	0	500	750	UN	BR	46.82	
4806		CO	0	450	600	UN	CO	38.9	
4807		CO	0	450	660	UN	BR	8.54	
4813		CO		150		CI	VC	39.09	
4901		CO	0	450	600	UN	CO	54.08	
4902		CO	0	450	600	UN	CO	102.88	
6400		CO							
0705		OV							

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
0706		OV							
0890		CO							
0902		CO							
1603		CO							
1605		CO							
1700		CO							
1706		CO							
1707		CO							
1790		CO							
1792		CO							
1903		CO							
2604		CO	0	300	400	UN	CO	88.8	
2709		CO							
2712		CO							
2790		CO							
2791		CO							
2809		CO							
2900		CO							
3508		CO							
3602		CO	0	500	750	UN	BR	6.71	
3606		CO							
3609		CO							
3610		CO							
3714		CO							
3716		CO							
3902		CO	0	540	650	FT	BR	10.44	
3903		CO							
4607		CO							
4690		CO							
4691		CO							
4692		CO							
4702		CO							
4709		CO							
4717		CO							
4790		CO							
4791		CO	0	500	750	UN	BR	67.07	
4800		CO							
4810		CO							
4811		CO							
4903		CO							
2802		CO							
2803		CO							
2804		CO							
2905		CO							
0903		CO	25.45	300		CI	VC	95.49	48
0904		CO							
1701		CO							
4701		CO	31.33	550	630	UN	BR	24.72	

WASTE WATER SYMBOLOGY



LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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

SEWER MATERIAL

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

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Scale: 1:1250 Date: 25/11/2016

198 Nodes

Sheet 1 of 1

United Utilities

helping life flow smoothly

SEWER RECORDS

OS Sheet No: SJ8397NW

Scale: 1:1250 Date: 25/11/2016

Printed By: Property Searches

APPENDIX C

PHASE 1 CONSTRUCTION DRAINAGE INFORMATION

TRAFFORD STREET

600DIA

REUSE EXISTING CONNECTION INTO UNITED UTILITIES PUBLIC SEWER SUBJECT TO S106 AGREEMENT REF EC5169. CONTRACTOR TO APPLY FOR S106 PART 2 APPLICATION BEFORE COMMENCING ANY WORK ON THE PUBLIC SEWER

UU MH
CL: 34.90
IL 31.01
d = 3.89m

525DIA UTT

300DIA

RAINWATER PIPE TO BE COORDINATED WITH ARCHITECT AND ABOVE GROUND DRAINAGE DESIGNER TO AVOID CLASH RODDING EYE.

EXISTING RUN ASSUMED TO SERVE VIADUCT PIERS AND IS TO BE MAINTAINED. DETAILS TBC ON SITE BACKDROP TO BE CONFIRMED ONCE EXISTING DRAIN HAS BEEN SURVEYED.

PROVIDE CLASS Z SURROUND FOR DRAINAGE BELOW PILECAP

CHANNEL DRAIN TO SUIT ARCHITECT AND BUILDING SERVICES ENGINEER

SW1- FLOW CONTROL
1.5m DIA PCC
CL: +34.965
IL: +32.552
HYDROBRAKE OPTIMUM (BY HYDROBRAKE INTERNATIONAL) SCL-0194-2330-1170-2330
DESIGN FLOW: 23.3 l/s DESIGN HEAD: 1.170m

FW8
1.2m DIA PCC
CL: +35.110
IL : +31.710

400DIA @ 1:421 (2.5l/s/Ha)

DP1
IL: +33.540

RE
CL: +34.965

225DIA (S1.000) @ 1:150

150 DIA

CHANNEL DRAIN TO SUIT ARCHITECT AND BUILDING SERVICES ENGINEER

CW1
1350mm DIA PCC
CL: +34.902
IL: +31.116

BD
IL: +33.523

150DIA @ 1:100

225DIA @ 1:150 (S1.001)

WASTOP SS225mm INLINE NON RETURN VALUE BY ALTHON TO PREVENT BACK UP OF CONTAMINATED FLOWS INTO THE SURFACE WATER NETWORK

BD
IL: +32.542

225DIA @ 1:100

FW6
1.2m DIA PCC
CL: +35.085
IL: +31.390

225DIA @ 1:150 (S2.000)

225DIA @ 1:150 (S2.003)

BD
IL: +33.290

SW2
600mm DIA PPIC
CL: +35.077
IL: +32.576

BD
IL: +33.519

BD
IL: +33.515

225DIA @ 1:100

SW5
600mm DIA PPIC
CL: +34.965
IL: +33.529

225DIA @ 1:150 (S3.000)

ALL FOUL DRAINAGE AND SVPs FROM LEVEL 01 AND ABOVE TO BE COLLECTED AT SERVICE YARD LEVEL AND DROPPED AT ONE LOCATION. FURTHER COORDINATION REQUIRED WITH BUILDING SERVICES ENGINEER.

SVP

DP2
IL: +33.540

IL: +33.540

FOUL SYSTEM TO BE VENTED A THIS LOCATION.

RE
CL: +35.000

EXG DP

IL: +33.461

150DIA @ 1:100

DIRECTION OF FLOW REVERSES WHEN THE OUTFALL IS RESTRICTED BY THE FLOW CONTROL TO UTILISE THE OFFLINE ATTENUATION TANK

PROVIDE CLASS Z SURROUND FOR DRAINAGE BELOW SUBSTATION

WASTOP SS150mm INLINE NON RETURN VALUE BY ALTHON TO PREVENT ODOURS FROM BACKING UP INTO SYSTEM

Substation

Landlord LV Switchroom

225DIA @ 1:150 (S2.002)

225DIA @ 1:100

RE
CL: +35.000

150DIA @ 1:100

IL: +33.546

EXG DP

FW4
600mm DIA PPIC
CL: +35.110
IL: +33.420

IL: +33.519

225DIA @ 1:100

G
CL: +35.110

FW3
600mm DIA PPIC
CL: +35.110
IL: +33.465

225DIA @ 1:150 (S2.001)

SW3
600mm DIA PPIC
CL: +35.110
IL: +32.700

BAY 'C' BELOW GROUND DRAINAGE TO HAVE MINIMUM 1m COVER TO AVOID CLASH WITH SWIMMING POOL BURIED INFRASTRUCTURE

FW10
600mm DIA PPIC
CL: +35.110
IL: +33.538

BAY 'D' DRAINAGE POINT OF CONNECTION. REFER TO VIA-REN-00-00-DR-C-1101 FOR CONTINUATION

300DIA

IL: +31.522

FW9
1.2m DIA PCC
CL: +35.085
IL: +31.507

150DIA @ 1:100

RE
CL: +35.110

IL: +34.610

G
CL: +35.110

EXG MH
CL: 35.09
IL 32.29
d = 2.8m

150DIA @ 1:100

150DIA @ 1:111.5

G
CL: +35.110

ALLOW FOR REPLACEMENT OF EXISTING DOWNPIPES AND GULLEY WITHIN ARCH BACKING TO SUIT HERITAGE ARCHITECT REQUIREMENTS. PROVIDE FLEXIBLE COUPLER CONNECTION BY POLYPIPE OR EQUAL APPROVED TO NEW BELOW GROUND DRAINS TO ALLOW FOR DIFFERENTIAL MOVEMENT BETWEEN VIADUCT AND NEW FOUNDATIONS.

FW5
600mm DIA PPIC
CL: +35.110
IL: +33.335

IL: +33.435

EXG DP

IL: +33.596

150DIA @ 1:26.2

IL: +33.769

IL: +33.804

EXG DP

IL: +33.961

EXG DP

IL: +34.194

150DIA @ 1:26.3

IL: +34.444

EXG DP

IL: +34.880

RE
CL: +35.620

WASTOP SS150mm INLINE NON RETURN VALUE BY ALTHON TO PREVENT ODOURS FROM BACKING UP INTO SYSTEM

G
CL: +35.110

225DIA

EXG MH
CL: 35.07
IL 33.30
d = 1.77m

150DIA

FW4
600mm DIA PPIC
CL: +35.110
IL: +33.420

IL: +33.671

EXG DP

IL: +34.013

150DIA @1:27.8

IL: +34.464

EXG DP

IL: +34.880

RE
CL: +35.620

EXG DP

IL: +33.910m

SS

DRAIN TO RUN BELOW M.U.T.

225mm DIA @1:71.8

G

SEE LEVEL 00-SERIES-00 GROUND FLOOR EXTENTS

FW 2
600mm DIA PPIC
CL: +35.620
IL: +33.847

SS

IL: +33.872

GEOCELLULAR ATTENUATION TANK
9.6 (W) x 10.0 (L) x 1.675m (D)
MIN 30.96m3 STORAGE
CL: +33.6 (TANK)
IL: +32.735

SS

CL: +35.09
IL 33.30
d = 1.59m

SW4 - CATCHPIT
600mm DIA PPIC
CL: +35.110
IL: +32.733
IL: +32.433 (SUMP)

1400mm THK RC PILE CAP

BALANCE TANK DRAIN IN ABEYANCE. TBC BY POOL DESIGNER

ss

SS

EXG DP

EXG DP UTT

EXG DP

EXG DP

1450mm THK RC PILE CAP

FOR CONTINUATION TO SHEET VIA-REN-00-00-DR-C-1101

FOR DRAINAGE REFER TO NEXT SHEET

PROPOSED BURIED INFRASTRUCTURE CORRIDOR WITHIN ARCH BAY - REFER TO M&E ENGINEER DRAWINGS. TO BE COORDIANTED WITH PROPOSED BELOW GROUND DRAINAGE

INFRASTRUCTURE CORRIDOR TO BE REALIGNED TO AVOID CLASH TOWER CRANE. INDICATIVE REALIGNMENT SHOWN.

Future connection to slot site

REFER TO SLOT SITE DRAWING PACKAGE FOR WORKS

REFER TO DRAWING: VIA-REN-00-00-DR-C-01105 FOR PROPOSED SURFACE WATER DRAINAGE TO SLOT SITE

EXTERNAL LEVELS TO FALL AWAY FROM BUILDING THRESHOLD MIN 1:60

Staff Welfare

Residential Entrance Lobby

Parcel Store

Gate switch location - TBC

Library

Games

Cardboard Store

Plant

Ramp 1:25

FOR DETAILED CORE WALL GENERAL ARRANGEMENT REFER TO DRAWING VIA-REN-B-XX-DR-S-01201

GREAT BRIDGEWATER STREET

NOTES:

1. FOR CURRENT PLANS, LEVELS AND STACK LOCATIONS REFER TO LATEST ARCHITECT LANDSCAPE ARCHITECT AND BUILDING SERVICES DRAWINGS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE BELOW GROUND DRAINAGE SPECIFICATION SP-C-00050, MANHOLE SCHEDULE ON DRAWING C-01300 AND DETAILS SHOWN ON DRAWING SERIES C-03301 & C-03311 TO C-03312.
3. THE FINAL CONNECTION TO THE SEWER IS SUBJECT TO UNITED UTILITIES APPROVAL AND IS TO BE IN ACCORDANCE WITH THEIR AGREED DETAILS.
4. FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS.
5. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSG AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
6. ALL FOUL AND SURFACE WATER DRAINAGE TO BE 150DIA PLASTIC TWIN WALL UNLESS NOTED OTHERWISE.
7. THE ATTENUATION TANK, FLOW CONTROL AND NON-RETURN VALUES ARE TO BE TO SUPPLIERS DESIGN AND DETAILS. INSTALLATION IS TO BE IN ACCORDANCE WITH THE SUPPLIER REQUIREMENTS.
8. ROCKER PIPE DETAIL TO BE PROVIDED AT ALL ENTRY AND EXIT POINTS FOR DRAINS CAST INTO CONCRETE FOUNDATIONS UNLESS NOTED OTHERWISE.
9. UNLESS NOTIFIED OTHERWISE CHANNEL DRAINS TO BE ACO M150D 0.0 OR SIMILAR APPROVED
10. FLOOR GULLEYS AND RWPS TO BE TRAPPED.
11. THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN. ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
12. THE CONTRACTOR IS TO KEEP A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND PROVIDE THIS TO RENAISSANCE UPON COMPLETION OF THE WORKS TO ALLOW FOR PRODUCTION OF A 'FINAL CONSTRUCTION' ISSUE DRAWING.
13. DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
14. MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
15. ALL CONCRETE PIPES TO BE TO ES EN 1916 CLASS 120 (54kN/m).
16. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2).
17. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
    A. BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
    B. PIPES LESS THAN OR EQUAL TO 500mm DIA
    C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
18. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
19. SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.

DRAWING LEGEND

- SITE BOUNDARY
- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- COMBINED WATER DRAINAGE
- EXISTING PRIVATE DRAINAGE TO BE RETAINED IN PHASE 1 WORKS
- EXISTING PRIVATE DRAINAGE TO BE REMOVED IN PHASE 1 WORKS
- EXISTING UNITED UTILITIES COMBINED SEWER
- G GULLY
- CHANNEL DRAIN
- RAINWATER PIPE/ SOIL VENT PIPE
- RE RODDING EYE
- IN-LINE NON-RETURN VALUE

Rev:	Description:	Date:	By:	Chkd:
C03	AMENITY CHANGE UPDATE	16.03.22	SS	PC
C02	UPDATED FOR DESIGN TEAM COMMENTS	03.11.20	SS	PC
C01	STAGE 5	02.10.20	SS	PC

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Renaissance Associates Ltd
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Manchester
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Project:
VIADUX, MANCHESTER

Drawing Title:
BELOW GROUND DRAINAGE GROUND LEVEL PLAN

Status:
STAGE 5

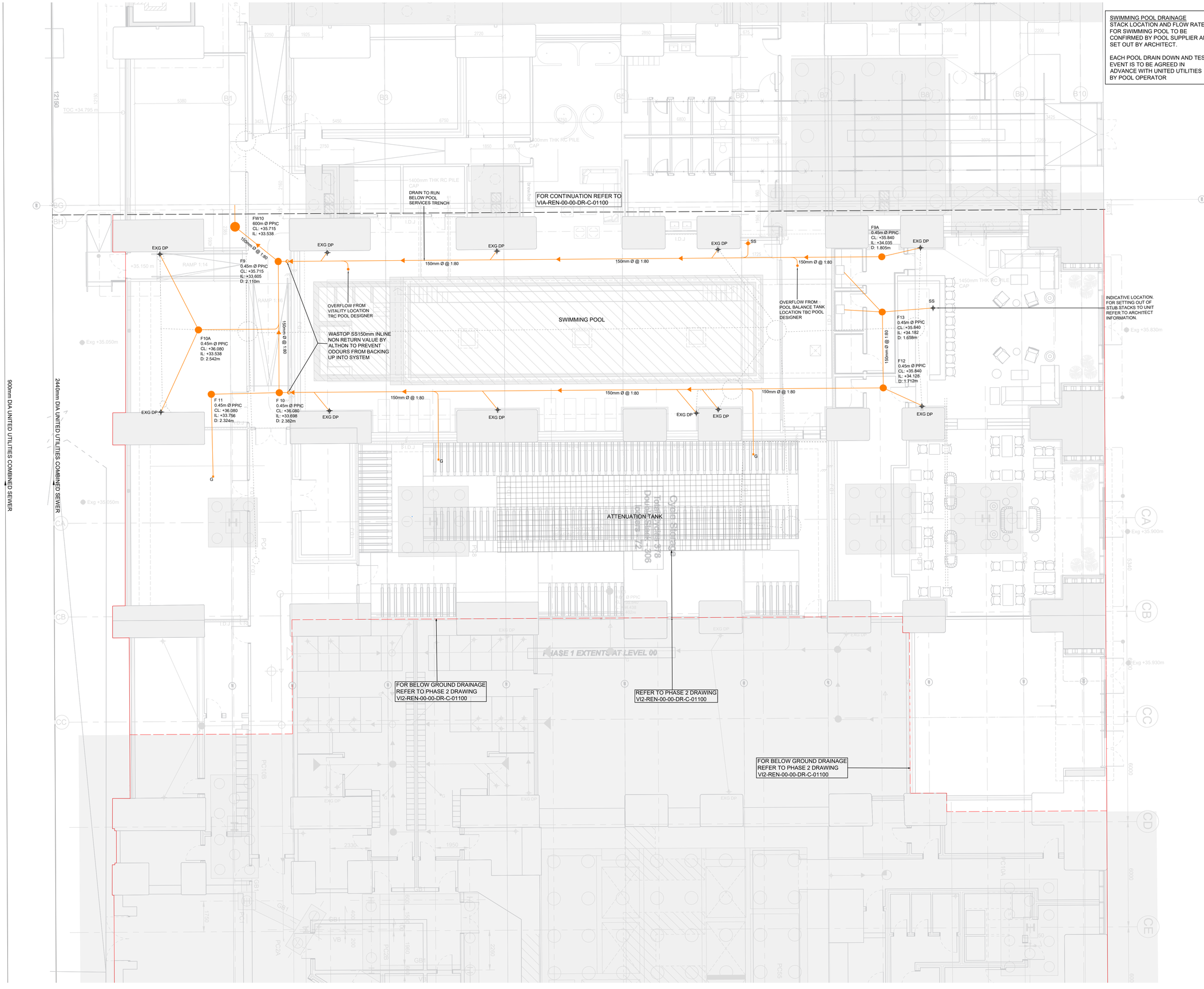
Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	OCT 20	MR	JB	PC

Scale: 1:100 | Project No: 1910-12

Project: | Originator: | Volume: | Level: | Type: | Role: | Category/Number: | Rev:

VIA - REN - 00 - 00 - DR - C - 01100 - C03

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    C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
18. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
19. SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.
20. ALL MAMHOLES COVER RATINGS TO BE CLASS B125 UNLESS NOTED OTHERWISE.

DRAWING LEGEND

- SITE BOUNDARY
- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- COMBINED WATER DRAINAGE
- EXISTING PRIVATE DRAINAGE TO BE RETAINED IN PHASE 1 WORKS
- EXISTING PRIVATE DRAINAGE TO BE REMOVED IN PHASE 1 WORKS
- EXISTING UNITED UTILITIES COMBINED SEWER
- G — GULLY
- CHANNEL DRAIN
- RAINWATER PIPE/ SOIL VENT PIPE
- RE — RODDING EYE
- IN-LINE NON-RETURN VALUE

Rev:	Description:	Date:	By:	Chkd:
C01	STAGE 5	20.05.22	SS	PC

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Renaissance Associates Ltd
Carvers Warehouse
77 Dale Street
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Project:
VIADUX, MANCHESTER

Drawing Title:
GROUND FLOOR DRAINAGE PLAN SHEET 2

Status:
STAGE 5

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	MAY'22	PH	JB	PC

Scale: 1:100 | Project No: 1910-12

Project:	Originator:	Volume:	Level:	Type:	Role:	Category/Number:	Rev:
VIA	REN	00	00	DR	C	01101	C01

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STREET

NOTE IF EXISTING DRAINAGE LEVELS PERMIT GRAVITY CONNECTION TO NEW SW NETWORK, RETAIN EXISTING, ALLOW FOR REPLACEMENT AS SHOWN.

INDICATES PHASE 2 DRAINAGE, REFER TO VI2-REN-00-01-DR-C-01110 FOR DETAILS

ACCESSIBLE

B125 ACO MULTIDRAIN M100PPD NO 0.0J 1%

S1,02
600mm Ø PPIC
CL: +43.285
IL: +42.593

S1,00
450mm Ø PPIC
CL: +43.300
IL: +42.737

S1,03
600mm Ø PPIC
CL: +43.285
IL: +42.538

150Ø @ 1:100 (S1.000)

RWP FROM ABOVE CANOPY

225Ø @ 1:100 (S1.002)

225Ø @ 1:100 (S1.001)

S1,01
600mm Ø PPIC
CL: +43.285
IL: +42.650

225Ø @ 1:100 (S1.003)

S1.04
600mm Ø PPIC
CL: +43.190
IL: +42.472

225Ø @ 1:100 (S1.004)

F1,00
1.2m Ø PCC
CL: +43.300
IL: +42.431

F1,01
1.2m Ø PCC
CL: +43.300
IL: +42.389

225Ø @ 1:100 (F1.001)

225Ø @ 1:100 (F1.000)

G

G

225Ø

RWP FOR TOWER ATTENUATION BY BLUE ROOF. DISCHARGE RATE 1,15 l/s

SVP B

F1,02
1.2m Ø PCC
CL: +43.190
IL: +41.990

S5,00
1,05m Ø PCC
CL: +43.210
IL: +42.565

S1.05
600mm Ø PPIC
CL: +43.260
IL: +42.407

225Ø @ 1:100 (S1.005)

S1.06
600mm Ø PPIC
CL: +43.430
IL: +42.331

225Ø @ 1:100 (S1.006)

E600 ACO S200 1% CHANNEL DRAIN

225Ø @ 1:100 (F1.002)

150Ø @ 1:100 (S5.000)

RWP FOR TOWER ATTENUATION BY BLUE ROOF. DISCHARGE RATE 1,15 l/s

S5,01
1.05m Ø PCC
CL: +43.194
IL: +42.470

RWP (BLUE ROOF)

G07

G06

G07

225Ø @ 1:80 (P0.000)

F1,03
1.2m Ø PCC
CL: +43.280
IL: +41.655

F3.00
1.2m ØPCC
CL:+43.280
IL: TBC ON SITE

F1,04
1.2m Ø PCC
CL: +43.244
IL: +41.580

150Ø @ 1:100 (S5.001)

E600 ACO S200 1% CHANNEL DRAIN

225Ø @ 1:100 (F1.003)

S5,02
1.05m Ø PCC
CL: +43.253
IL: +42.407

F2,00
1.2m Ø PCC
CL: +43.300
IL: +42.176

225Ø @ 1:16 (F2.000)

G

225Ø

F1,05
1.2m Ø PCC
CL: +43.220
IL: +41.525

225Ø @ 1:100 (F1.004)

RWP (BLUE ROOF)

150Ø @ 1:100 (S5.002)

SVP A

G

F-SVP 1
IL 41.884

225Ø @ 1:80 (F3.000)

S1,11
1.2m Ø PCC w/ SILT TRAP
CL: +43.275
IL: +41.385

150Ø @ 1:100 (S3.001)

S4,00
450mm Ø PPIC
w/ SILT TRAP
CL: +43.270
IL: +41.410

225Ø @ 1:100 (F1.007)

225Ø @ 1:100 (F1.006)

225Ø @ 1:100 (F1.005)

F4.00
1.2m ØPCC
CL:+43.200
IL: TBC ON SITE

150Ø @ 1:100 (S5.003)

S5,03
1.05m Ø PCC
CL: +43.273
IL: +42.355

S1,07
600mm Ø PPIC
CL: +43.200
IL: +42.215

INDICATIVE POSITION OF RETAINING WALL

225Ø @ 1:100 (S1.007)

CONNECTION TO PLANTERS TO LANDSCAPE ARCHITECTS DETAIL

S1,08
600mm Ø PPIC
CL: +42.970
IL: +42.126

S1.09
600mm Ø PPIC
CL: +42.770
IL: +42.066

225Ø @ 1:100 (S1.008)

225Ø @ 1:100 (S1.009)

WASTOP SS150mm INLINE NON RETURN VALVE BY ALTHON

150Ø @ 1:100 (S2.000)

S3,00
450mm Ø PPIC
CL: +43.290
IL: +42.076

S3,01
450mm Ø PPIC
CL: +43.290
IL: +41.982

150Ø @ 1:100 (S3.000)

EXISTING CHANNEL DRAIN MODIFIED / REPLACED TO SUIT ROAD REALIGNMENT WORKS

E600 ACO S200 1% CHANNEL DRAIN

225Ø @ 1:169 (S1.010)

225Ø @ 1:170 (S1.011& S1.012)

225Ø @ 1:35(S4.000)

S1.10
1.2m Ø PCC
CL: +42.772
IL: +42.045

S2.00
450mm Ø PPIC
CL: +42.750
IL: +42.139

S-RWP 1
IL 41.871
MAX DISCHARGE RATE 54,3 l/s
TOTAL IMPERMEABLE AREA 0,133 HA

S-RWP 2
IL 42.258
MAX DISCHARGE RATE 6,9 l/s

F1,07
1.2m Ø PCC
CL: +43.286
IL: +41.400

F1,06
1.2m Ø PCC
CL: +43.286
IL: +41.495

S5.00A
1.05m Ø PCC
CL: +43.210
IL: +42.675

150Ø @ 1:100 (S5.001A)

S5.00B
1.05m Ø PCC
CL: +43.200
IL: +42.620

150Ø @ 1:100 (S5.001C)

S5.00C
1.05m Ø PCC
CL: +43.200
IL: +42.680

RWP (BLUE ROOF)

150Ø @ 1:100 (S5.000C)

INDICATIVE TOWER CRANE LOCATION. EXISTING DRAINAGE TO BE DIVERTED OR ABANDONED SUBJECT TO SURVEY FINDINGS.

G20?

G21?

G21?

HEAD OF EXISTING DRAINAGE RUN AT EASTERN END OF SERVICE YARD

FOR HILTON SLOT SITE DRAINAGE DETAILS REFER TO HSS-REN-00-00-DR-C-01100

NOTE BLUE ROOF TO PODIUM LEVEL 02 DECK TO HAVE MAX 4.6 l/s PEAK DISCHARGE RATE

PROVIDE NEW GULLIES WITHIN SERVICE YARD. CONNECT TO LOCATIONS OF EXISTING REMOVED GULLIES

NOTE LEVEL OF BRICKWORK ARCH BELOW ASSUMED AT +41.295m IN THIS LOCATION. TBC ON SITE TO CHECK FOR CLASH WITH DRAINAGE

OFFSITE RESURFACING WORKS TO BE DETAILED TO REUSE EXISTING DRAINAGE

2 NEW RWP DROP POINTS PENETRATING THROUGH THE VIADUCT. VERTICAL DRAINAGE TO BE DESIGNED AND DETAILED BY ABOVE GROUND DRAINAGE DESIGNER

NEW SVP DROP POINT PENETRATING THROUGH THE VIADUCT. VERTICAL DRAINAGE TO BE DESIGNED AND DETAILED BY ABOVE GROUND DRAINAGE DESIGNER

PHASE I EXTENTS OF PODIUM

SVP & RWP SETTING OUT

SVP AND RWP LOCATIONS ARE INDICATIVE FOR DETAILED SETTING OUT REFER TO ARCHITECTS/ BUILDING SERVICES ENGINEERS DRAWINGS. ALL CAPILLARY DRAINAGE IS IN ABEYANCE UNTIL SETTING OUT OF ALL SVPs, STACKS AND RWPs IS CONFIRMED BY THE ARCHITECT AND BUILDING SERVICES ENGINEER

ALL CONNECTIONS BETWEEN ABOVE GROUND DRAINAGE AND BELOW GROUND DRAINAGE TO BE SIZED TO SUIT ABOVE GROUND DRAINAGE.

EXTERNAL WORKS SETTING OUT

FOR PROPOSED SITE LEVELS REFER TO LANDSCAPE DRAWINGS. CHANNELS/ GULLY LOCATIONS TO LANDSCAPE ARCHITECT SPECIFICATION UNLESS NOTES OTHER WISE.

BEDDING/ SURROUND REQUIREMENTS

ALL DRAINAGE TO BE CONCRETE ENCASED (CLASS Z BEDDING), EXCAVATIONS FORMED USING MINIMUM DIG TECHNIQUES SUCH AS TRENCH BOXING TO MINIMISE EXCAVATIONS TO ARCH STRUCTURE BALLAST.

COVER LEVELS

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

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE BELOW GROUND DRAINAGE SPECIFICATION SP-C-00050, MANHOLE SCHEDULE ON DRAWING C-01301 AND DETAILS SHOWN ON DRAWING SERIES C-03301 & C-03311 TO C-03312.
3. REFER TO DRAWING VIA-REN-00-00-DR-C-01100 FOR BELOW GROUND FLOOR DRAINAGE GROUND LEVEL PLAN.
4. FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS.
5. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSG AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
6. RWPs, SVPs, SSs AND FLOOR GULLEYS TO BE TRAPPED.
7. THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN. ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
8. THE CONTRACTOR IS TO KEEP A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND PROVIDE THIS TO RENAISSANCE UPON COMPLETION OF THE WORKS TO ALLOW FOR PRODUCTION OF A 'FINAL CONSTRUCTION' ISSUE DRAWING.
9. DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
10. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
11. MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
12. COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
13. ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
14. ALL CONCRETE PIPES TO BE TO ES EN 1916 CLASS 120 (54kN/m),
15. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2).
16. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
    A. BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
    B. PIPES LESS THAN OR EQUAL TO 500mm DIA
    C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
17. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA. 40kN/m, 225mm DIA. 45kN/m AND 300mm DIA. 72kN/m.
18. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE - (CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
19. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY,
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.

DRAWING LEGEND

- PLANNING BOUNDARY
- OWNERSHIP BOUNDARY
- PHASE 1 BOUNDARY
- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- EXISTING DRAINAGE TO BE RETAINED
- EXISTING DRAINAGE TO BE REMOVED
- PHASE 2 DRAINAGE
- G — GULLY
- CHANNEL DRAIN TO LANDSCAPE ARCHITECTS SPECIFICATION UNO
- RAINWATER PIPE/ SOIL VENT PIPE

Rev:	Description:	Date:	By:	Chkd:
C03	CHANNEL DRAINS CO-ORDINATED	04.11.22	AM	PC
C02	RECEIPT OF SITE SURVEY INFORMATION	26.11.21	HW	PC
C01	CONSTRUCTION	29.09.21	HW	PC

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Manchester
M1 2HG

Project:

VIADUX, MANCHESTER

Drawing Title:

BELOW GROUND DRAINAGE LEVEL 01 PLAN (SHEET 01)

Status:

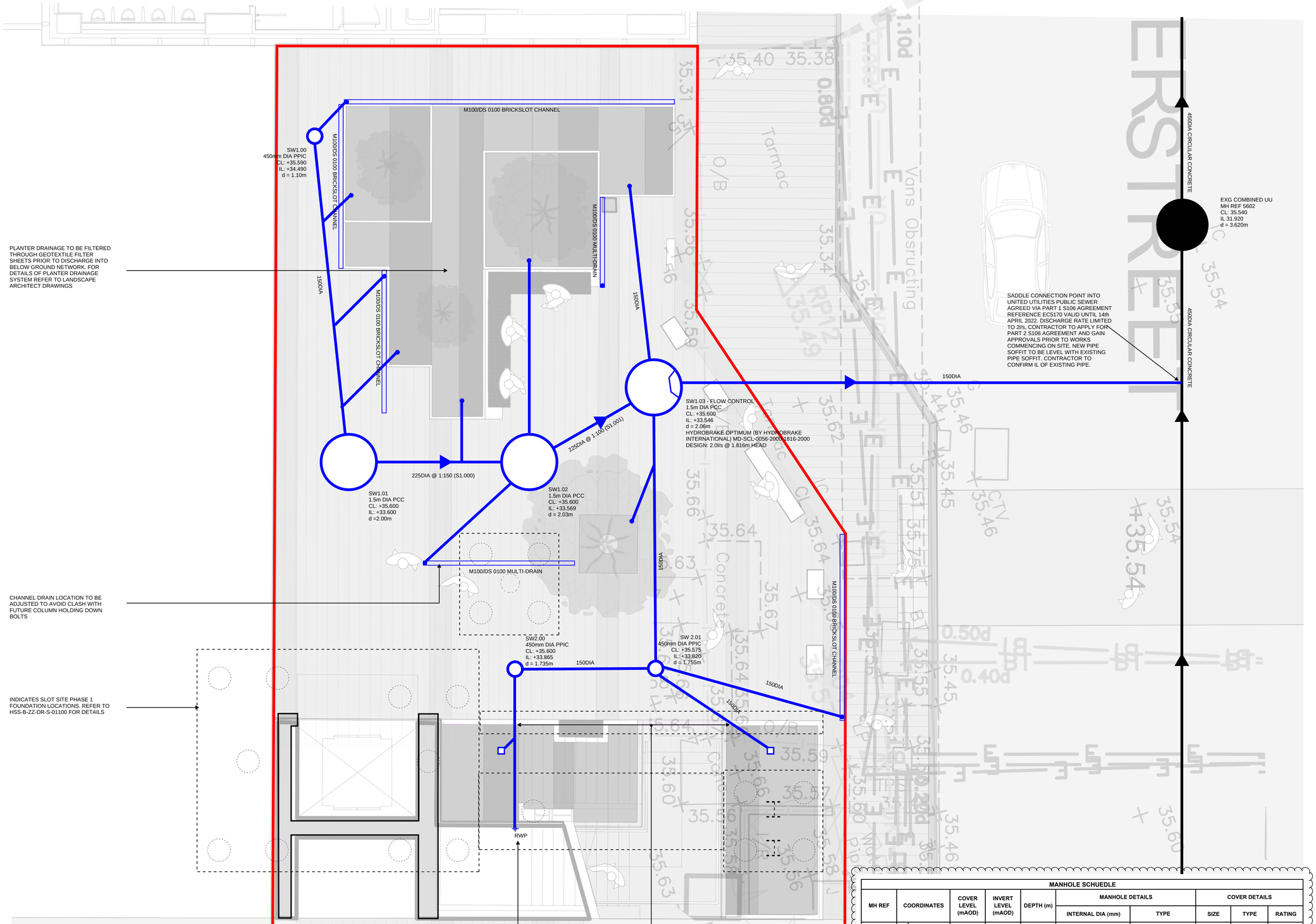
CONSTRUCTION

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV'21	HW	HW	PC

Scale:	Project No:
1:150	1910-12

Project:	Originator:	Volume:	Level:	Type:	Role:	Category/Number:	Rev:
VIA	REN	0	01	DR	C	01101	C03

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NOTES:

1. FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS
2. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWERS FOR ADOPTION 7TH EDITION
3. ALL FOUL AND SURFACE WATER DRAINAGE TO BE 150mm DIA UNLESS NOTED OTHERWISE
4. SEWERS TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN; 1.2m IN HIGHWAYS OR VERGES, OR LESS THAN 0.9m IN PEDESTRIAN AREAS, THEN A 150mm CONCRETE SLAB SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND
5. ROCKER PIPE DETAIL TO BE PROVIDED AT ALL ENTRY AND EXIT POINTS FOR DRAINS CAST INTO CONCRETE FOUNDATIONS
6. ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
7. SEWER PIPES TO BE LAID IN MAXIMUM 3m LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER
8. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
9. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
   A) BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
   B) PIPES LESS THAN OR EQUAL TO 500mm DIA
   C) BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
10. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED, DEMONSTRATING THAT SUCH PRECAUTIONS ARE NOT NECESSARY
11. UNLESS NOTIFIED OTHERWISE CHANNEL DRAINS TO BE ACO M150D 0.0 OR SIMILAR APPROVED
12. THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN. ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT

PROVIDE C250 RECESSED COVERS TO ALL MANHOLES. COVER FRAME SETTING OUT TO TIE IN WITH PAVING JOINTING. REFER TO LANDSCAPE ARCHITECT REQUIRMENTS.

FOR ALL SETTING OUT AND DETAILS OF CHANNEL DRAINS AND EXTERNAL FINISHED LEVELS REFER TO LANDSCAPE ARCHITECT DRAWING PACK

DRAWING LEGEND

- SITE BOUNDARY
- SURFACE WATER DRAINAGE
- FOUL WATER DRAINAGE
- COMBINED WATER DRAINAGE
- EXISTING PRIVATE DRAINAGE TO BE RETAINED IN PHASE 1 WORKS
- EXISTING PRIVATE DRAINAGE TO BE REMOVED IN PHASE 1 WORKS
- EXISTING UNITED UTILITIES COMBINED SEWER
- G GULLEY
- LINEAR DRAINAGE CHANNEL

MANHOLE SCHUEDLE

MH REF	COORDINATES	COVER LEVEL (mAOD)	INVERT LEVEL (mAOD)	DEPTH (m)	MANHOLE DETAILS		COVER DETAILS		
					INTERNAL DIA (mm)	TYPE	SIZE	TYPE	RATING
SW1.00	E: 383502641 N: 397661568	35.590	34.490	1.100	450	PPIC	450 x 450	RECESSED	C250
SW1.01	E: 383510917 N: 397659752	35.600	33.600	2.000	1500	PC B	600 x 600	RECESSED	C250
SW1.02	E: 383512399 N: 397664168	35.600	33.569	2.031	1500	PC B	600 x 600	RECESSED	C250
SW1.03	E: 383511571 N: 397667848	35.600	33.546	2.054	1500	PC WITH FLOW CONTROL B	600 x 600	RECESSED	C250
SW2.00	E: 383517360 N: 397662108	35.600	33.865	1.735	450	PPIC	350 x 350	RECESSED	C250
SW2.01	E: 383518500 N: 397665571	35.575	33.820	1.755	450	PPIC	350 x 350	RECESSED	C250

Rev:	Description:	Date:	By:	Chkd:
C03	MANHOLE SCHEDULE ADDED	18.06.21	JB	PC
C02	UPDATED FOR COMMENTS	27.04.21	AS	PC
C01	STAGE 5 CONSTRUCTION ISSUE	30.03.21	JB	PC

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Project:
VIADUX
MANCHESTER

Drawing Title:
SLOT SITE BELOW GROUND DRAINAGE PLAN

Status:
STAGE 5

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	MAR '21	JB	JB	PC

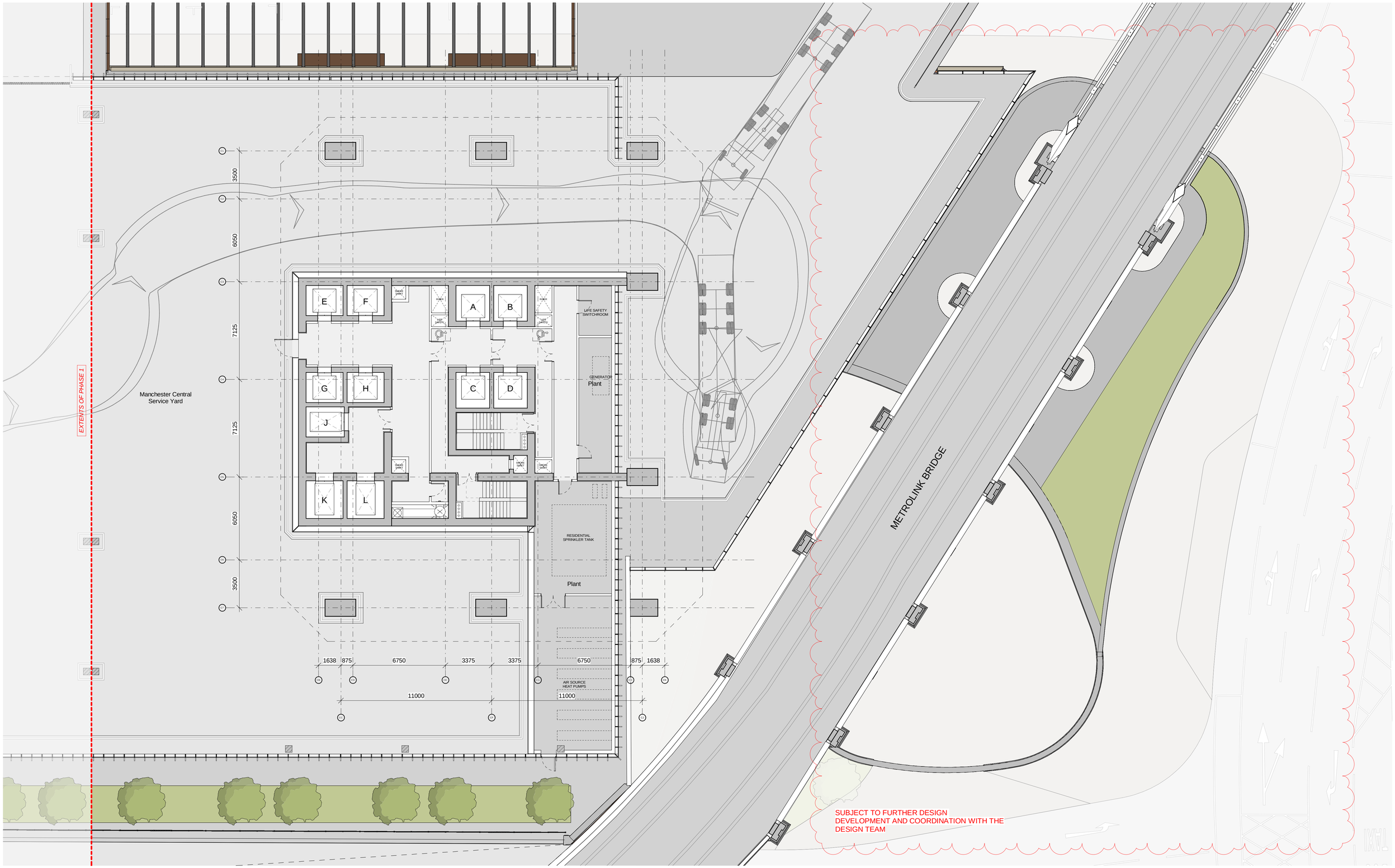
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Project: | Originator: | Volume: | Level: | Type: | Role: | Category/Number: | Rev:
HSS-REN-00-00-DR-C-01100-C03

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APPENDIX D

PROPOSED DEVELOPMENT PLANS



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SCALE 1:125

0 1m 5m 10m

NORTH

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	XX-10-2024	Planning Issue - Hotel & Residential

DRAFT

Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a
General Arrangement
Level 01 Plan

Job No 10448

Scale 1:250 @ A3
1 : 125@ A1

SHP Drawing Code 10448-SHP-ZC- A-B5D9-G200-PL-01-001

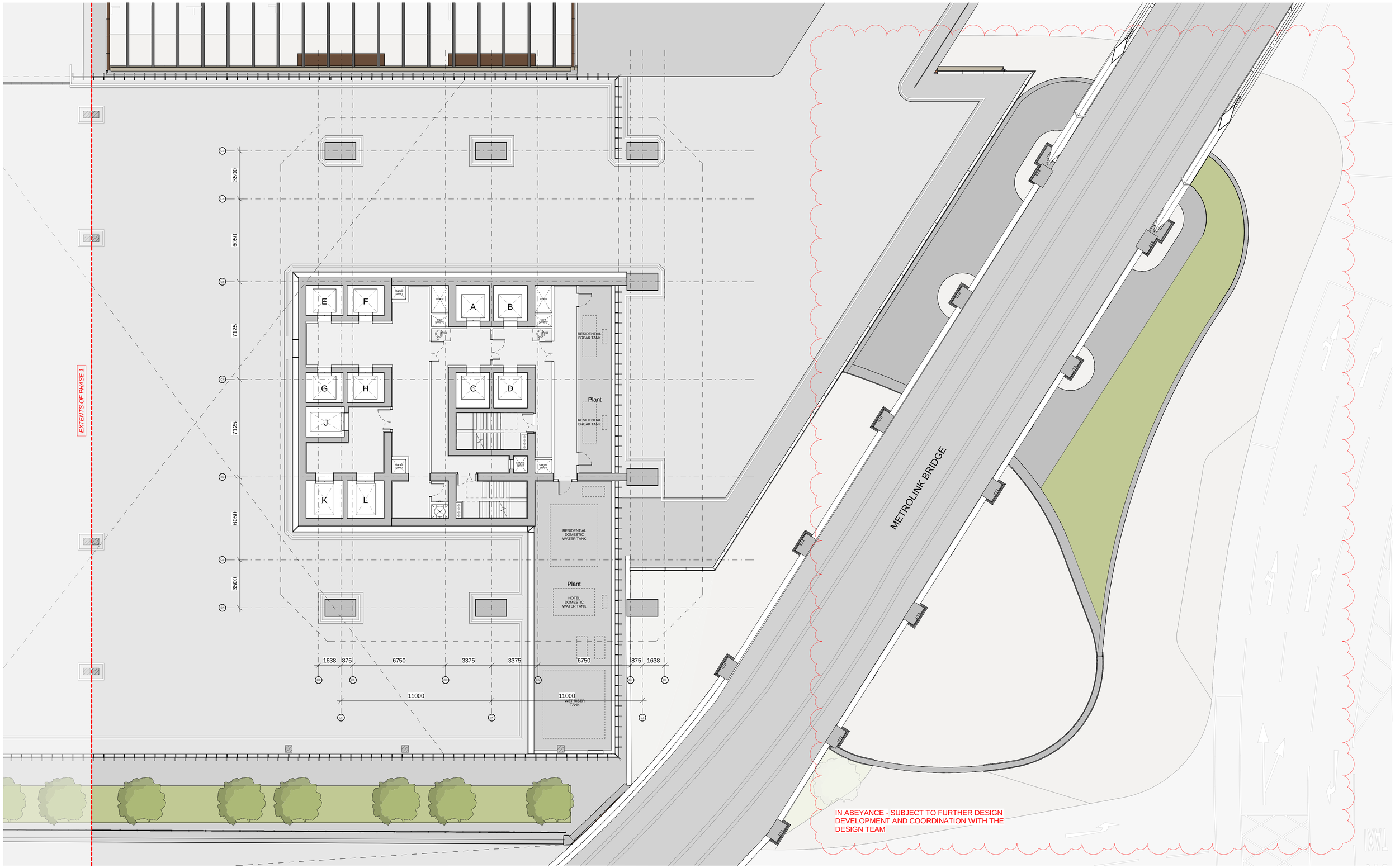
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0 1m 5m 10m

NORTH

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	XX-10-2024	Planning Issue - Hotel & Residential

DRAFT

Project Title
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Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a
General Arrangement
Level 02 Plan

Job No
10448

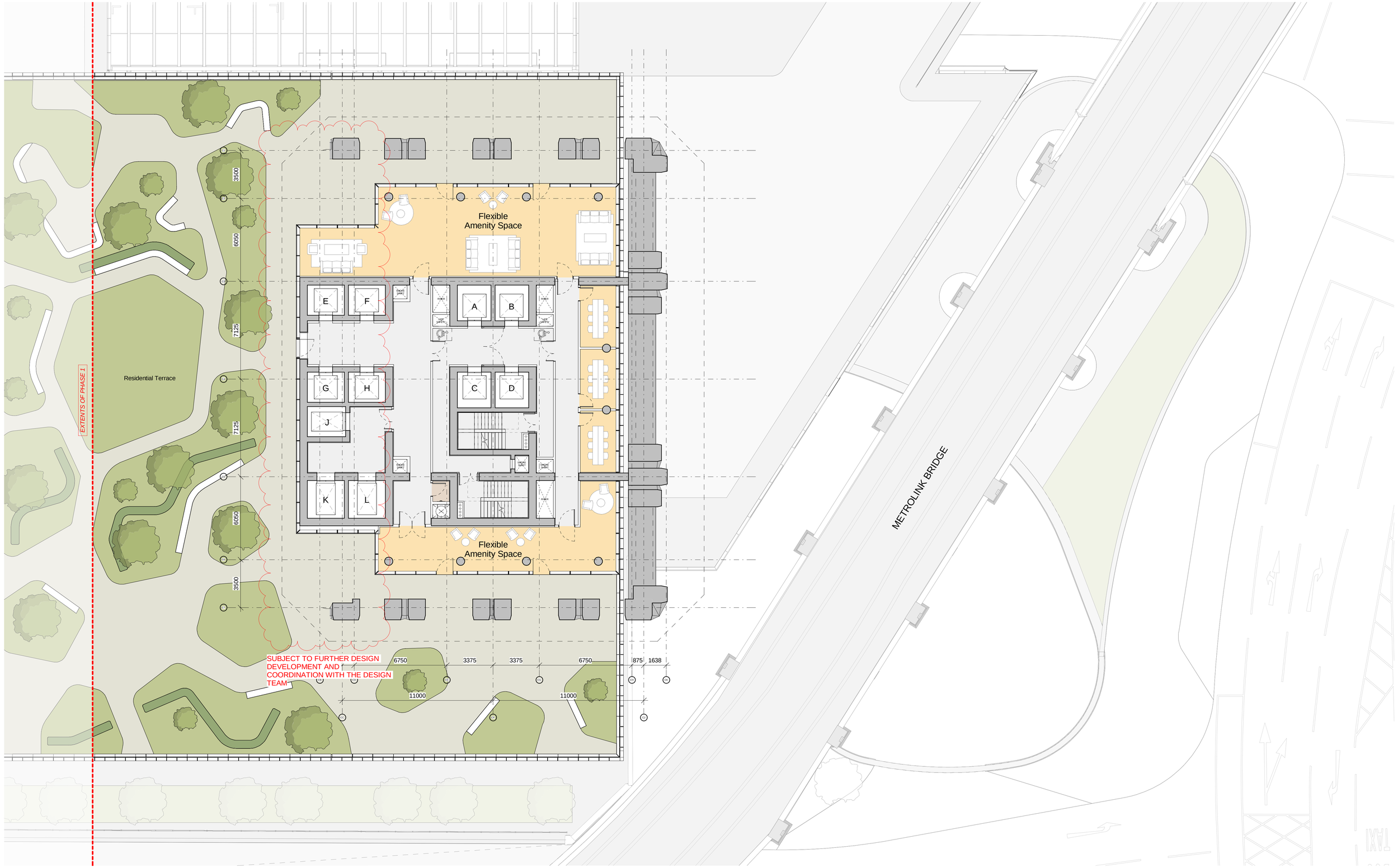
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SHP Drawing Code *Project-Architect Zone-Role-Planning-Unit(asset)-X-Type-Level/Location-Series*
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NORTH

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	XX-10-2024	Planning Issue - Hotel & Residential

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Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a
General Arrangement
Level 03 Plan

Job No
10448

Scale
1:250 @ A3
1 : 125@ A1

SHP Drawing Code *Project-Architect-Zone-Role-Planning-Unit(aco)-& Type-Level/Location-Series*
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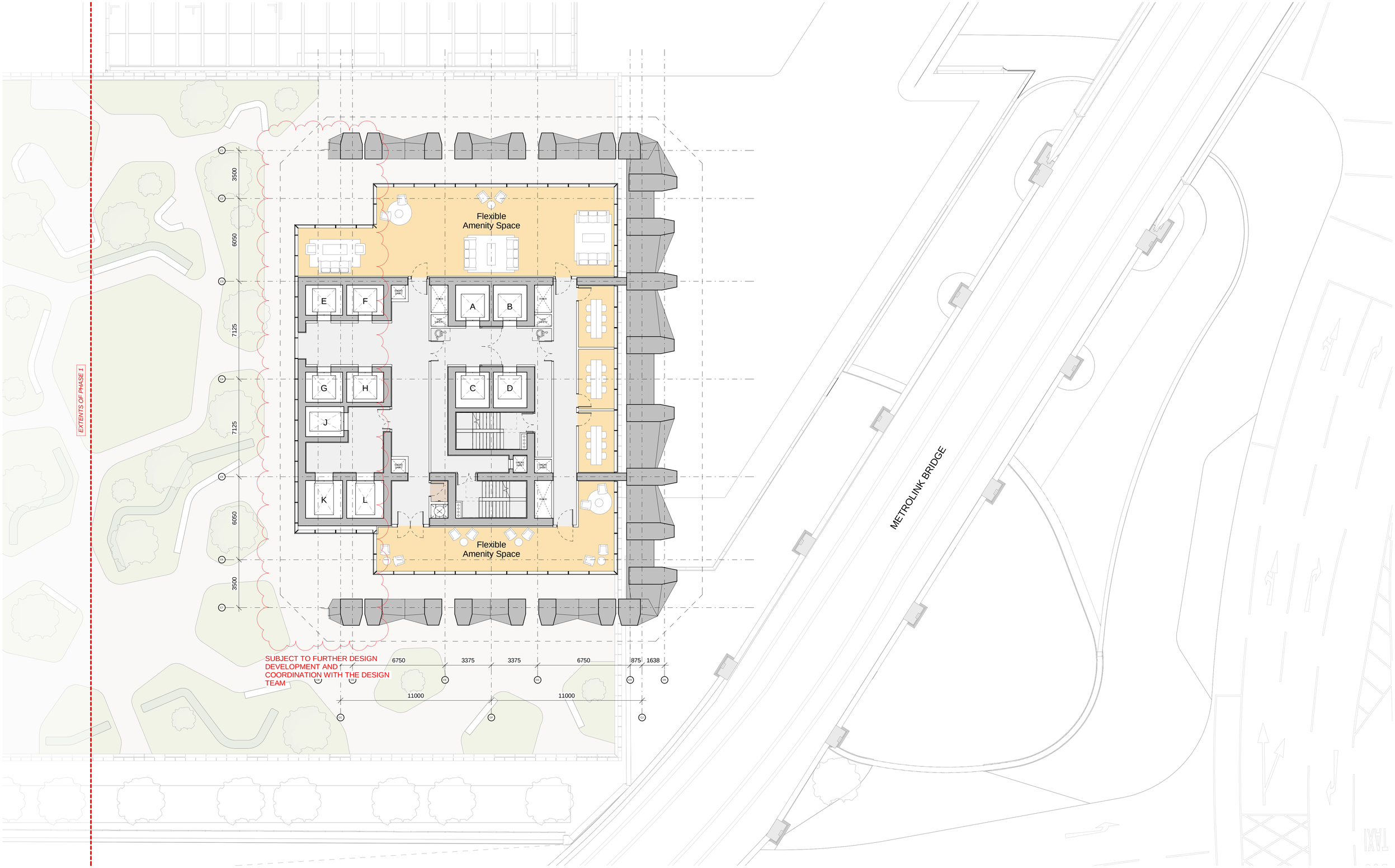
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SCALE 1:125

0 1m 5m 10m

NORTH

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	XX-10-2024	Planning Issue - Hotel & Residential

DRAFT

Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a
General Arrangement
Level 04 Plan

Job No
10448

Scale
1:250 @ A3
1 : 125@ A1

SHP Drawing Code
Project-Architect-Zone-Role-Planning-Uniclass1 & Type-Level/Location-Series
10448-SHP-ZC- A-B5D9-G200-PL-04-001

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SCALE 1:500

0 10m 20m 30m 50m

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	31-10-2024	Planning Issue - Hotel & Residential

Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a & 2b
Masterplan
East Elevation - Albion Street

Job No
10448

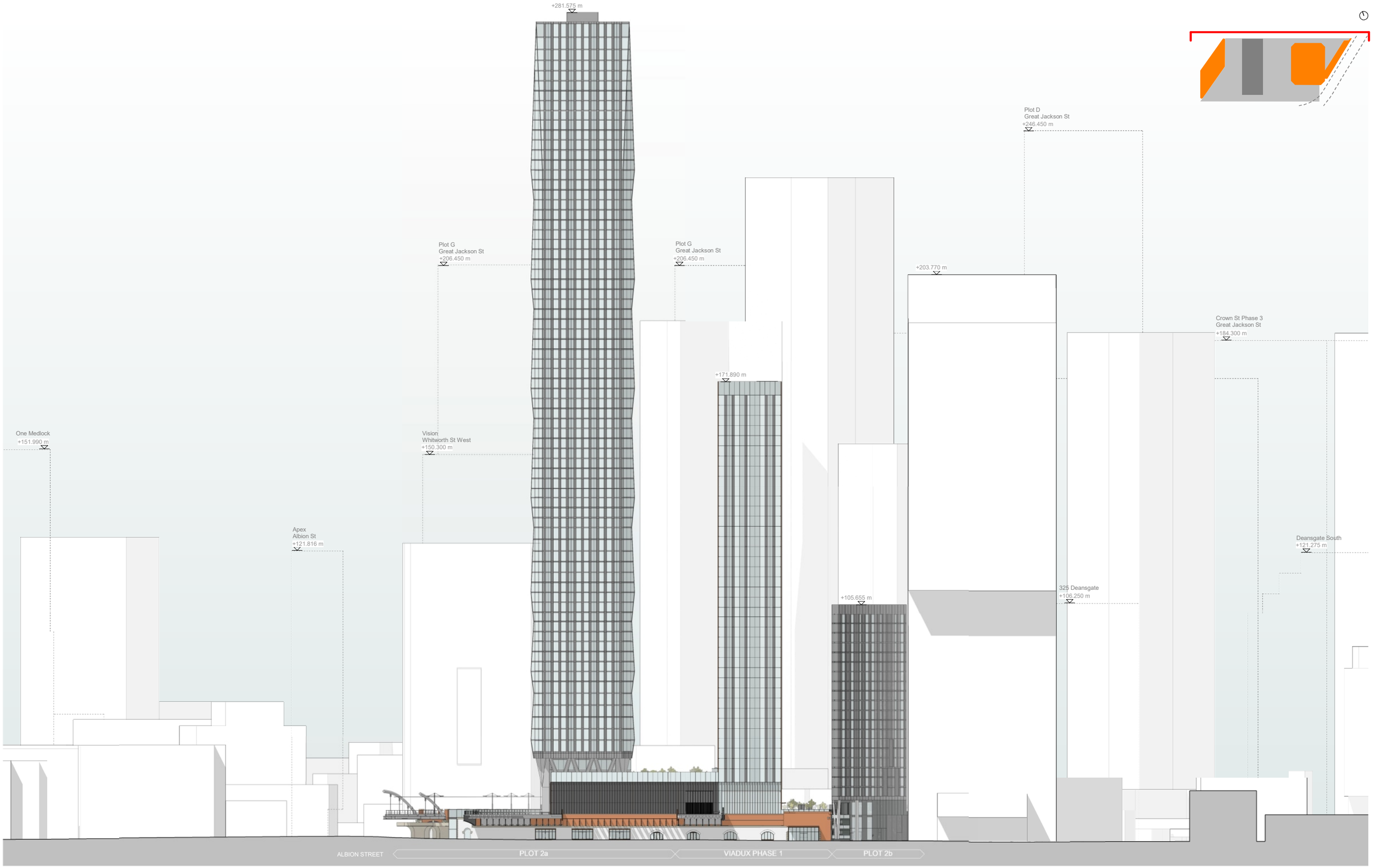
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SCALE 1:500

0 10m 20m 30m 50m

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	31-10-2024	Planning Issue - Hotel & Residential

Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a & 2b
Masterplan
North Elevation - Great Bridgewater Street

Job No
10448

Scale
1:1000 @ A3
1 : 500@ A1

SHP Drawing Code
Project-Architect-Zone-Role-Planning-Uniclass1 # Type-Level-Location-Series
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CYCLE STORE
320 Spaces
230 double stackers & 90 lockers

Bar
192 m²

Bar Store
7 m²

WC
21 m²

Parcel Store
34 m²

Post
23 m²

E

F

A

B

G

H

J

C

D

Bar Store
23 m²

K

L

Residential Refuse
Store 1
50 m²

Comms
11 m²

BOH Office
13 m²

Fire Escape

Luggage Store
21 m²

Fire Escape

Sub-Station
26 m²

LV Switch
39 m²

Plant
16 m²

Entrance
580 m²

Residential Refuse Store 3
68m²

TR105

EXTENTS OF PHASE 1

Commercial
Sprinkler Tank

Tanks
182 m²

Residential Refuse
Store 2
81 m²

Hotel & Resturant
Refuse
10 m²

Commercial
Sprinkler Pumps

Hotel & Resturant
Refuse
11 m²

Hotel & Resturant
Refuse

SUBJECT TO FURTHER DESIGN
DEVELOPMENT AND COORDINATION WITH THE
DESIGN TEAM

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SCALE 1:125

0 1m 5m 10m

NORTH

Rev	Date	Description
P01	26-03-2024	Planning Issue
P02	XX-10-2024	Planning Issue - Hotel & Residential

DRAFT

Project Title
Viadux Phase 2 - Plot 2a & 2b
Manchester

Status
PLANNING

Drawing Title
Viadux Phase 2 - Plot 2a
General Arrangement
Ground Floor Plan

Job No
10448

Scale
1:250 @ A3
1 : 125@ A1

SHP Drawing Code
Project-Architect Zone-Role-Planning-Unit(ass)-& Type-Level/Location-Series
10448-SHP-ZC- A-B5D9-G200-PL-00-001

Revision
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APPENDIX E

EXISTING IMPERMEABLE AREAS PLAN

NOTES:

1. THIS DRAWING IS INTENDED TO INDICATE THE EXISTING DRAINED AREAS FROM THE VIADUX SITE. IT IS BASED UPON A REVIEW OF THE TOPOGRPHICAL SURVEY AND AERIAL IMAGES OF THE SITE.
2. EXISTING DISCHARGE RATES GIVEN HAVE BEEN CALCULATED USING MICRODRAINAGE. GREENFIELD RUN-OFF RATES ARE BASED ON THE AREA OF SOFT LANDSCAPING AND BROWNFIELD RUN-OFF RATES ARE BASED ON THE HARD PAVED AREAS.

KEY

OWNERSHIP BOUNDARY
TOTAL AREA:4730m² (0.473 ha)

SOFT LANDSCAPED AREAS

AREA: 0m² (0 ha)

HARD PAVED AREAS

AREA: 4090m² (0.409 ha)

NOTE - SECTION OF BRIDGE FALLS TOWARDS SITE. AREA TO BE ALLOWED FOR IN THE PROPOSED DRAINAGE NETWORK

VIADUX PHASE 1

METROLINK TRACK

Trafford Street

Albion Street

A5103

No Access

GREENFIELD RUN-OFF RATES

EVENT	GREENFIELD RUN-OFF
1:1	5.0 l/s
1:2	5.8 l/s
1:30	8.3 l/s
1:100	9.0 l/s
QBAR	**5.7 l/s**

- GREENFIELD RUN-OFF CALCULATED IN MICRODRAINAGE USING ICP SuDS WHICH USES THE IH125 METHOD AND LINEARLY INTERPOLATES THE RESULTS FOR CATCHMENTS LESS THAN 50ha
- CATCHMENT AREA = 0.409 ha
- URBAN PROPORTION = 0.75

Rev:	Description:	Date:	By:	Chkd:
P01	ISSUED FOR PLANNING	08.11.24	HW	KG

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Carvers Warehouse
77 Dale Street
Manchester
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Project:

VIADUX PHASE 2, MANCHESTER

Drawing Title:

BLOCK C, D & E EXISTING DRAINED AREA PLAN

Status:

RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV 24	HW	--	KG

Scale:	Project No:
1:200	2209-01

Project - Originator - Volume - Level - Type - Role - Number: V2B-REN-CC-00-DR-C-00050

Revision: P01

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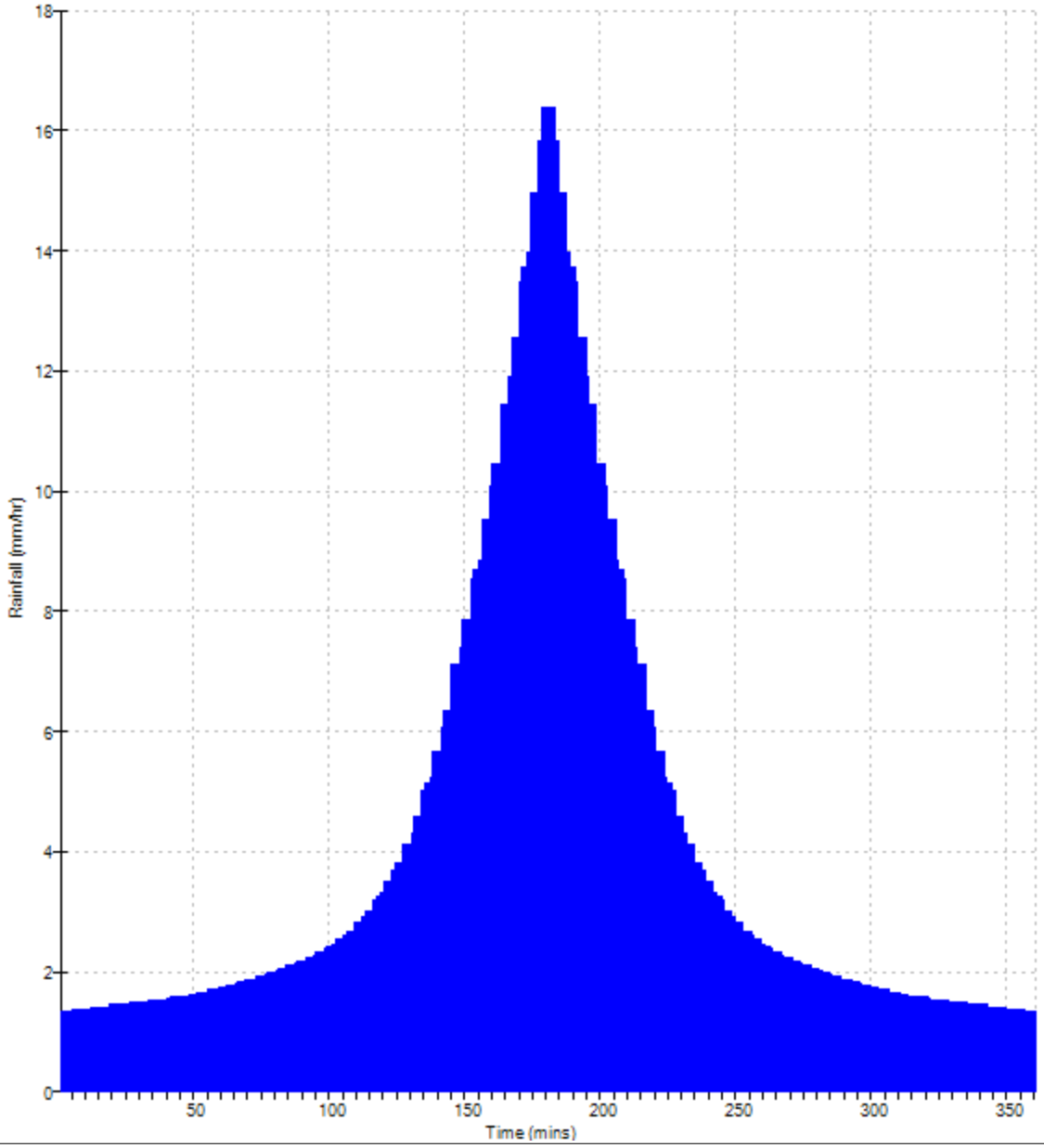
APPENDIX F

RAINFALL PROFILES

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	16.404
Ave. Intensity (mm/hr)	4.185
Return Period (years)	2.0

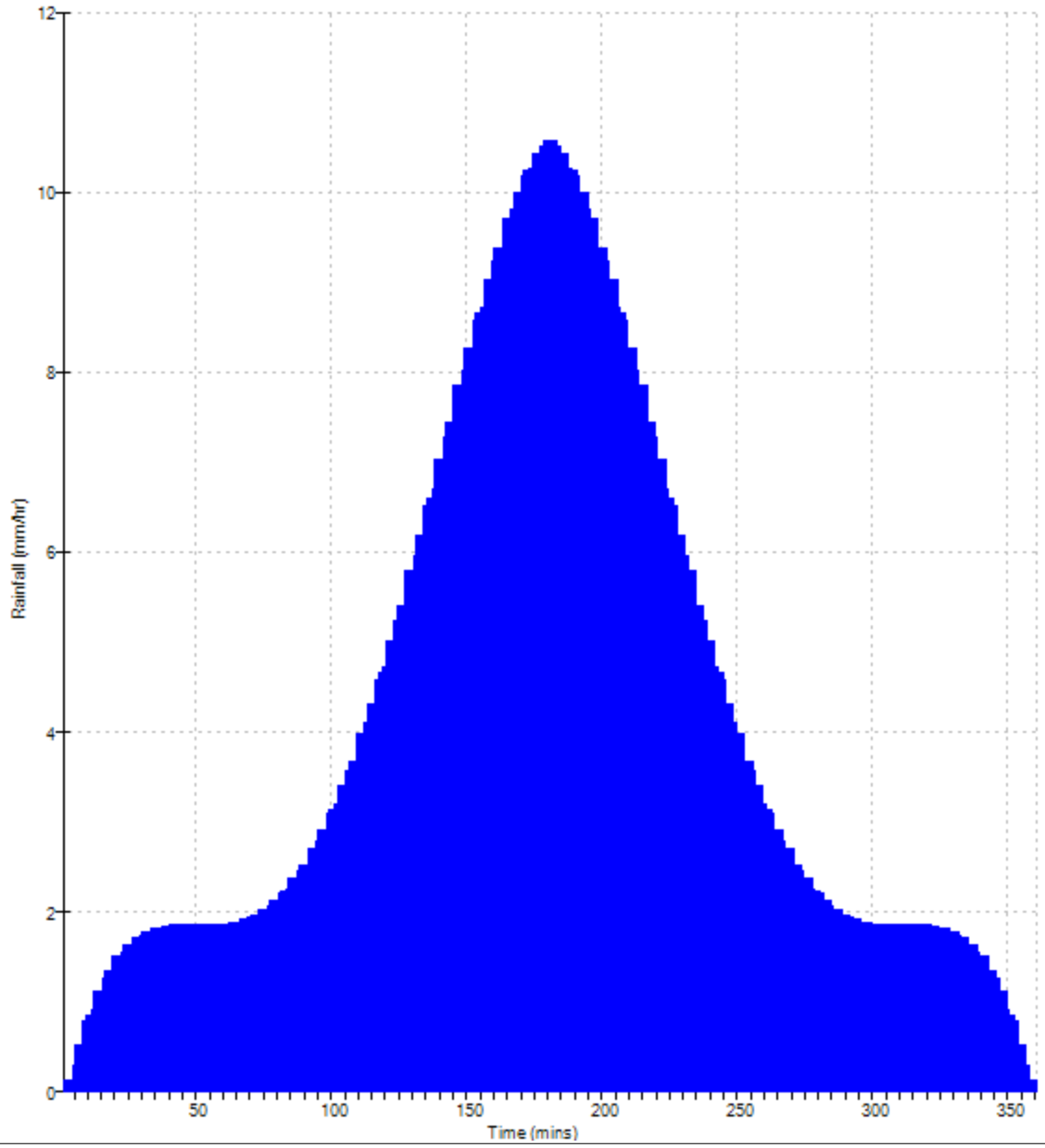


©1982-2020 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	10.584
Ave. Intensity (mm/hr)	4.185
Return Period (years)	2.0

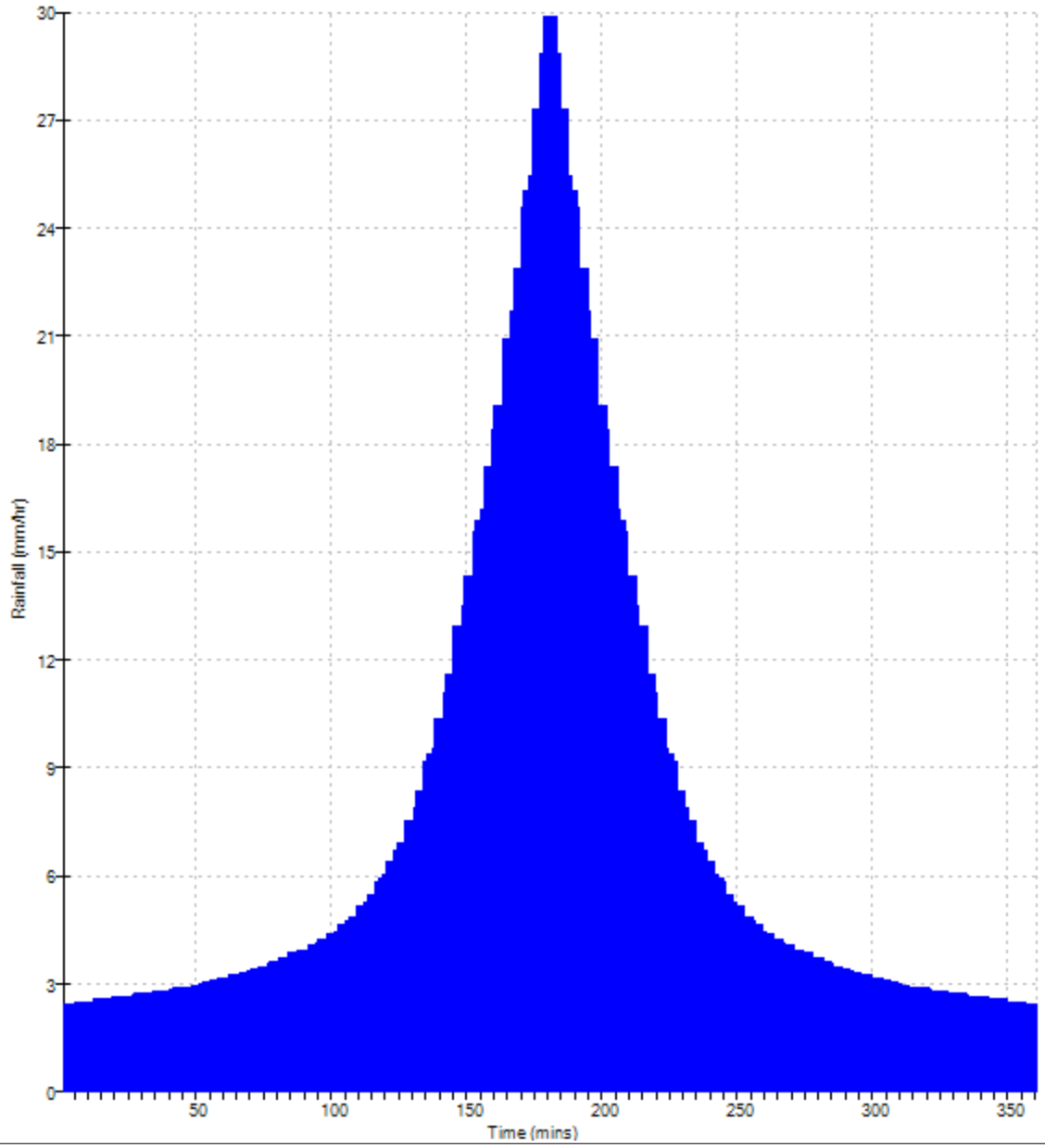


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Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	29.920
Ave. Intensity (mm/hr)	7.633
Return Period (years)	30.0

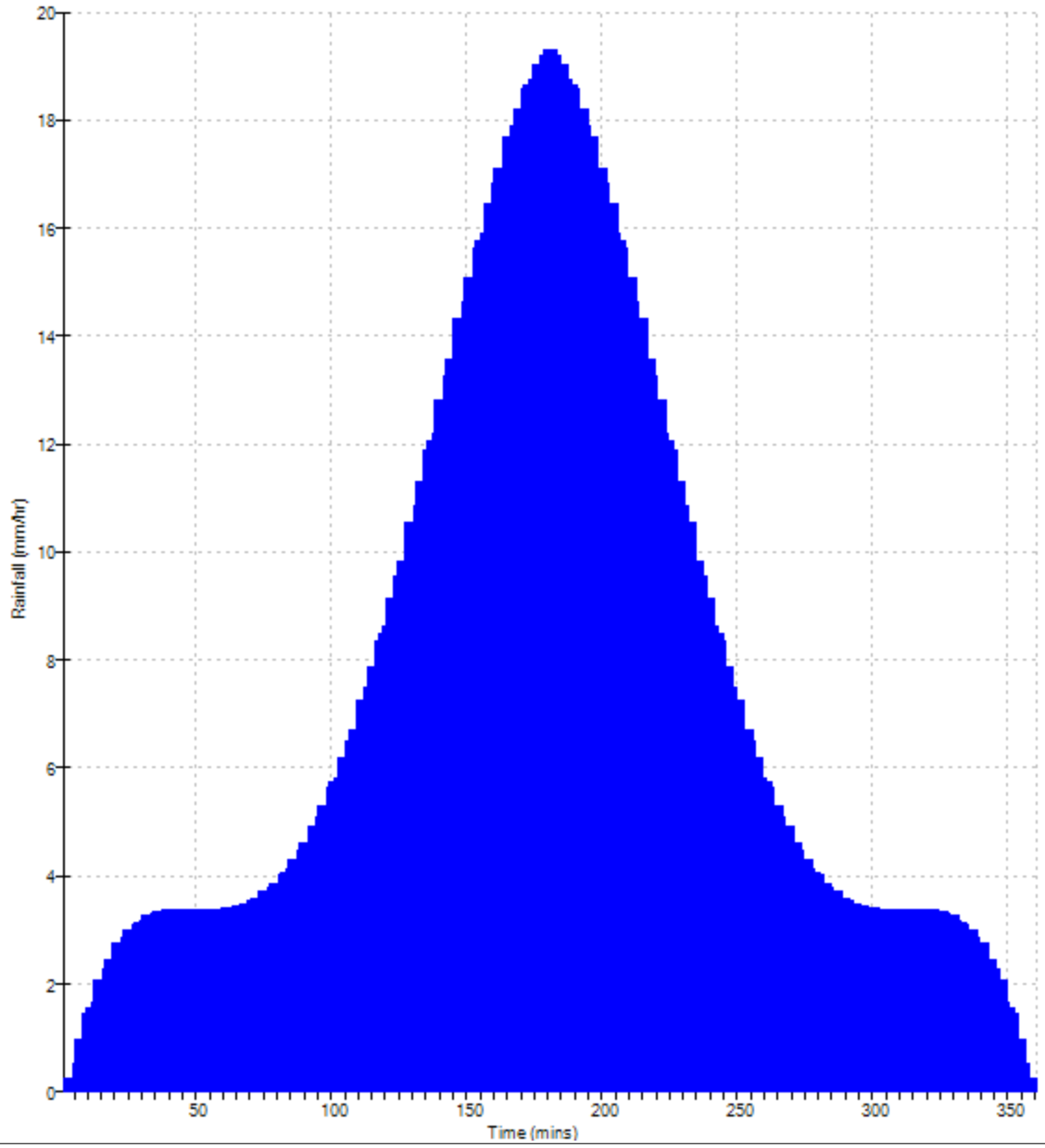


©1982-2020 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	19.304
Ave. Intensity (mm/hr)	7.633
Return Period (years)	30.0

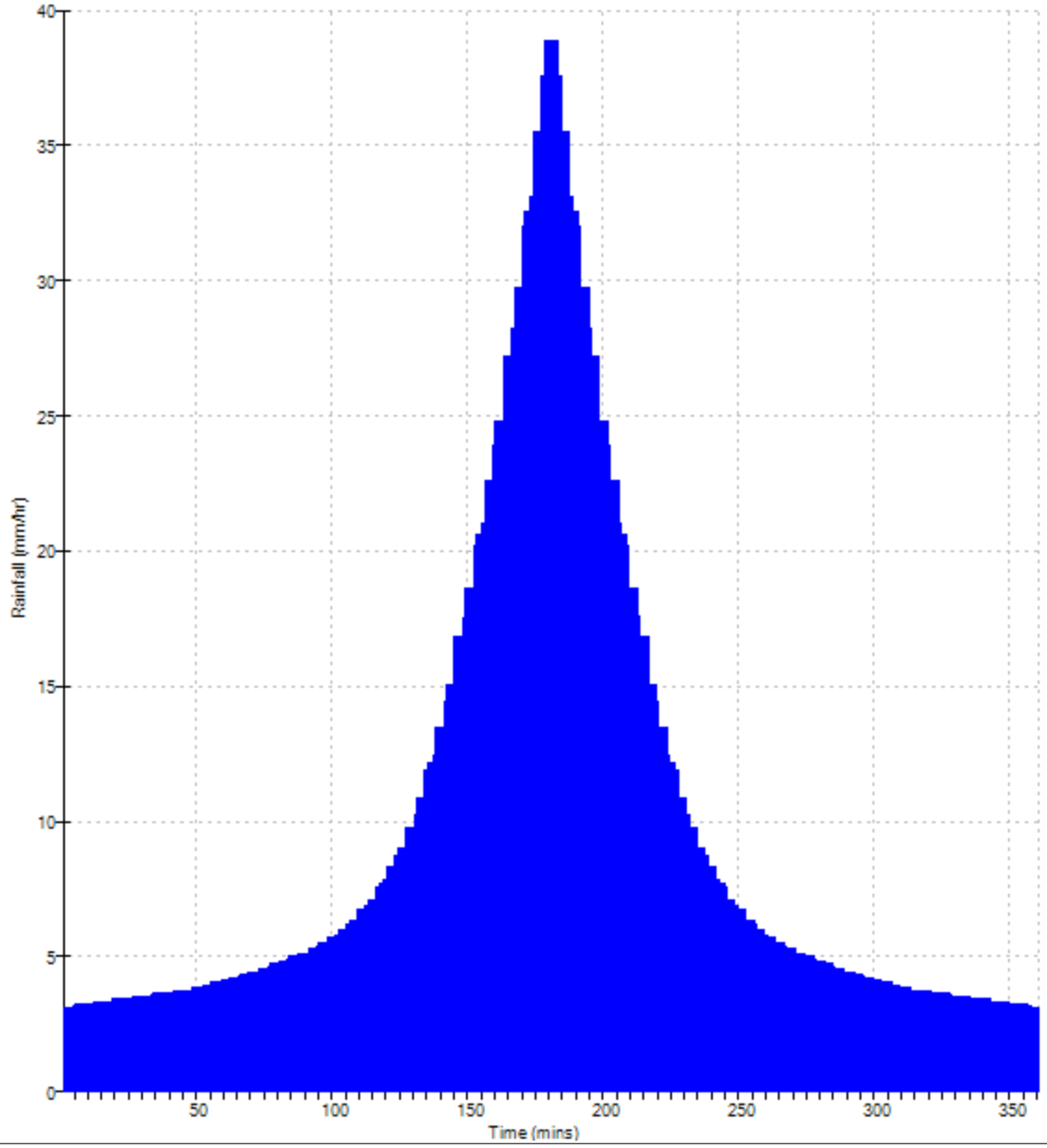


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Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	38.913
Ave. Intensity (mm/hr)	9.927
Return Period (years)	100.0

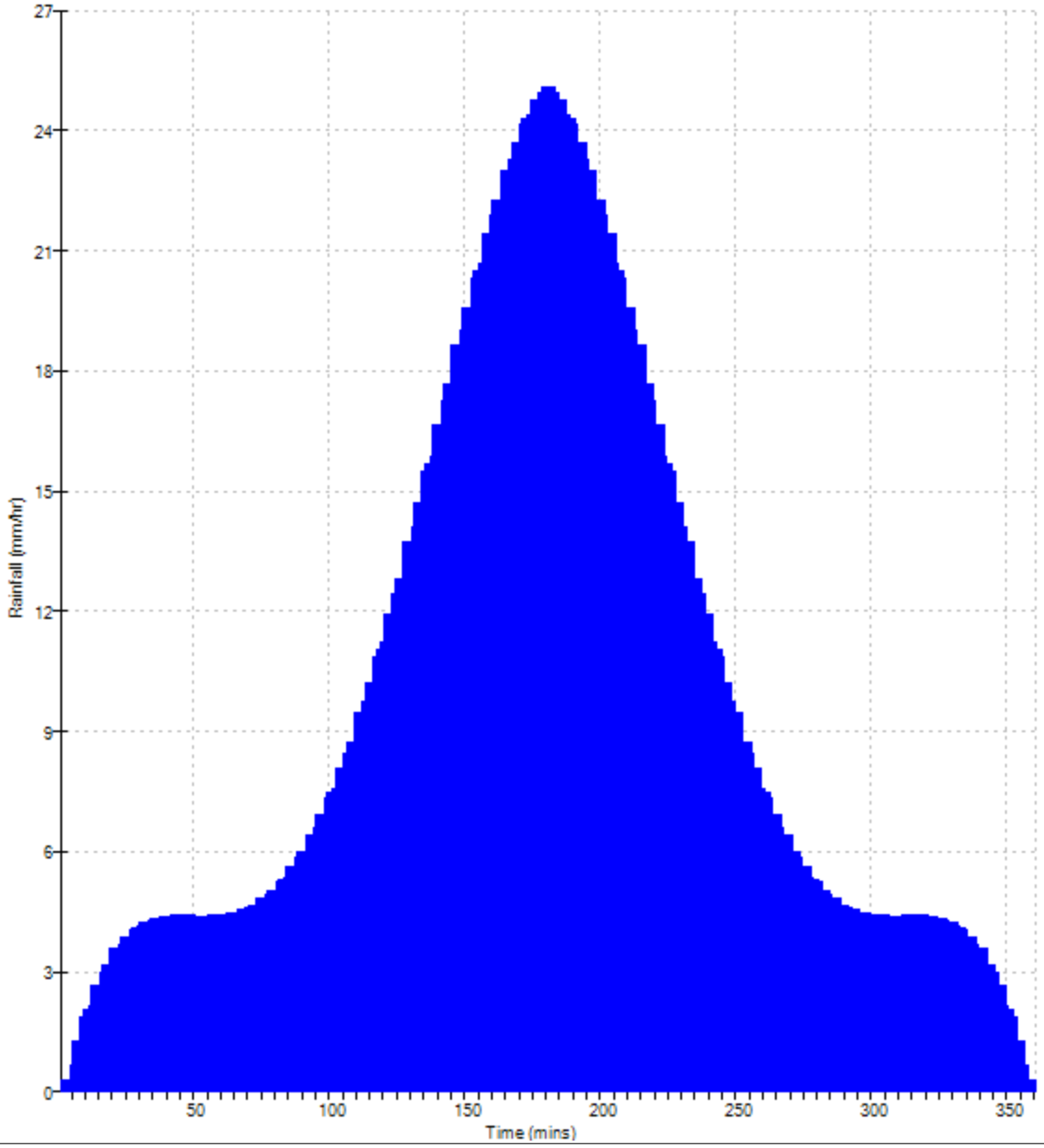


©1982-2020 Innovyze

Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	25.106
Ave. Intensity (mm/hr)	9.927
Return Period (years)	100.0

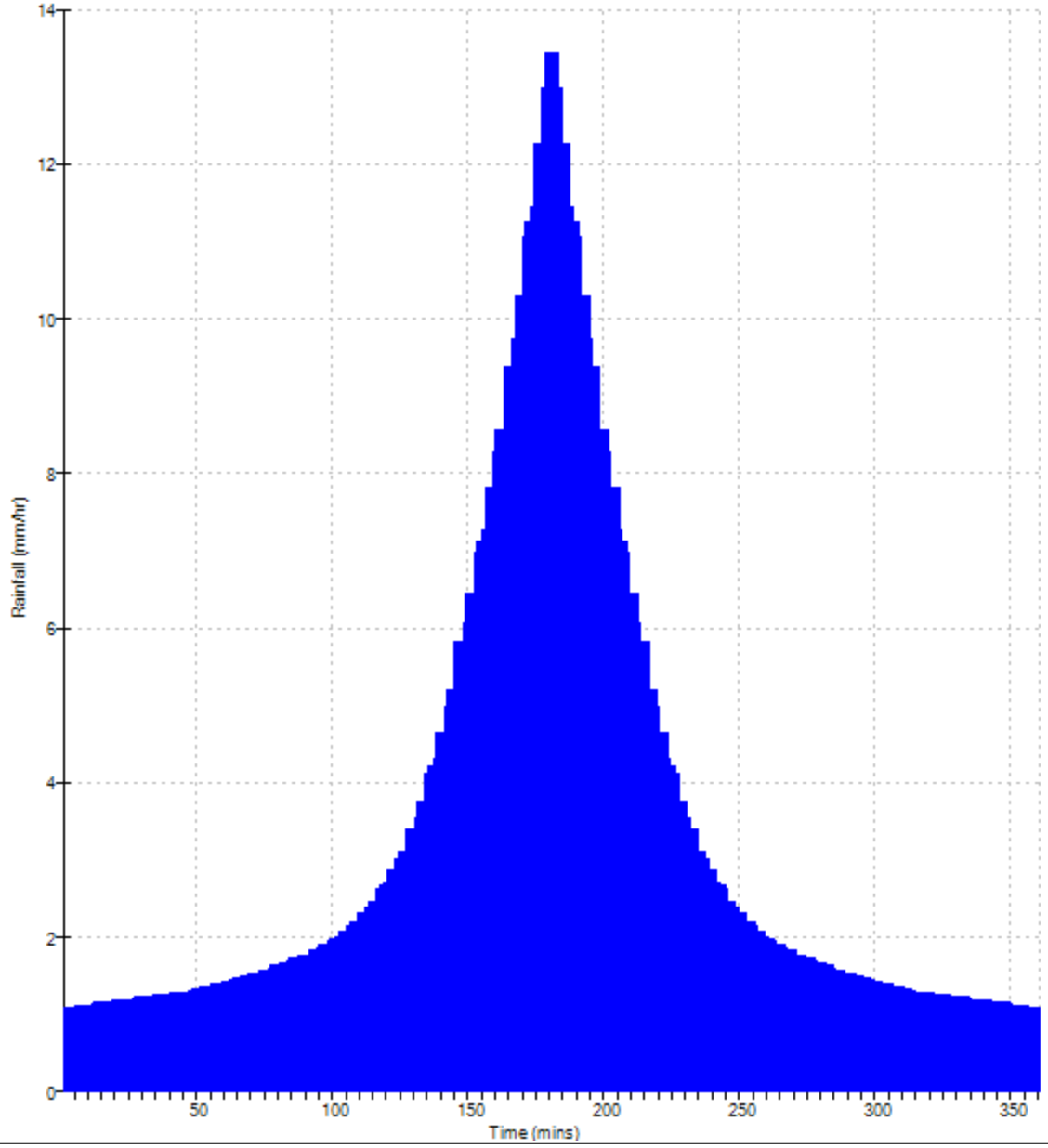


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Rainfall profile

Storm duration (mins) 360

FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	13.445
Ave. Intensity (mm/hr)	3.430
Return Period (years)	1.0

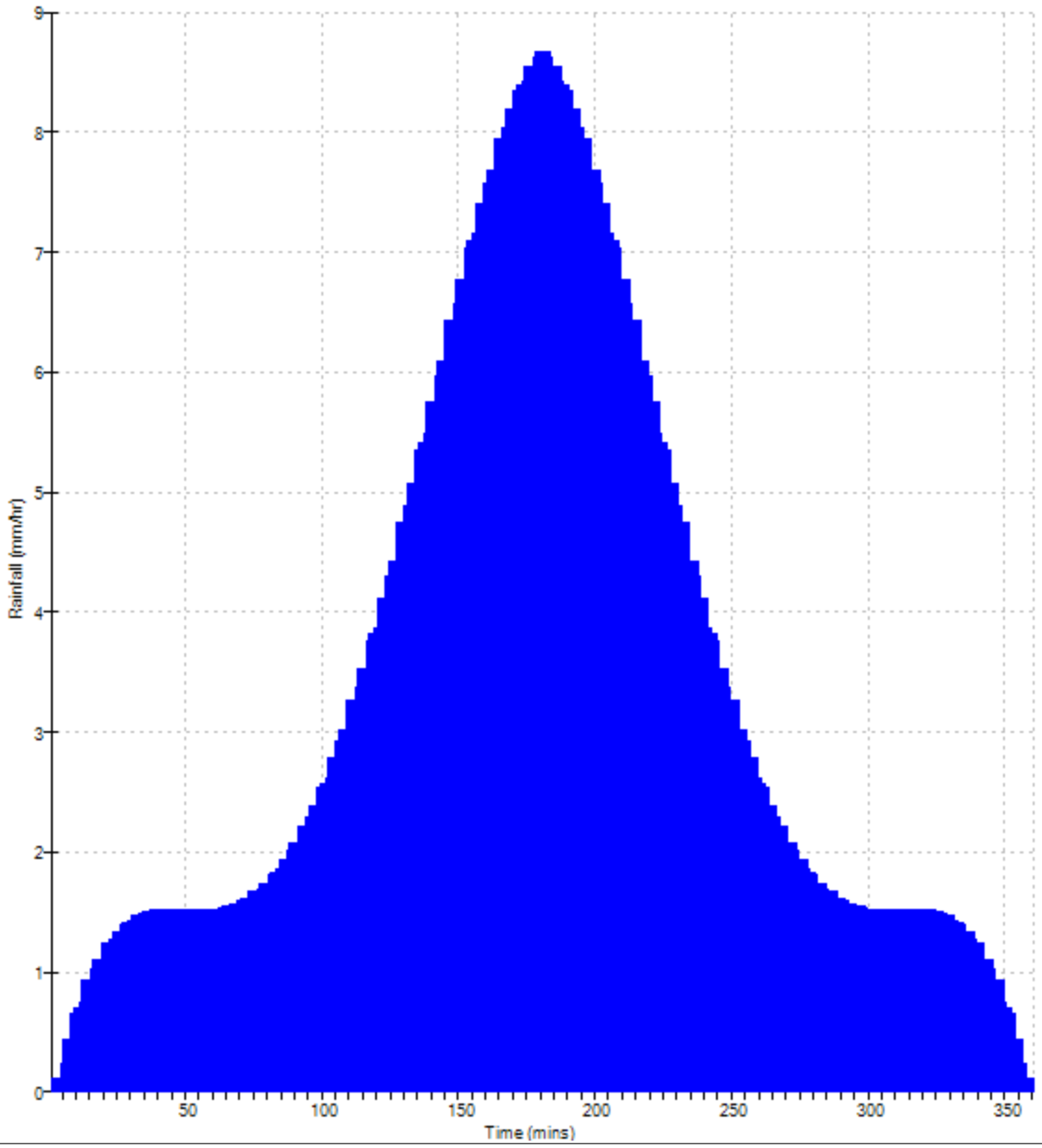


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Rainfall profile

Storm duration (mins) 360

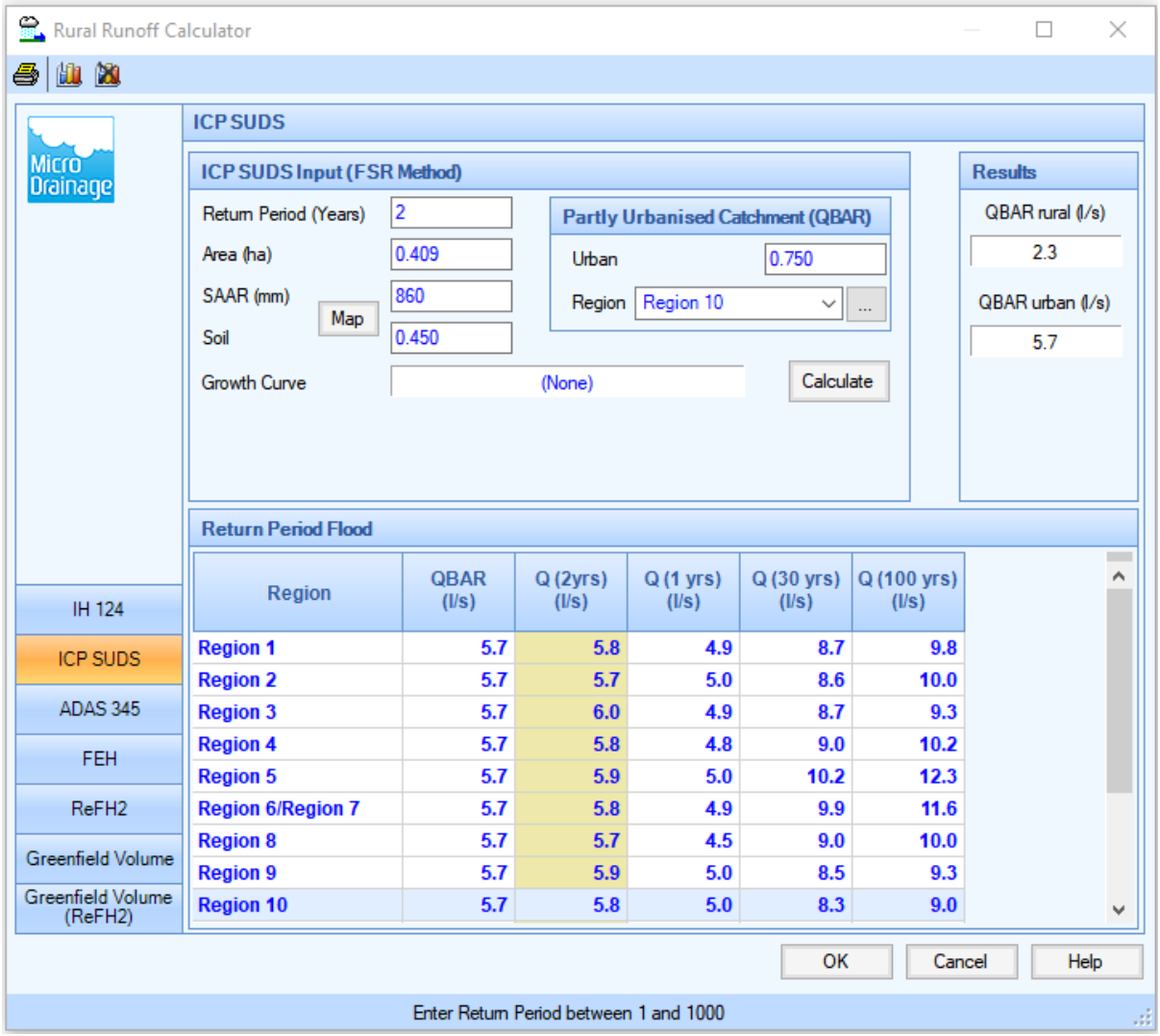
FSR Data	
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.359
Peak Intensity (mm/hr)	8.675
Ave. Intensity (mm/hr)	3.430
Return Period (years)	1.0



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APPENDIX G

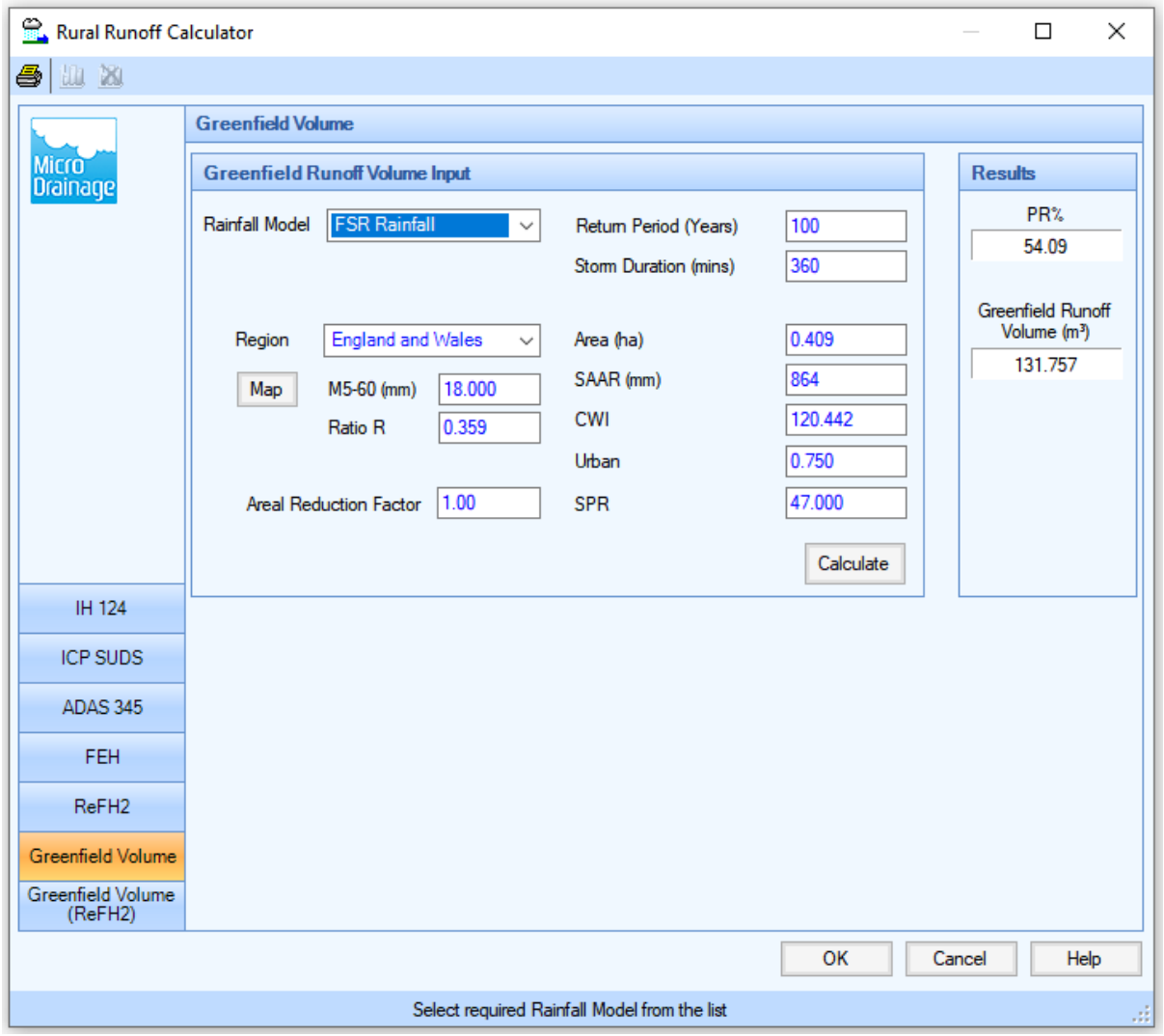
GREENFIELD RUNOFF RATE CALCULATION



Region	QBAR (l/s)	Q (2yrs) (l/s)	Q (1 yrs) (l/s)	Q (30 yrs) (l/s)	Q (100 yrs) (l/s)
Region 1	5.7	5.8	4.9	8.7	9.8
Region 2	5.7	5.7	5.0	8.6	10.0
Region 3	5.7	6.0	4.9	8.7	9.3
Region 4	5.7	5.8	4.8	9.0	10.2
Region 5	5.7	5.9	5.0	10.2	12.3
Region 6/Region 7	5.7	5.8	4.9	9.9	11.6
Region 8	5.7	5.7	4.5	9.0	10.0
Region 9	5.7	5.9	5.0	8.5	9.3
Region 10	5.7	5.8	5.0	8.3	9.0

APPENDIX H

GREENFIELD RUNOFF VOLUME CALCULATION


Rural Runoff Calculator
Micro Drainage
Greenfield Volume
Greenfield Runoff Volume Input
Rainfall Model
FSR Rainfall
Return Period (Years)
100
Storm Duration (mins)
360
Region
England and Wales
Area (ha)
0.409
Map
M5-60 (mm)
18.000
SAAR (mm)
864
Ratio R
0.359
CWI
120.442
Urban
0.750
Areal Reduction Factor
1.00
SPR
47.000
Calculate
Results
PR%
54.09
Greenfield Runoff Volume (m³)
131.757
IH 124
ICP SUDS
ADAS 345
FEH
ReFH2
Greenfield Volume
Greenfield Volume (ReFH2)
OK
Cancel
Help
Select required Rainfall Model from the list

APPENDIX I

PROPOSED IMPERMEABLE AREAS PLAN

GENERAL NOTES:

1. THIS DRAWING IS INTENDED TO INDICATE THE PROPOSED DRAINED AREAS FOR BLOCK C & D OF THE VIADUX DEVELOPMENT AND SHOULD BE READ IN CONJUNCTION WITH:
   - BLOCK C, D & E PROPOSED BELOW GROUND DRAINAGE DRAWING
   - BLOCK C, D & E MICRODRAINAGE MODEL AND CALCULATION OUTPUTS

KEY

- DEVELOPMENT BOUNDARY
- BLOCK C, D & E BOUNDARY (EXCLUDING GMPTE BRIDGE AREA) TOTAL AREA: 4090m² (0.409ha)
- INTERFACE BOUNDARY BETWEEN PHASE 1 AND 2 AT GROUND FLOOR LEVEL

BLUE ROOF AREA SUMMARY			
MANHOLE REF	HATCH	BLUE ROOF AREA (ha)	CATCHMENT (ha)
SL2.00		0.072	0.115
SL3.00		0.089	0.105
	TOTAL	0.161	0.220

PROPOSED IMPERMEABLE AREA SUMMARY			
MANHOLE REF	HATCH	AREA (ha)	CATCHMENT (ha)
SL1.00		0.006	0.006
SL2.00		0.012	0.012
SL1.02		0.019	0.019
SL3.00		0.005	0.005
SL3.01		0.025	0.025
SL6.00		0.037	0.037
SL8.00		0.056	0.075
	TOTAL	0.160	0.179

SL3.00 BLUE ROOF A (PODIUM)

BLUE ROOF AREA: 890 m²
CATCHMENT AREA: 1045 m²
STORAGE VOLUME: 86.3 m³
MAXIMUM RUNOFF RATE: 1.8 l/s

RWP's TO BLUE ROOF TO BE CO-ORDINATED AT STAGE 3 WITH BLUE ROOF SUBCONTRACTOR.

SL2.00 BLUE ROOF B (TOWER)

BLUE ROOF AREA: 720 m²
CATCHMENT AREA: 1150 m²
STORAGE VOLUME: 69.8 m³
MAXIMUM RUNOFF RATE: 1.2 l/s

RWP's TO BLUE ROOF TO BE CO-ORDINATED AT STAGE 3 WITH BLUE ROOF SUBCONTRACTOR.

1500mm DIA COMBINED SEWER
300mm DIA COMBINED SEWER
UU MH 6601
CL: +35.880
IL: +32.150 (BASED ON PURE UTILITIES SOLUTIONS SURVEY DATE MARCH 22)
LOWER ROOF AND UNDERSIDE OF BRIDGE ABOVE GROUND DRAINAGE TO ABOVE GROUND DRAINAGE ENGINEERS DESIGN AND DETAIL
SL1.08
1200 DIA PCC
HYDROBRAKE FLOW CONTROL
DESIGN FLOW: 5.7 l/s
DESIGN HEAD: 1.6 m
CL: 35.900
IL: 33.295
C1.00
1200 DIA PCC
CL: 35.040
IL: 32.715
RWP
ATTENUATION TANK VENT
SL9.00
CL: 35.930
TOP OF TANK: 35.330
IL: 33.330
70m²x 2.0m DEEP ATTENUATION TANK
225mm @ 1:100
225mm DIA @1:100
225mm DIA @1:27.2
150mm DIA @1:100
150mm DIA @1:6.2
SL1.07
600 DIA PPIC
CL: 35.405
IL: 33.975
SL1.06
600 DIA PPIC
CL: 35.505
IL: 34.220
SL1.00
600 DIA PPIC
CL: 39.310
IL: 24.820
SL1.01
600 DIA PPIC
CL: 39.600
IL: 34.725
100mm DIA @1:100
150mm DIA @1:61.5
RWP FA
SL1.05
600 DIA PPIC
CL: 35.905
IL: 34.935
SL1.04
600 DIA PPIC
CL: 35.905
IL: 33.990
150mm DIA @1:100
150mm DIA @1:100
150mm DIA @1:41.2
SL1.02
600 DIA PPIC
CL: 39.760
IL: 34.310
150mm DIA @1:28.7
SL1.03
600 DIA PPIC
CL: 35.630
IL: 34.165
150mm DIA @1:100
SL3.02
1200 DIA HYDRO DOWNSTREAM DEFENDER
CL: 35.635
IL: 34.250
150mm DIA @1:100
SL3.01
600 DIA PPIC
CL: 35.680
IL: 34.265
150mm DIA @1:100
SL3.00
600 DIA PPIC
CL: 35.680
IL: 34.310
SL6.00
600 DIA PPIC
CL: 35.905
IL: 34.165
RWP
2440mm DIA COMBINED SEWER
2440mm DIA COMBINED SEWER

P01	ISSUED FOR PLANNING	08.11.24	HW	KG
Rev:	Description:	Date:	By:	Chkd:

renaissance
Renaissance Associates Ltd
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:
VIADUX PHASE 2, MANCHESTER

Drawing Title:
BLOCK C, D & E PROPOSED DRAINED AREAS PLAN

Status:
RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV 24	HW	--	KG

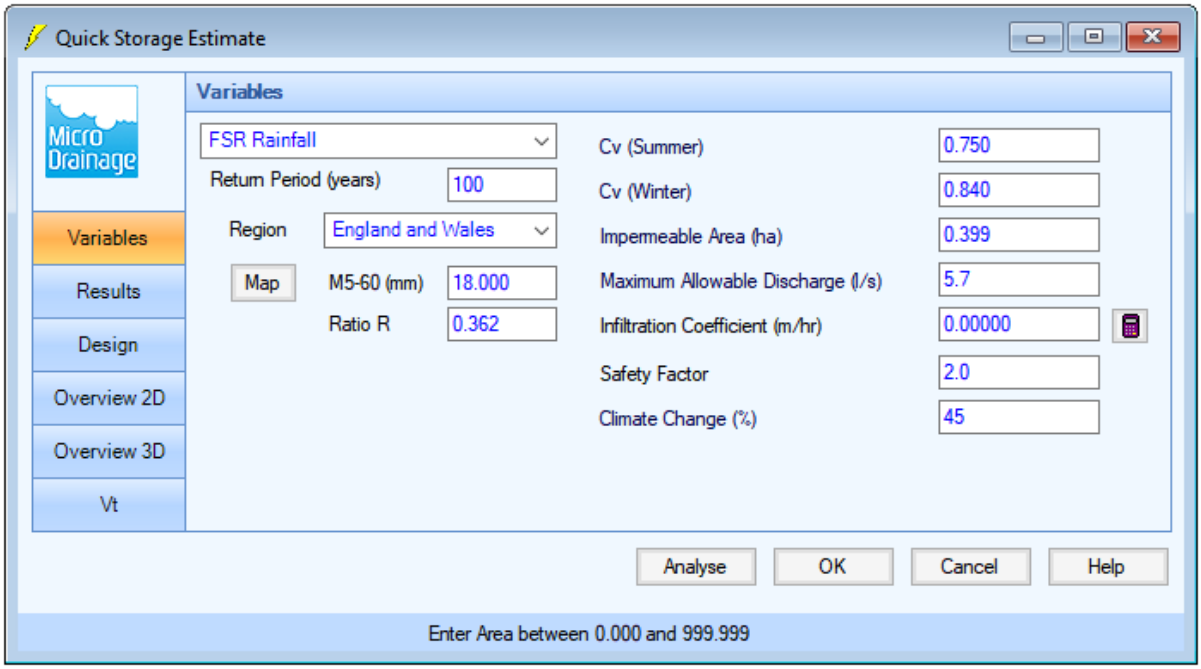
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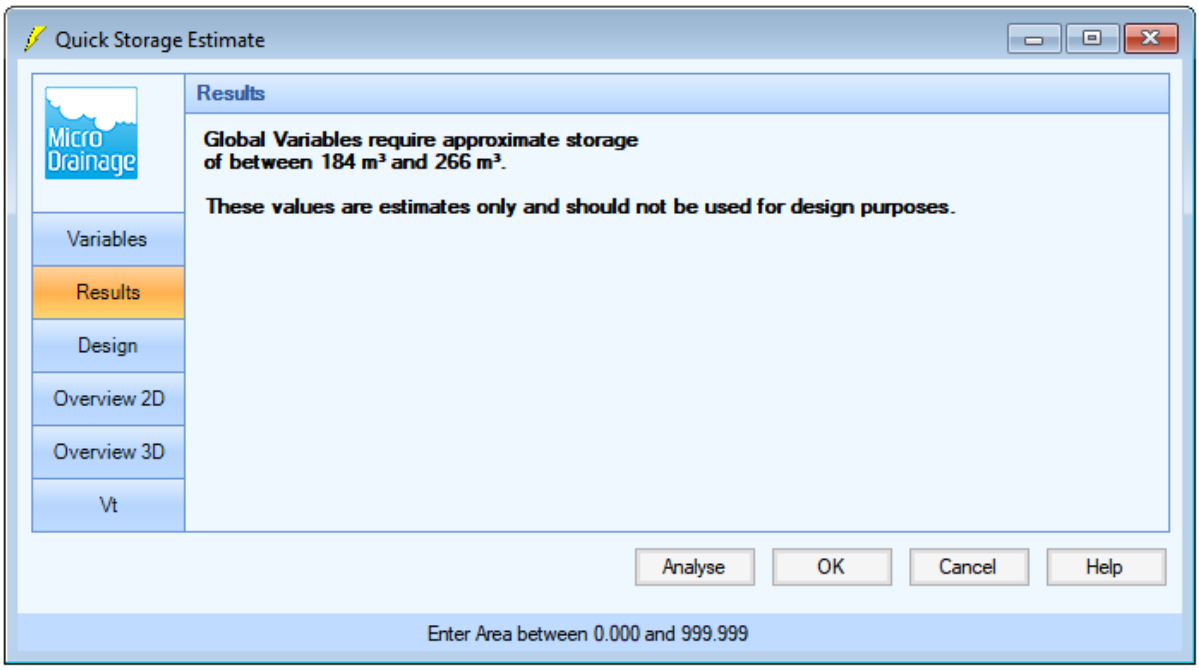
Project: | Originator: | Volume: | Level: | Type: | Role: | Category/Number: | Rev:
V2B-REN-CC-00-DR-C-00060-P01

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APPENDIX J

MICRODRAINAGE QUICK STORAGE ESTIMATE


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FSR Rainfall
Return Period (years) 100
Region England and Wales
Map
M5-60 (mm) 18.000
Ratio R 0.362
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 0.399
Maximum Allowable Discharge (l/s) 5.7
Infiltration Coefficient (m/hr) 0.00000
Safety Factor 2.0
Climate Change (%) 45
Analyse
OK
Cancel
Help
Enter Area between 0.000 and 999.999


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage
of between 184 m³ and 266 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Area between 0.000 and 999.999

APPENDIX K

BELOW GROUND DRAINAGE GENERAL ARRANGEMENTS

RIBA STAGE 2
THESE DRAWINGS ARE INTENDED TO COMMUNICATE THE INITIAL CONCEPT FOR THE PROPOSED BUILDINGS AND ARE APPROPRIATE FOR RIBA STAGE 2 (CONCEPT DESIGN).

ALL STRUCTURAL SIZES ARE INDICATIVE ONLY AND TO ASSIST WITH HIGH LEVEL COSTING BY THE PROJECT QUANTITY SURVEYOR AND CONTRACTOR. ALL STRUCTURAL SIZES AND REINFORCEMENT RATES ARE INDICATIVE AT THIS STAGE AND ARE SUBJECT TO CHANGE AS THE DESIGN DEVELOPS THROUGH RIBA STAGES 3 (SPATIAL CO-ORDINATION) AND STAGE 4 (TECHNICAL DESIGN) AND TO REFLECT INPUT FROM CONTRACTOR DESIGNED PACKAGES.

300mm DIA COMBINED SEWER
UU MH 6601
CL: +35.880
IL: +32.150 (BASED ON PURE UTILITIES SOLUTIONS SURVEY DATE MARCH 22)
1500mm DIA COMBINED SEWER
PROPOSED COMBINED WATER SADDLE CONNECTION INTO EXISTING COMBINED SEWER WITHIN GREAT BRIDGEWATER STREET SUBJECT TO UNITED UTILITIES AND LLFA APPROVAL. INVERT LEVEL OF CONNECTION POINT TO BE CONFIRMED PRIOR TO COMMENCEMENT OF DRAINAGE WORKS.
EXISTING BRICKWORK TO BE REMOVED TO ACCOMODATE NEW CONNECTION. NEW PIPE TO BE FULLY BED INTO EXISTING BRICKWORK WITH EPOXY MORTAR AND ENCASED IN CONCRETE SURROUND. CARE TO BE TAKEN TO ENSURE NO DEBRIS FALL INTO THE EXISTING SEWER.
LOWER ROOF AND UNDERSIDE OF BRIDGE ABOVE GROUND DRAINAGE TO ABOVE GROUND DRAINAGE ENGINEERS DESIGN AND DETAIL
SL1.08
1200 DIA PCC
HYDROBRAKE FLOW CONTROL
DESIGN FLOW: 5.7 l/s
DESIGN HEAD: 1.6 m
CL: 35.900
IL: 33.245
C1.00
1200 DIA PCC
CL: 35.040
IL: 32.715
ATTENUATION TANK VENT
SL9.00
CL: 35.930
TOP OF TANK: 34.930
IL: 33.330
50m²x 1.6m DEEP
ATTENUATION TANK
FL1.05
600 DIA PPIC
CL: 35.905
IL: 34.235
225mm @ 1:100
CLE STORE
20 Spaces
stackers & 90 lockers
Bar
192 m²
FL1.04
450 DIA PPIC
CL: 35.930
IL: 35.280
150mm DIA @1:80
Bar Store
WC
FL1.04
450 DIA PPIC
CL: 35.930
IL: 35.165
150mm DIA @1:56.9
Parcel Store
34 m²
Post
23 m²
FL1.05
600 DIA PPIC
CL: 35.905
IL: 34.420
FL1.05
600 DIA PPIC
CL: 35.905
IL: 34.530
150mm DIA @1:100
SVP FA
SVP
POTENTIAL CONNECTION FROM BASEMENT RISING MAIN IF REQUIRED
150mm DIA @1:80
225mm DIA @1:27.2
SL2.00
600 DIA PPIC
CL: 35.900
IL: 34.850
150mm DIA @1:100
SL1.07
600 DIA PPIC
CL: 35.905
IL: 33.620
150mm DIA @1:6.2
RWP FA
RWP FA
RWP FA
SL8.00
600 DIA PPIC
CL: 35.905
IL: 34.220
SL1.06
600 DIA PPIC
CL: 35.905
IL: 33.695
150mm DIA @1:80
150mm DIA @1:100
SL1.05
600 DIA PPIC
CL: 35.905
IL: 34.935
FL1.04
450 DIA PPIC
CL: 35.905
IL: 34.610
Sub-Station
26 m²
SL1.04
600 DIA PPIC
CL: 35.905
IL: 33.990
150mm DIA @1:100
150mm DIA @1:80
150mm DIA @1:100
150mm DIA @1:100
Residential Refuse Store 3
68m²
LV Switch
39 m²
Fire Escape
Luggage Store
21 m²
Plant
16 m²
Comms
11 m²
BOH Office
13 m²
Fire Escape
Residential Refuse Store 1
52 m²
FL1.02
450 DIA PPIC
CL: 35.930
IL: 35.280
150mm DIA @1:51.1
RISING MAIN LOCATION AND CONNECTION TO BE AGREED WITH BUILDING SERVICES ENGINEER
FL1.01
610 DIA PACKAGE PUMPING STATION
REFER TO SPECIFICATION BELOW
CL: 33.300
PIPE IL: 32.300
CHAMBER BL: 31.630
150mm DIA @1:80
SL6.00
600 DIA PPIC
CL: 35.905
IL: 34.165
Hotel & Resturant Refuse
10 m²
Residential Refuse Store 2
81 m²
FL1.03
450 DIA PPIC
CL: 35.905
IL: 34.855
Commercial Sprinkler Tank
Tanks
FL1.00
450 DIA PPIC
CL: 33.300
IL: 32.400
Hotel & Resturant Refuse
Commercial Sprinkler Pumps
Hotel & Resturant Refuse
11 m²
RWP
2440mm DIA COMBINED SEWER
EXTENTS OF PHASE 1
EXG DP
RWP
EXG DP
RWP
SL1.00
600 DIA PPIC
CL: 36.310
IL: 34.820
150mm DIA @1:100
100mm DIA @1:100
SL1.01
600 DIA PPIC
CL: 36.600
IL: 34.720
RWP
150mm DIA @1:51.5
SL1.02
600 DIA PPIC
CL: 35.760
IL: 34.410
150mm DIA @1:25.7
SL1.03
600 DIA PPIC
CL: 35.630
IL: 34.165
150mm DIA @1:100
SL3.02
1200 DIA HYDRO DOWNSTREAM DEFENDER
CL: 35.635
IL: 34.250
150mm DIA @1:100
SL3.01
600 DIA PPIC
CL: 35.680
IL: 34.265
150mm DIA @1:100
SL3.00
600 DIA PPIC
CL: 35.680
IL: 34.310

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
2. THE FINAL CONNECTION TO THE PUBLIC SEWER IS SUBJECT TO UNITED UTILITIES APPROVAL AND IS TO BE IN ACCORDANCE WITH THEIR AGREED DETAILS.
3. FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS
4. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSG AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
5. RWPs, SVPs, SSs AND FLOOR GULLEYS ARE TO HAVE RODDABLE ACCESS POINTS ABOVE GROUND FLOOR TO BUILDING SERVICES DETAILS. ALL FLOOR GULLEYS AND RWP'S ARE TO BE TRAPPED.
6. ALL GULLY AND CHANNEL DRAIN LOCATIONS INDICATIVE.REFER TO ARCHITECT AND LANDSCAPE ARCHITECT DRAWINGS FOR SETTING OUT AND SPECIFICATION.
7. THE ATTENUATION TANK AND FLOW CONTROL ARE TO BE TO SUPPLIERS DESIGN AND DETAILS. INSTALLATION IS TO BE IN ACCORDANCE WITH THE SUPPLIERS REQUIREMENTS.
8. SEWERS TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN: 1.2m IN HIGHWAYS OR VERGES, OR LESS THAN 0.9m IN PEDESTRIAN AREAS, THEN A 150mm CONCRETE SLAB SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND. REFER TO DETAILS SHEETS.
9. DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
10. THE CHAMBER SIZE OF PCC MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
11. MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
12. COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
13. ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
14. ALL CONCRETE PIPES TO BE TO ES EN 1916 CLASS 120 (54kN/m).
15. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2).
16. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
    A. BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
    B. PIPES LESS THAN OR EQUAL TO 500mm DIA
    C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE
    D. REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
17. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA. 40kN/m, 225mm DIA. 45kN/m AND 300mm DIA. 72kN/m.
18. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE -(CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
19. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY. 20.SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.
20. ALLOW FOR ALL EXISTING DRAINAGE ON SITE TO BE GRUBBED UP AND BACKFILLED. ANY CONNECTIONS FROM THE SITE TO THE PUBLIC SEWER TO THE SITE ARE TO BE CAPPED AND GROUTED.

DRAWING LEGEND

- INDICATIVE PRIVATELY DRAINED AREA
- INTERFACE BOUNDARY BETWEEN PHASE 1 AND 2 AT GROUND FLOOR LEVEL
- PROPOSED SURFACE WATER DRAINAGE NETWORK
- PROPOSED FOUL WATER DRAINAGE NETWORK
- PROPOSED COMBINED WATER DRAINAGE NETWORK
- EXISTING UNITED UTLITIES WATER COMBINED SEWER
- APPROXIMATE EXTENT OF PROPOSED GEO-CELLULAR ATTENUATION TANK

SPRINKLER TANK OPERATION AND DRAIN-DOWN
NO ALLOWANCE HAS BEEN MADE WITHIN THE DESIGN FOR THE BASEMEN FLOODING OR FOR DRAIN-DOWN OF THE SPRINKLER TANK. WATER ASSOCIATED WITH EMPTYING OR TESTING OF THE SPRINKLER TANK IS TO BE MANAGED SEPARATELY AND IS NOT TO DISCHARGE INTO THE BASEMENT DRAINAGE.
MANAGEMENT STRATEGY IS TO BE CONFIRMED BY BUILDING SERVICES ENGINEER

IF BUNDING IS REQUIRED AROUND THE SPRINKLER TANKS THE LOCATION AND EXTENT SHOULD BE ADVISED BY THE ARCHITECT AND BUILDING SERVICES ENGINEER AND ALLOWANCES SHOULD BE MADE FOR A REINFORCED MASONRY BUND WALL

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

PROTECTIVE COVER SLAB
ALLOW FOR PROTECTIVE CONCRETE COVER SLAB OVER ANY DRAINAGE BENEATH TRAFFICKED AREAS WITH LESS THAN 1200mm COVER.

EXISTING SERVICES
UTILITY SCAN INDICATES BURIED SERVICES BENEATH THE SITE. UTILITY SCAN TO BE REVIEWED PRIOR TO ANY EXCAVATION WORKS.

ATTENUATION TANK
ATTENUATION TANK TO BE DESIGNED FOR SUITABLE LOADING. SUPPLIERS TO UNDERTAKE DETAILED BUOYANCY CHECK AND ADVISE ON ANY TIE DOWN DETAILS.
ALLOW FOR VENT PIPE AND INSPECTION CHAMBERS. SUPPLIER TO ADVISE PRIOR TO STAGE 4

ALL STORAGE VOLUMES ARE INDICATVIE ONLY AND SUBJECT TO CHANGE AS THE DESIGN PROGRESSES.

SVP AND RWP SETTING OUT
DRAINAGE INDICATED ON THIS DRAWING HAS BEEN PRODUCED WITH NO INPUT FROM A BUILDING SERVICES ENGINEER.

SVP AND RWP LOCATIONS ARE TO BE SET OUT AT STAGE 3

ALL CONNECTIONS BETWEEN ABOVE GROUND AND BELOW GROUND DRAINAGE TO BE SIZED TO SUIT ABOVE GROUND DRAINAGE

EXISTING GMPTE DRAINAGE TO BE DIVERTED AROUND CANOPY FOUNDATIONS

TREES
THE DESIGN OF LANDSCAPING SHOULD BE UNDERTAKEN AT THE SAME TIME AS THE DESIGN OF THE DRAINAGE SO THAT THE IMPACT OF TREE ROOTS ON THE DRAINAGE CAN BE CONSIDERED. A SEWER OR LATERAL DRAIN SHOULD NOT BE LOCATED CLOSER TO TREES/BUSHES/SHRUBS THAN THE CANOPY WIDTH AT MATURE HEIGHT, EXCEPT WHERE SPECIAL PROTECTION MEASURES PROVIDED, IN ACCORDANCE WITH B7.6 OF THE SEWERAGE SECTOR GUIDANCE APPENDIX C. A TREE SHOULD NOT BE PLANTED DIRECTLY OVER A SEWER OR WHERE THE EXCAVATION ONTO THE SEWER WOULD REQUIRE THE REMOVAL OF THE TREE.

FOUL WATER PUMPING STATION
292 LITRE SINGLE PUMPING STATION
CHAMBER SIZE: 610mm x 1000mm HDPE
RISING MAIN: 63mm MDPE CONNECTOR TO CONNECT TO DISCHARGE PIPEWORK.
INLET: 2 NUMBER 110mm INLET SEAL
PUMP: DAB FEKA VS750 SUBMERSIBLE PUMP WITH INTEGRAL FLOAT
INTERNAL: 2" PIPEWORK AND FITTINGS INCLUDING BACKWATER VALVE ALARM TO BE INCLUDED
NOTE:
1. THERE MUST BE A MINIMUM OF 450mm BELOW THE BOTTOM OF THE INLET PIPE TO THE BASE OF THE CHAMBER TO ALLOW FOR THE PUMP TO OPERATE.
2. INLETS TO BE CUT ON SITE AND SEALED
3. ALLOW FOR MAINTENANCE ACCESS OF PUMPING STATION. REFER TO PUMP STATION MAINTENANCE REQUIREMENTS

Rev:	Description:	Date:	By:	Chkd:
P01	ISSUED FOR PLANNING	08.11.24	HW	KG

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Project:
VIADUX PHASE 2, MANCHESTER

Drawing Title:
BLOCK C, D & E - LEVEL 00 BELOW GROUND DRAINAGE PLAN

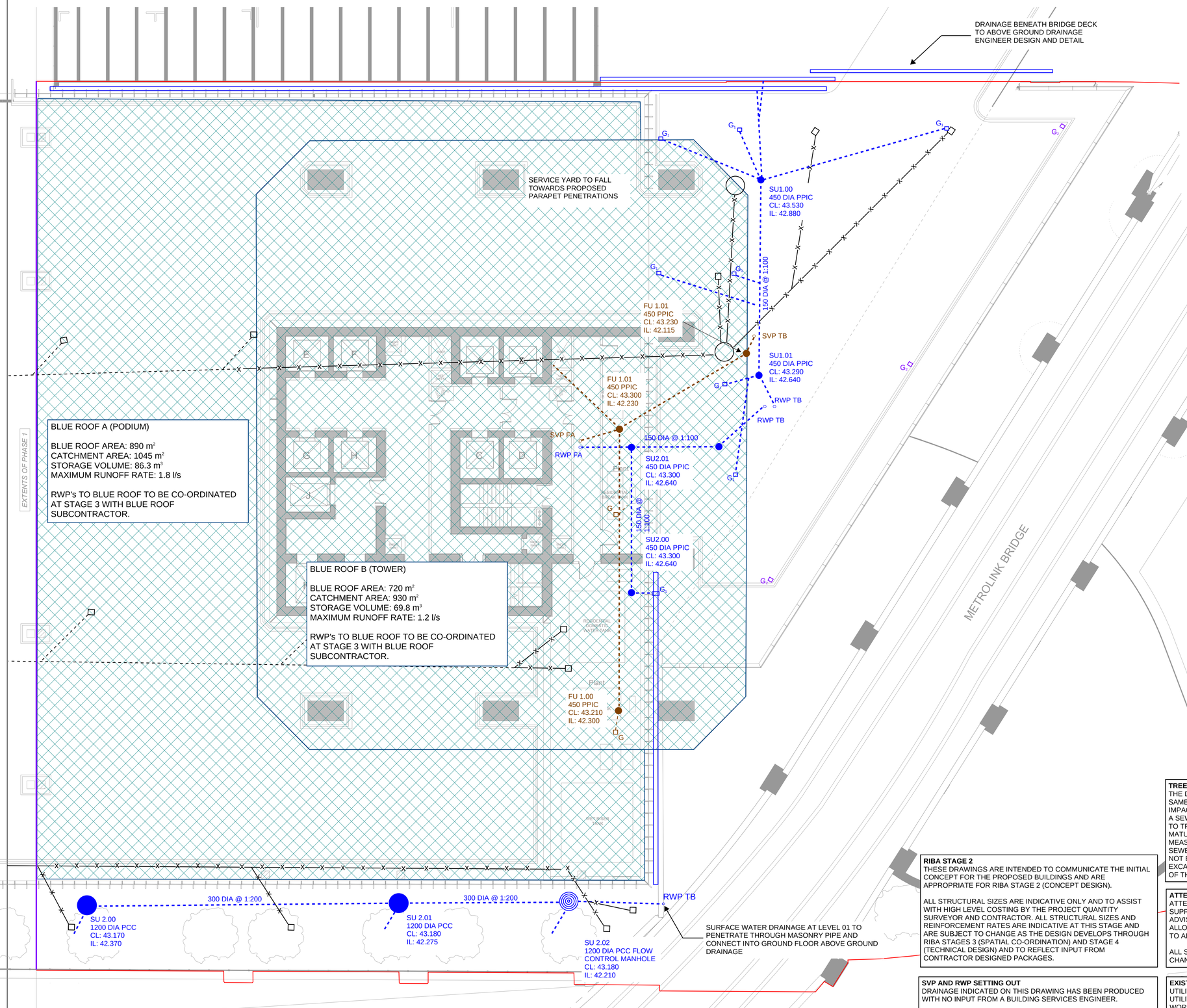
Status:
RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV 24	HW	--	KG

Scale: 1:125
Project No: 2209-01

Project:	Originator:	Volume:	Level:	Type:	Role:	Category/Number:	Rev:
V2B	REN	CC	00	DR	C	01100	P01

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DRAWING LEGEND

- INDICATIVE PRIVATELY DRAINED AREA
- INTERFACE BOUNDARY BETWEEN PHASE 1 AND 2 AT GROUND FLOOR LEVEL
- PROPOSED SURFACE WATER DRAINAGE NETWORK
- PROPOSED FOUL WATER DRAINAGE NETWORK
- PROPOSED COMBINED WATER DRAINAGE NETWORK
- EXISTING UNITED UTILITIES WATER COMBINED SEWER
- APPROXIMATE EXTENT OF BLUE ROOF ABOVE
- G_1 SURFACE WATER GULLY (CONNECTION INTO BELOW GROUND DRAINAGE NETWORK)
- G_2 INDICATIVE ABOVE GROUND SURFACE WATER GULLY - REQUIREMENTS AND LOCATION TO BE CONFIRMED BY BUILDING SERVICES ENGINEER
- EXISTING SERVICE YARD DRAINAGE TO BE GRUBBED UP
- EXISTING SERVICE YARD DRAINAGE TO BE RETAINED

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
2. THE FINAL CONNECTION TO THE PUBLIC SEWER IS SUBJECT TO UNITED UTILITIES APPROVAL AND IS TO BE IN ACCORDANCE WITH THEIR AGREED DETAILS.
3. FOR ALL ABOVE GROUND DRAINAGE AND ASSOCIATED PUMPS REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS
4. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSG AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
5. RWPs, SVPs, SSs AND FLOOR GULLEYS ARE TO HAVE RODDABLE ACCESS POINTS ABOVE GROUND FLOOR TO BUILDING SERVICES DETAILS. ALL FLOOR GULLEYS AND RWP'S ARE TO BE TRAPPED.
6. ALL GULLY AND CHANNEL DRAIN LOCATIONS INDICATIVE.REFER TO ARCHITECT AND LANDSCAPE ARCHITECT DRAWINGS FOR SETTING OUT AND SPECIFICATION.
7. THE ATTENUATION TANK AND FLOW CONTROL ARE TO BE TO SUPPLIERS DESIGN AND DETAILS. INSTALLATION IS TO BE IN ACCORDANCE WITH THE SUPPLIERS REQUIREMENTS.
8. SEWERS TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN; 1.2m IN HIGHWAYS OR VERGES, OR LESS THAN 0.9m IN PEDESTRIAN AREAS, THEN A 150mm CONCRETE SLAB SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND. REFER TO DETAILS SHEETS.
9. THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN. ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
10. THE CONTRACTOR IS TO KEEP A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND PROVIDE THIS TO RENAISSANCE UPON COMPLETION OF THE WORKS TO ALLOW FOR PRODUCTION OF A 'FINAL CONSTRUCTION' ISSUE DRAWING.
11. DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
12. THE CHAMBER SIZE OF PCC MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
13. MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
14. COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
15. ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
16. ALL CONCRETE PIPES TO BE TO ES EN 1916 CLASS 120 (54kN/m).
17. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2).
18. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
    A. BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
    B. PIPES LESS THAN OR EQUAL TO 500mm DIA
    C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE
    D. REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
19. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA. 40kN/m, 225mm DIA. 45kN/m AND 300mm DIA. 72kN/m.
20. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE -(CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
21. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
    20.SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.
20. ALLOW FOR ALL EXISTING DRAINAGE ON SITE TO BE GRUBBED UP AND BACKFILLED. ANY CONNECTIONS FROM THE SITE TO THE PUBLIC SEWER TO THE SITE ARE TO BE CAPPED AND GROUTED.

PROTECTIVE COVER SLAB
ALLOW FOR PROTECTIVE CONCRETE COVER SLAB OVER ANY DRAINAGE BENEATH TRAFFICKED AREAS WITH LESS THAN 1200mm COVER.

RIBA STAGE 2
THESE DRAWINGS ARE INTENDED TO COMMUNICATE THE INITIAL CONCEPT FOR THE PROPOSED BUILDINGS AND ARE APPROPRIATE FOR RIBA STAGE 2 (CONCEPT DESIGN).

ALL STRUCTURAL SIZES ARE INDICATIVE ONLY AND TO ASSIST WITH HIGH LEVEL COSTING BY THE PROJECT QUANTITY SURVEYOR AND CONTRACTOR. ALL STRUCTURAL SIZES AND REINFORCEMENT RATES ARE INDICATIVE AT THIS STAGE AND ARE SUBJECT TO CHANGE AS THE DESIGN DEVELOPS THROUGH RIBA STAGES 3 (SPATIAL CO-ORDINATION) AND STAGE 4 (TECHNICAL DESIGN) AND TO REFLECT INPUT FROM CONTRACTOR DESIGNED PACKAGES.

SVP AND RWP SETTING OUT
DRAINAGE INDICATED ON THIS DRAWING HAS BEEN PRODUCED WITH NO INPUT FROM A BUILDING SERVICES ENGINEER.

SVP AND RWP LOCATIONS ARE TO BE SET OUT AT STAGE 3

ALL CONNECTIONS BETWEEN ABOVE GROUND AND BELOW GROUND DRAINAGE TO BE SIZED TO SUIT ABOVE GROUND DRAINAGE

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ALLOW FOR VENT PIPE AND INSPECTION CHAMBERS. SUPPLIER TO ADVISE PRIOR TO STAGE 4

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

Rev:	Description:	Date:	By:	Chkd:
P01	ISSUED FOR PLANNING	08.11.24	HW	KG

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Project:
VIADUX PHASE 2, MANCHESTER

Drawing Title:
BLOCK C, D & E - LEVEL 01 BELOW GROUND DRAINAGE PLAN

Status:
RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV 24	HW	--	KG

Scale: 1:125 | Project No: 2209-01

Project: Originator: Volume: Level: Type: Role: Category/Number: Rev:

V2B-REN-CC-01-DR-C-01110-P01

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APPENDIX L

PROPOSED SURFACE WATER MICRODRAINAGE CALCULATIONS

Storage Structures for Storm

Cellular Storage Manhole: SL10.00 Blue Roof Podium, DS/PN: SL5.000

Invert Level (m) 79.890 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	890.0	0.0	0.109	0.0	0.0
0.108	890.0	0.0			

Cellular Storage Manhole: SL8.00 Blue Roof Tower, DS/PN: SL6.000

Invert Level (m) 79.890 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	720.0	0.0	0.109	0.0	0.0
0.108	720.0	0.0			

Cellular Storage Manhole: SL8.00 Tank, DS/PN: SL8.000

Invert Level (m) 33.330 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	0.0	1.601	0.0	0.0
1.600	50.0	0.0			

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

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

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.274	4-8	0.109

Total Area Contributing (ha) = 0.383

Total Pipe Volume (m³) = 2.907

Network Design Table for Storm

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

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
SL1.000	10.301	0.103	100.0	0.007	5.00	0.0	0.600	o	100	Pipe/Conduit	
SL2.000	13.054	0.131	100.0	0.012	5.00	0.0	0.600	o	100	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)
SL1.000	50.00	5.22	34.822	0.007	0.0	0.0	0.0	0.77	6.0	0.9
SL2.000	50.00	5.28	34.850	0.012	0.0	0.0	0.0	0.77	6.0	1.6

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Network Design Table for Storm

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
SL1.001	15.901	0.309	51.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
SL1.002	6.321	0.196	32.2	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL3.000	4.243	0.042	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
SL3.001	1.830	0.018	100.4	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL3.002	8.569	0.086	99.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL1.003	17.282	0.173	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL4.000	17.604	0.176	100.0	0.037	5.00	0.0	0.600	o	150	Pipe/Conduit	
SL1.004	5.573	0.056	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL1.005	7.185	0.072	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
SL5.000	12.697	0.155	82.0	0.105	5.00	0.0	0.600	o	100	Pipe/Conduit	
SL5.001	18.371	45.914	0.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
SL6.000	15.478	0.206	75.3	0.115	5.00	0.0	0.600	o	100	Pipe/Conduit	
SL6.001	11.385	45.821	0.2	0.000	0.00	0.0	0.600	o	75	Pipe/Conduit	
SL1.006	2.732	0.077	35.3	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)
SL1.001	50.00	5.53	34.719	0.019	0.0	0.0	0.0	1.08	8.5	2.6
SL1.002	50.00	5.59	34.360	0.045	0.0	0.0	0.0	1.78	31.4	6.1
SL3.000	50.00	5.07	34.310	0.000	0.0	0.0	0.0	1.00	17.8	0.0
SL3.001	50.00	5.10	34.268	0.025	0.0	0.0	0.0	1.00	17.7	3.4
SL3.002	50.00	5.24	34.249	0.025	0.0	0.0	0.0	1.01	17.8	3.4
SL1.003	50.00	5.87	34.164	0.070	0.0	0.0	0.0	1.00	17.8	9.5
SL4.000	50.00	5.29	34.167	0.037	0.0	0.0	0.0	1.00	17.8	5.0
SL1.004	50.00	5.97	33.991	0.107	0.0	0.0	0.0	1.00	17.8	14.5
SL1.005	50.00	6.09	33.935	0.107	0.0	0.0	0.0	1.00	17.8	14.5
SL5.000	50.00	5.25	79.890	0.105	0.0	0.0	0.0	0.85	6.7«	14.2
SL5.001	50.00	5.27	79.735	0.105	0.0	0.0	0.0	12.34	96.9	14.2
SL6.000	50.00	5.29	79.890	0.115	0.0	0.0	0.0	0.89	7.0«	15.6
SL6.001	50.00	5.31	79.684	0.115	0.0	0.0	0.0	12.96	57.2	15.6
SL1.006	50.00	6.11	33.696	0.327	0.0	0.0	0.0	2.21	87.9	44.3

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Network Design Table for Storm

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
SL7.000	2.968	0.477	6.2	0.056	5.00	0.0	0.600	o	100	Pipe/Conduit	
SL1.007	10.162	0.373	27.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
SL8.000	3.360#	0.034	100.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
SL1.008	7.566	0.076	100.0	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)
SL7.000	50.00	5.02	34.221	0.056	0.0	0.0	0.0	3.12	24.5	7.6
SL1.007	50.00	6.17	33.619	0.383	0.0	0.0	0.0	2.52	100.1	51.9
SL8.000	50.00	5.04	33.330	0.000	0.0	0.0	0.0	1.31	52.0	0.0
SL1.008	50.00	6.27	33.246	0.383	0.0	0.0	0.0	1.31	52.0	51.9

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m
SL1.00	36.310	1.488	Open Manhole	600	SL1.000	34.822	100		
SL2.00	35.900	1.050	Open Manhole	600	SL2.000	34.850	100		
SL1.01	36.600	1.881	Open Manhole	600	SL1.001	34.719	100	SL1.000	34.71
								SL2.000	34.71
SL1.02	35.760	1.400	Open Manhole	600	SL1.002	34.360	150	SL1.001	34.41
SL3.00	35.680	1.370	Open Manhole	600	SL3.000	34.310	150		
SL3.01	35.635	1.367	Open Manhole	600	SL3.001	34.268	150	SL3.000	34.26
SL3.02	35.680	1.431	Open Manhole	1200	SL3.002	34.249	150	SL3.001	34.24
SL1.03	35.630	1.466	Open Manhole	1200	SL1.003	34.164	150	SL1.002	34.16
								SL3.002	34.16
SL6.00	35.905	1.738	Open Manhole	600	SL4.000	34.167	150		
SL1.04	35.905	1.914	Open Manhole	600	SL1.004	33.991	150	SL1.003	33.99
								SL4.000	33.99
SL1.05	35.905	1.970	Open Manhole	600	SL1.005	33.935	150	SL1.004	33.93
SL10.00 Blue Roof Podium	80.000	0.110	Open Manhole	1	SL5.000	79.890	100		
SL10.01 Flow Control	80.000	0.265	Junction		SL5.001	79.735	100	SL5.000	79.73
SL8.00 Blue Roof Tower	80.000	0.110	Open Manhole	1	SL6.000	79.890	100		
SL9.01 Flow Control	80.000	0.316	Junction		SL6.001	79.684	75	SL6.000	79.68
SL1.06	35.905	2.209	Open Manhole	600	SL1.006	33.696	225	SL1.005	33.86
								SL5.001	33.82
								SL6.001	33.86
SL7.00	35.905	1.684	Open Manhole	1200	SL7.000	34.221	100		
SL1.07	35.905	2.286	Open Manhole	600	SL1.007	33.619	225	SL1.006	33.61
								SL7.000	33.74
SL8.00 Tank	35.930	2.600	Open Manhole	1200	SL8.000	33.330	225		
SL1.09	35.905	2.659	Open Manhole	1200	SL1.008	33.246	225	SL1.007	33.24
								SL8.000	33.29
SL1.10	35.905	2.735	Open Manhole	1200		OUTFALL		SL1.008	33.17

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SL1.00	383645.226	397616.069	383645.226	397616.069	Required	
SL2.00	383629.496	397619.243	383629.496	397619.243	Required	



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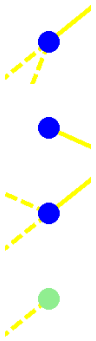
Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SL1.01	383637.671	397609.067	383637.671	397609.067	Required	
SL1.02	383626.112	397598.147	383626.112	397598.147	Required	
SL3.00	383613.530	397583.752	383613.530	397583.752	Required	
SL3.01	383612.890	397587.946	383612.890	397587.946	Required	
SL3.02	383614.418	397588.952	383614.418	397588.952	Required	
SL1.03	383620.955	397594.492	383620.955	397594.492	Required	
SL6.00	383596.541	397596.937	383596.541	397596.937	Required	
SL1.04	383610.212	397608.028	383610.212	397608.028	Required	
SL1.05	383614.543	397611.534	383614.543	397611.534	Required	
SL10.00 Blue Roof Podium	383589.373	397617.339	383589.373	397617.339	Required	
SL10.01 Flow Control	383601.792	397614.694			No Entry	
SL8.00 Blue Roof Tower	383594.755	397624.936	383594.755	397624.936	Required	
SL9.01 Flow Control	383609.422	397619.991			No Entry	
SL1.06	383620.112	397616.075	383620.112	397616.075	Required	
SL7.00	383621.164	397615.023	383621.164	397615.023	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SL1.07	383622.239	397617.789	383622.239	397617.789	Required	
SL8.00 Tank	383621.810	397627.941	383621.810	397627.941	Required	
SL1.09	383630.130	397624.192	383630.130	397624.192	Required	
SL1.10	383636.010	397628.954			No Entry	



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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.007	0.007	0.007
2.000	-	-	100	0.012	0.012	0.012
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.026	0.026	0.026
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.025	0.025	0.025
3.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.037	0.037	0.037
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.105	0.105	0.105
5.001	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.115	0.115	0.115
6.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.056	0.056	0.056
1.007	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.383	0.383	0.383

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
SL1.008	SL1.10	35.905	33.170	0.000	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet 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	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales
Return Period (years)	100	M5-60 (mm)	18.000

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Synthetic Rainfall Details

Ratio R	0.360	Cv (Winter)	0.840
Profile Type	Summer	Storm Duration (mins)	30
Cv (Summer)	0.750		

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Online Controls for Storm

Depth/Flow Relationship Manhole: SL10.01 Flow Control, DS/PN: SL5.001, Volume (m³): 0.1

Invert Level (m) 79.735

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.0000	0.014	0.3530	0.055	0.8370	0.104	1.1780
0.002	0.0000	0.015	0.3720	0.060	0.8780	0.105	1.1840
0.003	0.0000	0.016	0.3910	0.065	0.9170	0.110	1.2140
0.004	0.0000	0.017	0.4080	0.070	0.9550	0.115	1.2420
0.005	0.0000	0.018	0.4250	0.075	0.9910	0.120	1.2700
0.006	0.1110	0.019	0.4410	0.080	1.0250	0.125	1.2970
0.007	0.1620	0.020	0.4570	0.085	1.0590	0.130	1.3240
0.008	0.2010	0.025	0.5280	0.090	1.0920	0.135	1.3510
0.009	0.2330	0.030	0.5910	0.095	1.1230	0.140	1.3760
0.010	0.2620	0.035	0.6480	0.100	1.1540	0.145	1.4020
0.011	0.2870	0.040	0.7000	0.101	1.1600	0.150	1.4260
0.012	0.3110	0.045	0.7480	0.102	1.1660		
0.013	0.3330	0.050	0.7940	0.103	1.1720		

Depth/Flow Relationship Manhole: SL9.01 Flow Control, DS/PN: SL6.001, Volume (m³): 0.1

Invert Level (m) 79.684

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	0.0000	0.014	0.3530	0.055	0.8370	0.104	1.1780
0.002	0.0000	0.015	0.3720	0.060	0.8780	0.105	1.1840
0.003	0.0000	0.016	0.3910	0.065	0.9170	0.110	1.2140
0.004	0.0000	0.017	0.4080	0.070	0.9550	0.115	1.2420
0.005	0.0000	0.018	0.4250	0.075	0.9910	0.120	1.2700
0.006	0.1110	0.019	0.4410	0.080	1.0250	0.125	1.2970
0.007	0.1620	0.020	0.4570	0.085	1.0590	0.130	1.3240
0.008	0.2010	0.025	0.5280	0.090	1.0920	0.135	1.3510
0.009	0.2330	0.030	0.5910	0.095	1.1230	0.140	1.3760
0.010	0.2620	0.035	0.6480	0.100	1.1540	0.145	1.4020
0.011	0.2870	0.040	0.7000	0.101	1.1600	0.150	1.4260
0.012	0.3110	0.045	0.7480	0.102	1.1660		
0.013	0.3330	0.050	0.7940	0.103	1.1720		

Hydro-Brake® Optimum Manhole: SL1.09, DS/PN: SL1.008, Volume (m³): 3.5

Unit Reference	MD-SCL-0099-5700-1600-5700
Design Head (m)	1.600
Design Flow (l/s)	5.7
Flush-Flo™	Calculated
Objective	Minimise blockage risk
Application	Surface

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Hydro-Brake® Optimum Manhole: SL1.09, DS/PN: SL1.008, Volume (m³): 3.5

Sump Available	Yes
Diameter (mm)	99
Invert Level (m)	33.246
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	5.7
Flush-Flo™	0.387	5.7
Kick-Flo®	0.866	4.3
Mean Flow over Head Range	-	4.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.0	3.000	7.6	7.000	11.4
0.200	5.3	1.400	5.4	3.500	8.2	7.500	11.8
0.300	5.6	1.600	5.7	4.000	8.7	8.000	12.1
0.400	5.7	1.800	6.0	4.500	9.2	8.500	12.5
0.500	5.6	2.000	6.3	5.000	9.7	9.000	12.8
0.600	5.5	2.200	6.6	5.500	10.2	9.500	13.2
0.800	4.8	2.400	6.9	6.000	10.6		
1.000	4.6	2.600	7.1	6.500	11.0		

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APPENDIX M

OVERLAND FLOW ROUTES

GENERAL NOTES:

1. DO NOT SCALE FROM THIS DRAWING
2. FOR FURTHER DETAILS OF ITEMS NOTED ON THIS DRAWING, REFER TO ARCHITECTURAL AND CIVIL AND STRUCTURAL ENGINEERING INFORMATION.

OVERLAND FLOOD RISK
OVERLAND FLOOD ROUTING MIMICS THE EXISITNG SCENARIO WITH OVERLAND SURFACE FLOWS. DIRECTED AROUND EXISTING VIADUCT. THEREFORE THE NEW BUILDING DOES NOT INCREASE THE FLOODING RISK TO ADJACENT PROPERTIES OR THE HIGHWAY.

1500mm DIA COMBINED SEWER
300mm DIA COMBINED SEWER
DO MH 0601
CL: +35.880
IL: +32.150 (BASED ON PURE UTILITIES SOLUTIONS SURVEY DATE MARCH 22)
LOWER ROOF AND UNDERSIDE OF BRIDGE ABOVE GROUND DRAINAGE TO ABOVE GROUND DRAINAGE ENGINEERS DESIGN AND DETAIL
SL1.08
1200 DIA PCC
HYDROBRAKE FLOW CONTROL
DESIGN FLOW: 5.7 l/s
DESIGN HEAD: 1.6 m
CL: 35.900
IL: 33.295
C1.00
1200 DIA PCC
CL: 35.040
IL: 32.715
ATTENUATION TANK VENT
SL9.00
CL: 35.930
TOP OF TANK: 34.930
IL: 33.330
50m²x 1.6m DEEP ATTENUATION TANK
225mm @ 1:100
225mm DIA @1:12.7
225mm DIA @1:100
150mm DIA @1:100
150mm DIA @1:6.2
SL2.00
600 DIA PPIC
CL: 35.900
IL: 34.850
SL1.07
600 DIA PPIC
CL: 35.905
IL: 33.670
SL8.00
600 DIA PPIC
CL: 35.905
IL: 34.220
SL1.06
600 DIA PPIC
CL: 35.905
IL: 33.695
SL1.05
600 DIA PPIC
CL: 35.905
IL: 34.935
SL1.04
600 DIA PPIC
CL: 35.905
IL: 33.990
SL1.00
600 DIA PPIC
CL: 36.310
IL: 34.820
100mm DIA @1:100
SL1.01
600 DIA PPIC
CL: 36.600
IL: 34.720
150mm DIA @1:51.5
SL1.02
600 DIA PPIC
CL: 35.760
IL: 34.410
150mm DIA @1:25.7
SL1.03
600 DIA PPIC
CL: 35.630
IL: 34.165
SL3.02
1200 DIA HYDRO DOWNSTREAM DEFENDER
CL: 35.635
IL: 34.250
SL3.01
600 DIA PPIC
CL: 35.680
IL: 34.265
SL1.00
600 DIA PPIC
CL: 35.680
IL: 34.310
SL6.00
600 DIA PPIC
CL: 35.905
IL: 34.165
2440mm DIA COMBINED SEWER
EXTENTS OF PHASE 1
CLE STORE
20 Spaces
stackers & 90 lockers
Bar
192 m²
WC
21 m²
Bar Store
7 m²
Parcel Store
34 m²
Post
23 m²
Entrance
160 m²
Bar Store
23 m²
Luggage Store
21 m²
Fire Escape
Sub-Station
26 m²
LV Switch
39 m²
Residential Refuse Store 3
68m²
Plant
18 m²
Comms
11 m²
BOH Office
13 m²
Residential Refuse Store 1
50 m²
Residential Refuse Store 2
81 m²
Hotel & Resturant Refuse
10 m²
Hotel & Resturant Refuse
11 m²
Commercial Sprinkler Tank
Tanks
162 m²
Commercial Sprinkler Pumps
RWP
RWP FA
EXG DP
35.820
35.930
35.940
36.080
35.590
36.444
36.385
36.594
36.550
36.600
36.655
36.590
36.010
35.625
35.480
35.380
35.855

P01	ISSUED FOR PLANNING	08.11.24	HW	KG
Rev:	Description:	Date:	By:	Chkd:

renaissance

Renaissance Associates Ltd
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:
VIADUX PHASE 2, MANCHESTER

Drawing Title:
BLOCK C, D & E OVERLAND FLOW ROUTE PLAN

Status:
RIBA STAGE 2

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	NOV 24	HW	--	KG

Scale: 1:125 | Project No: 2209-01

Project: Originator: Volume: Level: Type: Role: Category/Number: Rev:

V2B-REN-CC-00-DR-C-00070-P01

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APPENDIX N

SUDS PROFORMA

NORTH WEST SuDS PRO-FORMA TEMPLATE

Document Change Log		
Version	**Date Agreed**	**Changes made**
Version 1	April 2020	Initial version issued
Version 2	July 2020	• Page 1 – 'Guidance to support you' section – word 'approved' changed to 'appropriate' • Section 5 – Box 4 'Evidence Required' - word 'approved' changed to 'appropriate' • Section 5 – Box 9 'Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site' - word 'approved' changed to 'appropriate'
Version 3	August 2020	• Front sheet and Document Change Log added • Page 1 – Para 1 Footnote – words 'of 0.5 hectares' removed
Version 4	July 2021	• Front page amended and branding removed. • Section 1 - Previously Developed/ Brownfield Site – words *'then one of the approaches outlined in Section 24.5 of The SuDS Manual (C753) should be adopted'* removed. • Section 7b – Hierarchy Level 2 – Note wording amended from '*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*' to '*Where discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary for the applicant to provide evidence to the local planning authority to support their proposed approach'*
Version 5	May 2022	• Pro-forma guidance updated to take account of the new climate change allowances published on 10 May 2022. There is no change to the pro-forma itself.

Website: [The Flood Hub]

This website is an online resource which has been funded by the North West Regional Flood and Coastal Committee as a one stop shop for flood advice and information across the North West.

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[PLEASE ADD LOCAL AUTHORITY LOGO TO THIS PAGE]

[*LOCAL AUTHORITY*] SuDS PRO-FORMA

This Pro-forma is endorsed by the North West Regional Flood and Coastal Committee, including representatives from Lead Local Flood Authorities, Highway Authorities, United Utilities and the Environment Agency

[Amend as appropriate]

Version 5: May 2022

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development[1].

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 in Critical Drainage Areas.*

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference *(if available)*	Pre-application
State type of planning application *i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters* *Information only required if drainage is to be considered as part of reserved matters application*	Pre-application
Developer(s) Name:	Salboy Central LTD
Consultant(s) Name:	renaissance Associates LTD
Development Address *(including postcode)*	Land off Albion Street M1 5LH
Development Grid Reference *(Eastings/Northings)*	Easting: 383550 Northing: 397630
Total Development Site Area (Ha)	0.409 Ha for Block C&D (Phase 2A) only
Drained Area (Ha)* of Development	0.399 Ha for Block C&D (Phase 2A) only
Please indicate the flood zone that your development is in. Tick all that apply. *Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).*	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. *Based on the Environment Agency Surface Water Flood Map.*	High ☐ Medium ☐ Low ☒
Have you submitted a Site Specific Flood Risk Assessment (FRA)? *See separate guidance notes for clarification on when a FRA is required*	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 *(years)* *Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026*	100 Years

Development Type:		**State Proposed Number of Units**
Greenfield Site • *Site is wholly undeveloped, and a new drainage system will be installed*	☐	
Previously Developed/ Brownfield Site • *Site is already developed, and the entirety 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.*	☒	452 Apartments 3 Penthouses 160 Hotel Rooms
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.	V2B-REN-XX-XX-RP-C-00001 V2B-REN-CC-XX-RP-C-00002 V2B-REN-CC-00-DR-C-01100 V2B-REN-CC-01-DR-C-01110	

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0.329 Ha	0.329 Ha	0.0 Ha
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: • 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 *Outline planning applications should be able to demonstrate that a suitable drainage system is achievable.* *All other type of planning application 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 quality *(refer to Section 3.3 SuDS Manual)* **Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5)** • *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) • *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: • 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.	V2B-REN-CC-XX-RP-C-00002 P03

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) *Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application*
Qbar *(Approach 2)*		5.7	5.7
1 in 1 Year Event *(Approach 1)*	16.7	5.0	
1 in 30 Year Event	37.1	8.3	
1 in 100 Year Event* *(Approach 1)*	48.3	9.0	
** 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.*			

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)*	IH24 - Microdrainage

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.	V2B-REN-XX-XX-RP-C-00001 P03 V2B-REN-CC-XX-RP-C-00002 P03

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)*	165	132	205
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.	V2B-REN-XX-XX-RP-C-00001 P01 V2B-REN-CC-XX-RP-C-00002 P01

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	1 in 30 Year+40% 1 in 100 Year+45%
State housing density (houses per ha)	NA
State urban creep allowance used (%)	0% - Not suitable due to type of development
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒

State storage volume required (m^3) *(excluding non-void spaces)* *Must include an allowance for climate change and urban creep*	Blue Roof: 201.6m^3 Geocellular Tank: 114.0m^3 Total: 315.6m^3 TBC following RIBA Stage 4 Design
Have you incorporated interception into your design? *(Refer to Chapter 24 of The SuDS Manual C753)* *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.*	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. *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.*	Blue roof, geo-cellular tank
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. *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*	Blue roof, geo-cellular tank,and drainage network
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.	V2B-REN-XX-XX-RP-C-00001 P01 V2B-REN-CC-XX-RP-C-00002 P01

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☒
• *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	☐	• Residential roofs
LOW	☐	• 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	☒	• 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/motorways[2]
HIGH	☐	• 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 motorways[1]

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☐
• *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☐
• *If the proposed development has a high polluting potential, a detailed risk assessment will 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 may 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:	

[2] Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.	TWS-REN-XX-XX-RP-C-00001 P01

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.	Adoption of Blue roof and Permeable Paving

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	V2B-REN-XX-XX-RP-C-00001 P01 V2B-REN-CC-XX-RP-C-00002 P01

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 *An editable version of this form is available on SusDrain website.*	☐	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: • 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	☐	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.

	further site specific ground investigation e.g. to consider seasonal variations to groundwater.		**Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).*

Proposed method of surface water discharge		**Is this proposed?**	
Hierarchy Level 2: To a surface water body *(select type)* ***NOTE:*** *Consent from LLFA or Permit from Environment Agency may be required – refer to guidance*		Yes ☐ No ☒ N/A ☐ ☐ Main river ☐ Canal ☐ Ordinary watercourse ☐ Other water body	
If YES - Evidence Required		**If NO – Evidence Required** **Tick ALL 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 discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary for the applicant to provide evidence to the local planning authority to support their proposed approach.*

Proposed method of surface water discharge		**Is this proposed?**	
Hierarchy Level 3: To a surface water sewer or highway drain *(select type)*		Yes ☐ No ☒ N/A ☐ ☐ Surface water sewer ☐ Highway drain	
If YES - Evidence Required		**If NO – Evidence Required** **Tick ALL that apply**	
☐	Written correspondence from Water and Sewerage Company/ Highway Authority regarding proposed connection.	☐ ☒	Plan showing nearby sewers and highway drains **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.	V2B-REN-XX-XX-RP-C-00001 P01 V2B-REN-CC-XX-RP-C-00002 P01

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.	V2B-REN-XX-XX-RP-C-00001 P01 V2B-REN-CC-XX-RP-C-00002 P01

SECTION 8: OPERATION AND MAINTENANCE – TECHNICAL STANDARD S12 AND NATIONAL PLANNING POLICY FRAMEWORK

The applicant is responsible to ensure that ALL components selected in Section 7 can be maintained for the design life of the development. This information is required so the Local Planning Authority can ensure the maintenance and management of the sustainable drainage system. The Local Planning Authority will discuss how this will be secured (e.g. via planning condition or planning obligation).

	Information Provided?
Management Plan	Yes ☒ No ☐
Evidence Required: **Plan/ drawing provided to show the position of the different SuDS components with:** • Key included to identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption *(relates to maintenance and management arrangements below).* • Plan/ drawing to identify any areas where certain activities are prohibited, detailing reasons why. **Action plan for accidental pollutant spillages.**	☐ ☐

	Information Provided?
Maintenance Schedule	Yes ☒ No ☒
Evidence Required: A copy of the maintenance schedule including: 1. **Proactive and preventative maintenance** Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. 2. **Reactive and corrective maintenance** (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures.	☐

	Information Provided?
Maintenance and Management Arrangements	Yes ☐ No ☒
Evidence Required: Evidence of formal agreement with the party responsible for undertaking maintenance. Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply. ☐ **Water and Sewerage Company** *Section 104 agreement (Water Industry Act 1991)* ☐ **Highway Authority** *Section 278/38 agreement (Highways Act 1980)* ☐ **Local Authority Public Open Space** *[Refer to Local Authority Policy]* Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply. ☐ **Management Company** ☐ **Property Owner** *(for SuDS components within property boundary only)* ☐ **Other** (please state)	☐

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.	

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.

Submitter Details			
Completed by	Henry Wilkinson	**Email Address**	henrywilkinson@renaissance-ltd.com
		Telephone Number(s)	01615521961
Signed off by	Kevin Gilsenan	**Accreditation(s) and/or Qualification(s) of Signatory**	FIStructE, CEng, BEng, MSc, DIC
Date *(dd/mm/yyyy)*	04.11.24	**Company**	renaissance Associates LTD

Client Details			
Name		**Company**	Salboy Central LTD