

TN02 – Drainage Strategy

Project No.	Project Title:	Date Issued	Rev
SDS1456	186 Creighton Avenue	28/10/2022	00

1. Introduction

- 1.1. SD Structures have been commissioned by XUL Architects to undertake a drainage strategy to be submitted along with the additional documents to request planning approval for a residential development located at 186 Creighton Avenue, London, N2 9BJ.
- 1.2. The report has been completed in accordance with guidance presented within the National Planning Policy Framework and its associated Planning Practice Guidance.

2. Existing Site & Proposed Site

- 2.1. The site is located adjacent to 186 Creighton Avenue, London, N2 9BJ (Coordinate reference: 527566, 190076) with a total site area of 0.0935ha.
- 2.2. The site is currently consisting of a single residential dwelling with an outbuilding to the rear of the property.
- 2.3. Based on the British Geological Survey mappings, the underlying geology is made up of London Clay Formation with an overlaying superficial deposit made up of Dollis Hill Gravel Member.
- 2.4. The proposed development comprises of the demolition of the existing dwellings and the erecting of a single residential dwelling with a rear terrace and landscaping. The proposed development will change the impermeable area from 0.04ha to 0.039ha.
- 2.5. The existing drainage on site has been surveyed. From the surface it is evident that surface water runoff and foul water are spilt. From this survey it is assumed that there is a public surface water sewer and a public foul water sewer running along Creighton Avenue. An extract of the survey has been attached to this document within the appendices.
- 2.6. Greenfield and Pre-development discharge rates have been calculated using synthetic rainfall data derived from the Flood Study Report (FSR).
- 2.7. Greenfield runoff rates have been calculated using the IH124 methodology, whereas Pre-development rates have been calculated using the Modified Ration Method. These rates are outlined in Table 1 below.

Return Period	Greenfield Runoff Rates	Pre-Development Discharge Rates
1:1yr	3.96l/s/ha	8.0l/s
QBAR	4.6l/s/ha	NA
1:30yr	10.72l/s/ha	19.5l/s
1:100yr	14.86l/s/ha	25.3l/s

Table 1 - Existing discharge rates

3. Drainage Hierarchy

- 3.1. **Infiltration:** the underlying geology has been assessed using the mapping provided by the British geological Survey. From the mapping it is evident that the underlying geology is made up of London Clay formation with a superficial deposit made up of Dollis Hill Gravel Member. London Clay is commonly associated with very low infiltration whereas Dollis Hill Gravel Member can have low to medium infiltration rates. These medium to low infiltration rates can be used to install Type B SuDS (e.g., permeable surfacing lined with a permeable geotextile), but it has been assumed that the infiltration rates will not be able to discharge all surface water runoff from the development.
- 3.2. **Connection into Watercourse:** There is no watercourse or drainage ditch located in close proximity to the development. Due to this discharging surface water runoff via a connection into a watercourse or drainage ditch has been discounted.
- 3.3. **Connection into Public Sewer:** From the CCTV survey undertaken by the applicant, it is evident that the existing private drainage within the property is split into foul and surface water. It is therefore assumed that the public sewers Along Creighton Avenue are also split into foul and surface water sewers. It is assumed that the public surface water sewer running along Creighton Avenue is location at a deeper depth, due to this a new connection into the public surface water sewer will be required to discharge all surface water runoff.

4. Proposed Strategy

- 4.1. The London Borough of Haringey's Development Management report states under policy DM25 that all minor development proposals should aim to achieve a greenfield run-off rate and, at a minimum, achieve a 50 per cent reduction on existing run-off rates.
- 4.2. To provide this reduction, the proposed front drive will be made from a permeable surfacing system with a minimum of 300mm sub-base. The permeable surfacing system should be lined with a permeable geotextile. Additionally, a geocellular storage tank system will be located within the rear of the property to provide additional storage for extreme rainfall events.
- 4.3. Both SuDS systems will utilise an orifice plate to restrict the overall discharge rate into the public surface water sewer by a minimum of 50%
- 4.4. The required storage for the proposed SuDS can be seen in Table 2 below.

Design Parameters	SuDS Design (1:100yr+40%cc)	
	Geocellular Storage Crate System	Permeable Surfacing
Contribution Catchment area	390m ² +10% additional areas for urban creep	
SuDS Storage Volume	5.09m ³	7.29m ³
Flow control device	Orifice Plate at invert level	

Table 2 - SuDS design

- 4.5. The proposed drainage system has been modelled using the industry standard Causeway Flow+ software. The undertaken hydraulic calculations use synthetic rainfall data derived using the Flood Estimation Report (FSR). A 40% allowance in rainfall event has been made to allow for any future climatic changes.

- 4.6. In Table 3 the proposed and existing discharge rates have been provided, additionally within this table the percentage reduction when compared to the existing situation is provided.

Return Period +40%cc	Existing Runoff Rates	Proposed Runoff Rates +cc	Percentage Reduction
1:1yr	8.0l/s	3.7l/s	53%
1:30yr	19.5l/s	5.8l/s	70%
1:100yr	25.3	6.6l/s	74%

Table 3 – Proposed discharge rates

- 4.7. Based on the above table and the included results of the hydraulic model it is evident that the proposed drainage system is able to accommodate up to and including the design event.
- 4.8. Additionally, from Table 3 it is evident that the proposed development will provide a minimum of 50% reduction in runoff rates when compared to the existing situation. This is considered to in accordance with local planning policies.

5. **Management and Maintenance**

- 5.1. The proposed drainage system will be located in public space and therefore the management and maintenance task for the proposed systems will require the appointment of a management company during the lifetime of the systems.
- 5.2. Due to the nature of this development being a private residential development it is the owner's responsibility to ensure the adequate management and maintenance of the proposed SuDS features over their lifetime.
- 5.3. Typical management requirements have been outlined in Table 4 below. The owner should also refer to any manufacture's specific management and maintenance requirements.

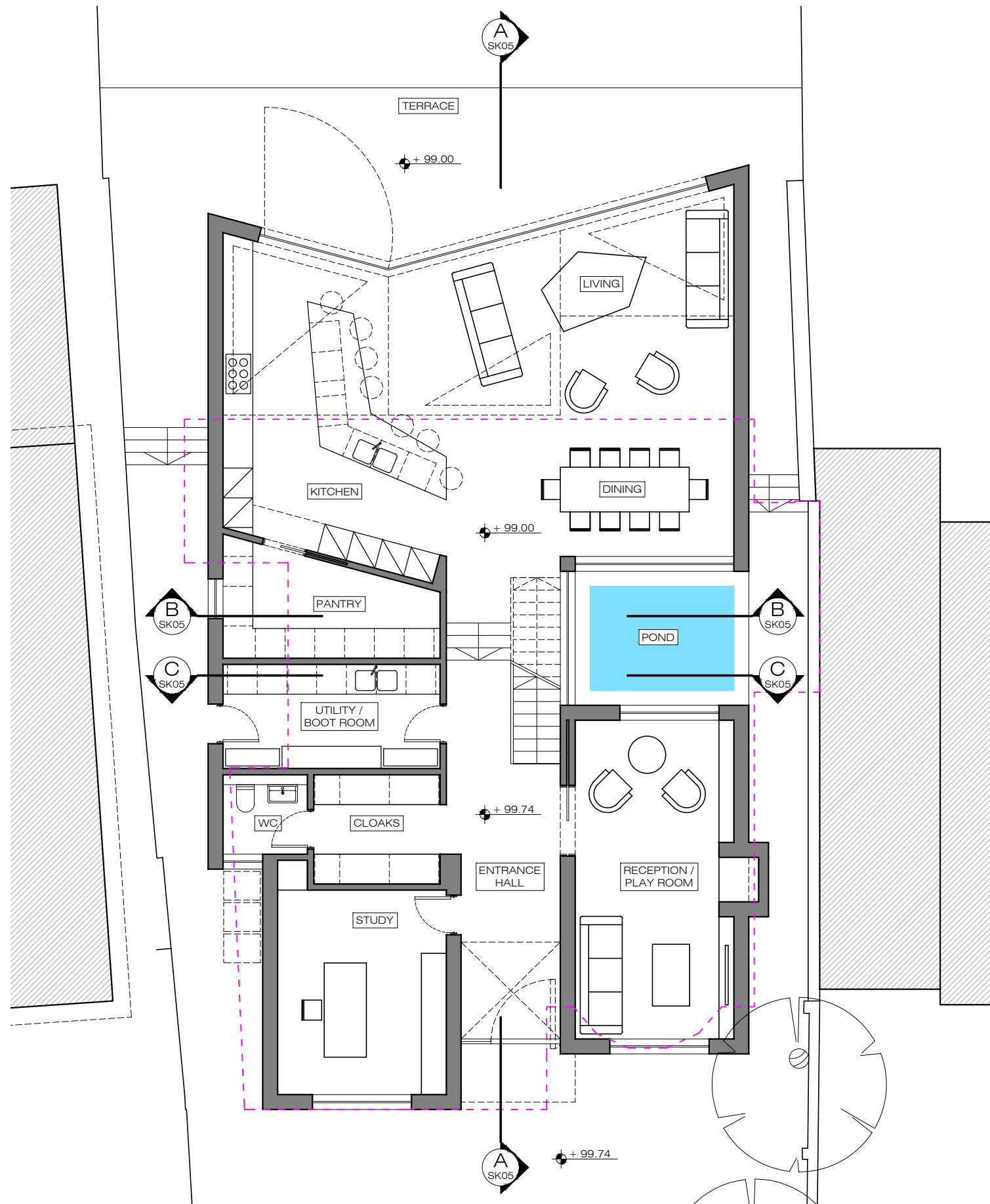
Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
General Pipework and manholes	Private ownership or management company	Inspect pipework and manholes and clear any blockages; Repair to any defects over long term usage	Annually or after severe storm events
Attenuation / Geocellular storage	Private ownership or management company	Inspect and clear inlets, outlets and any overflows as well as inspect catchpits up and downstream of storage	6 Monthly
		Litter and debris removal	Monthly
		Amenity grass cutting of surrounding green spaces	As required
Flow Control Device (Vortex or Orifice)	Private ownership or management company	Inspections of operational equipment, identifying any elements that are not operating correctly	Monthly for 3 months after installation, and then annually
		Remove sediment, debris, and any oils etc. from the control device	6 monthly, or as required
		General inspection to check all inlets / outlets / overflows to ensure adequate operation	Annually
Catch pit manholes / structures	Private ownership or management company	Inspection of manhole / structure and removal of any build of silt / debris within	Annually or after severe storm events
Permeable Paving	Private ownership or management company within estate non-adopted zones	Brushing and vacuuming	Annually or if clogging is noticed at a more frequent rate
		Removal of weeds / mow adjacent grassed areas	As required / annually
		Remedial work, replacing broken blocks where necessary	As required
		Inspect for poor operation / inability to drain surface water	Three monthly, or 48hrs after large storms within first 6 months
		Monitor inspection chambers	Annually

Table 4 – Maintenance Schedule

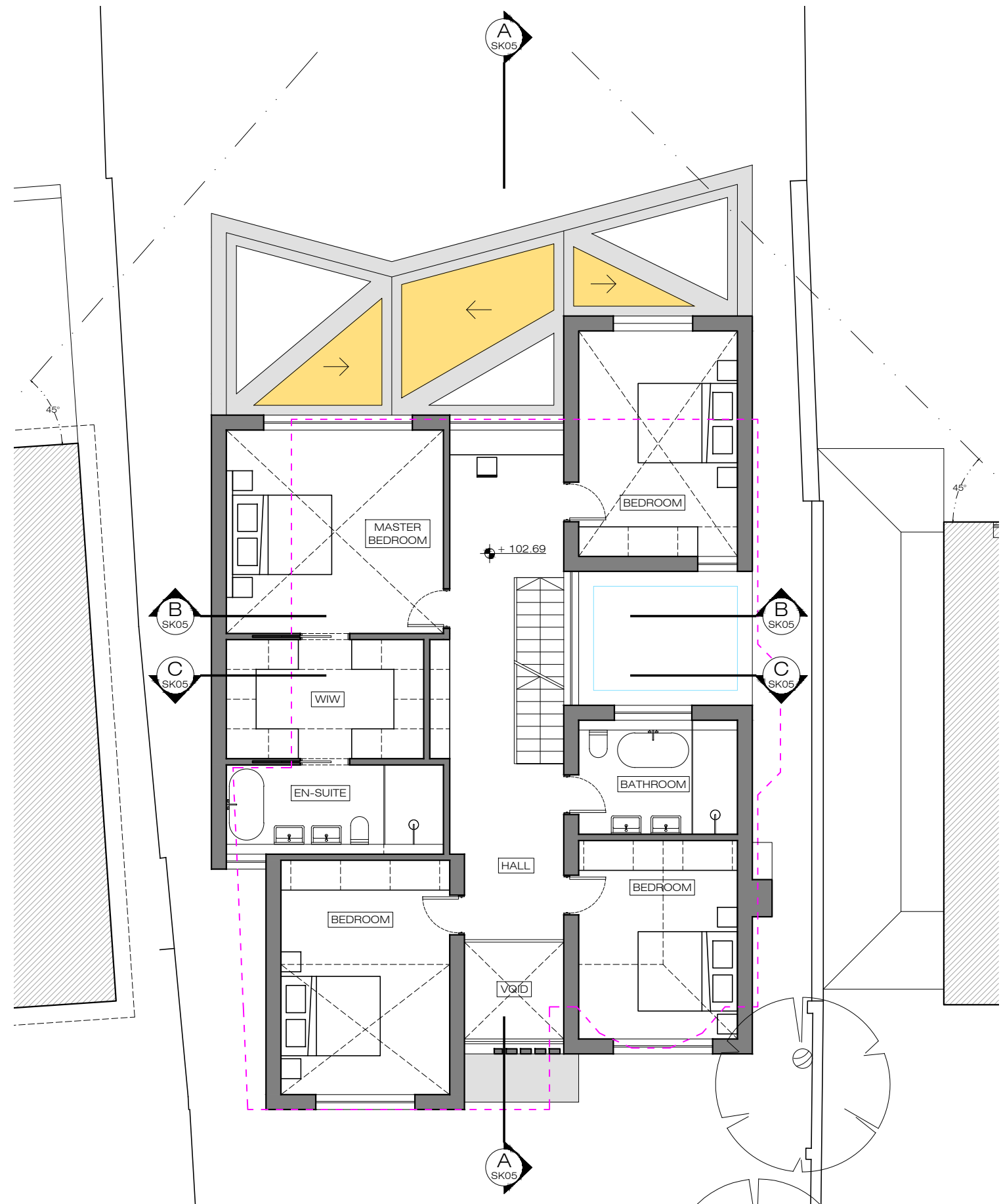
6. Summary

- 6.1. This report has been undertaken to be accompanied for the planning application for the development located at 186 Creighton Avenue, London, N2 9BJ.
- 6.2. The report outlines that the most viable method of discharging surface water runoff is via a new connection into the assumed public surface water sewer running along Creighton Avenue.
- 6.3. To provide a minimum of 50% reduction in discharge rates when compared to the existing situation a combination of underground storage, permeable surfacing and an orifice plate have been proposed to ensure the proposed development will comply with the LPA's policies.
- 6.4. Typical management and maintenance requirement have been included within this report. Before commission the development the owner should be provide a manual outline the management and maintenance requirements for each proposed SuDS system.

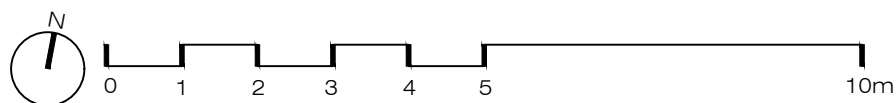
APPENDIX A – ARCHITECTURAL LAYOUT



X PROPOSED
Ground Floor Plan 1:100@A3



X PROPOSED
First Floor Plan 1:100@A3



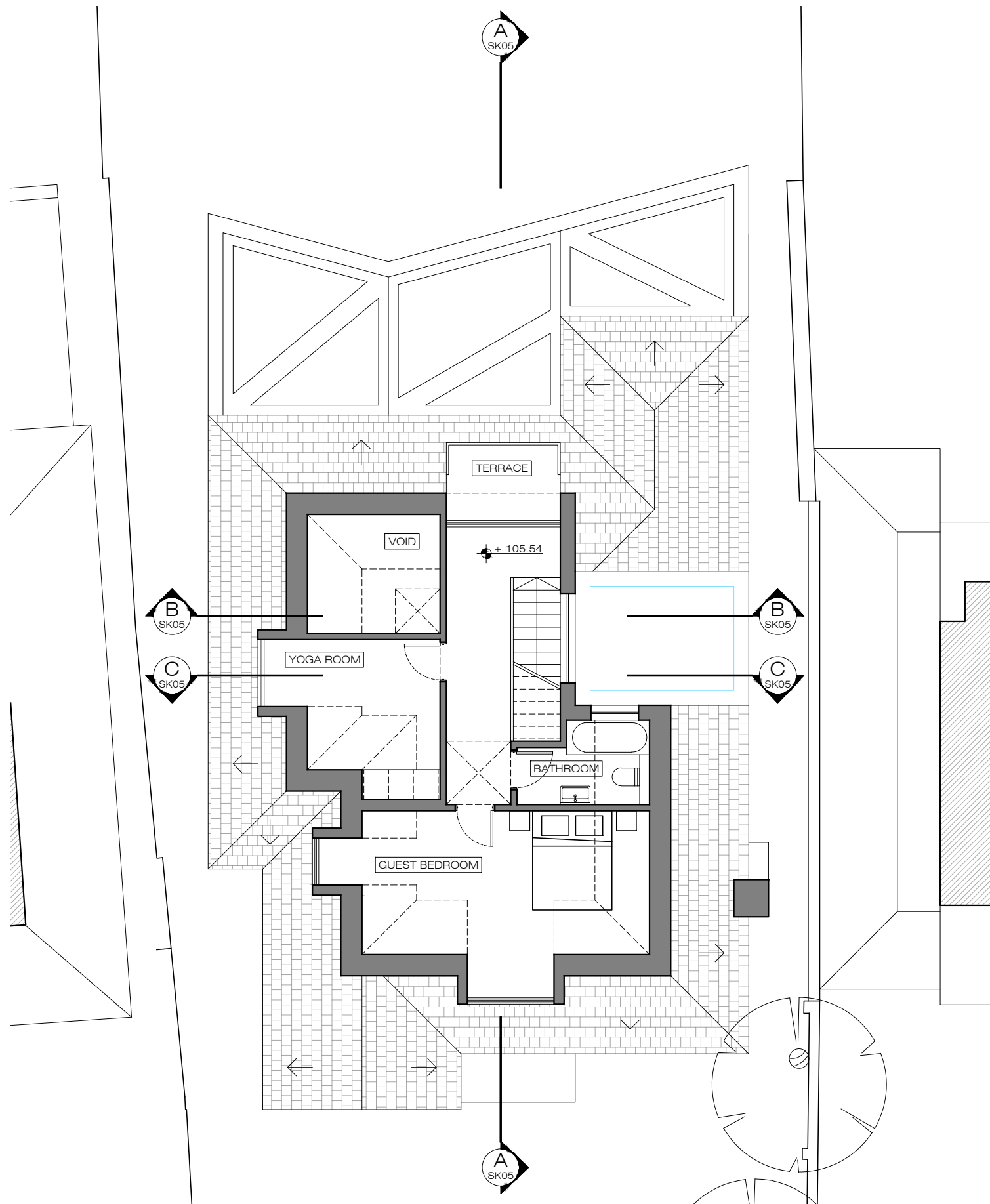
Project Number 21175

| drawn by FM | date 05.07.22

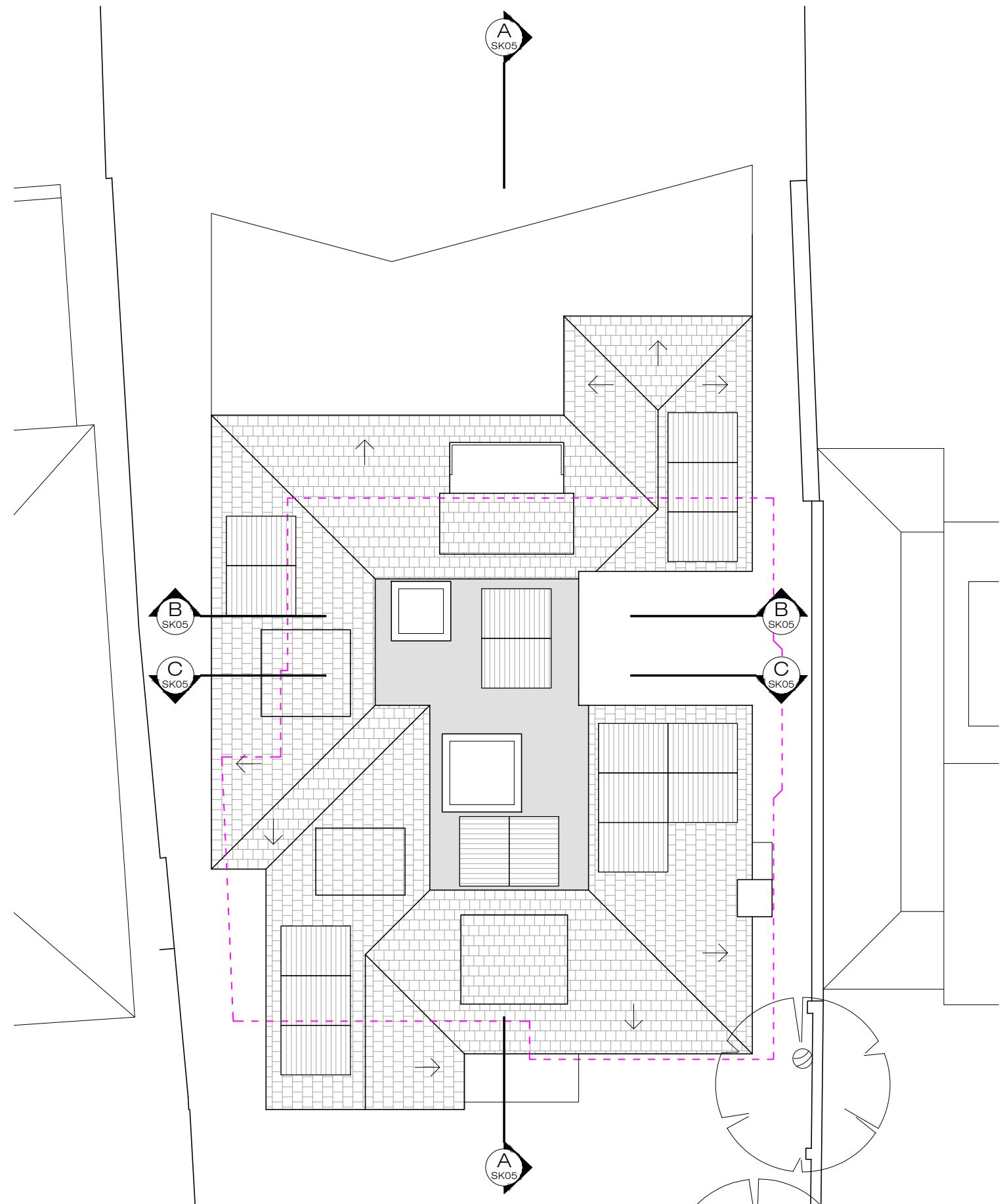
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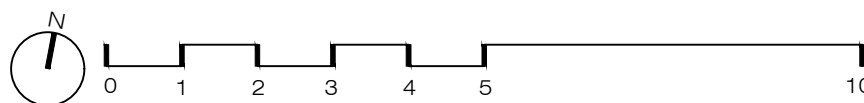
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X PROPOSED
Second Floor Plan 1:100@A3



X PROPOSED
Roof Plan 1:100@A3



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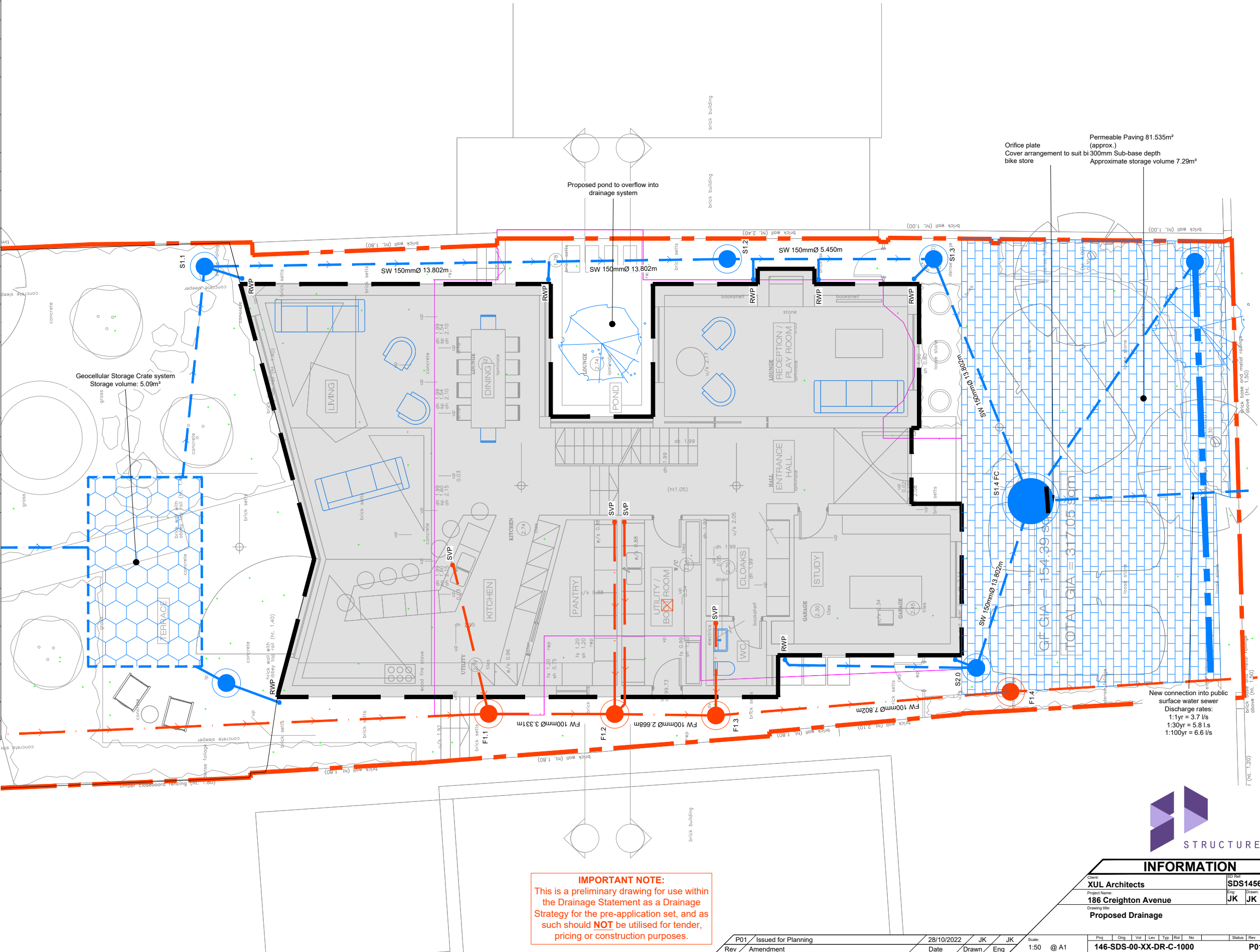
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APPENDIX B – PROPOSED DRAINAGE LAYOUT

Below Ground Drainage Key	
General Notation	
100mmØ ID (pipe diameter) at 1/80 (approximate gradient)	Pipework other than that covered by the general drainage notes will be identified as adjacent BD - Backdrop connection UIL - Upper Invert Level
Existing Drainage	
	Existing Drainage - Combined Water
	Existing Drainage - Foul Water
	Existing Drainage - Surface Water
	Existing Drainage - to be abandoned
	Existing Drainage - Manholes Sizes as shown on plan / schedules Information as per services survey
	Existing Drainage - Pump and Rising Main Sizes shown indicatively Information as per services survey
Combined Water	
	Proposed Drainage - Combined Water drain
	Proposed Drainage - Combined Water Manholes Sizes are per plan and schedules PPIC - Polypropylene Inspection Chamber PCC - Pre-Cast Concrete
Foul Water	
	Proposed Drainage - Foul Water drain
	Proposed Drainage - Foul Water Manholes Sizes are per plan and schedules PPIC - Polypropylene Inspection Chamber PCC - Pre-Cast Concrete
	Proposed Drainage - Foul Water Pumping Chamber and Rising Main Sizes shown indicatively Refer to pump manufacturers' specification
	Foul Connection: SVP - Soil Vent Pipe SS - Stub Stack AAV - Air Admittance Valve FA - From Above (refer to Architectural / M&E plans) FS - Floor Socket (for internal gullies / shower drains)
	FG - Foul Gully (trapped and roddable)
Surface Water	
	Proposed Drainage - Surface Water drain
	Proposed Drainage - Surface Water land drain Perforated pipe laid within sub-base material
	Proposed Drainage - Surface Water channel drain (ACO or similar approved)
	Proposed Drainage - Foul Water Manholes Sizes are per plan and schedules PPIC - Polypropylene Inspection Chamber PCC - Pre-Cast Concrete FC - Flow Control chamber (Hydro-Brake™ by Hydro International or similar approved) CP - Catch Pit chamber
	Proposed Drainage - Surface Water Pumping Chamber and Rising Main Sizes shown indicatively Refer to pump manufacturers' specification
	Proposed Drainage - Cellular storage structure or soakaway Sizes as per plan and schedules Refer to crate manufacturers' specification
	Proposed Drainage - Permeable surfacing Permeable paving / permeable asphalt Refer to Landscape Architect's / Construction build-ups drawings for more information
	RWP - Rain Water Pipe
	YG - Yard Gully (trapped and roddable) RG - Road Gully

- General Notes:
- Do not scale from this drawing manually or electronically. Written permission must be obtained from SD Structures prior to scaling.
 - Contact SD Structures in the event of any discrepancies between findings on site and these drawings.
 - This drawing is also to be read in conjunction with all relevant Architect's, Engineer's and Specialist's drawings and specifications.
 - 3D views are indicative only and any conflicting 2D information should take precedence. If in doubt contact SD Structures prior to starting work.
 - All work is to be carried out in accordance with the relevant British Standards, European norms, codes of practice and building practice.
 - The Contractor shall obtain licences from the Highway Authority prior to carrying out any workings within the existing Public Highway.



APPENDIX C – HYDRAULIC CALCULATIONS



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.000
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
MRM	0.040	4.00	10.000	1900	0.000	0.000	1.000
MRM_Outlet			9.900	1900	10.000	0.000	1.900

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1	MRM	MRM_Outlet	10.000	0.600	9.000	8.000	1.000	10.0	1000	4.02	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1	10.602	8327.0	7.2	0.000	0.900	0.040	0.0	22	1.709

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1	10.000	10.0	1000	Circular	10.000	9.000	0.000	9.900	8.000	0.900

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1	MRM	1900	Manhole	Adoptable	MRM_Outlet	1900	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MRM	0.000	0.000	10.000	1.000	1900				
						0	1	9.000	1000
MRM_Outlet	10.000	0.000	9.900	1.900	1900		1	8.000	1000



Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0



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Page 3
SDS1456
Creighton Avenue
Pre-Development Rates

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	MRM	10	9.025	0.025	8.0	0.0894	0.0000	OK
15 minute summer	MRM_Outlet	10	8.024	0.024	8.0	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	MRM	1	MRM_Outlet	8.0	1.732	0.001	0.0462	3.1



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Page 4
SDS1456
Creighton Avenue
Pre-Development Rates

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MRM	10	9.037	0.037	19.5	0.1347	0.0000	OK
15 minute summer	MRM_Outlet	10	8.035	0.035	19.5	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	MRM	1	MRM_Outlet	19.5	2.256	0.002	0.0864	7.6



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Page 5
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Pre-Development Rates

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MRM	10	9.042	0.042	25.3	0.1524	0.0000	OK
15 minute summer	MRM_Outlet	10	8.040	0.040	25.3	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	MRM	1	MRM_Outlet	25.3	2.422	0.003	0.1045	9.8



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Page 1
SDS1456
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Initial Design

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.850
Ratio-R	0.400	Preferred Cover Depth (m)	0.700
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Catchment	0.039	4.00	98.900	1200	0.000	0.000	0.925
Tank			98.800		10.000	0.000	0.994
Outlet			98.700	1200	20.000	0.000	1.063

Links

Name	US Node	DS Node	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)
1.000	Catchment	Tank	0.600	97.975	97.806	0.169	59.2	225	4.10
1.001	Tank	Outlet	0.600	97.806	97.637	0.169	59.2	225	4.20

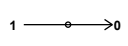
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.703	67.7	9.9	0.700	0.769	0.039	0.0	58	1.220
1.001	1.703	67.7	9.9	0.769	0.838	0.039	0.0	58	1.220

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	10.000	59.2	225	Circular	98.900	97.975	0.700	98.800	97.806	0.769
1.001	10.000	59.2	225	Circular	98.800	97.806	0.769	98.700	97.637	0.838

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Catchment	1200	Manhole	Adoptable	Tank		Junction	
1.001	Tank		Junction		Outlet	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Catchment	0.000	0.000	98.900	0.925	1200				
						0	1.000	97.975	225
Tank	10.000	0.000	98.800	0.994			1	1.000	97.806
						0	1.001	97.806	225



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Outlet	20.000	0.000	98.700	1.063	1200	1	1.001	97.637	225
									

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
1	40	10	0
30	0	0	0
30	40	10	0
100	0	0	0
100	40	10	0

Node Tank Online Orifice Control

Flap Valve	x	Invert Level (m)	97.806	Diameter (m)	0.065
Downstream Link	1.001	Design Depth (m)	0.300	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	4.0		

Node Tank Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	97.806	Depth (m)	0.350
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	54	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	15.000	Number Required	1
Porosity	0.97	Pit Length (m)	1.000		

Node Tank Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	98.150	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	18	Depth (m)	0.300
Safety Factor	2.0	Width (m)	8.100	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Catchment	10	98.026	0.051	7.8	0.1013	0.0000	OK
30 minute summer	Tank	21	97.938	0.132	6.6	1.9252	0.0000	OK
30 minute summer	Outlet	21	97.668	0.031	2.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Catchment	1.000	Tank	7.8	0.115	0.1300	
30 minute summer	Tank	1.001	Outlet	2.8	0.041	0.0333	3.9



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Page 4
SDS1456
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Results for 1 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	Catchment	9	98.039	0.064	11.9	0.1319	0.0000	OK
30 minute summer	Tank	21	98.016	0.210	10.3	3.0530	0.0000	OK
30 minute summer	Outlet	22	97.672	0.035	3.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	Catchment	1.000	Tank	11.9	0.176	0.2065	
30 minute summer	Tank	1.001	Outlet	3.7	0.054	0.0405	6.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Catchment	22	98.141	0.166	16.5	0.3276	0.0000	OK
30 minute summer	Tank	22	98.142	0.336	16.4	4.8850	0.0000	SURCHARGED
30 minute summer	Outlet	22	97.677	0.040	4.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Catchment	1.000	Tank	16.4	0.242	0.3558	
30 minute summer	Tank	1.001	Outlet	4.8	0.071	0.0489	9.6

Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Catchment	23	98.283	0.308	25.4	0.6340	0.0000	SURCHARGED
30 minute summer	Tank	23	98.282	0.476	22.4	8.1839	0.0000	SURCHARGED
30 minute summer	Outlet	23	97.681	0.044	5.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Catchment	1.000	Tank	22.4	0.331	0.3977	
30 minute summer	Tank	1.001	Outlet	5.8	0.085	0.0560	14.8

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Catchment	23	98.222	0.247	21.6	0.4880	0.0000	SURCHARGED
30 minute summer	Tank	23	98.221	0.415	20.0	6.7160	0.0000	SURCHARGED
30 minute summer	Outlet	23	97.680	0.043	5.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Catchment	1.000	Tank	20.0	0.295	0.3977	
30 minute summer	Tank	1.001	Outlet	5.4	0.079	0.0531	12.6



Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	Catchment	41	98.415	0.440	23.9	0.9053	0.0000	SURCHARGED
60 minute summer	Tank	41	98.413	0.607	22.4	11.3719	0.0000	SURCHARGED
60 minute summer	Outlet	41	97.684	0.047	6.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	Catchment	1.000	Tank	22.4	0.331	0.3977	
60 minute summer	Tank	1.001	Outlet	6.6	0.097	0.0614	24.2