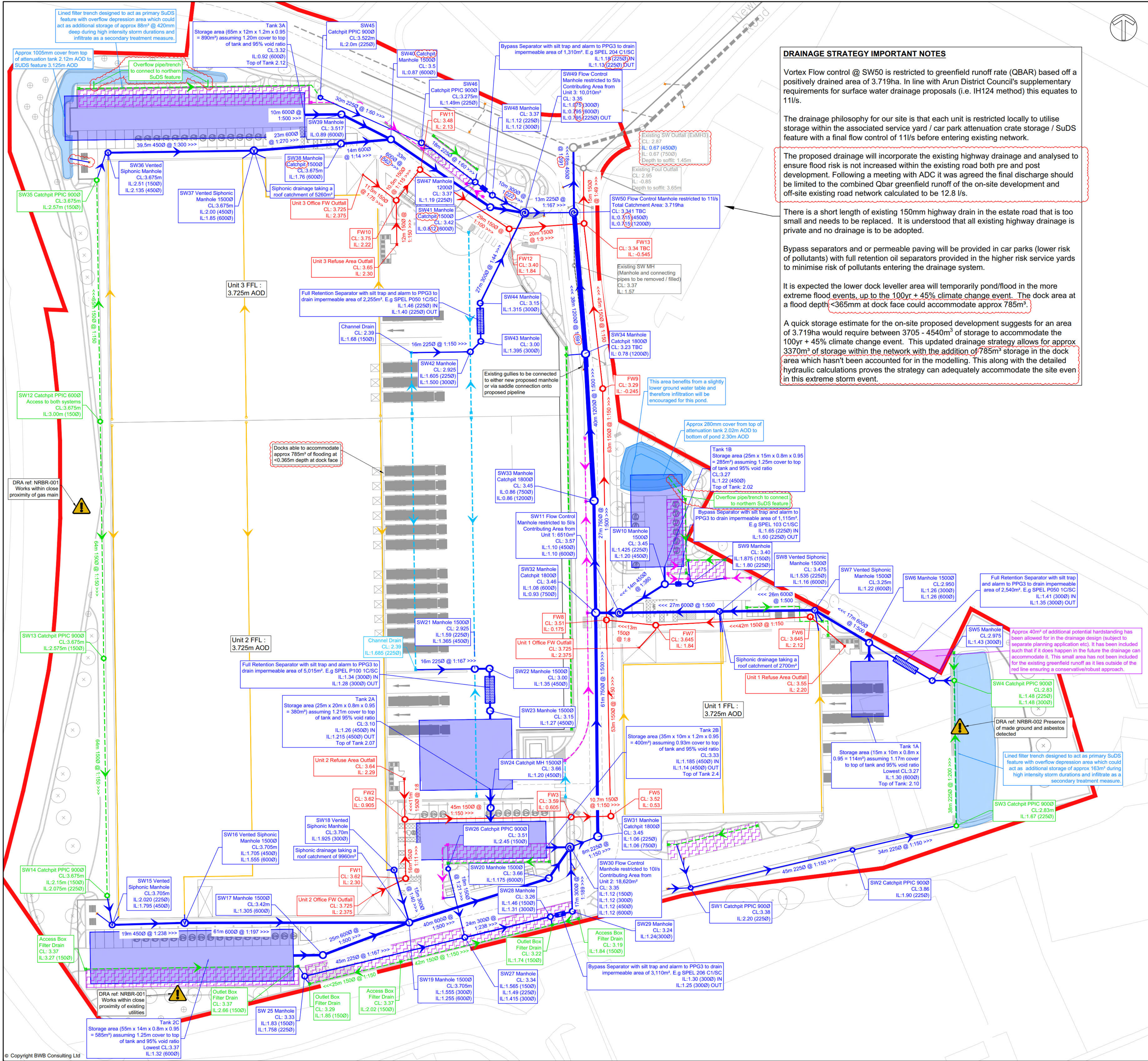


Appendix A

243912-BWB-EXT-XX-D-C-0500-[A5-C07]_Drainage Layout



DRAINAGE STRATEGY IMPORTANT NOTES

Vortex Flow control @ SW50 is restricted to greenfield runoff rate (QBAR) based off a positively drained area of 3.719ha. In line with Arun District Council's supplementary requirements for surface water drainage proposals (i.e. IH124 method) this equates to 11l/s.

The drainage philosophy for our site is that each unit is restricted locally to utilise storage within the associated service yard / car park attenuation grate storage / SuDS feature with a final flow control of 11l/s before entering existing network.

The proposed drainage will incorporate the existing highway drainage and analysed to ensure flood risk is not increased within the existing road both pre and post development. Following a meeting with ADC it was agreed the final discharge should be limited to the combined Qbar greenfield runoff of the on-site development and off-site existing road network calculated to be 12.8 l/s.

There is a short length of existing 150mm highway drain in the estate road that is too small and needs to be replaced. It is understood that all existing highway drainage is private and no drainage is to be adopted.

Bypass separators and or permeable paving will be provided in car parks (lower risk of pollutants) with full retention oil separators provided in the higher risk service yards to minimise risk of pollutants entering the drainage system.

It is expected the lower dock leveller area will temporarily pond/flood in the more extreme flood events, up to the 100yr + 45% climate change event. The dock area at a flood depth <365mm at dock face could accommodate approx 785m³.

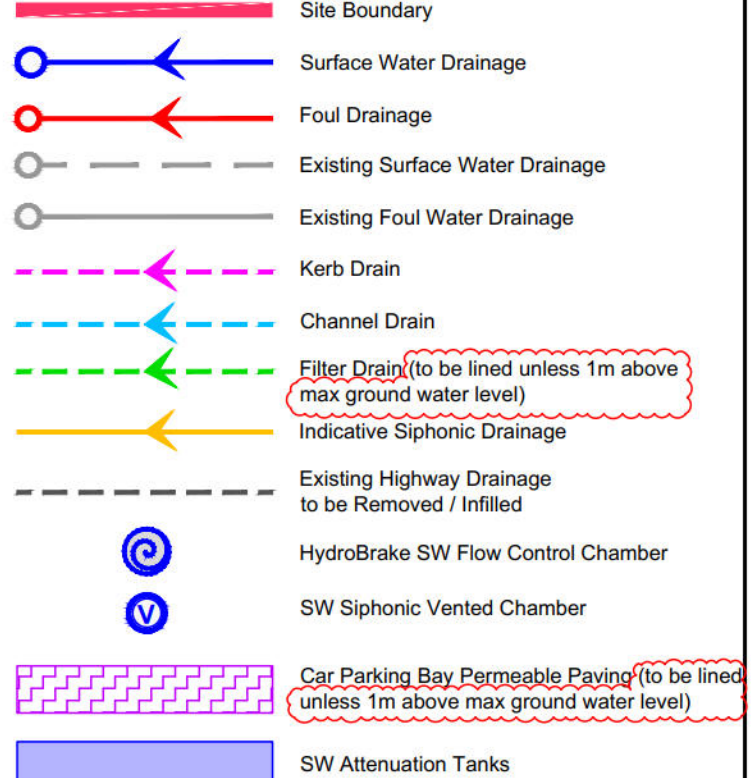
A quick storage estimate for the on-site proposed development suggests for an area of 3.719ha would require between 3705 - 4540m³ of storage to accommodate the 100yr + 45% climate change event. This updated drainage strategy allows for approx 3370m³ of storage within the network with the addition of 785m³ storage in the dock area which hasn't been accounted for in the modelling. This along with the detailed hydraulic calculations proves the strategy can adequately accommodate the site even in this extreme storm event.

Drainage Notes

- All adoptable surface and foul water drainage works (including connections to the Public Sewers) to be carried out in strict accordance with the 'Sewer Sector Guidance' and any specific requirements of the adopting authority.
- All adoptable highway drainage works to be carried out in strict accordance with the Local Highway Authority requirements and the DfT MCHW Specification for Highway Works.
- All private drainage works are to be carried out in accordance with Building Regulations Part H, BS EN 752, the Civil Engineering Specification for the Water Industry and, where provided, the BWB Drainage Specification.
- Where applicable the contractor shall allow free and full access to the drainage works for the local authority, highway authority, drainage authority or the overseeing organisation.
- The Contractor shall check the condition of the existing drainage and ensure it is structurally sound and free from blockages / obstructions. Where necessary the Contractor is to replace and/or undertake remedial works on defective drainage. All drainage is to be cleaned by jetting, removing all debris from site to an appropriately licensed tip.
- The exact position, level, line, size and use of existing drainage is to be confirmed on site. Any discrepancies to be reported to the engineer prior to the commencement of works.
- For new connections to existing manholes, existing benching is to be broken out and reformed to suit. Concrete/brick surround to be made good.
- All temporary works associated with the construction of the drainage works shall be the responsibility of the contractor, including the protection of any uncovered/shallow pipework against construction traffic.
- The Contractor is responsible for obtaining and paying for all necessary permissions to enable construction of the works to be undertaken, including but not limited to licences for street works and connections to existing sewers. This includes Section 108 applications when connecting directly or indirectly to the public sewerage network (complete application to be made at least 3 weeks prior to the planned outfall construction works).
- Any damage caused to existing footways, roads or other third party property to be made good.
- Under roads and external paved areas all materials within 450mm of finished levels to be non-frost susceptible. Reinforcements shall be undertaken in accordance with the BWB standard detail.
- All proposed chamber covers are to be marked permanently with "SWS" (or equiv.) on surface water sewers and "FWS" (or equiv.) on foul sewers. All covers to be in accordance with BS EN 124.
- Unless noted otherwise, all lateral connections are to be installed with level soffits to the diameters and gradients shown on the layout drawing. Any pipe bends should be provided to suit the direction of flow & no pipework should be downsized in the direction of flow.
- The number and location of all RWPs is shown indicatively only. To be confirmed by Architect / M&E contractor prior to commencement of works.
- Foul water 'pop up positions' are shown indicatively only, to be confirmed by the Architect / M&E contractor prior to commencement of works. Refer to Architect plans for setting out of internal foul pop up positions.
- All RWPs and SVPs to be fitted with rodable access plates. All foul drains to have rodable access.
- Above ground drainage details to be designed/confirmed by the Architect/M&E contractor, including ventilation of the foul drainage system.
- Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
- All specialist/proprietary products such as separators, attenuation tanks, channel drains, soakways, package pumping station and water treatment units to be installed as per the manufacturer's installation details and specifications.
- Any filter drain or permeable paving that has an invert within 1m of the anticipated maximum ground water level (Ref 243912-GW-01-V1) is to incorporate an impermeable liner/membrane.

- #### Notes
- Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - This drawing is to be read in conjunction with BWB drawings: 243912-BWB-EXT-XX-D-C-0001_Civil Engineering Notes, 243912-BWB-EXT-XX-D-C-0500_Drainage Catchment Plan, 243912-BWB-EXT-XX-D-C-0560_Drainage Construction Details Sheet 1 & 243912-BWB-EXT-XX-D-C-0560_Drainage Construction Details Sheet 2
 - For details of FRA including original drainage strategy please refer to: Oldlands Farm Phase 3 FRA & DS dated Dec 2022.
 - For the corresponding hydraulic model refer to BWB Report: 243912-BWB-EXT-XX-T-C-0500-[44-C08] Drainage Hydraulic Report

Key Plan



Important CDM / H&S Notes

- For more information of specified hazard refer to BWB Designers Risk Assessment: 243912-BWB-EXT-XX-HS-C-0001**
- Any construction personnel including operatives intending to construct the designs shown on this drawing should ensure that they have been regularly and thoroughly briefed by the principal Contractor on all health and safety matters and have had sight of:
- The full Designers and Contractors risk assessments and risk registers.
 - The developed construction health and safety plan.
 - The Contractors construction method statements.
- Hazards that are obvious to a competent Contractor are not shown, as are every day and low risk hazards.

C07	11.02.26	Updated to ADC Comments	DH	TAJ
C06	20.11.25	Note updated following LLFA comments	DH	TAJ
C05	22.10.25	Tank clearance note added	DH	TAJ
C04	18.09.25	Layout updated to suit masterplan changes.	DH	TAJ
C03	10.09.25	Layout updated to suit masterplan changes. Additional SuDS features added. Pipe sizes and Chambers adjusted.	DH	TAJ
C02	22.08.25	Pipe 1.010 & 1.011 upsized to 1200mm	DH	DH
C01	20.12.24	Issued for tender	DH	TAJ
P02	29.11.24	Issued for comment	DH	TAJ
P01	11.11.24	Preliminary Issue	DH	TAJ
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions

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Client: **PANATTONI**

Project Title: **Newlands Road, Bognor Regis**

Drawing Title: **Drainage Layout**

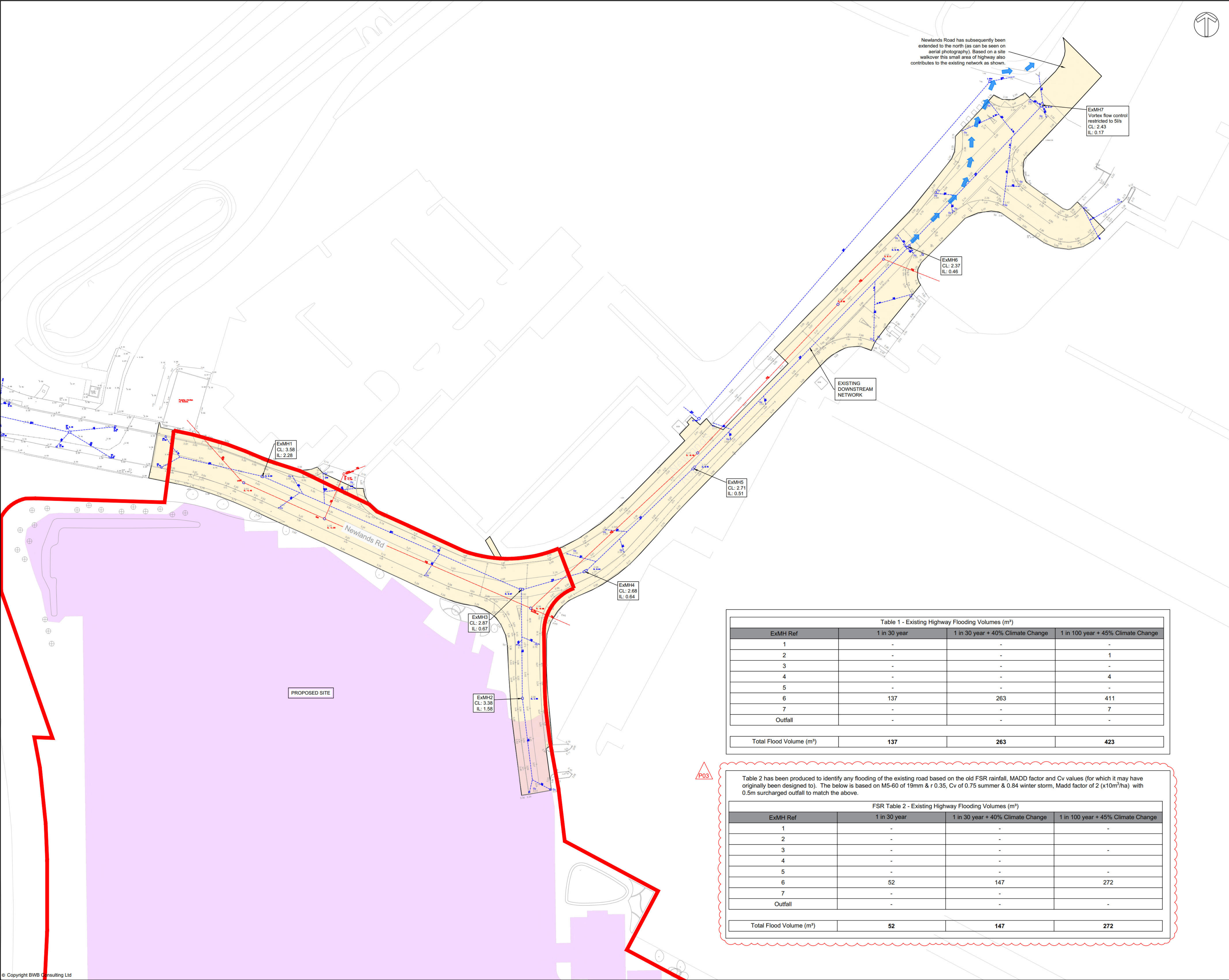
Drawn:	J.Arnold	Reviewed:	T.Jones
BWB Ref:	243912	Date:	08.11.24
Scale:	Scale@A1: 1:500		

FOR CONSTRUCTION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
243912-BWB-EXT-XX-D-C-0500	A5	C07

Appendix B

243912-BWB-EXT-XX-G-C-0535-[S2-P03]_Existing Downstream Highway Drainage
System Assessment



Newlands Road has subsequently been extended to the north (as can be seen on aerial photography). Based on a site walkover this small area of highway also contributes to the existing network as shown.

ExMH7
Vortex flow control
restricted to 5/s
CL: 2.43
IL: 0.17

ExMH6
CL: 2.37
IL: 0.46

EXISTING
DOWNSTREAM
NETWORK

ExMH5
CL: 2.71
IL: 0.51

ExMH4
CL: 2.68
IL: 0.64

ExMH3
CL: 2.87
IL: 0.67

ExMH2
CL: 3.38
IL: 1.58

PROPOSED SITE

Newlands Rd

Table 1 - Existing Highway Flooding Volumes (m³)			
ExMH Ref	1 in 30 year	1 in 30 year + 40% Climate Change	1 in 100 year + 45% Climate Change
1	-	-	-
2	-	-	1
3	-	-	-
4	-	-	4
5	-	-	-
6	137	263	411
7	-	-	7
Outfall	-	-	-
Total Flood Volume (m³)	137	263	423

P03

FSR Table 2 - Existing Highway Flooding Volumes (m³)			
ExMH Ref	1 in 30 year	1 in 30 year + 40% Climate Change	1 in 100 year + 45% Climate Change
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	52	147	272
7	-	-	-
Outfall	-	-	-
Total Flood Volume (m³)	52	147	272

Notes

- Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
- This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
- All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
- Any discrepancies noted on site are to be reported to the engineer immediately.
- Flood volumes for Table 1 have been derived from hydraulic modelling with the following key parameters - FEH 22 rainfall data, Summer and Winter CV=1 with a 0.5m Surcharged Outfall. No MADD Factor has been accounted for.
- For Existing Highway Model FEH results refer to BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0505-S2-P01_Existing Highway Drainage Hydraulic Report.
- For Existing Highway Model FSR results refer to BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0507-S2-P01_Existing Highway Drainage Hydraulic Report FSR.
- Cover and invert levels of existing drainage based on Sitech Surveying Services topographical survey: 15193-21 - Estate Road - Underground Services Survey dated March 2021.

Key

- Existing Highway Drainage Catchment (0.606ha)
- Proposed Site Boundary
- Existing overland flood flow route
- Proposed development catchment area (see sketch 0536 for further details)

Existing Drainage Network Overview

This drawing has been produced to demonstrate the existing highway drainage system.

The existing network is restricted to 5 l/s and has been hydraulically modelled with the results summarised in table 1 below.

The results show that the road currently floods by the following amounts:

30yr = 137m³
30yr + 40% Climate Change = 263m³
100yr + 45% Climate Change = 423m³

From analysing the hydraulic model and topography the majority of flooding occurs at ExMH 6 where it is expected to naturally flow in a north easterly direction before outfalling back into the lower surrounding ditch/watercourse network.

The proposed drainage associated with the new development plot must not exacerbate this existing flooding.

P03	09.02.26	Table 2 added to show FSR results	DH	TAJ
P02	18.09.25	Updated to latest masterplan amendments	DH	TAJ
P01	10.09.25	Issued for information	DH	TAJ
Rev	Date	Details of issue / revision	Drw	Rev

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Project Title

Newlands Road, Bognor Regis

Drawing Title

Existing Downstream Highway Drainage System Assessment

Drawn: D.Holmes Reviewed: T.Jones

BWB Ref: 243912 Date: Sept 25 Scale@A1: 1:500

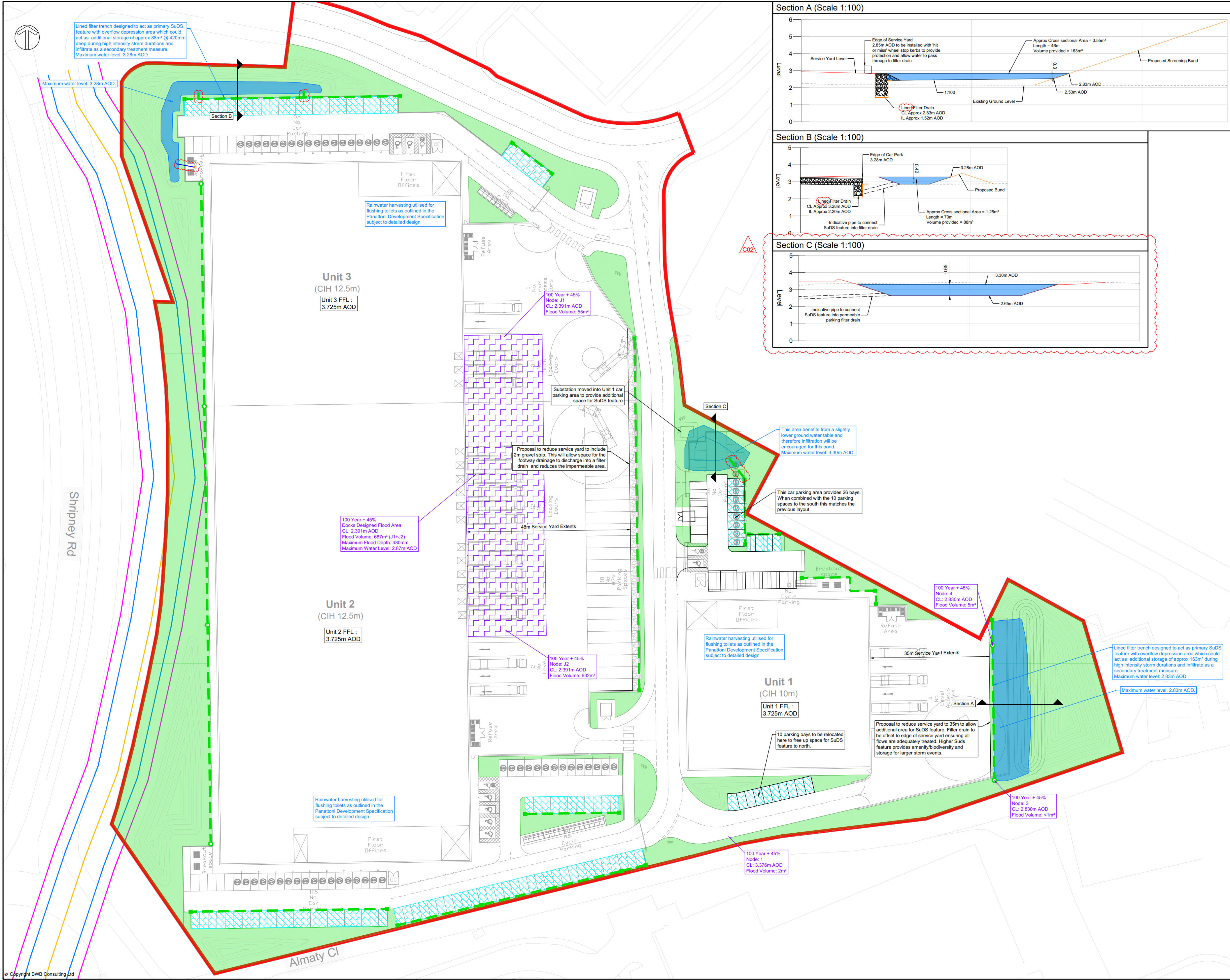
Drawing Status

For Information

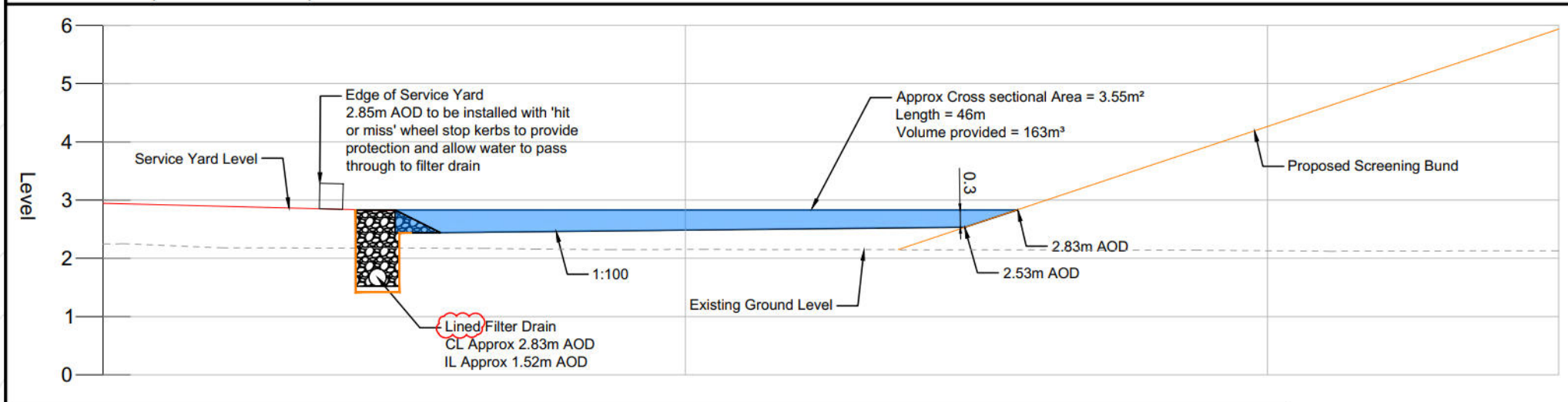
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
243912-BWB-EXT-XX-G-C-0535	S2	P03

Appendix C

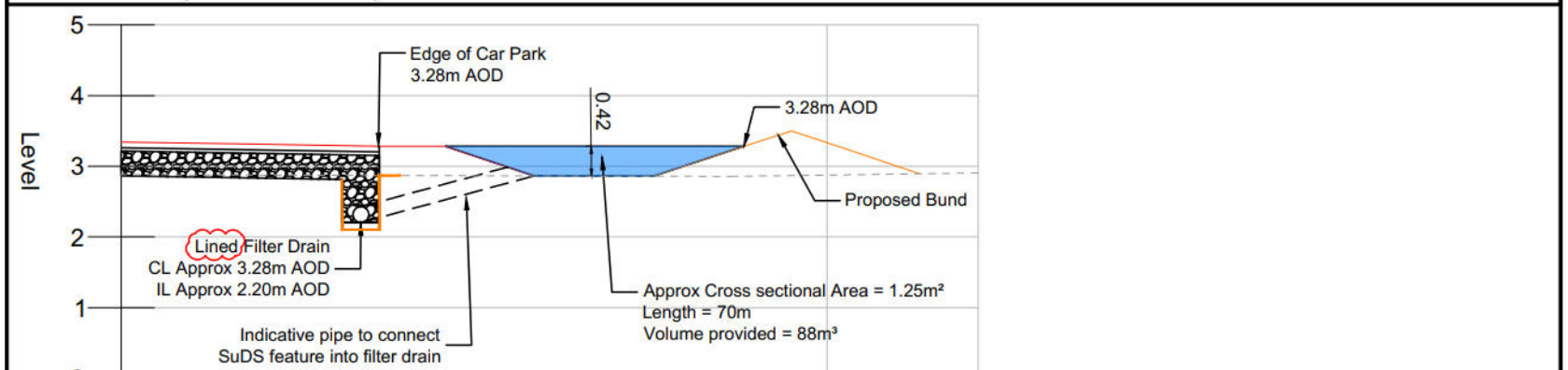
243912-BWB-EXT-XX-D-C-0537-[A5-C02]_SuDS Overview Plan & Masterplan
Amendment



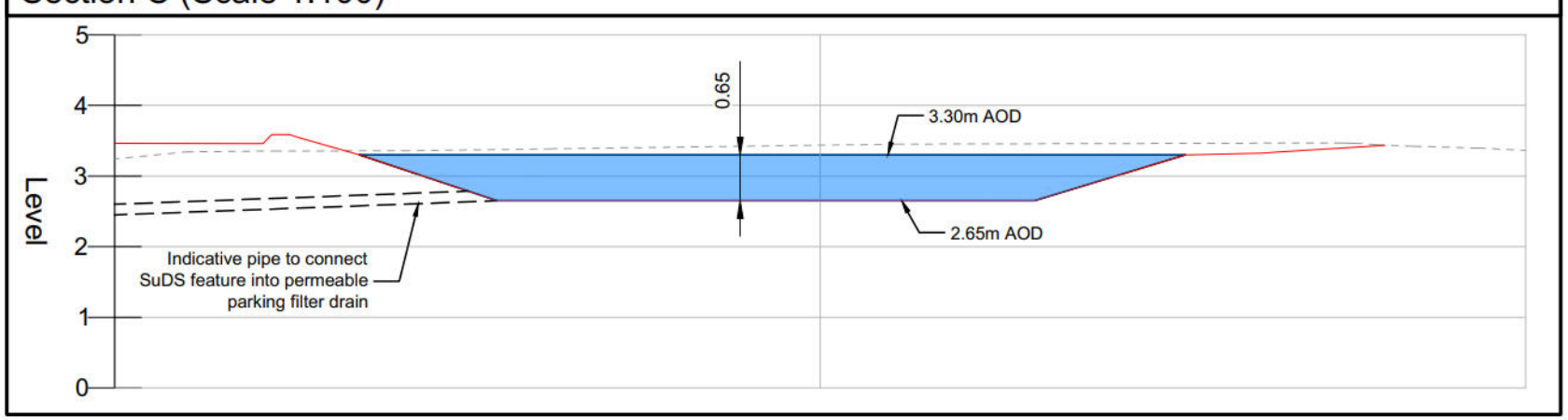
Section A (Scale 1:100)



Section B (Scale 1:100)



Section C (Scale 1:100)



Notes

- Do not scale this drawing. All dimensions must be checked/verified on site. If in doubt ask.
- This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
- All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
- Any discrepancies noted on site are to be reported to the engineer immediately.

Legend

- Soft Landscaping Area
- SuDS Pond / Overflow Wetlands Area Feature
- SuDS Permeable Paving
- SuDS Flood Storage Area
- SuDS Filter Drain
- Topsail Mound to remain as proposed displayed at 0.250m intervals

C02	11.02.26	Section C added	DH	TAJ
C01	20.11.25	Note updated following LLFA comments	DH	TAJ
P03	18.09.25	Updated to latest masterplan amendments	DH	TAJ
P02	12.09.25	Included more information	RA	DH
P01	10.09.25	Issued for Information	DH	TAJ
Rev	Date	Details of issue / revision	Drw	Rev

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Project Title

Newlands Road, Bognor Regis

Drawing Title

SuDS Overview Plan & Masterplan Amendments

Drawn:	D.Holmes	Reviewed:	T.Jones
BWB Ref:	243912	Date:	Sept 25
Scale@A1:	1:500		

Drawing Status

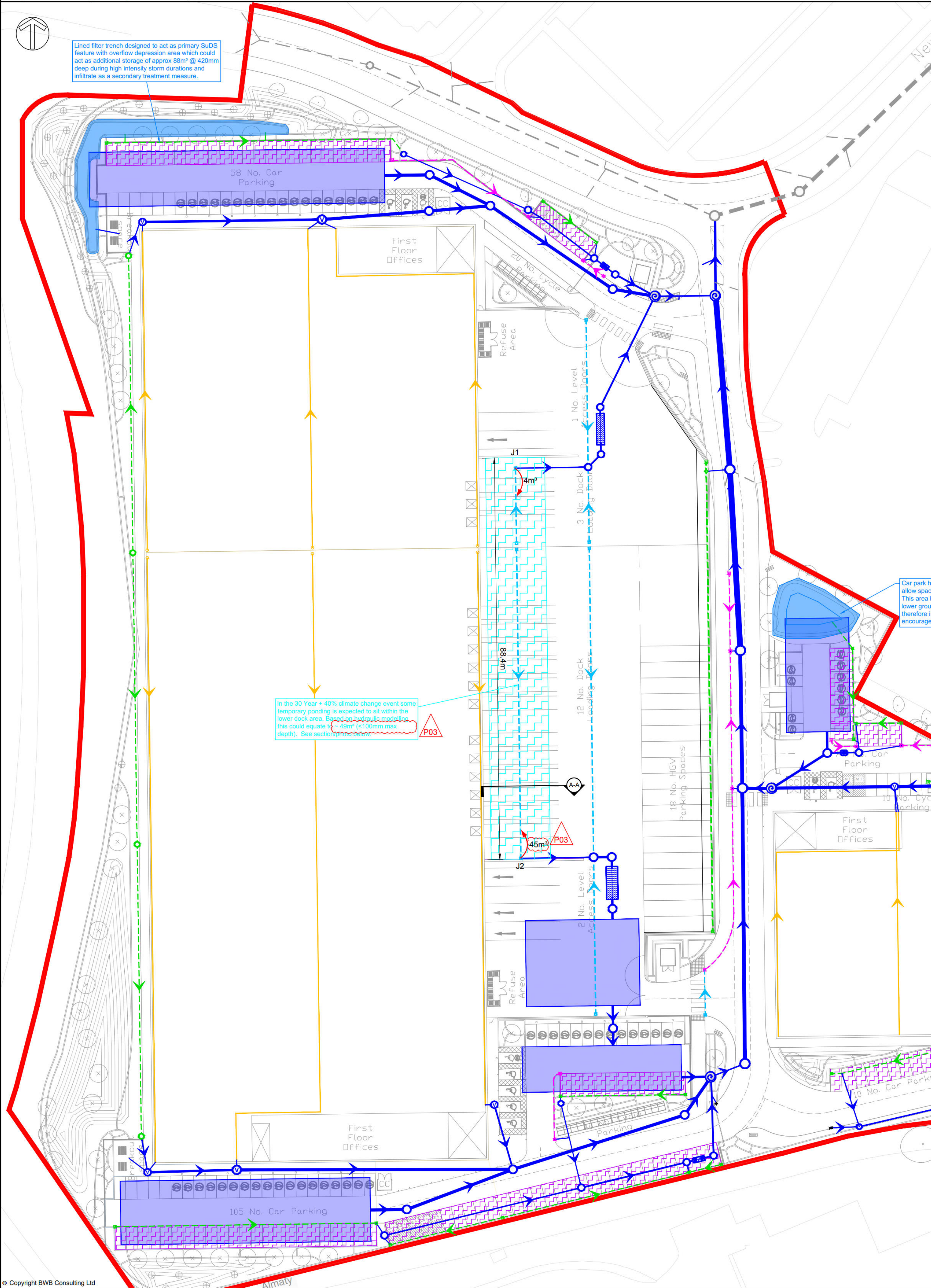
FOR CONSTRUCTION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
243912-BWB-EXT-XX-D-C-0537	A5	C02

Appendix D

243912-BWB-EXT-XX-G-C-0538-[S2-P03]_Drainage Flood Volumes 30yr + 40%
Climate Change Exceedance Plan

Proposed Development (Scale 1:500)



Existing Highway (Scale 1:500)

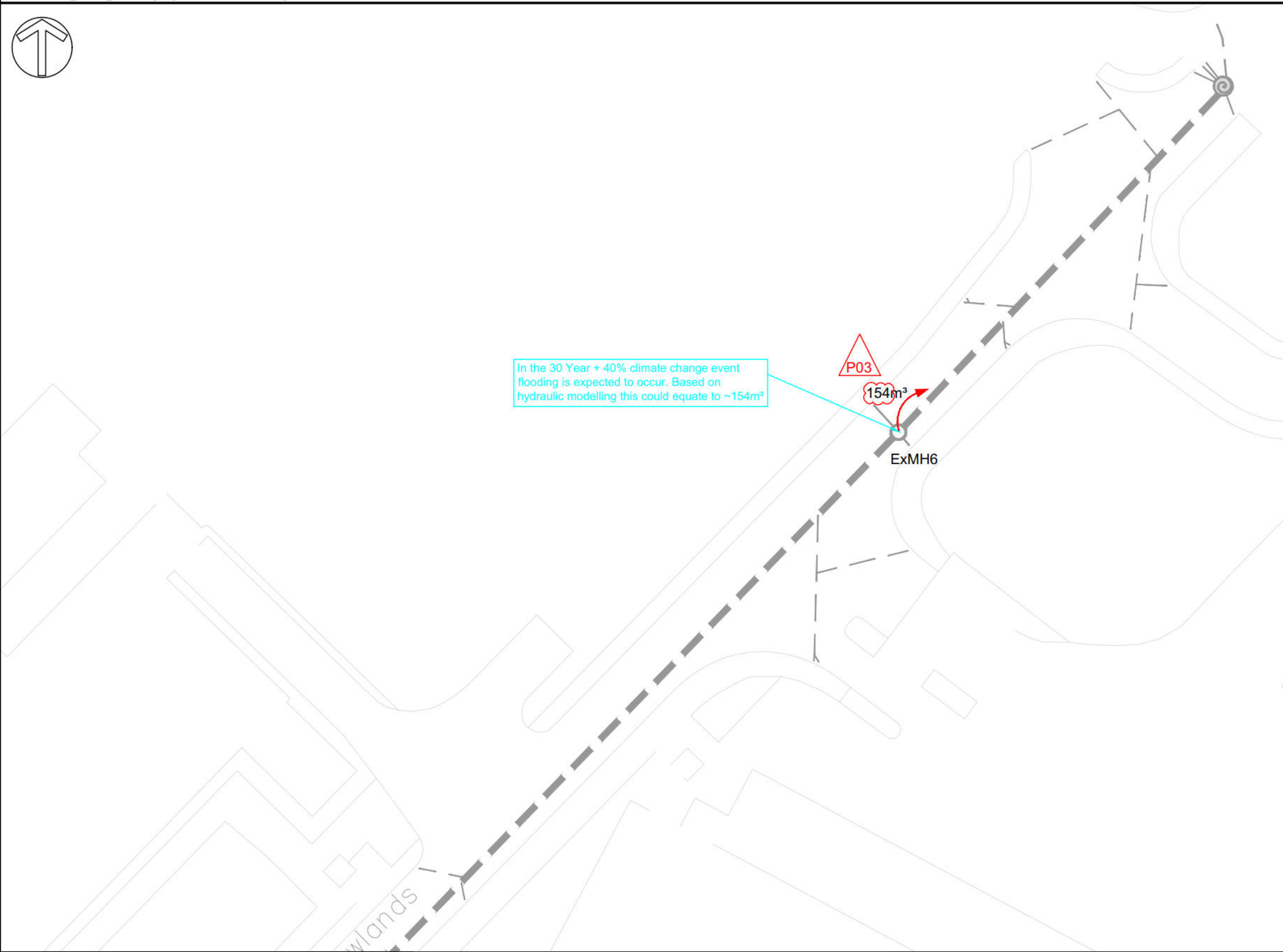


Table A: Existing Road Drainage Flooding Volumes (m³)			
Storm Event	Existing Highway Flooding Prior to Proposed Development	Existing Highway Flooding with Proposed Development	% Betterment
1 in 30 year + 40% Climate Change (FEH)	263	154 P03	41 P03
243912-BWB-EXT-XX-T-C-0505 P01 243912-BWB-EXT-XX-T-C-0500 C08			
1 in 30 year + 40% Climate Change (Old FSR/Cv etc.)	147	65	56
243912-BWB-EXT-XX-T-C-0507 P01 243912-BWB-EXT-XX-T-C-0508 P01			

Drainage Philosophy

Existing Highway

The existing highway currently discharges into the Oldlands Farm ditch to the north via a flow control chamber restricted back to 5/ls.

The existing highway has been hydraulically modelled to the same parameters in which the proposed site is subject to (i.e. FEH-22 rainfall data, CV=1 with a surcharged outfall). This results in flooding (shown in Table A) within the existing highway prior to the addition of the proposed development network.

A quick storage estimate suggests the existing highway has insufficient storage and will always have a problem with flooding in intense storm events.

The strategy will be to limit the proposed development to QBAR, with the aim of no increase to existing flooding within the existing highway and ideally reducing these volumes where possible.

Proposed Development

As outlined in the Restricted Discharge section of the Arun District Council website: <https://www.arun.gov.uk/surfacewater/IH124> method will be used to calculate the greenfield runoff rate (QBAR) for a positively drained area of 3.719ha (For more information refer to BWB sketch 0536). In summary this results in a QBAR of 111/ls.

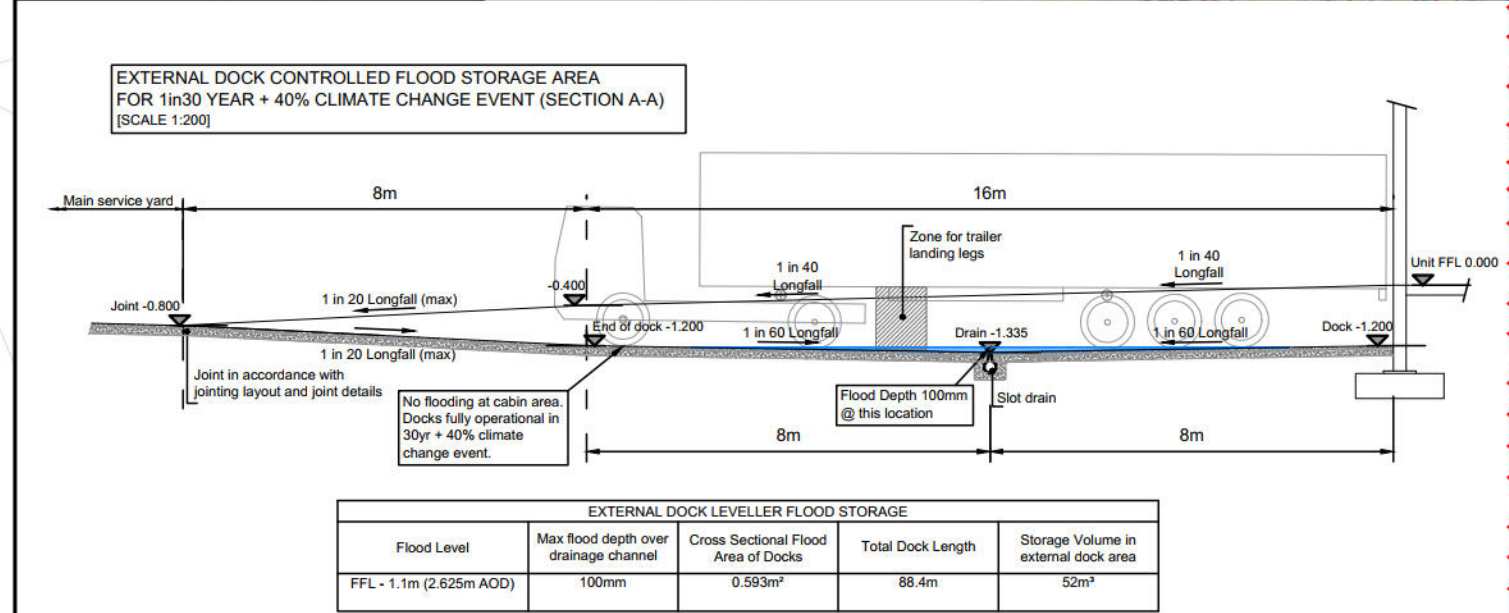
The drainage for the on-site proposed development has been hydraulically modelled to meet the following criteria:

- No flooding up to the 1 in 30 year event
- No flooding in the 1 in 30 year + 40% Climate Change unless an area is specifically designed to hold or convey water as part of the design (i.e. lower dock area).
- Flooding volumes are acceptable during a 1 in 100 year + 45% Climate Change with the provision that the flooding is controlled and will remain on site.

In addition to the above the proposed development does not increase offsite flooding in the existing highway.

Outfall Discharge Rate

The proposed development is restricted back to QBAR 111/ls and the existing highway is limited to 5/ls. The combined outfall rate has been calculated to be 12.8/ls. The modelling shows that the proposed development with the existing highway provides an approx 41% betterment to the flooding within the existing highway for the 30yr + CC event.



- Notes
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 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - To be read in conjunction with BWB sketch: 243912-BWB-EXT-XX-G-C-0535-S2 P03 Existing Downstream Highway System Assessment.
 - To be read in conjunction with BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0500-A4 C08 Drainage Hydraulic Report.
 - For Existing Highway Model results refer to BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0505-S2-P01 Drainage Hydraulic Report Existing Highway.
 - For Proposed Development Greenfield runoff calculations refer to BWB Report: 243912-BWB-EXT-XX-T-C-0502-S2 P03 Proposed Development Greenfield Runoff Estimation.
 - For information regarding discharge rates for the proposed development refer to BWB sketch: 243912-BWB-EXT-XX-G-C-0536-S2 P03 Proposed Development Discharge Rate.

Key

- Proposed Development Site Boundary
- Surface Water Carrier Drainage
- Surface Water Filter Drainage
- Surface Water Siphonics (indicative)
- Surface Water Kerb Drain
- Surface Water Channel / Slot Drain
- Existing Highway Surface Water Carrier Drainage
- Permeable Paving modelled at 350mm deep with a 30% void ratio
- Underground Attenuation Tank
- SuDS Pond / Overflow Wetlands Area Feature
- SuDS Flood Storage Area
- Topsoil Mound to remain as proposed displayed at 0.250m intervals

P03	10.02.26	Updated to new outfall discharge rate	DH	TAJ
P02	18.09.25	Updated to latest masterplan and model revisions	DH	TAJ
P01	10.09.25	Issued for Information	DH	TAJ
Rev	Date	Details of issue / revision	Drw	Rev

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Client

PANATTONI

Project Title

Newlands Road, Bognor Regis

Drawing Title

Drainage Flood Volumes
30yr + Climate Change
Exceedance Plan

Drawn:	D.Holmes	Reviewed:	T.Jones
BWB Ref:	243912	Date:	Sept 25
Scale@A1:	1:500		

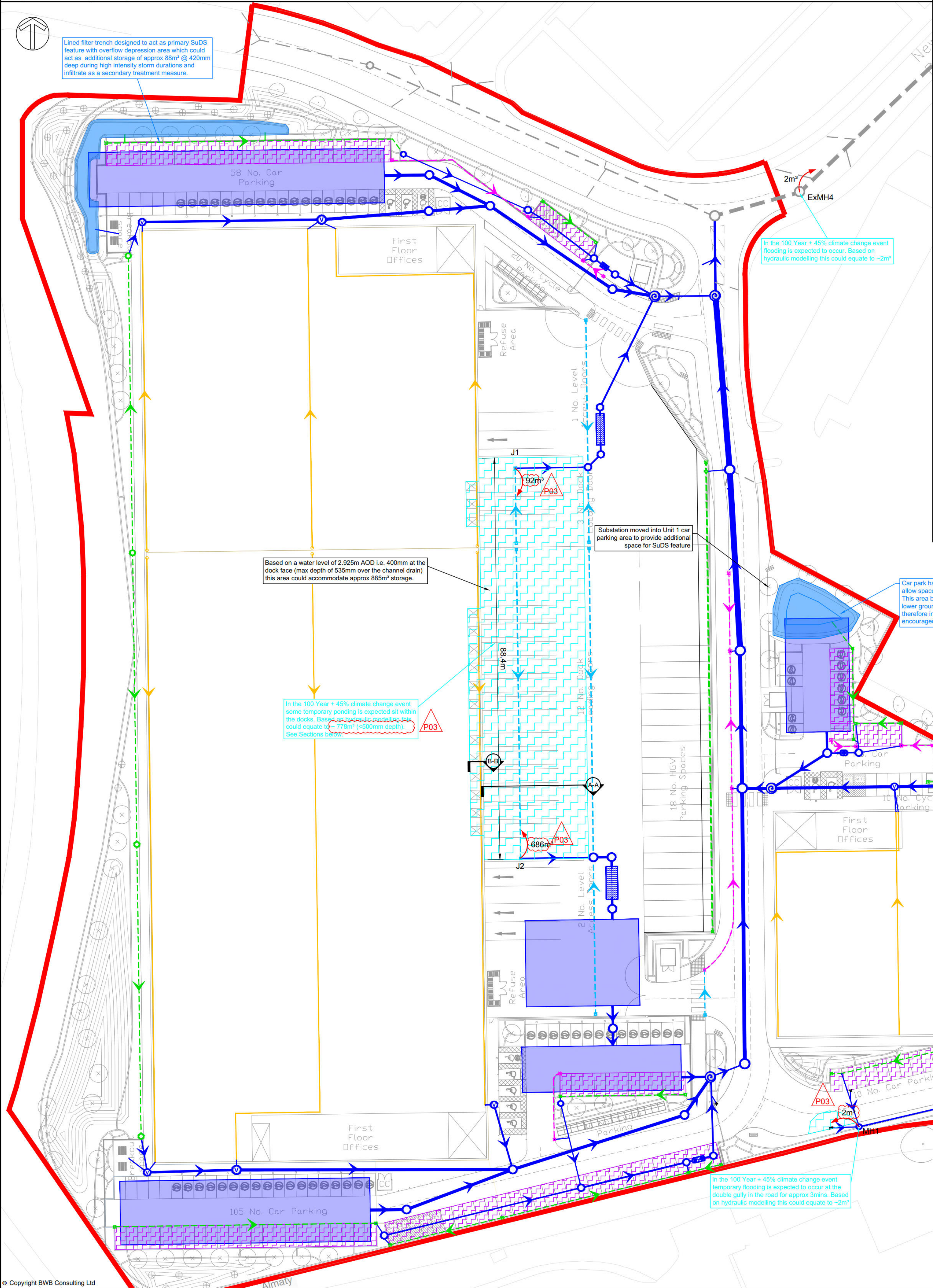
For Information

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
243912-BWB-EXT-XX-D-C-0538	S2	P03

Appendix E

243912-BWB-EXT-XX-G-C-0539-[S2-P03]_Drainage Flood Volumes 100yr + 45%
Climate Change Exceedance Plan

Proposed Development (Scale 1:500)



Existing Highway (Scale 1:500)

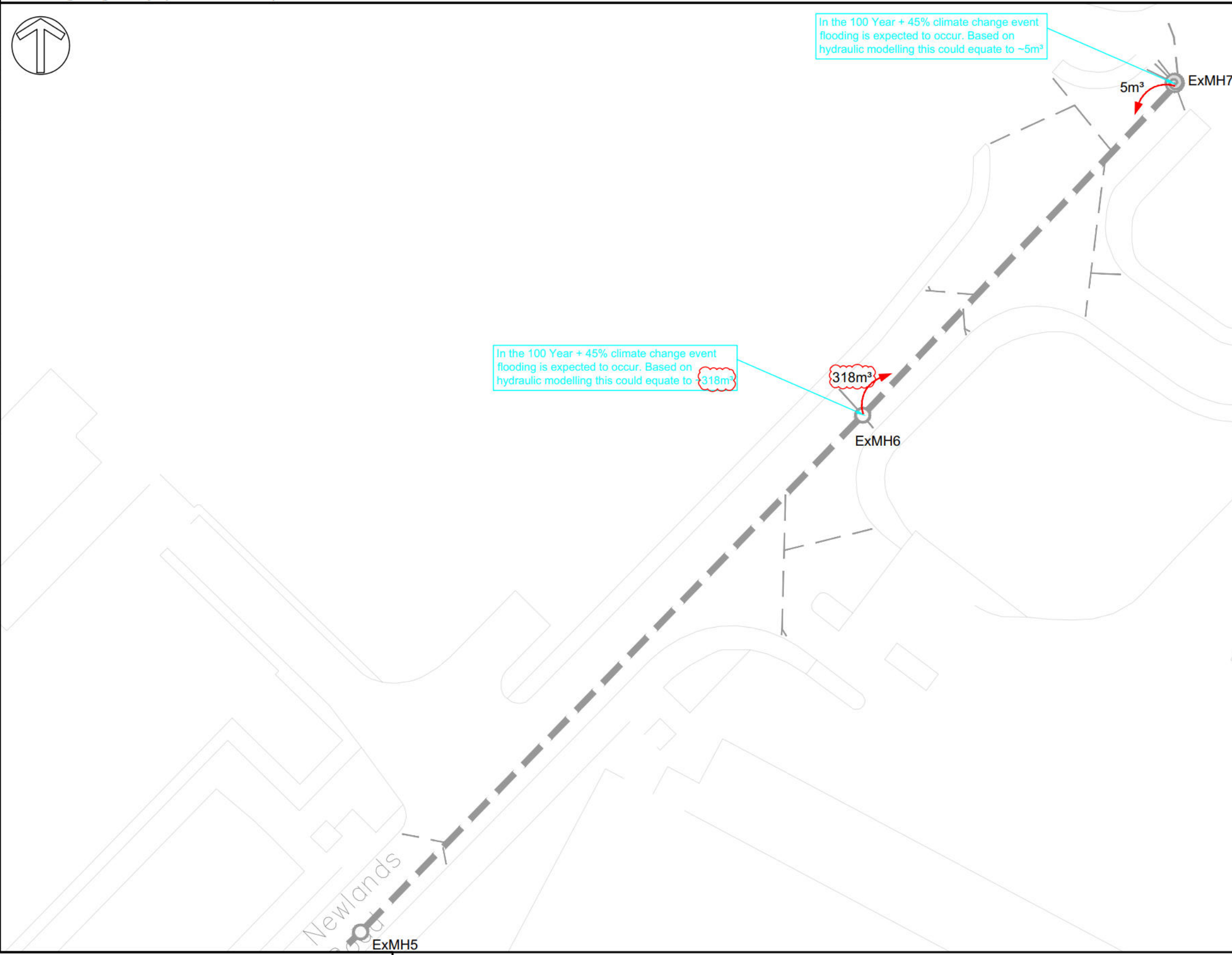


Table A: Existing Road Drainage Flooding Volumes (m³)			
Storm Event	Existing Highway Flooding Prior to Proposed Development	Existing Highway Flooding with Proposed Development	% Betterment
1 in 100 year + 45% Climate Change (FEH) 243912-BWB-EXT-XX-T-C-0505 P01 243912-BWB-EXT-XX-T-C-0500 C08	423	323	24 P03
1 in 100 year + 45% Climate Change (Old FSR/Cv etc.) 243912-BWB-EXT-XX-T-C-0507 P01 243912-BWB-EXT-XX-T-C-0508 P01	272	145	47

Drainage Philosophy

Existing Highway

The existing highway currently discharges into the Oldlands Farm ditch to the north via a flow control chamber restricted back to 5/s.

The existing highway has been hydraulically modelled to the same parameters in which the proposed site is subject to (i.e. FEH-22 rainfall data, CV=1 with a surcharged outfall). This results in flooding (shown in Table A) within the existing highway prior to the addition of the proposed development network.

A quick storage estimate suggests the existing highway has insufficient storage and will always have a problem with flooding in intense storm events.

The strategy will be to limit the proposed development to QBAR, with the aim of no increase to existing flooding within the existing highway and ideally reducing these volumes where possible.

Proposed Development

As outlined in the Restricted Discharge section of the Arun District Council website: [https://www.arun.gov.uk/surfacewater/the-ih124-method-will-be-used-to-calculate-the-greenfield-runoff-rate-\(qbar\)-for-a-positively-drained-area-of-3.719ha-\(for-more-information-refer-to-bwb-sketch-0536\).](https://www.arun.gov.uk/surfacewater/the-ih124-method-will-be-used-to-calculate-the-greenfield-runoff-rate-(qbar)-for-a-positively-drained-area-of-3.719ha-(for-more-information-refer-to-bwb-sketch-0536).) In summary this results in a QBAR of 11l/s.

The drainage for the on-site proposed development has been hydraulically modelled to meet the following criteria:

- No flooding up to the 1 in 30 year event
- No flooding in the 1 in 30 year + 40% Climate Change unless an area is specifically designed to hold or convey water as part of the design (i.e. lower dock area).
- Flooding volumes are acceptable during a 1 in 100 year + 45% Climate Change with the provision that the flooding is controlled and will remain on site.

In addition to the above the proposed development does not increase offsite flooding in the existing highway.

Outfall Discharge Rate

The proposed development is restricted back to QBAR 11l/s and the existing highway is limited to 5/s. The combined outfall rate has been calculated to be 12.8l/s. The modelling shows that the proposed development with the existing highway provides an approx 24% betterment to the flooding within the existing highway for the 100yr + CC event.

- Notes
- Do not scale this drawing. All dimensions must be checked/verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - To be read in conjunction with BWB sketch: 243912-BWB-EXT-XX-G-C-0535-S4 P03 Existing Downstream Highway System Assessment
 - To be read in conjunction with BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0500-A4 C08 Drainage Hydraulic Report
 - For Existing Highway Model results refer to BWB hydraulic Report: 243912-BWB-EXT-XX-T-C-0505-S2 P01 Drainage Hydraulic Report Existing Highway
 - For Proposed Development Greenfield runoff calculations refer to BWB Report: 243912-BWB-EXT-XX-T-C-0502-S2 P03 Proposed Development Greenfield Runoff Estimation
 - For information regarding discharge rates for the proposed development refer to BWB sketch: 243912-BWB-EXT-XX-G-C-0536-S4 P03 Proposed Development Discharge Rate

Key

- Proposed Development Site Boundary
- Surface Water Carrier Drainage
- Surface Water Filter Drainage
- Surface Water Siphonics (indicative)
- Surface Water Kerb Drain
- Surface Water Channel / Slot Drain
- Existing Highway Surface Water Carrier Drainage
- Permeable Paving modelled at 350mm deep with a 30% void ratio
- Underground Attenuation Tank
- SuDS Pond / Overflow Wetlands Area Feature
- SuDS Flood Storage Area
- Topsoil Mound to remain as proposed displayed at 0.250m intervals

P03	10.02.26	Updated to new outfall discharge rate	DH	TAJ
P02	18.09.25	Updated to latest masterplan and model revisions	DH	TAJ
P01	10.09.25	Issued for Information	DH	TAJ
Rev	Date	Details of issue / revision	Drw	Rev

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Client

PANATTONI

Project Title
Newlands Road, Bognor Regis

Drainage Flood Volumes 100yr + Climate Change Exceedance Plan

Drawn:	D.Holmes	Reviewed:	T.Jones
BWB Ref:	243912	Date:	Sept 25
Scale @A1:	1:500		
Drawing Status			
For Information			
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev	
243912-BWB-EXT-XX-D-C-0539	S2	P03	

Appendix F

243912-BWB-EXT-XX-T-C-0500-[A4-C08]_Drainage Hydraulic Report

**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	x
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.080	5.00	3.376	900	494258.572	101373.022	1.176	2.200
2			3.862	900	494302.395	101383.250	1.962	1.900
3	0.021	5.00	2.830	900	494330.501	101389.806	1.160	1.670
4	0.182	5.00	2.830	900	494329.938	101429.136	1.350	1.480
5			2.975	1200	494323.972	101429.136	1.545	1.430
6			3.100	1500	494306.862	101439.388	1.840	1.260
7	0.081	5.00	3.250	1500	494292.142	101448.208	2.030	1.220
8	0.201	5.00	3.479	1500	494266.340	101447.867	2.319	1.160
9	0.086	5.00	3.400	1200	494258.481	101455.349	1.600	1.800
10			3.450	1500	494251.543	101455.258	2.250	1.200
11			3.593	1800	494239.341	101447.464	2.493	1.100
12		5.00	3.620	900	494098.649	101499.328	0.620	3.000
13	0.026	5.00	3.650	900	494099.603	101435.147	1.075	2.575
14			3.675	900	494100.533	101370.907	1.600	2.075
15	0.261	5.00	3.706	1500	494103.680	101363.570	1.911	1.795
16	0.487	5.00	3.704	1500	494124.534	101363.795	2.149	1.555
17		5.00	3.418	1200	494158.962	101354.803	2.113	1.305
18	0.254	5.00	3.700	1200	494178.252	101376.460	1.775	1.925
19			3.514	1500	494182.332	101363.615	2.259	1.255
20			3.579	1500	494220.134	101375.607	2.404	1.175
J2	0.166	5.00	2.391	1200	494184.083	101432.089	0.781	1.610
22	0.330	5.00	3.000	1500	494204.085	101432.443	1.650	1.350
23			3.126	1500	494204.244	101420.970	1.856	1.270
24			3.678	1500	494204.380	101394.589	2.478	1.200
25	0.149	5.00	3.492	1200	494154.037	101349.088	1.734	1.758
26	0.066	5.00	3.519	900	494192.894	101378.147	1.069	2.450
27	0.019	5.00	3.340	1200	494197.388	101359.599	1.925	1.415
28	0.081	5.00	3.256	1200	494220.559	101365.203	1.946	1.310
29			3.235	1200	494226.507	101366.646	1.995	1.240
30	0.023	5.00	3.623	1500	494225.866	101383.980	2.503	1.120
31			3.451	1800	494233.398	101386.902	2.391	1.060
32	0.101	5.00	3.456	1800	494232.839	101447.511	2.526	0.930
33	0.060	5.00	3.456	1800	494232.393	101477.837	2.596	0.860
34	0.043	5.00	3.230	2100	494230.095	101517.661	2.450	0.780
35	0.013	5.00	3.634	900	494097.702	101564.737	1.064	2.570
36	0.140	5.00	3.699	1500	494100.770	101572.123	1.564	2.135
37	0.392	5.00	3.699	1500	494140.283	101572.672	1.849	1.850
38			3.707	1500	494173.595	101573.140	1.947	1.760
39		5.00	3.517	1500	494163.985	101582.507	2.627	0.890
40			3.499	1500	494175.985	101576.646	2.629	0.870
41	0.005	5.00	3.415	1500	494204.285	101557.358	2.603	0.812
J1	0.048	5.00	2.391	1200	494182.883	101517.961	0.786	1.605
43	0.177	5.00	3.000	1200	494201.716	101521.011	1.605	1.395
44			3.150	1200	494201.549	101531.374	1.835	1.315
45	0.147	5.00	3.522	900	494158.278	101587.058	1.522	2.000
46			3.275	900	494185.655	101574.790	1.785	1.490
47	0.057	5.00	3.371	1200	494200.191	101564.150	2.181	1.190
48			3.370	1200	494204.850	101560.596	2.250	1.120
49	0.022	5.00	3.348	1800	494213.587	101555.791	2.553	0.795

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
50	0.004	5.00	3.341	1800	494226.874	101555.916	2.626	0.715
ExMH3	0.197	5.00	2.860	1800	494226.798	101573.518	2.190	0.670
ExMH1	0.062	5.00	3.580	1200	494150.911	101606.609	1.300	2.280
ExMH4			2.680	1800	494245.463	101578.757	2.040	0.640
ExMH5	0.084	5.00	2.710	1800	494277.278	101609.015	2.200	0.510
ExMH6	0.122	5.00	2.370	1800	494340.155	101673.616	1.910	0.460
ExMH7	0.129	5.00	2.430	1800	494379.221	101715.415	2.260	0.170
Outfall			2.440		494378.469	101722.864	2.290	0.150

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)
S3.000	12	13	64.188	0.600	3.000	2.575	0.425	151.0	150	6.31	50.0
S3.001	13	14	64.247	0.600	2.575	2.150	0.425	151.2	150	7.63	50.0
S3.002	14	15	7.983	0.600	2.075	2.020	0.055	145.1	225	7.75	50.0
S3.003	15	16	20.855	0.600	1.795	1.705	0.090	231.7	450	8.01	50.0
S3.004	16	19	57.798	0.600	1.555	1.255	0.300	192.7	600	8.56	50.0
S4.000	17	19	24.976	0.600	1.305	1.255	0.050	499.5	600	5.38	50.0
S5.000	18	19	13.477	0.600	1.925	1.555	0.370	36.4	300	5.09	50.0
S3.005	19	20	39.659	0.600	1.255	1.175	0.080	495.7	600	9.17	50.0
S3.006	20	30	10.147	0.600	1.175	1.120	0.055	184.5	600	9.26	50.0
S6.000	25	27	44.607	0.600	1.758	1.490	0.268	166.4	225	5.74	50.0
S7.000	26	27	19.085	0.600	2.450	1.565	0.885	21.6	150	5.15	50.0
S6.001	27	28	23.839	0.600	1.415	1.310	0.105	227.0	300	6.12	50.0
S6.002	28	29	6.121	0.600	1.310	1.240	0.070	87.4	300	6.18	50.0
S6.003	29	30	17.346	0.600	1.240	1.120	0.120	144.6	300	6.40	50.0
S8.000A	J2	22	20.005	0.600	1.610	1.515	0.095	210.6	300	5.31	37.3
S8.000	22	23	11.400	0.600	1.350	1.270	0.080	142.5	450	5.42	50.0
S8.001	23	24	26.307	0.600	1.270	1.200	0.070	375.8	450	5.84	50.0
S8.002	24	30	23.995	0.600	1.200	1.120	0.080	299.9	450	6.18	50.0
S3.007	30	31	8.079	0.600	1.120	1.060	0.060	134.7	225	9.38	50.0
S3.008	31	32	60.612	0.600	1.060	0.930	0.130	466.2	750	10.17	50.0
S1.000	1	2	45.001	0.600	2.200	1.900	0.300	150.0	225	5.70	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)
S3.000	0.815	14.4	0.0	0.470	0.925	0.000	0.0	0	0.000
S3.001	0.815	14.4	4.7	0.925	1.375	0.026	0.0	59	0.729
S3.002	1.083	43.1	4.7	1.375	1.461	0.026	0.0	50	0.712
S3.003	1.331	211.7	51.8	1.461	1.549	0.287	0.0	151	1.107
S3.004	1.751	495.0	139.8	1.549	1.659	0.774	0.0	217	1.515
S4.000	1.082	306.1	0.0	1.513	1.659	0.000	0.0	0	0.000
S5.000	2.613	184.7	46.0	1.475	1.659	0.254	0.0	102	2.183
S3.005	1.087	307.2	185.7	1.659	1.804	1.028	0.0	337	1.136
S3.006	1.789	505.9	185.7	1.804	1.903	1.028	0.0	251	1.658
S6.000	1.010	40.2	26.8	1.509	1.625	0.149	0.0	135	1.081
S7.000	2.178	38.5	11.9	0.919	1.625	0.066	0.0	57	1.923
S6.001	1.039	73.4	42.3	1.625	1.646	0.234	0.0	163	1.074
S6.002	1.682	118.9	56.9	1.646	1.695	0.315	0.0	146	1.664
S6.003	1.305	92.3	56.9	1.695	2.203	0.315	0.0	171	1.371
S8.000A	1.079	76.3	22.4	0.481	1.185	0.166	0.0	111	0.941
S8.000	1.701	270.5	89.6	1.200	1.406	0.496	0.0	178	1.534
S8.001	1.042	165.8	89.6	1.406	2.028	0.496	0.0	236	1.062
S8.002	1.168	185.8	89.6	2.028	2.053	0.496	0.0	220	1.158
S3.007	1.125	44.7	336.4	2.278	2.166	1.862	0.0	225	1.146
S3.008	1.289	569.5	336.4	1.641	1.776	1.862	0.0	416	1.340
S1.000	1.065	42.3	14.4	0.951	1.737	0.080	0.0	90	0.964

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)
S1.001	2	3	28.860	0.600	1.900	1.670	0.230	125.5	225	6.12	50.0
S1.002	3	4	39.334	0.600	1.670	1.480	0.190	207.0	300	6.72	50.0
S1.003	4	5	5.966	0.600	1.480	1.430	0.050	119.3	300	6.79	50.0
S1.004	5	6	19.946	0.600	1.430	1.370	0.060	332.4	450	7.09	50.0
S1.005	6	7	17.160	0.600	1.260	1.220	0.040	429.0	600	7.33	50.0
S1.006	7	8	25.804	0.600	1.220	1.160	0.060	430.1	600	7.70	50.0
S1.007	8	11	27.002	0.600	1.160	1.100	0.060	450.0	600	8.10	50.0
S2.000	9	10	6.939	0.600	1.800	1.425	0.375	18.5	225	5.04	50.0
S2.001	10	11	14.479	0.600	1.200	1.100	0.100	144.8	450	5.18	50.0
S1.008	11	32	6.502	0.600	1.100	1.080	0.020	325.1	600	8.18	50.0
S1.009	32	33	30.329	0.600	0.930	0.860	0.070	433.3	750	10.54	50.0
S1.010	33	34	39.890	0.600	0.860	0.780	0.080	498.6	1200	10.94	50.0
S1.011	34	50	38.390	0.600	0.780	0.715	0.065	590.6	1200	11.36	25.4
S9.000	12	35	65.416	0.600	3.000	2.570	0.430	152.1	150	6.34	50.0
S9.001	35	36	8.046	0.600	2.570	2.510	0.060	134.1	150	6.50	50.0
S9.002	36	37	39.517	0.600	2.135	2.000	0.135	292.7	450	7.05	50.0
S9.003	37	38	33.315	0.600	1.850	1.760	0.090	370.2	600	7.49	50.0
S9.004	38	40	4.243	0.600	1.760	0.870	0.890	4.8	600	7.50	50.0
S10.000	39	40	13.355	0.600	0.890	0.870	0.020	667.8	600	5.24	50.0
S9.005	40	41	34.248	0.600	0.870	0.812	0.058	590.5	600	8.08	50.0
S9.006	41	49	9.433	0.600	0.812	0.795	0.017	554.9	600	8.23	50.0
S12.000	45	46	30.000	0.600	2.000	1.490	0.510	58.8	225	5.29	50.0
S12.001	46	47	18.014	0.600	1.490	1.190	0.300	60.0	225	5.47	50.0
S12.002	47	48	5.860	0.600	1.190	1.120	0.070	83.7	225	5.54	50.0
S12.003	48	49	9.971	0.600	1.120	1.075	0.045	221.6	300	5.70	50.0
S11.000A	J1	43	19.078	0.600	1.605	1.470	0.135	141.3	225	5.29	37.3
S11.000	43	44	10.364	0.600	1.395	1.315	0.080	129.6	300	5.41	50.0
S11.001	44	49	27.223	0.600	1.315	1.075	0.240	113.4	300	5.72	36.2

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)
S1.001	1.166	46.3	14.4	1.737	0.935	0.080	0.0	86	1.030
S1.002	1.089	77.0	18.2	0.860	1.050	0.101	0.0	99	0.897
S1.003	1.438	101.6	51.1	1.050	1.245	0.283	0.0	150	1.439
S1.004	1.109	176.4	51.1	1.095	1.280	0.283	0.0	166	0.966
S1.005	1.169	330.5	51.1	1.240	1.430	0.283	0.0	158	0.857
S1.006	1.168	330.1	65.8	1.430	1.719	0.364	0.0	180	0.919
S1.007	1.141	322.6	102.1	1.719	1.893	0.565	0.0	231	1.017
S2.000	3.056	121.5	15.5	1.375	1.800	0.086	0.0	54	2.116
S2.001	1.687	268.3	15.5	1.800	2.043	0.086	0.0	73	0.933
S1.008	1.345	380.2	117.6	1.893	1.776	0.651	0.0	228	1.192
S1.009	1.338	591.0	472.3	1.776	1.846	2.614	0.0	509	1.477
S1.010	1.668	1886.7	483.2	1.396	1.250	2.674	0.0	412	1.410
S1.011	1.532	1732.4	249.4	1.250	1.426	2.717	0.0	304	1.107
S9.000	0.812	14.4	0.0	0.470	0.914	0.000	0.0	0	0.000
S9.001	0.866	15.3	2.4	0.914	1.039	0.013	0.0	40	0.632
S9.002	1.183	188.1	27.6	1.114	1.249	0.153	0.0	116	0.854
S9.003	1.259	356.1	98.4	1.249	1.347	0.545	0.0	215	1.084
S9.004	11.199	3166.4	98.4	1.347	2.029	0.545	0.0	71	5.213
S10.000	0.935	264.3	0.0	2.027	2.029	0.000	0.0	0	0.000
S9.005	0.995	281.2	98.4	2.029	2.003	0.545	0.0	245	0.910
S9.006	1.026	290.2	99.4	2.003	1.953	0.550	0.0	241	0.933
S12.000	1.708	67.9	26.5	1.297	1.560	0.147	0.0	98	1.609
S12.001	1.691	67.2	26.5	1.560	1.956	0.147	0.0	98	1.592
S12.002	1.430	56.9	36.9	1.956	2.025	0.204	0.0	132	1.519
S12.003	1.052	74.4	36.9	1.950	1.973	0.204	0.0	149	1.049
S11.000A	1.098	43.6	6.5	0.561	1.305	0.048	0.0	58	0.792
S11.000	1.380	97.5	40.7	1.305	1.535	0.225	0.0	135	1.319
S11.001	1.475	104.3	29.5	1.535	1.973	0.225	0.0	109	1.274

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)
S9.007	49	50	13.288	0.600	0.795	0.715	0.080	166.1	225	8.45	50.0
S1.012	50	ExMH3	17.602	0.600	0.715	0.670	0.045	391.2	450	11.65	50.0
Ex 1	ExMH1	ExMH3	82.788	0.600	2.280	0.670	1.610	51.4	225	5.75	36.1
Ex 3	ExMH3	ExMH4	19.409	0.600	0.670	0.640	0.030	647.0	750	11.94	24.8
Ex 4	ExMH4	ExMH5	43.849	0.600	0.640	0.510	0.130	337.3	750	12.43	23.7
Ex 5	ExMH5	ExMH6	90.103	0.600	0.510	0.460	0.050	1802.1	750	14.74	21.7
Ex 6	ExMH6	ExMH7	57.213	0.600	0.460	0.170	0.290	197.3	750	15.22	20.9
Ex 7	ExMH7	Outfall	7.487	0.600	0.170	0.150	0.020	374.4	225	15.40	21.5

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)
S9.007	1.011	40.2	180.9	2.328	2.401	1.001	0.0	225	1.030
S1.012	1.022	162.5	672.6	2.176	1.740	3.722	0.0	450	1.035
Ex 1	1.828	72.7	8.1	1.075	1.965	0.062	0.0	51	1.216
Ex 3	1.092	482.6	356.9	1.440	1.290	3.982	0.0	482	1.190
Ex 4	1.518	670.5	341.0	1.290	1.450	3.982	0.0	379	1.524
Ex 5	0.650	287.1	318.9	1.450	1.160	4.066	0.0	750	0.656
Ex 6	1.988	878.5	316.3	1.160	1.510	4.187	0.0	310	1.834
Ex 7	0.670	26.6	335.4	2.035	2.065	4.317	0.0	225	0.682

Pipeline Schedule

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)
64.188	151.0	150	Circular	3.620	3.000	0.470	3.650	2.575	0.925
64.247	151.2	150	Circular	3.650	2.575	0.925	3.675	2.150	1.375
7.983	145.1	225	Circular	3.675	2.075	1.375	3.706	2.020	1.461
20.855	231.7	450	Circular	3.706	1.795	1.461	3.704	1.705	1.549
57.798	192.7	600	Circular	3.704	1.555	1.549	3.514	1.255	1.659
24.976	499.5	600	Circular	3.418	1.305	1.513	3.514	1.255	1.659
13.477	36.4	300	Circular	3.700	1.925	1.475	3.514	1.555	1.659
39.659	495.7	600	Circular	3.514	1.255	1.659	3.579	1.175	1.804
10.147	184.5	600	Circular	3.579	1.175	1.804	3.623	1.120	1.903
44.607	166.4	225	Circular	3.492	1.758	1.509	3.340	1.490	1.625
19.085	21.6	150	Circular	3.519	2.450	0.919	3.340	1.565	1.625
23.839	227.0	300	Circular	3.340	1.415	1.625	3.256	1.310	1.646
6.121	87.4	300	Circular	3.256	1.310	1.646	3.235	1.240	1.695
17.346	144.6	300	Circular	3.235	1.240	1.695	3.623	1.120	2.203
20.005	210.6	300	Circular	2.391	1.610	0.481	3.000	1.515	1.185
11.400	142.5	450	Circular	3.000	1.350	1.200	3.126	1.270	1.406

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
12	900	Manhole	Adoptable	13	900	Manhole	Adoptable
13	900	Manhole	Adoptable	14	900	Manhole	Adoptable
14	900	Manhole	Adoptable	15	1500	Manhole	Adoptable
15	1500	Manhole	Adoptable	16	1500	Manhole	Adoptable
16	1500	Manhole	Adoptable	19	1500	Manhole	Adoptable
17	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
18	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
19	1500	Manhole	Adoptable	20	1500	Manhole	Adoptable
20	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
25	1200	Manhole	Adoptable	27	1200	Manhole	Adoptable
26	900	Manhole	Adoptable	27	1200	Manhole	Adoptable
27	1200	Manhole	Adoptable	28	1200	Manhole	Adoptable
28	1200	Manhole	Adoptable	29	1200	Manhole	Adoptable
29	1200	Manhole	Adoptable	30	1500	Manhole	Adoptable
J2	1200	Manhole	Adoptable	22	1500	Manhole	Adoptable
22	1500	Manhole	Adoptable	23	1500	Manhole	Adoptable

**Pipeline Schedule**

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)
26.307	375.8	450	Circular	3.126	1.270	1.406	3.678	1.200	2.028
23.995	299.9	450	Circular	3.678	1.200	2.028	3.623	1.120	2.053
8.079	134.7	225	Circular	3.623	1.120	2.278	3.451	1.060	2.166
60.612	466.2	750	Circular	3.451	1.060	1.641	3.456	0.930	1.776
45.001	150.0	225	Circular	3.376	2.200	0.951	3.862	1.900	1.737
28.860	125.5	225	Circular	3.862	1.900	1.737	2.830	1.670	0.935
39.334	207.0	300	Circular	2.830	1.670	0.860	2.830	1.480	1.050
5.966	119.3	300	Circular	2.830	1.480	1.050	2.975	1.430	1.245
19.946	332.4	450	Circular	2.975	1.430	1.095	3.100	1.370	1.280
17.160	429.0	600	Circular	3.100	1.260	1.240	3.250	1.220	1.430
25.804	430.1	600	Circular	3.250	1.220	1.430	3.479	1.160	1.719
27.002	450.0	600	Circular	3.479	1.160	1.719	3.593	1.100	1.893
6.939	18.5	225	Circular	3.400	1.800	1.375	3.450	1.425	1.800
14.479	144.8	450	Circular	3.450	1.200	1.800	3.593	1.100	2.043
6.502	325.1	600	Circular	3.593	1.100	1.893	3.456	1.080	1.776
30.329	433.3	750	Circular	3.456	0.930	1.776	3.456	0.860	1.846
39.890	498.6	1200	Circular	3.456	0.860	1.396	3.230	0.780	1.250
38.390	590.6	1200	Circular	3.230	0.780	1.250	3.341	0.715	1.426
65.416	152.1	150	Circular	3.620	3.000	0.470	3.634	2.570	0.914
8.046	134.1	150	Circular	3.634	2.570	0.914	3.699	2.510	1.039
39.517	292.7	450	Circular	3.699	2.135	1.114	3.699	2.000	1.249
33.315	370.2	600	Circular	3.699	1.850	1.249	3.707	1.760	1.347
4.243	4.8	600	Circular	3.707	1.760	1.347	3.499	0.870	2.029
13.355	667.8	600	Circular	3.517	0.890	2.027	3.499	0.870	2.029
34.248	590.5	600	Circular	3.499	0.870	2.029	3.415	0.812	2.003
9.433	554.9	600	Circular	3.415	0.812	2.003	3.348	0.795	1.953
30.000	58.8	225	Circular	3.522	2.000	1.297	3.275	1.490	1.560
18.014	60.0	225	Circular	3.275	1.490	1.560	3.371	1.190	1.956

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
23	1500	Manhole	Adoptable	24	1500	Manhole	Adoptable
24	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
30	1500	Manhole	Adoptable	31	1800	Manhole	Adoptable
31	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
1	900	Manhole	Adoptable	2	900	Manhole	Adoptable
2	900	Manhole	Adoptable	3	900	Manhole	Adoptable
3	900	Manhole	Adoptable	4	900	Manhole	Adoptable
4	900	Manhole	Adoptable	5	1200	Manhole	Adoptable
5	1200	Manhole	Adoptable	6	1500	Manhole	Adoptable
6	1500	Manhole	Adoptable	7	1500	Manhole	Adoptable
7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable
8	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
9	1200	Manhole	Adoptable	10	1500	Manhole	Adoptable
10	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
11	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
32	1800	Manhole	Adoptable	33	1800	Manhole	Adoptable
33	1800	Manhole	Adoptable	34	2100	Manhole	Adoptable
34	2100	Manhole	Adoptable	50	1800	Manhole	Adoptable
12	900	Manhole	Adoptable	35	900	Manhole	Adoptable
35	900	Manhole	Adoptable	36	1500	Manhole	Adoptable
36	1500	Manhole	Adoptable	37	1500	Manhole	Adoptable
37	1500	Manhole	Adoptable	38	1500	Manhole	Adoptable
38	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
39	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
40	1500	Manhole	Adoptable	41	1500	Manhole	Adoptable
41	1500	Manhole	Adoptable	49	1800	Manhole	Adoptable
45	900	Manhole	Adoptable	46	900	Manhole	Adoptable
46	900	Manhole	Adoptable	47	1200	Manhole	Adoptable

**Pipeline Schedule**

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)
5.860	83.7	225	Circular	3.371	1.190	1.956	3.370	1.120	2.025
9.971	221.6	300	Circular	3.370	1.120	1.950	3.348	1.075	1.973
19.078	141.3	225	Circular	2.391	1.605	0.561	3.000	1.470	1.305
10.364	129.6	300	Circular	3.000	1.395	1.305	3.150	1.315	1.535
27.223	113.4	300	Circular	3.150	1.315	1.535	3.348	1.075	1.973
13.288	166.1	225	Circular	3.348	0.795	2.328	3.341	0.715	2.401
17.602	391.2	450	Circular	3.341	0.715	2.176	2.860	0.670	1.740
82.788	51.4	225	Circular	3.580	2.280	1.075	2.860	0.670	1.965
19.409	647.0	750	Circular	2.860	0.670	1.440	2.680	0.640	1.290
43.849	337.3	750	Circular	2.680	0.640	1.290	2.710	0.510	1.450
90.103	1802.1	750	Circular	2.710	0.510	1.450	2.370	0.460	1.160
57.213	197.3	750	Circular	2.370	0.460	1.160	2.430	0.170	1.510
7.487	374.4	225	Circular	2.430	0.170	2.035	2.440	0.150	2.065

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
47	1200	Manhole	Adoptable	48	1200	Manhole	Adoptable
48	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
J1	1200	Manhole	Adoptable	43	1200	Manhole	Adoptable
43	1200	Manhole	Adoptable	44	1200	Manhole	Adoptable
44	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
49	1800	Manhole	Adoptable	50	1800	Manhole	Adoptable
50	1800	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH1	1200	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH3	1800	Manhole	Adoptable	ExMH4	1800	Manhole	Adoptable
ExMH4	1800	Manhole	Adoptable	ExMH5	1800	Manhole	Adoptable
ExMH5	1800	Manhole	Adoptable	ExMH6	1800	Manhole	Adoptable
ExMH6	1800	Manhole	Adoptable	ExMH7	1800	Manhole	Adoptable
ExMH7	1800	Manhole	Adoptable	Outfall		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	494258.572	101373.022	3.376	1.176	900					
						0	S1.000	2.200	225	
2	494302.395	101383.250	3.862	1.962	900		1	S1.000	1.900	225
						0	S1.001	1.900	225	
3	494330.501	101389.806	2.830	1.160	900		1	S1.001	1.670	225
						0	S1.002	1.670	300	
4	494329.938	101429.136	2.830	1.350	900		1	S1.002	1.480	300
						0	S1.003	1.480	300	
5	494323.972	101429.136	2.975	1.545	1200		1	S1.003	1.430	300
						0	S1.004	1.430	450	
6	494306.862	101439.388	3.100	1.840	1500		1	S1.004	1.370	450
						0	S1.005	1.260	600	

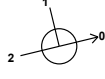
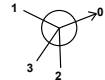
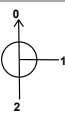


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
7	494292.142	101448.208	3.250	2.030	1500		S1.005	1.220	600
						0	S1.006	1.220	600
8	494266.340	101447.867	3.479	2.319	1500		S1.006	1.160	600
						0	S1.007	1.160	600
9	494258.481	101455.349	3.400	1.600	1200				
						0	S2.000	1.800	225
10	494251.543	101455.258	3.450	2.250	1500		S2.000	1.425	225
						0	S2.001	1.200	450
11	494239.341	101447.464	3.593	2.493	1800		S2.001	1.100	450
						2	S1.007	1.100	600
						0	S1.008	1.100	600
12	494098.649	101499.328	3.620	0.620	900		S3.000	3.000	150
						0-2	S9.000	3.000	150
13	494099.603	101435.147	3.650	1.075	900		S3.000	2.575	150
						0	S3.001	2.575	150
14	494100.533	101370.907	3.675	1.600	900		S3.001	2.150	150
						0	S3.002	2.075	225
15	494103.680	101363.570	3.706	1.911	1500		S3.002	2.020	225
						0	S3.003	1.795	450
16	494124.534	101363.795	3.704	2.149	1500		S3.003	1.705	450
						0	S3.004	1.555	600
17	494158.962	101354.803	3.418	2.113	1200				
						0	S4.000	1.305	600
18	494178.252	101376.460	3.700	1.775	1200				
						0	S5.000	1.925	300
19	494182.332	101363.615	3.514	2.259	1500		S5.000	1.555	300
						2	S4.000	1.255	600
						3	S3.004	1.255	600
						0	S3.005	1.255	600
20	494220.134	101375.607	3.579	2.404	1500		S3.005	1.175	600
						0	S3.006	1.175	600
J2	494184.083	101432.089	2.391	0.781	1200				
						0	S8.000A	1.610	300



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
22	494204.085	101432.443	3.000	1.650	1500	 1	S8.000A	1.515	300
						0	S8.000	1.350	450
23	494204.244	101420.970	3.126	1.856	1500	 1	S8.000	1.270	450
						0	S8.001	1.270	450
24	494204.380	101394.589	3.678	2.478	1500	 1	S8.001	1.200	450
						0	S8.002	1.200	450
25	494154.037	101349.088	3.492	1.734	1200	 0			
						0	S6.000	1.758	225
26	494192.894	101378.147	3.519	1.069	900	 0			
						0	S7.000	2.450	150
27	494197.388	101359.599	3.340	1.925	1200	 1	S7.000	1.565	150
						2	S6.000	1.490	225
						0	S6.001	1.415	300
28	494220.559	101365.203	3.256	1.946	1200	 1	S6.001	1.310	300
						0	S6.002	1.310	300
29	494226.507	101366.646	3.235	1.995	1200	 0	S6.002	1.240	300
						1	S6.003	1.240	300
30	494225.866	101383.980	3.623	2.503	1500	 1	S8.002	1.120	450
						2	S6.003	1.120	300
						3	S3.006	1.120	600
						0	S3.007	1.120	225
31	494233.398	101386.902	3.451	2.391	1800	 0	S3.007	1.060	225
						1	S3.008	1.060	750
32	494232.839	101447.511	3.456	2.526	1800	 0	S1.008	1.080	600
						1	S3.008	0.930	750
						2	S1.009	0.930	750
33	494232.393	101477.837	3.456	2.596	1800	 0	S1.009	0.860	750
						1	S1.010	0.860	1200
34	494230.095	101517.661	3.230	2.450	2100	 0	S1.010	0.780	1200
						1	S1.011	0.780	1200
35	494097.702	101564.737	3.634	1.064	900	 0	S9.000	2.570	150
						1	S9.001	2.570	150
36	494100.770	101572.123	3.699	1.564	1500	 0	S9.001	2.510	150
						1	S9.002	2.135	450

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
37	494140.283	101572.672	3.699	1.849	1500	1 — 	1 S9.002	2.000	450
						0	S9.003	1.850	600
38	494173.595	101573.140	3.707	1.947	1500	1 — 	1 S9.003	1.760	600
						0	S9.004	1.760	600
39	494163.985	101582.507	3.517	2.627	1500		0 S10.000	0.890	600
						1	S10.000	0.870	600
40	494175.985	101576.646	3.499	2.629	1500	1 — 	2 S9.004	0.870	600
						0	S9.005	0.870	600
41	494204.285	101557.358	3.415	2.603	1500	1 — 	1 S9.005	0.812	600
						0	S9.006	0.812	600
J1	494182.883	101517.961	2.391	0.786	1200		0 S11.000A	1.605	225
						1	S11.000A	1.470	225
43	494201.716	101521.011	3.000	1.605	1200	1 — 	0 S11.000	1.395	300
						1	S11.000	1.315	300
44	494201.549	101531.374	3.150	1.835	1200		0 S11.001	1.315	300
						0	S12.000	2.000	225
45	494158.278	101587.058	3.522	1.522	900		1 S12.000	1.490	225
						0	S12.001	1.490	225
46	494185.655	101574.790	3.275	1.785	900	1 — 	1 S12.001	1.190	225
						0	S12.002	1.190	225
47	494200.191	101564.150	3.371	2.181	1200	1 — 	1 S12.002	1.120	225
						0	S12.003	1.120	300
48	494204.850	101560.596	3.370	2.250	1200	1 — 	1 S11.001	1.075	300
						2	S12.003	1.075	300
						3	S9.006	0.795	600
						0	S9.007	0.795	225
49	494213.587	101555.791	3.348	2.553	1800	1 — 	1 S9.007	0.715	225
						2	S1.011	0.715	1200
						0	S1.012	0.715	450
50	494226.874	101555.916	3.341	2.626	1800	1 — 	1 Ex 1	0.670	225
						2	S1.012	0.670	450
						0	Ex 3	0.670	750
ExMH3	494226.798	101573.518	2.860	2.190	1800	1 — 			
						2			
						0			

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
ExMH1	494150.911	101606.609	3.580	1.300	1200		0	Ex 1	2.280 225
ExMH4	494245.463	101578.757	2.680	2.040	1800		1	Ex 3	0.640 750
ExMH5	494277.278	101609.015	2.710	2.200	1800		0	Ex 4	0.640 750
ExMH6	494340.155	101673.616	2.370	1.910	1800		1	Ex 5	0.510 750
ExMH7	494379.221	101715.415	2.430	2.260	1800		0	Ex 6	0.460 750
Outfall	494378.469	101722.864	2.440	2.290			1	Ex 7	0.150 225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	30	40	0	0
2	0	0	0	100	45	0	0
30	0	0	0				

Node Outfall Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.500	150	0.500	300	0.500	450	0.500	600	0.500	750	0.500
15	0.500	165	0.500	315	0.500	465	0.500	615	0.500	765	0.500
30	0.500	180	0.500	330	0.500	480	0.500	630	0.500	780	0.500
45	0.500	195	0.500	345	0.500	495	0.500	645	0.500	795	0.500
60	0.500	210	0.500	360	0.500	510	0.500	660	0.500	810	0.500
75	0.500	225	0.500	375	0.500	525	0.500	675	0.500	825	0.500
90	0.500	240	0.500	390	0.500	540	0.500	690	0.500	840	0.500
105	0.500	255	0.500	405	0.500	555	0.500	705	0.500	855	0.500
120	0.500	270	0.500	420	0.500	570	0.500	720	0.500	870	0.500
135	0.500	285	0.500	435	0.500	585	0.500	735	0.500	885	0.500

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1050	0.500	1110	0.500	1170	0.500	1230	0.500	1290	0.500	1350	0.500	1410	0.500
1065	0.500	1125	0.500	1185	0.500	1245	0.500	1305	0.500	1365	0.500	1425	0.500
1080	0.500	1140	0.500	1200	0.500	1260	0.500	1320	0.500	1380	0.500	1440	0.500
1095	0.500	1155	0.500	1215	0.500	1275	0.500	1335	0.500	1395	0.500		

Node 11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.100	Product Number	CTL-SHE-0087-5000-2470-5000
Design Depth (m)	2.470	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 30 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.120	Product Number	CTL-SHE-0128-1000-2230-1000
Design Depth (m)	2.230	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1500

Node 49 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.795	Product Number	CTL-SHE-0086-5000-2570-5000
Design Depth (m)	2.570	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 50 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.715	Product Number	CTL-SHE-0137-1100-2000-1100
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	11.0	Min Node Diameter (mm)	1500

Node ExMH7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.510	Product Number	CTL-SHE-0148-1280-2000-1280
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.8	Min Node Diameter (mm)	1800

Node 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.530
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	542.0	542.0	0.300	542.0	566.8

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	150.0	0.0	0.800	150.0	0.0	0.801	0.0	0.0

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.670
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	200.0	200.0	0.350	200.0	217.5	0.351	0.0	217.5

Node 10 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.220
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	375.0	0.0	0.800	375.0	0.0	0.801	0.0	0.0

Node 17 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	770.0	0.0	0.800	770.0	0.0	0.801	0.0	0.0

Node 23 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.270
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	500.0	0.0	0.800	500.0	0.0	0.801	0.0	0.0

Node 24 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	350.0	0.0	1.200	350.0	0.0	1.201	0.0	0.0

Node 25 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	660.0	660.0	0.350	660.0	691.9	0.351	0.0	691.9

Node 26 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	4

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	137.5	137.5	0.350	137.5	152.0	0.351	0.0	152.0

Node 39 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.920
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	780.0	0.0	1.200	780.0	0.0	1.201	0.0	0.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	313.0	313.0	0.350	313.0	335.0	0.351	0.0	335.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.860
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	132.0	132.0	0.420	132.0	149.1

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	76.334	21.600	2 year 30 minute summer	75.407	21.338
1 year 15 minute winter	53.568	21.600	2 year 30 minute winter	52.918	21.338
1 year 30 minute summer	49.841	14.103	2 year 60 minute summer	50.706	13.400
1 year 30 minute winter	34.976	14.103	2 year 60 minute winter	33.688	13.400
1 year 60 minute summer	33.678	8.900	2 year 120 minute summer	34.937	9.233
1 year 60 minute winter	22.375	8.900	2 year 120 minute winter	23.211	9.233
1 year 120 minute summer	25.040	6.617	2 year 180 minute summer	27.895	7.178
1 year 120 minute winter	16.636	6.617	2 year 180 minute winter	18.132	7.178
1 year 180 minute summer	20.597	5.300	2 year 240 minute summer	22.420	5.925
1 year 180 minute winter	13.388	5.300	2 year 240 minute winter	14.895	5.925
1 year 240 minute summer	16.839	4.450	2 year 360 minute summer	17.250	4.439
1 year 240 minute winter	11.187	4.450	2 year 360 minute winter	11.213	4.439
1 year 360 minute summer	13.212	3.400	2 year 480 minute summer	13.533	3.576
1 year 360 minute winter	8.588	3.400	2 year 480 minute winter	8.991	3.576
1 year 480 minute summer	10.483	2.770	2 year 600 minute summer	11.019	3.014
1 year 480 minute winter	6.965	2.770	2 year 600 minute winter	7.529	3.014
1 year 600 minute summer	8.601	2.353	2 year 720 minute summer	9.763	2.617
1 year 600 minute winter	5.877	2.353	2 year 720 minute winter	6.562	2.617
1 year 720 minute summer	7.665	2.054	2 year 960 minute summer	7.947	2.093
1 year 720 minute winter	5.151	2.054	2 year 960 minute winter	5.264	2.093
1 year 960 minute summer	6.288	1.656	2 year 1440 minute summer	5.706	1.529
1 year 960 minute winter	4.165	1.656	2 year 1440 minute winter	3.835	1.529
1 year 1440 minute summer	4.571	1.225	2 year 2160 minute summer	4.094	1.132
1 year 1440 minute winter	3.072	1.225	2 year 2160 minute winter	2.821	1.132
1 year 2160 minute summer	3.323	0.918	30 year 15 minute summer	288.602	81.664
1 year 2160 minute winter	2.290	0.918	30 year 15 minute winter	202.527	81.664
2 year 15 minute summer	116.402	32.938	30 year 30 minute summer	190.913	54.022
2 year 15 minute winter	81.686	32.938	30 year 30 minute winter	133.974	54.022



Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 60 minute summer	129.360	34.186	30 year +40% CC 480 minute winter	24.994	9.942
30 year 60 minute winter	85.943	34.186	30 year +40% CC 600 minute summer	30.258	8.276
30 year 120 minute summer	78.849	20.838	30 year +40% CC 600 minute winter	20.674	8.276
30 year 120 minute winter	52.386	20.838	30 year +40% CC 720 minute summer	26.550	7.116
30 year 180 minute summer	59.815	15.393	30 year +40% CC 720 minute winter	17.844	7.116
30 year 180 minute winter	38.881	15.393	30 year +40% CC 960 minute summer	21.256	5.597
30 year 240 minute summer	46.709	12.344	30 year +40% CC 960 minute winter	14.081	5.597
30 year 240 minute winter	31.033	12.344	30 year +40% CC 1440 minute summer	14.910	3.996
30 year 360 minute summer	34.845	8.967	30 year +40% CC 1440 minute winter	10.021	3.996
30 year 360 minute winter	22.650	8.967	30 year +40% CC 2160 minute summer	10.399	2.874
30 year 480 minute summer	26.872	7.102	30 year +40% CC 2160 minute winter	7.165	2.874
30 year 480 minute winter	17.853	7.102	100 year +45% CC 15 minute summer	524.796	148.499
30 year 600 minute summer	21.613	5.912	100 year +45% CC 15 minute winter	368.278	148.499
30 year 600 minute winter	14.767	5.912	100 year +45% CC 30 minute summer	350.356	99.139
30 year 720 minute summer	18.965	5.083	100 year +45% CC 30 minute winter	245.864	99.139
30 year 720 minute winter	12.745	5.083	100 year +45% CC 60 minute summer	239.317	63.244
30 year 960 minute summer	15.183	3.998	100 year +45% CC 60 minute winter	158.996	63.244
30 year 960 minute winter	10.058	3.998	100 year +45% CC 120 minute summer	143.157	37.832
30 year 1440 minute summer	10.650	2.854	100 year +45% CC 120 minute winter	95.110	37.832
30 year 1440 minute winter	7.158	2.854	100 year +45% CC 180 minute summer	108.110	27.820
30 year 2160 minute summer	7.428	2.053	100 year +45% CC 180 minute winter	70.274	27.820
30 year 2160 minute winter	5.118	2.053	100 year +45% CC 240 minute summer	84.335	22.287
30 year +40% CC 15 minute summer	404.042	114.330	100 year +45% CC 240 minute winter	56.030	22.287
30 year +40% CC 15 minute winter	283.538	114.330	100 year +45% CC 360 minute summer	62.969	16.204
30 year +40% CC 30 minute summer	267.279	75.631	100 year +45% CC 360 minute winter	40.931	16.204
30 year +40% CC 30 minute winter	187.564	75.631	100 year +45% CC 480 minute summer	48.654	12.858
30 year +40% CC 60 minute summer	181.103	47.860	100 year +45% CC 480 minute winter	32.325	12.858
30 year +40% CC 60 minute winter	120.321	47.860	100 year +45% CC 600 minute summer	39.198	10.721
30 year +40% CC 120 minute summer	110.389	29.173	100 year +45% CC 600 minute winter	26.782	10.721
30 year +40% CC 120 minute winter	73.340	29.173	100 year +45% CC 720 minute summer	34.440	9.230
30 year +40% CC 180 minute summer	83.741	21.550	100 year +45% CC 720 minute winter	23.146	9.230
30 year +40% CC 180 minute winter	54.434	21.550	100 year +45% CC 960 minute summer	27.619	7.273
30 year +40% CC 240 minute summer	65.393	17.281	100 year +45% CC 960 minute winter	18.296	7.273
30 year +40% CC 240 minute winter	43.446	17.281	100 year +45% CC 1440 minute summer	19.362	5.189
30 year +40% CC 360 minute summer	48.783	12.554	100 year +45% CC 1440 minute winter	13.012	5.189
30 year +40% CC 360 minute winter	31.710	12.554	100 year +45% CC 2160 minute summer	13.429	3.711
30 year +40% CC 480 minute summer	37.621	9.942	100 year +45% CC 2160 minute winter	9.253	3.711

**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.96%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.275	0.075	9.9	0.0478	0.0000	OK
15 minute summer	2	11	1.971	0.071	9.8	0.0449	0.0000	OK
15 minute summer	3	11	1.750	0.080	12.3	0.0506	0.0000	OK
15 minute summer	4	11	1.622	0.142	33.7	0.0903	0.0000	OK
15 minute summer	5	11	1.569	0.139	33.8	0.1567	0.0000	OK
360 minute summer	6	296	1.378	0.118	10.1	11.3355	0.0000	OK
360 minute summer	7	296	1.378	0.158	10.5	0.2784	0.0000	OK
360 minute summer	8	296	1.378	0.218	17.5	0.3844	0.0000	OK
15 minute summer	9	10	1.848	0.048	10.7	0.0544	0.0000	OK
360 minute summer	10	296	1.378	0.178	16.3	56.6181	0.0000	OK
360 minute summer	11	296	1.378	0.278	17.0	0.7063	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	12	2.619	0.044	3.2	0.0282	0.0000	OK
15 minute summer	14	12	2.115	0.040	2.7	0.0254	0.0000	OK
15 minute summer	15	10	1.923	0.128	34.6	0.2254	0.0000	OK
15 minute summer	16	10	1.727	0.172	94.6	0.3048	0.0000	OK
480 minute summer	17	376	1.428	0.123	18.1	79.3968	0.0000	OK
15 minute summer	18	10	2.015	0.090	31.7	0.1015	0.0000	OK
15 minute summer	19	12	1.628	0.373	124.8	0.6586	0.0000	OK
15 minute summer	20	12	1.625	0.450	49.1	0.7952	0.0000	OK
15 minute summer	J2	9	1.803	0.193	20.7	0.2186	0.0000	OK
15 minute summer	22	9	1.795	0.445	65.9	0.7856	0.0000	OK
360 minute summer	23	224	1.432	0.162	27.5	77.3735	0.0000	OK
360 minute summer	24	224	1.432	0.232	27.5	77.4096	0.0000	OK
15 minute summer	25	10	1.866	0.108	18.5	0.1216	0.0000	OK
15 minute summer	26	10	2.498	0.048	8.2	0.0306	0.0000	OK
15 minute summer	27	12	1.677	0.262	28.3	0.2964	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	1	S1.000	2	9.8	0.890	0.231	0.4950	
15 minute summer	2	S1.001	3	9.8	0.845	0.211	0.3346	
15 minute summer	3	S1.002	4	12.1	0.532	0.157	0.9391	
15 minute summer	4	S1.003	5	33.8	1.046	0.332	0.1926	
15 minute summer	5	S1.004	6	33.6	0.872	0.191	0.7699	
360 minute summer	6	S1.005	7	7.5	0.382	0.023	0.8389	
360 minute summer	7	S1.006	8	10.1	0.266	0.031	1.9492	
360 minute summer	8	S1.007	11	17.0	0.237	0.053	2.9646	
15 minute summer	9	S2.000	10	10.6	1.804	0.088	0.0409	
360 minute summer	10	S2.001	11	-13.2	-0.275	-0.049	1.1633	
360 minute summer	11	Hydro-Brake®	32	3.4				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1397	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.0972	
15 minute summer	13	S3.001	14	2.7	0.630	0.190	0.2785	
15 minute summer	14	S3.002	15	2.7	0.596	0.064	0.0367	
15 minute summer	15	S3.003	16	34.0	0.967	0.161	0.7367	
15 minute summer	16	S3.004	19	93.3	1.053	0.188	7.1561	
480 minute summer	17	S4.000	19	-18.1	-0.449	-0.059	1.3543	
15 minute summer	18	S5.000	19	31.5	1.876	0.170	0.2263	
15 minute summer	19	S3.005	20	49.1	0.715	0.160	8.1437	
15 minute summer	20	S3.006	30	64.9	0.458	0.128	2.4178	
15 minute summer	J2	S8.000A	22	24.8	0.985	0.325	1.1639	
15 minute summer	22	S8.000	23	81.5	2.088	0.301	0.9088	
360 minute summer	23	S8.001	24	-9.7	0.285	-0.059	1.7580	
360 minute summer	24	S8.002	30	-27.5	-0.352	-0.148	2.3891	
15 minute summer	25	S6.000	27	18.2	0.953	0.452	1.1494	
15 minute summer	26	S7.000	27	8.1	1.698	0.211	0.1732	
15 minute summer	27	S6.001	28	27.9	0.756	0.380	1.6176	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	12	1.659	0.349	34.8	0.3944	0.0000	SURCHARGED
15 minute summer	29	12	1.645	0.405	35.4	0.4581	0.0000	SURCHARGED
15 minute summer	30	11	1.618	0.498	102.8	0.8799	0.0000	SURCHARGED
480 minute summer	31	328	1.279	0.219	8.2	0.5582	0.0000	OK
480 minute summer	32	328	1.279	0.349	14.1	0.8887	0.0000	OK
480 minute summer	33	328	1.279	0.419	14.0	1.0667	0.0000	OK
480 minute summer	34	328	1.279	0.499	13.3	1.7289	0.0000	OK
15 minute summer	35	11	2.604	0.034	1.7	0.0215	0.0000	OK
15 minute summer	36	11	2.231	0.096	18.9	0.1705	0.0000	OK
15 minute summer	37	10	2.027	0.177	66.5	0.3128	0.0000	OK
15 minute summer	38	11	1.819	0.059	65.7	0.1039	0.0000	OK
1440 minute winter	39	1350	1.268	0.378	9.8	258.7326	0.0000	OK
1440 minute winter	40	1350	1.268	0.398	10.0	0.7028	0.0000	OK
1440 minute winter	41	1350	1.268	0.456	5.6	0.8053	0.0000	OK
15 minute summer	J1	10	1.662	0.057	6.0	0.0647	0.0000	OK
15 minute summer	43	10	1.515	0.120	27.9	0.1353	0.0000	OK
15 minute summer	44	10	1.424	0.109	27.8	0.1233	0.0000	OK
15 minute summer	45	10	2.082	0.082	18.3	0.0519	0.0000	OK
15 minute summer	46	10	1.569	0.079	18.2	0.0504	0.0000	OK
15 minute summer	47	11	1.317	0.127	25.2	0.1437	0.0000	OK
1440 minute winter	48	1350	1.268	0.148	1.9	0.1671	0.0000	OK
1440 minute winter	49	1350	1.268	0.473	5.6	1.2032	0.0000	SURCHARGED
480 minute summer	50	328	1.279	0.564	11.0	1.4356	0.0000	SURCHARGED
360 minute summer	ExMH3	232	1.147	0.477	16.5	1.2133	0.0000	OK
15 minute summer	ExMH1	11	2.329	0.049	7.8	0.0551	0.0000	OK
360 minute summer	ExMH4	232	1.147	0.507	14.9	1.2896	0.0000	OK
360 minute summer	ExMH5	232	1.147	0.637	15.0	1.6204	0.0000	OK
360 minute summer	ExMH6	232	1.147	0.687	13.9	1.7474	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	28	S6.002	29	35.4	0.973	0.298	0.4310	
15 minute summer	29	S6.003	30	36.4	0.603	0.395	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
480 minute summer	31	S3.008	32	8.2	0.382	0.014	9.3301	
480 minute summer	32	S1.009	33	12.5	0.478	0.021	6.8819	
480 minute summer	33	S1.010	34	12.2	0.379	0.006	15.8283	
480 minute summer	34	S1.011	50	11.0	0.161	0.006	18.4990	
15 minute summer	35	S9.001	36	1.6	0.553	0.105	0.0233	
15 minute summer	36	S9.002	37	18.5	0.772	0.098	0.9488	
15 minute summer	37	S9.003	38	65.7	1.696	0.185	1.3900	
15 minute summer	38	S9.004	40	65.9	1.508	0.021	0.3769	
1440 minute winter	39	S10.000	40	-9.8	-0.218	-0.037	2.5719	
1440 minute winter	40	S9.005	41	-5.4	0.176	-0.019	7.3290	
1440 minute winter	41	S9.006	49	-5.6	0.088	-0.019	2.2068	
15 minute summer	J1	S11.000A	43	5.9	0.759	0.134	0.1477	
15 minute summer	43	S11.000	44	27.8	1.129	0.285	0.2555	
15 minute summer	44	S11.001	49	27.5	1.164	0.264	0.7561	
15 minute summer	45	S12.000	46	18.2	1.426	0.267	0.3820	
15 minute summer	46	S12.001	47	18.0	1.026	0.268	0.3192	
15 minute summer	47	S12.002	48	24.9	1.080	0.438	0.1412	
1440 minute winter	48	S12.003	49	1.8	0.450	0.024	0.4107	
1440 minute winter	49	Hydro-Brake®	50	3.2				
480 minute summer	50	Hydro-Brake®	ExMH3	10.3				
360 minute summer	ExMH3	Ex 3	ExMH4	14.9	0.481	0.031	5.9371	
15 minute summer	ExMH1	Ex 1	ExMH3	7.5	0.497	0.104	1.3279	
360 minute summer	ExMH4	Ex 4	ExMH5	12.3	0.384	0.018	15.6760	
360 minute summer	ExMH5	Ex 5	ExMH6	11.3	0.355	0.039	36.9801	
360 minute summer	ExMH6	Ex 6	ExMH7	12.3	0.136	0.014	24.6735	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	ExMH7	232	1.147	0.977	13.1	2.4853	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.650	0.500	9.3	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)
360 minute summer	ExMH7	Ex 7	Outfall	12.7	0.320	0.477	0.2978	362.4



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.295	0.095	15.2	0.0602	0.0000	OK
15 minute summer	2	11	1.989	0.089	15.0	0.0569	0.0000	OK
15 minute summer	3	11	1.770	0.100	18.9	0.0634	0.0000	OK
15 minute summer	4	11	1.666	0.186	51.8	0.1181	0.0000	OK
15 minute summer	5	11	1.605	0.175	51.9	0.1978	0.0000	OK
360 minute winter	6	344	1.455	0.195	8.8	22.5182	0.0000	OK
360 minute winter	7	344	1.455	0.235	8.5	0.4154	0.0000	OK
360 minute winter	8	344	1.455	0.295	13.7	0.5214	0.0000	OK
15 minute summer	9	10	1.860	0.060	16.3	0.0683	0.0000	OK
360 minute winter	10	352	1.455	0.255	12.1	84.3930	0.0000	OK
360 minute winter	11	352	1.455	0.355	13.2	0.9038	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	12	2.631	0.056	4.9	0.0358	0.0000	OK
15 minute summer	14	12	2.125	0.050	4.3	0.0320	0.0000	OK
15 minute summer	15	10	1.956	0.161	53.0	0.2844	0.0000	OK
15 minute summer	16	10	1.770	0.215	144.7	0.3804	0.0000	OK
360 minute winter	17	352	1.499	0.194	28.8	131.1644	0.0000	OK
15 minute summer	18	9	2.035	0.110	48.2	0.1248	0.0000	OK
15 minute summer	19	11	1.769	0.514	191.0	0.9091	0.0000	OK
15 minute summer	20	11	1.755	0.580	84.2	1.0251	0.0000	OK
15 minute summer	J2	8	1.859	0.249	31.5	0.2817	0.0000	OK
15 minute winter	22	8	1.846	0.496	89.0	0.8760	0.0000	SURCHARGED
360 minute winter	23	352	1.498	0.228	20.9	108.9186	0.0000	OK
360 minute winter	24	352	1.498	0.298	19.9	99.7582	0.0000	OK
15 minute summer	25	12	1.963	0.205	28.2	0.2323	0.0000	OK
15 minute summer	26	10	2.509	0.059	12.5	0.0373	0.0000	OK
15 minute summer	27	11	1.871	0.456	41.5	0.5153	0.0000	SURCHARGED

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	1	S1.000	2	15.0	0.990	0.354	0.6820	
15 minute summer	2	S1.001	3	15.0	0.949	0.324	0.4565	
15 minute summer	3	S1.002	4	18.7	0.583	0.243	1.3021	
15 minute summer	4	S1.003	5	51.9	1.173	0.510	0.2637	
15 minute summer	5	S1.004	6	51.9	0.981	0.294	1.0553	
360 minute winter	6	S1.005	7	6.3	0.372	0.019	1.5591	
360 minute winter	7	S1.006	8	8.2	0.258	0.025	3.0997	
360 minute winter	8	S1.007	11	13.2	0.215	0.041	4.2065	
15 minute summer	9	S2.000	10	16.2	2.012	0.133	0.0559	
360 minute winter	10	S2.001	11	-9.6	-0.211	-0.036	1.6426	
360 minute winter	11	Hydro-Brake®	32	3.4				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1933	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.1311	
15 minute summer	13	S3.001	14	4.3	0.714	0.297	0.3851	
15 minute summer	14	S3.002	15	4.3	0.677	0.100	0.0508	
15 minute summer	15	S3.003	16	52.2	1.083	0.246	1.0099	
15 minute summer	16	S3.004	19	142.7	1.080	0.288	10.0527	
360 minute winter	17	S4.000	19	-28.8	-0.522	-0.094	2.3192	
15 minute summer	18	S5.000	19	48.3	2.043	0.262	0.5122	
15 minute summer	19	S3.005	20	84.2	0.761	0.274	10.6318	
15 minute summer	20	S3.006	30	105.5	0.473	0.208	2.8444	
15 minute summer	J2	S8.000A	22	41.3	1.001	0.541	1.3297	
15 minute winter	22	S8.000	23	108.3	2.320	0.400	0.9116	
360 minute winter	23	S8.001	24	7.8	0.244	0.047	2.5304	
360 minute winter	24	S8.002	30	-19.9	-0.284	-0.107	3.0459	
15 minute summer	25	S6.000	27	25.8	0.965	0.641	1.7354	
15 minute summer	26	S7.000	27	12.4	1.744	0.323	0.2289	
15 minute summer	27	S6.001	28	43.1	0.754	0.587	1.6787	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	11	1.834	0.524	54.1	0.5923	0.0000	SURCHARGED
15 minute summer	29	11	1.804	0.564	55.9	0.6384	0.0000	SURCHARGED
15 minute summer	30	11	1.746	0.626	165.2	1.1066	0.0000	SURCHARGED
360 minute summer	31	240	1.383	0.323	8.3	0.8219	0.0000	OK
360 minute summer	32	240	1.383	0.453	14.4	1.1525	0.0000	OK
360 minute summer	33	240	1.383	0.523	14.6	1.3306	0.0000	OK
360 minute summer	34	240	1.383	0.603	13.7	2.0882	0.0000	OK
15 minute summer	35	11	2.612	0.042	2.5	0.0266	0.0000	OK
15 minute summer	36	11	2.255	0.120	28.9	0.2120	0.0000	OK
15 minute summer	37	10	2.068	0.218	101.9	0.3859	0.0000	OK
15 minute summer	38	10	1.832	0.072	100.7	0.1269	0.0000	OK
960 minute winter	39	960	1.363	0.473	15.8	329.4406	0.0000	OK
960 minute winter	40	960	1.363	0.493	16.1	0.8711	0.0000	OK
960 minute winter	41	960	1.363	0.551	9.6	0.9735	0.0000	OK
15 minute summer	J1	10	1.677	0.072	9.2	0.0812	0.0000	OK
15 minute summer	43	10	1.548	0.153	42.7	0.1729	0.0000	OK
15 minute summer	44	10	1.448	0.133	42.6	0.1506	0.0000	OK
15 minute summer	45	10	2.103	0.103	27.9	0.0657	0.0000	OK
15 minute summer	46	10	1.593	0.103	27.7	0.0655	0.0000	OK
15 minute summer	47	11	1.380	0.190	38.6	0.2145	0.0000	OK
960 minute winter	48	960	1.363	0.243	4.3	0.2748	0.0000	OK
960 minute winter	49	960	1.363	0.568	9.7	1.4454	0.0000	SURCHARGED
360 minute summer	50	240	1.383	0.668	10.9	1.6996	0.0000	SURCHARGED
240 minute summer	ExMH3	152	1.367	0.697	21.6	1.7726	0.0000	OK
15 minute summer	ExMH1	10	2.340	0.060	11.8	0.0681	0.0000	OK
240 minute summer	ExMH4	152	1.367	0.727	18.7	1.8490	0.0000	OK
240 minute summer	ExMH5	152	1.366	0.856	18.5	2.1798	0.0000	SURCHARGED
240 minute summer	ExMH6	152	1.366	0.906	16.0	2.3068	0.0000	SURCHARGED

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	28	S6.002	29	55.9	0.980	0.470	0.4310	
15 minute summer	29	S6.003	30	57.7	0.820	0.626	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
360 minute summer	31	S3.008	32	8.2	0.386	0.014	13.9161	
360 minute summer	32	S1.009	33	12.5	0.502	0.021	9.1845	
360 minute summer	33	S1.010	34	12.3	0.415	0.007	20.7068	
360 minute summer	34	S1.011	50	10.9	0.125	0.006	23.2488	
15 minute summer	35	S9.001	36	2.4	0.618	0.157	0.0313	
15 minute summer	36	S9.002	37	28.4	0.866	0.151	1.2946	
15 minute summer	37	S9.003	38	100.7	1.933	0.283	1.8598	
15 minute summer	38	S9.004	40	100.4	1.449	0.032	0.4942	
960 minute winter	39	S10.000	40	-15.8	-0.238	-0.060	3.2455	
960 minute winter	40	S9.005	41	-8.2	0.202	-0.029	8.8812	
960 minute winter	41	S9.006	49	-9.6	-0.066	-0.033	2.5796	
15 minute summer	J1	S11.000A	43	9.1	0.823	0.209	0.2200	
15 minute summer	43	S11.000	44	42.6	1.286	0.437	0.3433	
15 minute summer	44	S11.001	49	43.3	1.175	0.415	1.2216	
15 minute summer	45	S12.000	46	27.7	1.574	0.407	0.5318	
15 minute summer	46	S12.001	47	27.7	1.079	0.412	0.4726	
15 minute summer	47	S12.002	48	37.6	1.150	0.662	0.2193	
960 minute winter	48	S12.003	49	5.7	0.506	0.077	0.6511	
960 minute winter	49	Hydro-Brake®	50	1.7				
360 minute summer	50	Hydro-Brake®	ExMH3	10.5				
240 minute summer	ExMH3	Ex 3	ExMH4	18.7	0.509	0.039	8.3711	
15 minute summer	ExMH1	Ex 1	ExMH3	11.5	0.582	0.158	1.6753	
240 minute summer	ExMH4	Ex 4	ExMH5	13.9	0.402	0.021	19.2135	
240 minute summer	ExMH5	Ex 5	ExMH6	11.7	0.378	0.041	39.6562	
240 minute summer	ExMH6	Ex 6	ExMH7	12.6	0.137	0.014	25.1806	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	ExMH7	152	1.366	1.196	14.1	3.0448	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.650	0.500	10.9	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)
240 minute summer	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	302.8

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.370	0.170	37.6	0.1079	0.0000	OK
15 minute summer	2	11	2.075	0.175	37.0	0.1115	0.0000	OK
15 minute summer	3	11	1.958	0.288	45.6	0.1829	0.0000	OK
15 minute summer	4	11	1.884	0.404	126.2	0.2570	0.0000	SURCHARGED
600 minute winter	5	585	1.846	0.416	11.7	0.4709	0.0000	OK
600 minute winter	6	585	1.846	0.586	11.6	78.9585	0.0000	OK
600 minute winter	7	600	1.846	0.626	7.6	1.1070	0.0000	SURCHARGED
600 minute winter	8	585	1.846	0.686	15.2	1.2127	0.0000	SURCHARGED
15 minute summer	9	10	1.903	0.103	40.4	0.1164	0.0000	OK
600 minute winter	10	585	1.846	0.646	18.0	224.4534	0.0000	SURCHARGED
600 minute winter	11	585	1.846	0.746	15.1	1.8994	0.0000	SURCHARGED
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	11	2.677	0.102	12.2	0.0648	0.0000	OK
15 minute summer	14	10	2.448	0.373	56.0	0.2374	0.0000	SURCHARGED
15 minute summer	15	9	2.498	0.703	139.7	1.2418	0.0000	SURCHARGED
15 minute summer	16	10	2.372	0.817	383.2	1.4428	0.0000	SURCHARGED
600 minute winter	17	585	1.866	0.561	41.0	400.6916	0.0000	OK
15 minute summer	18	10	2.399	0.474	119.8	0.5364	0.0000	SURCHARGED
15 minute summer	19	10	2.135	0.880	505.4	1.5549	0.0000	SURCHARGED
15 minute summer	20	10	2.124	0.949	152.2	1.6776	0.0000	SURCHARGED
15 minute winter	J2	6	2.214	0.604	73.4	0.6831	0.0000	FLOOD RISK
15 minute winter	22	6	2.164	0.814	217.9	1.4379	0.0000	SURCHARGED
600 minute winter	23	600	1.867	0.597	21.6	284.7235	0.0000	SURCHARGED
600 minute winter	24	600	1.867	0.667	17.6	222.9366	0.0000	SURCHARGED
15 minute summer	25	12	2.874	1.116	70.0	6.0296	0.0000	SURCHARGED
15 minute summer	26	12	2.882	0.432	31.1	1.6140	0.0000	SURCHARGED
15 minute summer	27	10	2.582	1.167	91.1	1.3202	0.0000	SURCHARGED

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	1	S1.000	2	37.0	1.222	0.875	1.4498	
15 minute summer	2	S1.001	3	37.0	1.088	0.799	1.0529	
15 minute summer	3	S1.002	4	48.4	0.776	0.628	2.7507	
15 minute summer	4	S1.003	5	126.4	1.795	1.243	0.4190	
600 minute winter	5	S1.004	6	11.6	0.646	0.066	3.1075	
600 minute winter	6	S1.005	7	4.4	0.340	0.013	4.8194	
600 minute winter	7	S1.006	8	7.0	0.248	0.021	7.2684	
600 minute winter	8	S1.007	11	14.3	0.183	0.044	7.6058	
15 minute summer	9	S2.000	10	40.2	2.500	0.331	0.1118	
600 minute winter	10	S2.001	11	-14.5	-0.130	-0.054	2.2941	
600 minute winter	11	Hydro-Brake®	32	3.3				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.4088	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.2624	
15 minute summer	13	S3.001	14	11.4	0.909	0.792	0.9604	
15 minute summer	14	S3.002	15	-48.2	-1.269	-1.120	0.3175	
15 minute summer	15	S3.003	16	156.3	1.287	0.738	3.3043	
15 minute summer	16	S3.004	19	387.9	1.468	0.784	16.2804	
600 minute winter	17	S4.000	19	-41.0	-0.535	-0.134	6.9408	
15 minute summer	18	S5.000	19	124.6	2.160	0.674	0.9490	
15 minute summer	19	S3.005	20	152.2	0.875	0.495	11.1710	
15 minute summer	20	S3.006	30	158.5	0.563	0.313	2.8582	
15 minute winter	J2	S8.000A	22	72.1	1.244	0.945	1.4087	
15 minute winter	22	S8.000	23	218.4	2.859	0.807	0.9257	
600 minute winter	23	S8.001	24	10.2	0.226	0.062	4.1682	
600 minute winter	24	S8.002	30	-17.6	-0.230	-0.095	3.8019	
15 minute summer	25	S6.000	27	64.6	1.625	1.609	1.7741	
15 minute summer	26	S7.000	27	28.7	1.731	0.745	0.3360	
15 minute summer	27	S6.001	28	93.8	1.332	1.277	1.6787	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	10	2.466	1.156	115.9	1.3077	0.0000	SURCHARGED
15 minute summer	29	10	2.349	1.109	119.0	1.2540	0.0000	SURCHARGED
15 minute summer	30	10	2.115	0.995	286.2	1.7578	0.0000	SURCHARGED
360 minute winter	31	256	1.905	0.845	8.3	2.1498	0.0000	SURCHARGED
360 minute winter	32	256	1.905	0.975	14.1	2.4806	0.0000	SURCHARGED
360 minute winter	33	256	1.905	1.045	14.3	2.6588	0.0000	OK
360 minute winter	34	256	1.905	1.125	13.9	3.8958	0.0000	OK
15 minute summer	35	11	2.640	0.070	6.2	0.0444	0.0000	OK
15 minute summer	36	10	2.336	0.201	71.7	0.3549	0.0000	OK
15 minute summer	37	10	2.201	0.351	255.4	0.6209	0.0000	OK
15 minute summer	38	10	1.872	0.112	252.4	0.1976	0.0000	OK
960 minute winter	39	945	1.790	0.900	29.3	646.7086	0.0000	SURCHARGED
960 minute winter	40	945	1.792	0.922	29.9	1.6291	0.0000	SURCHARGED
960 minute winter	41	945	1.790	0.978	18.8	1.7286	0.0000	SURCHARGED
15 minute summer	J1	10	2.123	0.518	26.6	0.5863	0.0000	FLOOD RISK
15 minute summer	43	10	2.081	0.686	105.8	0.7758	0.0000	SURCHARGED
15 minute summer	44	10	1.928	0.613	105.9	0.6937	0.0000	SURCHARGED
15 minute summer	45	11	2.805	0.805	69.2	1.0704	0.0000	SURCHARGED
15 minute summer	46	10	2.323	0.833	64.5	0.5300	0.0000	SURCHARGED
15 minute summer	47	10	2.015	0.825	88.1	0.9327	0.0000	SURCHARGED
960 minute winter	48	945	1.790	0.670	5.9	0.7574	0.0000	SURCHARGED
960 minute winter	49	930	1.789	0.994	17.7	2.5297	0.0000	SURCHARGED
360 minute winter	50	256	1.905	1.190	11.7	3.0276	0.0000	SURCHARGED
60 minute winter	ExMH3	36	2.481	1.811	80.5	4.6089	0.0000	SURCHARGED
60 minute winter	ExMH1	37	2.441	0.161	14.5	0.1824	0.0000	OK
60 minute winter	ExMH4	36	2.478	1.838	63.8	4.6770	0.0000	FLOOD RISK
60 minute summer	ExMH5	35	2.435	1.925	83.6	4.8991	0.0000	FLOOD RISK
180 minute summer	ExMH6	92	2.370	1.910	80.1	4.8610	64.1459	FLOOD

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	28	S6.002	29	119.0	1.690	1.001	0.4310	
15 minute summer	29	S6.003	30	122.4	1.738	1.327	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
360 minute winter	31	S3.008	32	8.1	0.398	0.014	26.6766	
360 minute winter	32	S1.009	33	12.7	0.554	0.022	13.3484	
360 minute winter	33	S1.010	34	12.7	0.416	0.007	42.6658	
360 minute winter	34	S1.011	50	11.6	0.115	0.007	42.6675	
15 minute summer	35	S9.001	36	6.0	0.787	0.395	0.0618	
15 minute summer	36	S9.002	37	70.8	1.082	0.376	2.7086	
15 minute summer	37	S9.003	38	252.4	2.527	0.709	3.4587	
15 minute summer	38	S9.004	40	252.0	2.402	0.080	0.6743	
960 minute winter	39	S10.000	40	-29.3	-0.280	-0.111	3.7618	
960 minute winter	40	S9.005	41	-14.7	0.183	-0.052	9.6469	
960 minute winter	41	S9.006	49	-18.7	-0.075	-0.064	2.6571	
15 minute summer	J1	S11.000A	43	24.0	0.834	0.550	0.7588	
15 minute summer	43	S11.000	44	105.9	1.503	1.086	0.7298	
15 minute summer	44	S11.001	49	107.9	1.532	1.034	1.9170	
15 minute summer	45	S12.000	46	64.5	1.739	0.950	1.1931	
15 minute summer	46	S12.001	47	65.5	1.647	0.974	0.7164	
15 minute summer	47	S12.002	48	89.3	2.247	1.571	0.2331	
960 minute winter	48	S12.003	49	8.4	0.534	0.113	0.7022	
960 minute winter	49	Hydro-Brake®	50	2.3				
360 minute winter	50	Hydro-Brake®	ExMH3	11.0				
60 minute winter	ExMH3	Ex 3	ExMH4	63.8	0.719	0.132	8.5423	
60 minute winter	ExMH1	Ex 1	ExMH3	17.3	0.487	0.238	2.9070	
60 minute winter	ExMH4	Ex 4	ExMH5	68.3	0.507	0.102	19.2989	
60 minute summer	ExMH5	Ex 5	ExMH6	90.8	0.457	0.316	39.6562	
180 minute summer	ExMH6	Ex 6	ExMH7	14.6	0.140	0.017	25.1806	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	ExMH7	24	2.417	2.247	65.9	5.7189	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.650	0.500	12.9	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)
30 minute summer	ExMH7	Ex 7	Outfall	12.8	0.322	0.481	0.2978	190.5



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.074	0.874	52.6	0.5561	0.0000	SURCHARGED
720 minute winter	2	690	2.601	0.701	4.0	0.4457	0.0000	SURCHARGED
720 minute winter	3	690	2.600	0.930	5.1	0.5917	0.0000	FLOOD RISK
720 minute winter	4	705	2.600	1.120	14.1	39.1771	0.0000	FLOOD RISK
720 minute winter	5	705	2.600	1.170	13.6	1.3237	0.0000	SURCHARGED
720 minute winter	6	705	2.600	1.340	13.3	116.5109	0.0000	SURCHARGED
720 minute winter	7	705	2.600	1.380	7.8	2.4385	0.0000	SURCHARGED
720 minute winter	8	705	2.601	1.441	16.7	2.5469	0.0000	SURCHARGED
720 minute winter	9	705	2.602	0.802	5.2	0.9065	0.0000	SURCHARGED
720 minute winter	10	705	2.601	1.401	23.0	287.8323	0.0000	SURCHARGED
720 minute winter	11	705	2.600	1.500	19.2	3.8183	0.0000	SURCHARGED
15 minute summer	12	12	3.032	0.032	3.7	0.0205	0.0000	OK
15 minute summer	13	11	3.097	0.522	19.8	0.3319	0.0000	SURCHARGED
15 minute summer	14	9	2.866	0.791	19.3	0.5034	0.0000	SURCHARGED
15 minute summer	15	9	2.883	1.088	184.6	1.9229	0.0000	SURCHARGED
15 minute summer	16	9	2.755	1.200	512.3	2.1208	0.0000	SURCHARGED
1440 minute summer	17	1350	2.397	1.092	38.0	587.1667	0.0000	SURCHARGED
15 minute summer	18	9	2.856	0.931	167.7	1.0532	0.0000	SURCHARGED
15 minute summer	19	9	2.442	1.187	686.1	2.0973	0.0000	SURCHARGED
960 minute summer	20	975	2.394	1.219	13.0	2.1545	0.0000	SURCHARGED
1440 minute summer	J2	1230	2.391	0.781	6.9	0.8833	44.7012	FLOOD
960 minute summer	22	915	2.394	1.044	29.3	1.8455	0.0000	SURCHARGED
1440 minute winter	23	1350	2.396	1.126	73.1	382.2272	0.0000	SURCHARGED
720 minute winter	24	660	2.394	1.194	25.0	399.0082	0.0000	SURCHARGED
15 minute summer	25	13	2.923	1.165	97.9	15.8474	0.0000	SURCHARGED
15 minute summer	26	13	2.976	0.526	43.5	5.5679	0.0000	SURCHARGED
15 minute summer	27	9	2.740	1.325	94.4	1.4989	0.0000	SURCHARGED
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	1	S1.000	2	50.0	1.257	1.181	1.7897	
720 minute winter	2	S1.001	3	4.0	0.645	0.086	1.1478	
720 minute winter	3	S1.002	4	5.1	0.401	0.066	2.7699	
720 minute winter	4	S1.003	5	13.6	0.823	0.134	0.4201	
720 minute winter	5	S1.004	6	13.3	0.634	0.075	3.1603	
720 minute winter	6	S1.005	7	4.4	0.327	0.013	4.8336	
720 minute winter	7	S1.006	8	9.8	0.250	0.030	7.2684	
720 minute winter	8	S1.007	11	15.9	0.187	0.049	7.6058	
720 minute winter	9	S2.000	10	4.2	1.291	0.035	0.2760	
720 minute winter	10	S2.001	11	-18.8	-0.119	-0.070	2.2941	
720 minute winter	11	Hydro-Brake®	32	3.7				
15 minute summer	12	S3.000	13	-3.7	-0.321	-0.255	0.6541	
15 minute summer	12	S9.000	35	1.5	0.225	0.102	0.4369	
15 minute summer	13	S3.001	14	19.3	1.102	1.338	1.1311	
15 minute summer	14	S3.002	15	20.7	0.989	0.480	0.3175	
15 minute summer	15	S3.003	16	192.9	1.366	0.911	3.3043	
15 minute summer	16	S3.004	19	514.2	1.826	1.039	16.2804	
1440 minute summer	17	S4.000	19	-38.0	-0.354	-0.124	7.0352	
15 minute summer	18	S5.000	19	171.9	2.441	0.931	0.9490	
15 minute summer	19	S3.005	20	194.5	0.877	0.633	11.1710	
960 minute summer	20	S3.006	30	13.2	0.240	0.026	2.8582	
1440 minute summer	J2	S8.000A	22	6.9	0.633	0.090	1.4087	
960 minute summer	22	S8.000	23	39.0	0.915	0.144	1.8063	
1440 minute winter	23	S8.001	24	-66.5	-0.420	-0.401	4.1682	
720 minute winter	24	S8.002	30	-25.0	-0.256	-0.135	3.8019	
15 minute summer	25	S6.000	27	68.3	1.718	1.701	1.7741	
15 minute summer	26	S7.000	27	31.2	1.771	0.810	0.3360	
15 minute summer	27	S6.001	28	95.0	1.349	1.293	1.6787	



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	9	2.674	1.364	126.9	1.5430	0.0000	SURCHARGED
15 minute summer	29	9	2.568	1.328	128.8	1.5014	0.0000	SURCHARGED
960 minute winter	30	885	2.394	1.274	28.1	2.2512	0.0000	SURCHARGED
240 minute winter	31	156	2.335	1.275	11.0	3.2454	0.0000	SURCHARGED
240 minute winter	32	156	2.335	1.405	16.7	3.5761	0.0000	SURCHARGED
240 minute winter	33	156	2.335	1.475	15.9	3.7540	0.0000	SURCHARGED
240 minute winter	34	156	2.335	1.555	15.4	5.3866	0.0000	SURCHARGED
15 minute summer	35	12	2.657	0.087	8.9	0.0553	0.0000	OK
15 minute summer	36	10	2.385	0.250	100.4	0.4411	0.0000	OK
960 minute winter	37	900	2.324	0.474	21.3	0.8382	0.0000	OK
960 minute winter	38	885	2.313	0.553	21.3	0.9769	0.0000	OK
2160 minute summer	39	1920	2.368	1.478	30.8	892.5529	0.0000	SURCHARGED
1440 minute winter	40	1350	2.492	1.622	30.0	2.8666	0.0000	SURCHARGED
2160 minute summer	41	1860	2.344	1.532	15.3	2.7076	0.0000	SURCHARGED
15 minute summer	J1	9	2.391	0.786	31.9	0.8890	3.6967	FLOOD
15 minute summer	43	9	2.410	1.015	127.3	1.1481	0.0000	SURCHARGED
960 minute winter	44	900	2.325	1.010	8.5	1.1418	0.0000	SURCHARGED
15 minute summer	45	12	2.868	0.868	96.8	8.0860	0.0000	SURCHARGED
15 minute summer	46	10	2.468	0.978	72.0	0.6217	0.0000	SURCHARGED
960 minute winter	47	900	2.326	1.136	7.9	1.2849	0.0000	SURCHARGED
960 minute winter	48	885	2.330	1.210	7.8	1.3682	0.0000	SURCHARGED
960 minute winter	49	885	2.337	1.542	20.2	3.9253	0.0000	SURCHARGED
240 minute winter	50	156	2.335	1.620	12.3	4.1230	0.0000	SURCHARGED
30 minute winter	ExMH3	19	2.666	1.996	125.1	5.0796	0.0000	FLOOD RISK
30 minute summer	ExMH1	19	2.886	0.606	37.2	0.6853	0.0000	SURCHARGED
60 minute summer	ExMH4	32	2.671	2.031	118.4	5.1686	0.0000	FLOOD RISK
60 minute summer	ExMH5	32	2.592	2.082	172.2	5.2979	0.0000	FLOOD RISK
240 minute summer	ExMH6	112	2.370	1.910	91.4	4.8610	154.0162	FLOOD

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	28	S6.002	29	128.8	1.829	1.083	0.4310	
15 minute summer	29	S6.003	30	132.0	1.874	1.430	1.2215	
960 minute winter	30	Hydro-Brake®	31	7.9				
240 minute winter	31	S3.008	32	-11.0	0.402	-0.019	26.6766	
240 minute winter	32	S1.009	33	13.5	0.571	0.023	13.3484	
240 minute winter	33	S1.010	34	13.6	0.487	0.007	44.9444	
240 minute winter	34	S1.011	50	11.8	0.198	0.007	43.2544	
15 minute summer	35	S9.001	36	8.7	0.859	0.567	0.0813	
15 minute summer	36	S9.002	37	99.4	1.117	0.528	3.7154	
960 minute winter	37	S9.003	38	21.3	1.185	0.060	8.4713	
960 minute winter	38	S9.004	40	21.3	0.535	0.007	1.1795	
2160 minute summer	39	S10.000	40	-30.8	-0.159	-0.116	3.7618	
1440 minute winter	40	S9.005	41	-14.8	0.110	-0.053	9.6469	
2160 minute summer	41	S9.006	49	-15.2	-0.054	-0.052	2.6571	
15 minute summer	J1	S11.000A	43	29.8	0.827	0.682	0.7588	
15 minute summer	43	S11.000	44	128.0	1.818	1.313	0.7298	
960 minute winter	44	S11.001	49	8.3	0.677	0.079	1.9170	
15 minute summer	45	S12.000	46	72.0	1.810	1.060	1.1931	
15 minute summer	46	S12.001	47	72.6	1.826	1.080	0.7164	
960 minute winter	47	S12.002	48	7.8	0.730	0.137	0.2331	
960 minute winter	48	S12.003	49	7.8	0.533	0.105	0.7022	
960 minute winter	49	Hydro-Brake®	50	2.5				
240 minute winter	50	Hydro-Brake®	ExMH3	11.0				
30 minute winter	ExMH3	Ex 3	ExMH4	123.0	0.948	0.255	8.5423	
30 minute summer	ExMH1	Ex 1	ExMH3	36.2	1.064	0.498	3.2926	
60 minute summer	ExMH4	Ex 4	ExMH5	134.3	0.531	0.200	19.2989	
60 minute summer	ExMH5	Ex 5	ExMH6	190.8	0.472	0.664	39.6562	
240 minute summer	ExMH6	Ex 6	ExMH7	-14.3	0.143	-0.016	25.1806	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.02%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	ExMH7	19	2.424	2.254	89.1	5.7369	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.650	0.500	13.5	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)
30 minute winter	ExMH7	Ex 7	Outfall	12.8	0.323	0.482	0.2978	193.2



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 92.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	3.376	1.176	68.3	0.7479	1.8960	FLOOD
15 minute summer	2	10	2.882	0.982	53.5	0.6245	0.0000	SURCHARGED
960 minute winter	3	840	2.830	1.160	10.0	0.7378	2.4231	FLOOD
960 minute winter	4	840	2.830	1.350	24.0	163.7296	9.7355	FLOOD
720 minute winter	5	690	2.832	1.402	17.3	1.5861	0.0000	FLOOD RISK
960 minute winter	6	915	2.833	1.573	13.7	116.9213	0.0000	FLOOD RISK
720 minute winter	7	705	2.832	1.612	14.2	2.8487	0.0000	SURCHARGED
960 minute winter	8	915	2.830	1.670	17.6	2.9512	0.0000	SURCHARGED
720 minute winter	9	675	2.831	1.031	5.5	10.8331	0.0000	SURCHARGED
720 minute winter	10	675	2.830	1.630	31.0	288.2371	0.0000	SURCHARGED
720 minute winter	11	705	2.831	1.731	26.0	4.4053	0.0000	SURCHARGED
15 minute summer	12	12	3.094	0.094	12.9	0.0596	0.0000	OK
15 minute summer	13	10	3.503	0.928	29.6	0.5903	0.0000	FLOOD RISK
15 minute summer	14	9	3.291	1.216	19.6	0.7733	0.0000	SURCHARGED
15 minute summer	15	9	3.305	1.510	233.7	2.6681	0.0000	SURCHARGED
15 minute summer	16	9	3.168	1.613	654.5	2.8496	0.0000	SURCHARGED
480 minute winter	17	312	2.602	1.297	81.8	587.3989	0.0000	SURCHARGED
15 minute summer	18	9	3.299	1.374	217.9	1.5535	0.0000	SURCHARGED
480 minute winter	19	312	2.601	1.346	90.2	2.3787	0.0000	SURCHARGED
480 minute winter	20	312	2.598	1.423	65.3	2.5149	0.0000	SURCHARGED
2160 minute winter	J2	1320	2.391	0.781	36.8	0.8833	685.8629	FLOOD
480 minute winter	22	312	2.552	1.202	85.2	2.1235	0.0000	SURCHARGED
480 minute winter	23	312	2.561	1.291	68.2	382.5186	0.0000	SURCHARGED
480 minute winter	24	312	2.575	1.375	104.4	401.5965	0.0000	SURCHARGED
15 minute summer	25	13	2.983	1.225	127.2	27.9088	0.0000	SURCHARGED
15 minute summer	26	13	3.092	0.642	56.5	10.4239	0.0000	SURCHARGED
15 minute summer	27	9	2.867	1.452	94.9	1.6417	0.0000	SURCHARGED
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	1	S1.000	2	53.5	1.347	1.265	1.7897	
15 minute summer	2	S1.001	3	54.6	1.374	1.179	1.1478	
960 minute winter	3	S1.002	4	-9.0	0.383	-0.117	2.7699	
960 minute winter	4	S1.003	5	13.7	0.778	0.135	0.4201	
720 minute winter	5	S1.004	6	17.1	0.638	0.097	3.1603	
960 minute winter	6	S1.005	7	-12.4	0.327	-0.038	4.8336	
720 minute winter	7	S1.006	8	-10.3	0.275	-0.031	7.2684	
960 minute winter	8	S1.007	11	17.5	0.182	0.054	7.6058	
720 minute winter	9	S2.000	10	5.5	1.302	0.045	0.2760	
720 minute winter	10	S2.001	11	-25.8	-0.163	-0.096	2.2941	
720 minute winter	11	Hydro-Brake®	32	3.7				
15 minute summer	12	S3.000	13	-12.9	-0.854	-0.895	0.9361	
15 minute summer	12	S9.000	35	10.3	0.640	0.720	0.9540	
15 minute summer	13	S3.001	14	19.6	1.119	1.360	1.1311	
15 minute summer	14	S3.002	15	25.0	1.029	0.581	0.3175	
15 minute summer	15	S3.003	16	241.3	1.523	1.140	3.3043	
15 minute summer	16	S3.004	19	658.4	2.338	1.330	16.2804	
480 minute winter	17	S4.000	19	-81.8	-0.590	-0.267	7.0352	
15 minute summer	18	S5.000	19	221.2	3.141	1.197	0.9490	
480 minute winter	19	S3.005	20	65.3	0.490	0.213	11.1710	
480 minute winter	20	S3.006	30	67.6	0.290	0.134	2.8582	
2160 minute winter	J2	S8.000A	22	-33.6	0.536	-0.441	1.4087	
480 minute winter	22	S8.000	23	-68.4	1.182	-0.253	1.8063	
480 minute winter	23	S8.001	24	-68.2	-0.430	-0.411	4.1682	
480 minute winter	24	S8.002	30	-77.0	-0.486	-0.415	3.8019	
15 minute summer	25	S6.000	27	69.5	1.748	1.730	1.7741	
15 minute summer	26	S7.000	27	32.0	1.869	0.831	0.3360	
15 minute summer	27	S6.001	28	95.5	1.357	1.301	1.6787	



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 92.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	9	2.831	1.521	134.7	1.7200	0.0000	SURCHARGED
15 minute summer	29	9	2.716	1.476	137.8	1.6697	0.0000	SURCHARGED
480 minute winter	30	312	2.595	1.475	79.4	2.6069	0.0000	SURCHARGED
240 minute summer	31	144	2.889	1.829	17.1	4.6547	0.0000	SURCHARGED
240 minute summer	32	144	2.888	1.958	27.4	4.9823	0.0000	SURCHARGED
240 minute summer	33	144	2.887	2.027	31.9	5.1582	0.0000	SURCHARGED
240 minute summer	34	144	2.886	2.106	29.7	7.2963	0.0000	SURCHARGED
15 minute summer	35	12	2.764	0.194	19.7	0.1233	0.0000	SURCHARGED
15 minute summer	36	11	2.442	0.307	131.1	0.5423	0.0000	OK
600 minute winter	37	435	2.402	0.552	40.5	0.9748	0.0000	OK
1440 minute winter	38	900	2.459	0.699	143.6	1.2347	0.0000	SURCHARGED
1440 minute winter	39	900	2.532	1.642	38.8	892.8424	0.0000	SURCHARGED
360 minute winter	40	312	2.663	1.793	147.1	3.1679	0.0000	SURCHARGED
1440 minute winter	41	900	2.478	1.666	50.0	2.9431	0.0000	SURCHARGED
1440 minute winter	J1	870	2.391	0.786	12.6	0.8890	92.4400	FLOOD
15 minute summer	43	10	2.486	1.091	151.6	1.2341	0.0000	SURCHARGED
960 minute winter	44	645	2.420	1.105	11.2	1.2501	0.0000	SURCHARGED
15 minute summer	45	13	2.914	0.914	125.8	18.4622	0.0000	SURCHARGED
15 minute summer	46	10	2.576	1.086	73.0	0.6904	0.0000	SURCHARGED
960 minute winter	47	645	2.428	1.238	10.2	1.4001	0.0000	SURCHARGED
960 minute winter	48	645	2.426	1.306	10.2	1.4774	0.0000	SURCHARGED
360 minute summer	49	360	2.425	1.630	77.7	4.1476	0.0000	SURCHARGED
240 minute summer	50	144	2.886	2.171	16.5	5.5253	0.0000	SURCHARGED
15 minute winter	ExMH3	11	2.739	2.069	207.7	5.2657	0.0000	FLOOD RISK
30 minute summer	ExMH1	18	3.287	1.007	48.8	1.1395	0.0000	FLOOD RISK
30 minute summer	ExMH4	17	2.679	2.039	181.9	5.1887	0.0000	FLOOD RISK
15 minute winter	ExMH5	11	2.614	2.104	218.7	5.3557	0.0000	FLOOD RISK
240 minute summer	ExMH6	104	2.370	1.910	116.8	4.8610	318.4246	FLOOD

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	28	S6.002	29	137.8	1.957	1.159	0.4310	
15 minute summer	29	S6.003	30	140.7	1.998	1.525	1.2215	
480 minute winter	30	Hydro-Brake®	31	8.2				
240 minute summer	31	S3.008	32	-17.1	0.401	-0.030	26.6766	
240 minute summer	32	S1.009	33	17.8	0.577	0.030	13.3484	
240 minute summer	33	S1.010	34	19.7	0.499	0.010	44.9444	
240 minute summer	34	S1.011	50	15.4	0.201	0.009	43.2544	
15 minute summer	35	S9.001	36	19.1	1.095	1.251	0.1347	
15 minute summer	36	S9.002	37	130.9	1.221	0.696	4.8190	
600 minute winter	37	S9.003	38	40.5	1.454	0.114	9.2057	
1440 minute winter	38	S9.004	40	165.9	0.589	0.052	1.1952	
1440 minute winter	39	S10.000	40	74.5	-0.309	0.282	3.7618	
360 minute winter	40	S9.005	41	-51.6	-0.183	-0.184	9.6469	
1440 minute winter	41	S9.006	49	-50.0	-0.178	-0.172	2.6571	
1440 minute winter	J1	S11.000A	43	-11.4	0.512	-0.261	0.7588	
15 minute summer	43	S11.000	44	128.2	1.820	1.315	0.7298	
960 minute winter	44	S11.001	49	11.1	0.680	0.106	1.9170	
15 minute summer	45	S12.000	46	73.0	1.835	1.075	1.1931	
15 minute summer	46	S12.001	47	73.3	1.844	1.091	0.7164	
960 minute winter	47	S12.002	48	10.2	0.711	0.179	0.2331	
960 minute winter	48	S12.003	49	10.1	0.515	0.136	0.7022	
360 minute summer	49	Hydro-Brake®	50	3.2				
240 minute summer	50	Hydro-Brake®	ExMH3	11.0				
15 minute winter	ExMH3	Ex 3	ExMH4	189.2	1.082	0.392	8.5423	
30 minute summer	ExMH1	Ex 1	ExMH3	53.3	1.340	0.733	3.2926	
30 minute summer	ExMH4	Ex 4	ExMH5	200.1	0.641	0.298	19.2989	
15 minute winter	ExMH5	Ex 5	ExMH6	198.2	0.611	0.690	39.6562	
240 minute summer	ExMH6	Ex 6	ExMH7	-18.5	0.153	-0.021	25.1806	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 92.22%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	ExMH7	17	2.430	2.260	102.1	5.7517	5.3366	FLOOD
15 minute summer	Outfall	1	0.650	0.500	12.8	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)
30 minute summer	ExMH7	Ex 7	Outfall	13.1	0.328	0.490	0.2978	194.2

Appendix G

243912-BWB-EXT-XX-T-C-0506-[S2-P03]_Proposed Development Greenfield
Runoff Estimation

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	09/02/2026
Calculated by	Daniel Holmes
Reference	243912
Model version	2.2.2

Location

Site name	Panattoni Park
Site location	Bognor Regis



Site easting (British National Grid)	494190
Site northing (British National Grid)	101548

Site details

Total site area (ha)	4.317	ha
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Greenfield runoff

Method

Method	IH124	
IH124		
	<u>My value</u>	<u>Map value</u>
SAAR (mm)	720	mm
How should SPR be derived?	WRAP soil type	
WRAP soil type	3	
SPR	0.37	
QBar (IH124) (l/s)	12.8	l/s

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	IH124	
Flow rate 1 year (l/s)	10.9	l/s
Flow rate 2 year (l/s)	11.3	l/s
Flow rate 10 years (l/s)	20.8	l/s
Flow rate 30 years (l/s)	29.5	l/s
Flow rate 100 years (l/s)	40.9	l/s
Flow rate 200 years (l/s)	47.9	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix H

243912-BWB-EXT-XX-T-C-0507-[S2-P01]_Existing Highway Drainage Hydraulic
Report FSR

**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	1.200
CV	0.840	Include Intermediate Ground	x
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.062	5.00	3.580	1200	494150.911	101606.609	1.300	2.280
2	0.046	5.00	3.380	1200	494227.069	101541.575	1.800	1.580
3	0.164	5.00	2.870	1800	494226.798	101573.518	2.200	0.670
4			2.680	1800	494245.463	101578.840	2.040	0.640
5	0.084	5.00	2.710	1800	494277.278	101609.079	2.200	0.510
6	0.099	5.00	2.370	1800	494340.155	101673.809	1.910	0.460
7	0.152	5.00	2.430	1800	494379.221	101715.415	2.260	0.170
8			2.430		494378.469	101722.864	2.280	0.150

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	1	3	82.788	0.600	2.280	0.670	1.610	51.4	225	5.75	36.1
2	2	3	31.944	0.600	1.580	0.670	0.910	35.1	150	5.31	37.5
3	3	4	19.409	0.600	0.670	0.640	0.030	647.0	750	6.05	34.7
4	4	5	43.893	0.600	0.640	0.510	0.130	337.6	750	6.53	33.5
5	5	6	90.241	0.600	0.510	0.460	0.050	1804.8	750	8.85	29.1
6	6	7	57.072	0.600	0.460	0.170	0.290	196.8	750	9.33	27.5
7	7	8	7.487	0.600	0.170	0.150	0.020	374.4	225	9.51	27.4

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	1.828	72.7	6.8	1.075	1.975	0.062	0.0	46	1.154
2	1.704	30.1	5.2	1.650	2.050	0.046	0.0	42	1.277
3	1.092	482.6	28.6	1.450	1.290	0.271	0.0	122	0.611
4	1.517	670.2	27.6	1.290	1.450	0.271	0.0	102	0.765
5	0.649	286.9	31.4	1.450	1.160	0.355	0.0	166	0.432
6	1.991	879.6	38.0	1.160	1.510	0.455	0.0	104	1.019
7	0.670	26.6	50.4	2.035	2.055	0.606	0.0	225	0.682

Pipeline Schedule

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)
82.788	51.4	225	Circular	3.580	2.280	1.075	2.870	0.670	1.975
31.944	35.1	150	Circular	3.380	1.580	1.650	2.870	0.670	2.050
19.409	647.0	750	Circular	2.870	0.670	1.450	2.680	0.640	1.290
43.893	337.6	750	Circular	2.680	0.640	1.290	2.710	0.510	1.450

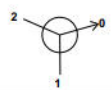
US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1	1200	Manhole	Adoptable	3	1800	Manhole	Adoptable
2	1200	Manhole	Adoptable	3	1800	Manhole	Adoptable
3	1800	Manhole	Adoptable	4	1800	Manhole	Adoptable
4	1800	Manhole	Adoptable	5	1800	Manhole	Adoptable

Pipeline Schedule

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)
90.241	1804.8	750	Circular	2.710	0.510	1.450	2.370	0.460	1.160
57.072	196.8	750	Circular	2.370	0.460	1.160	2.430	0.170	1.510
7.487	374.4	225	Circular	2.430	0.170	2.035	2.430	0.150	2.055

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
5	1800	Manhole	Adoptable	6	1800	Manhole	Adoptable
6	1800	Manhole	Adoptable	7	1800	Manhole	Adoptable
7	1800	Manhole	Adoptable	8		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	494150.911	101606.609	3.580	1.300	1200				
						0	1	2.280	225
2	494227.069	101541.575	3.380	1.800	1200				
						0	2	1.580	150
3	494226.798	101573.518	2.870	2.200	1800		1 2	0.670	150
						2 1	0.670	225	
						0 3	0.670	750	
4	494245.463	101578.840	2.680	2.040	1800		1 3	0.640	750
						0 4	0.640	750	
5	494277.278	101609.079	2.710	2.200	1800		1 4	0.510	750
						0 5	0.510	750	
6	494340.155	101673.809	2.370	1.910	1800		1 5	0.460	750
						0 6	0.460	750	
7	494379.221	101715.415	2.430	2.260	1800		1 6	0.170	750
						0 7	0.170	225	
8	494378.469	101722.864	2.430	2.280			1 7	0.150	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.350	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160



Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	30	40	0	0
2	0	0	0	100	45	0	0
30	0	0	0				

Node 8 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m ²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.500	210	0.500	420	0.500	630	0.500	840	0.500	1050	0.500	1260	0.500
15	0.500	225	0.500	435	0.500	645	0.500	855	0.500	1065	0.500	1275	0.500
30	0.500	240	0.500	450	0.500	660	0.500	870	0.500	1080	0.500	1290	0.500
45	0.500	255	0.500	465	0.500	675	0.500	885	0.500	1095	0.500	1305	0.500
60	0.500	270	0.500	480	0.500	690	0.500	900	0.500	1110	0.500	1320	0.500
75	0.500	285	0.500	495	0.500	705	0.500	915	0.500	1125	0.500	1335	0.500
90	0.500	300	0.500	510	0.500	720	0.500	930	0.500	1140	0.500	1350	0.500
105	0.500	315	0.500	525	0.500	735	0.500	945	0.500	1155	0.500	1365	0.500
120	0.500	330	0.500	540	0.500	750	0.500	960	0.500	1170	0.500	1380	0.500
135	0.500	345	0.500	555	0.500	765	0.500	975	0.500	1185	0.500	1395	0.500
150	0.500	360	0.500	570	0.500	780	0.500	990	0.500	1200	0.500	1410	0.500
165	0.500	375	0.500	585	0.500	795	0.500	1005	0.500	1215	0.500	1425	0.500
180	0.500	390	0.500	600	0.500	810	0.500	1020	0.500	1230	0.500	1440	0.500
195	0.500	405	0.500	615	0.500	825	0.500	1035	0.500	1245	0.500		

Node 7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.170	Product Number	CTL-SHE-0089-5000-2260-5000
Design Depth (m)	2.260	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	99.342	28.110	1 year 1440 minute summer	5.284	1.416
1 year 15 minute winter	69.713	28.110	1 year 1440 minute winter	3.551	1.416
1 year 30 minute summer	65.891	18.645	1 year 2160 minute summer	3.874	1.071
1 year 30 minute winter	46.239	18.645	1 year 2160 minute winter	2.669	1.071
1 year 60 minute summer	45.726	12.084	2 year 15 minute summer	128.515	36.365
1 year 60 minute winter	30.379	12.084	2 year 15 minute winter	90.186	36.365
1 year 120 minute summer	29.101	7.690	2 year 30 minute summer	85.010	24.055
1 year 120 minute winter	19.334	7.690	2 year 30 minute winter	59.656	24.055
1 year 180 minute summer	22.852	5.881	2 year 60 minute summer	58.092	15.352
1 year 180 minute winter	14.854	5.881	2 year 60 minute winter	38.595	15.352
1 year 240 minute summer	18.381	4.857	2 year 120 minute summer	36.351	9.607
1 year 240 minute winter	12.212	4.857	2 year 120 minute winter	24.151	9.607
1 year 360 minute summer	14.319	3.685	2 year 180 minute summer	28.240	7.267
1 year 360 minute winter	9.308	3.685	2 year 180 minute winter	18.357	7.267
1 year 480 minute summer	11.429	3.020	2 year 240 minute summer	22.531	5.954
1 year 480 minute winter	7.593	3.020	2 year 240 minute winter	14.969	5.954
1 year 600 minute summer	9.465	2.589	2 year 360 minute summer	17.409	4.480
1 year 600 minute winter	6.467	2.589	2 year 360 minute winter	11.316	4.480
1 year 720 minute summer	8.517	2.283	2 year 480 minute summer	13.831	3.655
1 year 720 minute winter	5.724	2.283	2 year 480 minute winter	9.189	3.655
1 year 960 minute summer	7.108	1.872	2 year 600 minute summer	11.410	3.121
1 year 960 minute winter	4.708	1.872	2 year 600 minute winter	7.796	3.121



Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 720 minute summer	10.233	2.743	30 year +40% CC 180 minute winter	47.862	18.948
2 year 720 minute winter	6.877	2.743	30 year +40% CC 240 minute summer	58.018	15.333
2 year 960 minute summer	8.495	2.237	30 year +40% CC 240 minute winter	38.546	15.333
2 year 960 minute winter	5.627	2.237	30 year +40% CC 360 minute summer	44.097	11.348
2 year 1440 minute summer	6.262	1.678	30 year +40% CC 360 minute winter	28.664	11.348
2 year 1440 minute winter	4.209	1.678	30 year +40% CC 480 minute summer	34.666	9.161
2 year 2160 minute summer	4.555	1.259	30 year +40% CC 480 minute winter	23.031	9.161
2 year 2160 minute winter	3.139	1.259	30 year +40% CC 600 minute summer	28.351	7.755
30 year 15 minute summer	243.268	68.836	30 year +40% CC 600 minute winter	19.371	7.755
30 year 15 minute winter	170.714	68.836	30 year +40% CC 720 minute summer	25.240	6.765
30 year 30 minute summer	161.958	45.828	30 year +40% CC 720 minute winter	16.963	6.765
30 year 30 minute winter	113.654	45.828	30 year +40% CC 960 minute summer	20.695	5.449
30 year 60 minute summer	110.635	29.238	30 year +40% CC 960 minute winter	13.709	5.449
30 year 60 minute winter	73.503	29.238	30 year +40% CC 1440 minute summer	14.972	4.013
30 year 120 minute summer	68.536	18.112	30 year +40% CC 1440 minute winter	10.062	4.013
30 year 120 minute winter	45.534	18.112	30 year +40% CC 2160 minute summer	10.676	2.951
30 year 180 minute summer	52.594	13.534	30 year +40% CC 2160 minute winter	7.356	2.951
30 year 180 minute winter	34.187	13.534	100 year +45% CC 15 minute summer	456.184	129.084
30 year 240 minute summer	41.442	10.952	100 year +45% CC 15 minute winter	320.129	129.084
30 year 240 minute winter	27.533	10.952	100 year +45% CC 30 minute summer	306.687	86.782
30 year 360 minute summer	31.498	8.106	100 year +45% CC 30 minute winter	215.219	86.782
30 year 360 minute winter	20.475	8.106	100 year +45% CC 60 minute summer	210.766	55.699
30 year 480 minute summer	24.762	6.544	100 year +45% CC 60 minute winter	140.028	55.699
30 year 480 minute winter	16.451	6.544	100 year +45% CC 120 minute summer	130.652	34.527
30 year 600 minute summer	20.251	5.539	100 year +45% CC 120 minute winter	86.802	34.527
30 year 600 minute winter	13.837	5.539	100 year +45% CC 180 minute summer	99.943	25.719
30 year 720 minute summer	18.029	4.832	100 year +45% CC 180 minute winter	64.966	25.719
30 year 720 minute winter	12.116	4.832	100 year +45% CC 240 minute summer	78.406	20.720
30 year 960 minute summer	14.782	3.892	100 year +45% CC 240 minute winter	52.091	20.720
30 year 960 minute winter	9.792	3.892	100 year +45% CC 360 minute summer	59.190	15.232
30 year 1440 minute summer	10.694	2.866	100 year +45% CC 360 minute winter	38.475	15.232
30 year 1440 minute winter	7.187	2.866	100 year +45% CC 480 minute summer	46.316	12.240
30 year 2160 minute summer	7.626	2.108	100 year +45% CC 480 minute winter	30.772	12.240
30 year 2160 minute winter	5.254	2.108	100 year +45% CC 600 minute summer	37.736	10.322
30 year +40% CC 15 minute summer	340.575	96.371	100 year +45% CC 600 minute winter	25.783	10.322
30 year +40% CC 15 minute winter	239.000	96.371	100 year +45% CC 720 minute summer	33.487	8.975
30 year +40% CC 30 minute summer	226.741	64.160	100 year +45% CC 720 minute winter	22.505	8.975
30 year +40% CC 30 minute winter	159.116	64.160	100 year +45% CC 960 minute summer	27.309	7.191
30 year +40% CC 60 minute summer	154.889	40.933	100 year +45% CC 960 minute winter	18.090	7.191
30 year +40% CC 60 minute winter	102.904	40.933	100 year +45% CC 1440 minute summer	19.598	5.252
30 year +40% CC 120 minute summer	95.951	25.357	100 year +45% CC 1440 minute winter	13.171	5.252
30 year +40% CC 120 minute winter	63.748	25.357	100 year +45% CC 2160 minute summer	13.852	3.828
30 year +40% CC 180 minute summer	73.632	18.948	100 year +45% CC 2160 minute winter	9.544	3.828

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	2.329	0.049	8.0	0.1027	0.0000	OK
15 minute winter	2	10	1.624	0.044	5.8	0.0726	0.0000	OK
360 minute winter	3	264	0.968	0.298	6.0	1.2010	0.0000	OK
360 minute winter	4	264	0.968	0.328	4.9	0.8343	0.0000	OK
360 minute winter	5	264	0.968	0.458	5.4	1.5146	0.0000	OK
360 minute winter	6	264	0.968	0.508	4.7	1.8207	0.0000	OK
360 minute winter	7	264	0.967	0.797	5.3	3.0985	0.0000	SURCHARGED
15 minute summer	8	1	0.650	0.500	2.4	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 winter	1	1	3	7.7	0.521	0.106	1.2633	
15 minute winter	2	2	3	5.7	0.542	0.190	0.3298	
360 minute winter	3	3	4	4.9	0.351	0.010	3.3743	
360 minute winter	4	4	5	3.6	0.205	0.005	10.2372	
360 minute winter	5	5	6	2.5	0.189	0.009	27.0273	
360 minute winter	6	6	7	4.0	0.090	0.005	21.6183	
360 minute winter	7	7	8	3.8	0.096	0.143	0.2978	84.7

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	2.336	0.056	10.3	0.1167	0.0000	OK
15 minute winter	2	10	1.631	0.051	7.6	0.0835	0.0000	OK
480 minute winter	3	352	1.096	0.426	5.8	1.7187	0.0000	OK
480 minute winter	4	352	1.096	0.456	4.9	1.1612	0.0000	OK
480 minute winter	5	352	1.096	0.586	5.3	1.9394	0.0000	OK
480 minute winter	6	352	1.096	0.636	4.5	2.2803	0.0000	OK
480 minute winter	7	352	1.097	0.927	5.2	3.6005	0.0000	SURCHARGED
15 minute summer	8	1	0.650	0.500	3.4	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 winter	1	1	3	9.9	0.569	0.136	1.4751	
15 minute winter	2	2	3	7.5	0.606	0.248	0.3641	
480 minute winter	3	3	4	4.9	0.319	0.010	5.2276	
480 minute winter	4	4	5	3.5	0.208	0.005	14.2585	
480 minute winter	5	5	6	2.4	0.188	0.009	34.6308	
480 minute winter	6	6	7	3.7	0.088	0.004	23.9228	
480 minute winter	7	7	8	3.8	0.097	0.144	0.2978	116.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1	208	2.406	0.126	3.0	0.2634	0.0000	OK
240 minute winter	2	144	2.397	0.817	3.1	1.3383	0.0000	SURCHARGED
360 minute winter	3	208	2.379	1.709	13.0	6.8918	0.0000	SURCHARGED
360 minute winter	4	208	2.379	1.739	11.8	4.4254	0.0000	SURCHARGED
180 minute winter	5	112	2.377	1.867	20.8	6.1754	0.0000	SURCHARGED
480 minute winter	6	272	2.370	1.910	24.5	6.8454	52.4253	FLOOD
180 minute winter	7	112	2.378	2.208	11.9	8.5790	0.0000	FLOOD RISK
15 minute summer	8	1	0.650	0.500	4.2	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)
360 minute winter	1	1	3	3.4	0.253	0.047	2.5940	
240 minute winter	2	2	3	3.6	0.292	0.120	0.5624	
360 minute winter	3	3	4	11.8	0.347	0.025	8.5423	
360 minute winter	4	4	5	11.4	0.236	0.017	19.3182	
180 minute winter	5	5	6	19.6	0.294	0.068	39.7169	
480 minute winter	6	6	7	3.7	0.079	0.004	25.1186	
180 minute winter	7	7	8	4.4	0.111	0.166	0.2978	83.1



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	39	2.433	0.153	15.2	0.3198	0.0000	OK
60 minute winter	2	38	2.557	0.977	13.1	1.6006	0.0000	SURCHARGED
120 minute summer	3	68	2.455	1.785	51.9	7.1952	0.0000	SURCHARGED
120 minute summer	4	68	2.458	1.818	53.7	4.6267	0.0000	FLOOD RISK
120 minute summer	5	68	2.427	1.917	58.9	6.3429	0.0000	FLOOD RISK
600 minute winter	6	300	2.370	1.910	23.2	6.8454	146.6058	FLOOD
30 minute winter	7	24	2.412	2.242	52.2	8.7130	0.0000	FLOOD RISK
15 minute summer	8	1	0.650	0.500	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	1	1	3	14.6	0.514	0.201	2.8375	
60 minute winter	2	2	3	10.7	0.749	0.355	0.5624	
120 minute summer	3	3	4	53.7	0.479	0.111	8.5423	
120 minute summer	4	4	5	48.1	0.374	0.072	19.3182	
120 minute summer	5	5	6	62.4	0.327	0.218	39.7169	
600 minute winter	6	6	7	3.7	0.074	0.004	25.1186	
30 minute winter	7	7	8	4.5	0.113	0.169	0.2978	58.0



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	21	2.646	0.366	32.1	0.7638	0.0000	SURCHARGED
30 minute winter	2	20	2.865	1.285	21.3	2.1052	0.0000	SURCHARGED
60 minute summer	3	34	2.589	1.919	154.9	7.7378	0.0000	FLOOD RISK
30 minute winter	4	20	2.592	1.952	106.7	4.9689	0.0000	FLOOD RISK
30 minute winter	5	20	2.546	2.036	176.5	6.7351	0.0000	FLOOD RISK
720 minute winter	6	315	2.370	1.910	28.1	6.8454	271.6148	FLOOD
30 minute summer	7	22	2.418	2.248	78.1	8.7373	0.0000	FLOOD RISK
15 minute summer	8	1	0.650	0.500	4.6	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)
30 minute summer	1	1	3	32.1	0.962	0.441	3.2926	
30 minute winter	2	2	3	20.5	1.243	0.682	0.5624	
60 minute summer	3	3	4	98.9	0.627	0.205	8.5423	
30 minute winter	4	4	5	143.2	0.631	0.214	19.3182	
30 minute winter	5	5	6	210.7	0.531	0.734	39.7169	
720 minute winter	6	6	7	-4.2	0.072	-0.005	25.1186	
30 minute summer	7	7	8	4.5	0.113	0.169	0.2978	58.3

Appendix I

243912-BWB-EXT-XX-T-C-0508-[S2-P01]_Drainage Hydraulic Report FSR

**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.080	5.00	3.376	900	494258.572	101373.022	1.176	2.200
2			3.862	900	494302.395	101383.250	1.962	1.900
3	0.021	5.00	2.830	900	494330.501	101389.806	1.160	1.670
4	0.182	5.00	2.830	900	494329.938	101429.136	1.350	1.480
5			2.975	1200	494323.972	101429.136	1.545	1.430
6			3.100	1500	494306.862	101439.388	1.840	1.260
7	0.081	5.00	3.250	1500	494292.142	101448.208	2.030	1.220
8	0.201	5.00	3.479	1500	494266.340	101447.867	2.319	1.160
9	0.086	5.00	3.400	1200	494258.481	101455.349	1.600	1.800
10			3.450	1500	494251.543	101455.258	2.250	1.200
11			3.593	1800	494239.341	101447.464	2.493	1.100
12		5.00	3.620	900	494098.649	101499.328	0.620	3.000
13	0.026	5.00	3.650	900	494099.603	101435.147	1.075	2.575
14			3.675	900	494100.533	101370.907	1.600	2.075
15	0.261	5.00	3.706	1500	494103.680	101363.570	1.911	1.795
16	0.487	5.00	3.704	1500	494124.534	101363.795	2.149	1.555
17		5.00	3.418	1200	494158.962	101354.803	2.113	1.305
18	0.254	5.00	3.700	1200	494178.252	101376.460	1.775	1.925
19			3.514	1500	494182.332	101363.615	2.259	1.255
20			3.579	1500	494220.134	101375.607	2.404	1.175
J2	0.166	5.00	2.391	1200	494184.083	101432.089	0.781	1.610
22	0.330	5.00	3.000	1500	494204.085	101432.443	1.650	1.350
23			3.126	1500	494204.244	101420.970	1.856	1.270
24			3.678	1500	494204.380	101394.589	2.478	1.200
25	0.149	5.00	3.492	1200	494154.037	101349.088	1.734	1.758
26	0.066	5.00	3.519	900	494192.894	101378.147	1.069	2.450
27	0.019	5.00	3.340	1200	494197.388	101359.599	1.925	1.415
28	0.081	5.00	3.256	1200	494220.559	101365.203	1.946	1.310
29			3.235	1200	494226.507	101366.646	1.995	1.240
30	0.023	5.00	3.623	1500	494225.866	101383.980	2.503	1.120
31			3.451	1800	494233.398	101386.902	2.391	1.060
32	0.101	5.00	3.456	1800	494232.839	101447.511	2.526	0.930
33	0.060	5.00	3.456	1800	494232.393	101477.837	2.596	0.860
34	0.043	5.00	3.230	2100	494230.095	101517.661	2.450	0.780
35	0.013	5.00	3.634	900	494097.702	101564.737	1.064	2.570
36	0.140	5.00	3.699	1500	494100.770	101572.123	1.564	2.135
37	0.392	5.00	3.699	1500	494140.283	101572.672	1.849	1.850
38			3.707	1500	494173.595	101573.140	1.947	1.760
39		5.00	3.517	1500	494163.985	101582.507	2.627	0.890
40			3.499	1500	494175.985	101576.646	2.629	0.870
41	0.005	5.00	3.415	1500	494204.285	101557.358	2.603	0.812
J1	0.048	5.00	2.391	1200	494182.883	101517.961	0.786	1.605
43	0.177	5.00	3.000	1200	494201.716	101521.011	1.605	1.395
44			3.150	1200	494201.549	101531.374	1.835	1.315
45	0.147	5.00	3.522	900	494158.278	101587.058	1.522	2.000
46			3.275	900	494185.655	101574.790	1.785	1.490
47	0.057	5.00	3.371	1200	494200.191	101564.150	2.181	1.190
48			3.370	1200	494204.850	101560.596	2.250	1.120

**Nodes**

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
49	0.022	5.00	3.348	1800	494213.587	101555.791	2.553	0.795
50	0.004	5.00	3.341	1800	494226.874	101555.916	2.626	0.715
ExMH3	0.197	5.00	2.860	1800	494226.798	101573.518	2.190	0.670
ExMH1	0.062	5.00	3.580	1200	494150.911	101606.609	1.300	2.280
ExMH4			2.680	1800	494245.463	101578.757	2.040	0.640
ExMH5	0.084	5.00	2.710	1800	494277.278	101609.015	2.200	0.510
ExMH6	0.122	5.00	2.370	1800	494340.155	101673.616	1.910	0.460
ExMH7	0.129	5.00	2.430	1800	494379.221	101715.415	2.260	0.170
Outfall			2.440		494378.469	101722.864	2.290	0.150

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)
S3.000	12	13	64.188	0.600	3.000	2.575	0.425	151.0	150	6.31	50.0
S3.001	13	14	64.247	0.600	2.575	2.150	0.425	151.2	150	7.63	50.0
S3.002	14	15	7.983	0.600	2.075	2.020	0.055	145.1	225	7.75	50.0
S3.003	15	16	20.855	0.600	1.795	1.705	0.090	231.7	450	8.01	50.0
S3.004	16	19	57.798	0.600	1.555	1.255	0.300	192.7	600	8.56	50.0
S4.000	17	19	24.976	0.600	1.305	1.255	0.050	499.5	600	5.38	50.0
S5.000	18	19	13.477	0.600	1.925	1.555	0.370	36.4	300	5.09	50.0
S3.005	19	20	39.659	0.600	1.255	1.175	0.080	495.7	600	9.17	50.0
S3.006	20	30	10.147	0.600	1.175	1.120	0.055	184.5	600	9.26	50.0
S6.000	25	27	44.607	0.600	1.758	1.490	0.268	166.4	225	5.74	50.0
S7.000	26	27	19.085	0.600	2.450	1.565	0.885	21.6	150	5.15	50.0
S6.001	27	28	23.839	0.600	1.415	1.310	0.105	227.0	300	6.12	50.0
S6.002	28	29	6.121	0.600	1.310	1.240	0.070	87.4	300	6.18	50.0
S6.003	29	30	17.346	0.600	1.240	1.120	0.120	144.6	300	6.40	50.0
S8.000A	J2	22	20.005	0.600	1.610	1.515	0.095	210.6	300	5.31	37.3
S8.000	22	23	11.400	0.600	1.350	1.270	0.080	142.5	450	5.42	50.0
S8.001	23	24	26.307	0.600	1.270	1.200	0.070	375.8	450	5.84	50.0
S8.002	24	30	23.995	0.600	1.200	1.120	0.080	299.9	450	6.18	50.0
S3.007	30	31	8.079	0.600	1.120	1.060	0.060	134.7	225	9.38	50.0
S3.008	31	32	60.612	0.600	1.060	0.930	0.130	466.2	750	10.17	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)
S3.000	0.815	14.4	0.0	0.470	0.925	0.000	0.0	0	0.000
S3.001	0.815	14.4	3.5	0.925	1.375	0.026	0.0	50	0.671
S3.002	1.083	43.1	3.5	1.375	1.461	0.026	0.0	44	0.658
S3.003	1.331	211.7	38.9	1.461	1.549	0.287	0.0	130	1.023
S3.004	1.751	495.0	104.8	1.549	1.659	0.774	0.0	186	1.402
S4.000	1.082	306.1	0.0	1.513	1.659	0.000	0.0	0	0.000
S5.000	2.613	184.7	34.5	1.475	1.659	0.254	0.0	87	2.012
S3.005	1.087	307.2	139.3	1.659	1.804	1.028	0.0	283	1.061
S3.006	1.789	505.9	139.3	1.804	1.903	1.028	0.0	214	1.538
S6.000	1.010	40.2	20.1	1.509	1.625	0.149	0.0	113	1.012
S7.000	2.178	38.5	8.9	0.919	1.625	0.066	0.0	49	1.776
S6.001	1.039	73.4	31.7	1.625	1.646	0.234	0.0	137	1.001
S6.002	1.682	118.9	42.7	1.646	1.695	0.315	0.0	124	1.547
S6.003	1.305	92.3	42.7	1.695	2.203	0.315	0.0	143	1.281
S8.000A	1.079	76.3	16.8	0.481	1.185	0.166	0.0	95	0.870
S8.000	1.701	270.5	67.2	1.200	1.406	0.496	0.0	152	1.423
S8.001	1.042	165.8	67.2	1.406	2.028	0.496	0.0	199	0.990
S8.002	1.168	185.8	67.2	2.028	2.053	0.496	0.0	187	1.078
S3.007	1.125	44.7	252.3	2.278	2.166	1.862	0.0	225	1.146
S3.008	1.289	569.5	252.3	1.641	1.776	1.862	0.0	349	1.252

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)
S1.000	1	2	45.001	0.600	2.200	1.900	0.300	150.0	225	5.70	50.0
S1.001	2	3	28.860	0.600	1.900	1.670	0.230	125.5	225	6.12	50.0
S1.002	3	4	39.334	0.600	1.670	1.480	0.190	207.0	300	6.72	50.0
S1.003	4	5	5.966	0.600	1.480	1.430	0.050	119.3	300	6.79	50.0
S1.004	5	6	19.946	0.600	1.430	1.370	0.060	332.4	450	7.09	50.0
S1.005	6	7	17.160	0.600	1.260	1.220	0.040	429.0	600	7.33	50.0
S1.006	7	8	25.804	0.600	1.220	1.160	0.060	430.1	600	7.70	50.0
S1.007	8	11	27.002	0.600	1.160	1.100	0.060	450.0	600	8.10	50.0
S2.000	9	10	6.939	0.600	1.800	1.425	0.375	18.5	225	5.04	50.0
S2.001	10	11	14.479	0.600	1.200	1.100	0.100	144.8	450	5.18	50.0
S1.008	11	32	6.502	0.600	1.100	1.080	0.020	325.1	600	8.18	50.0
S1.009	32	33	30.329	0.600	0.930	0.860	0.070	433.3	750	10.54	50.0
S1.010	33	34	39.890	0.600	0.860	0.780	0.080	498.6	1200	10.94	50.0
S1.011	34	50	38.390	0.600	0.780	0.715	0.065	590.6	1200	11.36	25.4
S9.000	12	35	65.416	0.600	3.000	2.570	0.430	152.1	150	6.34	50.0
S9.001	35	36	8.046	0.600	2.570	2.510	0.060	134.1	150	6.50	50.0
S9.002	36	37	39.517	0.600	2.135	2.000	0.135	292.7	450	7.05	50.0
S9.003	37	38	33.315	0.600	1.850	1.760	0.090	370.2	600	7.49	50.0
S9.004	38	40	4.243	0.600	1.760	0.870	0.890	4.8	600	7.50	50.0
S10.000	39	40	13.355	0.600	0.890	0.870	0.020	667.8	600	5.24	50.0
S9.005	40	41	34.248	0.600	0.870	0.812	0.058	590.5	600	8.08	50.0
S9.006	41	49	9.433	0.600	0.812	0.795	0.017	554.9	600	8.23	50.0
S12.000	45	46	30.000	0.600	2.000	1.490	0.510	58.8	225	5.29	50.0
S12.001	46	47	18.014	0.600	1.490	1.190	0.300	60.0	225	5.47	50.0
S12.002	47	48	5.860	0.600	1.190	1.120	0.070	83.7	225	5.54	50.0
S12.003	48	49	9.971	0.600	1.120	1.075	0.045	221.6	300	5.70	50.0
S11.000A	J1	43	19.078	0.600	1.605	1.470	0.135	141.3	225	5.29	37.3
S11.000	43	44	10.364	0.600	1.395	1.315	0.080	129.6	300	5.41	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)
S1.000	1.065	42.3	10.8	0.951	1.737	0.080	0.0	77	0.891
S1.001	1.166	46.3	10.8	1.737	0.935	0.080	0.0	73	0.952
S1.002	1.089	77.0	13.7	0.860	1.050	0.101	0.0	85	0.828
S1.003	1.438	101.6	38.3	1.050	1.245	0.283	0.0	127	1.340
S1.004	1.109	176.4	38.3	1.095	1.280	0.283	0.0	142	0.894
S1.005	1.169	330.5	38.3	1.240	1.430	0.283	0.0	137	0.792
S1.006	1.168	330.1	49.4	1.430	1.719	0.364	0.0	156	0.849
S1.007	1.141	322.6	76.6	1.719	1.893	0.565	0.0	198	0.942
S2.000	3.056	121.5	11.6	1.375	1.800	0.086	0.0	47	1.953
S2.001	1.687	268.3	11.6	1.800	2.043	0.086	0.0	63	0.856
S1.008	1.345	380.2	88.2	1.893	1.776	0.651	0.0	195	1.104
S1.009	1.338	591.0	354.2	1.776	1.846	2.614	0.0	419	1.395
S1.010	1.668	1886.7	362.4	1.396	1.250	2.674	0.0	353	1.305
S1.011	1.532	1732.4	187.1	1.250	1.426	2.717	0.0	263	1.023
S9.000	0.812	14.4	0.0	0.470	0.914	0.000	0.0	0	0.000
S9.001	0.866	15.3	1.8	0.914	1.039	0.013	0.0	35	0.582
S9.002	1.183	188.1	20.7	1.114	1.249	0.153	0.0	100	0.787
S9.003	1.259	356.1	73.8	1.249	1.347	0.545	0.0	184	1.003
S9.004	11.199	3166.4	73.8	1.347	2.029	0.545	0.0	62	4.783
S10.000	0.935	264.3	0.0	2.027	2.029	0.000	0.0	0	0.000
S9.005	0.995	281.2	73.8	2.029	2.003	0.545	0.0	209	0.844
S9.006	1.026	290.2	74.5	2.003	1.953	0.550	0.0	207	0.866
S12.000	1.708	67.9	19.9	1.297	1.560	0.147	0.0	83	1.487
S12.001	1.691	67.2	19.9	1.560	1.956	0.147	0.0	84	1.479
S12.002	1.430	56.9	27.7	1.956	2.025	0.204	0.0	111	1.423
S12.003	1.052	74.4	27.7	1.950	1.973	0.204	0.0	127	0.978
S11.000A	1.098	43.6	4.9	0.561	1.305	0.048	0.0	51	0.729
S11.000	1.380	97.5	30.5	1.305	1.535	0.225	0.0	115	1.225

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)
S11.001	44	49	27.223	0.600	1.315	1.075	0.240	113.4	300	5.72	36.2
S9.007	49	50	13.288	0.600	0.795	0.715	0.080	166.1	225	8.45	50.0
S1.012	50	ExMH3	17.602	0.600	0.715	0.670	0.045	391.2	450	11.65	50.0
Ex 1	ExMH1	ExMH3	82.788	0.600	2.280	0.670	1.610	51.4	225	5.75	36.1
Ex 3	ExMH3	ExMH4	19.409	0.600	0.670	0.640	0.030	647.0	750	11.94	24.8
Ex 4	ExMH4	ExMH5	43.849	0.600	0.640	0.510	0.130	337.3	750	12.43	23.7
Ex 5	ExMH5	ExMH6	90.103	0.600	0.510	0.460	0.050	1802.1	750	14.74	21.7
Ex 6	ExMH6	ExMH7	57.213	0.600	0.460	0.170	0.290	197.3	750	15.22	20.9
Ex 7	ExMH7	Outfall	7.487	0.600	0.170	0.150	0.020	374.4	225	15.40	21.5

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)
S11.001	1.475	104.3	22.1	1.535	1.973	0.225	0.0	93	1.179
S9.007	1.011	40.2	135.7	2.328	2.401	1.001	0.0	225	1.030
S1.012	1.022	162.5	504.5	2.176	1.740	3.722	0.0	450	1.035
Ex 1	1.828	72.7	6.1	1.075	1.965	0.062	0.0	44	1.114
Ex 3	1.092	482.6	267.7	1.440	1.290	3.982	0.0	400	1.120
Ex 4	1.518	670.5	255.8	1.290	1.450	3.982	0.0	320	1.420
Ex 5	0.650	287.1	239.1	1.450	1.160	4.066	0.0	526	0.723
Ex 6	1.988	878.5	237.2	1.160	1.510	4.187	0.0	265	1.702
Ex 7	0.670	26.6	251.5	2.035	2.065	4.317	0.0	225	0.682

Pipeline Schedule

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)
64.188	151.0	150	Circular	3.620	3.000	0.470	3.650	2.575	0.925
64.247	151.2	150	Circular	3.650	2.575	0.925	3.675	2.150	1.375
7.983	145.1	225	Circular	3.675	2.075	1.375	3.706	2.020	1.461
20.855	231.7	450	Circular	3.706	1.795	1.461	3.704	1.705	1.549
57.798	192.7	600	Circular	3.704	1.555	1.549	3.514	1.255	1.659
24.976	499.5	600	Circular	3.418	1.305	1.513	3.514	1.255	1.659
13.477	36.4	300	Circular	3.700	1.925	1.475	3.514	1.555	1.659
39.659	495.7	600	Circular	3.514	1.255	1.659	3.579	1.175	1.804
10.147	184.5	600	Circular	3.579	1.175	1.804	3.623	1.120	1.903
44.607	166.4	225	Circular	3.492	1.758	1.509	3.340	1.490	1.625
19.085	21.6	150	Circular	3.519	2.450	0.919	3.340	1.565	1.625
23.839	227.0	300	Circular	3.340	1.415	1.625	3.256	1.310	1.646
6.121	87.4	300	Circular	3.256	1.310	1.646	3.235	1.240	1.695
17.346	144.6	300	Circular	3.235	1.240	1.695	3.623	1.120	2.203
20.005	210.6	300	Circular	2.391	1.610	0.481	3.000	1.515	1.185

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
12	900	Manhole	Adoptable	13	900	Manhole	Adoptable
13	900	Manhole	Adoptable	14	900	Manhole	Adoptable
14	900	Manhole	Adoptable	15	1500	Manhole	Adoptable
15	1500	Manhole	Adoptable	16	1500	Manhole	Adoptable
16	1500	Manhole	Adoptable	19	1500	Manhole	Adoptable
17	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
18	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
19	1500	Manhole	Adoptable	20	1500	Manhole	Adoptable
20	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
25	1200	Manhole	Adoptable	27	1200	Manhole	Adoptable
26	900	Manhole	Adoptable	27	1200	Manhole	Adoptable
27	1200	Manhole	Adoptable	28	1200	Manhole	Adoptable
28	1200	Manhole	Adoptable	29	1200	Manhole	Adoptable
29	1200	Manhole	Adoptable	30	1500	Manhole	Adoptable
J2	1200	Manhole	Adoptable	22	1500	Manhole	Adoptable

Pipeline Schedule

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)
11.400	142.5	450	Circular	3.000	1.350	1.200	3.126	1.270	1.406
26.307	375.8	450	Circular	3.126	1.270	1.406	3.678	1.200	2.028
23.995	299.9	450	Circular	3.678	1.200	2.028	3.623	1.120	2.053
8.079	134.7	225	Circular	3.623	1.120	2.278	3.451	1.060	2.166
60.612	466.2	750	Circular	3.451	1.060	1.641	3.456	0.930	1.776
45.001	150.0	225	Circular	3.376	2.200	0.951	3.862	1.900	1.737
28.860	125.5	225	Circular	3.862	1.900	1.737	2.830	1.670	0.935
39.334	207.0	300	Circular	2.830	1.670	0.860	2.830	1.480	1.050
5.966	119.3	300	Circular	2.830	1.480	1.050	2.975	1.430	1.245
19.946	332.4	450	Circular	2.975	1.430	1.095	3.100	1.370	1.280
17.160	429.0	600	Circular	3.100	1.260	1.240	3.250	1.220	1.430
25.804	430.1	600	Circular	3.250	1.220	1.430	3.479	1.160	1.719
27.002	450.0	600	Circular	3.479	1.160	1.719	3.593	1.100	1.893
6.939	18.5	225	Circular	3.400	1.800	1.375	3.450	1.425	1.800
14.479	144.8	450	Circular	3.450	1.200	1.800	3.593	1.100	2.043
6.502	325.1	600	Circular	3.593	1.100	1.893	3.456	1.080	1.776
30.329	433.3	750	Circular	3.456	0.930	1.776	3.456	0.860	1.846
39.890	498.6	1200	Circular	3.456	0.860	1.396	3.230	0.780	1.250
38.390	590.6	1200	Circular	3.230	0.780	1.250	3.341	0.715	1.426
65.416	152.1	150	Circular	3.620	3.000	0.470	3.634	2.570	0.914
8.046	134.1	150	Circular	3.634	2.570	0.914	3.699	2.510	1.039
39.517	292.7	450	Circular	3.699	2.135	1.114	3.699	2.000	1.249
33.315	370.2	600	Circular	3.699	1.850	1.249	3.707	1.760	1.347
4.243	4.8	600	Circular	3.707	1.760	1.347	3.499	0.870	2.029
13.355	667.8	600	Circular	3.517	0.890	2.027	3.499	0.870	2.029
34.248	590.5	600	Circular	3.499	0.870	2.029	3.415	0.812	2.003
9.433	554.9	600	Circular	3.415	0.812	2.003	3.348	0.795	1.953
30.000	58.8	225	Circular	3.522	2.000	1.297	3.275	1.490	1.560

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
22	1500	Manhole	Adoptable	23	1500	Manhole	Adoptable
23	1500	Manhole	Adoptable	24	1500	Manhole	Adoptable
24	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
30	1500	Manhole	Adoptable	31	1800	Manhole	Adoptable
31	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
1	900	Manhole	Adoptable	2	900	Manhole	Adoptable
2	900	Manhole	Adoptable	3	900	Manhole	Adoptable
3	900	Manhole	Adoptable	4	900	Manhole	Adoptable
4	900	Manhole	Adoptable	5	1200	Manhole	Adoptable
5	1200	Manhole	Adoptable	6	1500	Manhole	Adoptable
6	1500	Manhole	Adoptable	7	1500	Manhole	Adoptable
7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable
8	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
9	1200	Manhole	Adoptable	10	1500	Manhole	Adoptable
10	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
11	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
32	1800	Manhole	Adoptable	33	1800	Manhole	Adoptable
33	1800	Manhole	Adoptable	34	2100	Manhole	Adoptable
34	2100	Manhole	Adoptable	50	1800	Manhole	Adoptable
12	900	Manhole	Adoptable	35	900	Manhole	Adoptable
35	900	Manhole	Adoptable	36	1500	Manhole	Adoptable
36	1500	Manhole	Adoptable	37	1500	Manhole	Adoptable
37	1500	Manhole	Adoptable	38	1500	Manhole	Adoptable
38	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
39	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
40	1500	Manhole	Adoptable	41	1500	Manhole	Adoptable
41	1500	Manhole	Adoptable	49	1800	Manhole	Adoptable
45	900	Manhole	Adoptable	46	900	Manhole	Adoptable



Pipeline Schedule

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)
18.014	60.0	225	Circular	3.275	1.490	1.560	3.371	1.190	1.956
5.860	83.7	225	Circular	3.371	1.190	1.956	3.370	1.120	2.025
9.971	221.6	300	Circular	3.370	1.120	1.950	3.348	1.075	1.973
19.078	141.3	225	Circular	2.391	1.605	0.561	3.000	1.470	1.305
10.364	129.6	300	Circular	3.000	1.395	1.305	3.150	1.315	1.535
27.223	113.4	300	Circular	3.150	1.315	1.535	3.348	1.075	1.973
13.288	166.1	225	Circular	3.348	0.795	2.328	3.341	0.715	2.401
17.602	391.2	450	Circular	3.341	0.715	2.176	2.860	0.670	1.740
82.788	51.4	225	Circular	3.580	2.280	1.075	2.860	0.670	1.965
19.409	647.0	750	Circular	2.860	0.670	1.440	2.680	0.640	1.290
43.849	337.3	750	Circular	2.680	0.640	1.290	2.710	0.510	1.450
90.103	1802.1	750	Circular	2.710	0.510	1.450	2.370	0.460	1.160
57.213	197.3	750	Circular	2.370	0.460	1.160	2.430	0.170	1.510
7.487	374.4	225	Circular	2.430	0.170	2.035	2.440	0.150	2.065

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
46	900	Manhole	Adoptable	47	1200	Manhole	Adoptable
47	1200	Manhole	Adoptable	48	1200	Manhole	Adoptable
48	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
J1	1200	Manhole	Adoptable	43	1200	Manhole	Adoptable
43	1200	Manhole	Adoptable	44	1200	Manhole	Adoptable
44	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
49	1800	Manhole	Adoptable	50	1800	Manhole	Adoptable
50	1800	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH1	1200	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH3	1800	Manhole	Adoptable	ExMH4	1800	Manhole	Adoptable
ExMH4	1800	Manhole	Adoptable	ExMH5	1800	Manhole	Adoptable
ExMH5	1800	Manhole	Adoptable	ExMH6	1800	Manhole	Adoptable
ExMH6	1800	Manhole	Adoptable	ExMH7	1800	Manhole	Adoptable
ExMH7	1800	Manhole	Adoptable	Outfall		Junction	

Manhole Schedule

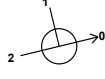
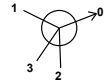
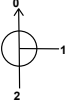
Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	494258.572	101373.022	3.376	1.176	900		0	S1.000	2.200	225
2	494302.395	101383.250	3.862	1.962	900		1	S1.000	1.900	225
						0	S1.001	1.900	225	
3	494330.501	101389.806	2.830	1.160	900		1	S1.001	1.670	225
						0	S1.002	1.670	300	
4	494329.938	101429.136	2.830	1.350	900		1	S1.002	1.480	300
						0	S1.003	1.480	300	
5	494323.972	101429.136	2.975	1.545	1200		1	S1.003	1.430	300
						0	S1.004	1.430	450	
6	494306.862	101439.388	3.100	1.840	1500		1	S1.004	1.370	450
						0	S1.005	1.260	600	

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
7	494292.142	101448.208	3.250	2.030	1500		S1.005	1.220	600
						0	S1.006	1.220	600
8	494266.340	101447.867	3.479	2.319	1500		S1.006	1.160	600
						0	S1.007	1.160	600
9	494258.481	101455.349	3.400	1.600	1200				
						0	S2.000	1.800	225
10	494251.543	101455.258	3.450	2.250	1500		S2.000	1.425	225
						0	S2.001	1.200	450
11	494239.341	101447.464	3.593	2.493	1800		S2.001	1.100	450
						2	S1.007	1.100	600
						0	S1.008	1.100	600
12	494098.649	101499.328	3.620	0.620	900		S3.000	3.000	150
						0-2	S9.000	3.000	150
13	494099.603	101435.147	3.650	1.075	900		S3.000	2.575	150
						0	S3.001	2.575	150
14	494100.533	101370.907	3.675	1.600	900		S3.001	2.150	150
						0	S3.002	2.075	225
15	494103.680	101363.570	3.706	1.911	1500		S3.002	2.020	225
						0	S3.003	1.795	450
16	494124.534	101363.795	3.704	2.149	1500		S3.003	1.705	450
						0	S3.004	1.555	600
17	494158.962	101354.803	3.418	2.113	1200				
						0	S4.000	1.305	600
18	494178.252	101376.460	3.700	1.775	1200				
						0	S5.000	1.925	300
19	494182.332	101363.615	3.514	2.259	1500		S5.000	1.555	300
						2	S4.000	1.255	600
						3	S3.004	1.255	600
						0	S3.005	1.255	600
20	494220.134	101375.607	3.579	2.404	1500		S3.005	1.175	600
						0	S3.006	1.175	600
J2	494184.083	101432.089	2.391	0.781	1200				
						0	S8.000A	1.610	300



Manhole Schedule

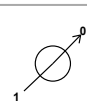
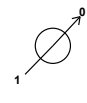
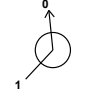
Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
22	494204.085	101432.443	3.000	1.650	1500	 1	S8.000A	1.515	300
						0	S8.000	1.350	450
23	494204.244	101420.970	3.126	1.856	1500	 1	S8.000	1.270	450
						0	S8.001	1.270	450
24	494204.380	101394.589	3.678	2.478	1500	 1	S8.001	1.200	450
						0	S8.002	1.200	450
25	494154.037	101349.088	3.492	1.734	1200	 0			
						0	S6.000	1.758	225
26	494192.894	101378.147	3.519	1.069	900	 0			
						0	S7.000	2.450	150
27	494197.388	101359.599	3.340	1.925	1200	 1	S7.000	1.565	150
						2	S6.000	1.490	225
						0	S6.001	1.415	300
28	494220.559	101365.203	3.256	1.946	1200	 1	S6.001	1.310	300
						0	S6.002	1.310	300
29	494226.507	101366.646	3.235	1.995	1200	 0	S6.002	1.240	300
						0	S6.003	1.240	300
30	494225.866	101383.980	3.623	2.503	1500	 1	S8.002	1.120	450
						2	S6.003	1.120	300
						3	S3.006	1.120	600
						0	S3.007	1.120	225
31	494233.398	101386.902	3.451	2.391	1800	 0	S3.007	1.060	225
						0	S3.008	1.060	750
32	494232.839	101447.511	3.456	2.526	1800	 0	S1.008	1.080	600
						2	S3.008	0.930	750
						0	S1.009	0.930	750
33	494232.393	101477.837	3.456	2.596	1800	 0	S1.009	0.860	750
						0	S1.010	0.860	1200
34	494230.095	101517.661	3.230	2.450	2100	 0	S1.010	0.780	1200
						0	S1.011	0.780	1200
35	494097.702	101564.737	3.634	1.064	900	 0	S9.000	2.570	150
						0	S9.001	2.570	150
36	494100.770	101572.123	3.699	1.564	1500	 1	S9.001	2.510	150
						0	S9.002	2.135	450



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
37	494140.283	101572.672	3.699	1.849	1500	1 — 	1 S9.002	2.000	450
						0	S9.003	1.850	600
38	494173.595	101573.140	3.707	1.947	1500	1 — 	1 S9.003	1.760	600
						0	S9.004	1.760	600
39	494163.985	101582.507	3.517	2.627	1500		0 S10.000	0.890	600
						0	S10.000	0.870	600
40	494175.985	101576.646	3.499	2.629	1500	1 — 	2 S9.004	0.870	600
						0	S9.005	0.870	600
41	494204.285	101557.358	3.415	2.603	1500	1 — 	1 S9.005	0.812	600
						0	S9.006	0.812	600
J1	494182.883	101517.961	2.391	0.786	1200		0 S11.000A	1.605	225
						0	S11.000A	1.470	225
43	494201.716	101521.011	3.000	1.605	1200	1 — 	0 S11.000	1.395	300
						1	S11.000	1.315	300
44	494201.549	101531.374	3.150	1.835	1200		0 S11.001	1.315	300
						0	S12.000	2.000	225
45	494158.278	101587.058	3.522	1.522	900		1 S12.000	1.490	225
						0	S12.001	1.490	225
46	494185.655	101574.790	3.275	1.785	900	1 — 	1 S12.001	1.190	225
						0	S12.002	1.120	225
47	494200.191	101564.150	3.371	2.181	1200	1 — 	1 S12.001	1.120	300
						0	S12.003	1.120	300
48	494204.850	101560.596	3.370	2.250	1200	1 — 	1 S11.001	1.075	300
						0	S12.003	1.075	300
49	494213.587	101555.791	3.348	2.553	1800	2 — 	3 S9.006	0.795	600
						1	S9.007	0.795	225
50	494226.874	101555.916	3.341	2.626	1800	1 — 	1 S9.007	0.715	225
						2	S1.011	0.715	1200
						0	S1.012	0.715	450
ExMH3	494226.798	101573.518	2.860	2.190	1800	1 — 	1 Ex 1	0.670	225
						2	S1.012	0.670	450
						0	Ex 3	0.670	750

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
ExMH1	494150.911	101606.609	3.580	1.300	1200		0	Ex 1	2.280	225
ExMH4	494245.463	101578.757	2.680	2.040	1800		1	Ex 3	0.640	750
ExMH5	494277.278	101609.015	2.710	2.200	1800		1	Ex 4	0.510	750
ExMH6	494340.155	101673.616	2.370	1.910	1800		1	Ex 5	0.460	750
ExMH7	494379.221	101715.415	2.430	2.260	1800		1	Ex 6	0.170	750
Outfall	494378.469	101722.864	2.440	2.290			1	Ex 7	0.150	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.350	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	30	40	0	0
2	0	0	0	100	45	0	0
30	0	0	0				

Node Outfall Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.500	105	0.500	210	0.500	315	0.500	420	0.500	525	0.500	630	0.500
15	0.500	120	0.500	225	0.500	330	0.500	435	0.500	540	0.500	645	0.500
30	0.500	135	0.500	240	0.500	345	0.500	450	0.500	555	0.500	660	0.500
45	0.500	150	0.500	255	0.500	360	0.500	465	0.500	570	0.500	675	0.500
60	0.500	165	0.500	270	0.500	375	0.500	480	0.500	585	0.500	690	0.500
75	0.500	180	0.500	285	0.500	390	0.500	495	0.500	600	0.500	705	0.500
90	0.500	195	0.500	300	0.500	405	0.500	510	0.500	615	0.500	720	0.500



Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
735	0.500	840	0.500	945	0.500	1050	0.500	1155	0.500	1260	0.500	1365	0.500
750	0.500	855	0.500	960	0.500	1065	0.500	1170	0.500	1275	0.500	1380	0.500
765	0.500	870	0.500	975	0.500	1080	0.500	1185	0.500	1290	0.500	1395	0.500
780	0.500	885	0.500	990	0.500	1095	0.500	1200	0.500	1305	0.500	1410	0.500
795	0.500	900	0.500	1005	0.500	1110	0.500	1215	0.500	1320	0.500	1425	0.500
810	0.500	915	0.500	1020	0.500	1125	0.500	1230	0.500	1335	0.500	1440	0.500
825	0.500	930	0.500	1035	0.500	1140	0.500	1245	0.500	1350	0.500		

Node 11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.100	Product Number	CTL-SHE-0087-5000-2470-5000
Design Depth (m)	2.470	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 30 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.120	Product Number	CTL-SHE-0128-1000-2230-1000
Design Depth (m)	2.230	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1500

Node 49 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.795	Product Number	CTL-SHE-0086-5000-2570-5000
Design Depth (m)	2.570	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 50 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.715	Product Number	CTL-SHE-0137-1100-2000-1100
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	11.0	Min Node Diameter (mm)	1500

Node ExMH7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.510	Product Number	CTL-SHE-0148-1280-2000-1280
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.8	Min Node Diameter (mm)	1800

Node 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.530
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	542.0	542.0	0.300	542.0	566.8

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	150.0	0.0	0.800	150.0	0.0	0.801	0.0	0.0

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.670
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	200.0	200.0	0.350	200.0	217.5	0.351	0.0	217.5

Node 10 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.220
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	375.0	0.0	0.800	375.0	0.0	0.801	0.0	0.0

Node 17 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	770.0	0.0	0.800	770.0	0.0	0.801	0.0	0.0

Node 23 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.270
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	500.0	0.0	0.800	500.0	0.0	0.801	0.0	0.0

Node 24 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	350.0	0.0	1.200	350.0	0.0	1.201	0.0	0.0

Node 25 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	660.0	660.0	0.350	660.0	691.9	0.351	0.0	691.9

Node 26 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	137.5	137.5	0.350	137.5	152.0	0.351	0.0	152.0

Node 39 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.920
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	780.0	0.0	1.200	780.0	0.0	1.201	0.0	0.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	313.0	313.0	0.350	313.0	335.0	0.351	0.0	335.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.860
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	132.0	132.0	0.420	132.0	149.1

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	99.342	28.110	2 year 30 minute summer	85.010	24.055
1 year 15 minute winter	69.713	28.110	2 year 30 minute winter	59.656	24.055
1 year 30 minute summer	65.891	18.645	2 year 60 minute summer	58.092	15.352
1 year 30 minute winter	46.239	18.645	2 year 60 minute winter	38.595	15.352
1 year 60 minute summer	45.726	12.084	2 year 120 minute summer	36.351	9.607
1 year 60 minute winter	30.379	12.084	2 year 120 minute winter	24.151	9.607
1 year 120 minute summer	29.101	7.690	2 year 180 minute summer	28.240	7.267
1 year 120 minute winter	19.334	7.690	2 year 180 minute winter	18.357	7.267
1 year 180 minute summer	22.852	5.881	2 year 240 minute summer	22.531	5.954
1 year 180 minute winter	14.854	5.881	2 year 240 minute winter	14.969	5.954
1 year 240 minute summer	18.381	4.857	2 year 360 minute summer	17.409	4.480
1 year 240 minute winter	12.212	4.857	2 year 360 minute winter	11.316	4.480
1 year 360 minute summer	14.319	3.685	2 year 480 minute summer	13.831	3.655
1 year 360 minute winter	9.308	3.685	2 year 480 minute winter	9.189	3.655
1 year 480 minute summer	11.429	3.020	2 year 600 minute summer	11.410	3.121
1 year 480 minute winter	7.593	3.020	2 year 600 minute winter	7.796	3.121
1 year 600 minute summer	9.465	2.589	2 year 720 minute summer	10.233	2.743
1 year 600 minute winter	6.467	2.589	2 year 720 minute winter	6.877	2.743
1 year 720 minute summer	8.517	2.283	2 year 960 minute summer	8.495	2.237
1 year 720 minute winter	5.724	2.283	2 year 960 minute winter	5.627	2.237
1 year 960 minute summer	7.108	1.872	2 year 1440 minute summer	6.262	1.678
1 year 960 minute winter	4.708	1.872	2 year 1440 minute winter	4.209	1.678
1 year 1440 minute summer	5.284	1.416	2 year 2160 minute summer	4.555	1.259
1 year 1440 minute winter	3.551	1.416	2 year 2160 minute winter	3.139	1.259
1 year 2160 minute summer	3.874	1.071	30 year 15 minute summer	243.268	68.836
1 year 2160 minute winter	2.669	1.071	30 year 15 minute winter	170.714	68.836
2 year 15 minute summer	128.515	36.365	30 year 30 minute summer	161.958	45.828
2 year 15 minute winter	90.186	36.365	30 year 30 minute winter	113.654	45.828



Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 60 minute summer	110.635	29.238	30 year +40% CC 480 minute winter	23.031	9.161
30 year 60 minute winter	73.503	29.238	30 year +40% CC 600 minute summer	28.351	7.755
30 year 120 minute summer	68.536	18.112	30 year +40% CC 600 minute winter	19.371	7.755
30 year 120 minute winter	45.534	18.112	30 year +40% CC 720 minute summer	25.240	6.765
30 year 180 minute summer	52.594	13.534	30 year +40% CC 720 minute winter	16.963	6.765
30 year 180 minute winter	34.187	13.534	30 year +40% CC 960 minute summer	20.695	5.449
30 year 240 minute summer	41.442	10.952	30 year +40% CC 960 minute winter	13.709	5.449
30 year 240 minute winter	27.533	10.952	30 year +40% CC 1440 minute summer	14.972	4.013
30 year 360 minute summer	31.498	8.106	30 year +40% CC 1440 minute winter	10.062	4.013
30 year 360 minute winter	20.475	8.106	30 year +40% CC 2160 minute summer	10.676	2.951
30 year 480 minute summer	24.762	6.544	30 year +40% CC 2160 minute winter	7.356	2.951
30 year 480 minute winter	16.451	6.544	100 year +45% CC 15 minute summer	456.184	129.084
30 year 600 minute summer	20.251	5.539	100 year +45% CC 15 minute winter	320.129	129.084
30 year 600 minute winter	13.837	5.539	100 year +45% CC 30 minute summer	306.687	86.782
30 year 720 minute summer	18.029	4.832	100 year +45% CC 30 minute winter	215.219	86.782
30 year 720 minute winter	12.116	4.832	100 year +45% CC 60 minute summer	210.766	55.699
30 year 960 minute summer	14.782	3.892	100 year +45% CC 60 minute winter	140.028	55.699
30 year 960 minute winter	9.792	3.892	100 year +45% CC 120 minute summer	130.652	34.527
30 year 1440 minute summer	10.694	2.866	100 year +45% CC 120 minute winter	86.802	34.527
30 year 1440 minute winter	7.187	2.866	100 year +45% CC 180 minute summer	99.943	25.719
30 year 2160 minute summer	7.626	2.108	100 year +45% CC 180 minute winter	64.966	25.719
30 year 2160 minute winter	5.254	2.108	100 year +45% CC 240 minute summer	78.406	20.720
30 year +40% CC 15 minute summer	340.575	96.371	100 year +45% CC 240 minute winter	52.091	20.720
30 year +40% CC 15 minute winter	239.000	96.371	100 year +45% CC 360 minute summer	59.190	15.232
30 year +40% CC 30 minute summer	226.741	64.160	100 year +45% CC 360 minute winter	38.475	15.232
30 year +40% CC 30 minute winter	159.116	64.160	100 year +45% CC 480 minute summer	46.316	12.240
30 year +40% CC 60 minute summer	154.889	40.933	100 year +45% CC 480 minute winter	30.772	12.240
30 year +40% CC 60 minute winter	102.904	40.933	100 year +45% CC 600 minute summer	37.736	10.322
30 year +40% CC 120 minute summer	95.951	25.357	100 year +45% CC 600 minute winter	25.783	10.322
30 year +40% CC 120 minute winter	63.748	25.357	100 year +45% CC 720 minute summer	33.487	8.975
30 year +40% CC 180 minute summer	73.632	18.948	100 year +45% CC 720 minute winter	22.505	8.975
30 year +40% CC 180 minute winter	47.862	18.948	100 year +45% CC 960 minute summer	27.309	7.191
30 year +40% CC 240 minute summer	58.018	15.333	100 year +45% CC 960 minute winter	18.090	7.191
30 year +40% CC 240 minute winter	38.546	15.333	100 year +45% CC 1440 minute summer	19.598	5.252
30 year +40% CC 360 minute summer	44.097	11.348	100 year +45% CC 1440 minute winter	13.171	5.252
30 year +40% CC 360 minute winter	28.664	11.348	100 year +45% CC 2160 minute summer	13.852	3.828
30 year +40% CC 480 minute summer	34.666	9.161	100 year +45% CC 2160 minute winter	9.544	3.828



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	2.276	0.076	10.2	0.0484	0.0000	OK
15 minute winter	2	11	1.971	0.071	10.0	0.0454	0.0000	OK
15 minute winter	3	11	1.751	0.081	12.6	0.0512	0.0000	OK
15 minute winter	4	11	1.624	0.144	34.5	0.0914	0.0000	OK
15 minute winter	5	11	1.570	0.140	34.4	0.1585	0.0000	OK
15 minute winter	6	15	1.372	0.112	39.8	10.5068	0.0000	OK
30 minute winter	7	22	1.360	0.140	21.6	0.2478	0.0000	OK
240 minute winter	8	228	1.358	0.198	14.8	0.3496	0.0000	OK
15 minute winter	9	10	1.849	0.049	11.0	0.0551	0.0000	OK
240 minute winter	10	228	1.358	0.158	13.0	49.5690	0.0000	OK
240 minute winter	11	228	1.358	0.258	14.3	0.6562	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	13	12	2.620	0.045	3.3	0.0286	0.0000	OK
15 minute winter	14	12	2.115	0.040	2.8	0.0257	0.0000	OK
15 minute winter	15	10	1.924	0.129	35.6	0.2287	0.0000	OK
15 minute winter	16	10	1.729	0.174	97.0	0.3079	0.0000	OK
480 minute winter	17	376	1.407	0.102	11.8	64.3723	0.0000	OK
15 minute winter	18	10	2.016	0.091	32.4	0.1029	0.0000	OK
15 minute winter	19	11	1.632	0.377	127.3	0.6669	0.0000	OK
15 minute winter	20	11	1.625	0.450	53.0	0.7957	0.0000	OK
15 minute summer	J2	9	1.799	0.189	20.2	0.2141	0.0000	OK
15 minute summer	22	9	1.792	0.442	65.0	0.7810	0.0000	OK
240 minute winter	23	168	1.414	0.144	21.7	68.4864	0.0000	OK
240 minute winter	24	168	1.413	0.213	25.0	71.1884	0.0000	OK
15 minute winter	25	10	1.867	0.109	19.0	0.1237	0.0000	OK
15 minute winter	26	10	2.499	0.049	8.4	0.0310	0.0000	OK
15 minute winter	27	12	1.683	0.268	29.0	0.3030	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 winter	1	S1.000	2	10.0	0.896	0.236	0.5023	
15 minute winter	2	S1.001	3	10.0	0.850	0.216	0.3401	
15 minute winter	3	S1.002	4	12.4	0.528	0.161	0.9541	
15 minute winter	4	S1.003	5	34.4	1.051	0.339	0.1956	
15 minute winter	5	S1.004	6	34.4	0.878	0.195	0.7826	
15 minute winter	6	S1.005	7	19.6	0.518	0.059	0.7308	
30 minute winter	7	S1.006	8	22.2	0.370	0.067	1.6602	
240 minute winter	8	S1.007	11	14.3	0.232	0.044	2.6549	
15 minute winter	9	S2.000	10	10.9	1.815	0.090	0.0417	
240 minute winter	10	S2.001	11	-10.6	-0.252	-0.040	1.0386	
240 minute winter	11	Hydro-Brake®	32	3.4				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1370	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.0930	
15 minute winter	13	S3.001	14	2.8	0.635	0.195	0.2843	
15 minute winter	14	S3.002	15	2.8	0.601	0.066	0.0375	
15 minute winter	15	S3.003	16	34.8	0.973	0.164	0.7511	
15 minute winter	16	S3.004	19	95.1	1.024	0.192	7.3480	
480 minute winter	17	S4.000	19	-11.8	-0.361	-0.038	1.0986	
15 minute winter	18	S5.000	19	32.2	1.886	0.174	0.2303	
15 minute winter	19	S3.005	20	53.0	0.731	0.172	8.2009	
15 minute winter	20	S3.006	30	68.5	0.475	0.135	2.4483	
15 minute summer	J2	S8.000A	22	24.9	0.987	0.326	1.1484	
15 minute summer	22	S8.000	23	81.8	2.070	0.302	0.9067	
240 minute winter	23	S8.001	24	-8.0	0.250	-0.048	1.5437	
240 minute winter	24	S8.002	30	-21.9	-0.400	-0.118	2.2290	
15 minute winter	25	S6.000	27	18.4	0.932	0.457	1.1823	
15 minute winter	26	S7.000	27	8.3	1.708	0.216	0.1810	
15 minute winter	27	S6.001	28	29.5	0.740	0.402	1.6309	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	28	12	1.666	0.356	36.4	0.4031	0.0000	SURCHARGED
15 minute winter	29	12	1.652	0.412	37.8	0.4664	0.0000	SURCHARGED
15 minute winter	30	11	1.631	0.511	109.4	0.9026	0.0000	SURCHARGED
720 minute winter	31	555	1.252	0.192	8.0	0.4881	0.0000	OK
720 minute winter	32	555	1.252	0.322	12.5	0.8186	0.0000	OK
720 minute winter	33	555	1.252	0.392	12.5	0.9965	0.0000	OK
720 minute winter	34	555	1.252	0.472	12.3	1.6334	0.0000	OK
15 minute winter	35	11	2.604	0.034	1.7	0.0216	0.0000	OK
15 minute winter	36	11	2.232	0.097	19.4	0.1721	0.0000	OK
15 minute winter	37	10	2.029	0.179	68.2	0.3166	0.0000	OK
15 minute winter	38	11	1.819	0.059	67.1	0.1048	0.0000	OK
1440 minute winter	39	1350	1.257	0.367	9.6	250.9292	0.0000	OK
1440 minute winter	40	1350	1.257	0.387	9.8	0.6843	0.0000	OK
1440 minute winter	41	1350	1.257	0.445	5.5	0.7868	0.0000	OK
15 minute winter	J1	10	1.663	0.058	6.2	0.0656	0.0000	OK
15 minute winter	43	10	1.516	0.121	28.6	0.1371	0.0000	OK
15 minute winter	44	10	1.425	0.110	28.4	0.1244	0.0000	OK
15 minute winter	45	10	2.083	0.083	18.8	0.0527	0.0000	OK
15 minute winter	46	10	1.570	0.080	18.6	0.0511	0.0000	OK
15 minute winter	47	11	1.319	0.129	25.6	0.1458	0.0000	OK
15 minute winter	48	11	1.259	0.139	25.3	0.1566	0.0000	OK
1440 minute winter	49	1350	1.257	0.462	5.5	1.1764	0.0000	SURCHARGED
720 minute winter	50	555	1.252	0.537	11.3	1.3655	0.0000	SURCHARGED
360 minute winter	ExMH3	256	1.097	0.427	13.8	1.0872	0.0000	OK
15 minute winter	ExMH1	11	2.329	0.049	8.0	0.0556	0.0000	OK
360 minute winter	ExMH4	256	1.097	0.457	13.0	1.1634	0.0000	OK
360 minute winter	ExMH5	256	1.097	0.587	13.3	1.4942	0.0000	OK
360 minute winter	ExMH6	256	1.097	0.637	12.8	1.6212	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 winter	28	S6.002	29	37.8	0.978	0.318	0.4310	
15 minute winter	29	S6.003	30	39.6	0.619	0.430	1.2215	
15 minute winter	30	Hydro-Brake®	31	9.2				
720 minute winter	31	S3.008	32	8.0	0.370	0.014	8.1532	
720 minute winter	32	S1.009	33	11.7	0.465	0.020	6.2601	
720 minute winter	33	S1.010	34	11.7	0.317	0.006	14.5584	
720 minute winter	34	S1.011	50	11.2	0.141	0.006	17.2467	
15 minute winter	35	S9.001	36	1.6	0.553	0.105	0.0234	
15 minute winter	36	S9.002	37	18.9	0.776	0.101	0.9627	
15 minute winter	37	S9.003	38	67.1	1.707	0.188	1.4134	
15 minute winter	38	S9.004	40	67.1	1.615	0.021	0.3796	
1440 minute winter	39	S10.000	40	-9.6	-0.218	-0.036	2.4912	
1440 minute winter	40	S9.005	41	-5.3	0.176	-0.019	7.1333	
1440 minute winter	41	S9.006	49	-5.5	0.093	-0.019	2.1567	
15 minute winter	J1	S11.000A	43	6.0	0.764	0.138	0.1507	
15 minute winter	43	S11.000	44	28.4	1.136	0.291	0.2593	
15 minute winter	44	S11.001	49	28.2	1.174	0.271	0.7801	
15 minute winter	45	S12.000	46	18.6	1.434	0.274	0.3891	
15 minute winter	46	S12.001	47	18.4	1.030	0.273	0.3244	
15 minute winter	47	S12.002	48	25.3	1.069	0.446	0.1440	
15 minute winter	48	S12.003	49	25.3	0.867	0.340	0.3305	
1440 minute winter	49	Hydro-Brake®	50	3.5				
720 minute winter	50	Hydro-Brake®	ExMH3	10.3				
360 minute winter	ExMH3	Ex 3	ExMH4	13.0	0.485	0.027	5.2404	
15 minute winter	ExMH1	Ex 1	ExMH3	7.7	0.497	0.106	1.3508	
360 minute winter	ExMH4	Ex 4	ExMH5	11.5	0.370	0.017	14.2690	
360 minute winter	ExMH5	Ex 5	ExMH6	11.2	0.341	0.039	34.6191	
360 minute winter	ExMH6	Ex 6	ExMH7	12.1	0.118	0.014	23.9937	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	ExMH7	256	1.097	0.927	12.7	2.3591	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.650	0.500	9.2	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)
360 minute winter	ExMH7	Ex 7	Outfall	12.6	0.317	0.473	0.2978	357.1

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.96%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	2.287	0.087	13.2	0.0556	0.0000	OK
15 minute winter	2	11	1.982	0.082	12.9	0.0523	0.0000	OK
15 minute winter	3	11	1.762	0.092	16.3	0.0586	0.0000	OK
15 minute winter	4	11	1.649	0.169	44.8	0.1072	0.0000	OK
15 minute winter	5	11	1.591	0.161	44.6	0.1823	0.0000	OK
360 minute winter	6	344	1.403	0.143	7.4	15.0076	0.0000	OK
360 minute winter	7	344	1.403	0.183	8.0	0.3234	0.0000	OK
360 minute winter	8	344	1.403	0.243	13.0	0.4294	0.0000	OK
15 minute winter	9	10	1.856	0.056	14.2	0.0633	0.0000	OK
360 minute winter	10	344	1.403	0.203	11.2	65.7410	0.0000	OK
360 minute winter	11	344	1.403	0.303	12.6	0.7712	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	13	11	2.627	0.052	4.3	0.0330	0.0000	OK
15 minute winter	14	12	2.121	0.046	3.7	0.0295	0.0000	OK
15 minute winter	15	10	1.944	0.149	46.2	0.2633	0.0000	OK
15 minute winter	16	10	1.755	0.200	125.7	0.3525	0.0000	OK
360 minute winter	17	344	1.451	0.146	21.1	96.6172	0.0000	OK
15 minute winter	18	10	2.029	0.104	42.0	0.1175	0.0000	OK
15 minute winter	19	11	1.714	0.459	165.7	0.8110	0.0000	OK
15 minute winter	20	11	1.708	0.533	72.7	0.9423	0.0000	OK
15 minute winter	J2	8	1.847	0.237	27.4	0.2678	0.0000	OK
15 minute winter	22	8	1.830	0.480	85.6	0.8478	0.0000	SURCHARGED
360 minute winter	23	344	1.451	0.181	18.8	86.4277	0.0000	OK
360 minute winter	24	344	1.451	0.251	18.1	83.9854	0.0000	OK
15 minute winter	25	11	1.885	0.127	24.6	0.1437	0.0000	OK
15 minute winter	26	10	2.504	0.054	10.9	0.0347	0.0000	OK
15 minute winter	27	11	1.811	0.396	38.3	0.4476	0.0000	SURCHARGED

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 winter	1	S1.000	2	12.9	0.956	0.306	0.6094	
15 minute winter	2	S1.001	3	13.0	0.913	0.280	0.4099	
15 minute winter	3	S1.002	4	16.1	0.559	0.209	1.1620	
15 minute winter	4	S1.003	5	44.6	1.127	0.439	0.2366	
15 minute winter	5	S1.004	6	44.8	0.943	0.254	0.9471	
360 minute winter	6	S1.005	7	5.9	0.376	0.018	1.0643	
360 minute winter	7	S1.006	8	7.8	0.257	0.023	2.3176	
360 minute winter	8	S1.007	11	12.6	0.215	0.039	3.3704	
15 minute winter	9	S2.000	10	14.1	1.942	0.116	0.0505	
360 minute winter	10	S2.001	11	-9.0	-0.203	-0.033	1.3243	
360 minute winter	11	Hydro-Brake®	32	3.3				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1675	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.1145	
15 minute winter	13	S3.001	14	3.7	0.685	0.255	0.3447	
15 minute winter	14	S3.002	15	3.7	0.649	0.086	0.0455	
15 minute winter	15	S3.003	16	45.2	1.043	0.214	0.9096	
15 minute winter	16	S3.004	19	123.4	1.053	0.249	9.0360	
360 minute winter	17	S4.000	19	-21.1	-0.461	-0.069	1.6628	
15 minute winter	18	S5.000	19	42.3	1.969	0.229	0.3867	
15 minute winter	19	S3.005	20	72.7	0.757	0.237	9.8350	
15 minute winter	20	S3.006	30	99.5	0.481	0.197	2.7612	
15 minute winter	J2	S8.000A	22	34.4	0.965	0.451	1.3009	
15 minute winter	22	S8.000	23	106.0	2.277	0.392	0.9104	
360 minute winter	23	S8.001	24	6.9	0.264	0.042	1.9825	
360 minute winter	24	S8.002	30	-17.1	-0.285	-0.092	2.5922	
15 minute winter	25	S6.000	27	24.2	0.942	0.603	1.4024	
15 minute winter	26	S7.000	27	10.8	1.791	0.281	0.2231	
15 minute winter	27	S6.001	28	37.7	0.772	0.514	1.6787	

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.96%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	28	11	1.780	0.470	49.0	0.5319	0.0000	SURCHARGED
15 minute winter	29	11	1.755	0.515	50.0	0.5822	0.0000	SURCHARGED
15 minute winter	30	11	1.704	0.584	150.7	1.0313	0.0000	SURCHARGED
360 minute winter	31	272	1.309	0.249	8.2	0.6348	0.0000	OK
360 minute winter	32	272	1.309	0.379	14.0	0.9654	0.0000	OK
360 minute winter	33	272	1.309	0.449	14.0	1.1434	0.0000	OK
360 minute winter	34	272	1.309	0.529	13.3	1.8333	0.0000	OK
15 minute winter	35	11	2.609	0.039	2.2	0.0248	0.0000	OK
15 minute winter	36	11	2.246	0.111	25.1	0.1967	0.0000	OK
15 minute winter	37	10	2.054	0.204	88.4	0.3597	0.0000	OK
15 minute winter	38	10	1.827	0.067	87.2	0.1186	0.0000	OK
1440 minute winter	39	1350	1.320	0.430	10.9	297.7916	0.0000	OK
1440 minute winter	40	1350	1.320	0.450	11.1	0.7958	0.0000	OK
1440 minute winter	41	1350	1.320	0.508	6.0	0.8983	0.0000	OK
15 minute winter	J1	10	1.672	0.067	8.0	0.0755	0.0000	OK
15 minute winter	43	10	1.536	0.141	37.1	0.1594	0.0000	OK
15 minute winter	44	10	1.441	0.126	36.9	0.1421	0.0000	OK
15 minute winter	45	10	2.095	0.095	24.3	0.0607	0.0000	OK
15 minute winter	46	10	1.584	0.094	24.1	0.0598	0.0000	OK
15 minute winter	47	11	1.349	0.159	33.2	0.1804	0.0000	OK
1440 minute winter	48	1350	1.320	0.200	2.0	0.2266	0.0000	OK
1440 minute winter	49	1350	1.320	0.525	6.1	1.3370	0.0000	SURCHARGED
360 minute winter	50	272	1.309	0.594	11.1	1.5123	0.0000	SURCHARGED
360 minute winter	ExMH3	248	1.185	0.515	14.4	1.3116	0.0000	OK
15 minute winter	ExMH1	10	2.336	0.056	10.3	0.0633	0.0000	OK
360 minute winter	ExMH4	248	1.185	0.545	13.4	1.3879	0.0000	OK
360 minute winter	ExMH5	248	1.185	0.675	13.6	1.7187	0.0000	OK
360 minute winter	ExMH6	248	1.185	0.725	13.1	1.8458	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 winter	28	S6.002	29	50.0	1.003	0.421	0.4310	
15 minute winter	29	S6.003	30	50.6	0.719	0.548	1.2215	
15 minute winter	30	Hydro-Brake®	31	9.2				
360 minute winter	31	S3.008	32	8.2	0.391	0.014	10.6452	
360 minute winter	32	S1.009	33	12.5	0.502	0.021	7.5610	
360 minute winter	33	S1.010	34	12.3	0.370	0.007	17.2309	
360 minute winter	34	S1.011	50	11.0	0.136	0.006	19.8762	
15 minute winter	35	S9.001	36	2.1	0.596	0.138	0.0285	
15 minute winter	36	S9.002	37	24.6	0.834	0.131	1.1644	
15 minute winter	37	S9.003	38	87.2	1.847	0.245	1.6880	
15 minute winter	38	S9.004	40	86.9	1.550	0.027	0.4479	
1440 minute winter	39	S10.000	40	-10.9	-0.207	-0.041	2.9599	
1440 minute winter	40	S9.005	41	-5.8	0.158	-0.021	8.2452	
1440 minute winter	41	S9.006	49	-6.0	0.068	-0.021	2.4346	
15 minute winter	J1	S11.000A	43	7.9	0.819	0.181	0.1861	
15 minute winter	43	S11.000	44	36.9	1.235	0.378	0.3133	
15 minute winter	44	S11.001	49	37.2	1.169	0.357	1.0478	
15 minute winter	45	S12.000	46	24.1	1.517	0.354	0.4757	
15 minute winter	46	S12.001	47	23.7	1.056	0.353	0.4098	
15 minute winter	47	S12.002	48	32.7	1.116	0.576	0.1874	
1440 minute winter	48	S12.003	49	3.2	0.464	0.043	0.5567	
1440 minute winter	49	Hydro-Brake®	50	2.2				
360 minute winter	50	Hydro-Brake®	ExMH3	10.4				
360 minute winter	ExMH3	Ex 3	ExMH4	13.4	0.493	0.028	6.4595	
15 minute winter	ExMH1	Ex 1	ExMH3	9.9	0.548	0.137	1.5566	
360 minute winter	ExMH4	Ex 4	ExMH5	11.7	0.389	0.017	16.6760	
360 minute winter	ExMH5	Ex 5	ExMH6	11.4	0.359	0.040	38.4514	
360 minute winter	ExMH6	Ex 6	ExMH7	12.4	0.139	0.014	25.0599	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	ExMH7	248	1.185	1.015	13.0	2.5837	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.650	0.500	9.9	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)
360 minute winter	ExMH7	Ex 7	Outfall	12.8	0.321	0.479	0.2978	370.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	2.327	0.127	25.0	0.0807	0.0000	OK
15 minute winter	2	11	2.020	0.120	24.6	0.0765	0.0000	OK
15 minute winter	3	11	1.800	0.130	30.9	0.0829	0.0000	OK
15 minute winter	4	11	1.747	0.267	85.8	0.1700	0.0000	OK
15 minute winter	5	11	1.662	0.232	85.1	0.2618	0.0000	OK
480 minute winter	6	472	1.656	0.396	10.9	51.4474	0.0000	OK
480 minute winter	7	472	1.656	0.436	7.7	0.7698	0.0000	OK
480 minute winter	8	472	1.656	0.496	14.9	0.8758	0.0000	OK
15 minute winter	9	10	1.880	0.080	26.9	0.0909	0.0000	OK
480 minute winter	10	472	1.656	0.456	16.0	156.1816	0.0000	SURCHARGED
480 minute winter	11	472	1.656	0.556	14.1	1.4141	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	13	11	2.651	0.076	8.1	0.0482	0.0000	OK
15 minute winter	14	12	2.141	0.066	7.2	0.0419	0.0000	OK
15 minute winter	15	10	2.040	0.245	87.8	0.4333	0.0000	OK
15 minute winter	16	10	2.024	0.469	231.7	0.8290	0.0000	OK
720 minute winter	17	705	1.694	0.389	28.9	274.1783	0.0000	OK
15 minute winter	18	10	2.072	0.147	79.6	0.1668	0.0000	OK
15 minute winter	19	10	1.917	0.662	345.9	1.1690	0.0000	SURCHARGED
15 minute winter	20	10	1.898	0.723	112.6	1.2768	0.0000	SURCHARGED
15 minute winter	J2	7	2.016	0.406	51.8	0.4590	0.0000	SURCHARGED
15 minute winter	22	7	1.986	0.636	154.2	1.1237	0.0000	SURCHARGED
720 minute winter	23	705	1.694	0.424	13.9	202.0164	0.0000	OK
720 minute winter	24	705	1.694	0.494	10.5	165.0312	0.0000	SURCHARGED
15 minute winter	25	11	2.665	0.907	46.4	1.0256	0.0000	SURCHARGED
15 minute winter	26	10	2.558	0.108	20.7	0.0688	0.0000	OK
15 minute winter	27	11	2.275	0.860	71.3	0.9722	0.0000	SURCHARGED

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 winter	1	S1.000	2	24.6	1.109	0.580	0.9969	
15 minute winter	2	S1.001	3	24.6	1.081	0.530	0.6553	
15 minute winter	3	S1.002	4	30.8	0.635	0.401	1.8808	
15 minute winter	4	S1.003	5	85.1	1.359	0.837	0.3717	
15 minute winter	5	S1.004	6	85.5	1.130	0.485	1.5096	
480 minute winter	6	S1.005	7	5.3	0.351	0.016	3.5717	
480 minute winter	7	S1.006	8	7.2	0.257	0.022	6.0400	
480 minute winter	8	S1.007	11	14.1	0.215	0.044	7.0391	
15 minute winter	9	S2.000	10	26.7	2.276	0.220	0.0816	
480 minute winter	10	S2.001	11	-12.7	-0.170	-0.048	2.2941	
480 minute winter	11	Hydro-Brake®	32	3.3				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.2740	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.1847	
15 minute winter	13	S3.001	14	7.2	0.816	0.499	0.5673	
15 minute winter	14	S3.002	15	7.2	0.778	0.167	0.0738	
15 minute winter	15	S3.003	16	88.0	1.208	0.415	2.1745	
15 minute winter	16	S3.004	19	272.9	1.173	0.551	14.9727	
720 minute winter	17	S4.000	19	-28.9	-0.467	-0.094	5.1694	
15 minute winter	18	S5.000	19	79.4	2.108	0.430	0.7067	
15 minute winter	19	S3.005	20	112.6	0.808	0.366	11.1710	
15 minute winter	20	S3.006	30	134.5	0.552	0.266	2.8582	
15 minute winter	J2	S8.000A	22	51.0	1.124	0.669	1.4087	
15 minute winter	22	S8.000	23	155.0	2.656	0.573	0.9136	
720 minute winter	23	S8.001	24	4.1	0.275	0.025	4.1200	
720 minute winter	24	S8.002	30	-10.5	-0.149	-0.057	3.8019	
15 minute winter	25	S6.000	27	45.3	1.140	1.128	1.7741	
15 minute winter	26	S7.000	27	20.5	1.840	0.533	0.2979	
15 minute winter	27	S6.001	28	73.4	1.043	1.000	1.6787	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	28	10	2.145	0.835	97.3	0.9444	0.0000	SURCHARGED
15 minute winter	29	10	2.056	0.816	99.6	0.9233	0.0000	SURCHARGED
15 minute winter	30	10	1.897	0.777	236.3	1.3722	0.0000	SURCHARGED
240 minute winter	31	184	1.682	0.622	8.4	1.5828	0.0000	OK
240 minute winter	32	184	1.682	0.752	15.7	1.9136	0.0000	SURCHARGED
240 minute winter	33	184	1.682	0.822	15.7	2.0916	0.0000	OK
240 minute winter	34	184	1.682	0.902	14.8	3.1237	0.0000	OK
15 minute winter	35	11	2.625	0.055	4.1	0.0348	0.0000	OK
15 minute winter	36	10	2.292	0.157	47.6	0.2766	0.0000	OK
15 minute winter	37	10	2.132	0.282	168.3	0.4980	0.0000	OK
15 minute winter	38	10	1.851	0.091	166.3	0.1613	0.0000	OK
1440 minute winter	39	1380	1.627	0.737	17.9	525.5806	0.0000	SURCHARGED
1440 minute winter	40	1410	1.627	0.757	18.2	1.3383	0.0000	SURCHARGED
720 minute winter	41	765	1.634	0.822	16.5	1.4526	0.0000	SURCHARGED
15 minute winter	J1	10	1.695	0.090	15.1	0.1018	0.0000	OK
1440 minute winter	43	1380	1.627	0.232	3.8	0.2625	0.0000	OK
1440 minute winter	44	1380	1.627	0.312	3.8	0.3530	0.0000	SURCHARGED
15 minute winter	45	9	2.136	0.136	45.9	0.0864	0.0000	OK
15 minute winter	46	11	1.802	0.312	46.4	0.1983	0.0000	SURCHARGED
1440 minute winter	47	1380	1.627	0.437	4.3	0.4942	0.0000	SURCHARGED
1440 minute winter	48	1380	1.627	0.507	5.7	0.5731	0.0000	SURCHARGED
1440 minute winter	49	1380	1.626	0.831	12.9	2.1149	0.0000	SURCHARGED
240 minute winter	50	184	1.682	0.967	11.9	2.4602	0.0000	SURCHARGED
120 minute winter	ExMH3	78	2.394	1.724	32.3	4.3883	0.0000	SURCHARGED
120 minute winter	ExMH1	78	2.408	0.128	6.7	0.1443	0.0000	OK
120 minute winter	ExMH4	78	2.392	1.752	27.2	4.4579	0.0000	FLOOD RISK
120 minute winter	ExMH5	78	2.382	1.872	26.0	4.7654	0.0000	SURCHARGED
120 minute winter	ExMH6	76	2.370	1.910	27.8	4.8610	10.2039	FLOOD

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 winter	28	S6.002	29	99.6	1.414	0.838	0.4310	
15 minute winter	29	S6.003	30	102.3	1.453	1.109	1.2215	
15 minute winter	30	Hydro-Brake®	31	9.2				
240 minute winter	31	S3.008	32	8.4	0.399	0.015	25.1610	
240 minute winter	32	S1.009	33	13.4	0.557	0.023	13.3445	
240 minute winter	33	S1.010	34	13.2	0.456	0.007	34.5368	
240 minute winter	34	S1.011	50	11.9	0.129	0.007	36.1223	
15 minute winter	35	S9.001	36	4.0	0.706	0.259	0.0451	
15 minute winter	36	S9.002	37	46.6	0.992	0.248	1.8570	
15 minute winter	37	S9.003	38	166.3	2.241	0.467	2.6141	
15 minute winter	38	S9.004	40	165.8	1.859	0.052	0.6246	
1440 minute winter	39	S10.000	40	-17.9	-0.177	-0.068	3.7618	
1440 minute winter	40	S9.005	41	-9.1	0.142	-0.032	9.6469	
720 minute winter	41	S9.006	49	-16.4	-0.083	-0.057	2.6571	
15 minute winter	J1	S11.000A	43	14.9	0.826	0.342	0.4040	
1440 minute winter	43	S11.000	44	3.8	0.676	0.039	0.6680	
1440 minute winter	44	S11.001	49	3.8	0.621	0.036	1.9170	
15 minute winter	45	S12.000	46	46.4	1.688	0.684	0.9705	
15 minute winter	46	S12.001	47	45.1	1.133	0.670	0.7164	
1440 minute winter	47	S12.002	48	5.7	0.636	0.099	0.2331	
1440 minute winter	48	S12.003	49	7.2	0.479	0.097	0.7022	
1440 minute winter	49	Hydro-Brake®	50	2.5				
240 minute winter	50	Hydro-Brake®	ExMH3	10.8				
120 minute winter	ExMH3	Ex 3	ExMH4	27.2	0.583	0.056	8.5423	
120 minute winter	ExMH1	Ex 1	ExMH3	6.5	0.237	0.089	2.6072	
120 minute winter	ExMH4	Ex 4	ExMH5	18.6	0.434	0.028	19.2989	
120 minute winter	ExMH5	Ex 5	ExMH6	20.5	0.425	0.071	39.6562	
120 minute winter	ExMH6	Ex 6	ExMH7	14.4	0.147	0.016	25.1806	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	ExMH7	80	2.376	2.206	22.1	5.6154	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.650	0.500	12.5	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)
120 minute winter	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	237.3



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	2.360	0.160	35.0	0.1017	0.0000	OK
15 minute winter	2	10	2.045	0.145	34.3	0.0924	0.0000	OK
960 minute winter	3	945	1.954	0.284	3.2	0.1808	0.0000	OK
960 minute winter	4	930	1.955	0.475	9.0	0.3019	0.0000	SURCHARGED
960 minute winter	5	945	1.955	0.525	9.0	0.5942	0.0000	SURCHARGED
960 minute winter	6	930	1.955	0.695	8.8	94.6166	0.0000	SURCHARGED
960 minute winter	7	930	1.954	0.734	5.7	1.2964	0.0000	SURCHARGED
960 minute winter	8	930	1.956	0.796	11.5	1.4071	0.0000	SURCHARGED
960 minute winter	9	930	1.954	0.154	2.7	0.1740	0.0000	OK
960 minute winter	10	930	1.954	0.754	14.1	262.9518	0.0000	SURCHARGED
960 minute winter	11	930	1.954	0.854	11.7	2.1732	0.0000	SURCHARGED
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	13	11	2.671	0.096	11.3	0.0608	0.0000	OK
15 minute summer	14	10	2.332	0.257	9.8	0.1635	0.0000	SURCHARGED
15 minute summer	15	10	2.387	0.592	117.5	1.0453	0.0000	SURCHARGED
15 minute winter	16	9	2.306	0.751	348.7	1.3270	0.0000	SURCHARGED
960 minute winter	17	945	1.977	0.672	27.2	481.7152	0.0000	SURCHARGED
15 minute summer	18	10	2.264	0.339	106.0	0.3831	0.0000	SURCHARGED
15 minute summer	19	10	2.088	0.833	471.2	1.4718	0.0000	SURCHARGED
15 minute summer	20	10	2.058	0.883	141.2	1.5604	0.0000	SURCHARGED
15 minute winter	J2	6	2.215	0.605	72.7	0.6839	0.0000	FLOOD RISK
15 minute winter	22	6	2.162	0.812	215.9	1.4356	0.0000	SURCHARGED
1440 minute winter	23	1410	1.977	0.707	12.5	336.9795	0.0000	SURCHARGED
1440 minute winter	24	1410	1.977	0.777	9.8	259.6937	0.0000	SURCHARGED
15 minute winter	25	12	2.865	1.107	65.2	4.2874	0.0000	SURCHARGED
15 minute winter	26	11	2.866	0.416	28.9	0.9496	0.0000	SURCHARGED
15 minute summer	27	10	2.525	1.110	86.1	1.2554	0.0000	SURCHARGED

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 winter	1	S1.000	2	34.3	1.207	0.811	1.2894	
15 minute winter	2	S1.001	3	34.6	1.105	0.746	0.9559	
960 minute winter	3	S1.002	4	3.2	0.374	0.042	2.7427	
960 minute winter	4	S1.003	5	9.0	0.756	0.089	0.4201	
960 minute winter	5	S1.004	6	8.8	0.581	0.050	3.1603	
960 minute winter	6	S1.005	7	4.0	0.338	0.012	4.8336	
960 minute winter	7	S1.006	8	5.1	0.254	0.016	7.2684	
960 minute winter	8	S1.007	11	10.9	0.167	0.034	7.6058	
960 minute winter	9	S2.000	10	2.7	1.188	0.022	0.2384	
960 minute winter	10	S2.001	11	-11.4	-0.108	-0.042	2.2941	
960 minute winter	11	Hydro-Brake®	32	3.2				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.3642	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.2389	
15 minute winter	13	S3.001	14	10.4	0.886	0.719	0.9274	
15 minute summer	14	S3.002	15	10.4	0.843	0.242	0.3175	
15 minute summer	15	S3.003	16	135.6	1.311	0.640	3.3043	
15 minute winter	16	S3.004	19	382.9	1.409	0.774	16.2804	
960 minute winter	17	S4.000	19	-27.2	-0.425	-0.089	7.0352	
15 minute summer	18	S5.000	19	106.3	2.181	0.575	0.9490	
15 minute summer	19	S3.005	20	141.2	0.857	0.460	11.1710	
15 minute summer	20	S3.006	30	150.2	0.533	0.297	2.8582	
15 minute winter	J2	S8.000A	22	71.4	1.241	0.936	1.4087	
15 minute winter	22	S8.000	23	216.5	2.855	0.800	0.9260	
1440 minute winter	23	S8.001	24	3.9	0.299	0.023	4.1682	
1440 minute winter	24	S8.002	30	-9.8	-0.103	-0.053	3.8019	
15 minute winter	25	S6.000	27	61.6	1.548	1.532	1.7741	
15 minute winter	26	S7.000	27	28.4	1.824	0.737	0.3360	
15 minute summer	27	S6.001	28	90.4	1.283	1.230	1.6787	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	10	2.396	1.086	112.4	1.2286	0.0000	SURCHARGED
15 minute summer	29	10	2.280	1.040	115.0	1.1759	0.0000	SURCHARGED
15 minute summer	30	10	2.046	0.926	273.9	1.6364	0.0000	SURCHARGED
480 minute winter	31	320	1.987	0.927	8.2	2.3589	0.0000	SURCHARGED
480 minute winter	32	320	1.987	1.057	13.3	2.6898	0.0000	SURCHARGED
480 minute winter	33	320	1.987	1.127	13.3	2.8680	0.0000	OK
480 minute winter	34	320	1.987	1.207	13.0	4.1807	0.0000	SURCHARGED
15 minute winter	35	11	2.637	0.067	5.8	0.0424	0.0000	OK
15 minute winter	36	10	2.327	0.192	66.7	0.3390	0.0000	OK
15 minute winter	37	10	2.187	0.337	237.3	0.5960	0.0000	OK
1440 minute winter	38	1410	1.959	0.199	12.8	0.3515	0.0000	OK
1440 minute winter	39	1410	1.958	1.068	24.7	771.4698	0.0000	SURCHARGED
1440 minute winter	40	1380	1.960	1.090	24.8	1.9267	0.0000	SURCHARGED
1440 minute winter	41	1380	1.960	1.148	12.2	2.0288	0.0000	SURCHARGED
15 minute winter	J1	10	1.995	0.390	21.2	0.4414	0.0000	SURCHARGED
1440 minute winter	43	1380	1.962	0.567	5.3	0.6408	0.0000	SURCHARGED
1440 minute winter	44	1380	1.961	0.646	5.3	0.7309	0.0000	SURCHARGED
15 minute winter	45	11	2.749	0.749	64.4	0.4761	0.0000	SURCHARGED
15 minute winter	46	11	2.245	0.755	61.7	0.4803	0.0000	SURCHARGED
1440 minute winter	47	1380	1.960	0.770	4.7	0.8710	0.0000	SURCHARGED
1440 minute winter	48	1380	1.960	0.840	12.2	0.9500	0.0000	SURCHARGED
1440 minute winter	49	1380	1.960	1.165	12.1	2.9656	0.0000	SURCHARGED
480 minute winter	50	320	1.987	1.272	11.5	3.2370	0.0000	SURCHARGED
60 minute winter	ExMH3	36	2.480	1.810	75.3	4.6071	0.0000	SURCHARGED
60 minute winter	ExMH1	37	2.445	0.165	14.6	0.1861	0.0000	OK
60 minute winter	ExMH4	36	2.489	1.849	65.6	4.7070	0.0000	FLOOD RISK
60 minute winter	ExMH5	36	2.434	1.924	86.0	4.8971	0.0000	FLOOD RISK
180 minute winter	ExMH6	92	2.370	1.910	61.8	4.8610	65.2409	FLOOD

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	28	S6.002	29	115.0	1.634	0.968	0.4310	
15 minute summer	29	S6.003	30	118.3	1.680	1.282	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
480 minute winter	31	S3.008	32	8.1	0.387	0.014	26.6766	
480 minute winter	32	S1.009	33	12.2	0.541	0.021	13.3484	
480 minute winter	33	S1.010	34	12.2	0.434	0.006	44.3814	
480 minute winter	34	S1.011	50	11.4	0.183	0.007	43.2460	
15 minute winter	35	S9.001	36	5.6	0.772	0.366	0.0583	
15 minute winter	36	S9.002	37	65.6	1.063	0.349	2.5057	
15 minute winter	37	S9.003	38	233.9	2.473	0.657	3.2881	
1440 minute winter	38	S9.004	40	12.8	0.483	0.004	0.7707	
1440 minute winter	39	S10.000	40	-24.7	-0.239	-0.093	3.7618	
1440 minute winter	40	S9.005	41	-12.0	0.130	-0.043	9.6469	
1440 minute winter	41	S9.006	49	-12.1	-0.047	-0.042	2.6571	
15 minute winter	J1	S11.000A	43	22.3	0.829	0.512	0.7588	
1440 minute winter	43	S11.000	44	5.3	0.718	0.054	0.7298	
1440 minute winter	44	S11.001	49	5.1	0.605	0.049	1.9170	
15 minute winter	45	S12.000	46	61.7	1.662	0.909	1.1931	
15 minute winter	46	S12.001	47	62.5	1.571	0.929	0.7164	
1440 minute winter	47	S12.002	48	10.4	0.649	0.183	0.2331	
1440 minute winter	48	S12.003	49	4.7	0.468	0.064	0.7022	
1440 minute winter	49	Hydro-Brake®	50	2.8				
480 minute winter	50	Hydro-Brake®	ExMH3	11.0				
60 minute winter	ExMH3	Ex 3	ExMH4	65.6	0.718	0.136	8.5423	
60 minute winter	ExMH1	Ex 1	ExMH3	16.3	0.490	0.224	2.9346	
60 minute winter	ExMH4	Ex 4	ExMH5	70.7	0.507	0.105	19.2989	
60 minute winter	ExMH5	Ex 5	ExMH6	101.4	0.468	0.353	39.6562	
180 minute winter	ExMH6	Ex 6	ExMH7	12.7	0.147	0.014	25.1806	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	ExMH7	37	2.416	2.246	38.6	5.7151	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.650	0.500	13.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	207.7

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 94.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	2.765	0.565	46.8	0.3596	0.0000	SURCHARGED
960 minute winter	2	915	2.664	0.764	3.4	0.4859	0.0000	SURCHARGED
960 minute winter	3	915	2.664	0.994	4.3	0.6320	0.0000	FLOOD RISK
960 minute winter	4	915	2.663	1.183	12.0	73.3496	0.0000	FLOOD RISK
960 minute winter	5	900	2.664	1.234	11.6	1.3954	0.0000	SURCHARGED
960 minute winter	6	930	2.666	1.406	11.3	116.6274	0.0000	SURCHARGED
960 minute winter	7	930	2.667	1.447	6.4	2.5560	0.0000	SURCHARGED
960 minute winter	8	930	2.668	1.508	14.0	2.6647	0.0000	SURCHARGED
960 minute winter	9	930	2.668	0.868	3.6	0.9818	0.0000	SURCHARGED
960 minute winter	10	930	2.669	1.469	20.3	287.9512	0.0000	SURCHARGED
960 minute winter	11	930	2.668	1.568	17.0	3.9905	0.0000	SURCHARGED
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute winter	13	11	2.858	0.283	15.2	0.1798	0.0000	SURCHARGED
15 minute summer	14	9	2.698	0.623	16.3	0.3961	0.0000	SURCHARGED
15 minute winter	15	9	2.664	0.869	165.7	1.5350	0.0000	SURCHARGED
15 minute summer	16	9	2.621	1.066	429.7	1.8844	0.0000	SURCHARGED
960 minute winter	17	690	2.417	1.112	39.3	587.1889	0.0000	SURCHARGED
15 minute winter	18	9	2.638	0.713	149.3	0.8064	0.0000	SURCHARGED
960 minute winter	19	690	2.412	1.157	81.6	2.0453	0.0000	SURCHARGED
960 minute winter	20	690	2.405	1.230	83.9	2.1734	0.0000	SURCHARGED
2160 minute winter	J2	1500	2.391	0.781	17.9	0.8833	245.4790	FLOOD
960 minute winter	22	690	2.402	1.052	20.8	1.8594	0.0000	SURCHARGED
960 minute winter	23	690	2.410	1.140	65.2	382.2520	0.0000	SURCHARGED
960 minute winter	24	690	2.417	1.217	51.2	401.3163	0.0000	SURCHARGED
15 minute winter	25	13	2.903	1.145	87.2	11.9125	0.0000	SURCHARGED
15 minute winter	26	12	2.935	0.485	38.7	3.8249	0.0000	SURCHARGED
15 minute winter	27	9	2.667	1.252	93.4	1.4165	0.0000	SURCHARGED
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 winter	1	S1.000	2	44.2	1.219	1.043	1.7897	
960 minute winter	2	S1.001	3	3.4	0.616	0.073	1.1478	
960 minute winter	3	S1.002	4	4.3	0.381	0.056	2.7699	
960 minute winter	4	S1.003	5	11.6	0.774	0.114	0.4201	
960 minute winter	5	S1.004	6	11.3	0.584	0.064	3.1603	
960 minute winter	6	S1.005	7	5.4	0.313	0.016	4.8336	
960 minute winter	7	S1.006	8	5.7	0.264	0.017	7.2684	
960 minute winter	8	S1.007	11	13.4	0.178	0.041	7.6058	
960 minute winter	9	S2.000	10	3.6	1.215	0.030	0.2760	
960 minute winter	10	S2.001	11	-16.8	-0.106	-0.063	2.2941	
960 minute winter	11	Hydro-Brake®	32	3.7				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.5650	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.2997	
15 minute winter	13	S3.001	14	16.7	0.968	1.161	1.1311	
15 minute summer	14	S3.002	15	18.9	0.976	0.440	0.3175	
15 minute winter	15	S3.003	16	171.4	1.337	0.809	3.3043	
15 minute summer	16	S3.004	19	438.6	1.576	0.886	16.2804	
960 minute winter	17	S4.000	19	-39.3	-0.407	-0.128	7.0352	
15 minute winter	18	S5.000	19	153.0	2.231	0.828	0.9490	
960 minute winter	19	S3.005	20	-77.6	0.436	-0.252	11.1710	
960 minute winter	20	S3.006	30	-83.9	-0.298	-0.166	2.8582	
2160 minute winter	J2	S8.000A	22	-16.3	0.531	-0.214	1.4087	
960 minute winter	22	S8.000	23	20.4	0.910	0.075	1.8063	
960 minute winter	23	S8.001	24	-55.7	-0.352	-0.336	4.1682	
960 minute winter	24	S8.002	30	73.5	0.464	0.395	3.8019	
15 minute winter	25	S6.000	27	66.7	1.678	1.661	1.7741	
15 minute winter	26	S7.000	27	30.6	1.772	0.795	0.3360	
15 minute winter	27	S6.001	28	94.3	1.339	1.284	1.6787	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 94.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	28	9	2.581	1.271	124.6	1.4380	0.0000	SURCHARGED
15 minute winter	29	9	2.471	1.231	127.2	1.3928	0.0000	SURCHARGED
960 minute winter	30	690	2.406	1.286	83.9	2.2721	0.0000	SURCHARGED
1440 minute winter	31	1020	2.421	1.361	7.8	3.4630	0.0000	SURCHARGED
1440 minute winter	32	1020	2.422	1.492	11.4	3.7976	0.0000	SURCHARGED
1440 minute winter	33	1020	2.420	1.560	11.5	3.9712	0.0000	SURCHARGED
1440 minute winter	34	1020	2.421	1.641	12.8	5.6850	0.0000	SURCHARGED
15 minute winter	35	11	2.649	0.079	7.8	0.0504	0.0000	OK
2160 minute winter	36	1440	2.368	0.233	11.2	0.4123	0.0000	OK
1440 minute winter	37	990	2.368	0.518	16.7	0.9153	0.0000	OK
2160 minute winter	38	1440	2.361	0.601	123.1	1.0622	0.0000	SURCHARGED
2160 minute winter	39	1620	2.402	1.512	23.7	892.6125	0.0000	SURCHARGED
960 minute winter	40	720	2.564	1.694	44.6	2.9940	0.0000	SURCHARGED
960 minute winter	41	735	2.386	1.574	42.9	2.7818	0.0000	SURCHARGED
15 minute winter	J1	10	2.391	0.786	28.4	0.8890	0.4719	FLOOD
1440 minute winter	43	1050	2.386	0.991	7.6	1.1205	0.0000	SURCHARGED
1440 minute winter	44	1020	2.385	1.070	6.8	1.2101	0.0000	SURCHARGED
15 minute winter	45	12	2.847	0.847	86.2	5.0278	0.0000	SURCHARGED
15 minute summer	46	10	2.406	0.916	70.3	0.5826	0.0000	SURCHARGED
1440 minute winter	47	1020	2.387	1.197	10.4	1.3542	0.0000	SURCHARGED
1440 minute winter	48	1020	2.386	1.266	8.9	1.4322	0.0000	SURCHARGED
1440 minute winter	49	1020	2.387	1.592	20.5	4.0522	0.0000	SURCHARGED
1440 minute winter	50	1020	2.423	1.708	11.6	4.3476	0.0000	SURCHARGED
30 minute winter	ExMH3	19	2.666	1.996	121.5	5.0788	0.0000	FLOOD RISK
30 minute winter	ExMH1	20	2.783	0.503	29.0	0.5694	0.0000	SURCHARGED
60 minute summer	ExMH4	33	2.632	1.992	116.8	5.0709	0.0000	FLOOD RISK
30 minute winter	ExMH5	19	2.567	2.057	150.0	5.2349	0.0000	FLOOD RISK
180 minute winter	ExMH6	84	2.370	1.910	78.4	4.8610	150.6653	FLOOD

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 winter	28	S6.002	29	127.2	1.806	1.070	0.4310	
15 minute winter	29	S6.003	30	130.1	1.847	1.410	1.2215	
960 minute winter	30	Hydro-Brake®	31	8.0				
1440 minute winter	31	S3.008	32	7.7	0.368	0.014	26.6766	
1440 minute winter	32	S1.009	33	11.1	0.485	0.019	13.3484	
1440 minute winter	33	S1.010	34	12.8	0.338	0.007	44.9444	
1440 minute winter	34	S1.011	50	11.2	0.122	0.006	43.2544	
15 minute winter	35	S9.001	36	7.5	0.829	0.489	0.0727	
2160 minute winter	36	S9.002	37	-9.4	0.480	-0.050	4.3410	
1440 minute winter	37	S9.003	38	17.1	1.097	0.048	8.7931	
2160 minute winter	38	S9.004	40	-103.3	-0.368	-0.033	1.1949	
2160 minute winter	39	S10.000	40	-23.7	-0.209	-0.090	3.7618	
960 minute winter	40	S9.005	41	-21.6	0.159	-0.077	9.6469	
960 minute winter	41	S9.006	49	-42.9	-0.152	-0.148	2.6571	
15 minute winter	J1	S11.000A	43	28.7	0.846	0.658	0.7588	
1440 minute winter	43	S11.000	44	6.8	0.739	0.069	0.7298	
1440 minute winter	44	S11.001	49	6.6	0.597	0.063	1.9170	
15 minute winter	45	S12.000	46	70.9	1.784	1.044	1.1931	
15 minute summer	46	S12.001	47	71.5	1.798	1.064	0.7164	
1440 minute winter	47	S12.002	48	8.9	0.649	0.156	0.2331	
1440 minute winter	48	S12.003	49	6.0	0.463	0.081	0.7022	
1440 minute winter	49	Hydro-Brake®	50	1.6				
1440 minute winter	50	Hydro-Brake®	ExMH3	10.9				
30 minute winter	ExMH3	Ex 3	ExMH4	109.5	0.940	0.227	8.5423	
30 minute winter	ExMH1	Ex 1	ExMH3	41.8	1.052	0.575	3.2926	
60 minute summer	ExMH4	Ex 4	ExMH5	89.3	0.525	0.133	19.2989	
30 minute winter	ExMH5	Ex 5	ExMH6	157.1	0.521	0.547	39.6562	
180 minute winter	ExMH6	Ex 6	ExMH7	15.0	0.149	0.017	25.1806	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 94.15%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	ExMH7	34	2.416	2.246	46.2	5.7163	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.650	0.500	12.9	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)
60 minute winter	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	209.9

Appendix J

243912-BWB-EXT-XX-T-C-0509-[S2-P01]_Site Wide 0.725m Surcharge Sensitivity
Check



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	x
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.080	5.00	3.376	900	494258.572	101373.022	1.176	2.200
2			3.862	900	494302.395	101383.250	1.962	1.900
3	0.021	5.00	2.830	900	494330.501	101389.806	1.160	1.670
4	0.182	5.00	2.830	900	494329.938	101429.136	1.350	1.480
5			2.975	1200	494323.972	101429.136	1.545	1.430
6			3.100	1500	494306.862	101439.388	1.840	1.260
7	0.081	5.00	3.250	1500	494292.142	101448.208	2.030	1.220
8	0.201	5.00	3.479	1500	494266.340	101447.867	2.319	1.160
9	0.086	5.00	3.400	1200	494258.481	101455.349	1.600	1.800
10			3.450	1500	494251.543	101455.258	2.250	1.200
11			3.593	1800	494239.341	101447.464	2.493	1.100
12		5.00	3.620	900	494098.649	101499.328	0.620	3.000
13	0.026	5.00	3.650	900	494099.603	101435.147	1.075	2.575
14			3.675	900	494100.533	101370.907	1.600	2.075
15	0.261	5.00	3.706	1500	494103.680	101363.570	1.911	1.795
16	0.487	5.00	3.704	1500	494124.534	101363.795	2.149	1.555
17		5.00	3.418	1200	494158.962	101354.803	2.113	1.305
18	0.254	5.00	3.700	1200	494178.252	101376.460	1.775	1.925
19			3.514	1500	494182.332	101363.615	2.259	1.255
20			3.579	1500	494220.134	101375.607	2.404	1.175
J2	0.166	5.00	2.391	1200	494184.083	101432.089	0.781	1.610
22	0.330	5.00	3.000	1500	494204.085	101432.443	1.650	1.350
23			3.126	1500	494204.244	101420.970	1.856	1.270
24			3.678	1500	494204.380	101394.589	2.478	1.200
25	0.149	5.00	3.492	1200	494154.037	101349.088	1.734	1.758
26	0.066	5.00	3.519	900	494192.894	101378.147	1.069	2.450
27	0.019	5.00	3.340	1200	494197.388	101359.599	1.925	1.415
28	0.081	5.00	3.256	1200	494220.559	101365.203	1.946	1.310
29			3.235	1200	494226.507	101366.646	1.995	1.240
30	0.023	5.00	3.623	1500	494225.866	101383.980	2.503	1.120
31			3.451	1800	494233.398	101386.902	2.391	1.060
32	0.101	5.00	3.456	1800	494232.839	101447.511	2.526	0.930
33	0.060	5.00	3.456	1800	494232.393	101477.837	2.596	0.860
34	0.043	5.00	3.230	2100	494230.095	101517.661	2.450	0.780
35	0.013	5.00	3.634	900	494097.702	101564.737	1.064	2.570
36	0.140	5.00	3.699	1500	494100.770	101572.123	1.564	2.135
37	0.392	5.00	3.699	1500	494140.283	101572.672	1.849	1.850
38			3.707	1500	494173.595	101573.140	1.947	1.760
39		5.00	3.517	1500	494163.985	101582.507	2.627	0.890
40			3.499	1500	494175.985	101576.646	2.629	0.870
41	0.005	5.00	3.415	1500	494204.285	101557.358	2.603	0.812
J1	0.048	5.00	2.391	1200	494182.883	101517.961	0.786	1.605
43	0.177	5.00	3.000	1200	494201.716	101521.011	1.605	1.395
44			3.150	1200	494201.549	101531.374	1.835	1.315
45	0.147	5.00	3.522	900	494158.278	101587.058	1.522	2.000
46			3.275	900	494185.655	101574.790	1.785	1.490
47	0.057	5.00	3.371	1200	494200.191	101564.150	2.181	1.190
48			3.370	1200	494204.850	101560.596	2.250	1.120
49	0.022	5.00	3.348	1800	494213.587	101555.791	2.553	0.795



Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
50	0.004	5.00	3.341	1800	494226.874	101555.916	2.626	0.715
ExMH3	0.197	5.00	2.860	1800	494226.798	101573.518	2.190	0.670
ExMH1	0.062	5.00	3.580	1200	494150.911	101606.609	1.300	2.280
ExMH4			2.680	1800	494245.463	101578.757	2.040	0.640
ExMH5	0.084	5.00	2.710	1800	494277.278	101609.015	2.200	0.510
ExMH6	0.122	5.00	2.370	1800	494340.155	101673.616	1.910	0.460
ExMH7	0.129	5.00	2.430	1800	494379.221	101715.415	2.260	0.170
Outfall			2.440		494378.469	101722.864	2.290	0.150

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)
S3.000	12	13	64.188	0.600	3.000	2.575	0.425	151.0	150	6.31	50.0
S3.001	13	14	64.247	0.600	2.575	2.150	0.425	151.2	150	7.63	50.0
S3.002	14	15	7.983	0.600	2.075	2.020	0.055	145.1	225	7.75	50.0
S3.003	15	16	20.855	0.600	1.795	1.705	0.090	231.7	450	8.01	50.0
S3.004	16	19	57.798	0.600	1.555	1.255	0.300	192.7	600	8.56	50.0
S4.000	17	19	24.976	0.600	1.305	1.255	0.050	499.5	600	5.38	50.0
S5.000	18	19	13.477	0.600	1.925	1.555	0.370	36.4	300	5.09	50.0
S3.005	19	20	39.659	0.600	1.255	1.175	0.080	495.7	600	9.17	50.0
S3.006	20	30	10.147	0.600	1.175	1.120	0.055	184.5	600	9.26	50.0
S6.000	25	27	44.607	0.600	1.758	1.490	0.268	166.4	225	5.74	50.0
S7.000	26	27	19.085	0.600	2.450	1.565	0.885	21.6	150	5.15	50.0
S6.001	27	28	23.839	0.600	1.415	1.310	0.105	227.0	300	6.12	50.0
S6.002	28	29	6.121	0.600	1.310	1.240	0.070	87.4	300	6.18	50.0
S6.003	29	30	17.346	0.600	1.240	1.120	0.120	144.6	300	6.40	50.0
S8.000A	J2	22	20.005	0.600	1.610	1.515	0.095	210.6	300	5.31	37.3
S8.000	22	23	11.400	0.600	1.350	1.270	0.080	142.5	450	5.42	50.0
S8.001	23	24	26.307	0.600	1.270	1.200	0.070	375.8	450	5.84	50.0
S8.002	24	30	23.995	0.600	1.200	1.120	0.080	299.9	450	6.18	50.0
S3.007	30	31	8.079	0.600	1.120	1.060	0.060	134.7	225	9.38	50.0
S3.008	31	32	60.612	0.600	1.060	0.930	0.130	466.2	750	10.17	50.0
S1.000	1	2	45.001	0.600	2.200	1.900	0.300	150.0	225	5.70	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)
S3.000	0.815	14.4	0.0	0.470	0.925	0.000	0.0	0	0.000
S3.001	0.815	14.4	4.7	0.925	1.375	0.026	0.0	59	0.729
S3.002	1.083	43.1	4.7	1.375	1.461	0.026	0.0	50	0.712
S3.003	1.331	211.7	51.8	1.461	1.549	0.287	0.0	151	1.107
S3.004	1.751	495.0	139.8	1.549	1.659	0.774	0.0	217	1.515
S4.000	1.082	306.1	0.0	1.513	1.659	0.000	0.0	0	0.000
S5.000	2.613	184.7	46.0	1.475	1.659	0.254	0.0	102	2.183
S3.005	1.087	307.2	185.7	1.659	1.804	1.028	0.0	337	1.136
S3.006	1.789	505.9	185.7	1.804	1.903	1.028	0.0	251	1.658
S6.000	1.010	40.2	26.8	1.509	1.625	0.149	0.0	135	1.081
S7.000	2.178	38.5	11.9	0.919	1.625	0.066	0.0	57	1.923
S6.001	1.039	73.4	42.3	1.625	1.646	0.234	0.0	163	1.074
S6.002	1.682	118.9	56.9	1.646	1.695	0.315	0.0	146	1.664
S6.003	1.305	92.3	56.9	1.695	2.203	0.315	0.0	171	1.371
S8.000A	1.079	76.3	22.4	0.481	1.185	0.166	0.0	111	0.941
S8.000	1.701	270.5	89.6	1.200	1.406	0.496	0.0	178	1.534
S8.001	1.042	165.8	89.6	1.406	2.028	0.496	0.0	236	1.062
S8.002	1.168	185.8	89.6	2.028	2.053	0.496	0.0	220	1.158
S3.007	1.125	44.7	336.4	2.278	2.166	1.862	0.0	225	1.146
S3.008	1.289	569.5	336.4	1.641	1.776	1.862	0.0	416	1.340
S1.000	1.065	42.3	14.4	0.951	1.737	0.080	0.0	90	0.964

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)
S1.001	2	3	28.860	0.600	1.900	1.670	0.230	125.5	225	6.12	50.0
S1.002	3	4	39.334	0.600	1.670	1.480	0.190	207.0	300	6.72	50.0
S1.003	4	5	5.966	0.600	1.480	1.430	0.050	119.3	300	6.79	50.0
S1.004	5	6	19.946	0.600	1.430	1.370	0.060	332.4	450	7.09	50.0
S1.005	6	7	17.160	0.600	1.260	1.220	0.040	429.0	600	7.33	50.0
S1.006	7	8	25.804	0.600	1.220	1.160	0.060	430.1	600	7.70	50.0
S1.007	8	11	27.002	0.600	1.160	1.100	0.060	450.0	600	8.10	50.0
S2.000	9	10	6.939	0.600	1.800	1.425	0.375	18.5	225	5.04	50.0
S2.001	10	11	14.479	0.600	1.200	1.100	0.100	144.8	450	5.18	50.0
S1.008	11	32	6.502	0.600	1.100	1.080	0.020	325.1	600	8.18	50.0
S1.009	32	33	30.329	0.600	0.930	0.860	0.070	433.3	750	10.54	50.0
S1.010	33	34	39.890	0.600	0.860	0.780	0.080	498.6	1200	10.94	50.0
S1.011	34	50	38.390	0.600	0.780	0.715	0.065	590.6	1200	11.36	25.4
S9.000	12	35	65.416	0.600	3.000	2.570	0.430	152.1	150	6.34	50.0
S9.001	35	36	8.046	0.600	2.570	2.510	0.060	134.1	150	6.50	50.0
S9.002	36	37	39.517	0.600	2.135	2.000	0.135	292.7	450	7.05	50.0
S9.003	37	38	33.315	0.600	1.850	1.760	0.090	370.2	600	7.49	50.0
S9.004	38	40	4.243	0.600	1.760	0.870	0.890	4.8	600	7.50	50.0
S10.000	39	40	13.355	0.600	0.890	0.870	0.020	667.8	600	5.24	50.0
S9.005	40	41	34.248	0.600	0.870	0.812	0.058	590.5	600	8.08	50.0
S9.006	41	49	9.433	0.600	0.812	0.795	0.017	554.9	600	8.23	50.0
S12.000	45	46	30.000	0.600	2.000	1.490	0.510	58.8	225	5.29	50.0
S12.001	46	47	18.014	0.600	1.490	1.190	0.300	60.0	225	5.47	50.0
S12.002	47	48	5.860	0.600	1.190	1.120	0.070	83.7	225	5.54	50.0
S12.003	48	49	9.971	0.600	1.120	1.075	0.045	221.6	300	5.70	50.0
S11.000A	J1	43	19.078	0.600	1.605	1.470	0.135	141.3	225	5.29	37.3
S11.000	43	44	10.364	0.600	1.395	1.315	0.080	129.6	300	5.41	50.0
S11.001	44	49	27.223	0.600	1.315	1.075	0.240	113.4	300	5.72	36.2

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)
S1.001	1.166	46.3	14.4	1.737	0.935	0.080	0.0	86	1.030
S1.002	1.089	77.0	18.2	0.860	1.050	0.101	0.0	99	0.897
S1.003	1.438	101.6	51.1	1.050	1.245	0.283	0.0	150	1.439
S1.004	1.109	176.4	51.1	1.095	1.280	0.283	0.0	166	0.966
S1.005	1.169	330.5	51.1	1.240	1.430	0.283	0.0	158	0.857
S1.006	1.168	330.1	65.8	1.430	1.719	0.364	0.0	180	0.919
S1.007	1.141	322.6	102.1	1.719	1.893	0.565	0.0	231	1.017
S2.000	3.056	121.5	15.5	1.375	1.800	0.086	0.0	54	2.116
S2.001	1.687	268.3	15.5	1.800	2.043	0.086	0.0	73	0.933
S1.008	1.345	380.2	117.6	1.893	1.776	0.651	0.0	228	1.192
S1.009	1.338	591.0	472.3	1.776	1.846	2.614	0.0	509	1.477
S1.010	1.668	1886.7	483.2	1.396	1.250	2.674	0.0	412	1.410
S1.011	1.532	1732.4	249.4	1.250	1.426	2.717	0.0	304	1.107
S9.000	0.812	14.4	0.0	0.470	0.914	0.000	0.0	0	0.000
S9.001	0.866	15.3	2.4	0.914	1.039	0.013	0.0	40	0.632
S9.002	1.183	188.1	27.6	1.114	1.249	0.153	0.0	116	0.854
S9.003	1.259	356.1	98.4	1.249	1.347	0.545	0.0	215	1.084
S9.004	11.199	3166.4	98.4	1.347	2.029	0.545	0.0	71	5.213
S10.000	0.935	264.3	0.0	2.027	2.029	0.000	0.0	0	0.000
S9.005	0.995	281.2	98.4	2.029	2.003	0.545	0.0	245	0.910
S9.006	1.026	290.2	99.4	2.003	1.953	0.550	0.0	241	0.933
S12.000	1.708	67.9	26.5	1.297	1.560	0.147	0.0	98	1.609
S12.001	1.691	67.2	26.5	1.560	1.956	0.147	0.0	98	1.592
S12.002	1.430	56.9	36.9	1.956	2.025	0.204	0.0	132	1.519
S12.003	1.052	74.4	36.9	1.950	1.973	0.204	0.0	149	1.049
S11.000A	1.098	43.6	6.5	0.561	1.305	0.048	0.0	58	0.792
S11.000	1.380	97.5	40.7	1.305	1.535	0.225	0.0	135	1.319
S11.001	1.475	104.3	29.5	1.535	1.973	0.225	0.0	109	1.274

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)
S9.007	49	50	13.288	0.600	0.795	0.715	0.080	166.1	225	8.45	50.0
S1.012	50	ExMH3	17.602	0.600	0.715	0.670	0.045	391.2	450	11.65	50.0
Ex 1	ExMH1	ExMH3	82.788	0.600	2.280	0.670	1.610	51.4	225	5.75	36.1
Ex 3	ExMH3	ExMH4	19.409	0.600	0.670	0.640	0.030	647.0	750	11.94	24.8
Ex 4	ExMH4	ExMH5	43.849	0.600	0.640	0.510	0.130	337.3	750	12.43	23.7
Ex 5	ExMH5	ExMH6	90.103	0.600	0.510	0.460	0.050	1802.1	750	14.74	21.7
Ex 6	ExMH6	ExMH7	57.213	0.600	0.460	0.170	0.290	197.3	750	15.22	20.9
Ex 7	ExMH7	Outfall	7.487	0.600	0.170	0.150	0.020	374.4	225	15.40	21.5

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)
S9.007	1.011	40.2	180.9	2.328	2.401	1.001	0.0	225	1.030
S1.012	1.022	162.5	672.6	2.176	1.740	3.722	0.0	450	1.035
Ex 1	1.828	72.7	8.1	1.075	1.965	0.062	0.0	51	1.216
Ex 3	1.092	482.6	356.9	1.440	1.290	3.982	0.0	482	1.190
Ex 4	1.518	670.5	341.0	1.290	1.450	3.982	0.0	379	1.524
Ex 5	0.650	287.1	318.9	1.450	1.160	4.066	0.0	750	0.656
Ex 6	1.988	878.5	316.3	1.160	1.510	4.187	0.0	310	1.834
Ex 7	0.670	26.6	335.4	2.035	2.065	4.317	0.0	225	0.682

Pipeline Schedule

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)
64.188	151.0	150	Circular	3.620	3.000	0.470	3.650	2.575	0.925
64.247	151.2	150	Circular	3.650	2.575	0.925	3.675	2.150	1.375
7.983	145.1	225	Circular	3.675	2.075	1.375	3.706	2.020	1.461
20.855	231.7	450	Circular	3.706	1.795	1.461	3.704	1.705	1.549
57.798	192.7	600	Circular	3.704	1.555	1.549	3.514	1.255	1.659
24.976	499.5	600	Circular	3.418	1.305	1.513	3.514	1.255	1.659
13.477	36.4	300	Circular	3.700	1.925	1.475	3.514	1.555	1.659
39.659	495.7	600	Circular	3.514	1.255	1.659	3.579	1.175	1.804
10.147	184.5	600	Circular	3.579	1.175	1.804	3.623	1.120	1.903
44.607	166.4	225	Circular	3.492	1.758	1.509	3.340	1.490	1.625
19.085	21.6	150	Circular	3.519	2.450	0.919	3.340	1.565	1.625
23.839	227.0	300	Circular	3.340	1.415	1.625	3.256	1.310	1.646
6.121	87.4	300	Circular	3.256	1.310	1.646	3.235	1.240	1.695
17.346	144.6	300	Circular	3.235	1.240	1.695	3.623	1.120	2.203
20.005	210.6	300	Circular	2.391	1.610	0.481	3.000	1.515	1.185
11.400	142.5	450	Circular	3.000	1.350	1.200	3.126	1.270	1.406

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
12	900	Manhole	Adoptable	13	900	Manhole	Adoptable
13	900	Manhole	Adoptable	14	900	Manhole	Adoptable
14	900	Manhole	Adoptable	15	1500	Manhole	Adoptable
15	1500	Manhole	Adoptable	16	1500	Manhole	Adoptable
16	1500	Manhole	Adoptable	19	1500	Manhole	Adoptable
17	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
18	1200	Manhole	Adoptable	19	1500	Manhole	Adoptable
19	1500	Manhole	Adoptable	20	1500	Manhole	Adoptable
20	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
25	1200	Manhole	Adoptable	27	1200	Manhole	Adoptable
26	900	Manhole	Adoptable	27	1200	Manhole	Adoptable
27	1200	Manhole	Adoptable	28	1200	Manhole	Adoptable
28	1200	Manhole	Adoptable	29	1200	Manhole	Adoptable
29	1200	Manhole	Adoptable	30	1500	Manhole	Adoptable
J2	1200	Manhole	Adoptable	22	1500	Manhole	Adoptable
22	1500	Manhole	Adoptable	23	1500	Manhole	Adoptable

Pipeline Schedule

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)
26.307	375.8	450	Circular	3.126	1.270	1.406	3.678	1.200	2.028
23.995	299.9	450	Circular	3.678	1.200	2.028	3.623	1.120	2.053
8.079	134.7	225	Circular	3.623	1.120	2.278	3.451	1.060	2.166
60.612	466.2	750	Circular	3.451	1.060	1.641	3.456	0.930	1.776
45.001	150.0	225	Circular	3.376	2.200	0.951	3.862	1.900	1.737
28.860	125.5	225	Circular	3.862	1.900	1.737	2.830	1.670	0.935
39.334	207.0	300	Circular	2.830	1.670	0.860	2.830	1.480	1.050
5.966	119.3	300	Circular	2.830	1.480	1.050	2.975	1.430	1.245
19.946	332.4	450	Circular	2.975	1.430	1.095	3.100	1.370	1.280
17.160	429.0	600	Circular	3.100	1.260	1.240	3.250	1.220	1.430
25.804	430.1	600	Circular	3.250	1.220	1.430	3.479	1.160	1.719
27.002	450.0	600	Circular	3.479	1.160	1.719	3.593	1.100	1.893
6.939	18.5	225	Circular	3.400	1.800	1.375	3.450	1.425	1.800
14.479	144.8	450	Circular	3.450	1.200	1.800	3.593	1.100	2.043
6.502	325.1	600	Circular	3.593	1.100	1.893	3.456	1.080	1.776
30.329	433.3	750	Circular	3.456	0.930	1.776	3.456	0.860	1.846
39.890	498.6	1200	Circular	3.456	0.860	1.396	3.230	0.780	1.250
38.390	590.6	1200	Circular	3.230	0.780	1.250	3.341	0.715	1.426
65.416	152.1	150	Circular	3.620	3.000	0.470	3.634	2.570	0.914
8.046	134.1	150	Circular	3.634	2.570	0.914	3.699	2.510	1.039
39.517	292.7	450	Circular	3.699	2.135	1.114	3.699	2.000	1.249
33.315	370.2	600	Circular	3.699	1.850	1.249	3.707	1.760	1.347
4.243	4.8	600	Circular	3.707	1.760	1.347	3.499	0.870	2.029
13.355	667.8	600	Circular	3.517	0.890	2.027	3.499	0.870	2.029
34.248	590.5	600	Circular	3.499	0.870	2.029	3.415	0.812	2.003
9.433	554.9	600	Circular	3.415	0.812	2.003	3.348	0.795	1.953
30.000	58.8	225	Circular	3.522	2.000	1.297	3.275	1.490	1.560
18.014	60.0	225	Circular	3.275	1.490	1.560	3.371	1.190	1.956

US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
23	1500	Manhole	Adoptable	24	1500	Manhole	Adoptable
24	1500	Manhole	Adoptable	30	1500	Manhole	Adoptable
30	1500	Manhole	Adoptable	31	1800	Manhole	Adoptable
31	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
1	900	Manhole	Adoptable	2	900	Manhole	Adoptable
2	900	Manhole	Adoptable	3	900	Manhole	Adoptable
3	900	Manhole	Adoptable	4	900	Manhole	Adoptable
4	900	Manhole	Adoptable	5	1200	Manhole	Adoptable
5	1200	Manhole	Adoptable	6	1500	Manhole	Adoptable
6	1500	Manhole	Adoptable	7	1500	Manhole	Adoptable
7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable
8	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
9	1200	Manhole	Adoptable	10	1500	Manhole	Adoptable
10	1500	Manhole	Adoptable	11	1800	Manhole	Adoptable
11	1800	Manhole	Adoptable	32	1800	Manhole	Adoptable
32	1800	Manhole	Adoptable	33	1800	Manhole	Adoptable
33	1800	Manhole	Adoptable	34	2100	Manhole	Adoptable
34	2100	Manhole	Adoptable	50	1800	Manhole	Adoptable
12	900	Manhole	Adoptable	35	900	Manhole	Adoptable
35	900	Manhole	Adoptable	36	1500	Manhole	Adoptable
36	1500	Manhole	Adoptable	37	1500	Manhole	Adoptable
37	1500	Manhole	Adoptable	38	1500	Manhole	Adoptable
38	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
39	1500	Manhole	Adoptable	40	1500	Manhole	Adoptable
40	1500	Manhole	Adoptable	41	1500	Manhole	Adoptable
41	1500	Manhole	Adoptable	49	1800	Manhole	Adoptable
45	900	Manhole	Adoptable	46	900	Manhole	Adoptable
46	900	Manhole	Adoptable	47	1200	Manhole	Adoptable

**Pipeline Schedule**

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)
5.860	83.7	225	Circular	3.371	1.190	1.956	3.370	1.120	2.025
9.971	221.6	300	Circular	3.370	1.120	1.950	3.348	1.075	1.973
19.078	141.3	225	Circular	2.391	1.605	0.561	3.000	1.470	1.305
10.364	129.6	300	Circular	3.000	1.395	1.305	3.150	1.315	1.535
27.223	113.4	300	Circular	3.150	1.315	1.535	3.348	1.075	1.973
13.288	166.1	225	Circular	3.348	0.795	2.328	3.341	0.715	2.401
17.602	391.2	450	Circular	3.341	0.715	2.176	2.860	0.670	1.740
82.788	51.4	225	Circular	3.580	2.280	1.075	2.860	0.670	1.965
19.409	647.0	750	Circular	2.860	0.670	1.440	2.680	0.640	1.290
43.849	337.3	750	Circular	2.680	0.640	1.290	2.710	0.510	1.450
90.103	1802.1	750	Circular	2.710	0.510	1.450	2.370	0.460	1.160
57.213	197.3	750	Circular	2.370	0.460	1.160	2.430	0.170	1.510
7.487	374.4	225	Circular	2.430	0.170	2.035	2.440	0.150	2.065

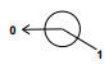
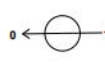
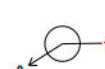
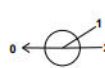
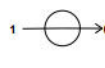
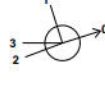
US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
47	1200	Manhole	Adoptable	48	1200	Manhole	Adoptable
48	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
J1	1200	Manhole	Adoptable	43	1200	Manhole	Adoptable
43	1200	Manhole	Adoptable	44	1200	Manhole	Adoptable
44	1200	Manhole	Adoptable	49	1800	Manhole	Adoptable
49	1800	Manhole	Adoptable	50	1800	Manhole	Adoptable
50	1800	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH1	1200	Manhole	Adoptable	ExMH3	1800	Manhole	Adoptable
ExMH3	1800	Manhole	Adoptable	ExMH4	1800	Manhole	Adoptable
ExMH4	1800	Manhole	Adoptable	ExMH5	1800	Manhole	Adoptable
ExMH5	1800	Manhole	Adoptable	ExMH6	1800	Manhole	Adoptable
ExMH6	1800	Manhole	Adoptable	ExMH7	1800	Manhole	Adoptable
ExMH7	1800	Manhole	Adoptable	Outfall		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	494258.572	101373.022	3.376	1.176	900					
						0	S1.000	2.200	225	
2	494302.395	101383.250	3.862	1.962	900		1	S1.000	1.900	225
						0	S1.001	1.900	225	
3	494330.501	101389.806	2.830	1.160	900		1	S1.001	1.670	225
						0	S1.002	1.670	300	
4	494329.938	101429.136	2.830	1.350	900		1	S1.002	1.480	300
						0	S1.003	1.480	300	
5	494323.972	101429.136	2.975	1.545	1200		1	S1.003	1.430	300
						0	S1.004	1.430	450	
6	494306.862	101439.388	3.100	1.840	1500		1	S1.004	1.370	450
						0	S1.005	1.260	600	

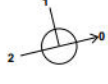
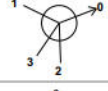
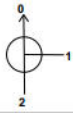


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
7	494292.142	101448.208	3.250	2.030	1500		1 S1.005	1.220	600
						0	S1.006	1.220	600
8	494266.340	101447.867	3.479	2.319	1500		1 S1.006	1.160	600
						0	S1.007	1.160	600
9	494258.481	101455.349	3.400	1.600	1200		0 S2.000	1.800	225
10	494251.543	101455.258	3.450	2.250	1500		1 S2.000	1.425	225
						0	S2.001	1.200	450
11	494239.341	101447.464	3.593	2.493	1800		1 S2.001	1.100	450
						2	S1.007	1.100	600
						0	S1.008	1.100	600
12	494098.649	101499.328	3.620	0.620	900		0-1 S3.000	3.000	150
						0-2	S9.000	3.000	150
13	494099.603	101435.147	3.650	1.075	900		1 S3.000	2.575	150
						0	S3.001	2.575	150
14	494100.533	101370.907	3.675	1.600	900		1 S3.001	2.150	150
						0	S3.002	2.075	225
15	494103.680	101363.570	3.706	1.911	1500		1 S3.002	2.020	225
						0	S3.003	1.795	450
16	494124.534	101363.795	3.704	2.149	1500		1 S3.003	1.705	450
						0	S3.004	1.555	600
17	494158.962	101354.803	3.418	2.113	1200		0 S4.000	1.305	600
18	494178.252	101376.460	3.700	1.775	1200		0 S5.000	1.925	300
19	494182.332	101363.615	3.514	2.259	1500		1 S5.000	1.555	300
						2	S4.000	1.255	600
						3	S3.004	1.255	600
						0	S3.005	1.255	600
20	494220.134	101375.607	3.579	2.404	1500		1 S3.005	1.175	600
						0	S3.006	1.175	600
J2	494184.083	101432.089	2.391	0.781	1200		0 S8.000A	1.610	300

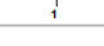


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
22	494204.085	101432.443	3.000	1.650	1500	 1	S8.000A	1.515	300
						0	S8.000	1.350	450
23	494204.244	101420.970	3.126	1.856	1500	 1	S8.000	1.270	450
						0	S8.001	1.270	450
24	494204.380	101394.589	3.678	2.478	1500	 1	S8.001	1.200	450
						0	S8.002	1.200	450
25	494154.037	101349.088	3.492	1.734	1200	 0			
						0	S6.000	1.758	225
26	494192.894	101378.147	3.519	1.069	900	 0			
						0	S7.000	2.450	150
27	494197.388	101359.599	3.340	1.925	1200	 1	S7.000	1.565	150
						2	S6.000	1.490	225
						0	S6.001	1.415	300
28	494220.559	101365.203	3.256	1.946	1200	 1	S6.001	1.310	300
						0	S6.002	1.310	300
29	494226.507	101366.646	3.235	1.995	1200	 0	S6.002	1.240	300
						0	S6.003	1.240	300
30	494225.866	101383.980	3.623	2.503	1500	 1	S8.002	1.120	450
						2	S6.003	1.120	300
						3	S3.006	1.120	600
						0	S3.007	1.120	225
31	494233.398	101386.902	3.451	2.391	1800	 0	S3.007	1.060	225
						0	S3.008	1.060	750
32	494232.839	101447.511	3.456	2.526	1800	 0	S1.008	1.080	600
						2	S3.008	0.930	750
						0	S1.009	0.930	750
33	494232.393	101477.837	3.456	2.596	1800	 0	S1.009	0.860	750
						0	S1.010	0.860	1200
34	494230.095	101517.661	3.230	2.450	2100	 0	S1.010	0.780	1200
						0	S1.011	0.780	1200
35	494097.702	101564.737	3.634	1.064	900	 0	S9.000	2.570	150
						0	S9.001	2.570	150
36	494100.770	101572.123	3.699	1.564	1500	 1	S9.001	2.510	150
						0	S9.002	2.135	450



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
37	494140.283	101572.672	3.699	1.849	1500		1 S9.002	2.000	450
							0 S9.003	1.850	600
38	494173.595	101573.140	3.707	1.947	1500		1 S9.003	1.760	600
							0 S9.004	1.760	600
39	494163.985	101582.507	3.517	2.627	1500		0 S10.000	0.890	600
							1 S10.000	0.870	600
40	494175.985	101576.646	3.499	2.629	1500		2 S9.004	0.870	600
							0 S9.005	0.870	600
41	494204.285	101557.358	3.415	2.603	1500		1 S9.005	0.812	600
							0 S9.006	0.812	600
J1	494182.883	101517.961	2.391	0.786	1200		0 S11.000A	1.605	225
							1 S11.000A	1.470	225
43	494201.716	101521.011	3.000	1.605	1200		0 S11.000	1.395	300
							1 S11.000	1.315	300
44	494201.549	101531.374	3.150	1.835	1200		0 S11.001	1.315	300
							1 S12.000	2.000	225
45	494158.278	101587.058	3.522	1.522	900		1 S12.000	1.490	225
							0 S12.001	1.490	225
46	494185.655	101574.790	3.275	1.785	900		1 S12.001	1.190	225
							0 S12.002	1.120	225
47	494200.191	101564.150	3.371	2.181	1200		1 S12.002	1.120	300
							0 S12.003	1.075	300
48	494204.850	101560.596	3.370	2.250	1200		1 S12.003	1.075	300
							0 S9.006	0.795	600
49	494213.587	101555.791	3.348	2.553	1800		3 S9.007	0.795	225
							0 S9.007	0.715	225
50	494226.874	101555.916	3.341	2.626	1800		1 S1.011	0.715	1200
							0 S1.012	0.715	450
ExMH3	494226.798	101573.518	2.860	2.190	1800		1 Ex 1	0.670	225
							0 Ex 3	0.670	750



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
ExMH1	494150.911	101606.609	3.580	1.300	1200		0	Ex 1	2.280	225
ExMH4	494245.463	101578.757	2.680	2.040	1800		1	Ex 3	0.640	750
ExMH5	494277.278	101609.015	2.710	2.200	1800		0	Ex 4	0.640	750
ExMH6	494340.155	101673.616	2.370	1.910	1800		1	Ex 4	0.510	750
ExMH7	494379.221	101715.415	2.430	2.260	1800		0	Ex 5	0.510	750
Outfall	494378.469	101722.864	2.440	2.290			1	Ex 5	0.460	750
Outfall	494378.469	101722.864	2.440	2.290			0	Ex 6	0.460	750
Outfall	494378.469	101722.864	2.440	2.290			1	Ex 6	0.170	750
Outfall	494378.469	101722.864	2.440	2.290			0	Ex 7	0.170	225
Outfall	494378.469	101722.864	2.440	2.290			1	Ex 7	0.150	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	30	40	0	0
2	0	0	0	100	45	0	0
30	0	0	0				

Node Outfall Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.725	150	0.725	300	0.725	450	0.725	600	0.725	750	0.725
15	0.725	165	0.725	315	0.725	465	0.725	615	0.725	765	0.725
30	0.725	180	0.725	330	0.725	480	0.725	630	0.725	780	0.725
45	0.725	195	0.725	345	0.725	495	0.725	645	0.725	795	0.725
60	0.725	210	0.725	360	0.725	510	0.725	660	0.725	810	0.725
75	0.725	225	0.725	375	0.725	525	0.725	675	0.725	825	0.725
90	0.725	240	0.725	390	0.725	540	0.725	690	0.725	840	0.725
105	0.725	255	0.725	405	0.725	555	0.725	705	0.725	855	0.725
120	0.725	270	0.725	420	0.725	570	0.725	720	0.725	870	0.725
135	0.725	285	0.725	435	0.725	585	0.725	735	0.725	885	0.725



Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1050	0.725	1110	0.725	1170	0.725	1230	0.725	1290	0.725	1350	0.725	1410	0.725
1065	0.725	1125	0.725	1185	0.725	1245	0.725	1305	0.725	1365	0.725	1425	0.725
1080	0.725	1140	0.725	1200	0.725	1260	0.725	1320	0.725	1380	0.725	1440	0.725
1095	0.725	1155	0.725	1215	0.725	1275	0.725	1335	0.725	1395	0.725		

Node 11 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.100	Product Number	CTL-SHE-0087-5000-2470-5000
Design Depth (m)	2.470	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 30 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	1.120	Product Number	CTL-SHE-0128-1000-2230-1000
Design Depth (m)	2.230	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	10.0	Min Node Diameter (mm)	1500

Node 49 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.795	Product Number	CTL-SHE-0086-5000-2570-5000
Design Depth (m)	2.570	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 50 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	0.715	Product Number	CTL-SHE-0137-1100-2000-1100
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	11.0	Min Node Diameter (mm)	1500

Node ExMH7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	0.510	Product Number	CTL-SHE-0148-1280-2000-1280
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.8	Min Node Diameter (mm)	1800

Node 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.530
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	542.0	542.0	0.300	542.0	566.8

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	150.0	0.0	0.800	150.0	0.0	0.801	0.0	0.0

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.670
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	200.0	200.0	0.350	200.0	217.5	0.351	0.0	217.5

Node 10 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.220
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	375.0	0.0	0.800	375.0	0.0	0.801	0.0	0.0

Node 17 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	770.0	0.0	0.800	770.0	0.0	0.801	0.0	0.0

Node 23 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.270
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	500.0	0.0	0.800	500.0	0.0	0.801	0.0	0.0

Node 24 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	350.0	0.0	1.200	350.0	0.0	1.201	0.0	0.0

Node 25 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	660.0	660.0	0.350	660.0	691.9	0.351	0.0	691.9

Node 26 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	4



Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	137.5	137.5	0.350	137.5	152.0	0.351	0.0	152.0

Node 39 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	0.920
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	780.0	0.0	1.200	780.0	0.0	1.201	0.0	0.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	313.0	313.0	0.350	313.0	335.0	0.351	0.0	335.0

Node 45 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	2.860
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	132.0	132.0	0.420	132.0	149.1

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	76.334	21.600	2 year 30 minute summer	75.407	21.338
1 year 15 minute winter	53.568	21.600	2 year 30 minute winter	52.918	21.338
1 year 30 minute summer	49.841	14.103	2 year 60 minute summer	50.706	13.400
1 year 30 minute winter	34.976	14.103	2 year 60 minute winter	33.688	13.400
1 year 60 minute summer	33.678	8.900	2 year 120 minute summer	34.937	9.233
1 year 60 minute winter	22.375	8.900	2 year 120 minute winter	23.211	9.233
1 year 120 minute summer	25.040	6.617	2 year 180 minute summer	27.895	7.178
1 year 120 minute winter	16.636	6.617	2 year 180 minute winter	18.132	7.178
1 year 180 minute summer	20.597	5.300	2 year 240 minute summer	22.420	5.925
1 year 180 minute winter	13.388	5.300	2 year 240 minute winter	14.895	5.925
1 year 240 minute summer	16.839	4.450	2 year 360 minute summer	17.250	4.439
1 year 240 minute winter	11.187	4.450	2 year 360 minute winter	11.213	4.439
1 year 360 minute summer	13.212	3.400	2 year 480 minute summer	13.533	3.576
1 year 360 minute winter	8.588	3.400	2 year 480 minute winter	8.991	3.576
1 year 480 minute summer	10.483	2.770	2 year 600 minute summer	11.019	3.014
1 year 480 minute winter	6.965	2.770	2 year 600 minute winter	7.529	3.014
1 year 600 minute summer	8.601	2.353	2 year 720 minute summer	9.763	2.617
1 year 600 minute winter	5.877	2.353	2 year 720 minute winter	6.562	2.617
1 year 720 minute summer	7.665	2.054	2 year 960 minute summer	7.947	2.093
1 year 720 minute winter	5.151	2.054	2 year 960 minute winter	5.264	2.093
1 year 960 minute summer	6.288	1.656	2 year 1440 minute summer	5.706	1.529
1 year 960 minute winter	4.165	1.656	2 year 1440 minute winter	3.835	1.529
1 year 1440 minute summer	4.571	1.225	2 year 2160 minute summer	4.094	1.132
1 year 1440 minute winter	3.072	1.225	2 year 2160 minute winter	2.821	1.132
1 year 2160 minute summer	3.323	0.918	30 year 15 minute summer	288.602	81.664
1 year 2160 minute winter	2.290	0.918	30 year 15 minute winter	202.527	81.664
2 year 15 minute summer	116.402	32.938	30 year 30 minute summer	190.913	54.022
2 year 15 minute winter	81.686	32.938	30 year 30 minute winter	133.974	54.022



Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 60 minute summer	129.360	34.186	30 year +40% CC 480 minute winter	24.994	9.942
30 year 60 minute winter	85.943	34.186	30 year +40% CC 600 minute summer	30.258	8.276
30 year 120 minute summer	78.849	20.838	30 year +40% CC 600 minute winter	20.674	8.276
30 year 120 minute winter	52.386	20.838	30 year +40% CC 720 minute summer	26.550	7.116
30 year 180 minute summer	59.815	15.393	30 year +40% CC 720 minute winter	17.844	7.116
30 year 180 minute winter	38.881	15.393	30 year +40% CC 960 minute summer	21.256	5.597
30 year 240 minute summer	46.709	12.344	30 year +40% CC 960 minute winter	14.081	5.597
30 year 240 minute winter	31.033	12.344	30 year +40% CC 1440 minute summer	14.910	3.996
30 year 360 minute summer	34.845	8.967	30 year +40% CC 1440 minute winter	10.021	3.996
30 year 360 minute winter	22.650	8.967	30 year +40% CC 2160 minute summer	10.399	2.874
30 year 480 minute summer	26.872	7.102	30 year +40% CC 2160 minute winter	7.165	2.874
30 year 480 minute winter	17.853	7.102	100 year +45% CC 15 minute summer	524.796	148.499
30 year 600 minute summer	21.613	5.912	100 year +45% CC 15 minute winter	368.278	148.499
30 year 600 minute winter	14.767	5.912	100 year +45% CC 30 minute summer	350.356	99.139
30 year 720 minute summer	18.965	5.083	100 year +45% CC 30 minute winter	245.864	99.139
30 year 720 minute winter	12.745	5.083	100 year +45% CC 60 minute summer	239.317	63.244
30 year 960 minute summer	15.183	3.998	100 year +45% CC 60 minute winter	158.996	63.244
30 year 960 minute winter	10.058	3.998	100 year +45% CC 120 minute summer	143.157	37.832
30 year 1440 minute summer	10.650	2.854	100 year +45% CC 120 minute winter	95.110	37.832
30 year 1440 minute winter	7.158	2.854	100 year +45% CC 180 minute summer	108.110	27.820
30 year 2160 minute summer	7.428	2.053	100 year +45% CC 180 minute winter	70.274	27.820
30 year 2160 minute winter	5.118	2.053	100 year +45% CC 240 minute summer	84.335	22.287
30 year +40% CC 15 minute summer	404.042	114.330	100 year +45% CC 240 minute winter	56.030	22.287
30 year +40% CC 15 minute winter	283.538	114.330	100 year +45% CC 360 minute summer	62.969	16.204
30 year +40% CC 30 minute summer	267.279	75.631	100 year +45% CC 360 minute winter	40.931	16.204
30 year +40% CC 30 minute winter	187.564	75.631	100 year +45% CC 480 minute summer	48.654	12.858
30 year +40% CC 60 minute summer	181.103	47.860	100 year +45% CC 480 minute winter	32.325	12.858
30 year +40% CC 60 minute winter	120.321	47.860	100 year +45% CC 600 minute summer	39.198	10.721
30 year +40% CC 120 minute summer	110.389	29.173	100 year +45% CC 600 minute winter	26.782	10.721
30 year +40% CC 120 minute winter	73.340	29.173	100 year +45% CC 720 minute summer	34.440	9.230
30 year +40% CC 180 minute summer	83.741	21.550	100 year +45% CC 720 minute winter	23.146	9.230
30 year +40% CC 180 minute winter	54.434	21.550	100 year +45% CC 960 minute summer	27.619	7.273
30 year +40% CC 240 minute summer	65.393	17.281	100 year +45% CC 960 minute winter	18.296	7.273
30 year +40% CC 240 minute winter	43.446	17.281	100 year +45% CC 1440 minute summer	19.362	5.189
30 year +40% CC 360 minute summer	48.783	12.554	100 year +45% CC 1440 minute winter	13.012	5.189
30 year +40% CC 360 minute winter	31.710	12.554	100 year +45% CC 2160 minute summer	13.429	3.711
30 year +40% CC 480 minute summer	37.621	9.942	100 year +45% CC 2160 minute winter	9.253	3.711



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.275	0.075	9.9	0.0478	0.0000	OK
15 minute summer	2	11	1.971	0.071	9.8	0.0449	0.0000	OK
15 minute summer	3	11	1.750	0.080	12.3	0.0506	0.0000	OK
15 minute summer	4	11	1.622	0.142	33.7	0.0903	0.0000	OK
15 minute summer	5	11	1.569	0.139	33.8	0.1567	0.0000	OK
480 minute summer	6	376	1.395	0.135	8.2	13.8035	0.0000	OK
480 minute summer	7	376	1.395	0.175	8.7	0.3087	0.0000	OK
480 minute summer	8	376	1.395	0.235	14.3	0.4147	0.0000	OK
15 minute summer	9	10	1.848	0.048	10.7	0.0544	0.0000	OK
480 minute summer	10	376	1.395	0.195	13.6	62.7416	0.0000	OK
480 minute summer	11	376	1.395	0.295	13.8	0.7499	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	12	2.619	0.044	3.2	0.0282	0.0000	OK
15 minute summer	14	12	2.115	0.040	2.7	0.0254	0.0000	OK
15 minute summer	15	10	1.923	0.128	34.6	0.2254	0.0000	OK
15 minute summer	16	10	1.727	0.172	94.6	0.3048	0.0000	OK
480 minute summer	17	392	1.437	0.132	19.4	86.1167	0.0000	OK
15 minute summer	18	10	2.015	0.090	31.7	0.1015	0.0000	OK
15 minute summer	19	12	1.628	0.373	124.8	0.6586	0.0000	OK
15 minute summer	20	12	1.625	0.450	49.1	0.7952	0.0000	OK
15 minute summer	J2	9	1.803	0.193	20.7	0.2186	0.0000	OK
15 minute summer	22	9	1.795	0.445	65.9	0.7856	0.0000	OK
480 minute summer	23	392	1.437	0.167	22.1	79.6283	0.0000	OK
480 minute summer	24	392	1.437	0.237	21.4	79.2130	0.0000	OK
15 minute summer	25	10	1.866	0.108	18.5	0.1216	0.0000	OK
15 minute summer	26	10	2.498	0.048	8.2	0.0306	0.0000	OK
15 minute summer	27	12	1.677	0.262	28.3	0.2964	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	1	S1.000	2	9.8	0.890	0.231	0.4950	
15 minute summer	2	S1.001	3	9.8	0.845	0.211	0.3346	
15 minute summer	3	S1.002	4	12.1	0.532	0.157	0.9391	
15 minute summer	4	S1.003	5	33.8	1.046	0.332	0.1926	
15 minute summer	5	S1.004	6	33.6	0.872	0.191	0.7699	
480 minute summer	6	S1.005	7	6.3	0.372	0.019	0.9891	
480 minute summer	7	S1.006	8	8.4	0.254	0.025	2.1955	
480 minute summer	8	S1.007	11	13.8	0.203	0.043	3.2366	
15 minute summer	9	S2.000	10	10.6	1.804	0.088	0.0409	
480 minute summer	10	S2.001	11	-11.1	-0.245	-0.041	1.2715	
480 minute summer	11	Hydro-Brake®	32	3.1				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1397	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.0972	
15 minute summer	13	S3.001	14	2.7	0.630	0.190	0.2785	
15 minute summer	14	S3.002	15	2.7	0.596	0.064	0.0367	
15 minute summer	15	S3.003	16	34.0	0.967	0.161	0.7367	
15 minute summer	16	S3.004	19	93.3	1.053	0.188	7.1561	
480 minute summer	17	S4.000	19	-19.4	-0.459	-0.063	1.4730	
15 minute summer	18	S5.000	19	31.5	1.876	0.170	0.2263	
15 minute summer	19	S3.005	20	49.1	0.715	0.160	8.1437	
15 minute summer	20	S3.006	30	64.9	0.458	0.128	2.4178	
15 minute summer	J2	S8.000A	22	24.8	0.985	0.325	1.1639	
15 minute summer	22	S8.000	23	81.5	2.088	0.301	0.9088	
480 minute summer	23	S8.001	24	-7.6	0.307	-0.046	1.8166	
480 minute summer	24	S8.002	30	-21.4	-0.285	-0.115	2.4468	
15 minute summer	25	S6.000	27	18.2	0.953	0.452	1.1494	
15 minute summer	26	S7.000	27	8.1	1.698	0.211	0.1732	
15 minute summer	27	S6.001	28	27.9	0.756	0.380	1.6176	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	12	1.659	0.349	34.8	0.3944	0.0000	SURCHARGED
15 minute summer	29	12	1.645	0.405	35.4	0.4581	0.0000	SURCHARGED
15 minute summer	30	11	1.618	0.498	102.8	0.8799	0.0000	SURCHARGED
480 minute summer	31	296	1.331	0.271	7.5	0.6887	0.0000	OK
480 minute summer	32	296	1.331	0.401	11.8	1.0194	0.0000	OK
480 minute summer	33	296	1.331	0.471	11.4	1.1975	0.0000	OK
480 minute summer	34	296	1.331	0.551	10.8	1.9070	0.0000	OK
15 minute summer	35	11	2.604	0.034	1.7	0.0215	0.0000	OK
15 minute summer	36	11	2.231	0.096	18.9	0.1705	0.0000	OK
15 minute summer	37	10	2.027	0.177	66.5	0.3128	0.0000	OK
15 minute summer	38	11	1.819	0.059	65.7	0.1039	0.0000	OK
2160 minute summer	39	1680	1.328	0.438	9.9	303.8187	0.0000	OK
2160 minute summer	40	1680	1.328	0.458	10.1	0.8101	0.0000	OK
2160 minute summer	41	1680	1.328	0.516	5.3	0.9126	0.0000	OK
15 minute summer	J1	10	1.662	0.057	6.0	0.0647	0.0000	OK
15 minute summer	43	10	1.515	0.120	27.9	0.1353	0.0000	OK
15 minute summer	44	10	1.424	0.109	27.8	0.1233	0.0000	OK
15 minute summer	45	10	2.082	0.082	18.3	0.0519	0.0000	OK
15 minute summer	46	10	1.569	0.079	18.2	0.0504	0.0000	OK
2160 minute summer	47	1680	1.328	0.138	1.9	0.1566	0.0000	OK
2160 minute summer	48	1680	1.328	0.208	6.5	0.2358	0.0000	OK
2160 minute summer	49	1680	1.328	0.533	5.5	1.3577	0.0000	SURCHARGED
480 minute summer	50	296	1.330	0.615	10.4	1.5664	0.0000	SURCHARGED
360 minute summer	ExMH3	216	1.262	0.592	12.2	1.5072	0.0000	OK
15 minute summer	ExMH1	11	2.329	0.049	7.8	0.0551	0.0000	OK
360 minute summer	ExMH4	216	1.262	0.622	10.8	1.5835	0.0000	OK
360 minute summer	ExMH5	216	1.262	0.752	11.2	1.9143	0.0000	SURCHARGED
360 minute summer	ExMH6	216	1.262	0.802	10.9	2.0413	0.0000	SURCHARGED
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	28	S6.002	29	35.4	0.973	0.298	0.4310	
15 minute summer	29	S6.003	30	36.4	0.603	0.395	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
480 minute summer	31	S3.008	32	7.3	0.340	0.013	11.5840	
480 minute summer	32	S1.009	33	10.5	0.473	0.018	8.0363	
480 minute summer	33	S1.010	34	10.1	0.379	0.005	18.2290	
480 minute summer	34	S1.011	50	10.4	0.161	0.006	20.8506	
15 minute summer	35	S9.001	36	1.6	0.553	0.105	0.0233	
15 minute summer	36	S9.002	37	18.5	0.772	0.098	0.9488	
15 minute summer	37	S9.003	38	65.7	1.696	0.185	1.3900	
15 minute summer	38	S9.004	40	65.9	1.508	0.021	0.3769	
2160 minute summer	39	S10.000	40	-9.9	-0.139	-0.037	3.0166	
2160 minute summer	40	S9.005	41	-5.1	0.139	-0.018	8.3753	
2160 minute summer	41	S9.006	49	-5.3	0.070	-0.018	2.4655	
15 minute summer	J1	S11.000A	43	5.9	0.759	0.134	0.1477	
15 minute summer	43	S11.000	44	27.8	1.129	0.285	0.2555	
15 minute summer	44	S11.001	49	27.5	1.164	0.264	0.7561	
15 minute summer	45	S12.000	46	18.2	1.426	0.267	0.3820	
15 minute summer	46	S12.001	47	18.0	1.026	0.268	0.3192	
2160 minute summer	47	S12.002	48	4.6	0.581	0.082	0.1877	
2160 minute summer	48	S12.003	49	1.9	0.401	0.025	0.5771	
2160 minute summer	49	Hydro-Brake®	50	2.5				
480 minute summer	50	Hydro-Brake®	ExMH3	9.4				
360 minute summer	ExMH3	Ex 3	ExMH4	10.8	0.481	0.022	7.4092	
15 minute summer	ExMH1	Ex 1	ExMH3	7.5	0.497	0.104	1.6473	
360 minute summer	ExMH4	Ex 4	ExMH5	9.6	0.384	0.014	18.2058	
360 minute summer	ExMH5	Ex 5	ExMH6	10.4	0.355	0.036	39.6450	
360 minute summer	ExMH6	Ex 6	ExMH7	11.2	0.136	0.013	25.1806	



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	ExMH7	216	1.262	1.092	12.4	2.7791	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.875	0.725	6.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	ExMH7	Ex 7	Outfall	12.4	0.311	0.464	0.2978	293.0



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.55%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.295	0.095	15.2	0.0602	0.0000	OK
15 minute summer	2	11	1.989	0.089	15.0	0.0569	0.0000	OK
15 minute summer	3	11	1.770	0.100	18.9	0.0634	0.0000	OK
15 minute summer	4	11	1.666	0.186	51.8	0.1181	0.0000	OK
15 minute summer	5	11	1.605	0.175	51.9	0.1978	0.0000	OK
360 minute winter	6	344	1.470	0.210	8.8	24.6626	0.0000	OK
360 minute winter	7	344	1.470	0.250	8.4	0.4417	0.0000	OK
360 minute winter	8	344	1.470	0.310	13.5	0.5477	0.0000	OK
15 minute summer	9	10	1.860	0.060	16.3	0.0683	0.0000	OK
360 minute winter	10	344	1.470	0.270	12.4	89.7025	0.0000	OK
360 minute winter	11	344	1.470	0.370	13.0	0.9415	0.0000	OK
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	12	2.631	0.056	4.9	0.0358	0.0000	OK
15 minute summer	14	12	2.125	0.050	4.3	0.0320	0.0000	OK
15 minute summer	15	10	1.956	0.161	53.0	0.2844	0.0000	OK
15 minute summer	16	10	1.770	0.215	144.7	0.3804	0.0000	OK
480 minute summer	17	456	1.509	0.204	33.3	138.5919	0.0000	OK
15 minute summer	18	9	2.035	0.110	48.2	0.1248	0.0000	OK
15 minute summer	19	11	1.769	0.514	191.0	0.9091	0.0000	OK
15 minute summer	20	11	1.755	0.580	84.2	1.0251	0.0000	OK
15 minute summer	J2	8	1.859	0.249	31.5	0.2817	0.0000	OK
15 minute winter	22	8	1.846	0.496	89.0	0.8760	0.0000	SURCHARGED
480 minute summer	23	448	1.509	0.239	26.2	113.7762	0.0000	OK
480 minute summer	24	448	1.509	0.309	24.3	103.1609	0.0000	OK
15 minute summer	25	12	1.963	0.205	28.2	0.2323	0.0000	OK
15 minute summer	26	10	2.509	0.059	12.5	0.0373	0.0000	OK
15 minute summer	27	11	1.871	0.456	41.5	0.5153	0.0000	SURCHARGED
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	1	S1.000	2	15.0	0.990	0.354	0.6820	
15 minute summer	2	S1.001	3	15.0	0.949	0.324	0.4565	
15 minute summer	3	S1.002	4	18.7	0.583	0.243	1.3021	
15 minute summer	4	S1.003	5	51.9	1.173	0.510	0.2637	
15 minute summer	5	S1.004	6	51.9	0.981	0.294	1.0553	
360 minute winter	6	S1.005	7	6.2	0.372	0.019	1.7063	
360 minute winter	7	S1.006	8	8.1	0.258	0.025	3.3272	
360 minute winter	8	S1.007	11	13.0	0.215	0.040	4.4439	
15 minute summer	9	S2.000	10	16.2	2.012	0.133	0.0559	
360 minute winter	10	S2.001	11	-9.9	-0.216	-0.037	1.7281	
360 minute winter	11	Hydro-Brake®	32	3.2				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.1933	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.1311	
15 minute summer	13	S3.001	14	4.3	0.714	0.297	0.3851	
15 minute summer	14	S3.002	15	4.3	0.677	0.100	0.0508	
15 minute summer	15	S3.003	16	52.2	1.083	0.246	1.0099	
15 minute summer	16	S3.004	19	142.7	1.080	0.288	10.0527	
480 minute summer	17	S4.000	19	-33.3	-0.577	-0.109	2.4657	
15 minute summer	18	S5.000	19	48.3	2.043	0.262	0.5122	
15 minute summer	19	S3.005	20	84.2	0.761	0.274	10.6318	
15 minute summer	20	S3.006	30	105.5	0.473	0.208	2.8444	
15 minute summer	J2	S8.000A	22	41.3	1.001	0.541	1.3297	
15 minute winter	22	S8.000	23	108.3	2.320	0.400	0.9116	
480 minute summer	23	S8.001	24	8.0	0.292	0.048	2.6470	
480 minute summer	24	S8.002	30	-24.3	-0.283	-0.131	3.1362	
15 minute summer	25	S6.000	27	25.8	0.965	0.641	1.7354	
15 minute summer	26	S7.000	27	12.4	1.744	0.323	0.2289	
15 minute summer	27	S6.001	28	43.1	0.754	0.587	1.6787	



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.55%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	11	1.834	0.524	54.1	0.5923	0.0000	SURCHARGED
15 minute summer	29	11	1.804	0.564	55.9	0.6384	0.0000	SURCHARGED
15 minute summer	30	11	1.746	0.626	165.2	1.1066	0.0000	SURCHARGED
360 minute summer	31	232	1.433	0.373	7.8	0.9503	0.0000	OK
360 minute summer	32	232	1.433	0.503	12.6	1.2810	0.0000	OK
360 minute summer	33	232	1.433	0.573	12.3	1.4591	0.0000	OK
360 minute summer	34	232	1.433	0.653	11.5	2.2630	0.0000	OK
15 minute summer	35	11	2.612	0.042	2.5	0.0266	0.0000	OK
15 minute summer	36	11	2.255	0.120	28.9	0.2120	0.0000	OK
15 minute summer	37	10	2.068	0.218	101.9	0.3859	0.0000	OK
15 minute summer	38	10	1.832	0.072	100.7	0.1269	0.0000	OK
2160 minute summer	39	1620	1.408	0.518	11.8	362.9745	0.0000	OK
2160 minute summer	40	1620	1.408	0.538	12.1	0.9508	0.0000	OK
2160 minute summer	41	1620	1.408	0.596	6.1	1.0533	0.0000	OK
15 minute summer	J1	10	1.677	0.072	9.2	0.0812	0.0000	OK
15 minute summer	43	10	1.548	0.153	42.7	0.1729	0.0000	OK
15 minute summer	44	10	1.448	0.133	42.6	0.1506	0.0000	OK
15 minute summer	45	10	2.103	0.103	27.9	0.0657	0.0000	OK
15 minute summer	46	10	1.593	0.103	27.7	0.0655	0.0000	OK
2160 minute summer	47	1620	1.408	0.218	2.4	0.2467	0.0000	OK
2160 minute summer	48	1620	1.408	0.288	4.2	0.3259	0.0000	OK
2160 minute summer	49	1620	1.408	0.613	6.1	1.5604	0.0000	SURCHARGED
360 minute summer	50	232	1.433	0.718	10.7	1.8279	0.0000	SURCHARGED
240 minute summer	ExMH3	140	1.548	0.878	16.8	2.2341	0.0000	SURCHARGED
15 minute summer	ExMH1	10	2.340	0.060	11.8	0.0681	0.0000	OK
240 minute summer	ExMH4	140	1.548	0.908	13.7	2.3105	0.0000	SURCHARGED
240 minute summer	ExMH5	140	1.548	1.038	13.5	2.6415	0.0000	SURCHARGED
240 minute summer	ExMH6	140	1.548	1.088	16.0	2.7694	0.0000	SURCHARGED
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	28	S6.002	29	55.9	0.980	0.470	0.4310	
15 minute summer	29	S6.003	30	57.7	0.820	0.626	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
360 minute summer	31	S3.008	32	7.6	0.371	0.013	16.1547	
360 minute summer	32	S1.009	33	10.9	0.502	0.019	10.2420	
360 minute summer	33	S1.010	34	10.5	0.415	0.006	23.1087	
360 minute summer	34	S1.011	50	10.7	0.125	0.006	25.5508	
15 minute summer	35	S9.001	36	2.4	0.618	0.157	0.0313	
15 minute summer	36	S9.002	37	28.4	0.866	0.151	1.2946	
15 minute summer	37	S9.003	38	100.7	1.933	0.283	1.8598	
15 minute summer	38	S9.004	40	100.4	1.449	0.032	0.4942	
2160 minute summer	39	S10.000	40	-11.8	-0.143	-0.045	3.5066	
2160 minute summer	40	S9.005	41	-5.8	0.109	-0.021	9.3807	
2160 minute summer	41	S9.006	49	-6.0	0.052	-0.021	2.6555	
15 minute summer	J1	S11.000A	43	9.1	0.823	0.209	0.2200	
15 minute summer	43	S11.000	44	42.6	1.286	0.437	0.3433	
15 minute summer	44	S11.001	49	43.3	1.175	0.415	1.2216	
15 minute summer	45	S12.000	46	27.7	1.574	0.407	0.5318	
15 minute summer	46	S12.001	47	27.7	1.079	0.412	0.4726	
2160 minute summer	47	S12.002	48	4.2	0.573	0.073	0.2320	
2160 minute summer	48	S12.003	49	2.3	0.406	0.032	0.6976	
2160 minute summer	49	Hydro-Brake®	50	2.3				
360 minute summer	50	Hydro-Brake®	ExMH3	9.8				
240 minute summer	ExMH3	Ex 3	ExMH4	13.7	0.509	0.028	8.5423	
15 minute summer	ExMH1	Ex 1	ExMH3	11.5	0.582	0.158	1.6753	
240 minute summer	ExMH4	Ex 4	ExMH5	10.9	0.402	0.016	19.2989	
240 minute summer	ExMH5	Ex 5	ExMH6	11.3	0.378	0.039	39.6562	
240 minute summer	ExMH6	Ex 6	ExMH7	12.5	0.137	0.014	25.1806	



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.55%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	ExMH7	140	1.548	1.378	14.0	3.5077	0.0000	SURCHARGED
15 minute summer	Outfall	1	0.875	0.725	7.5	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)
240 minute summer	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	257.2



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	2.370	0.170	37.6	0.1079	0.0000	OK
15 minute summer	2	11	2.075	0.175	37.0	0.1115	0.0000	OK
15 minute summer	3	11	1.958	0.288	45.6	0.1829	0.0000	OK
15 minute summer	4	11	1.884	0.404	126.2	0.2570	0.0000	SURCHARGED
600 minute winter	5	585	1.857	0.427	11.7	0.4829	0.0000	OK
600 minute winter	6	585	1.857	0.597	11.6	80.4914	0.0000	OK
600 minute winter	7	585	1.857	0.637	7.4	1.1255	0.0000	SURCHARGED
600 minute winter	8	585	1.857	0.697	14.9	1.2315	0.0000	SURCHARGED
15 minute summer	9	10	1.903	0.103	40.4	0.1164	0.0000	OK
600 minute winter	10	585	1.857	0.657	18.5	228.2572	0.0000	SURCHARGED
600 minute winter	11	585	1.857	0.757	15.6	1.9265	0.0000	SURCHARGED
15 minute summer	12	1	3.000	0.000	0.0	0.0000	0.0000	OK
15 minute summer	13	11	2.677	0.102	12.2	0.0648	0.0000	OK
15 minute summer	14	10	2.448	0.373	56.0	0.2374	0.0000	SURCHARGED
15 minute summer	15	9	2.498	0.703	139.7	1.2418	0.0000	SURCHARGED
15 minute summer	16	10	2.372	0.817	383.2	1.4428	0.0000	SURCHARGED
600 minute winter	17	600	1.874	0.569	43.1	406.2353	0.0000	OK
15 minute summer	18	10	2.399	0.474	119.8	0.5364	0.0000	SURCHARGED
15 minute summer	19	10	2.135	0.880	505.4	1.5549	0.0000	SURCHARGED
15 minute summer	20	10	2.124	0.949	152.2	1.6776	0.0000	SURCHARGED
15 minute winter	J2	6	2.214	0.604	73.4	0.6831	0.0000	FLOOD RISK
15 minute winter	22	6	2.164	0.814	217.9	1.4379	0.0000	SURCHARGED
600 minute winter	23	600	1.874	0.604	22.0	288.0892	0.0000	SURCHARGED
600 minute winter	24	600	1.874	0.674	18.2	225.2183	0.0000	SURCHARGED
15 minute summer	25	12	2.874	1.116	70.0	6.0296	0.0000	SURCHARGED
15 minute summer	26	12	2.882	0.432	31.1	1.6140	0.0000	SURCHARGED
15 minute summer	27	10	2.582	1.167	91.1	1.3202	0.0000	SURCHARGED

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	1	S1.000	2	37.0	1.222	0.875	1.4498	
15 minute summer	2	S1.001	3	37.0	1.088	0.799	1.0529	
15 minute summer	3	S1.002	4	48.4	0.776	0.628	2.7507	
15 minute summer	4	S1.003	5	126.4	1.795	1.243	0.4190	
600 minute winter	5	S1.004	6	11.6	0.632	0.066	3.1304	
600 minute winter	6	S1.005	7	4.1	0.339	0.012	4.8310	
600 minute winter	7	S1.006	8	6.7	0.248	0.020	7.2684	
600 minute winter	8	S1.007	11	14.0	0.183	0.043	7.6058	
15 minute summer	9	S2.000	10	40.2	2.500	0.331	0.1118	
600 minute winter	10	S2.001	11	-15.0	-0.134	-0.056	2.2941	
600 minute winter	11	Hydro-Brake®	32	3.2				
15 minute summer	12	S3.000	13	0.0	0.000	0.000	0.4088	
15 minute summer	12	S9.000	35	0.0	0.000	0.000	0.2624	
15 minute summer	13	S3.001	14	11.4	0.909	0.792	0.9604	
15 minute summer	14	S3.002	15	-48.2	-1.269	-1.120	0.3175	
15 minute summer	15	S3.003	16	156.3	1.287	0.738	3.3043	
15 minute summer	16	S3.004	19	387.9	1.468	0.784	16.2804	
600 minute winter	17	S4.000	19	-43.1	-0.544	-0.141	6.9678	
15 minute summer	18	S5.000	19	124.6	2.160	0.674	0.9490	
15 minute summer	19	S3.005	20	152.2	0.875	0.495	11.1710	
15 minute summer	20	S3.006	30	158.5	0.563	0.313	2.8582	
15 minute winter	J2	S8.000A	22	72.1	1.244	0.945	1.4087	
15 minute winter	22	S8.000	23	218.4	2.859	0.807	0.9257	
600 minute winter	23	S8.001	24	6.3	0.226	0.038	4.1682	
600 minute winter	24	S8.002	30	-18.2	-0.230	-0.098	3.8019	
15 minute summer	25	S6.000	27	64.6	1.625	1.609	1.7741	
15 minute summer	26	S7.000	27	28.7	1.731	0.745	0.3360	
15 minute summer	27	S6.001	28	93.8	1.332	1.277	1.6787	

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	10	2.466	1.156	115.9	1.3077	0.0000	SURCHARGED
15 minute summer	29	10	2.349	1.109	119.0	1.2540	0.0000	SURCHARGED
15 minute summer	30	10	2.115	0.995	286.2	1.7578	0.0000	SURCHARGED
360 minute winter	31	256	1.927	0.867	8.0	2.2070	0.0000	SURCHARGED
360 minute winter	32	256	1.927	0.997	13.2	2.5378	0.0000	SURCHARGED
360 minute winter	33	256	1.927	1.067	12.6	2.7160	0.0000	OK
360 minute winter	34	256	1.927	1.147	12.2	3.9739	0.0000	OK
15 minute summer	35	11	2.640	0.070	6.2	0.0444	0.0000	OK
15 minute summer	36	10	2.336	0.201	71.7	0.3549	0.0000	OK
15 minute summer	37	10	2.201	0.351	255.4	0.6209	0.0000	OK
15 minute summer	38	10	1.872	0.112	252.4	0.1976	0.0000	OK
960 minute winter	39	945	1.812	0.922	29.6	662.8542	0.0000	SURCHARGED
960 minute winter	40	960	1.813	0.943	30.0	1.6667	0.0000	SURCHARGED
960 minute winter	41	945	1.815	1.003	19.7	1.7720	0.0000	SURCHARGED
15 minute summer	J1	10	2.123	0.518	26.6	0.5863	0.0000	FLOOD RISK
15 minute summer	43	10	2.081	0.686	105.8	0.7758	0.0000	SURCHARGED
15 minute summer	44	10	1.928	0.613	105.9	0.6937	0.0000	SURCHARGED
15 minute summer	45	11	2.805	0.805	69.2	1.0704	0.0000	SURCHARGED
15 minute summer	46	10	2.323	0.833	64.5	0.5300	0.0000	SURCHARGED
15 minute summer	47	10	2.015	0.825	88.1	0.9327	0.0000	SURCHARGED
960 minute winter	48	930	1.811	0.691	5.6	0.7815	0.0000	SURCHARGED
960 minute winter	49	930	1.812	1.017	17.5	2.5886	0.0000	SURCHARGED
360 minute winter	50	256	1.927	1.212	11.2	3.0850	0.0000	SURCHARGED
30 minute winter	ExMH3	24	2.467	1.797	96.7	4.5736	0.0000	SURCHARGED
120 minute summer	ExMH1	64	2.442	0.162	13.0	0.1838	0.0000	OK
30 minute winter	ExMH4	24	2.466	1.826	82.1	4.6474	0.0000	FLOOD RISK
30 minute winter	ExMH5	24	2.438	1.928	92.3	4.9070	0.0000	FLOOD RISK
180 minute summer	ExMH6	92	2.370	1.910	88.1	4.8610	76.0060	FLOOD

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	28	S6.002	29	119.0	1.690	1.001	0.4310	
15 minute summer	29	S6.003	30	122.4	1.738	1.327	1.2215	
15 minute summer	30	Hydro-Brake®	31	9.2				
360 minute winter	31	S3.008	32	8.0	0.398	0.014	26.6766	
360 minute winter	32	S1.009	33	11.4	0.554	0.019	13.3484	
360 minute winter	33	S1.010	34	11.8	0.416	0.006	43.2539	
360 minute winter	34	S1.011	50	11.1	0.115	0.006	42.9228	
15 minute summer	35	S9.001	36	6.0	0.787	0.395	0.0618	
15 minute summer	36	S9.002	37	70.8	1.082	0.376	2.7086	
15 minute summer	37	S9.003	38	252.4	2.527	0.709	3.4587	
15 minute summer	38	S9.004	40	252.0	2.402	0.080	0.6743	
960 minute winter	39	S10.000	40	-29.6	-0.280	-0.112	3.7618	
960 minute winter	40	S9.005	41	-14.8	0.183	-0.053	9.6469	
960 minute winter	41	S9.006	49	-19.6	-0.078	-0.068	2.6571	
15 minute summer	J1	S11.000A	43	24.0	0.834	0.550	0.7588	
15 minute summer	43	S11.000	44	105.9	1.503	1.086	0.7298	
15 minute summer	44	S11.001	49	107.9	1.532	1.034	1.9170	
15 minute summer	45	S12.000	46	64.5	1.739	0.950	1.1931	
15 minute summer	46	S12.001	47	65.5	1.647	0.974	0.7164	
15 minute summer	47	S12.002	48	89.3	2.247	1.571	0.2331	
960 minute winter	48	S12.003	49	8.2	0.515	0.111	0.7022	
960 minute winter	49	Hydro-Brake®	50	2.5				
360 minute winter	50	Hydro-Brake®	ExMH3	10.9				
30 minute winter	ExMH3	Ex 3	ExMH4	82.1	0.915	0.170	8.5423	
120 minute summer	ExMH1	Ex 1	ExMH3	11.5	0.398	0.159	2.9171	
30 minute winter	ExMH4	Ex 4	ExMH5	78.5	0.660	0.117	19.2989	
30 minute winter	ExMH5	Ex 5	ExMH6	104.4	0.509	0.364	39.6562	
180 minute summer	ExMH6	Ex 6	ExMH7	14.6	0.140	0.017	25.1806	

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.74%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	ExMH7	36	2.420	2.250	40.2	5.7268	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.875	0.725	12.8	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)
60 minute winter	ExMH7	Ex 7	Outfall	12.9	0.324	0.484	0.2978	189.6



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 96.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	3.074	0.874	52.6	0.5561	0.0000	SURCHARGED
720 minute winter	2	705	2.613	0.713	4.0	0.4534	0.0000	SURCHARGED
720 minute winter	3	705	2.613	0.943	5.1	0.5998	0.0000	FLOOD RISK
720 minute winter	4	705	2.613	1.133	14.1	46.1928	0.0000	FLOOD RISK
720 minute winter	5	690	2.613	1.183	13.7	1.3377	0.0000	SURCHARGED
720 minute winter	6	705	2.613	1.353	13.3	116.5338	0.0000	SURCHARGED
720 minute winter	7	690	2.615	1.395	7.5	2.4648	0.0000	SURCHARGED
720 minute winter	8	690	2.614	1.454	16.7	2.5690	0.0000	SURCHARGED
720 minute winter	9	690	2.616	0.816	4.2	0.9226	0.0000	SURCHARGED
720 minute winter	10	690	2.614	1.414	23.2	287.8551	0.0000	SURCHARGED
720 minute winter	11	690	2.615	1.515	19.3	3.8556	0.0000	SURCHARGED
15 minute summer	12	12	3.032	0.032	3.7	0.0205	0.0000	OK
15 minute summer	13	11	3.097	0.522	19.8	0.3319	0.0000	SURCHARGED
15 minute summer	14	9	2.866	0.791	19.3	0.5034	0.0000	SURCHARGED
15 minute summer	15	9	2.883	1.088	184.6	1.9229	0.0000	SURCHARGED
15 minute summer	16	9	2.755	1.200	512.3	2.1208	0.0000	SURCHARGED
1440 minute summer	17	1350	2.397	1.092	38.3	587.1669	0.0000	SURCHARGED
15 minute summer	18	9	2.856	0.931	167.7	1.0532	0.0000	SURCHARGED
15 minute summer	19	9	2.442	1.187	686.1	2.0973	0.0000	SURCHARGED
2160 minute winter	20	1800	2.399	1.224	6.6	2.1624	0.0000	SURCHARGED
1440 minute winter	J2	1170	2.391	0.781	7.2	0.8833	94.5694	FLOOD
960 minute winter	22	855	2.395	1.045	19.2	1.8469	0.0000	SURCHARGED
720 minute winter	23	645	2.397	1.127	53.2	382.2281	0.0000	SURCHARGED
720 minute winter	24	645	2.395	1.195	64.9	399.5858	0.0000	SURCHARGED
15 minute summer	25	13	2.923	1.165	97.9	15.8474	0.0000	SURCHARGED
15 minute summer	26	13	2.976	0.526	43.5	5.5679	0.0000	SURCHARGED
15 minute summer	27	9	2.740	1.325	94.4	1.4989	0.0000	SURCHARGED
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	1	S1.000	2	50.0	1.257	1.181	1.7897	
720 minute winter	2	S1.001	3	4.0	0.645	0.086	1.1478	
720 minute winter	3	S1.002	4	5.1	0.401	0.066	2.7699	
720 minute winter	4	S1.003	5	13.7	0.818	0.134	0.4201	
720 minute winter	5	S1.004	6	13.3	0.620	0.075	3.1603	
720 minute winter	6	S1.005	7	-6.1	0.327	-0.018	4.8336	
720 minute winter	7	S1.006	8	6.8	0.250	0.021	7.2684	
720 minute winter	8	S1.007	11	15.9	0.187	0.049	7.6058	
720 minute winter	9	S2.000	10	4.2	1.255	0.035	0.2760	
720 minute winter	10	S2.001	11	-19.0	-0.120	-0.071	2.2941	
720 minute winter	11	Hydro-Brake®	32	3.7				
15 minute summer	12	S3.000	13	-3.7	-0.321	-0.255	0.6541	
15 minute summer	12	S9.000	35	1.5	0.225	0.102	0.4369	
15 minute summer	13	S3.001	14	19.3	1.102	1.338	1.1311	
15 minute summer	14	S3.002	15	20.7	0.989	0.480	0.3175	
15 minute summer	15	S3.003	16	192.9	1.366	0.911	3.3043	
15 minute summer	16	S3.004	19	514.2	1.826	1.039	16.2804	
1440 minute summer	17	S4.000	19	-38.3	-0.335	-0.125	7.0352	
15 minute summer	18	S5.000	19	171.9	2.441	0.931	0.9490	
15 minute summer	19	S3.005	20	194.5	0.877	0.633	11.1710	
2160 minute winter	20	S3.006	30	13.3	0.215	0.026	2.8582	
1440 minute winter	J2	S8.000A	22	-6.3	0.580	-0.082	1.4087	
960 minute winter	22	S8.000	23	18.9	0.897	0.070	1.8063	
720 minute winter	23	S8.001	24	43.3	0.274	0.261	4.1682	
720 minute winter	24	S8.002	30	-25.3	-0.256	-0.136	3.8019	
15 minute summer	25	S6.000	27	68.5	1.722	1.704	1.7741	
15 minute summer	26	S7.000	27	31.2	1.771	0.810	0.3360	
15 minute summer	27	S6.001	28	95.0	1.349	1.293	1.6787	



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 96.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	9	2.674	1.364	126.9	1.5430	0.0000	SURCHARGED
15 minute summer	29	9	2.568	1.328	128.8	1.5014	0.0000	SURCHARGED
720 minute winter	30	675	2.396	1.276	25.4	2.2544	0.0000	SURCHARGED
360 minute summer	31	208	2.380	1.320	11.0	3.3601	0.0000	SURCHARGED
360 minute summer	32	208	2.381	1.451	16.8	3.6921	0.0000	SURCHARGED
360 minute summer	33	208	2.381	1.521	12.7	3.8708	0.0000	SURCHARGED
360 minute summer	34	208	2.381	1.601	13.2	5.5459	0.0000	SURCHARGED
15 minute summer	35	12	2.657	0.087	8.9	0.0553	0.0000	OK
15 minute summer	36	10	2.385	0.250	100.4	0.4411	0.0000	OK
1440 minute winter	37	1080	2.324	0.474	15.2	0.8367	0.0000	OK
960 minute summer	38	885	2.322	0.562	32.2	0.9927	0.0000	OK
960 minute winter	39	885	2.378	1.488	41.2	892.5699	0.0000	SURCHARGED
1440 minute winter	40	1080	2.530	1.660	29.7	2.9337	0.0000	SURCHARGED
960 minute winter	41	885	2.413	1.601	20.1	2.8286	0.0000	SURCHARGED
15 minute summer	J1	9	2.391	0.786	31.9	0.8890	3.6967	FLOOD
15 minute summer	43	9	2.410	1.015	127.3	1.1481	0.0000	SURCHARGED
960 minute winter	44	870	2.394	1.079	8.6	1.2201	0.0000	SURCHARGED
15 minute summer	45	12	2.868	0.868	96.8	8.0860	0.0000	SURCHARGED
15 minute summer	46	10	2.468	0.978	72.0	0.6217	0.0000	SURCHARGED
960 minute winter	47	900	2.390	1.200	7.8	1.3573	0.0000	SURCHARGED
960 minute winter	48	885	2.391	1.271	9.8	1.4378	0.0000	SURCHARGED
960 minute winter	49	840	2.379	1.584	20.1	4.0302	0.0000	SURCHARGED
360 minute summer	50	208	2.381	1.666	11.6	4.2400	0.0000	SURCHARGED
60 minute summer	ExMH3	33	2.519	1.849	128.5	4.7058	0.0000	SURCHARGED
30 minute summer	ExMH1	19	2.943	0.663	37.2	0.7503	0.0000	SURCHARGED
30 minute winter	ExMH4	19	2.558	1.918	137.2	4.8815	0.0000	FLOOD RISK
30 minute winter	ExMH5	19	2.608	2.098	200.2	5.3388	0.0000	FLOOD RISK
180 minute summer	ExMH6	84	2.370	1.910	112.8	4.8610	164.7335	FLOOD

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	28	S6.002	29	128.8	1.829	1.083	0.4310	
15 minute summer	29	S6.003	30	132.0	1.874	1.430	1.2215	
720 minute winter	30	Hydro-Brake®	31	7.7				
360 minute summer	31	S3.008	32	-11.0	0.400	-0.019	26.6766	
360 minute summer	32	S1.009	33	12.0	0.562	0.020	13.3484	
360 minute summer	33	S1.010	34	12.7	0.469	0.007	44.9444	
360 minute summer	34	S1.011	50	10.9	0.174	0.006	43.2544	
15 minute summer	35	S9.001	36	8.7	0.859	0.567	0.0813	
15 minute summer	36	S9.002	37	99.4	1.117	0.528	3.7154	
1440 minute winter	37	S9.003	38	15.2	1.064	0.043	8.4729	
960 minute summer	38	S9.004	40	32.2	0.417	0.010	1.1848	
960 minute winter	39	S10.000	40	-41.2	-0.340	-0.156	3.7618	
1440 minute winter	40	S9.005	41	-14.5	0.110	-0.052	9.6469	
960 minute winter	41	S9.006	49	-19.9	-0.075	-0.069	2.6571	
15 minute summer	J1	S11.000A	43	29.8	0.827	0.682	0.7588	
15 minute summer	43	S11.000	44	128.0	1.818	1.313	0.7298	
960 minute winter	44	S11.001	49	8.4	0.648	0.080	1.9170	
15 minute summer	45	S12.000	46	72.0	1.810	1.060	1.1931	
15 minute summer	46	S12.001	47	72.6	1.826	1.080	0.7164	
960 minute winter	47	S12.002	48	9.8	0.711	0.172	0.2331	
960 minute winter	48	S12.003	49	7.6	0.510	0.102	0.7022	
960 minute winter	49	Hydro-Brake®	50	2.5				
360 minute summer	50	Hydro-Brake®	ExMH3	11.0				
60 minute summer	ExMH3	Ex 3	ExMH4	122.2	0.685	0.253	8.5423	
30 minute summer	ExMH1	Ex 1	ExMH3	36.2	1.064	0.498	3.2926	
30 minute winter	ExMH4	Ex 4	ExMH5	161.8	0.663	0.241	19.2989	
30 minute winter	ExMH5	Ex 5	ExMH6	219.0	0.527	0.763	39.6562	
180 minute summer	ExMH6	Ex 6	ExMH7	-19.6	0.150	-0.022	25.1806	

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 96.65%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	ExMH7	31	2.430	2.260	42.1	5.7509	0.0000	FLOOD RISK
15 minute summer	Outfall	1	0.875	0.725	12.8	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)
60 minute winter	ExMH7	Ex 7	Outfall	12.8	0.322	0.480	0.2978	196.0



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 91.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	3.376	1.176	68.3	0.7479	1.8960	FLOOD
15 minute summer	2	10	2.882	0.982	53.5	0.6245	0.0000	SURCHARGED
960 minute winter	3	780	2.830	1.160	5.2	0.7378	3.8753	FLOOD
1440 minute winter	4	1140	2.830	1.350	17.5	163.7296	12.8460	FLOOD
960 minute winter	5	810	2.832	1.402	13.8	1.5857	0.0000	FLOOD RISK
720 minute winter	6	675	2.835	1.575	42.4	116.9248	0.0000	FLOOD RISK
720 minute winter	7	705	2.834	1.614	27.5	2.8515	0.0000	SURCHARGED
720 minute winter	8	675	2.835	1.675	25.9	2.9602	0.0000	SURCHARGED
720 minute winter	9	645	2.834	1.034	5.5	11.0166	0.0000	SURCHARGED
720 minute winter	10	675	2.834	1.634	31.4	288.2430	0.0000	SURCHARGED
720 minute winter	11	645	2.834	1.734	26.1	4.4122	0.0000	SURCHARGED
15 minute summer	12	12	3.094	0.094	12.9	0.0596	0.0000	OK
15 minute summer	13	10	3.503	0.928	29.6	0.5903	0.0000	FLOOD RISK
15 minute summer	14	9	3.291	1.216	19.6	0.7733	0.0000	SURCHARGED
15 minute summer	15	9	3.305	1.510	233.7	2.6681	0.0000	SURCHARGED
15 minute summer	16	9	3.168	1.613	654.5	2.8496	0.0000	SURCHARGED
480 minute winter	17	312	2.603	1.298	90.9	587.3994	0.0000	SURCHARGED
15 minute summer	18	9	3.299	1.374	217.9	1.5535	0.0000	SURCHARGED
480 minute winter	19	312	2.605	1.350	91.3	2.3849	0.0000	SURCHARGED
480 minute winter	20	312	2.602	1.427	58.0	2.5221	0.0000	SURCHARGED
2160 minute winter	J2	1320	2.391	0.781	36.7	0.8833	699.1331	FLOOD
480 minute winter	22	312	2.556	1.206	86.4	2.1308	0.0000	SURCHARGED
480 minute winter	23	312	2.566	1.296	69.6	382.5281	0.0000	SURCHARGED
480 minute winter	24	312	2.584	1.384	113.9	401.6126	0.0000	SURCHARGED
15 minute summer	25	13	2.983	1.225	127.2	27.9088	0.0000	SURCHARGED
15 minute summer	26	13	3.092	0.642	56.5	10.4239	0.0000	SURCHARGED
15 minute summer	27	9	2.867	1.452	94.9	1.6417	0.0000	SURCHARGED
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	1	S1.000	2	53.5	1.347	1.265	1.7897	
15 minute summer	2	S1.001	3	54.6	1.374	1.179	1.1478	
960 minute winter	3	S1.002	4	4.8	0.379	0.062	2.7699	
1440 minute winter	4	S1.003	5	9.9	0.711	0.098	0.4201	
960 minute winter	5	S1.004	6	13.7	0.583	0.078	3.1603	
720 minute winter	6	S1.005	7	-29.8	0.349	-0.090	4.8336	
720 minute winter	7	S1.006	8	-22.8	0.275	-0.069	7.2684	
720 minute winter	8	S1.007	11	22.5	0.186	0.070	7.6058	
720 minute winter	9	S2.000	10	5.5	1.302	0.046	0.2760	
720 minute winter	10	S2.001	11	-25.9	-0.163	-0.096	2.2941	
720 minute winter	11	Hydro-Brake®	32	3.7				
15 minute summer	12	S3.000	13	-12.9	-0.854	-0.895	0.9361	
15 minute summer	12	S9.000	35	10.3	0.640	0.720	0.9540	
15 minute summer	13	S3.001	14	19.6	1.119	1.360	1.1311	
15 minute summer	14	S3.002	15	25.0	1.029	0.581	0.3175	
15 minute summer	15	S3.003	16	241.3	1.523	1.140	3.3043	
15 minute summer	16	S3.004	19	658.4	2.338	1.330	16.2804	
480 minute winter	17	S4.000	19	-90.9	-0.598	-0.297	7.0352	
15 minute summer	18	S5.000	19	221.2	3.141	1.197	0.9490	
480 minute winter	19	S3.005	20	58.0	0.490	0.189	11.1710	
480 minute winter	20	S3.006	30	57.4	0.290	0.114	2.8582	
2160 minute winter	J2	S8.000A	22	-33.5	0.536	-0.439	1.4087	
480 minute winter	22	S8.000	23	-69.6	1.182	-0.257	1.8063	
480 minute winter	23	S8.001	24	-69.6	-0.439	-0.420	4.1682	
480 minute winter	24	S8.002	30	-84.9	-0.536	-0.457	3.8019	
15 minute summer	25	S6.000	27	69.5	1.748	1.730	1.7741	
15 minute summer	26	S7.000	27	32.0	1.869	0.831	0.3360	
15 minute summer	27	S6.001	28	95.5	1.357	1.301	1.6787	

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 91.65%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	28	9	2.831	1.521	134.7	1.7200	0.0000	SURCHARGED
15 minute summer	29	9	2.716	1.476	137.8	1.6697	0.0000	SURCHARGED
480 minute winter	30	312	2.601	1.481	83.6	2.6166	0.0000	SURCHARGED
240 minute summer	31	144	3.000	1.940	15.8	4.9363	0.0000	SURCHARGED
240 minute summer	32	144	2.999	2.069	25.8	5.2644	0.0000	SURCHARGED
240 minute summer	33	144	2.998	2.138	26.3	5.4414	0.0000	SURCHARGED
240 minute summer	34	144	2.998	2.218	22.4	7.6837	0.0000	FLOOD RISK
15 minute summer	35	12	2.764	0.194	19.7	0.1233	0.0000	SURCHARGED
15 minute summer	36	11	2.442	0.307	131.1	0.5423	0.0000	OK
720 minute winter	37	555	2.400	0.550	35.1	0.9716	0.0000	OK
960 minute summer	38	600	2.451	0.691	326.9	1.2218	0.0000	SURCHARGED
720 minute summer	39	465	2.451	1.561	96.9	892.6987	0.0000	SURCHARGED
960 minute summer	40	630	2.625	1.755	199.7	3.1008	0.0000	SURCHARGED
960 minute summer	41	585	2.450	1.638	62.9	2.8946	0.0000	SURCHARGED
960 minute winter	J1	600	2.391	0.786	12.3	0.8890	72.8582	FLOOD
15 minute summer	43	10	2.486	1.091	151.6	1.2341	0.0000	SURCHARGED
960 minute summer	44	585	2.445	1.130	16.9	1.2775	0.0000	SURCHARGED
15 minute summer	45	13	2.914	0.914	125.8	18.4622	0.0000	SURCHARGED
15 minute summer	46	10	2.576	1.086	73.0	0.6904	0.0000	SURCHARGED
960 minute summer	47	585	2.458	1.268	15.5	1.4341	0.0000	SURCHARGED
960 minute summer	48	585	2.466	1.346	15.3	1.5226	0.0000	SURCHARGED
960 minute summer	49	585	2.469	1.674	37.2	4.2607	0.0000	SURCHARGED
240 minute summer	50	144	2.998	2.283	16.6	5.8112	0.0000	SURCHARGED
15 minute winter	ExMH3	11	2.736	2.066	207.7	5.2588	0.0000	FLOOD RISK
30 minute summer	ExMH1	18	3.270	0.990	48.8	1.1194	0.0000	SURCHARGED
15 minute summer	ExMH4	11	2.645	2.005	228.0	5.1020	0.0000	FLOOD RISK
30 minute summer	ExMH5	17	2.613	2.103	254.8	5.3515	0.0000	FLOOD RISK
360 minute summer	ExMH6	152	2.370	1.910	89.4	4.8610	333.6995	FLOOD

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	28	S6.002	29	137.8	1.957	1.159	0.4310	
15 minute summer	29	S6.003	30	140.7	1.998	1.525	1.2215	
480 minute winter	30	Hydro-Brake®	31	8.1				
240 minute summer	31	S3.008	32	-15.8	0.401	-0.028	26.6766	
240 minute summer	32	S1.009	33	13.8	0.577	0.023	13.3484	
240 minute summer	33	S1.010	34	14.7	0.499	0.008	44.9444	
240 minute summer	34	S1.011	50	15.8	0.201	0.009	43.2544	
15 minute summer	35	S9.001	36	19.1	1.095	1.251	0.1347	
15 minute summer	36	S9.002	37	130.9	1.221	0.696	4.8190	
720 minute winter	37	S9.003	38	47.1	1.388	0.132	9.1931	
960 minute summer	38	S9.004	40	-214.1	-0.760	-0.068	1.1952	
720 minute summer	39	S10.000	40	-96.9	-0.428	-0.367	3.7618	
960 minute summer	40	S9.005	41	-37.2	-0.132	-0.132	9.6469	
960 minute summer	41	S9.006	49	-39.1	-0.139	-0.135	2.6571	
960 minute winter	J1	S11.000A	43	-10.8	0.566	-0.248	0.7588	
15 minute summer	43	S11.000	44	128.2	1.820	1.315	0.7298	
960 minute summer	44	S11.001	49	16.8	0.620	0.161	1.9170	
15 minute summer	45	S12.000	46	73.0	1.835	1.075	1.1931	
15 minute summer	46	S12.001	47	73.3	1.844	1.091	0.7164	
960 minute summer	47	S12.002	48	15.3	0.648	0.270	0.2331	
960 minute summer	48	S12.003	49	15.2	0.474	0.205	0.7022	
960 minute summer	49	Hydro-Brake®	50	2.2				
240 minute summer	50	Hydro-Brake®	ExMH3	11.0				
15 minute winter	ExMH3	Ex 3	ExMH4	189.1	1.082	0.392	8.5423	
30 minute summer	ExMH1	Ex 1	ExMH3	52.8	1.328	0.726	3.2926	
15 minute summer	ExMH4	Ex 4	ExMH5	-228.0	0.847	-0.340	19.2989	
30 minute summer	ExMH5	Ex 5	ExMH6	260.8	0.593	0.909	39.6562	
360 minute summer	ExMH6	Ex 6	ExMH7	12.5	0.129	0.014	25.1806	

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 91.65%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	ExMH7	17	2.430	2.260	101.4	5.7517	4.4213	FLOOD
15 minute summer	Outfall	1	0.875	0.725	13.2	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)
30 minute summer	ExMH7	Ex 7	Outfall	12.8	0.323	0.482	0.2978	183.2

Appendix K

784-B071527 V1 - Biodiversity Enhancement Strategy (BES)

Oldlands Farm Phase 3

784-B071527

Biodiversity Enhancement Strategy (BES)

Panattoni UK

October 2025

Document prepared on behalf of Tetra Tech Limited. Registered in England number: 01959704



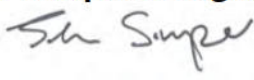
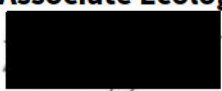
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DOCUMENT CONTROL

Document:	Biodiversity Enhancement Strategy (BES)
Project:	Oldlands Farm Phase 3
Client:	Panattoni UK
Project Number:	784-B071527
File Origin:	M:\Projects\784-B071527_Oldlands_Farm_Phase_3_\60_Output\63_Published

Revision:	V1	Prepared by:	Ben Cooke BSc (Hons) MSc Senior Ecologist ACIEEM 
Date:	March 2025	Checked by:	John Simper Principal Ecologist MCIEEM 
Status:	Final	Approved By:	Kevin Wood BSc (Hons) Associate Ecologist 
Description of Revision:	First Issue		

Revision:	V2	Prepared by:	Ben Cooke BSc (Hons) MSc Senior Ecologist ACIEEM 
Date:	October 2025	Checked by:	Trish Holden BSc MSc MCIEEM Principal Ecologist 
Status:	Final	Approved By:	Kevin Wood BSc (Hons) Associate Ecologist

Description of Revision:	Report updated to correspondence to latest version of the RM Design (Detailed Planting Plan, Sheet 1, 2380-24-02-C-06 and Detailed Planting Plan, Sheet 2, 2380-24-02-C-06, BCA Design).			

TABLE OF CONTENTS

1.0	INTRODUCTION	5
1.1	Background	5
1.2	Site Description	5
1.3	Development Proposals	5
1.4	Purpose of Report	5
1.5	Responsibilities	6
1.5.1	Construction Phase	6
1.6	Key Contact Details	8
2.0	BASELINE INFORMATION	9
2.1	Previous Reports	9
2.2	Desk Study Results	9
2.3	Habitats	9
2.4	Protected or Notable Species	9
3.0	MANAGEMENT PRACTICES	10
3.1	Grassland	10
3.2	Proposed Thicket Planting	16
3.3	Proposed Ingenious Hedgerow	19
3.4	Bats	22
3.5	Birds	23
3.6	Reptiles	23
4.0	MONITORING AND REPORTING	25
5.0	CONCLUSION	26
6.0	REFERENCES	27
	FIGURES	28
	APPENDICES	29

APPENDICES

APPENDIX A: REPORT CONDITIONS

APPENDIX B: KEY LEGISLATION

APPENDIX C: INVASIVE SPECIES AND COMPETITIVE WEEDS

APPENDIX D: CDM RISK ASSESSMENTS

1.0 INTRODUCTION

1.1 BACKGROUND

Tetra Tech Ltd was commissioned by Panattoni UK in January 2025 to prepare a Biodiversity Enhancement Strategy (BES) for Oldlands Farm Phase 3, hereafter referred to as “the site”.

This report has been prepared by Senior Ecologist Ben Cooke BSc (Hons) MSc ACIEEM and the conditions pertinent to it are provided in Appendix A.

It should be noted that this report is to be read in conjunction with the Ecological Impact Assessment (EIA) (The Ecology Co-Op, 2022), Construction and Environmental Management Plan (CEMP) (Tetra Tech, 2025a) and the Landscape and Ecology Management Plan (LEMP) (Tetra Tech, 2025b).

The recommendations within this report should be reviewed (and reassessed if necessary) should there be any changes to the red line boundary or development proposals which this report was based on.

Scientific names are provided at the first mention of each species and common names (where appropriate) are then used throughout the rest of the report for ease of reading.

1.2 SITE DESCRIPTION

The site is located at Oldlands Farm, Bognor Regis, West Sussex, PO22 9NN. The site comprises an arable field with modified grassland strips partly bounded by hedgerows and scattered trees, with an area of hardstanding to the north-east. The remnants of derelict farm buildings are located to the south-east. The site is bound by a Rolls Royce warehouse, the Oldland's Farm Estate Access Road and Newlands Road to the north; Oldlands Cottage to the east, Almaty Close to the south and Shripney Road (A29) to the west.

The site is centred at the OS Grid Reference: SU 94168 01460 (Figure 1).

1.3 DEVELOPMENT PROPOSALS

The planning permission was granted for the demolition of existing derelict buildings and the construction of a new industrial / warehouse (Use Class B2 / B8) and ancillary offices (Arun District Planning Ref: BE / 150 / 22 / OUT).

1.4 PURPOSE OF REPORT

This BES has been produced to discharge Condition 18 of the Arun District Decision Notice (BE / 150 / 22 / OUT) with reference to existing ecological data for the site (see Section 2.1) and the site landscaping plan (Figures 2 and 3).

Condition 18 states that the report is to include the following:

- a) *Purpose and conservation objectives for the proposed enhancement measures;*

- b) Detailed designs or produce descriptions to achieve stated objectives;
- c) Locations, orientations and heights of proposed enhancement measures by appropriate maps and plans (where relevant);
- d) Persons responsible for implementing the enhancement measures; and
- e) Details of initial aftercare and long-term maintenance (where relevant).

The works shall be implemented in accordance with the approved details and shall be retained in that manner thereafter.

The approved BES shall be adhered to and implemented through the construction period strictly in accordance with the approved details, unless otherwise agreed in writing by the local planning authority.

The aim of the proposed BES is to secure biodiversity enhancement for the site. Therefore, the aims of BES are as follows:

- To detail enhancement measures for habitats (existing) and protected species within the site; and
- Provide a programme and timetable for the implementation of the enhancement works. All measures and works shall be completed in accordance with the approved details and programme.

Additionally, this report is to support the Reserved Matters submission comprising layout, scale, appearing and landscaping matters pursuant to Condition 1 of outline planning permission BE/150/22/OUT for 199,999 sq.f.t. (GIA) of Use Class B2/B8 with ancillary office provision, with associated infrastructure, parking and landscaping.

This report covers all the enhancements to be implemented onsite both during and post-construction. Any works related to the enhancement of existing habitats onsite (including maintenance and monitoring) post-construction are also detailed in the LEMP (Tetra Tech, 2025a).

1.5 RESPONSIBILITIES

A mitigation strategy that will negate or minimise the risk of any potential impacts on habitats and contravention of the relevant legislation that has been outlined within this BES. It is the responsibility of the developer, Panattoni UK, the principal contractor and any associated sub-contractors to carry out the works in a manner which will not contravene the legislation (see Appendix B), will not endanger protected species, and with due care to any other wildlife on site.

1.5.1 Construction Phase

Biodiversity Champion

A Biodiversity Champion will be nominated by the client, from within the grounds maintenance team, to influence site activities during **the operational phase of the project (i.e. for at least 10 years following project handover)** in line with the recommendations of this report. The Biodiversity Champion does not need to be the same individual throughout this time; but the responsibility should be passed on as required to maintain a consistent approach.

The champion does not need to be an ecologist but should be familiar with this report and have sufficient authority and presence on site to influence activities. The Biodiversity Champion nominated following completion of the construction phase may not have regular site presence during the entire operational life of the project; therefore, the role of Biodiversity Champion can be transferred to a new individual as required, for at least the first ten years of the operational life of the project.

During the Operational Phase the role of the Biodiversity Champion is to provide advice to the site management teams on all pertinent ecological issues as highlighted by this BES and to check that the ecological protection and mitigation measures, as specified in this document, are correctly implemented. This is for general ecological oversight of the project, and where complex ecological issues arise, advice should be sought from a suitably qualified ecologist. General responsibilities of the Biodiversity Champion during the Operational Phase are:

- Contacting an ecologist in the event of uncertainties about ecological issues surrounding the development.
- Ensuring that all site contractors / grounds maintenance workers know to report any ecological concerns / issues.
- Check and document that an overview of the site's ecological constraints is included within the ground maintenance staff inductions as appropriate; and
- Supervising and monitoring the management of newly created habitat as set out in this document.

Where additional issues are identified that are not currently covered in this management plan, or where it is considered that revised maintenance regimes are needed to maximise the ecological value of the site, the Biodiversity Champion should contact a suitably qualified ecologist who can make changes to management prescriptions as appropriate.

The Biodiversity Champion will take photographs, make logbook entries of inspections, and produce progress reports as appropriate to evidence that the above responsibilities are being upheld. This monitoring and review process will be carried out as an integral part of this BES.

Contractor

The landscape/ground maintenance contractor responsibilities include the following:

- Providing staff members who are suitably qualified and experienced, and able to carry out the required tasks as per the BES.
- The contractor is responsible for alerting the client should there be any tasks for which they do not have the appropriate resources or capability.
- Ensuring that they have received and understood all appropriate information prior to works commencing on site during the operational phase.
- The contractor is equally responsible for ensuring that they carefully study any updated documents which are produced, ensuring that they are fully understood, and any changes are communicated across the whole team.

- Providing to the client, where appropriate, evidence of compliance with the management plan.
- Alerting the client and/or appointed ecologist to any potential ecological issues arising, and for ceasing any works which may cause ecological disturbance or harm until further notice.
- The contractor will endeavour to monitor the success of the new and retained plants on site and will apply remedial measures where required.
- Carrying out maintenance and monitoring on the ecological features installed on site; and
- The contractor is responsible for reporting back to the client, should any remedial action be required on any ecological features.

Client

The client responsibilities include the following:

- Ensuring that the contractors employed are suitably qualified and experienced to undertake the habitat enhancement works, whilst maintaining the ecological value of the site; and
- Providing to the contractor all information required to allow them to carry out appropriate habitat and landscape management during the construction phase. This includes any updated versions of this BES and other related management plans, which will be circulated as soon as possible after being received.

1.6 KEY CONTACT DETAILS

In the event of ecological queries or assistance being required, please contact:

- Associate Ecologist, Kevin Wood
[REDACTED]
[REDACTED]
- Senior Ecologist, Ben Cooke
[REDACTED]
[REDACTED]
- UK Tetra Tech Ecology Team
[REDACTED]

2.0 BASELINE INFORMATION

2.1 PREVIOUS REPORTS

The following reports were reviewed to inform this BES:

- Construction and Environmental Management Plan (CEMP) (Tetra Tech, 2025a).
- Ecological Impact Assessment (EIA) (The Ecology Co-Op, 2022)
- Landscape and Ecology Management Plan (LEMP) (Tetra Tech, 2025b); and
- Soft Landscape Works Maintenance and Management Proposals (BCA Design, 2024)

2.2 DESK STUDY RESULTS

As identified in the EIA there is a single designated sites of conservation value within 2 km:

- The Brooks (Bersted Brooks) LNR (0.2 km west), which is designated for its wider areas of meadow, narrow reedbeds and ditches, permanent and temporary ponds, and an extensive newly planted floodplain woodland.

2.3 HABITATS

The habitat on site comprises of arable land with modified grassland strips partly bounded by hedgerows and scattered trees, with an area of hardstanding to the north-east. For a full Phase 1 Habitat Plan and habitat assessment, please refer to the associated EIA (The Ecology Co-Op, 2022).

2.4 PROTECTED OR NOTABLE SPECIES

Bats

Linear features (trees and hedgerows) on the site were identified as suitable for commuting and foraging bats and were found to support at least eight species of bat but in relatively low numbers. The buildings and trees on site were considered negligible to support roosting bats (The Ecology Co-Op, 2022).

Nesting Birds

The trees and hedgerows on site were considered suitable to support a range of breeding birds typical of arable assemblage habitats (The Ecology Co-Op, 2022).

Reptiles

Boundary habitats present on site including hedgerows and modified grassland, were found to support populations of slow worm *Anguis fragilis*, common lizard *Zootoca vivipara* and grass snake *Natrix helvetica* (The Ecology Co-Op, 2022).

Hedgehogs

The habitats present on site (particularly the boundary habitats) were also considered suitable to support hedgehogs

3.0 MANAGEMENT PRACTICES

Sections 3.1 to 3.4 provide further information and management practices relating to the ecological enhancements proposed within the site. This section should be read in conjunction with Figures 1 - 4 to provide spatial context. A schedule detailing the timings of prescribed management and monitoring practices is provided at the end of each sub-section (where appropriate).

3.1 GRASSLAND

3.1.1 Species-rich Grassland

Emorsgate Seed Mix EM3 (Special General-Purpose Meadow Mix)¹ is to be sown in areas labelled Species-rich Grassland (see Figures 2 and 3). This mixture is a varied array of species and is suited for sites where the exact soil conditions are unknown.

Composition of Seed Mix

The grass matrix is dominated by crested dog's-tail *Cynosurus cristatus* and red fescue *Festuca rubra*, with more abundant herbs include common knapweed *Centaurea nigra*, musk mallow *Malva moschata*, ribwort plantain *Plantago lanceolata* and salad burnet *Poterium sanguisorba* ssp. *sanguisorba*.

Ground Preparation

The areas will first be made suitable for sowing through repeated cultivation (i.e., ploughing to a depth of 300 mm) during March or August to stimulate and then remove any unwanted vegetation. Then plough or dig to bury the unwanted surface vegetation, harrow or rake to produce a medium tilth, and roll, or tread, to produce a firm surface.

Sowing

The seed mix is to be sown at 4 g per m² in Autumn (September - Mid-October) or Spring (Mid-April – June), if there is sufficient warmth and moisture. The seed must be surface sown and can be applied by machine or broadcast by hand. To get an even distribution and avoid running out, divide the seed into two or more parts and sow in overlapping sections. Do not incorporate or cover the seed, but firm in with a roll, or by treading, to give good soil/seed contact.

Year 1 Management

If the seed mix is sown during the autumn (September – mid-October), it shall be cut on three occasions during the first year in March, May and September.

If the seed mix is sown during the spring (March – mid-April), it shall also be cut on three occasions during the first year. The first cut is to take place six weeks after sowing (if sufficient material present, i.e., well established sward) and then twice more in May and September.

¹ EM3 Special General-Purpose Meadow Mixture - Emorsgate Seeds (wildseed.co.uk)

Cutting of the grassland sward is to a height of 7 cm. The arisings must be removed via raking and composted. Any residual perennial weeds identified after cutting during the first year (such as docks), must be dug out.

Ongoing Management

During the following years, the grassland is to be cut twice a year, in March / April and September / October to a height of 7 cm. The arisings will be left on the grassland floor for 1 - 7 days before being removed, to allow the seed to drop back into the grassland whilst avoiding nutrient enrichment.

Grass should not be cut during wet weather as the machinery may damage the soil structure. The arisings will be left on the grassland floor for a few days before being removed, to allow the seed to drop back into the grassland whilst avoiding nutrient enrichment.

The arisings will be collected carefully via raking to reduce the risk of harm to reptiles as they can use the cuttings for refuge.

In addition, no pesticides or fertilisers are to be applied to the grassland.

Ongoing Monitoring

The colonisation of invasive species and / or competitive weeds within the grassland will be prevented through monitoring (see Appendix C). This will comprise a spot check between April – September on an annual basis post-development. Competitive weeds will be hand pulled as required.

If invasive species continue to be present, additional treatment will be required (a specialist contractor is to be contacted and advice sort regarding the appropriate removal and safe disposal of said species), and the period of monitoring will need to be extended.

Scrub and bracken will be removed if it is encroaching into the grassland habitat to the detriment of the grassland flora. A small amount of scrub and bracken will be tolerated along the margins of the site to provide shelter and bird nesting habitat. It is recommended to be completed during November – February (inclusive), so that works do not conflict with the nesting bird season or the active reptile season.

An optimum baseline for scrub and bracken (< 5 % and < 20 % respectively) will be maintained via annual monitoring. This will be carried out to determine levels of scrub encroachment from the baseline.

Should areas of the grassland require re-seeding (e.g., areas of bare ground) these will be seeded at a density of 4g per m² in May or September.

The management practices relating to Species-rich Grassland Areas are summarised in Table 1.

Table 1: Species-rich Grassland Areas Management Schedule

Action	Responsible Individual(s)	Timing	Year										
			0	1	2	3	4	5	6	7	8	9	10 +
Ground preparation	Landscaping Contractor	March – August											
Sowing	Landscaping Contractor	September – Mid-October (Option 1) or March – mid-April (Option 2)											
Year 1 Management – Mowing	Management Company	Three times in a year - If Option 1 - March, May and September or if Option 2 - Six weeks after sowing, May and September.											
Year 1 Management – Perennial weeds	Management Company	After each cut											
Ongoing Management – Mowing	Management Company	Twice times a year - March – April and September -October											
Management – Grassland re-seeding	Management Company	May or September											
Ongoing Monitoring - Inspect for Invasive Species and / or Competitive Weeds	Management Company	As required – April – September											
Ongoing Monitoring - Scrub and / or Bracken Management	Management Company	As required – Ideally November – February											

3.1.2 Species-rich Grassland (Wetlands)

Emorsgate Seed Mix EM8F (Wildflowers for Wetlands)² is to be sown in areas labelled Species-rich Grassland (Wetlands) (see Figures 2 and 3). This mixture is a varied array of species and is suited for sites where the exact soil conditions are unknown.

Composition of Seed Mix

The mix consists exclusively of wildflowers and herbs, dominated by common knapweed and ribwort plantain. The mix also contains meadowsweet *Filipendula ularia*, meadow buttercup *Ranunculus acris* and ox-eye daisy *Leucanthemum vulgare*.

Ground Preparation

The areas will first be made suitable for sowing through repeated cultivation (i.e., ploughing to a depth of 300 mm) during March or August to stimulate and then remove any unwanted vegetation. Then plough or dig to bury the unwanted surface vegetation, harrow or rake to produce a medium tilth, and roll, or tread, to produce a firm surface.

Sowing

The seed mix is to be sown at 1.5 g per m² in Autumn (September - Mid-October) or Spring (Mid-April – June), if there is sufficient warmth and moisture. The seed must be surface sown and can be applied by machine or broadcast by hand. To get an even distribution and avoid running out, divide the seed into two or more parts and sow in overlapping sections. Do not incorporate or cover the seed, but firm in with a roll, or by treading, to give good soil/seed contact.

Year 1 Management

If the seed mix is sown during the autumn (September – mid-October), it shall be cut on three occasions during the first year in March, May and September.

If the seed mix is sown during the spring (March – mid-April), it shall also be cut on three occasions during the first year. The first cut is to take place six weeks after sowing (if sufficient material present, i.e., well established sward) and then twice more in May and September.

Cutting of the grassland sward is to a height of 7 cm. The arisings must be removed via raking and composted. Any residual perennial weeds identified after cutting during the first year (such as docks), must be dug out.

Ongoing Management

During the following years, the grassland is to be cut twice a year, in March / April and September / October to a height of 7 cm. The arisings will be left on the grassland floor for 1 - 7 days before being removed, to allow the seed to drop back into the grassland whilst avoiding nutrient enrichment.

² EM8F Wild Flowers for Wetlands - Emorsgate Seeds

Grass should not be cut during wet weather as the machinery may damage the soil structure. The arisings will be left on the grassland floor for a few days before being removed, to allow the seed to drop back into the grassland whilst avoiding nutrient enrichment.

The arisings will be collected carefully via raking to reduce the risk of harm to reptiles as they can use the cuttings for refuge.

In addition, no pesticides or fertilisers are to be applied to the grassland.

Ongoing Monitoring

The colonisation of invasive species and / or competitive weeds within the grassland will be prevented through monitoring (see Appendix C). This will comprise a spot check between April – September on an annual basis post-development. Competitive weeds will be hand pulled as required.

If invasive species continue to be present, additional treatment will be required (a specialist contractor is to be contacted and advice sort regarding the appropriate removal and safe disposal of said species), and the period of monitoring will need to be extended.

Scrub and bracken will be removed if it is encroaching into the grassland habitat to the detriment of the grassland flora. A small amount of scrub and bracken will be tolerated along the margins of the site to provide shelter and bird nesting habitat. It is recommended to be completed during November – February (inclusive), so that works do not conflict with the nesting bird season or the active reptile season.

An optimum baseline for scrub and bracken (< 5 % and < 20 % respectively) will be maintained via annual monitoring. This will be carried out to determine levels of scrub encroachment from the baseline.

Should areas of the grassland require re-seeding (e.g., areas of bare ground) these will be seeded at a density of 1.5g per m² in May or September.

The management practices relating to Species-rich Grassland (Wetlands) are summarised in Table 2.

Table 2: Species-rich Grassland Areas Management Schedule

Action	Responsible Individual(s)	Timing	Year										
			0	1	2	3	4	5	6	7	8	9	10 +
Ground preparation	Landscaping Contractor	March – August											
Sowing	Landscaping Contractor	September – Mid-October (Option 1) or March – mid-April (Option 2)											
Year 1 Management – Mowing	Management Company	Three times in a year - If Option 1 - March, May and September or if Option 2 - Six weeks after sowing, May and September.											
Year 1 Management – Perennial weeds	Management Company	After each cut											
Ongoing Management – Mowing	Management Company	Twice times a year - March – April and September -October											
Management – Grassland re-seeding	Management Company	May or September											
Ongoing Monitoring - Inspect for Invasive Species and / or Competitive Weeds	Management Company	As required – April – September											
Ongoing Monitoring - Scrub and / or Bracken Management	Management Company	As required – Ideally November – February											

3.2 PROPOSED THICKET PLANTING

Composition of Planting

Planting will consist of eight native species including;

- Field maple *Acer campestre*
- Hazel *Corylus avellana*
- Hawthorn *Crataegus monogyna*
- Alder buckthorn *Frangula alnus*
- Privet *Ligustrum vulgare*
- Blackthorn *Prunus spinosa*
- Goat willow *Salix caprea*; and
- Gorse *Ulex europeus*

The composition of each species will range from 5 – 20 % of the total planting mix.

Planting

Species are to be planted in groups of 7 - 15 (of the same species) spaced at centres of 1 m. Each sapling will be protected by bio-degradable tree shelters secured to 25 x 25 mm timber stakes. It is recommended that planting is completed during autumn (September – October) or early spring (March – April).

Where thicket mix planting is to take place adjacent to artificial habitats or structures (e.g., hard surfaces, kerbs or fencing) this is to be positioned 1 m from the edge of these features.

Ongoing Management

Thicket mix planting shall be maintained by the appointed Contractor.

All plants are to be re-firmed annually after frost to ensure they are not leaning, and that the soil level around the plants remains at the same height as they would at nursery level. This is to be completed for the first three years following planting. Watering will also be carried out as required to ensure successful establishment, also for the first three years after planting.

Any planting which fails will be replaced during the next suitable planting season for that species. An examination of the planting will take place annually each September for the first eight years post-construction.

Management operations will include thinning of the planting to promote growth alongside pruning and coppicing to maintain a healthy and attractive form. Thinning promotes new dense growth thus encouraging a strong, more robust planting in the mid to long term, and also increases air flow within the planting to maintain its good health.

Approximately a third of the thicket will be thinned, pruned and coppiced in Years 5 and 8 following planting. This is to be undertaken during November – February (inclusive) as to not conflict with the active period for protected and notable species.

Ongoing Monitoring

The colonisation of invasive species and competitive weeds within the hedgerow will be prevented through monitoring. This will comprise a spot check between April – September on an annual basis post development.

If invasive species continue to be present, additional treatment will be required (a specialist contractor is to be contacted and advice sort regarding the appropriate removal and safe disposal of said species), and the period of monitoring will need to be extended.

Shelter guards are to be monitored each year from mid-April – late September. The shelter guards are to be refirm / replace as required. This check is to be completed once during the first year after planting, extending to four times a year during Years 2 and 3. This will reduce to twice annually during Years 4 and 5, reducing back down to annually from Year 6 onwards.

Any remnants of the shelter guards will be removed once shrubs have become sufficiently established (estimated Years 4 – 5), unless otherwise already bio-degraded.

The interior of the shelter guards and the area surrounding planting are to be kept clear of competitive weed grow through spot herbicide treatment as required. Monitoring checks for competitive weeds are to be completed four times per year from Years 1 – 4. The checks are to reduce to twice annually from Years 5 – 7 and then annually from Year 8 onwards.

The management practices relating to Proposed Thicket Planting are summarised in Table 3.

Table 3: Proposed Thicket Planting

Action	Responsible Individual(s)	Timing	Year										
			0	1	2	3	4	5	6	7	8	9	10
Planting	Landscaping Contractor	September – October or March – April											
Management – Planting re-firmed	Management Company	As required											
Management – Watering	Management Company	As required											
Management – Replacement planting	Management Company	September											
Management – Pruning a of the third of thicket	Management Company	November – February											
Monitoring - Inspect for Invasive Species and / or Competitive Weeds	Management Company	April – September											
Monitoring – Check of the shelter guards	Management Company	mid-April – late September											
Monitoring – Check of the shelter guards for competitive weeds	Management Company	As required											

3.3 PROPOSED INGENIOUS HEDGEROW

Hedgerow Retention

Fencing will be installed prior to construction and will be adequately maintained to ensure no damage to the excluded vegetation.

Composition of Planting

Hedgerow planting (see Figures 2 and Figure 3) will consist of six species. Hawthorn and blackthorn are suitable species for shrub density, and as they are intrinsically thorny, offering dual purpose as a deterrent to human movement. Other species include privet *Ligustrum* sp., field maple *Acer campestre*, dogwood *Cornus sanguinea* and hazel *Coryllus avellana*, with the intention of staggering the flowering season to offer a prolonged nectar source for invertebrates. No single species will comprise more than 50 % of the planting allocation.

Planting

Ensure the ground is suitably prepared prior to planting. Each shrub/tree will be fitted with a shelter guard to prevent early bark damage. Individuals provided as bare root / root-balled these will be planted October - late March. Shrubs / trees will be planted at 450 mm centres in double staggered rows, 500 mm apart.

Ongoing Management

Following construction, the retention fencing surrounding the boundaries of the site will be dismantled.

All plants are to be re-firmed annually after frost to ensure they are not leaning, and that the soil level around the plants remains at the same height as they would at nursery level. This is to be completed for the first five years post-construction. Watering should be carried out as required to ensure successful establishment.

Any planting which fails will be replaced during the next suitable planting season for that species. An examination of the planting will take place annually each September for the first eight years post-construction.

Pruning to be completed annually (approx. each September), with the sides, tops and ends of the hedgerow to be cut to straight and true lines. Overhanging branches will be allowed to achieve natural form with the exception of lower branches which will be removed to allow access for grass cutting.

Ongoing Monitoring

The colonisation of invasive species and competitive weeds within the hedgerow will be prevented through monitoring (see Appendix C). This will comprise a spot check between April – September on an annual basis post development.

If invasive species continue to be present, additional treatment will be required (a specialist contractor is to be contacted and advice sort regarding the appropriate removal and safe disposal of said species), and the period of monitoring will need to be extended.

Shelter guards are to be monitored each year from mid-April – late September. The shelter guards are to be re-firmed / replaced as required. This check is to be completed once during the first year after planting, extending to four times a year during Years 2 and 3. This will reduce to twice annually during Years 4 and 5, reducing back down to annually from Year 6 onwards.

Shelter guards will be removed once shrubs have become sufficiently established (estimated Years 4 – 5).

The interior of the shelter guards and the area surrounding planting are to be kept clear of competitive weed grow through spot herbicide treatment as required. Monitoring checks for competitive weeds are to be completed four times per year from Years 1 – 4. The checks are to reduce to twice annually from Years 5 – 7 and then annually from Year 8 onwards.

The management practices relating to Proposed Ingenious Hedgerow are summarised in Table 4.

Table 4: Proposed Ingenious Hedgerow Management Schedule

Action	Responsible Individual(s)	Timing	Year										
			0	1	2	3	4	5	6	7	8	9	10
Hedgerow Retention - Installation of and Adherence to Protection Measures	Construction Contractor	As required											
Planting	Landscaping Contractor	October - late March											
Hedgerow Retention - Removal of Protection Measures	Construction Contractor	As required											
Ongoing Management – Re-firm Planting	Landscaping Contractor	As required											
Ongoing Management – Replacement of Failed Planting	Landscaping Contractor	September											
Ongoing Management – Pruning	Landscaping Contractor	September											
Ongoing Monitoring - Inspect for Invasive Species	Landscaping Contractor	As required – April – September											
Ongoing Monitoring – Inspect Shelter Guards and Surrounding Area for Competitive Weeds	Landscaping Contractor	As required – mid-April – late September Four times a year – Years 1 - 4 Twice times a year – Years 5 – 7 Annually – Year 8 onwards											

3.4 BATS

Four Beaumaris Woodstone Bat Box (or similar) will be installed on the acoustic fencing (a Jakoustic Acoustic Reflective Barrier, or similar performing barrier) proposed onsite. The acoustic fencing is proposed to be 2.75 m in height situated on top of a 3 m earth bund (Ian Sharland Limited , 2024). The proposed locations for these bat boxes are provided in Figure 4.

The locations may change dependent on the practicalities of erecting boxes, but the minimum numbers for the site will not change. When placing bat boxes, the following recommendations are considered:

- Boxes shall be installed facing a south-eastern to south-western aspect, away from public areas, in areas of darkness, and towards areas of soft landscaping;
- Boxes shall be installed at least 4 m above ground level to reduce the risk of vandalism and minimise disturbance,
- Entrances should be free of clutter; and
- If possible, the erection of bat boxes should be undertaken during winter months to allow weathering in prior to the active season.

The boxes have an open bottom section enabling them to be maintenance free. However, any damaged boxes should be repaired or replaced as necessary in their original positions. Should the bat boxes require removal for repair / replacement, this should be undertaken by an ecologist with an appropriate Natural England Class 2 bat licence.

Further details regarding the specifications and dimensions of these boxes are provided in Table 5, with a CDM risk assessment is provided in Appendix D.

Table 5. Bat Box Specifications

Type	Description	Specifications
Beaumaris Woodstone Bat Box (Midi) Two required (if above not available or in combination)	A single entrance bat box (base) manufactured from woodcrete.	 Width: 16 cm; Height: 36 cm; Weight: 4.3 kg

3.5 BIRDS

Boxes must be installed with an easterly aspect, avoiding southern and westerly orientations. Feature locations are shown on Figure 4 and will include:

- **General purpose bird boxes (Schwegler 1B or similar) x 4** - to be installed within the trees and proposed acoustic fencing onsite a minimum of 3–5 m above ground level.

Further details regarding the specifications and dimensions of these boxes are provided in Table 6, with a CDM risk assessment provided in Appendix D.

Table 6: Bird Box Specifications

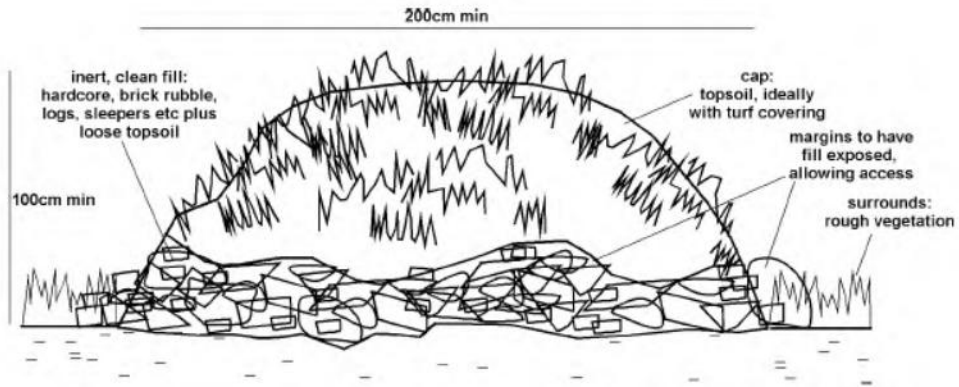
Type	Description	Specifications
General purpose bird boxes (Schwegler 1B or similar) Four required	The nesting boxes should be attractive to smaller birds such as tits, wrens, and tree sparrows.	 Width: 16 cm; Height: 23 cm; Weight: 3.6 kg

3.6 REPTILES

The creation of hibernaculum provides a frost-free, humid condition safe from predation for reptiles to shelter and hibernate.

The design of the hibernaculum is as set out by English Nature (English Nature, 2001) (Plate 1 below) and will include the use of logs and loose topsoil, with a covering of turf. Materials for the hibernaculum will be sourced in the first instance from the trees onsite (Tree 41, is proposed to undergo pollarding), if this is not possible then materials will have to be acquired off-site. The turf required to top them will be obtained from the area beneath the hibernacula itself.

Plate 1: Cross section of hibernacula (English Nature, 2001)



4.0 MONITORING AND REPORTING

An annual monitoring report would be produced for at least the first five years after project completion. To inform this report, an annual inspection of the site should be undertaken, the results of which would be documented within the monitoring report which should also summarise the management of the site over the preceding year and the measures achieved. This would include the checking of any bird and bat (to be undertaken by a Natural England licenced bat worker) boxes and the hibernaculum.

The report need not be produced by an ecologist, but by someone with sufficient authority and time on site to influence activities that may affect biodiversity as well as monitor the measures that have been put in place. The annual monitoring reports will be sent the LPA ecologist for review

5.0 CONCLUSION

This BES has been produced to discharge Condition 18 of the Arun District Decision Notice (BE / 150 / 22 / OUT) with reference to existing ecological data for the site, as well as supporting the Reserved Matters submission comprising layout, scale, appearance and landscaping matters pursuant to Condition 1 of outline planning permission BE/150/22/OUT for 199,999 sq.f.t. (GIA) of Use Class B2/B8 with ancillary office provision, with associated infrastructure, parking and landscaping.

The information detailed within the BES provides the competent authority with the evidence they need to be able to discharge Condition 18 of the Arun District planning permission (BE / 150 / 22 / OUT).

6.0 REFERENCES

BCA Design . (2024). *Soft Landscape Works Maintenance and Management Proposals - 10 Years, Oldlands Farm Phase 3, Newlands Road, Bognor Regis.*

Englsh Nature. (2001). *Great crested newt, mitigation guidelines.*

Ian Sharland Limited (2024). *Environmental Noise Impact Assessment .*

Tetra Tech. (2025a). *Construction and Ecology Management Plan. Project No. 784-B071527. Written on behalf of Panattoni UK.*

Tetra Tech. (2025b). *Landscape and Ecology Management Plan. Project No. 784-B071527. Written on behalf of Panattoni UK.*

The Ecology Co-Op. (2022). *Ecological Impact Assessment - Land at Oldlands Farm, Bognor Regis .*

FIGURES

Figure 1 – Site Location Plan

Figure 2 – Detailed Planting Plan (Sheet 1 of 2), Rev 06

Figure 3 - Detailed Planting Plan (Sheet 2 of 2), Rev 06

Figure 4 – Species Enhancement Plan



Site Location Plan

Oldlands Farm



BDW

Legend

Site boundary

Notes:

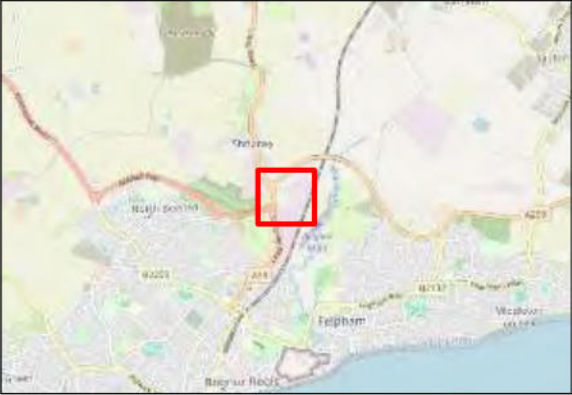
Drawn by: Chris.Dawe
Checked by: Ben Cooked

Figure No. 1
Revision No. A
27 February 2025

0 25 50 75 100 Meters
Scale 1:2,500 @A3

British National Grid
NGR: 494218E 101477N

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NOTES:

- Based on:
- UMC Architects drawing number: 23361-UMC-ZZZ-SI-M2-A-0601.P01 'Site Layout'
- 243912-BWB-EXT-XX-D-C-0600-[SI-P01]_Finished Levels

DRAWING LOCATION PLAN - NTS

KEY

- EXISTING HEDGEROW AND TREES TO BE RETAINED AND PROTECTED
- EXISTING HEDGEROW AND TREES TO BE REMOVED
- EXTRA HEAVY STANDARD TREES (Tree pit size 1500x1500x300mm) 18-20cm stem girth 4-5.5m height 1.8-2.1m clear stem Rootballed
- FEATHERED TREES 1.75-2.0m height 2x transplanted Well furnished with lateral shoots to base Root wrapped
- SPECIMEN SHRUBS (300mm depth of topsoil)
- PROPOSED THICKET MIX PLANTING (300mm depth of topsoil) Where thickets are planted next to a hard surface/kerb/edge, it should be positioned 1m from the edge.
- PROPOSED INDIGENOUS HEDGEROW (300mm depth of topsoil) Planted at 450mm centres in a double staggered row. Rows to be 500mm apart.
- PROPOSED FORMAL NATIVE HEDGE (300mm depth of topsoil) Planted at 450mm centres in a double staggered row. Rows to be 500mm apart.
- TALL ORNAMENTAL SHRUB PLANTING (300mm depth of topsoil + minimum 300mm depth subsoil) Ultimate plant height is above 1m.
- LOW ORNAMENTAL SHRUB/HERBACEOUS PLANTING (300mm depth of topsoil + minimum 300mm depth subsoil) Ultimate plant height is below 1m.
- GRASS SEED AREAS (150mm depth of topsoil + minimum 150mm depth subsoil) To be sown with DLF PM 120 'Stargrass' or similar approved Sown at a rate of 35-50g/m²
- SPECIES RICH GRASSLAND AREAS (Cultivated subsoil to a depth of 300mm) To be sown with *Emericoptis* EMS or similar approved Sown at a rate of 04 g/m²
- SPECIES RICH GRASSLAND AREAS (WETLAND) (Cultivated subsoil to a depth of 300mm) To be sown with *Emericoptis* EMBE or similar approved Sown at a rate of 1.5 g/m²
- GRAVEL MARGIN AREAS Gravel margin to be installed to perimeter of service yard areas, within secure fence/line & around sub stations. Edging boards to be installed between gravel/landscape interfaces to minimise migration of material.
- SECURITY FENCE (To Architects detail)
- ACOUSTIC FENCING (To Engineers detail)
- TIMBER KNEE RAIL (To Architects detail)
- SITE BOUNDARY
- EXISTING HEDGEROW AND TREES TO BE RETAINED AND PROTECTED
- EXISTING HEDGEROW AND TREES TO BE REMOVED

REV	DESCRIPTION	BY	CHKD	DATE
01	Additional planting bed added	MB		16-09-20
02	Updated to reflect latest GA/Drainage plan	MB		17-09-20
03	Updated to reflect latest GA/Drainage plan	MB		15-09-20
04	Colour added to plan	MB		12-11-24
05	Updated to suit revised site layout plan	HC	MB	04-11-24
07	Issued for construction	HC	MB	25-10-24

PROJECT ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	STATUS	REV
XXX	BCA	ELS	XX	DR	L	2380-24-02	C 06

BCA Design
Studio 3 The Court, Holwell Business Park Northfield Road, Southam,
Warwickshire CV47 0FS
Tel: +44 (0)1926 514321 Email: gen@bca-landscape.com Website: www.bca-landscape.com

FOR FURTHER DETAIL- REFER TO BCA DRAWING 2380-24-02



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DO NOT SCALE FROM THIS DRAWING

NOTES:
Based on
• UMC Architects drawing number: 23361-UMC-ZZZZ-S1-M2-A-0601 'Site Layout'
• 243912-BWB-EXT-XX-D-C-0600-[S1-P01]
_Finished Levels

NORTH

DRAWING LOCATION PLAN - NTS

REV	DESCRIPTION	BY	CHKD	DATE
06	Tree locations updated to provide 3m clearance to SuDS	MB		16-10-25
05	Updated to reflect latest GA/Drainage plan	MB		17-09-25
04	Updated to reflect latest GA/Drainage plan	MB		15-09-25
03	Colour added to plan	MB		12-11-24
02	Updated to suit revised site layout plan	HC	MB	04-11-24
01	Issued for construction	HC	MB	25-10-24

BCA DESIGN
Landscape Architects

CLIENT
PANATTONI

PROJECT
**OLDLANDS FARM PHASE 3,
NEWLANDS ROAD, BOGNOR
REGIS**

DRAWING TITLE
**DETAILED PLANTING PLAN
(Sheet 2 of 2)**

CONTRACT NUMBER:	2380/24	DATE:	22/10/24					
DRAWING STATUS:	CONSTRUCTION	CAD REFERENCE:	2380-24-02+03					
DRAWN BY:	HC	CHECKED BY:	MB					
SCALE:	1:250	ORIGINAL SHEET:	A0					
PROJECT ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	STATUS	REV	
XXX	BCA	ELS	XX	DR	L	2380-24-03	C	06

BCA Design
Studio 3, The Court, Holywell Business Park Northfield Road, Southam,
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Tel: +44 (0)1926 614031 Email: gen@bca-landscape.com Website: www.bca-landscape.com



Ecological Enhancement Plan

Oldlands Farm



BDW

Legend

- Site boundary
- Tree with general purpose bird box
- General purpose bat box
- Hibernacula

Notes:

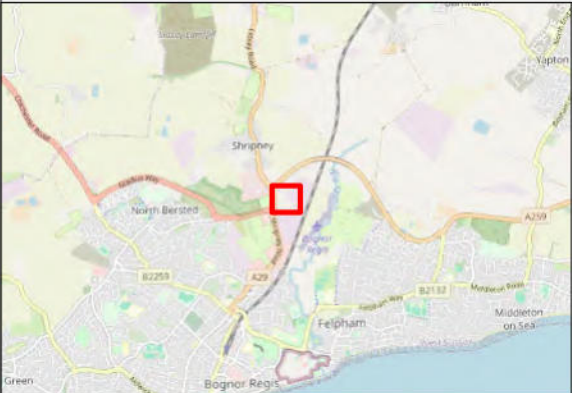
Drawn by: DYLAN.GUSSMAN
Checked by: Ben Cooke

Figure No. 4
Revision No. A
10 October 2025

0 10 20 30 40 Meters
Scale 1:1,250 @A3

British National Grid
NGR: 494218E 101477N

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Sovereign Street
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Registered in England
number: 01959704

APPENDICES

APPENDIX A: REPORT CONDITIONS

APPENDIX B: KEY LEGISLATION

APPENDIX C: INVASIVE SPECIES AND COMPETITIVE WEEDS

APPENDIX D: CDM RISK ASSESSMENT

APPENDIX A: REPORT CONDITIONS

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

Tetra Tech reserves the right to share this Report and any related materials, surveys, drawings and/or documents at any time with the relevant Local Ecological Records Centre (LERC), any relevant statutory body or any equivalent organisation as Tetra Tech may reasonably require from time-to-time.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Tetra Tech accept no liability for issues with performance arising from such factors.

APPENDIX B: KEY LEGISLATION

Habitats Directive

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, or the 'Habitats Directive', is a European Union directive adopted in 1992 in response to the Bern Convention. Its aims are to protect approximately 220 habitats and 1,000 species listed in its several Annexes.

In the UK, the Habitats Directive is transposed into national law via the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales, via the Conservation (Natural Habitats, &c) Regulations 1994 (as amended) in Scotland, and via the Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland.

Wildlife & Countryside Act 1981 (as amended)

This is the principal mechanism for the legislative protection of wildlife in the UK. This legislation is the chief means by which the 'Bern Convention' and the Birds Directive are implemented in the UK. Since it was first introduced, the Act has been amended several times.

The Act makes it an offence to (with exception to species listed in Schedule 2) intentionally:

- kill, injure, or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use; or
- take or destroy an egg of any wild bird.

Or to intentionally do the following to a wild bird listed in Schedule 1:

- disturbs any wild bird while it is building a nest or is in, on or near a nest containing eggs or young; or
- disturbs dependent young of such a bird.

In addition, the Act makes it an offence (subject to exceptions) to:

- intentionally or recklessly kill, injure or take any wild animal listed on Schedule 5;
- interfere with places used for shelter or protection, or intentionally disturbing animals occupying such places; and
- the Act also prohibits certain methods of killing, injuring, or taking wild animals.

Finally, the Act also makes it an offence (subject to exceptions) to: intentionally pick, uproot or destroy any wild plant listed in Schedule 8, or any seed or spore attached to any such wild plant; unless an authorised person, intentionally uproot any wild plant not included in Schedule 8; or sell, offer or expose for sale, or possess (for the purposes of trade), any live or dead wild plant included in Schedule 8, or any part of, or anything derived from, such a plant.

Following all amendments to the Act, Schedule 5 'Animals which are Protected' contains a total of 154 species of animal, including several mammals, reptiles, amphibians, fish and invertebrates. Schedule 8 'Plants which are Protected' of the Act, contains 185 species, including higher plants, bryophytes and fungi and lichens. A comprehensive and up-to-date list of these species can be obtained from the JNCC website.

Part 14 of the Act makes unlawful to plant or otherwise cause to grow in the wild any plant which is listed in Part II of Schedule 9.

It is recommended that plant material of these species is disposed of as bio-hazardous waste, and these plants should not be used in planting schemes.

Environmental Protection Act 1990

The Act imposes a classification of soil and other waste containing viable propagules of invasive non-native plant species as controlled waste. This has been applied to Japanese Knotweed *Reynoutria japonica*, with the result that waste containing this species must be disposed of in accordance with the duty of care set out in section 34 of the Act.

Wildlife & Countryside Act 1981 (as amended)

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- It is recommended that plant material of these species is disposed of as bio-hazardous waste, and these plants should not be used in planting schemes.

Birds Directive

The EC Directive on the Conservation of Wild Birds (79/409/EEC) or 'Birds Directive' was introduced to achieve favourable conservation status of all wild bird species across their distribution range. In this context, the most important provision is the identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex 1 of the Directive, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance.

Conservation of Habitats and Species Regulations 2017 (as amended)

Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species (listed in Annexes I or II of the Habitats Directive respectively) to the European Commission. These sites, if ratified by Ministers, are then designated as Special Protection Areas (SPAs) within six years. Public bodies must also help preserve, maintain and re-establish habitats for wild birds.

The 2018 amendments mainly related to the impact of the *People Over Wind* decision and some implications arising for neighbourhood plan development and a range of other planning tools including Local Development Orders and Permission in Principle – see here for full details:

<https://www.legislation.gov.uk/uksi/2018/1307/note/made>

The 2019 amendments related to the EU exit. Most of these changes involved transferring functions from the European Commission to the appropriate authorities in England and Wales. All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant. The obligations of a competent authority in the 2017 Regulations for the protection of sites or species do not change. – see here for full details:

<https://www.legislation.gov.uk/ukdsi/2019/9780111176573>

The Regulations make it an offence to deliberately capture, kill, disturb or trade in the animals listed in Schedule 2, or pick, uproot, destroy, or trade in the plants listed in Schedule 5.

Global IUCN Red List

The International Union for Conservation of Nature (IUCN) Threatened Species was devised to provide a list of those species that are most at risk of becoming extinct globally. It provides taxonomic, conservation status and distribution information about threatened taxa around the globe.

The system catalogues threatened species into groups of varying levels of threat, which are: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CE), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD), Not Evaluated (NE). Criteria for designation into each of the categories is complex, and consider several principles.

Local Biodiversity Action Plan (LBAP)

Local Biodiversity Action Plans (LBAP) identify habitat and species conservation priorities at a local level (typically at the County level) and are usually drawn up by a consortium of local Government organisations and conservation charities.

Some LBAP's may also include Habitat Action Plans (HAP) and/or Species Action Plans (SAP), which are used to guide and inform the local decision making process.

National Planning Framework 4

National Planning Framework 4 (NPF4) is the top tier of planning policy. The Framework provides guidance to local authorities and other agencies on planning policy and the operation of the planning system.

"Policy 1 gives significant weight to the nature crisis to ensure that it is recognised as a priority in all plans and decisions. Policy 4 protects and enhances natural heritage, and this is further supported by Policy 5 on soils and Policy 6 on forests, woodland and trees. Policy 20 also promotes the expansion and connectivity of blue and green infrastructure, whilst Policy 10 recognises the particular sensitivities of coastal areas.

Protection of the natural features of brownfield land is also highlighted in Policy 9, and protection of the green belt in Policy 8 will ensure that biodiversity in these locations is conserved and accessible to communities, bringing nature into the design and layout of our cities, towns, streets and spaces in Policy 14.

Most significantly, Policy 3 plays a critical role in ensuring that development will secure positive effects for biodiversity. It rebalances the planning system in favour of conserving, restoring and enhancing biodiversity and promotes investment in nature-based solutions, benefiting people and nature. The policy ensures that Local Development Plans (LDPs) protect, conserve, restore and enhance biodiversity and promote nature recovery and nature restoration. Proposals will be required to contribute to the enhancement of biodiversity, including by restoring degraded habitats and building and strengthening nature networks. Adverse impacts, including cumulative impacts, of development proposals on the natural environment will be minimised through careful planning and design, taking into account the need to reverse biodiversity loss. Development proposals for national, major or Environmental Impact Assessment (EIA) development will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity, including nature networks, so they are in a demonstrably better state than without intervention. Proposals for local development will include appropriate measures to conserve, restore and enhance biodiversity.”

See here for full details: <https://www.gov.scot/publications/national-planning-framework-4/>

Adopted Chichester Local Plan Key Policies 2014-2029

The Chichester District Council, Adopted Chichester Local Plan Key Policies 2014-2029 states in Policy 49 Biodiversity that planning permission for development will only be granted where:

“...it can be demonstrated that all the following criteria have been met:

- 1. The biodiversity value of the site is safeguarded;*
- 2. Demonstrable harm to habitats or species which are protected or which are of importance to biodiversity is avoided or mitigated;*
- 3. The proposal has incorporated features that enhance biodiversity as part of good design and sustainable development;*
- 4. The proposal protects, manages and enhances the District's network of ecology, biodiversity and geological sites, including the international, national and local designated sites (statutory and non-statutory), priority habitats, wildlife corridors and stepping stones that connect them;*
- 5. Any individual or cumulative adverse impacts on sites are avoided;*
- 6. The benefits of development outweigh any adverse impact on the biodiversity on the site. Exceptions will only be made where no reasonable alternatives are available; and planning conditions and/or planning obligations may be imposed to mitigate or compensate for the harmful effects of the development.”*

Policy 50 relates to development and disturbance of birds in Chichester and Langstone Harbours Special Protection Areas

“It is Natural England's advice that all net increases in residential development within the 5.6km 'Zone of Influence' are likely to have a significant effect on the Chichester and Langstone Harbours SPA either alone or in-combination with other developments and will need to be subject to the provisions of Regulation 61 of the Conservation of Habitats and Species Regulations 2010. In the absence of appropriate avoidance and/or mitigation measures that will enable the planning authority to ascertain that the development would not adversely affect the integrity of the SPA, planning permission will not be granted because the tests for derogations in Regulation 62 are unlikely to be met. Furthermore, such development would not have the benefit of the presumption in favour of sustainable development in the National Planning Policy Framework.

Net increases in residential development, which incorporates appropriate avoidance/mitigation measures, which would avoid any likelihood of a significant effect on the SPA, will not require an 'appropriate assessment'. Appropriate avoidance/mitigation measures will comprise:

- a) A contribution in accordance with the joint mitigation strategy outlined in Phase III of the Solent Disturbance and Mitigation Project; or*
- b) A developer provided package of measures associated with the proposed development designed to avoid any significant effect on the SPA; or*
- c) A combination of measures in (a) and (b) above.*

Avoidance/mitigation measures will need to be phased with development and shall be maintained in perpetuity. All mitigation measures in (a), (b) and (c) above must be agreed to be appropriate by Natural England. They should also have regard to the Chichester Harbour AONB Management Plan. The provisions of this policy do not exclude the possibility that some residential schemes either within or outside the Zone of Influence might require further assessment under the Habitats Regulations. For example, large schemes, schemes proposing bespoke avoidance/mitigation measures, or schemes proposing an alternative approach to the protection of the SPAs. Such schemes will be assessed on their own merits, and subject to advice from Natural England.”

APPENDIX C: INVASIVE SPECIES AND COMPETITIVE WEEDS

Non-native Invasive Species Listed under Schedule 9, Part II (W&CA, 1981)

Common Name	Scientific Name
Few-flowered Leek	<i>Allium paradoxum</i>
Fanwort	<i>Cabomba caroliniana</i>
Hottentot Fig	<i>Carpobrotus edulis</i>
Australian Swamp Stonecrop	<i>Crassula helmsii</i>
Water Hyacinth	<i>Eichhornia crassipes</i>
Shallon	<i>Gaultheria shallon</i>
Giant Hogweed	<i>Heracleum mantegazzianum</i>
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>
Curly Waterweed	<i>Lagarosiphon major</i>
Parrot's-feather	<i>Myriophyllum aquaticum</i>
Water Lettuce	<i>Pistia stratiotes</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Giant Knotweed	<i>Fallopia sachalinensis</i>
Hybrid Knotweed	<i>Fallopia japonica x Fallopia sachalinensis</i>
False-acacia	<i>Robinia pseudoacacia</i>
Perfoliate Alexanders	<i>Smyrniun perfoliatum</i>
Variegated Yellow Archangel	<i>Lamiastrum galeobdolon subsp. argentatum</i>
Yellow Azalea	<i>Rhododendron luteum</i>
Himalayan Balsam	<i>Impatiens glandulifera</i>
Cotoneaster	<i>Cotoneaster horizontalis</i>
Cotoneaster, Entire-leaved	<i>Cotoneaster integrifolius</i>
Cotoneaster, Himalayan	<i>Cotoneaster simonsii</i>
Cotoneaster, Hollyberry	<i>Cotoneaster bullatus</i>
Cotoneaster, Small-leaved	<i>Cotoneaster microphyllus</i>
False Virginia Creeper	<i>Parthenocissus inserta</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>
Hottentot Fig	<i>Carpobrotus edulis</i>
Three-cornered Garlic	<i>Allium triquetrum</i>
Water Hyacinth	<i>Eichhornia crassipes</i>
Few-flowered Leek	<i>Allium paradoxum</i>
Montbretia	<i>Crocsmia x crocosmiiflora</i>

Common Name	Scientific Name
Floating Water Primrose	<i>Ludwigia peploides</i>
Water Primrose	<i>Ludwigia grandiflora</i>
Water Primrose	<i>Ludwigia uruguayensis</i>
Rhododendron	<i>Rhododendron ponticum</i>
Rhododendron	<i>Rhododendron ponticum x Rhododendron maximum</i>
Giant Rhubarb	<i>Gunnera tinctoria</i>
Japanese Rose	<i>Rosa rugosa</i>
Giant Salvinia	<i>Salvinia molesta</i>
Purple Dewplant	<i>Disphyma crassifolium</i>
Fanwort (otherwise known as Carolina Water-Shield)	<i>Cabomba caroliniana</i>
Water Lettuce	<i>Pistia stratiotes</i>
Parrot's Feather	<i>Myriophyllum aquaticum</i>
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>
Duck Potato	<i>Sagittaria latifolia</i>
Stonecrop, Australian Swamp (otherwise known as New Zealand Pygmyweed)	<i>Crassula helmsii</i>
Curly Waterweed	<i>Lagarosiphon major</i>
Waterweeds	All species of the genus <i>Elodea</i> .

Competitive Weeds

Common Name	Scientific Name
Hedge bindweed	<i>Calystegia sepium</i>
Field bindweed	<i>Convolvulus arvensis</i>
Green alkanet	<i>Pentaglottis sempervirens</i>
Herb bennet	<i>Geum urbanum</i>
Couch grass	<i>Elymus repens</i>
Ground elder	<i>Aegopodium podagraria</i>
Oxalis sp.	<i>Oxalis sp.</i>
Lesser celandine	<i>Ficaria verna</i>
Enchanter's nightshade	<i>Circaea lutetiana</i>
Cleavers	<i>Galium aparine</i>
Herb Robert	<i>Geranium robertianum</i>
Bittercress sp.	<i>Cardamine sp.</i>
Creeping buttercup	<i>Ranunculus repens</i>

Common Name	Scientific Name
Nettles	<i>Urtica dioica</i>
Creeping thistle	<i>Cirsium arvense</i>
Rosebay willowherb	<i>Chamerion angustifolium</i>
Common chickweed	<i>Stellaria media</i>
Horsetail sp.	<i>Equisetum sp.</i>
Annual meadow grass	<i>Poa annua</i>
Broad-leaved dock	<i>Rumex obtusifolius</i>
Curled dock	<i>Rumex crispus</i>

APPENDIX D: CDM RISK ASSESSMENTS

CDM Risk Assessment – Provision of Bird and Bat Boxes

Species	CDM Design Rationale	Hazard Control Mechanism	Residual Risk Level
Birds	Location for instalment	The locations of the bird boxes are detailed in Figure 4. The locations have been selected for ecological reasons to increase the likelihood of nesting birds using the features provided (if possible at a height of at least 3 m with clear airspace access to deter predators and in an area where artificial lighting will not shine directly upon the feature). The locations have however also been selected to avoid potential hazards from ensuring ease of access for any future maintenance (see section below) and ensuring the safety of the public.	Negligible
	Maintenance	The bird boxes do not require annual cleaning. However, should they require replacement or repair over winter due to damage, ladders, towers or MEWPs (or other provision to provide safe access) will be used as required by the contractor's own risk assessment.	Negligible
	Monitoring	Monitoring of the bird boxes will be undertaken for the first five years post-construction.	Negligible
	Manual handling	The weight of the proposed bird boxes within Table 4 range from 7.5 – 3.6 kg. These boxes have been selected to minimise manual handling risks during installation and replacement (if required).	Negligible
Bats	Location for instalment	The locations of the bat boxes are detailed in Figure 4. The locations have been selected for ecological reasons to increase the likelihood of roosting bats utilising the features provided (so at a height of at least 4 m to deter vandalism and theft, located to ensure the features are readily accessible from bat flight paths, as close to green infrastructure as possible and in an area where artificial lighting will not shine directly upon the feature). The locations have however also been selected to avoid potential hazards from ensuring ease of any future maintenance (see section below) and ensuring the safety of the public.	Negligible
	Maintenance	The bat boxes do not require regular maintenance. However, should they require replacement or repair due to damage, ladders, towers, or MEWPs (or other provision to provide safe access) will be used as required by	Negligible

Appendix M
Stormsaver Rainwater Harvesting Info

		the contractor's own risk assessment. This should take place over winter and be guided a licenced bat ecologist.	
	Monitoring	Monitoring of the bat boxes will be undertaken for the first five years post-construction.	Negligible
	Manual handling	The weight of the proposed bat boxes within Table 3 range from is 5.6 – 4.3 kg. This has been selected to minimise manual handling risks during installation and replacement (if required).	Negligible

Appendix L
Stormsaver Rainwater Harvesting Info

Rainwater Harvesting System		
Product Code	Quantity	Description
1/SVF/B/1.5-1.8	1.00	Integrated vortex filter, pre fitted inside main storage tank, to remove leaves and other debris prior to rainwater entering the main body of the tank.
1/SVF/VM100-150	1.00	Removable Filter Mesh to suit 100mm - 150mm drainage
5/UC/M/5X1.5	1.00	Concrete surround, 5,000L capacity. Dimensions 3070mm length x 1500mm dia. Stainless steel inlet calmer and low level warning.
10/IC/150	1.00	150mm diameter inlet into storage tank with inlet diffuser.
10/OF/150	1.00	150mm diameter overflow from the underground storage tank.
10/BPF/160	1.00	150mm Non Return Valve. To prevent water backflowing through the overflow. Unit is supplied fitted in the tank overflow. This item is required to meet BS8515:2009.
10/TT/1X0.6X1.0	2.00	Inclusive turret, 1 section @ 600mm dia. x 1000mm length. GRP Construction
10/TC/PD/600	2.00	Inclusive 600 x 600mm pedestrian bolt down duty cover.
10/SD/100	1.00	2 x 100mm service ducts
32/1/COM/CIV	1.00	Project Administration - Civils
11/2X5SDCS/F	1.00	2 X 5SCDS stainless steel submersible pump. Max Q 2l/s and Max H 1.68 bar - Fixed Foot Filter
15/X/2PCOMBI/VS5	1.00	eXpress 400 2P Combi - Variable Speed. Stormsaver Low cost Combi Unit provides a pressurised water supply with all the benefits of a non pressurised header tank system. Connects to duty standby submersible pumps in the main storage tank. The package combines 2 booster pumps and regulation compliant mains water top up all in one self contained unit. Dimensions 1650 (H) x 840mm (W) x 740mm (D) The unit also houses 400L back up storage, variable speed pumps, electrical processor control, system electrics, pressure set, control & sensors for a mains water top up which is compliant with the Water Supply (Water Fittings) Regulations 1999 (Optional BMS output). Please ensure that the mains water top up meets the demands of the outgoing water. Stormsaver cannot accept responsibility for this. Rainwater inlet 28mm. Mainswater inlet 35mm. Outlet 54mm. Booster Set - Max flow rate: 5.3 l/s @
17/BMS145	1.00	Common alarm output connection to your BMS system. One alarm will be raised if any of the following errors occur: Zero flow, clean filter, Pump Overload. Also Mains water reading & Rainwater reading. With mains water relay
23/WM/PO/35	1.00	Pulsed Output Water Meter 35mm dia
16/FILT/50	1.00	Upgrade to 50 micron filtration. Externally mounted to the processor unit. Includes 3 free replacement filter cartridges. [inc bowl & filters]

16/FILT/20	1.00	Upgrade to 20 micron filtration. Externally mounted to the processor unit. Includes 3 free replacement filter cartridges. [inc bowl & filters]
25/UV4/A	1.00	UV4A Disinfection rated at 1.03L/sec providing sterilised water free of bacteria and virus (requires maintenance). 22mm connection
32/1/COM/ME	1.00	Project Administration - M&E
30/DEL/SS	1.00	Standard delivery of all equipment listed in the quotation (UK mainland). This is not FORS accredited, and this would incur an additional charge.
31/COM/G1	1.00	Commissioning visit: Includes 1 day on site time to commission system on completion of the installation by others - Green area

Stormsaver: COMBI Rainwater Harvesting System Schematic

1. Rainwater is collected from roof area
2. Rainwater enters drainage through sealed gullies
3. Rainwater storage tank & encasement material
4. Integrated vortex filter
5. Inlet calmer
6. Overflow from rainwater storage tank with NRV
7. Submersible pump (optional standby)
8. Floating suction filter
9. 50mm Black & Green MDPE piped supply to building
10. Tank access chamber (bolt down covers)
11. Service connection chamber, electrical connections
12. Electrical service duct
13. Stormsaver Control Unit - COMBI
14. Incoming pumped rainwater supply
15. Optional micron filtration
16. Mains cold water supply (top up)
17. COMBI overflow connection to drain
18. Local power supply
19. Optional BMS (by others)
20. Optional UV disinfection unit
21. Boosted rainwater supply
22. Optional monitoring unit supplied with Rainwater & Mainswater meters
23. Points of use

Disclaimer

This schematic is to be used as a general overview of a typical Stormsaver Water Reuse System layout. It is not site specific and should not be relied upon for technical submittal or installation guidance.

Water Reuse Specialists

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**Proud UK
Manufacturer**

Product Description

The Stormsaver vortex filter is a low maintenance unit that prevents large particles in the rainwater supply from entering the storage tank. They come integrated into our below ground and single piece above ground storage tanks, with a range of inlet connections to suit individual site requirements. The integrated filter makes installation easier and cheaper, and is ideal when used with shallow drainage, as the invert drop across the filter and the overflow is only 50mm. The vortex filter has been designed to meet with BS EN 16941-1:2018.

How it works

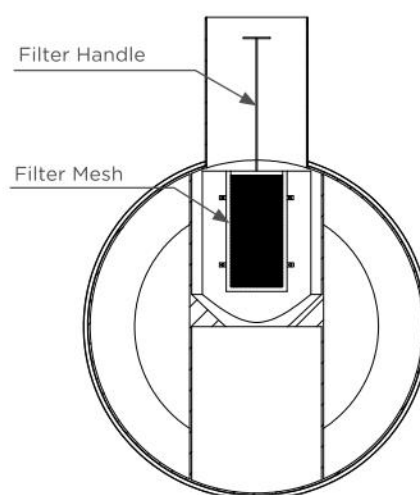
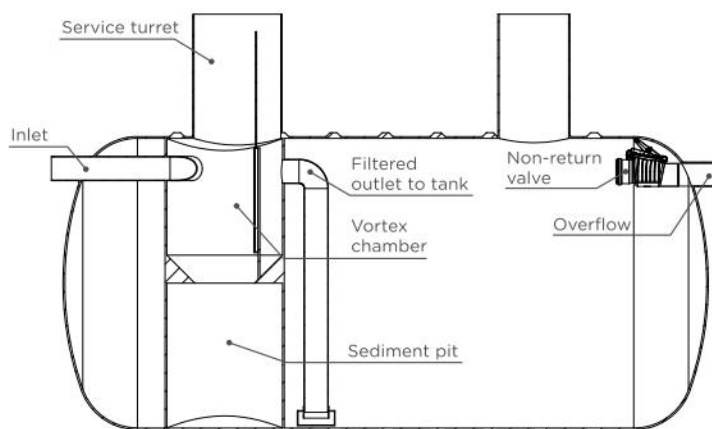
Rainwater enters the filter via the inlet, and goes into the vortex chamber. The rainwater will then continue to flow through the removable stainless steel filter and into the main storage tank via a calmed inlet. Particles greater than 1mm that have been trapped by the filter will then drop to the bottom of the vortex chamber, or be washed to drain via an optional overflow.

The vortex filter has been designed to take four times the flow rate of the storage tanks inlet pipework. The filter is only 90% efficient when clean. This is why 6 monthly maintenance is critical so that the filter functions at optimal efficiency throughout its lifespan. Should the vortex filter become blinded, water will then pass over the weir at the top of the stainless steel filter, or out to drain via the optional overflow.

Technical Details

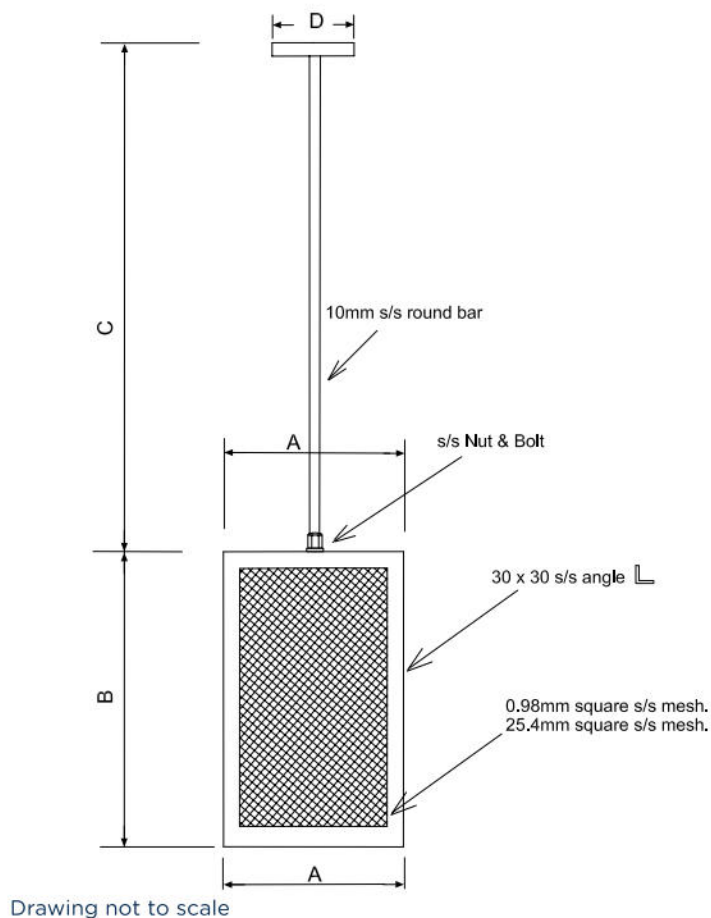
Material - Housing	GRP
Material - Filter	Stainless Steel
Mesh Size	1mm
Hydraulic efficiency	90% - When the filter is clean
Inlet	100mm - 450mm
Outlet to tank	100mm - 450mm
Overflow (optional)	100mm - 450mm

Technical Drawing



Drawing not to scale

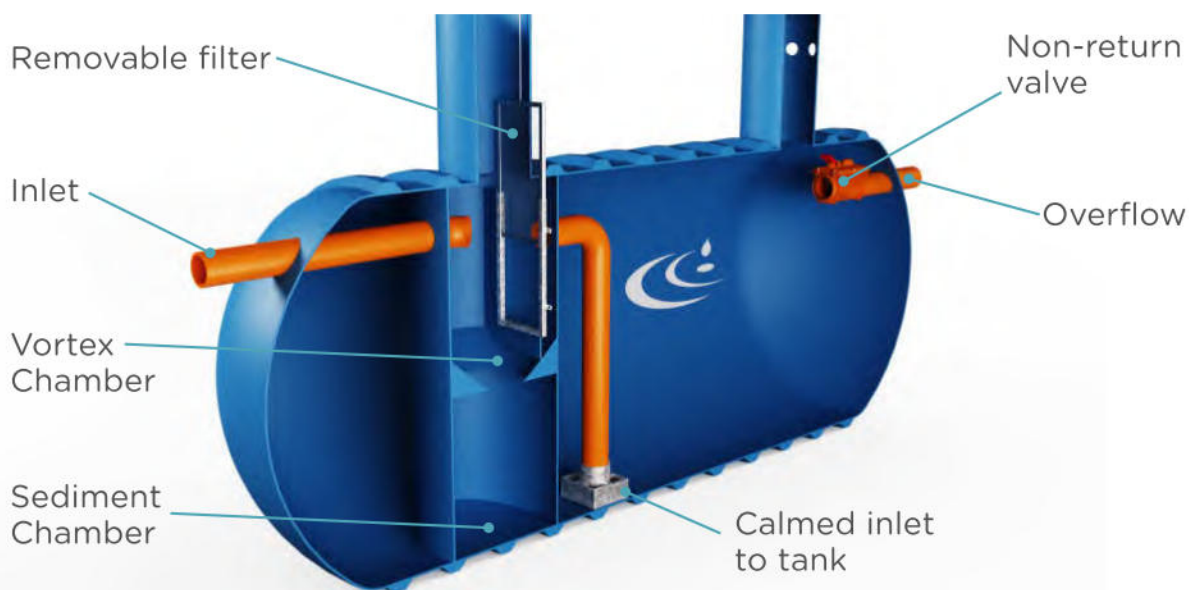
Removable Stainless Steel Filter Mesh



Inlet Size	A	B	C *	D
100mm	300mm	600mm	1000mm	200mm
150mm	300mm	600mm	1000mm	200mm
200mm	450mm	900mm	1000mm	200mm
225mm	450mm	900mm	1000mm	200mm
250mm	450mm	900mm	1000mm	200mm
300mm	450mm	900mm	1000mm	200mm
375mm	500mm	900mm	1000mm	200mm
450mm	500mm	900mm	1000mm	200mm

* Additional length filter handle can be purchased to suit finished ground level

Vortex filter installed in below ground storage tank



Drawing not to scale



Proud UK Manufacturer

Product Description

The Stormsaver underground storage tank has been designed specifically for use with the Stormsaver rainwater recovery system. All tanks are one piece GRP, pre-fabricated and delivered to site for simple and rapid installation.

As standard, all tanks come complete with:

- 2 x 600mm dia x 1m high access shaft/s
- Pedestrian duty lockable cover
- 1 x Filter mesh
- 1 x inlet, 1 x overflow and 2 x 100mm service ducts
- Pre fitted inlet calmer to oxygenate and calm incoming rainwater flow and prevent sediment being disturbed.

Non Return Valves are also quoted and should be fitted on the overflow to conform with BS8515: 2009

The tanks are available in a range of sizes, from 1500L to 170,000L. Tanks can also be joined together using interconnecting pipework to create larger volumes if required.

All tanks are manufactured in accordance with BS4994 under ISO9001 Design and Build approved.

Technical Information

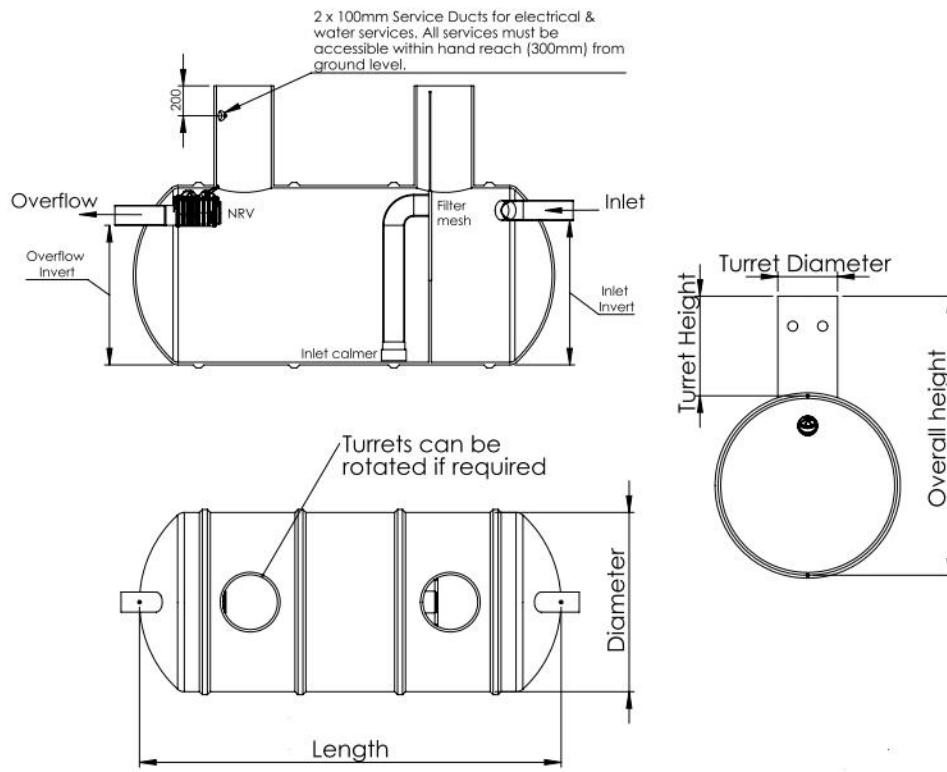
- All standard tanks are designed to be installed with a concrete surround up to a depth of 2000mm (from finished ground level to top of tank).
- All heavy duty tanks are designed to be installed with a concrete surround up to a depth of 3000mm (from finished ground level to top of tank).
- Tank shells are engineered with the parameter and principles of BS4994.
- All tanks are made of high quality glass reinforced plastic (GRP) incorporating a Lloyds approved resin system that meets BS3496-1999 and ISO2599-1980-GLASS.
- The concrete mix required for tanks is 15N/MM2 Aggregate 25mm slump mix in accordance with BS8500

Optional Extras

Option	Details
Access Turrets	Additional turrets in 500mm and 1000mm lengths. If more than 1000mm is required on a standard tank then please note the tank will need upgrading to heavy duty.
Inlets & Overflows	Our range is from 100mm upto 375mm, and can be supplied to suit site requirements. They can also be moved and rotated from the standard location to suit site. Push fit connections are standard but can be upgraded to flanged as an option.
Integrated Vortex Filter*	To meet with BS8515:2009 all rainwater harvesting tanks require a pre tank filter. Integrated vortex filters can be fitted into all tanks with a diameter greater than 1.5m and length greater than 3m. This type of integrated filter ensures that the invert across the below ground equipment is kept to a minimum (standard 50mm). *Please see separate data sheet for more information on the filter.
Turret Covers	Standard covers are pedestrian duty. We can upgrade to D400 vehicle duty covers or lockable covers.
Granular Surround	If concrete is not feasible for installation we can upgrade the tank for installation with a granular surround.
Heavy Duty	Tanks needing to be installed below 2000mm from finished ground level to the top of tank will need to be upgraded to our heavy duty tank.

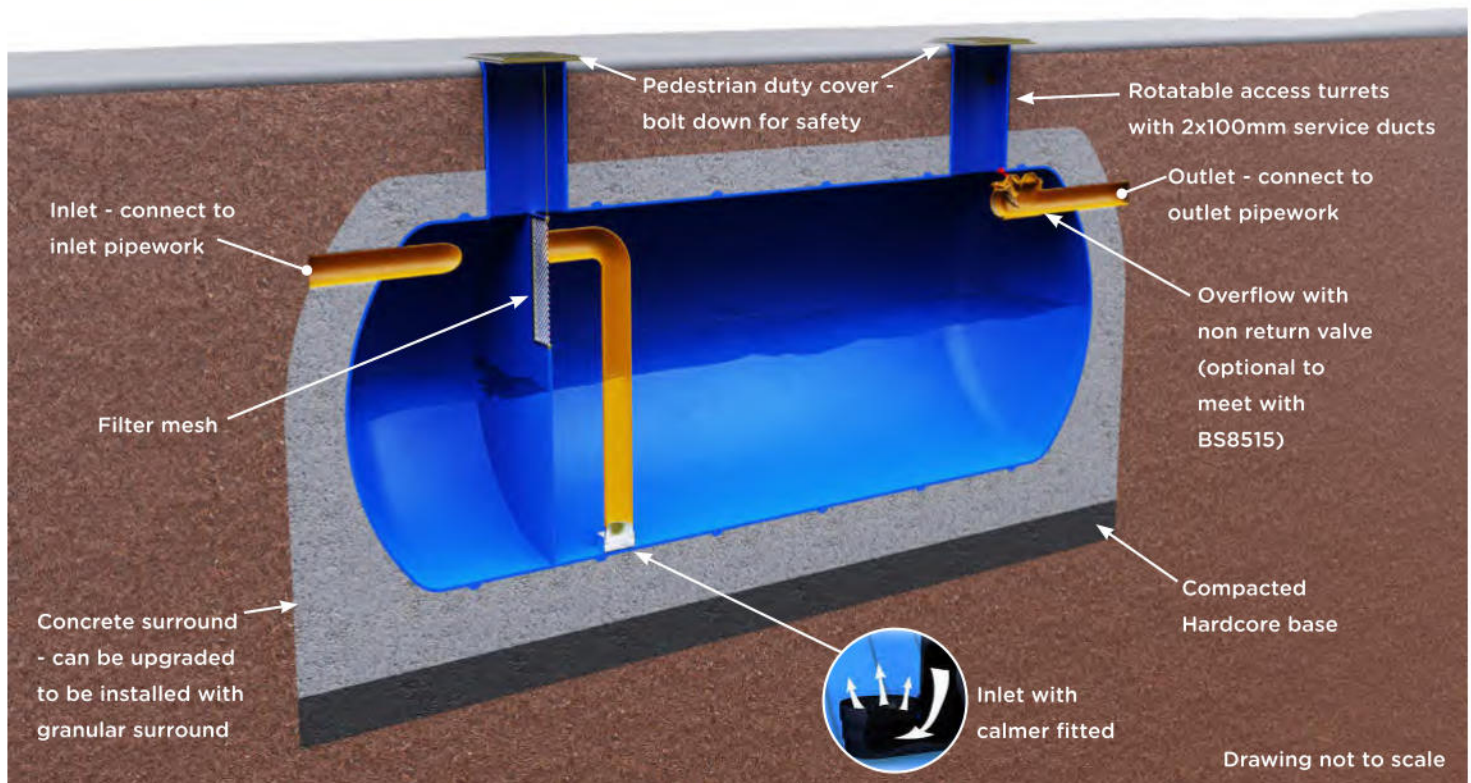
All optional extras are available at the relevant price.

Technical Drawing



Drawing not to scale

Installed Tank Drawing

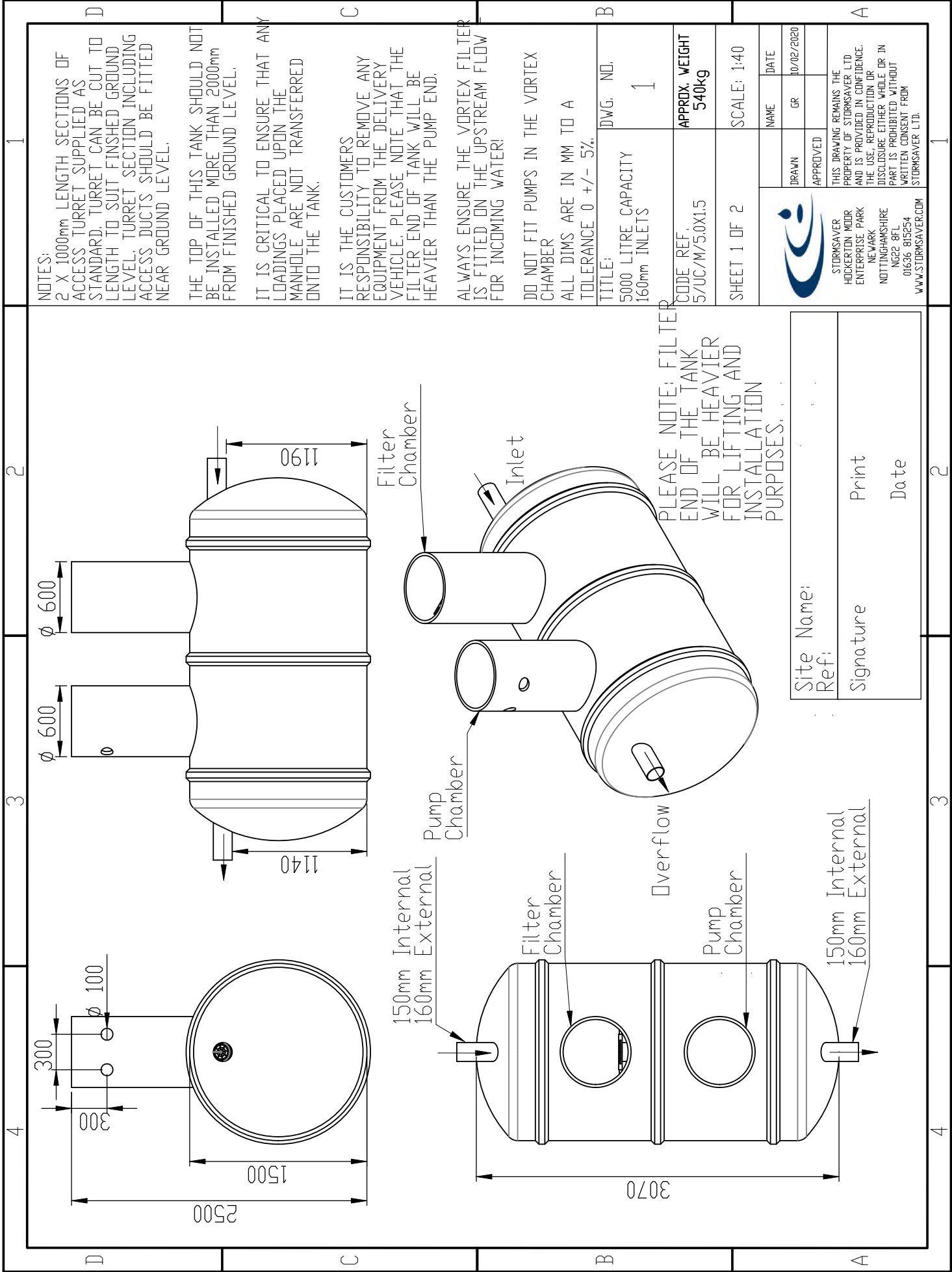


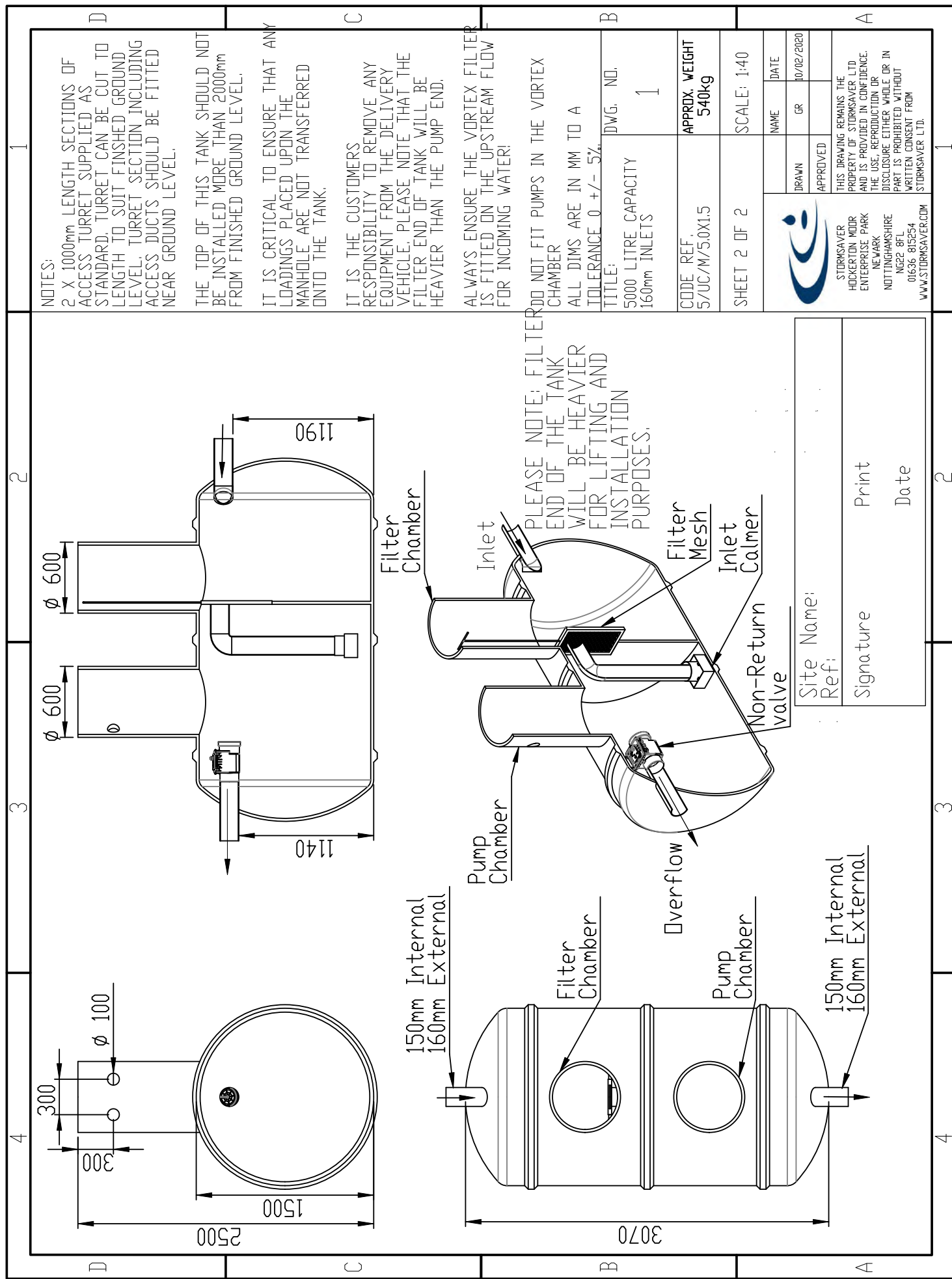
Drawing not to scale

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**Proud UK
Manufacturer**

Product Description

The Stormsaver non return valve is designed to stop unwanted water entering the storage tank via the overflow.

All systems that are required to comply with BS EN 16941-1:2018 will need to have a non return valve fitted to the overflow of the main storage tank.

They are designed to be installed horizontally into the drainage pipework and will allow water to overflow from the main storage tank, but stop any water back flowing into the storage tank. It will also stop vermin entering the storage tank.

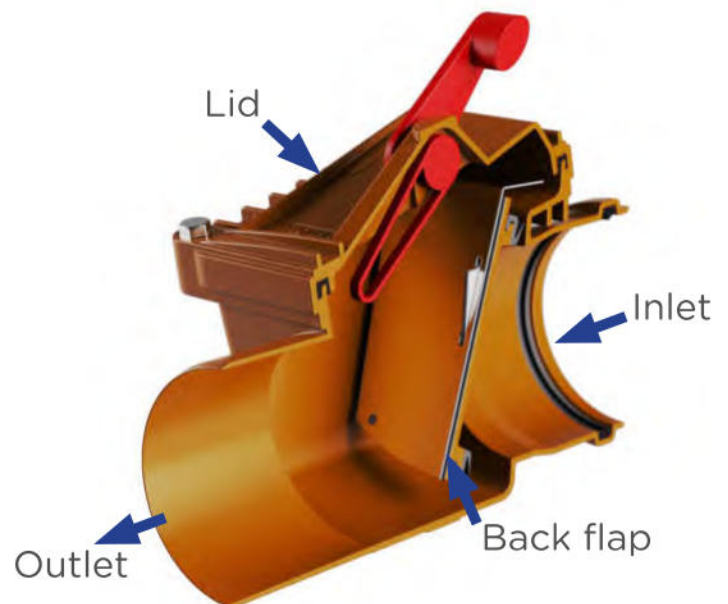
The Stormsaver non return valve will operate automatically, and does not require an external power supply.

The non return valve is designed to be self cleaning using the flow of water going through it. If maintenance on the valve is required there is a service hatch on top of the valve, this allows access to the back flap for cleaning if needed.

Technical Information

Connection sizes	-110mm -160mm -200mm -250mm -315mm
Housing material	Polyvinyl Chloride (PVC)
Back flap material	Stainless Steel
Weight (approx.)	1.0kg up to 14.1kg

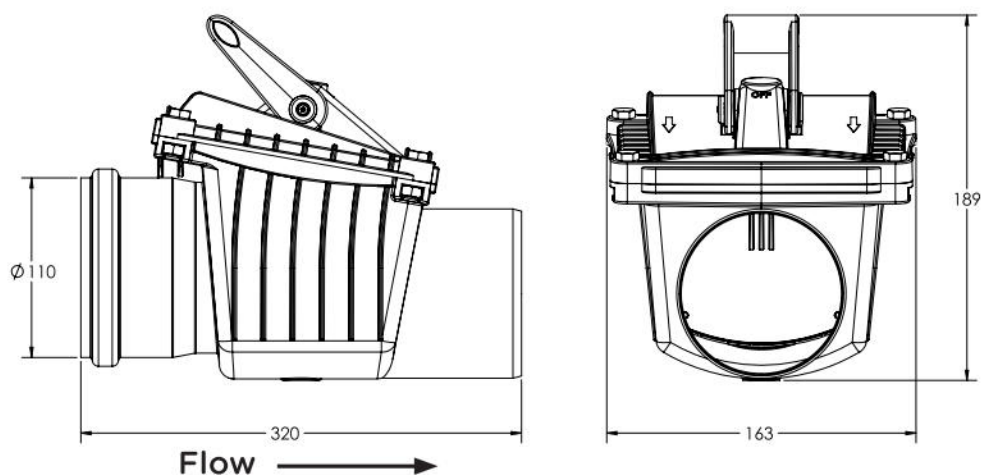
Section view



Learn More

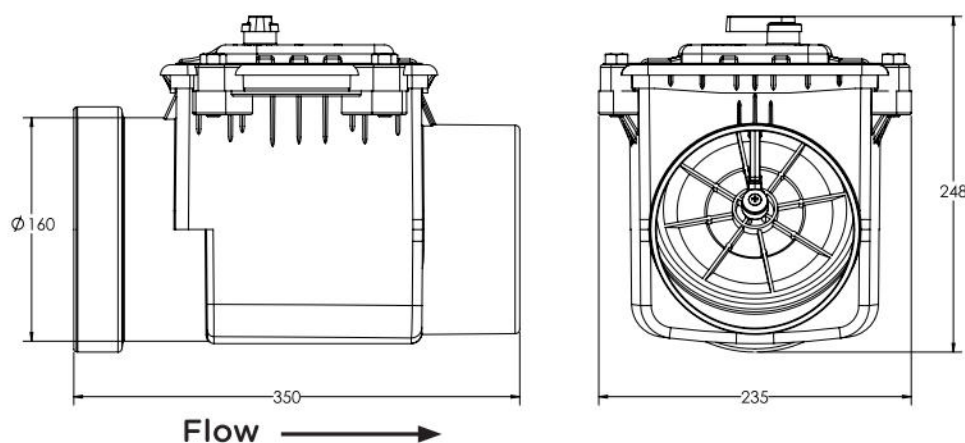
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110mm - Non Return Valve



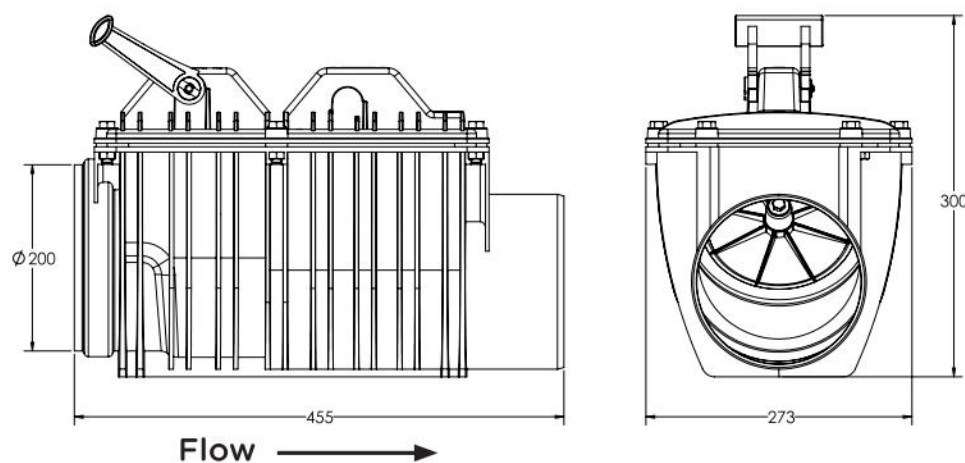
Connections	DN-110
Housing material	PVC
Back flap material	Stainless steel
Weight	1.0kg
Dimensions	320mm (L) x 163mm (W) x 189mm (H)

160mm - Non Return Valve



Connections	DN-160
Housing material	PVC
Back flap Material	Stainless steel
Weight	1.9kg
Dimensions	350mm (L) x 235mm (W) x 248mm (H)

200mm - Non Return Valve



Connections	DN-200
Housing material	PVC
Back flap material	Stainless steel
Weight	3.9kg
Dimensions	455mm (L) x 273mm (W) x 300mm (H)



**Proud UK
Manufacturer**

Product Description

The Stormsaver submersible pump is manufactured from stainless steel. It is a vertical multistage pump motor driven, centrifugal pump. It is silent running and is fitted with a motor cooled by the flow of water, and a double mechanical seal with a chamber between them containing the lubricating liquid, assuring long life.

It is designed to be submerged in either Stormsaver below ground or above ground tanks, and comes complete with 5m of stainless steel lifting rope that can be used to remove the pump for maintenance, and also with 20m of electrical cable.

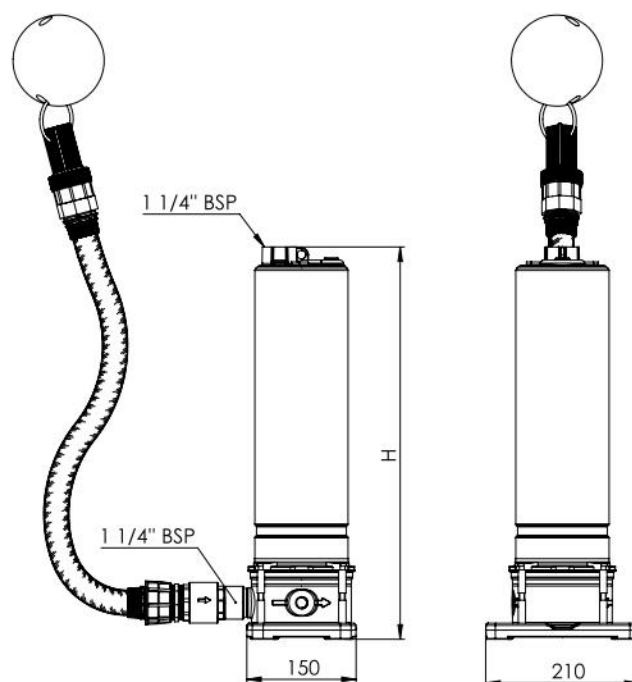
The pump is supplied with flexible hose and a coarse floating suction filter. This ensures water is extracted approximately 100-150mm below the surface of the water, to meet with BS EN 16941-1:2018.

If space inside the storage tank is restrictive causing the floating suction filter to not operate effectively, Stormsaver can provide a fixed foot filter instead which still extracts the cleanest water in a fixed position.

Technical Information

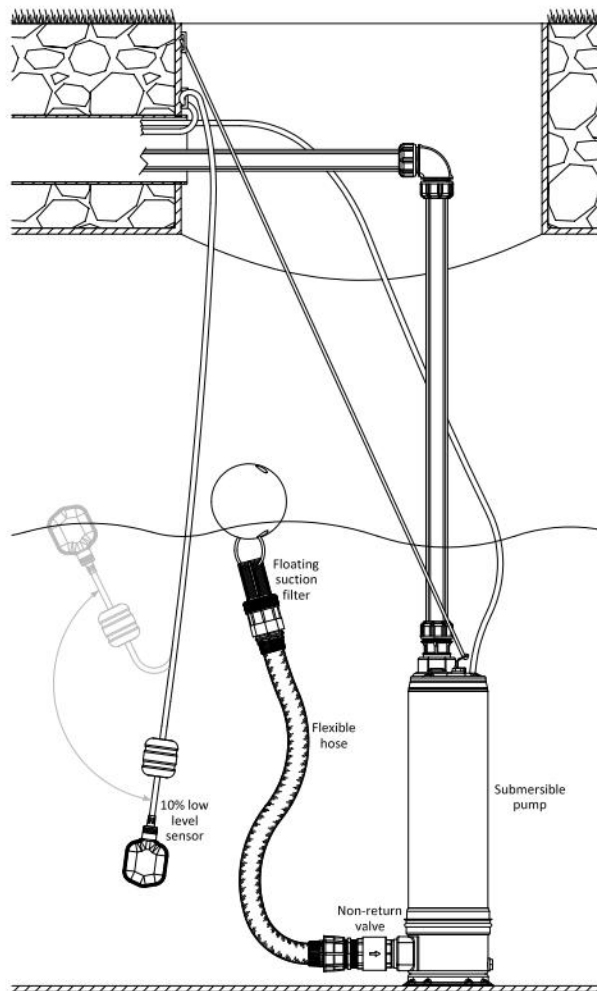
- Inlet and outlet are 1-1/4" BSP (35mm)
- Protection degree IP68
- Power supply 240V 50Hz
- Insulation class F
- Continuous duty
- Capacitor is permanently on and housed within the pump, incorporating built in thermal overload protection with automatic reset (single phase)
- 2 poles motor cooled by the pumped liquid
- Pump body, casing cover, diffuser and motor casing material is Stainless Steel (AISI 304.)
- Impeller and bush bearing in technopolymer
- Pump shaft is Stainless Steel (AISI 416)
- Mechanical seal in Silicon carbide/NBR
- Maximum operating pressure : 10 bar
- Maximum liquid temperature : 40°C

Technical Drawing



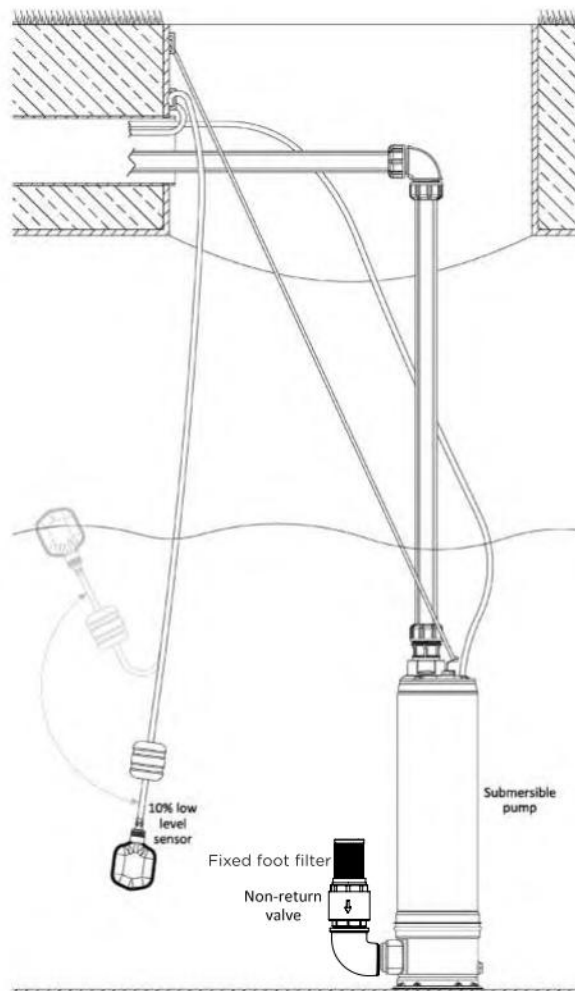
Drawing not to scale

Installed pump drawing - Floating suction filter



Drawing not to scale

Installed pump drawing - Fixed foot filter



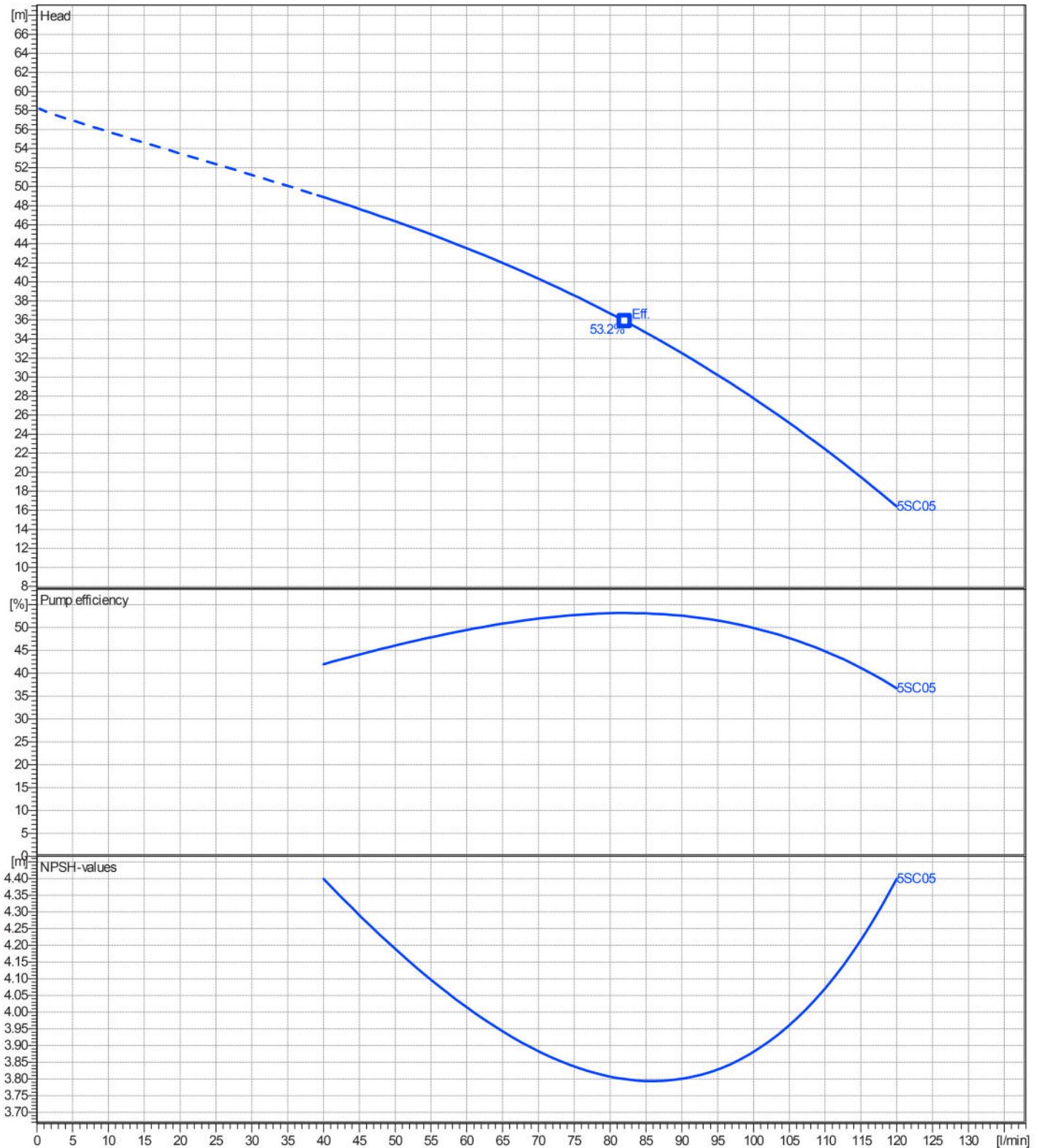
Drawing not to scale

If you require a fixed foot filter arrangement please contact Stormsaver for more information.

Dimensions, Power Ratings & Max Flow Rates

Product Code	Rated Voltage (V)	Height - H (mm)	Dry Weight of Pump (kg)	kW	Horse Power	Full Load Current (A)	Max Flow Rate with Head (refer to graphs)
3SCDS5/07/5	240	538	16.3	0.75	1	4.80	70L/m @ 2.2 bar
5SCDS5/09/5	240	538	15.8	0.9	1.2	5.72	120L/m @ 1.68 bar

Pump Flow Rate Graph - 5SCDS5/09/5





**Proud UK
Manufacturer**

Product Description

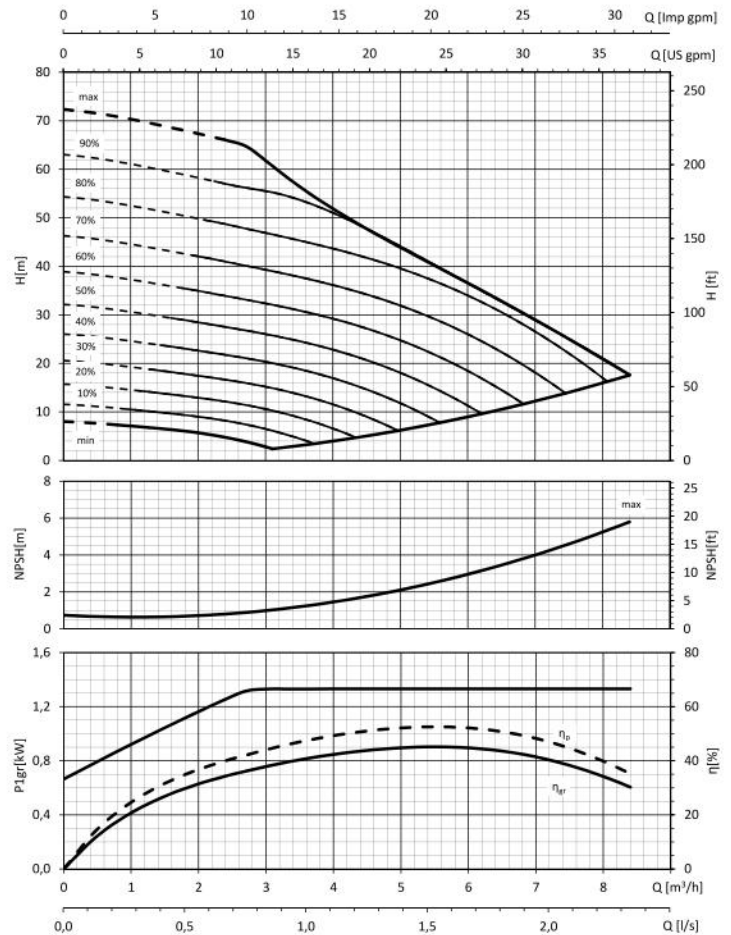
The Stormsaver Express Combi offers a solution for commercial buildings where space above ground is limited. It also lends itself to retro fit projects, or for sites that require water at pressure.

The Express Combi is a single enclosed unit that houses the control panel, a 400L break tank (Express 400) or a 620L break tank (Express 620) and a twin pump booster set. It can be used in many types of buildings provided that the mains water pressure and flow rates match those met by the booster set. This is critical to ensure that the capabilities of the unit are matched to the water demands of the individual building. This product supplies a direct pressurised water supply.

The unit has a Type 'AB' Airbreak that is compliant with the Water Supply (Water Fittings) Regulations 1999. It also comes with a BMS common output as standard. This unit does not contain filtration.

Booster Pump Flow Rate

Variable Speed Pump Curve



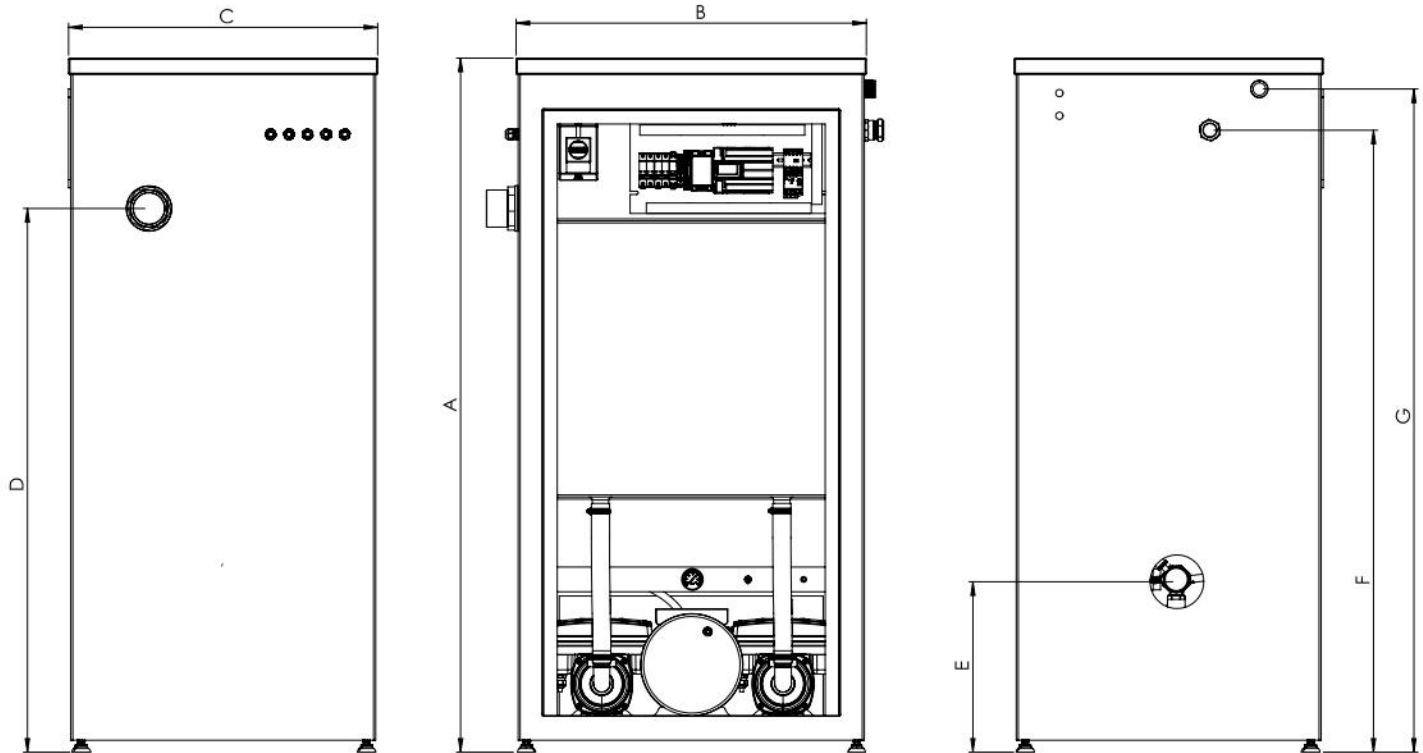
Other pumps are available on request

Technical Details

Colour	RAL 5005 - Blue
Housing Material	GRP
Power Supply	240v 20A single phase with Type C20 breaker
Location	The unit is not weather proof and must NOT be exposed to the elements. Extreme temperatures should also be avoided, so it is not subjected to warming or freezing. For access purposes a minimum of 1000mm is required at the front of the unit and a minimum of 450mm to each side. While also allowing for 100mm behind the unit.

Technical Drawing

Drawing not to scale - Express 400 Combi pictured



Unit must be installed at least 100mm away from a solid surface to enable the type 'AB' airbreak to function correctly at the back of the unit.

	Dry Weight	Wet Weight	Height (A)	Width (B)	Depth (C)	Floor to overflow (D)	Floor to outlet (E)	Floor to RW inlet (F)	Floor to MW inlet (G)
Express 400	min 250kg	max 650kg	1700mm	840mm	740mm	1300mm	440mm	1505mm	1550mm
Express 620	min 350kg	max 970kg	1950mm	1100mm	720mm	1550mm	510mm	1795mm	1880mm

All measurements are approximate and may vary marginally

Installation / Location

- The unit is NOT weather proof and must not be exposed to the elements or extremes in temperatures.
- The unit should be located at floor level so that access can be gained without the use of ladders or scaffolding. It must also not be fixed to the wall.
- The unit requires adequate access for maintenance, with a minimum of 450mm above the unit, 1000mm in front and a minimum of 100mm behind and 450mm at the sides for connection of pipework.
- The unit will need to be located so access can be gained for an electrical supply, rainwater supply, mainswater supply and a drain.

Connection Sizes

Component	Description
Rainwater inlet	28mm - Connects to pipe work from the submersible pump/s in the tank
Pressurised outlet	54mm - Connects to pipe work to points of use (can be altered if requested)
Overflow	90mm internal pipe - Connects to drain via sealed trapped gully - 110mm External
Mains water inlet	35mm - Connects to mains water pipe via a Y strainer supplied by others (the inlet can be altered if requested as this needs to match the flow requirements of site)



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Product Description

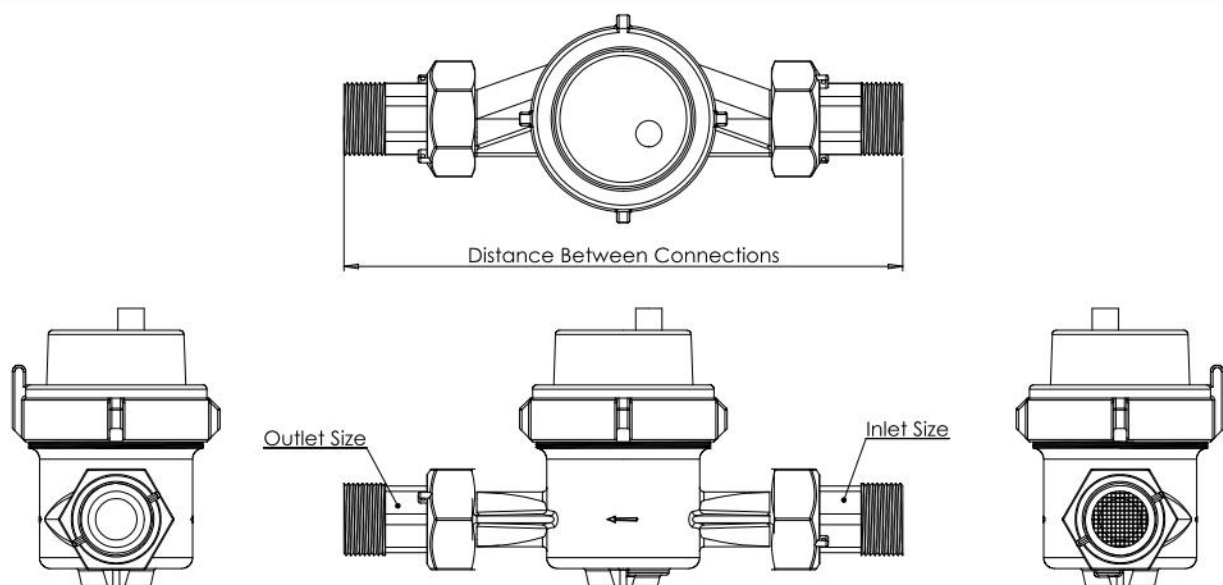
The Stormsaver water meter can be fitted to the Rainwater and Mainswater supply pipes. They will measure the amount of water being used, and have a pulsed outlet that will relay this to the BMS system.

Technical Information

Max water temperature	30 °C
Max voltage	24V - 0.2A
Number of litres per pulse	1
Water Meter type	Turbine

Nominal size of meter	22mm	28mm	35mm	42mm	54mm
Max. flow rate	1.4L/s	2.2L/s	3.5L/s	5.6L/s	10.3L/s
Nominal continuous flow rate	1.1L/s	1.75L/s	2.8L/s	4.4L/s	6.9L/s
Transitional flow rate (+/- 2%)	80L/h	126L/h	200L/h	320L/h	500L/h
Minimum flow rate (+/- 5%)	50L/h	79L/h	125L/h	200L/h	312.5L/h
Weight with couplings (Kg)	1.8 Kg	3.2 Kg	3.5 Kg	6.1 Kg	9.7 Kg

Technical Drawing



Drawing not to scale

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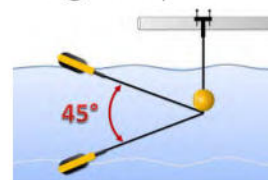
Product Description

Float switches are used in the main storage tank, header tank and Combi units. There are two main types used, the FFS10 (non-sensitive) and LM10C (sensitive). The size of the tank they are installed will determine which float switch is used. The float is rounded to prevent accumulation of solids, that could cause the float to sink and has an internal weight that fixes the centre of gravity, and rotation, close to the cable entry.

Technical Details - FFS10

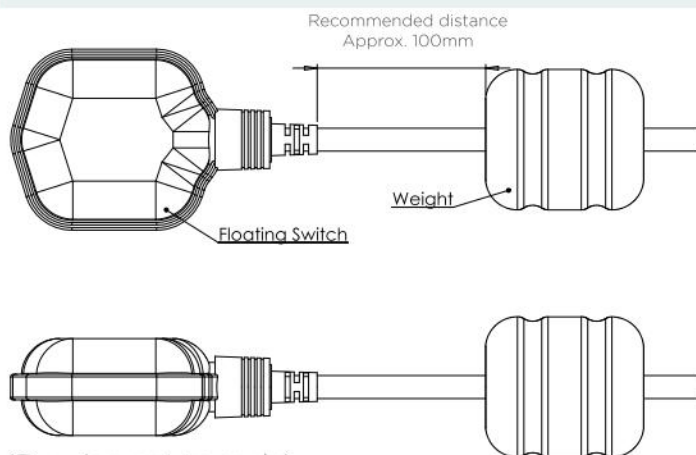
Body Material	Polypropylene
Cable Material	Rubber
Cable length	5m, 10m, 15m, or 20m
Switching angle	45°
Contact form	C/O
Temperature range	0 to 40°C
Power rating (max)	AC : 750VA DC : 180W
Switching voltage (max)	AC : 250V DC : 110V
Switching current (max) restrictive	10A
Switching current (max) inductive	AC : 4A DC : 1A

- Suitable for operation in turbulent fluids
- Unaffected by suspended solids
- The switch element is surrounded by non-hygroscopic closed cell expanded polyurethane, hermetically sealing the unit
- Can be submerged up to depths of 100m

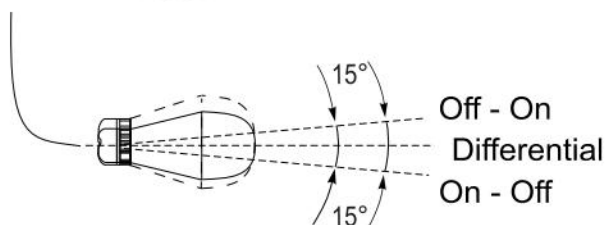


Activation angle: 45°

Technical Drawing - FFS10



(Drawing not to scale)



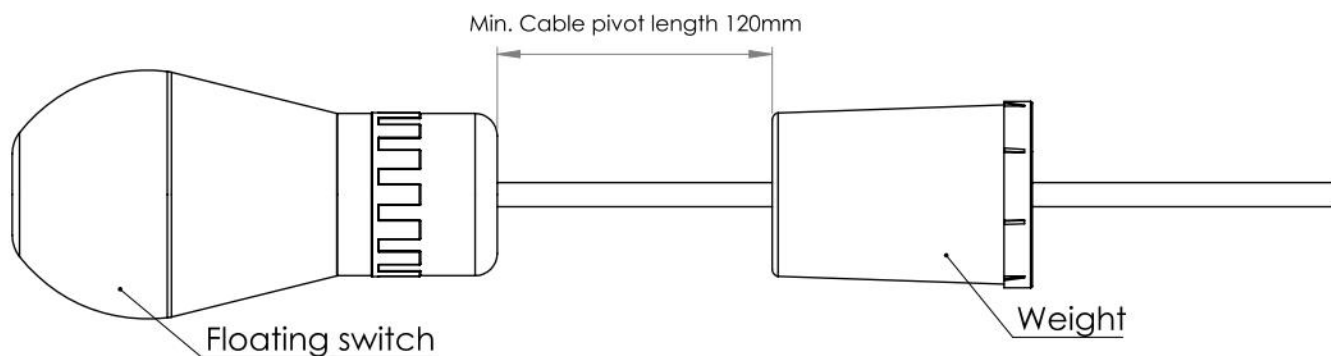
Technical Details - LM10C

Body Material	High Density Polyethylene
Cable cover material	PVC
Cable length	5m
Switching angle	15°
Contact form	C/O
Temperature range	0 to 55°C
Power rating (max)	AC : 750VA DC : 180W
Switching voltage (max)	AC : 250V DC : 110V
Switching current (max) restrictive	10A
Switching current (max) inductive	AC : 4A DC : 1A

- Suitable for operation in turbulent fluids
- Unaffected by suspended solids
- Suitable for smaller tanks, or those with restricted space
- More "sensitive" than the FFS10, with a smaller switching angle of 15°.
- The switch element is surrounded by non-hygroscopic closed cell expanded polyurethane, hermetically sealing the unit
- Can be submerged up to depths of 100m

Technical Drawing - LM10C

(Drawing not to scale)





Proud UK Manufacturer

Product Description

The Stormsaver cotton cartridge filter can be fitted externally to any standard non-pressurised, pressurised, solo, StormStation or Combi control units.

The filter unit is positioned horizontally on the outside of the control unit and requires a minimum of 250mm clearance below the bowl to allow removal for cleaning and maintenance. The filter should be kept away from bright lights to reduce organic build up inside the housing.

The maximum working pressure the filter can cope with is 10 bar and this must not be exceeded. The maximum differential pressure is 0.8 bar.

If required the flow rate can be increased by adding additional cotton cartridge filter units to the control panel and connected in parallel in descending micron rating e.g. 50 & 20 microns. Cartridge filters cannot be backwashed and must be replaced when they have debris build up.

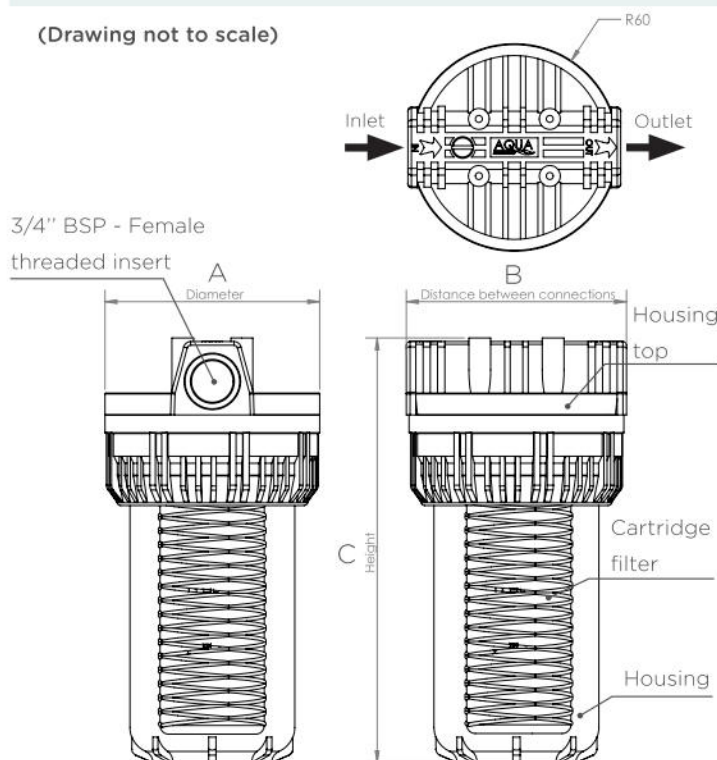


Learn More

View our full range of products at www.stormsaver.com

Technical Drawing

(Drawing not to scale)



Technical Data

Housing Materials	Polypropylene
Maximum differential pressure	0.8 Bar
Maximum working pressure	10 Bar
Flow rate (per unit)	1l/s
Filtration rating	50 & 20 micron
Efficiency	80%
A - Outer diameter	120mm
B - Distance between connections	120mm
C - Height	235mm
Connection size	22mm (3/4") - Female threaded inserts
Dry weight	2.4kg
Wet weight	14kg



**Proud UK
Manufacturer**

Product Description

The Stormsaver UV disinfection unit is used to minimise the growth of organisms within the rainwater supply.

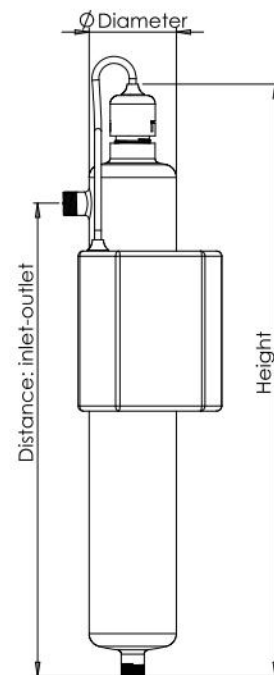
UV light is very versatile and can be used for disinfecting and destroying harmful microorganisms. With UV technology it is possible to destroy more than 99.99% of all pathogens within seconds without using chemicals, and is therefore an efficient, economic and particularly environmentally friendly process. Using a special quartz glass material, UV lamps are able to generate the exact wavelengths of UV light required for disinfection. Specially designed power supplies and electronic controls operate and monitor these lamps for optimum performance.

The unit should be installed directly before the application i.e. after the header tank, pressure vessel or combi unit, and is designed to help prevent potential illness caused by water born organisms.

The unit is available in two different ranges - Altima and Proxima which come in a variety of different flow rates. Both can be mounted in pipework horizontally or vertically, as long as sufficient space is allowed for the removal of the bulb at the lamp cable end.

Range Features

Features:	Range	
	A	P
Tested and proven disinfection capacity	•	•
Electro-polished stainless steel disinfection chamber	•	•
High output low pressure UV lamp	•	•
Highly efficient electronic ballast power supply	•	•
Glow-cap lamp operation indicator	•	•
Safety lamp connector	•	•
Micro-computer control		•
Audible alarm plus visual alarm display		•
Lamp change reminder with 365 days counter		•
Alarm and computer reset button		•
Digital display /lamp life readout		•
Volt Free BMS Contact (optional extra) *		•
Power connection for optional automatic solenoid safety shut-off valve		•

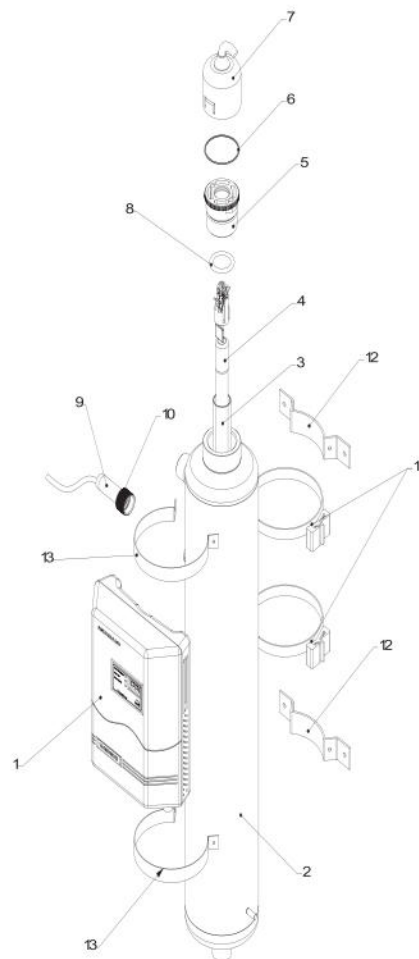


Please refer to table for dimensions

Technical Details

Code	25/UV1	25/UV2	25/UV4	25/UV7	25/UV10
Height (mm)	465	672	674	1023	1039
Diameter (mm)	63	68	84	87	108.2
Inlet to outlet (mm)	344.5	546.5	543	892	888
Control Box Dimensions (mm)	168(w) x 200(h) x 66(d)				
Weight (kg) approx. (+2.5kg for control box)	1.7	2.4	3.2	5.0	9.0
Connection (")	1/2" BSP	3/4" BSP	3/4" BSP	1" BSP	1 1/2" BSP
Min. free space required for bulb removal at lamp connector end (mm)	370	570	570	920	920
UV-C Output 254nm (W)	6.5	6.5	6.5	33	33
Power Consumption (W)	35	55	55	85	85
Voltage / Hz	230 Volt / 50 - 60Hz				
Max flow rate ensuring efficient disinfection for rainwater harvesting	(l/s)	0.25	0.63	1.03	2.13
	m ³ /h	0.9	2.27	3.71	10.44
UV Dose	(300 J/m ²) max. up to 10.5m ³				
Water UV Transmittance	(@254nm, 1cm) 80-98%				
Operating Pressure	max. 10bar				
Water Temperature	- recommended range 5 - 25°C - possible range 0 - 35°C				
Material	Reactor: Stainless steel 316L, electro polished. Control Box: ABS				

Exploded Drawing



- 1 - Control box
- 2 - Reactor
- 3 - Quartz sleeve
- 4 - UV lamp
- 5 - Head piece
- 6 - O - ring (head piece)
- 7 - Lamp connection
- 8 - O - ring (quartz sleeve)
- 9 - UV sensor
- 10 - Sensor connection
- 11 - Control fastening band
- 12 - Reactor fastening band
- 13 - Reactor fastening band

Other Information

Installation must comply with the Water Supply (Water Fittings) Regulations 1999. All pipework must be clearly colour coded and marked in accordance with the WRAS : IGN No 9-02-04 & IGN No 9-02-05. See separate Stormsaver data sheet.

The Stormsaver system complies with BS EN 16941-1:2024.

UV Lamp Details

Code	25/UV1	25/UV2	25/UV4	25/UV7	25/UV10
Type	NLR1825WS	NLR1845WS	NLR1845WS	NLR1880WS	NLR1880WS
Lamp Power (Watt)	20	40	40	80	80
UV-C output 254nm (Watt)	6.5	6.5	6.5	33	33
Lamp Life (Hours)	12 months (8760)				

Filtration

Ultra Violet light is an energy rich light that has a wavelength of 200-400 nanometres (nm). To enable the UV disinfection to work effectively it is important that the rainwater is filtered to a suitable level prior to passing through the UV unit.

UV filtration works by changing the DNA of microorganisms, and interrupting the cell division. This means the cell can no longer reproduce and therefore loses its pathogenic effect. The reason for needing a filtration level of 50 microns or less is to avoid shadowing. This is where bacteria can not hide behind large particles, and therefore not be affected by the UV light.

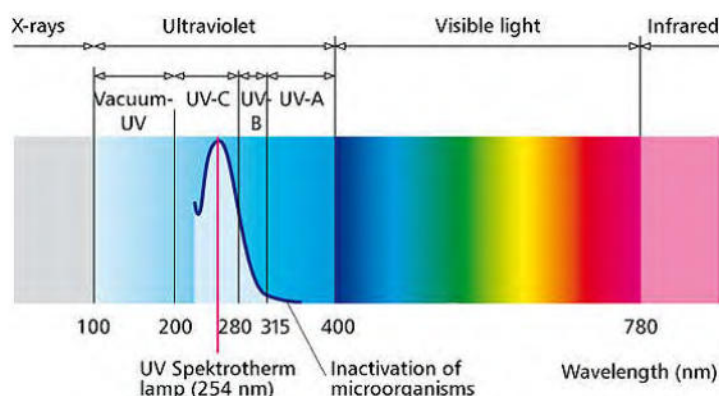
It is recommend that a filter with a rating of 50 microns or less is used. It is however important that other filtration is carried out prior to the 50 micron filter to ensure that the filter does not get blocked regularly.

Replacement Bulbs

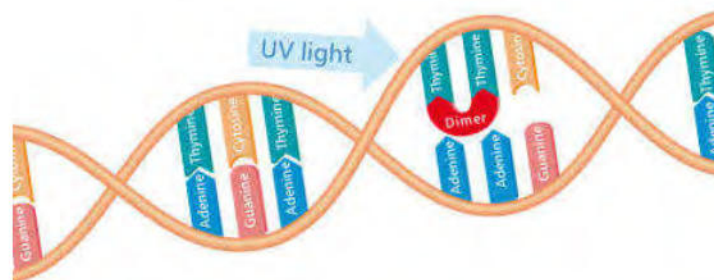
In order to maintain the effectiveness of the UV unit the bulb will need replacing. The bulb is designed to run constantly and has an effective life of approximately 12 months.

Replacement bulbs are available from Stormsaver and can be purchased as an individual item, or we can supply and change these as part of a maintenance package. For more details on taking out a maintenance contract please contact enquiries@stormsaver.com or order online at

UV Light Spectrum



DNA Strand



DNA strand showing how UV light changes the make up of the cell