

Technical design note

Project name	Dunsbury Park - Plot 5		
Design note title	Reserved Matters - drainage condition response		
Document reference	19453-HYD-XX-XX-RP-C-0003		
Author	Alastair Todd		
Revision	P01		
Date	2 August 2023	Approved	☐

This technical note looks to discharge drainage conditions in relation to Reserved Matters application for Phase 1 Plot 5 of APP/17/O1324. This report sets out each condition as worded by Hampshire Lead Local Flood Authority and addressed accordingly.

1. Full details of the allowable discharge rates for the impermeable area proposed, in accordance with the PBA Surface Water Drainage and SuDS Strategy (the relevant parts of the report and appendices should be included in this application for reference).

PBA surface water strategy drawings set out proposed discharge rates per plot based on an impermeable area provided at the time of the report. This was based on an allowable discharge rate of 5 x 3.4L/s/ha x impermeable area.

Plot 5 as relates to this application covers the area overlain by Plots 4 & 6 as shown on PBA drawings - **Appendix A** - which have proposed discharge rates of 8.11 L/s and 10.61 L/s respectively, total 18.72 L/s. Final flow controls for the new drainage design are restricted to 7.31 L/s and 11.4 L/s, total 18.71 L/s - **Appendix B** - which matches previously agreed rates as set out in PBA drainage strategy.

While PBA have set an allowable discharge rate of 5 x 3.4L/s/ha x impermeable area for the site, Plot 5 layout presents a larger impermeable area than calculated in the original report. Applying this calculation to current plots would result in discharge rates shown in Table 1 below.

Table 1

Plot	Impermeable area (ha)	Discharge rate (L/s)
500	0.34	5.78
501	0.51	8.67
502	0.635	10.80
Road	0.27	4.59
		Total = 29.84

Because this discharge rate is not considered suitable given limitations of downstream attenuation, the original flow rate of 18.72 L/s has been used as the total discharge rate for Plot 5. The discharge rate for each unit and access road has then been calculated as a proportion of the agreed rate based off their

percentage of the total new impermeable plot area. This strategy expected to retain maintenance responsibility for each unit within its curtilage while not compromising existing downstream attenuation features.

2. Confirmation that flooding modelled during the 1 in 100 year storm event does not occur for the 1 in 30 year event.

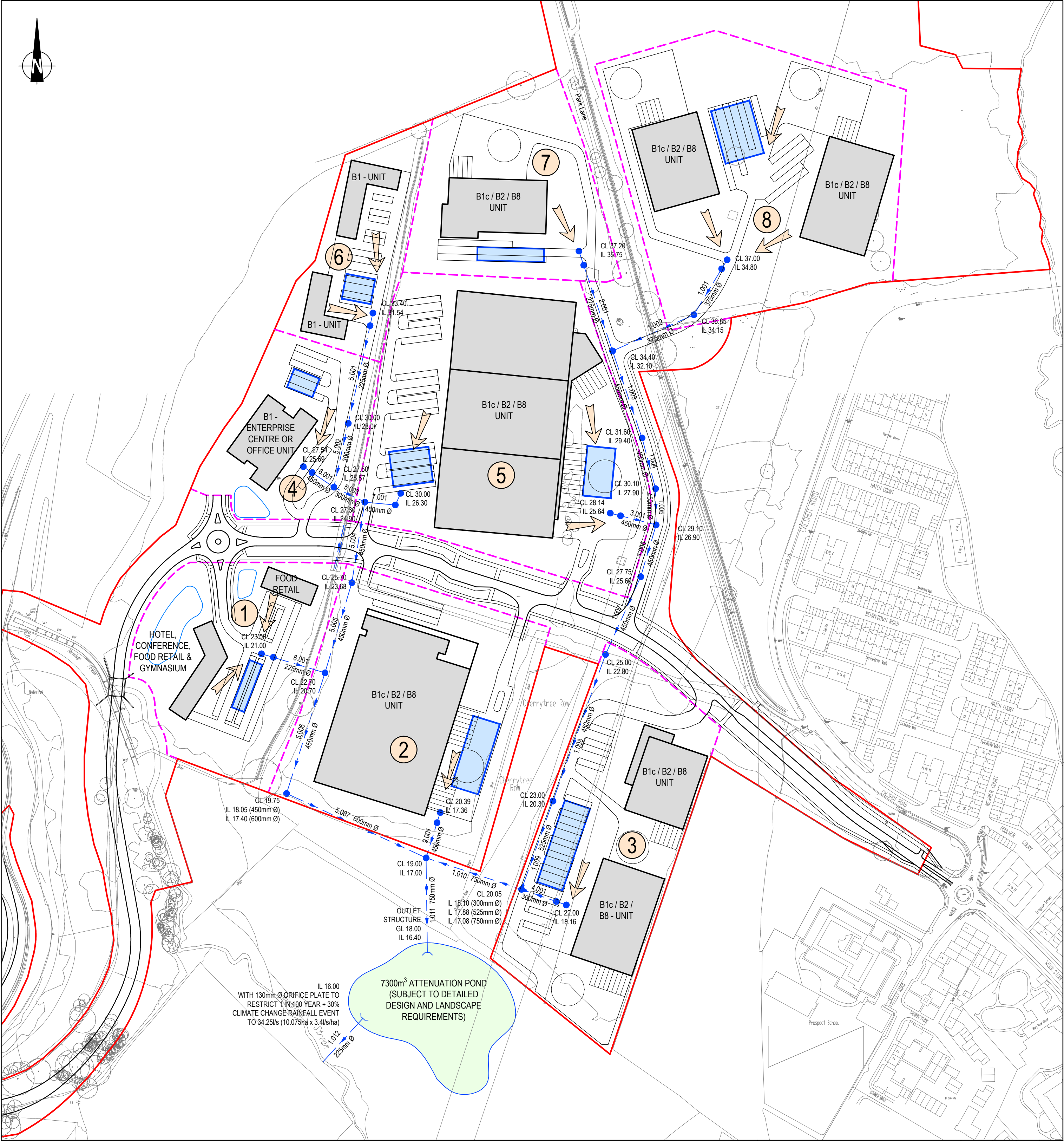
A new set of modelling has been undertaken to align with contractor requirements, primarily the inclusion of siphonic drainage for the unit roofs. These calculations and pipe layout are included in **Appendix C** and show that no flooding occurs on site in the 1 in 30 year storm event. Any flooding occurring in the 1 in 100 plus climate change event is designed to be retained within car parking areas and diverted away from critical infrastructure.

It should be noted that impermeable areas shown on calculations do not match those shown in Table 1 due to the exclusion of roof areas served by siphonic drainage. Siphonic drainage modelling requires for a discharge rate to be inputted rather than an area attributed to a certain pipe within the network.

3. Clarification over discrepancies between the calculations and drainage layout, especially with regards to the flow control discharge rates.

The site drawings as shown in **Appendix B** and the pipe layout drawing shown in **Appendix C** show that there are no discrepancies between proposed discharge rates and those modelled.

Appendix A



NOTES:

- DO NOT SCALE THIS DRAWING. IF IN DOUBT PLEASE REQUEST FURTHER INFORMATION.
- ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH SURFACE WATER DRAINAGE AND SuDS STRATEGY, REF. 30142/2001/R001.
- DEVELOPMENT AND PLOT LAYOUTS TAKEN FROM BAM DUNSBUY HILL FARM MASTERPLAN OPTION F, 4330/ARCH/1006 REV A, DATED 17TH OCTOBER 2014.
- PROPOSED DEVELOPMENT LEVELS, ROUTE AND SIZE OF PROPOSED SURFACE WATER PIPE NETWORK TAKEN FROM BAM BELOW GROUND DRAINAGE STRATEGY. DRAWING NUMBER 4330/SERVE/5000 REV P3, DATED 10TH MARCH 2015.
- IN ACCORDANCE WITH PLANNING CONDITION A2 FINAL DISCHARGE OFF SITE CANNOT EXCEED 3.4l/s/ha FOR RAINFALL EVENTS UP TO AND INCLUDING THE 1 IN 100 YEAR + 30% CLIMATE CHANGE EVENT.

KEY:

- SITE BOUNDARY
- INDICATIVE CATCHMENT BOUNDARY
- PROPOSED SURFACE WATER SEWER
- INDICATIVE SURFACE WATER ATTENUATION (ASSUMED 0.8m DEEP)
- PROPOSED DETENTION BASIN
- SURFACE WATER DISCHARGE LOCATION

SURFACE WATER DRAINAGE ATTENUATION			
PLOT	IMPERMEABLE AREA (ha) ¹	ALLOWABLE DISCHARGE RATE (l/s) ²	MINIMUM RECOMMENDED ON PLOT STORAGE (m ³) ³
1	0.546	9.29	304
2	1.656	28.15	931
3	1.933	32.86	1,040
4	0.477	8.11	246
5	2.278	38.72	1,278
6	0.624	10.61	335
7	0.776	13.20	402
8	1.785	30.34	985
TOTAL	10.075	N/A	5,521

- PLOT IMPERMEABLE AREA TAKEN FROM BAM BELOW GROUND DRAINAGE STRATEGY. DRAWING NUMBER 4330/SERVE/5000 REV P3, DATED 10TH MARCH 2015.
- ALLOWABLE DISCHARGE RATE FOR EACH PLOT = 5 x 3.4l/s/ha x IMPERMEABLE AREA.
- MINIMUM RECOMMENDED ON PLOT STORAGE BASED ON MICRODRAINAGE QUICK STORAGE ESTIMATE BASED ON PLOT IMPERMEABLE AREA AND ALLOWABLE DISCHARGE RATE (1 IN 100 YEAR + 30% CLIMATE CHANGE).

SuDS TREATMENT CHAIN			
PLOT USAGE	TOTAL MINIMUM NO. OF SuDS TREATMENT STAGES REQUIRED	TREATMENT STAGES PROVIDED OFF PLOT	MINIMUM NO. OF TREATMENT STAGES TO BE PROVIDED ON PLOT
HOTEL, CONFERENCE CENTRE AND FOOD STORE	2	1	1
B1	2	1	1
B2	3	1	2
B8	2	1	1

Mark	Revision	Date	Drawn	Chkd	Appd
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SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status

FOR INFORMATION

DUNSBUY HILL FARM

SURFACE WATER STRATEGY AND STORAGE REQUIREMENTS

Client			PORTSMOUTH CITY COUNCIL		
Date of 1st Issue	Designed	Drawn	 Offices throughout the UK and Europe www.peterbrett.com © Peter Brett Associates LLP READING Tel: 0118 950 0761		
15.05.2015	CMB	MJP			
A2 Scale	Checked	Approved	Drawing Number		
1:2000	CMB	DTH			
Revision			30142/2001/001		
-					

Appendix B

LEGEND

PROPOSED DRAINAGE - FOUL

- 100Ø@1:100 FOUL WATER DRAIN - PVCu
Approx. gradient and diameter as noted, 100mm Ø UNO
- FOUL WATER MANHOLE
PC Ring 1.2m Ø UNO
- FW-01 FOUL WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m

Note: All internal foul MH's and IC's to have recessed covers. double sealed and locking to prevent odours. Refer to layout for location.

- FOUL WATER SHALLOW ACCESS CHAMBER
Max depth to invert 600mm from GL, 300mm Ø
- FOUL RODDING EYE
Ø as noted
- YG FOUL YARD GULLY (to be trapped)
Gully reference as noted on drawing.
Cover grade to suit loading.
- FD FLOOR DRAIN (to be trapped)
Internal use only, refer to architect for details / specification.
Roddable from above slab into standard (Ø1) fitting.
Floor Drain / Gully to be kept charged to avoid odours.
- FOUL OUTLET / STACK POSITION
Shown indicative, refer to architect for setting out.
All branches 100mm Ø UNO.
Ø1 - Outlets connects into standard 90° rest bend.
Ø1A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
SVP - Indicates soil vent pipe by service engineer: with access.

PROPOSED DRAINAGE - STORM

- 150Ø@1:100 STORM WATER DRAIN - PVCu
Approx. gradient and diameter as noted, 150mm Ø UNO
- SW-01 STORM WATER MANHOLE
PC Ring 1.2m Ø UNO
- SW-01 STORM WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m
- STORM RODDING EYE
Ø as noted
- SILT TRAP
- CONCRETE ENCASEMENT TO PIPE
Refer to limits of cover table drawing 7101
- RAIN WATER OUTLET
Shown indicative, refer to architect for setting out.
Refer to rainwater pipe details for branch Ø.
Ø1 - Outlet connects into standard 90° rest bend.
Ø1A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
- RAIN WATER OUTLET ACCESS GULLY
AG - Outlet connects to gully.
- RG ROAD GULLY (to be trapped)
- YG YARD GULLY (to be trapped)
- PG PAVED AREA GULLY (to be trapped)
- DC DRAINAGE CHANNEL
(Refer to layout for specification)
- TH THRESHOLD DRAINAGE CHANNEL
(Refer to architect for details / specification)

OIL INTERCEPTOR - OI-01
CLASS 1 BY-PASS SEPARATOR (WITH ALARM - BY OTHERS).
KLARGESTER NSBP003 OR SIMILAR APPROVED. SIZED
ACCORDING TO EA DOCUMENT PPG3 AND INSTALLED IN
ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
TREATMENT AREA = 1100m²

SW-03
E600 CVR
CL: 33.220
IL(225Ø): 31.575
IL(300Ø): 31.500

FW-07
E600 CVR
CL: 33.200
IL: 31.200

SW-07
E600 CVR
CL: 33.220
IL: 31.915

SW-10
E600 CVR
CL: 32.770
IL: 30.900

FW-08
E600 CVR
CL: 32.670
IL: 30.670

SW-11
E600 CVR
CL: 31.820
IL: 29.350

SW-02
E600 CVR
CL: 33.255
IL: 32.020

SW-01
E600 CVR
CL: 33.550
IL: 32.350

FW-02
E600 CVR
CL: 33.265
IL: 32.135

FW-01
E600 CVR
CL: 33.300
IL: 32.280

FW-03
B125 CVR
CL: 33.255
IL: 32.055

FW-04
B125 CVR
CL: 33.230
IL: 31.985

FW-05
B125 CVR
CL: 33.230
IL: 31.965

FW-06
B125 CVR
CL: 33.235
IL: 32.230

SW-04
D400 CVR
CL: 33.240
IL: 31.505

ATTENUATION TANK - AT-05
TO BE LOCATED BENEATH CAR PARK.
DRAINED AREA = 4764m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
150m³ STORAGE PROVIDED IN GEOLIGHT (BY
SDS) CELLULAR STORAGE CRATES.
30m X 5.00m x 1m DEEP.
CL = 32.995
IL(IN) = 31.300
TOP OF TANK = 32.300
BASE OF TANK = 31.300

FLOW CONTROL MANHOLE - FC-01
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO 3.46 l/s
D400 CVR
CL: 33.115
IL: 31.300

RWP LOCATIONS SHOWN INDICATIVELY

SW-05
E600 CVR
CL: 33.280
IL: 31.955
SIL: 32.255

SW-06
E600 CVR
CL: 33.235
IL: 31.690
SIL: 32.000

KEY PLAN

NOTES

- All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
- The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWF, Adobe PDF files and/or hard copies and their associated information issue sheets.
- Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydrock immediately.
- Levels shown in metres above Ordnance Datum (mAOD).
- All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
- All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
- All drainage to be laid soffit to soffit unless otherwise shown.
- The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
- All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
- Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the final surface levels.
- Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
- The Contractor should comply with hsl(g) 47 "Avoiding Danger from Underground Services" when excavating around existing services.
- It is the contractors responsibility to determine the location and depth of all existing services, mains and cables prior to construction.
- Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
- All in-situ concrete and precast concrete components to be manufactured using Sulphate Resisting Portland Cement, (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002.
- All ironwork to be kite marked by BSI or certified by equal inspection authority.
- All redundant connections to be capped off and grouted from the down stream manhole.
- All new drainage pipes to be jetted, CCTV surveyed with DVD recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/engineer.
- Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
- Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

C04	DRAWING SCALE NOTE AMENDED TO SHOW 1:200 SCALE					
	H.MILLER	20/02/23	H.MILLER	20/02/23	J.MAGEE	20/02/23
C03	FOUL STACKS UPDATED TO FINAL ARCHITECT POSITIONS					
	H.MILLER	02/02/23	A. TODD	02/02/23	J. MAGEE	02/02/23
C02	UPDATED STACK LOCATIONS TO POSITIONS SPECIFIED BY ARCHITECT					
	H.MILLER	16/11/22	A. TODD	16/11/22	J. MAGEE	16/11/22
C01	FOR CONSTRUCTION					
	H.MILLER	08/08/22	A. TODD	08/08/22	J. MAGEE	08/08/22
P01	SUITABLE FOR REVIEW					
	H.MILLER	25/07/22	A. TODD	25/07/22	J. MAGEE	25/07/22
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE



Merchants' House North
Wapping Road
Bristol
BS1 4RW
t: +44 (0)117 945 9225
e: bristolcentral@hydrock.com

CLIENT

GLENCAR CONSTRUCTION LTD.

PROJECT

DUNSBURY PARK
UNITS 500, 501 & 502

TITLE

DRAINAGE LAYOUT
SHEET 1

HYDROCK PROJECT NO. C-19453-C		SCALE @ A1 1:200	
STATUS DESCRIPTION SUITABLE FOR CONSTRUCTION			STATUS A
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) G1129-HYD-ZZ-XX-DR-C-7010			REVISION C04

LEGEND

PROPOSED DRAINAGE - FOUL

- 1000@1:100
- FOUL WATER DRAIN - PVCu
Approx. gradient and diameter as noted, 100mm Ø UNO
- FW-01
- FOUL WATER MANHOLE
PC Ring 1.2m Ø UNO
- FW-01
- FOUL WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m

Note: All internal foul MH's and IC's to have recessed covers. double sealed and locking to prevent odours. Refer to layout for location.

- SAC
- FOUL WATER SHALLOW ACCESS CHAMBER
Max depth to invert 600mm from GL, 300mm Ø
- RE
- FOUL RODDING EYE
Ø as noted
- YG
- FOUL YARD GULLY (to be trapped)
Gully reference as noted on drawing.
Cover grade to suit loading.
- FD
- FLOOR DRAIN (to be trapped)
Internal use only, refer to architect for details / specification.
Roddable from above slab into standard (Ø1) fitting.
Floor Drain / Gully to be kept charged to avoid odours.
- Ø1 & Ø1A
- FOUL OUTLET / STACK POSITION
Shown indicative, refer to architect for setting out.
All branches 100mm Ø UNO.
Ø1 - Outlet connects into standard 90° rest bend.
Ø1A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
SVP - Indicates soil vent pipe by service engineer, with access.

PROPOSED DRAINAGE - STORM

- 1500@1:100
- STORM WATER DRAIN - PVCu
Approx. gradient and diameter as noted, 150mm Ø UNO
- SW-01
- STORM WATER MANHOLE
PC Ring 1.2m Ø UNO
- SW-01
- STORM WATER INSPECTION CHAMBER
PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m
- RE
- STORM RODDING EYE
Ø as noted
- SILT TRAP
- CONCRETE ENCASEMENT TO PIPE
Refer to limits of cover table drawing 7101
- Ø1 & Ø1A
- RAIN WATER OUTLET
Shown indicative, refer to architect for setting out.
Refer to rainwater pipe details for branch Ø.
Ø1 - Outlet connects into standard 90° rest bend.
Ø1A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
- AG
- RAIN WATER OUTLET ACCESS GULLY
AG - Outlet connects to gully.
- RG
- ROAD GULLY (to be trapped)
- YG
- YARD GULLY (to be trapped)
- PG
- PAVED AREA GULLY (to be trapped)
- DC
- DRAINAGE CHANNEL
(Refer to layout for specification)
- TH
- THRESHOLD DRAINAGE CHANNEL
(Refer to architect for details / specification)

OIL INTERCEPTOR - OI-01
CLASS 1 BY-PASS SEPARATOR (WITH ALARM - BY OTHERS).
KLARGESTER NSBP003 OR SIMILAR APPROVED. SIZED
ACCORDING TO EA DOCUMENT PPG3 AND INSTALLED IN
ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
TREATMENT AREA = 1390m²

FLOW CONTROL MANHOLE - FC-02
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO 5.1 l/s
D400 CVR
CL: 30.850
IL: 28.885

ATTENUATION TANK - AT-04
TO BE LOCATED BENEATH CAR PARK.
DRAINED AREA = 4764m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
205m³ STORAGE PROVIDED IN GEOLIGHT (BY SDS)
CELLULAR STORAGE CRATES.
26m x 10.5m x 0.75m DEEP.
CL = 30.310
IL(IN) = 28.920
TOP OF TANK = 29.680
BASE OF TANK = 28.930

ATTENUATION TANK - AT-03
TO BE LOCATED BENEATH ROAD.
DRAINED AREA = 2450m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
90m³ STORAGE PROVIDED IN GEOLIGHT (BY SDS)
CELLULAR STORAGE CRATES.
16m x 7.5m x 0.75m DEEP.
CL = 28.550
IL(IN) = 26.670
TOP OF TANK = 27.400
BASE OF TANK = 26.650

ATTENUATION TANK - AT-02
TO BE LOCATED BENEATH ROAD.
DRAINED AREA = 2450m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
67.5m³ STORAGE PROVIDED IN GEOLIGHT (BY SDS)
CELLULAR STORAGE CRATES.
19.5m x 7m x 0.5m DEEP.
CL = 27.535
IL(IN) = 26.550
TOP OF TANK = 26.950
BASE OF TANK = 26.450

KEY PLAN

NOTES

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- Levels shown in metres above Ordnance Datum (mAOD).
- All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
- All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
- All drainage to be laid soffit to soffit unless otherwise shown.
- The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
- All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
- Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the final surface levels.
- Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
- The Contractor should comply with hsl(g) 47 "Avoiding Danger from Underground Services" when excavating around existing services.
- It is the contractors responsibility to determine the location and depth of all existing services, mains and cables prior to construction.
- Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
- All in-situ concrete and precast concrete components to be manufactured using Sulphate Resisting Portland Cement, (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002
- All ironwork to be kite marked by BSI or certified by equal inspection authority.
- All redundant connections to be capped off and grouted from the down stream manhole.
- All new drainage pipes to be jetted, CCTV surveyed with DVD recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/engineer.
- Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
- Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

DRAWING SCALE NOTE AMENDED TO SHOW 1:200 SCALE					
C05	H.MILLER	20/02/23	H.MILLER	20/02/23	J.MAGEE
					20/02/23
C04	FOUL STACKS UPDATED TO FINAL ARCHITECT POSITIONS				
	H.MILLER	02/02/23	A. TODD	02/02/23	J. MAGEE
C03	FW-13 LOCATION UPDATED, 501 ATTENUATION TANK AMENDED				
	H.MILLER	15/12/22	A. TODD	15/12/22	J. MAGEE
C02	UPDATED STACK LOCATIONS TO POSITIONS SPECIFIED BY ARCHITECT				
	H.MILLER	16/11/22	A. TODD	16/11/22	J. MAGEE
C01	FOR CONSTRUCTION				
	H.MILLER	08/08/22	A. TODD	08/08/22	J. MAGEE
P01	SUITABLE FOR REVIEW				
	H.MILLER	25/07/22	A. TODD	25/07/22	J. MAGEE
REV	REVISION NOTES/COMMENTS				
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY

Hydrock

Merchants' House North
Wapping Road
Bristol
BS1 4RW
t: +44 (0)117 945 9225
e: bristolcentral@hydrock.com

CLIENT

GLENCAR CONSTRUCTION LTD.

PROJECT

DUNSBUARY PARK
UNITS 500, 501 & 502

TITLE

DRAINAGE LAYOUT
SHEET 2

HYDROCK PROJECT NO. C-19453-C		SCALE @ A1 1:200	
STATUS DESCRIPTION SUITABLE FOR CONSTRUCTION			STATUS A
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) G1129-HYD-ZZ-XX-DR-C-7011			REVISION C05

PROPOSED DRAINAGE - FOUL

Note: All internal foul MH's and IC's to have recessed covers. double sealed and locking to prevent odours. Refer to layout for location.

PROPOSED DRAINAGE - STORM

	STORM DRAIN - PVCu Approx. gradient and diameter as noted, 150mm Ø UNO
	STORM WATER MANHOLE PC Ring 1.2m Ø UNO
	STORM WATER INSPECTION CHAMBER PVCu 450mm Ø. Max 1.2m depth - reduced access to 3.0m
	STORM RODDING EYE Ø as noted
	SILT TRAP
	CONCRETE ENCASEMENT TO PIPE Refer to limits of cover table drawing 7101
	RAIN WATER OUTLET Shown indicative, refer to architect for setting out. Refer to rainwater pipe details for branch Ø. 01 - Outlet connects into standard 90° rest bend. 01A - Indicates access required in above slab plumbing for rodding, refer to service engineers drawings for details.
	RAIN WATER OUTLET ACCESS GULLY AG - Outlet connects to gully.
	ROAD GULLY (to be trapped)
	YARD GULLY (to be trapped)
	PAVED AREA GULLY (to be trapped)
	DRAINAGE CHANNEL (Refer to layout for specification)
	THRESHOLD DRAINAGE CHANNEL (Refer to architect for details / specification)

SW-25
E600 CVR
CL: 28.455
IL: 26.565

FLOW CONTROL MANHOLE - FC-04
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO 11.4 l/s
B125 CVR
CL: 27.445
IL: 26.445

SW-30
E600 CVR
CL: 27.460
IL: 26.715

OIL INTER



SW-32
B125 CVR
CL: 27.350
Ø): 26.525
5Ø): 26.450

SW-26
B125 CVR
CL: 26.870
IL: 26.190

ATTENUATION TANK - AT-01
TO BE LOCATED BENEATH CAR PARK.
DRAINED AREA = 6826m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
235m³ STORAGE PROVIDED IN GEOLIGHT (BY SDS)
CELLULAR STORAGE CRATES.
33m x 9.5m x 0.5m DEEP
IL(IN) = 26.100
CL = 26.910
TOP OF TANK = 26.600
BASE OF TANK = 26.100

ATTENUATION TANK TO VENT TO NEAREST
MANHOLE AS PER SDS TANK DESIGN

IL INTERCEPTOR - OI-01
 CLASS 1 BY-PASS SEPARATOR (WITH ALARM - BY OTHERS).
 LARGESTER NSBP004 OR SIMILAR APPROVED, SIZED
 ACCORDING TO EA DOCUMENT PPG3 AND INSTALLED IN
 ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS
 TREATMENT AREA = 1310m²

- 5000L RAINWATER HARVESTING TANK.
SHOWN INDICATIVELY. DETAILS BY OTHERS

FW-16/1
B125 CVR
CL: 27.480
II : 26 700

FW-17
B125 CVR
CL: 27.475
IL: 26.700

FW-18
B125 CVR
CL: 27.475
H: 22.700



- **FW-20**
D400 CVR
CL: 27.41
IL: 25.300

CL: 27.475
IL: 26.700

SW-42
B125 CVR
CL: 27.480
IL: 26.350

FLOW CONTROL MANHOLE - FC-03-1
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO 7.31 l/s
D400 CVR
CL: 27.265
IL: 25.970

FLOW CONTROL MANHOLE -
HYDRO-BRAKE FLOW CONTROL.
DISCHARGE LIMITED TO 11.4 l/s
B125 CVR
CL: 27.045
IL: 25.885

EXSW-0
CL: 26.85
IL: 25.85

EXSW-0
CL: 26.85
IL: 25.85

ATTENUATION TANK - AT-06
TO BE LOCATED BENEATH CEAR PARK.
DRAINED AREA = 835m²
SRP = 1 IN 100 YR + 40% CLIMATE CHANGE.
15m³ STORAGE PROVIDED IN GEOLIGHT (BY SDS)
CELLULAR STORAGE CRATES.
4m x 7.5m x 0.5m DEEP
IL(IN) = 25.890
CL = 26.787
TOP OF TANK = 26.390
BASE OF TANK = 25.890

**ATTENUATION TANK TO VENT TO NEAREST
MANHOLE AS PER SDS TANK DESIGN**

KEY PLAN

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
2. The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWG, Adobe PDF files and/or hard copies and any other drawings are not to be used.
3. Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydroack immediately.
4. Levels shown in metres above Ordnance Datum (mAOD).
5. All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
6. All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
7. All drainage to be laid soffit to suit unless otherwise shown.
8. The Contractor is to verify the line, level and diameter of existing sewers before commencing drainage works.
9. All foul drainage to be minimum 100mm diameter, all surface water drainage to be minimum 150mm diameter unless otherwise shown.
10. Cover levels shown on this drawing refer to approximate surface levels. It is the contractors responsibility to ensure that access covers and frames are set at the final surface levels.
11. Where possible the contractor is to orientate manhole biscuits and covers to locate them parallel to kerbs and paving.
12. The Contractor should comply with h(s)g 47 "Avoiding Danger from Underground Services" when excavating around existing services.
13. It is the contractors responsibility to determine the location and depth of any existing services and to protect them prior to construction.
14. Contractor to provide temporary screens in each of the down stream manholes during the construction period of the development in accordance with SFA 2.9.10 and the local sewerage undertakers requirements.
15. All in-situ concrete and precast concrete components to be manufactured using Sulphate Resisting Portland Cement, (SRPC) to BS 4027, if required, subject to soil conditions. Manhole components to be to BS EN 1917:2002.
16. All manwork to be kite marked by BSI or certified by equal inspection authority.
17. All redundant connections to be capped off and grouted from the down stream manhole.
18. All new drainage pipes to be jetted, CCTV surveyed with DVD recording and any defects highlighted to the supervising officer. Following the rectification of any defects, the drain is to be re-surveyed with CCTV and the recordings made available to the project manager/engineer.
19. Prior to commencing the works the contractor is to confirm details of the existing drainage system as noted on the drawing.
20. Prior to commencing the works the contractor is to undertake the drainage investigation work as noted on the drawing.

C06	DRAWING SCALE NOTE AMENDED TO SHOW 1:200 SCALE					
	H.MILLER	20/02/23	H.MILLER	20/02/23	J.MAGEE	20/02/23
C05	OIL INTERCEPTORS AND ATTENUATION TANK VENTING LOCATIONS/ NOTES ADDED					
	H.MILLER	11/11/22	A.TODD	11/11/22	A.TODD	11/11/22
C04	UNIT 500 SIPHONIC DRAINAGE POSITIONS COORDINATED WITH SPECIALISTS					
	H.MILLER	03/11/22	A.TODD	03/11/22	A.TODD	03/11/22
C03	UNIT 500 STACK POSITIONS COORDINATED WITH ARCHITECTS LAYOUT					
	FLOOR MANHOLE FWC 16/1 ADDED					
C02	H.MILLER	29/09/22	J.MAGEE	29/09/22	J.MAGEE	29/09/22
	FOR CONSTRUCTION					
C01	H.MILLER	18/08/22	A.TODD	18/08/22	J.MAGEE	18/08/22
	FOR CONSTRUCTION					
REV	H.MILLER	08/08/22	A.TODD	08/08/22	J.MAGEE	08/08/22
	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE



CLIENT	
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GLENCAR CONSTRUCTION LTD.

PROJECT

DUNSBURY PARK
UNITS 500, 501 & 502

DRAINAGE LAYOUT
SHEET 3

HYDROCK PROJECT NO. C-19453-C	SCALE @ A1 1:200
STATUS DESCRIPTION SUITABLE FOR CONSTRUCTION	STATUS A
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) G1129-HYD-ZZ-XX-DR-C-7012	REVISION C06

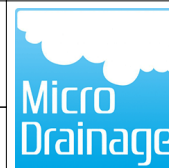
Appendix C

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<u>STORM SEWER DESIGN by the Modified Rational Method</u> <u>Design Criteria for Storm</u> Pipe Sizes STANDARD Manhole Sizes STANDARD FSR Rainfall Model - England and Wales <table><tr><td>Return Period (years)</td><td>100</td><td>PIMP (%)</td><td>100</td></tr><tr><td>M5-60 (mm)</td><td>19.200</td><td>Add Flow / Climate Change (%)</td><td>0</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Minimum Backdrop Height (m)</td><td>0.200</td></tr><tr><td>Maximum Rainfall (mm/hr)</td><td>50</td><td>Maximum Backdrop Height (m)</td><td>1.500</td></tr><tr><td>Maximum Time of Concentration (mins)</td><td>30</td><td>Min Design Depth for Optimisation (m)</td><td>1.200</td></tr><tr><td>Foul Sewage (l/s/ha)</td><td>0.000</td><td>Min Vel for Auto Design only (m/s)</td><td>1.00</td></tr><tr><td>Volumetric Runoff Coeff.</td><td>0.750</td><td>Min Slope for Optimisation (1:X)</td><td>500</td></tr></table> Designed with Level Soffits <u>Time Area Diagram for Storm at outfall S (pipe S8.010)</u> <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr></thead><tbody><tr><td>0-4</td><td>0.114</td><td>4-8</td><td>0.696</td><td>8-12</td><td>0.280</td></tr></tbody></table> Total Area Contributing (ha) = 1.090 Total Pipe Volume (m³) = 59.424 <u>Time Area Diagram at outfall S (pipe S17.004)</u> <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr></thead><tbody><tr><td>0-4</td><td>0.229</td><td>4-8</td><td>0.259</td></tr></tbody></table> Total Area Contributing (ha) = 0.488 Total Pipe Volume (m³) = 29.969										Return Period (years)	100	PIMP (%)	100	M5-60 (mm)	19.200	Add Flow / Climate Change (%)	0	Ratio R	0.350	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	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	0-4	0.114	4-8	0.696	8-12	0.280	Time (mins)	Area (ha)	Time (mins)	Area (ha)	0-4	0.229	4-8	0.259
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Network 2020.1.3

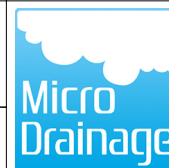
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S8.000	7.346	0.140	52.5	0.158	5.00		0.0	0.600	o	225	Pipe/Conduit	
S8.001	12.962	0.850	15.2	0.000	0.00		0.0	0.600	o	225	Pipe/Conduit	
S9.000	27.665	0.290	95.4	0.068	5.00		0.0	0.600	o	450	Pipe/Conduit	
S10.000	60.282	0.095	634.5	0.075	5.00		0.0	0.600	o	300	Pipe/Conduit	
S10.001	38.168	0.150	254.5	0.000	0.00		0.0	0.600	o	300	Pipe/Conduit	
S11.000	58.124	0.095	611.8	0.075	5.00		0.0	0.600	o	300	Pipe/Conduit	
S11.001	9.321	0.080	116.5	0.000	0.00		0.0	0.600	o	300	Pipe/Conduit	
S12.000	58.124	0.095	611.8	0.075	5.00		0.0	0.600	o	300	Pipe/Conduit	
S11.002	12.467	0.110	113.3	0.000	0.00		0.0	0.600	o	450	Pipe/Conduit	
S10.002	24.420	0.430	56.8	0.000	0.00		0.0	0.600	o	450	Pipe/Conduit	
S10.003	7.645	0.650	11.8	0.000	0.00		0.0	0.600	o	450	Pipe/Conduit	
S9.001	13.945	0.125	111.6	0.030	0.00		0.0	0.600	o	450	Pipe/Conduit	
S8.002	8.226	0.050	164.5	0.000	0.00		0.0	0.600	o	225	Pipe/Conduit	

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)
S8.000	50.00	5.07	29.875	0.158	0.0	0.0	0.0	1.81	72.0	21.4
S8.001	50.00	5.13	29.735	0.158	0.0	0.0	0.0	3.37	133.9	21.4
S9.000	50.00	5.22	29.295	0.068	0.0	0.0	0.0	2.08	331.1	9.2
S10.000	50.00	6.63	30.390	0.075	0.0	0.0	0.0	0.62	43.6	10.2
S10.001	50.00	7.28	29.995	0.075	0.0	0.0	0.0	0.98	69.3	10.2
S11.000	50.00	6.54	30.240	0.075	0.0	0.0	0.0	0.63	44.4	10.2
S11.001	50.00	6.65	29.845	0.075	0.0	0.0	0.0	1.46	102.9	10.2
S12.000	50.00	6.54	30.160	0.075	0.0	0.0	0.0	0.63	44.4	10.2
S11.002	50.00	6.76	29.765	0.150	0.0	0.0	0.0	1.91	303.6	20.3
S10.002	50.00	7.43	29.655	0.225	0.0	0.0	0.0	2.70	429.8	30.5
S10.003	50.00	7.45	29.225	0.225	0.0	0.0	0.0	5.95	946.8	30.5
S9.001	50.00	7.57	29.010	0.323	0.0	0.0	0.0	1.92	306.0	43.7
S8.002	50.00	7.70	28.885	0.481	0.0	0.0	0.0	1.02	40.4	65.1

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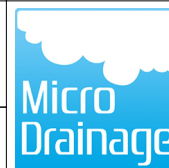


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PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.005	16.969	0.105	161.6	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.006	23.311	0.110	211.9	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.007	34.856	0.175	199.2	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.008	17.834	0.085	209.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.009	50.228	0.245	205.0	0.083	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.010	21.510	0.100	215.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.000	60.840	0.100	608.4	0.064	5.00	0.0	0.600	o	300	Pipe/Conduit	
S17.001	26.267	0.340	77.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S18.000	61.225	0.100	612.3	0.114	5.00	0.0	0.600	o	300	Pipe/Conduit	
S18.001	24.691	0.315	78.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S19.000	39.284	0.190	206.8	0.010	5.00	0.0	0.600	o	300	Pipe/Conduit	
S20.000	13.506	0.125	108.1	0.033	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.001	7.670	0.065	118.0	0.014	0.00	0.0	0.600	o	150	Pipe/Conduit	
S19.001	19.464	0.195	99.8	0.110	0.00	0.0	0.600	o	225	Pipe/Conduit	
S19.002	13.340	0.050	266.8	0.015	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.002	22.609	0.090	251.2	0.053	0.00	0.0	0.600	o	375	Pipe/Conduit	

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)
S8.005	50.00	8.69	26.670	0.945	0.0	0.0	0.0	1.03	40.8	127.9
S8.006	50.00	9.13	26.565	0.957	0.0	0.0	0.0	0.89	35.6	129.5
S8.007	50.00	9.76	26.455	1.007	0.0	0.0	0.0	0.92	36.7	136.3
S8.008	50.00	10.09	26.280	1.007	0.0	0.0	0.0	0.90	35.7	136.3
S8.009	50.00	11.01	26.195	1.090	0.0	0.0	0.0	0.91	36.2	147.6
S8.010	50.00	11.41	25.950	1.090	0.0	0.0	0.0	0.89	35.3	147.6
S17.000	50.00	6.61	26.900	0.064	0.0	0.0	0.0	0.63	44.5	8.7
S17.001	50.00	6.82	26.500	0.064	0.0	0.0	0.0	2.06	227.9	8.7
S18.000	50.00	6.62	26.875	0.114	0.0	0.0	0.0	0.63	44.4	15.4
S18.001	50.00	6.83	26.475	0.114	0.0	0.0	0.0	2.05	226.2	15.4
S19.000	50.00	5.60	26.595	0.010	0.0	0.0	0.0	1.09	77.0	1.4
S20.000	50.00	5.23	26.670	0.033	0.0	0.0	0.0	0.97	17.1	4.4
S20.001	50.00	5.37	26.545	0.046	0.0	0.0	0.0	0.92	16.3	6.3
S19.001	50.00	5.85	26.405	0.166	0.0	0.0	0.0	1.31	52.0	22.4
S19.002	50.00	6.05	26.210	0.181	0.0	0.0	0.0	1.10	122.0	24.5
S17.002	50.00	7.16	26.160	0.412	0.0	0.0	0.0	1.14	125.8	55.7

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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
S17.003	21.536	0.100	215.4	0.009	0.00	0.0	0.600	o	375	Pipe/Conduit	
S21.000	61.040	0.100	610.4	0.067	5.00	0.0	0.600	o	300	Pipe/Conduit	
S21.001	8.960	0.380	23.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.004	19.298	0.120	160.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

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)
S17.003	50.00	7.45	26.070	0.421	0.0	0.0	0.0	1.23	135.9	57.0
S21.000	50.00	6.62	26.450	0.067	0.0	0.0	0.0	0.63	44.5	9.1
S21.001	50.00	6.67	26.350	0.067	0.0	0.0	0.0	2.71	107.6	9.1
S17.004	50.00	7.76	25.970	0.488	0.0	0.0	0.0	1.03	40.9	66.0

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S8.010	S	26.850	25.850	0.000	0	0

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S17.004	S	26.850	25.850	0.000	0	0

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	6
Number of Online Controls	13	Number of Time/Area Diagrams	0
Number of Offline Controls	8	Number of Real Time Controls	0

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Hydro-Brake® Optimum Manhole: S12, DS/PN: S8.002, Volume (m³): 5.3

Unit Reference MD-SHE-0112-5100-0655-5100

Design Head (m) 0.655

Design Flow (l/s) 5.1

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 112

Invert Level (m) 28.885

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

Control Points

Head (m) Flow (l/s)

Design Point (Calculated) 0.655 5.1

Flush-Flo™ 0.204 5.1

Kick-Flo® 0.458 4.3

Mean Flow over Head Range - 4.3

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	3.9	1.200	6.8	3.000	10.4	7.000	15.6
0.200	5.1	1.400	7.3	3.500	11.2	7.500	16.1
0.300	5.0	1.600	7.7	4.000	11.9	8.000	16.6
0.400	4.7	1.800	8.2	4.500	12.6	8.500	17.2
0.500	4.5	2.000	8.6	5.000	13.3	9.000	17.7
0.600	4.9	2.200	9.0	5.500	13.9	9.500	18.1
0.800	5.6	2.400	9.4	6.000	14.5		
1.000	6.2	2.600	9.7	6.500	15.1		

Siphon Manhole: S20, DS/PN: S15.001, Volume (m³): 5.3

Invert Level (m) 31.955 Cut In Height (m) 0.600 Cut Out Height (m) 0.300

Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)
0.100	22.0000	1.100	22.0000	2.100	22.0000
0.200	22.0000	1.200	22.0000	2.200	22.0000
0.300	22.0000	1.300	22.0000	2.300	22.0000
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0.500	22.0000	1.500	22.0000	2.500	22.0000
0.600	22.0000	1.600	22.0000	2.600	22.0000
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0.800	22.0000	1.800	22.0000	2.800	22.0000
0.900	22.0000	1.900	22.0000	2.900	22.0000
1.000	22.0000	2.000	22.0000	3.000	22.0000

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<u>Siphon Manhole: S21, DS/PN: S14.001, Volume (m³): 7.4</u> Invert Level (m) 31.690 Cut In Height (m) 0.900 Cut Out Height (m) 0.600 <table><tr><th>Depth (m)</th><th>Outflow (l/s)</th><th>Depth (m)</th><th>Outflow (l/s)</th><th>Depth (m)</th><th>Outflow (l/s)</th></tr><tr><td>0.100</td><td>22.0000</td><td>1.100</td><td>22.0000</td><td>2.100</td><td>22.0000</td></tr><tr><td>0.200</td><td>22.0000</td><td>1.200</td><td>22.0000</td><td>2.200</td><td>22.0000</td></tr><tr><td>0.300</td><td>22.0000</td><td>1.300</td><td>22.0000</td><td>2.300</td><td>22.0000</td></tr><tr><td>0.400</td><td>22.0000</td><td>1.400</td><td>22.0000</td><td>2.400</td><td>22.0000</td></tr><tr><td>0.500</td><td>22.0000</td><td>1.500</td><td>22.0000</td><td>2.500</td><td>22.0000</td></tr><tr><td>0.600</td><td>22.0000</td><td>1.600</td><td>22.0000</td><td>2.600</td><td>22.0000</td></tr><tr><td>0.700</td><td>22.0000</td><td>1.700</td><td>22.0000</td><td>2.700</td><td>22.0000</td></tr><tr><td>0.800</td><td>22.0000</td><td>1.800</td><td>22.0000</td><td>2.800</td><td>22.0000</td></tr><tr><td>0.900</td><td>22.0000</td><td>1.900</td><td>22.0000</td><td>2.900</td><td>22.0000</td></tr><tr><td>1.000</td><td>22.0000</td><td>2.000</td><td>22.0000</td><td>3.000</td><td>22.0000</td></tr></table> <u>Hydro-Brake® Optimum Manhole: S5, DS/PN: S13.004, Volume (m³): 4.3</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0089-3500-1000-3500</td></tr><tr><td>Design Head (m)</td><td>1.000</td></tr><tr><td>Design Flow (l/s)</td><td>3.5</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>89</td></tr><tr><td>Invert Level (m)</td><td>31.175</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.000</td><td>3.5</td></tr><tr><td>Flush-Flo™</td><td>0.300</td><td>3.5</td></tr><tr><td>Kick-Flo®</td><td>0.632</td><td>2.8</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>3.1</td></tr></table> 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 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>2.7</td><td>1.200</td><td>3.8</td><td>3.000</td><td>5.8</td><td>7.000</td><td>8.7</td></tr><tr><td>0.200</td><td>3.4</td><td>1.400</td><td>4.1</td><td>3.500</td><td>6.2</td><td>7.500</td><td>9.0</td></tr><tr><td>0.300</td><td>3.5</td><td>1.600</td><td>4.3</td><td>4.000</td><td>6.7</td><td>8.000</td><td>9.2</td></tr><tr><td>0.400</td><td>3.4</td><td>1.800</td><td>4.6</td><td>4.500</td><td>7.0</td><td>8.500</td><td>9.5</td></tr><tr><td>0.500</td><td>3.3</td><td>2.000</td><td>4.8</td><td>5.000</td><td>7.4</td><td>9.000</td><td>9.8</td></tr><tr><td>0.600</td><td>3.0</td><td>2.200</td><td>5.0</td><td>5.500</td><td>7.7</td><td>9.500</td><td>10.0</td></tr><tr><td>0.800</td><td>3.1</td><td>2.400</td><td>5.2</td><td>6.000</td><td>8.1</td><td></td><td></td></tr><tr><td>1.000</td><td>3.5</td><td>2.600</td><td>5.4</td><td>6.500</td><td>8.4</td><td></td><td></td></tr></table>						Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	0.100	22.0000	1.100	22.0000	2.100	22.0000	0.200	22.0000	1.200	22.0000	2.200	22.0000	0.300	22.0000	1.300	22.0000	2.300	22.0000	0.400	22.0000	1.400	22.0000	2.400	22.0000	0.500	22.0000	1.500	22.0000	2.500	22.0000	0.600	22.0000	1.600	22.0000	2.600	22.0000	0.700	22.0000	1.700	22.0000	2.700	22.0000	0.800	22.0000	1.800	22.0000	2.800	22.0000	0.900	22.0000	1.900	22.0000	2.900	22.0000	1.000	22.0000	2.000	22.0000	3.000	22.0000	Unit Reference	MD-SHE-0089-3500-1000-3500	Design Head (m)	1.000	Design Flow (l/s)	3.5	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	89	Invert Level (m)	31.175	Minimum Outlet Pipe Diameter (mm)	150	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.000	3.5	Flush-Flo™	0.300	3.5	Kick-Flo®	0.632	2.8	Mean Flow over Head Range	-	3.1	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.7	1.200	3.8	3.000	5.8	7.000	8.7	0.200	3.4	1.400	4.1	3.500	6.2	7.500	9.0	0.300	3.5	1.600	4.3	4.000	6.7	8.000	9.2	0.400	3.4	1.800	4.6	4.500	7.0	8.500	9.5	0.500	3.3	2.000	4.8	5.000	7.4	9.000	9.8	0.600	3.0	2.200	5.0	5.500	7.7	9.500	10.0	0.800	3.1	2.400	5.2	6.000	8.1			1.000	3.5	2.600	5.4	6.500	8.4		
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©1982-2020 Innovyze																																																																																																																																																																																				

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Date 02/08/2023 14:15	Designed by AlastairTodd	
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Innovyze	Network 2020.1.3	
<u>Hydro-Brake® Optimum Manhole: S11, DS/PN: S8.007, Volume (m³): 2.0</u>		
Unit Reference MD-SHE-0157-1140-0860-1140		
Design Head (m) 0.860		
Design Flow (l/s) 11.4		
Flush-Flo™ Calculated		
Objective Minimise upstream storage		
Application Surface		
Sump Available Yes		
Diameter (mm) 157		
Invert Level (m) 26.455		
Minimum Outlet Pipe Diameter (mm) 225		
Suggested Manhole Diameter (mm) 1200		
Control PointsHead (m) Flow (l/s)		
Design Point (Calculated) 0.860 11.4		
Flush-Flo™ 0.280 11.4		
Kick-Flo® 0.609 9.7		
Mean Flow over Head Range - 9.6		
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) 0.1005.6 0.20011.2 0.30011.4 0.40011.2 0.50010.8 0.6009.9 0.80011.0 1.00012.2 1.20013.3 1.40014.3 1.60015.3 1.80016.2 2.00017.0 2.20017.8 2.40018.5 2.60019.3 3.00020.6 3.50022.2 4.00023.7 4.50025.1 5.00026.4 5.50027.6 6.00028.8 6.50029.9 7.00031.0 7.50032.0 8.00033.1 8.50034.0 9.00034.9 9.50035.8		
<u>Hydro-Brake® Optimum Manhole: S14, DS/PN: S8.010, Volume (m³): 3.5</u>		
Unit Reference MD-SHE-0161-1140-0500-1140		
Design Head (m) 0.500		
Design Flow (l/s) 11.4		
Flush-Flo™ Calculated		
Objective Minimise upstream storage		
Application Surface		
Sump Available Yes		
Diameter (mm) 161		
Invert Level (m) 25.950		
Minimum Outlet Pipe Diameter (mm) 225		
Suggested Manhole Diameter (mm) 1200		
Control PointsHead (m) Flow (l/s)		
Design Point (Calculated) 0.500 11.4		
Flush-Flo™ 0.236 11.4		
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Date 02/08/2023 14:15	Designed by AlastairTodd																																																																									
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<u>Siphon Manhole: S39, DS/PN: S17.001, Volume (m³): 5.5</u>																																																																										
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<u>Siphon Manhole: S31, DS/PN: S18.001, Volume (m³): 5.6</u>																																																																										
Invert Level (m) 26.475 Cut In Height (m) 0.600 Cut Out Height (m) 0.300																																																																										
<table><tr><td>Depth (m)</td><td>Outflow (l/s)</td><td>Depth (m)</td><td>Outflow (l/s)</td><td>Depth (m)</td><td>Outflow (l/s)</td></tr><tr><td>0.100</td><td>40.0000</td><td>0.900</td><td>40.0000</td><td>1.700</td><td>40.0000</td></tr><tr><td>0.200</td><td>40.0000</td><td>1.000</td><td>40.0000</td><td>1.800</td><td>40.0000</td></tr><tr><td>0.300</td><td>40.0000</td><td>1.100</td><td>40.0000</td><td>1.900</td><td>40.0000</td></tr><tr><td>0.400</td><td>40.0000</td><td>1.200</td><td>40.0000</td><td>2.000</td><td>40.0000</td></tr><tr><td>0.500</td><td>40.0000</td><td>1.300</td><td>40.0000</td><td>2.100</td><td>40.0000</td></tr><tr><td>0.600</td><td>40.0000</td><td>1.400</td><td>40.0000</td><td>2.200</td><td>40.0000</td></tr><tr><td>0.700</td><td>40.0000</td><td>1.500</td><td>40.0000</td><td>2.300</td><td>40.0000</td></tr><tr><td>0.800</td><td>40.0000</td><td>1.600</td><td>40.0000</td><td>2.400</td><td>40.0000</td></tr></table>			Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	0.100	40.0000	0.900	40.0000	1.700	40.0000	0.200	40.0000	1.000	40.0000	1.800	40.0000	0.300	40.0000	1.100	40.0000	1.900	40.0000	0.400	40.0000	1.200	40.0000	2.000	40.0000	0.500	40.0000	1.300	40.0000	2.100	40.0000	0.600	40.0000	1.400	40.0000	2.200	40.0000	0.700	40.0000	1.500	40.0000	2.300	40.0000	0.800	40.0000	1.600	40.0000	2.400	40.0000																		
Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)																																																																					
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		Micro Drainage																																																																		
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Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)																																																															
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2.600	40.0000	2.800	40.0000	3.000	40.0000																																																															
<u>Siphon Manhole: S40, DS/PN: S21.001, Volume (m³): 5.5</u>																																																																				
Invert Level (m) 26.350 Cut In Height (m) 0.600 Cut Out Height (m) 0.300																																																																				
<table><tr><td>Depth (m)</td><td>Outflow (l/s)</td><td>Depth (m)</td><td>Outflow (l/s)</td><td>Depth (m)</td><td>Outflow (l/s)</td></tr><tr><td>0.100</td><td>22.0000</td><td>1.100</td><td>22.0000</td><td>2.100</td><td>22.0000</td></tr><tr><td>0.200</td><td>22.0000</td><td>1.200</td><td>22.0000</td><td>2.200</td><td>22.0000</td></tr><tr><td>0.300</td><td>22.0000</td><td>1.300</td><td>22.0000</td><td>2.300</td><td>22.0000</td></tr><tr><td>0.400</td><td>22.0000</td><td>1.400</td><td>22.0000</td><td>2.400</td><td>22.0000</td></tr><tr><td>0.500</td><td>22.0000</td><td>1.500</td><td>22.0000</td><td>2.500</td><td>22.0000</td></tr><tr><td>0.600</td><td>22.0000</td><td>1.600</td><td>22.0000</td><td>2.600</td><td>22.0000</td></tr><tr><td>0.700</td><td>22.0000</td><td>1.700</td><td>22.0000</td><td>2.700</td><td>22.0000</td></tr><tr><td>0.800</td><td>22.0000</td><td>1.800</td><td>22.0000</td><td>2.800</td><td>22.0000</td></tr><tr><td>0.900</td><td>22.0000</td><td>1.900</td><td>22.0000</td><td>2.900</td><td>22.0000</td></tr><tr><td>1.000</td><td>22.0000</td><td>2.000</td><td>22.0000</td><td>3.000</td><td>22.0000</td></tr></table>			Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	0.100	22.0000	1.100	22.0000	2.100	22.0000	0.200	22.0000	1.200	22.0000	2.200	22.0000	0.300	22.0000	1.300	22.0000	2.300	22.0000	0.400	22.0000	1.400	22.0000	2.400	22.0000	0.500	22.0000	1.500	22.0000	2.500	22.0000	0.600	22.0000	1.600	22.0000	2.600	22.0000	0.700	22.0000	1.700	22.0000	2.700	22.0000	0.800	22.0000	1.800	22.0000	2.800	22.0000	0.900	22.0000	1.900	22.0000	2.900	22.0000	1.000	22.0000	2.000	22.0000	3.000	22.0000
Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)	Depth (m)	Outflow (l/s)																																																															
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1.000	22.0000	2.000	22.0000	3.000	22.0000																																																															
<u>Complex Manhole: S35, DS/PN: S17.004, Volume (m³): 4.4</u>																																																																				
<u>Hydro-Brake® Optimum</u>																																																																				
Unit Reference MD-SHE-0130-7300-0700-7300																																																																				
Design Head (m) 0.700																																																																				
Design Flow (l/s) 7.3																																																																				
Flush-Flo™ Calculated																																																																				
Objective Minimise upstream storage																																																																				
Application Surface																																																																				
Sump Available Yes																																																																				
Diameter (mm) 130																																																																				
Invert Level (m) 25.970																																																																				
Minimum Outlet Pipe Diameter (mm) 150																																																																				
Suggested Manhole Diameter (mm) 1200																																																																				
<table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>0.700</td><td>7.3</td></tr><tr><td>Flush-Flo™</td><td>0.229</td><td>7.3</td></tr><tr><td>Kick-Flo®</td><td>0.501</td><td>6.2</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>6.2</td></tr></table>			Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.700	7.3	Flush-Flo™	0.229	7.3	Kick-Flo®	0.501	6.2	Mean Flow over Head Range	-	6.2																																																			
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Kick-Flo®	0.501	6.2																																																																		
Mean Flow over Head Range	-	6.2																																																																		
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																																																																				
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Hydro-Brake® Optimum <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>4.7</td><td>1.200</td><td>9.4</td><td>3.000</td><td>14.5</td><td>7.000</td><td>21.8</td></tr><tr><td>0.200</td><td>7.3</td><td>1.400</td><td>10.1</td><td>3.500</td><td>15.6</td><td>7.500</td><td>22.4</td></tr><tr><td>0.300</td><td>7.2</td><td>1.600</td><td>10.8</td><td>4.000</td><td>16.6</td><td>8.000</td><td>23.2</td></tr><tr><td>0.400</td><td>7.0</td><td>1.800</td><td>11.4</td><td>4.500</td><td>17.6</td><td>8.500</td><td>23.9</td></tr><tr><td>0.500</td><td>6.3</td><td>2.000</td><td>12.0</td><td>5.000</td><td>18.5</td><td>9.000</td><td>24.6</td></tr><tr><td>0.600</td><td>6.8</td><td>2.200</td><td>12.5</td><td>5.500</td><td>19.4</td><td>9.500</td><td>25.3</td></tr><tr><td>0.800</td><td>7.8</td><td>2.400</td><td>13.0</td><td>6.000</td><td>20.2</td><td></td><td></td></tr><tr><td>1.000</td><td>8.6</td><td>2.600</td><td>13.6</td><td>6.500</td><td>21.0</td><td></td><td></td></tr></tbody></table> Siphon Invert Level (m) 25.970 Cut In Height (m) 0.000 Cut Out Height (m) 0.000								Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.7	1.200	9.4	3.000	14.5	7.000	21.8	0.200	7.3	1.400	10.1	3.500	15.6	7.500	22.4	0.300	7.2	1.600	10.8	4.000	16.6	8.000	23.2	0.400	7.0	1.800	11.4	4.500	17.6	8.500	23.9	0.500	6.3	2.000	12.0	5.000	18.5	9.000	24.6	0.600	6.8	2.200	12.5	5.500	19.4	9.500	25.3	0.800	7.8	2.400	13.0	6.000	20.2			1.000	8.6	2.600	13.6	6.500	21.0		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																								
0.100	4.7	1.200	9.4	3.000	14.5	7.000	21.8																																																																								
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0.400	7.0	1.800	11.4	4.500	17.6	8.500	23.9																																																																								
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0.600	6.8	2.200	12.5	5.500	19.4	9.500	25.3																																																																								
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<u>Offline Controls for Storm</u>							
<u>Depth/Flow Relationship Manhole: S8, DS/PN: S10.001, Loop to PN: S10.002</u>							
Invert Level (m) 29.995							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.7500	0.900	15.7500	1.700	15.7500	2.500	15.7500
0.200	15.7500	1.000	15.7500	1.800	15.7500	2.600	15.7500
0.300	15.7500	1.100	15.7500	1.900	15.7500	2.700	15.7500
0.400	15.7500	1.200	15.7500	2.000	15.7500	2.800	15.7500
0.500	15.7500	1.300	15.7500	2.100	15.7500	2.900	15.7500
0.600	15.7500	1.400	15.7500	2.200	15.7500	3.000	15.7500
0.700	15.7500	1.500	15.7500	2.300	15.7500		
0.800	15.7500	1.600	15.7500	2.400	15.7500		
<u>Depth/Flow Relationship Manhole: S9, DS/PN: S11.001, Loop to PN: S11.002</u>							
Invert Level (m) 29.885							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.7500	0.900	15.7500	1.700	15.7500	2.500	15.7500
0.200	15.7500	1.000	15.7500	1.800	15.7500	2.600	15.7500
0.300	15.7500	1.100	15.7500	1.900	15.7500	2.700	15.7500
0.400	15.7500	1.200	15.7500	2.000	15.7500	2.800	15.7500
0.500	15.7500	1.300	15.7500	2.100	15.7500	2.900	15.7500
0.600	15.7500	1.400	15.7500	2.200	15.7500	3.000	15.7500
0.700	15.7500	1.500	15.7500	2.300	15.7500		
0.800	15.7500	1.600	15.7500	2.400	15.7500		
<u>Depth/Flow Relationship Manhole: S10, DS/PN: S11.002, Loop to PN: S10.002</u>							
Invert Level (m) 29.805							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	15.7500	0.900	15.7500	1.700	15.7500	2.500	15.7500
0.200	15.7500	1.000	15.7500	1.800	15.7500	2.600	15.7500
0.300	15.7500	1.100	15.7500	1.900	15.7500	2.700	15.7500
0.400	15.7500	1.200	15.7500	2.000	15.7500	2.800	15.7500
0.500	15.7500	1.300	15.7500	2.100	15.7500	2.900	15.7500
0.600	15.7500	1.400	15.7500	2.200	15.7500	3.000	15.7500
0.700	15.7500	1.500	15.7500	2.300	15.7500		
0.800	15.7500	1.600	15.7500	2.400	15.7500		
<u>Depth/Flow Relationship Manhole: S20, DS/PN: S15.001, Loop to PN: S14.001</u>							
Invert Level (m) 31.955							
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Depth/Flow Relationship Manhole: S20, DS/PN: S15.001, Loop to PN: S14.001							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	16.1700	0.900	16.1700	1.700	16.1700	2.500	16.1700
0.200	16.1700	1.000	16.1700	1.800	16.1700	2.600	16.1700
0.300	16.1700	1.100	16.1700	1.900	16.1700	2.700	16.1700
0.400	16.1700	1.200	16.1700	2.000	16.1700	2.800	16.1700
0.500	16.1700	1.300	16.1700	2.100	16.1700	2.900	16.1700
0.600	16.1700	1.400	16.1700	2.200	16.1700	3.000	16.1700
0.700	16.1700	1.500	16.1700	2.300	16.1700		
0.800	16.1700	1.600	16.1700	2.400	16.1700		
Depth/Flow Relationship Manhole: S21, DS/PN: S14.001, Loop to PN: S14.002							
Invert Level (m) 31.690							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	16.1700	0.900	16.1700	1.700	16.1700	2.500	16.1700
0.200	16.1700	1.000	16.1700	1.800	16.1700	2.600	16.1700
0.300	16.1700	1.100	16.1700	1.900	16.1700	2.700	16.1700
0.400	16.1700	1.200	16.1700	2.000	16.1700	2.800	16.1700
0.500	16.1700	1.300	16.1700	2.100	16.1700	2.900	16.1700
0.600	16.1700	1.400	16.1700	2.200	16.1700	3.000	16.1700
0.700	16.1700	1.500	16.1700	2.300	16.1700		
0.800	16.1700	1.600	16.1700	2.400	16.1700		
Depth/Flow Relationship Manhole: S39, DS/PN: S17.001, Loop to PN: S17.002							
Invert Level (m) 26.500							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	13.4400	0.900	13.4400	1.700	13.4400	2.500	13.4400
0.200	13.4400	1.000	13.4400	1.800	13.4400	2.600	13.4400
0.300	13.4400	1.100	13.4400	1.900	13.4400	2.700	13.4400
0.400	13.4400	1.200	13.4400	2.000	13.4400	2.800	13.4400
0.500	13.4400	1.300	13.4400	2.100	13.4400	2.900	13.4400
0.600	13.4400	1.400	13.4400	2.200	13.4400	3.000	13.4400
0.700	13.4400	1.500	13.4400	2.300	13.4400		
0.800	13.4400	1.600	13.4400	2.400	13.4400		
Depth/Flow Relationship Manhole: S31, DS/PN: S18.001, Loop to PN: S17.002							
Invert Level (m) 26.475							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	23.9400	0.600	23.9400	1.100	23.9400	1.600	23.9400
0.200	23.9400	0.700	23.9400	1.200	23.9400	1.700	23.9400
0.300	23.9400	0.800	23.9400	1.300	23.9400	1.800	23.9400
0.400	23.9400	0.900	23.9400	1.400	23.9400	1.900	23.9400
0.500	23.9400	1.000	23.9400	1.500	23.9400	2.000	23.9400
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Depth/Flow Relationship Manhole: S31, DS/PN: S18.001, Loop to PN: S17.002					
Depth (m) Flow (l/s)		Depth (m) Flow (l/s)		Depth (m) Flow (l/s)	
2.100 23.9400		2.400 23.9400		2.700 23.9400	
2.200 23.9400		2.500 23.9400		2.800 23.9400	
2.300 23.9400		2.600 23.9400		2.900 23.9400	
				3.000 23.9400	
Depth/Flow Relationship Manhole: S40, DS/PN: S21.001, Loop to PN: S17.004					
Invert Level (m) 26.350					
Depth (m) Flow (l/s)		Depth (m) Flow (l/s)		Depth (m) Flow (l/s)	
0.100 14.0700		0.900 14.0700		1.700 14.0700	
0.200 14.0700		1.000 14.0700		1.800 14.0700	
0.300 14.0700		1.100 14.0700		1.900 14.0700	
0.400 14.0700		1.200 14.0700		2.000 14.0700	
0.500 14.0700		1.300 14.0700		2.100 14.0700	
0.600 14.0700		1.400 14.0700		2.200 14.0700	
0.700 14.0700		1.500 14.0700		2.300 14.0700	
0.800 14.0700		1.600 14.0700		2.400 14.0700	
				2.500 14.0700	
				2.600 14.0700	
				2.700 14.0700	
				2.800 14.0700	
				2.900 14.0700	
				3.000 14.0700	

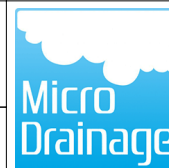
Hydrock Consultants Ltd		Page 17																																																																								
																																																																										
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Innovyze	Network 2020.1.3																																																																									
Storage Structures for Storm Cellular Storage Manhole: S14, DS/PN: S9.000 Invert Level (m) 29.160 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>200.0</td><td>200.0</td><td>1.010</td><td>0.0</td><td>256.9</td></tr><tr><td>1.000</td><td>200.0</td><td>256.6</td><td></td><td></td><td></td></tr></table> Cellular Storage Manhole: S5, DS/PN: S13.004 Invert Level (m) 31.505 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>150.0</td><td>150.0</td><td>1.001</td><td>0.0</td><td>199.0</td></tr><tr><td>1.000</td><td>150.0</td><td>199.0</td><td></td><td></td><td></td></tr></table> Cellular Storage Manhole: S10, DS/PN: S8.006 Invert Level (m) 26.565 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>120.0</td><td>120.0</td><td>0.751</td><td>0.0</td><td>152.9</td></tr><tr><td>0.750</td><td>120.0</td><td>152.9</td><td></td><td></td><td></td></tr></table> Cellular Storage Manhole: S11, DS/PN: S8.007 Invert Level (m) 26.455 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>135.0</td><td>135.0</td><td>0.501</td><td>0.0</td><td>158.3</td></tr><tr><td>0.500</td><td>135.0</td><td>158.2</td><td></td><td></td><td></td></tr></table> Cellular Storage Manhole: S14, DS/PN: S8.010 Invert Level (m) 25.950 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	200.0	200.0	1.010	0.0	256.9	1.000	200.0	256.6				Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	150.0	150.0	1.001	0.0	199.0	1.000	150.0	199.0				Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	120.0	120.0	0.751	0.0	152.9	0.750	120.0	152.9				Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	135.0	135.0	0.501	0.0	158.3	0.500	135.0	158.2			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																					
0.000	200.0	200.0	1.010	0.0	256.9																																																																					
1.000	200.0	256.6																																																																								
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																					
0.000	150.0	150.0	1.001	0.0	199.0																																																																					
1.000	150.0	199.0																																																																								
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																					
0.000	120.0	120.0	0.751	0.0	152.9																																																																					
0.750	120.0	152.9																																																																								
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																					
0.000	135.0	135.0	0.501	0.0	158.3																																																																					
0.500	135.0	158.2																																																																								
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Cellular Storage Manhole: S14, DS/PN: S8.010 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>30.0</td><td>30.0</td><td>0.501</td><td>0.0</td><td>41.0</td></tr><tr><td>0.500</td><td>30.0</td><td>41.0</td><td></td><td></td><td></td></tr></tbody></table> Cellular Storage Manhole: S33, DS/PN: S17.002 Invert Level (m) 26.070 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>470.0</td><td>470.0</td><td>0.501</td><td>0.0</td><td>513.4</td></tr><tr><td>0.500</td><td>470.0</td><td>513.4</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	30.0	30.0	0.501	0.0	41.0	0.500	30.0	41.0				Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	470.0	470.0	0.501	0.0	513.4	0.500	470.0	513.4			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																	
0.000	30.0	30.0	0.501	0.0	41.0																																	
0.500	30.0	41.0																																				
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																	
0.000	470.0	470.0	0.501	0.0	513.4																																	
0.500	470.0	513.4																																				
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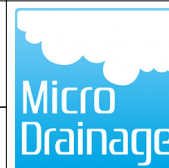
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Water	Surcharged	Flooded	Half Drain		Pipe	Status	
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)		Flow (l/s)
S8.000	S12	29.972	-0.128	0.000	0.38			20.0	OK
S8.001	S13	29.798	-0.162	0.000	0.17			19.9	OK
S9.000	S14	29.310	-0.435	0.000	0.01			1.4	OK
S10.000	S4	30.488	-0.202	0.000	0.23			9.5	OK
S10.001	S8	30.055	-0.240	0.000	0.00	9.5		0.0	OK
S11.000	S5	30.337	-0.203	0.000	0.22			9.4	OK
S11.001	S9	30.051	-0.094	0.000	0.00	8.7		0.0	OK
S12.000	S6	30.257	-0.203	0.000	0.22			9.4	OK
S11.002	S10	30.001	-0.214	0.000	0.00	15.7		0.0	OK
S10.002	S11	29.733	-0.372	0.000	0.07			25.0	OK
S10.003	S6	29.531	-0.144	0.000	0.05			24.8	OK
S9.001	S15	29.526	0.066	0.000	0.02			3.6	SURCHARGED
S8.002	S12	29.530	0.420	0.000	0.16			5.1	SURCHARGED
S13.000	S4	32.389	-0.186	0.000	0.07			4.2	OK

	US/MH	Level
PN	Name	Exceeded
S8.000	S12	
S8.001	S13	
S9.000	S14	
S10.000	S4	
S10.001	S8	
S11.000	S5	
S11.001	S9	
S12.000	S6	1
S11.002	S10	
S10.002	S11	
S10.003	S6	
S9.001	S15	
S8.002	S12	
S13.000	S4	

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for Storm

	US/MH	Level
PN	Name	Exceeded

S13.001	S5
S13.002	S20
S14.000	S18
S15.000	S16
S15.001	S20
S14.001	S21
S14.002	S21
S13.003	S4
S13.004	S5
S16.000	S8
S13.005	S6
S13.006	S20
S8.003	S7
S8.004	S8
S8.005	S9
S8.006	S10

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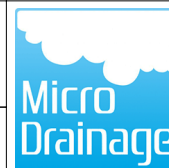
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

	US/MH	Level
PN	Name	Exceeded
S8.007	S11	
S8.008	S12	
S8.009	S13	
S8.010	S14	
S17.000	S34	
S17.001	S39	
S18.000	S47	
S18.001	S31	
S19.000	S33	
S20.000	S34	
S20.001	S35	
S19.001	S34	
S19.002	S35	
S17.002	S33	
S17.003	S34	
S21.000	S43	
S21.001	S40	
S17.004	S35	

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

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	13	Number of Time/Area Diagrams	0
Number of Offline Controls	8	Number of Real Time Controls	0

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.200	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	10.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

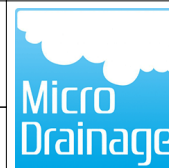
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.
S8.000	S12	15 Winter	30	+0%	100/15 Summer			
S8.001	S13	15 Winter	30	+0%	100/15 Summer			
S9.000	S14	180 Winter	30	+0%	100/30 Summer			
S10.000	S4	15 Winter	30	+0%				
S10.001	S8	15 Winter	30	+0%	30/15 Summer		1/15 Summer	114
S11.000	S5	15 Winter	30	+0%	100/15 Summer			
S11.001	S9	15 Winter	30	+0%	30/15 Summer		1/15 Summer	114
S12.000	S6	15 Winter	30	+0%	100/15 Summer	100/15 Winter		
S11.002	S10	30 Winter	30	+0%	30/15 Summer		1/15 Summer	114
S10.002	S11	15 Winter	30	+0%	100/15 Summer			
S10.003	S6	15 Winter	30	+0%	30/15 Summer			
S9.001	S15	15 Winter	30	+0%	1/15 Summer			
S8.002	S12	15 Winter	30	+0%	1/15 Summer			
S13.000	S4	15 Winter	30	+0%				
S13.001	S5	15 Winter	30	+0%	100/15 Summer			
S13.002	S20	180 Winter	30	+0%	30/120 Winter			
S14.000	S18	15 Winter	30	+0%	30/15 Winter			

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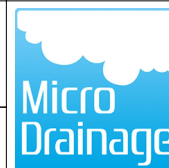
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Overflow		Half Drain	Pipe	Status
		Level	Depth	Volume			Time	Flow	
		(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	
S8.000	S12	30.059	-0.041	0.000	0.93			49.1	OK
S8.001	S13	29.947	-0.013	0.000	0.40			46.1	OK
S9.000	S14	29.682	-0.063	0.000	0.02		185	5.1	OK
S10.000	S4	30.553	-0.137	0.000	0.55			22.8	OK
S10.001	S8	30.427	0.132	0.000	0.00	15.8		0.0	SURCHARGED
S11.000	S5	30.432	-0.108	0.000	0.53			22.4	OK
S11.001	S9	30.418	0.273	0.000	0.00	15.7		0.0	SURCHARGED
S12.000	S6	30.379	-0.081	0.000	0.53			22.3	OK
S11.002	S10	30.362	0.147	0.000	0.12	15.8		22.0	SURCHARGED
S10.002	S11	29.922	-0.183	0.000	0.14			50.4	OK
S10.003	S6	29.869	0.194	0.000	0.11			50.0	SURCHARGED
S9.001	S15	29.786	0.326	0.000	0.02			4.9	SURCHARGED
S8.002	S12	29.818	0.708	0.000	0.18			5.7	SURCHARGED
S13.000	S4	32.413	-0.162	0.000	0.17			10.3	OK
S13.001	S5	32.137	-0.108	0.000	0.53			39.5	OK
S13.002	S20	31.971	0.026	0.000	0.12			9.6	SURCHARGED
S14.000	S18	32.423	0.033	0.000	0.56			23.5	SURCHARGED

PN	US/MH Name	Level Exceeded
S8.000	S12	
S8.001	S13	
S9.000	S14	
S10.000	S4	
S10.001	S8	
S11.000	S5	
S11.001	S9	
S12.000	S6	1
S11.002	S10	
S10.002	S11	
S10.003	S6	
S9.001	S15	
S8.002	S12	
S13.000	S4	
S13.001	S5	
S13.002	S20	
S14.000	S18	

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for Storm

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (1/s)	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (1/s)	
S8.005	S9	27.045	0.150	0.000	1.58			57.3	SURCHARGED
S8.006	S10	26.823	0.033	0.000	0.43		202	14.1	SURCHARGED
S8.007	S11	26.800	0.120	0.000	0.33			11.3	SURCHARGED
S8.008	S12	26.596	0.091	0.000	0.36			11.4	SURCHARGED
S8.009	S13	26.579	0.159	0.000	0.50			17.5	SURCHARGED
S8.010	S14	26.539	0.364	0.000	0.38			12.3	SURCHARGED
S17.000	S34	27.046	-0.154	0.000	0.46			19.4	OK
S17.001	S39	26.918	0.043	0.000	0.00	13.4		0.0	SURCHARGED
S18.000	S47	27.087	-0.088	0.000	0.81			34.3	OK
S18.001	S31	26.942	0.092	0.000	0.00	23.9		0.0	SURCHARGED
S19.000	S33	26.651	-0.244	0.000	0.04			2.9	OK
S20.000	S34	26.759	-0.061	0.000	0.65			10.1	OK
S20.001	S35	26.694	-0.001	0.000	0.98			13.8	OK
S19.001	S34	26.632	0.002	0.000	1.02			48.1	SURCHARGED
S19.002	S35	26.409	-0.176	0.000	0.55			52.1	OK
S17.002	S33	26.330	-0.205	0.000	0.06		218	6.7	OK
S17.003	S34	26.327	-0.118	0.000	0.06			6.9	OK
S21.000	S43	26.600	-0.150	0.000	0.46			19.3	OK
S21.001	S40	26.510	-0.065	0.000	0.00	14.1		0.0	OK
S17.004	S35	26.323	0.128	0.000	0.20			7.2	SURCHARGED

	US/MH	Level
PN	Name	Exceeded
S15.000	S16	
S15.001	S20	
S14.001	S21	
S14.002	S21	
S13.003	S4	
S13.004	S5	
S16.000	S8	
S13.005	S6	
S13.006	S20	
S8.003	S7	
S8.004	S8	
S8.005	S9	
S8.006	S10	
S8.007	S11	
S8.008	S12	
S8.009	S13	
S8.010	S14	
S17.000	S34	
S17.001	S39	
S18.000	S47	
S18.001	S31	
S19.000	S33	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH	Level
	Name	Exceeded
S20.000	S34	
S20.001	S35	
S19.001	S34	
S19.002	S35	
S17.002	S33	
S17.003	S34	
S21.000	S43	
S21.001	S40	
S17.004	S35	

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1) for Storm

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

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	13	Number of Time/Area Diagrams	0
Number of Offline Controls	8	Number of Real Time Controls	0

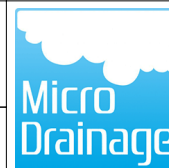
Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.200	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	10.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

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

US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.
S8.000	S12	15 Winter	100	+30%	100/15 Summer			
S8.001	S13	15 Winter	100	+30%	100/15 Summer			
S9.000	S14	240 Winter	100	+30%	100/30 Summer			
S10.000	S4	15 Winter	100	+30%				
S10.001	S8	30 Winter	100	+30%	30/15 Summer		1/15 Summer	114
S11.000	S5	15 Winter	100	+30%	100/15 Summer			
S11.001	S9	15 Winter	100	+30%	30/15 Summer		1/15 Summer	114
S12.000	S6	15 Winter	100	+30%	100/15 Summer	100/15 Winter		
S11.002	S10	15 Winter	100	+30%	30/15 Summer		1/15 Summer	114
S10.002	S11	30 Winter	100	+30%	100/15 Summer			
S10.003	S6	240 Winter	100	+30%	30/15 Summer			
S9.001	S15	240 Winter	100	+30%	1/15 Summer			
S8.002	S12	240 Winter	100	+30%	1/15 Summer			
S13.000	S4	15 Winter	100	+30%				
S13.001	S5	240 Winter	100	+30%	100/15 Summer			
S13.002	S20	240 Winter	100	+30%	30/120 Winter			
S14.000	S18	15 Winter	100	+30%	30/15 Winter			

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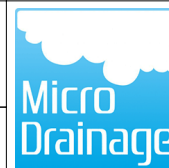
100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for Storm

		Water	Surcharged	Flooded			Half Drain	Pipe	
	US/MH	Level	Depth	Volume	Flow /	Overflow	Time	Flow	
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status
S8.000	S12	30.547	0.447	0.000	1.46			76.7	SURCHARGED
S8.001	S13	30.240	0.280	0.000	0.66			76.4	SURCHARGED
S9.000	S14	30.236	0.491	0.000	0.02			6.8	SURCHARGED
S10.000	S4	30.648	-0.042	0.000	0.89			37.1	OK
S10.001	S8	30.594	0.299	0.000	0.34	15.8		21.9	SURCHARGED
S11.000	S5	30.906	0.366	0.000	0.84			35.2	SURCHARGED
S11.001	S9	30.872	0.727	0.000	0.47	10.3		33.0	SURCHARGED
S12.000	S6	30.970	0.510	0.352	0.80			33.8	FLOOD
S11.002	S10	30.955	0.740	0.000	0.12	15.8		22.0	SURCHARGED
S10.002	S11	30.294	0.189	0.000	0.20			70.2	SURCHARGED
S10.003	S6	30.237	0.562	0.000	0.05			24.0	SURCHARGED
S9.001	S15	30.236	0.776	0.000	0.04			7.1	SURCHARGED
S8.002	S12	30.235	1.125	0.000	0.22			7.1	SURCHARGED
S13.000	S4	32.433	-0.142	0.000	0.29			17.3	OK
S13.001	S5	32.407	0.162	0.000	0.18			13.3	SURCHARGED
S13.002	S20	32.405	0.460	0.000	0.16			12.9	SURCHARGED
S14.000	S18	33.100	0.710	0.000	0.85			35.6	SURCHARGED

PN	US/MH Name	Level Exceeded
S8.000	S12	
S8.001	S13	
S9.000	S14	
S10.000	S4	
S10.001	S8	
S11.000	S5	
S11.001	S9	
S12.000	S6	1
S11.002	S10	
S10.002	S11	
S10.003	S6	
S9.001	S15	
S8.002	S12	
S13.000	S4	
S13.001	S5	
S13.002	S20	
S14.000	S18	

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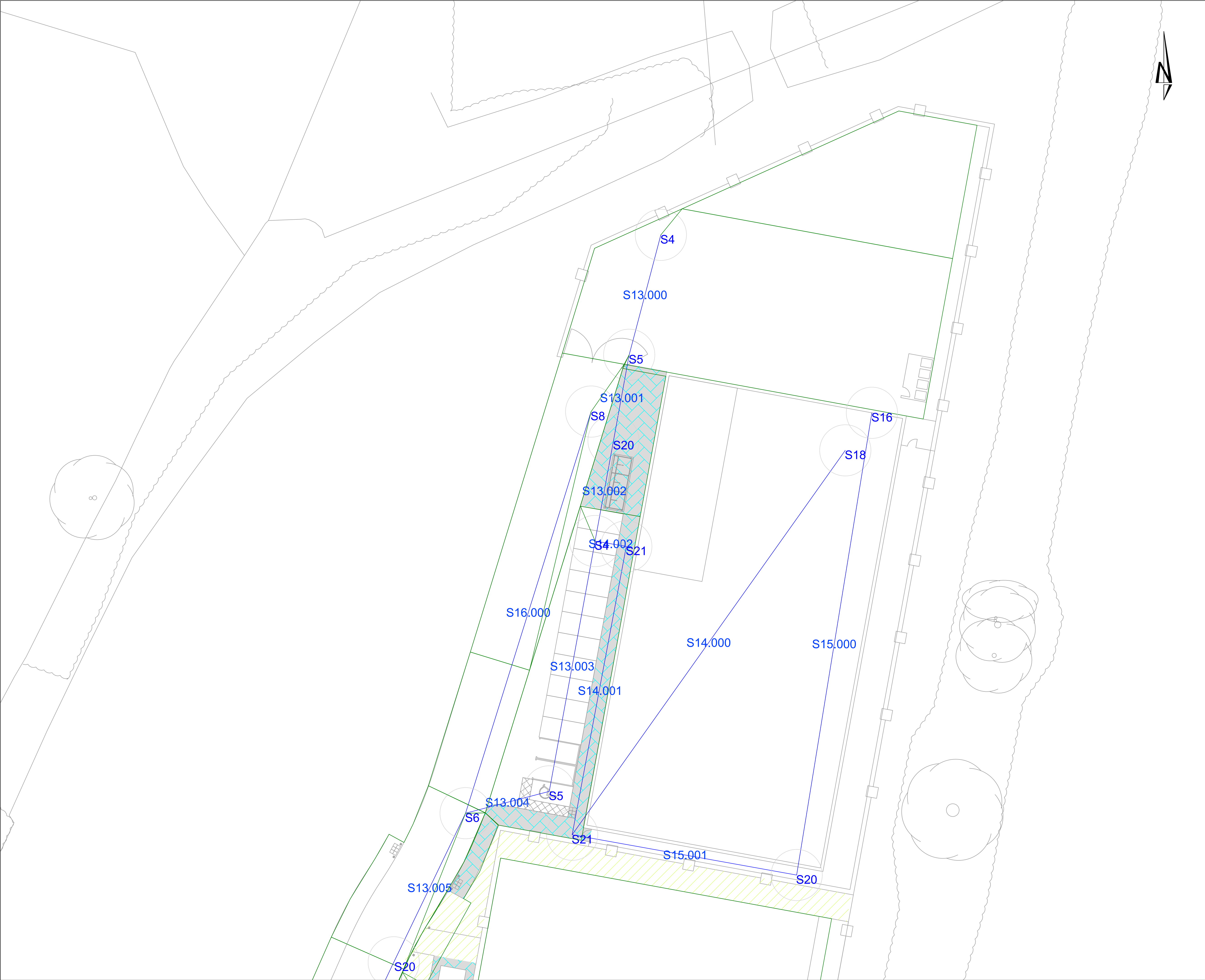
Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for Storm

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S8.005	S9	27.448	0.553	0.000	0.51			18.7	SURCHARGED
S8.006	S10	27.427	0.637	0.000	0.40			13.0	SURCHARGED
S8.007	S11	27.402	0.722	0.000	0.33			11.4	SURCHARGED
S8.008	S12	26.850	0.345	0.000	0.36			11.4	SURCHARGED
S8.009	S13	26.829	0.409	0.000	0.49			17.0	SURCHARGED
S8.010	S14	26.783	0.608	0.000	0.45			14.5	SURCHARGED
S17.000	S34	27.127	-0.073	0.000	0.75			31.8	OK
S17.001	S39	27.097	0.222	0.000	0.00	13.4		0.0	SURCHARGED
S18.000	S47	27.257	0.082	0.000	1.29			54.5	SURCHARGED
S18.001	S31	27.075	0.225	0.000	0.20	23.9		40.0	SURCHARGED
S19.000	S33	26.965	0.070	0.000	0.08			5.7	SURCHARGED
S20.000	S34	27.197	0.377	0.000	0.98			15.4	SURCHARGED
S20.001	S35	27.085	0.390	0.000	1.55			21.8	SURCHARGED
S19.001	S34	26.959	0.329	0.000	1.54			72.4	SURCHARGED
S19.002	S35	26.567	-0.018	0.000	0.15			14.4	OK
S17.002	S33	26.565	0.030	0.000	0.08		334	8.3	SURCHARGED
S17.003	S34	26.585	0.140	0.000	0.06			6.9	SURCHARGED
S21.000	S43	26.963	0.213	0.000	0.76			32.2	SURCHARGED
S21.001	S40	26.922	0.347	0.000	0.00	14.1		0.0	SURCHARGED
S17.004	S35	26.584	0.389	0.000	0.20			7.2	SURCHARGED

PN	US/MH Name	Level Exceeded
S15.000	S16	
S15.001	S20	
S14.001	S21	
S14.002	S21	
S13.003	S4	
S13.004	S5	
S16.000	S8	
S13.005	S6	
S13.006	S20	
S8.003	S7	
S8.004	S8	
S8.005	S9	
S8.006	S10	
S8.007	S11	
S8.008	S12	
S8.009	S13	
S8.010	S14	
S17.000	S34	
S17.001	S39	
S18.000	S47	
S18.001	S31	
S19.000	S33	

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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																																
<table> <thead> <tr> <th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr> </thead> <tbody> <tr> <td>S20.000</td><td>S34</td><td></td></tr> <tr> <td>S20.001</td><td>S35</td><td></td></tr> <tr> <td>S19.001</td><td>S34</td><td></td></tr> <tr> <td>S19.002</td><td>S35</td><td></td></tr> <tr> <td>S17.002</td><td>S33</td><td></td></tr> <tr> <td>S17.003</td><td>S34</td><td></td></tr> <tr> <td>S21.000</td><td>S43</td><td></td></tr> <tr> <td>S21.001</td><td>S40</td><td></td></tr> <tr> <td>S17.004</td><td>S35</td><td></td></tr> </tbody> </table>			PN	US/MH Name	Level Exceeded	S20.000	S34		S20.001	S35		S19.001	S34		S19.002	S35		S17.002	S33		S17.003	S34		S21.000	S43		S21.001	S40		S17.004	S35	
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KEY PLAN

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

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4. Levels shown in metres above Ordnance Datum (mAOD).

P01	SUITABLE FOR INFORMATION					
	H.MILLER	31/07/23	A. TODD	31/07/23	J. MAGEE	31/07/23
REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

Hydrock

Merchants' House North
Wapping Road
Bristol
BS1 4RW
t: +44 (0)117 945 9225
e: bristolcentral@hydrock.com

CLIENT

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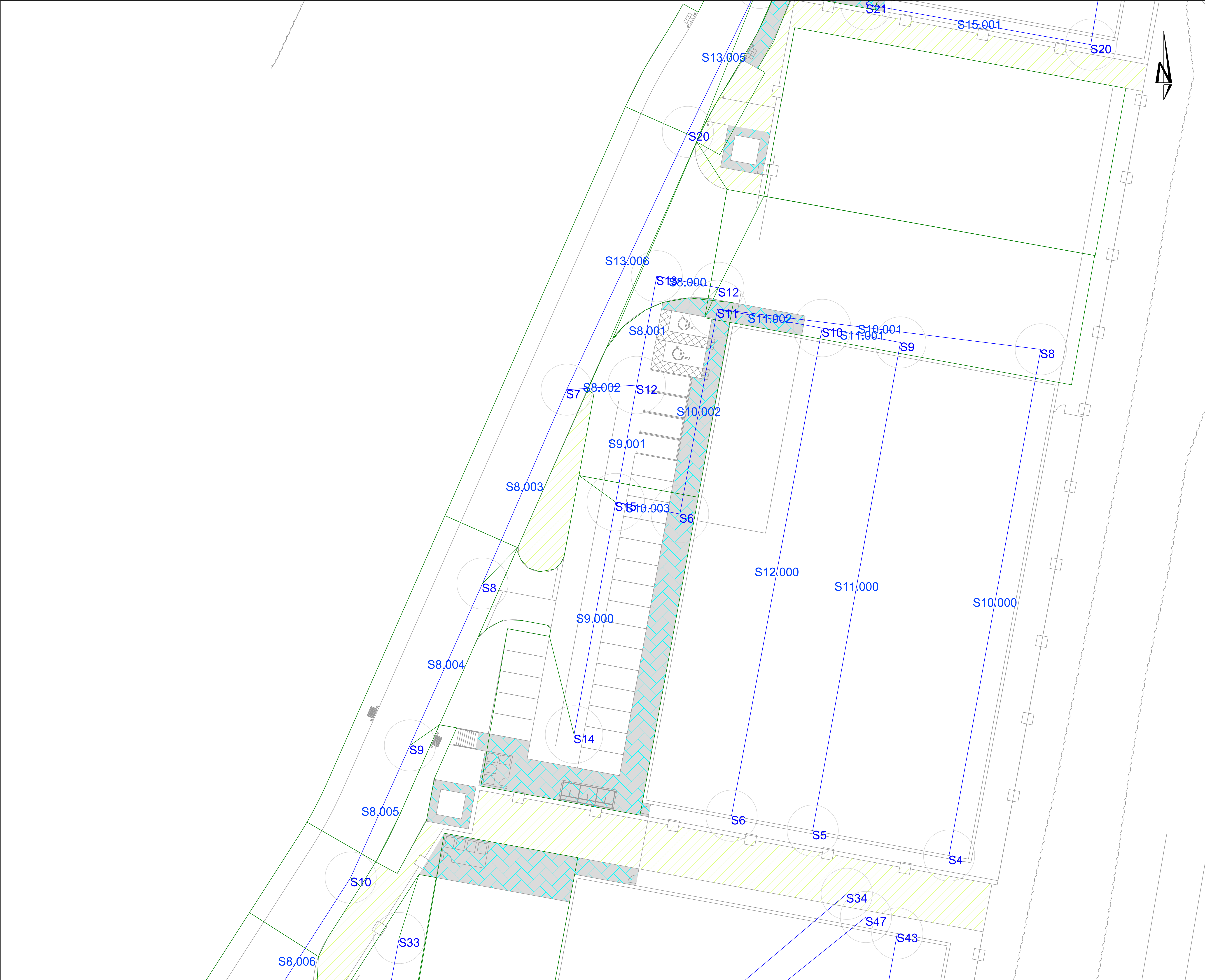
PROJECT

DUNSBURY PARK
UNITS 500, 501 & 502

TITLE

DRAINAGE LAYOUT
SHEET 1

HYDROCK PROJECT NO. C-19453-C	SCALE @ A1 1:200
STATUS DESCRIPTION SUITABLE FOR INFORMATION	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) G1129-HYD-ZZ-XX-SK-C-7710	REVISION P01



KEY PLAN

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Hydrock

Merchants' House North

Wapping Road

Bristol

BS1 4RW

t: +44 (0)117 945 9225

e: bristolcentral@hydrock.com

CLIENT

GLENCAR CONSTRUCTION LTD.

PROJECT

DUNSBURY PARK
UNITS 500, 501 & 502

TITLE

DRAINAGE LAYOUT
SHEET 2

HYDROCK PROJECT NO.
C-19453-C

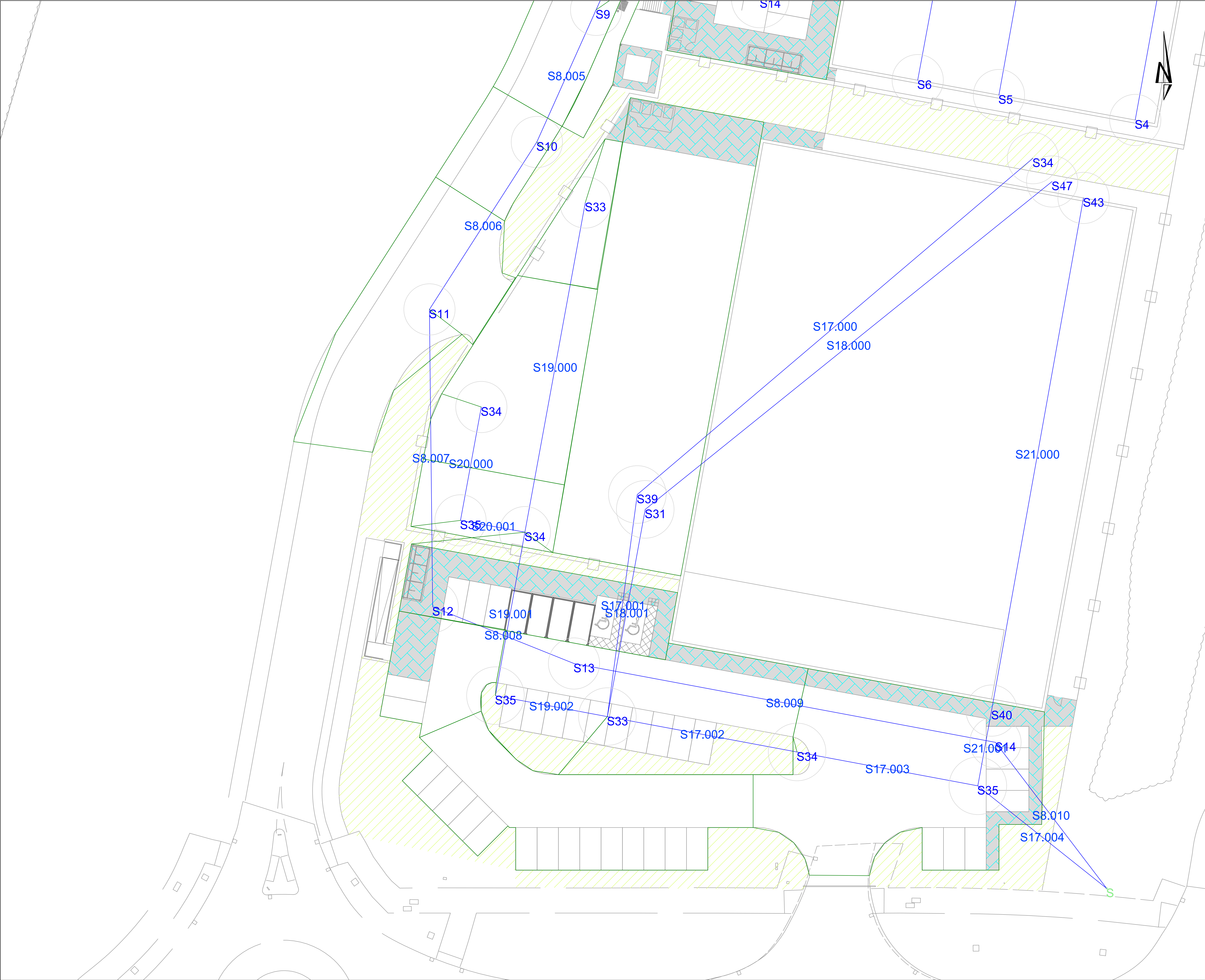
SCALE @ A1
1:200

STATUS DESCRIPTION
SUITABLE FOR INFORMATION

STATUS
S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
G1129-HYD-ZZ-XX-SK-C-7711

REVISION
P01



KEY PLAN

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Merchants' House North
Wapping Road
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BS1 4RW
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e: bristolcentral@hydrock.com

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PROJECT

DUNSBURY PARK
UNITS 500, 501 & 502

TITLE

DRAINAGE LAYOUT
SHEET 3

HYDROCK PROJECT NO.
C-19453-C

SCALE @ A1
1:200

STATUS DESCRIPTION
SUITABLE FOR INFORMATION

STATUS
S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
G1129-HYD-ZZ-XX-SK-C-7712

REVISION
P01