

**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.650
CV	0.750	Preferred Cover Depth (m)	1.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	100.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
7	0.070	5.00	34.450	3000	341862.571	391118.487	2.370
8	0.064	5.00	34.500	3000	341893.092	391124.749	2.411
6	0.078	5.00	34.150	3000	341871.820	391137.602	2.123
9	0.153	5.00	33.900	3000	341817.679	391116.409	1.845
5	0.025	5.00	33.800	3000	341841.833	391156.018	1.861
4	0.053	5.00	33.440	3000	341854.930	391177.597	1.564
3	0.000		33.484	1350	341864.376	391180.803	1.667
2	0.000		33.440	1350	341930.955	391138.711	2.086
1			33.300	1050	341937.825	391130.369	2.010

Links (Input)

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)
1.000	7	6	21.235	0.600	32.080	32.027	0.053	400.0	600	5.29	53.8
2.000	8	6	24.854	0.600	32.089	32.027	0.062	400.0	600	5.34	53.6
1.001	6	5	35.190	0.600	32.027	31.939	0.088	400.0	600	5.83	51.2
3.000	9	5	46.393	0.600	32.055	31.939	0.116	400.0	600	5.64	52.1
1.002	5	4	25.243	0.600	31.939	31.876	0.063	400.0	600	6.17	49.7
1.003	4	3	9.975	0.600	31.876	31.817	0.059	170.0	225	6.34	0.0
1.004	3	2	78.769	0.600	31.817	31.354	0.463	170.0	225	7.65	0.0
1.005	2	1	10.807	0.600	31.354	31.290	0.064	170.0	225	7.83	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.235	400.0	600	Double	34.450	32.080	1.770	34.150	32.027	1.523
2.000	24.854	400.0	600	Double	34.500	32.089	1.811	34.150	32.027	1.523
1.001	35.190	400.0	600	Double	34.150	32.027	1.523	33.800	31.939	1.261
3.000	46.393	400.0	600	Double	33.900	32.055	1.245	33.800	31.939	1.261
1.002	25.243	400.0	600	Double	33.800	31.939	1.261	33.440	31.876	0.964
1.003	9.975	170.0	225	Circular	33.440	31.876	1.339	33.484	31.817	1.442

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	7	3000	Manhole	Adoptable	6	3000	Manhole	Adoptable
2.000	8	3000	Manhole	Adoptable	6	3000	Manhole	Adoptable
1.001	6	3000	Manhole	Adoptable	5	3000	Manhole	Adoptable
3.000	9	3000	Manhole	Adoptable	5	3000	Manhole	Adoptable
1.002	5	3000	Manhole	Adoptable	4	3000	Manhole	Adoptable
1.003	4	3000	Manhole	Adoptable	3	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.004	78.769	170.0	225	Circular	33.484	31.817	1.442	33.440	31.354	1.861
1.005	10.807	170.0	225	Circular	33.440	31.354	1.861	33.300	31.290	1.785

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.004	3	1350	Manhole	Adoptable	2	1350	Manhole	Adoptable
1.005	2	1350	Manhole	Adoptable	1	1050	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FEH-22	Drain Down Time (mins)	240	30 year (l/s)	9.1
Rainfall Events	Singular	Additional Storage (m³/ha)	20.0	100 year (l/s)	11.2
Summer CV	0.750	Starting Level (m)		Check Discharge Volume	✓
Winter CV	0.840	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	179
Analysis Speed	Normal	1 year (l/s)	4.7		
Skip Steady State	✓	2 year (l/s)	5.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	FEH	Growth Factor 100 year	2.08
Positively Drained Area (ha)	0.699	Betterment (%)	0
SAAR (mm)	860	QMed	5.0
Host	1	QBar	5.4
BFIHost	0.351	Q 1 year (l/s)	4.7
Region	10	Q 2 year (l/s)	5.0
QBar/QMed conversion factor	1.075	Q 30 year (l/s)	9.1
Growth Factor 1 year	0.87	Q 100 year (l/s)	11.2
Growth Factor 2 year	0.93		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)	0.699	Storm Duration (mins)	360
Soil Index	4	Betterment (%)	0
SPR	0.47	PR	0.494
CWI	124.650	Runoff Volume (m³)	179

Node 4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	31.876	Product Number	CTL-SHE-0098-5000-1500-5000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	32.520	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	100	Depth (m)	0.400
Safety Factor	2.0	Width (m)	4.500	Inf Depth (m)	
Porosity	0.95	Length (m)	11.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	32.380	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.400
Safety Factor	2.0	Width (m)	4.500	Inf Depth (m)	
Porosity	0.95	Length (m)	17.000		

Results for 100 year +45% CC 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
240 minute winter	7	236	33.329	1.249	15.4	28.1425	0.0000	SURCHARGED
240 minute winter	8	236	33.329	1.240	6.4	9.4237	0.0000	SURCHARGED
240 minute winter	6	236	33.329	1.302	14.9	10.1609	0.0000	SURCHARGED
240 minute winter	9	236	33.330	1.275	15.3	11.1226	0.0000	SURCHARGED
240 minute winter	5	236	33.329	1.390	20.8	38.6906	0.0000	SURCHARGED
240 minute winter	4	236	33.329	1.453	8.0	11.2579	0.0000	FLOOD RISK
15 minute winter	3	10	31.870	0.053	4.9	0.0765	0.0000	OK
30 minute summer	2	223	31.409	0.055	4.9	0.0790	0.0000	OK
15 minute summer	1	110	31.343	0.053	4.9	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 winter	7	1.000	6	-11.7	0.156	-0.017	11.9628	
240 minute winter	8	2.000	6	4.0	0.146	0.006	14.0016	
240 minute winter	6	1.001	5	8.4	0.256	0.012	19.8244	
240 minute winter	9	3.000	5	11.4	0.252	0.017	26.1357	
240 minute winter	5	1.002	4	5.1	0.184	0.007	14.2208	
240 minute winter	4	1.003	3	4.9	0.667	0.123	0.0732	
15 minute winter	3	1.004	2	4.9	0.762	0.124	0.5768	
30 minute summer	2	1.005	1	4.9	0.669	0.123	0.0790	75.3