

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	x
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S13 FC			9.900	1200	276380.862	189940.684	3.070
EXMH1			10.000	1200	276368.799	189948.955	3.300
Carpark 2	0.014	5.00	9.300	1200	276386.501	189922.767	0.780
S6			9.400	450	276415.583	189924.618	0.750
S12			9.600	600	276383.942	189932.251	2.720
S3	0.028	5.00	9.300	1200	276446.941	189905.322	2.070
S4	0.054	5.00	9.500	1200	276428.100	189937.660	2.200
RG #1	0.039	5.00	8.900		276483.208	189891.948	1.400
RG #2	0.027	5.00	9.200		276431.771	189919.183	0.750
RG #3	0.032	5.00	9.400		276413.442	189926.555	0.750
S8	0.035	5.00	9.150	1200	276419.684	189917.866	2.070
HW_OUT			10.000		276363.469	189954.876	3.350
S1	0.030	5.00	8.600	1200	276475.744	189890.163	1.200
Attenuation #1			9.200		276401.974	189925.141	2.220
Carpark 3	0.020	5.00	9.600		276397.383	189935.743	0.480
Carpark 4	0.004	5.00	9.400		276377.864	189929.859	0.380
Carpark 1	0.034	5.00	8.700		276454.652	189913.863	0.730
S5			9.200	450	276429.810	189918.575	0.750
S7	0.021	5.00	9.250	1200	276421.489	189922.097	2.050

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)
1.006	S13 FC	EXMH1	14.626	0.600	6.830	6.700	0.130	112.5	300	7.09	50.0
1.002	S3	S8	30.005	0.600	7.230	7.080	0.150	200.0	225	6.23	50.0
1.003	S8	Attenuation #1	19.146	0.600	7.080	6.980	0.100	191.5	300	6.51	50.0
2.000	Carpark 1	S3	11.507	0.600	7.970	7.230	0.740	15.5	100	5.10	50.0
7.000	Carpark 2	S12	9.823	0.600	8.520	6.880	1.640	6.0	225	5.03	50.0
3.000	S4	S7	16.909	0.600	7.300	7.200	0.100	169.1	150	5.37	50.0
1.007	EXMH1	HW_OUT	7.967	0.600	6.700	6.650	0.050	159.3	300	7.20	50.0
1.001	S1	S3	32.549	0.600	7.400	7.230	0.170	191.5	225	5.69	50.0
1.000	RG #1	S1	7.674	0.600	7.500	7.400	0.100	76.7	150	5.11	50.0
5.000	RG #3	S6	2.887	0.600	8.650	8.650	0.000	0.0	100	5.05	50.0
1.005	S12	S13 FC	8.978	0.600	6.880	6.830	0.050	179.6	300	6.93	50.0
5.001	S6	S7	6.422	0.600	8.650	7.200	1.450	4.4	100	5.08	50.0
1.004	Attenuation #1	S12	19.383	0.600	6.980	6.880	0.100	193.8	300	6.80	50.0
6.000	Carpark 3	S12	13.887	0.600	9.120	6.880	2.240	6.2	100	5.07	50.0
8.000	Carpark 4	S12	6.532	0.600	9.020	6.880	2.140	3.1	100	5.02	50.0
4.000	RG #2	S5	2.053	0.600	8.450	8.450	0.000	0.0	100	5.03	50.0
4.001	S5	S7	9.036	0.600	8.450	7.200	1.250	7.2	100	5.09	50.0
3.001	S7	S8	4.600	0.600	7.200	7.080	0.120	38.3	150	5.41	50.0

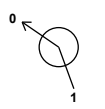
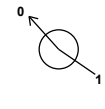
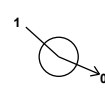
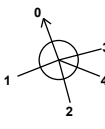
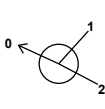
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.006	1.481	104.7	61.1	2.770	3.000	0.338	0.0	165	1.537
1.002	0.921	36.6	23.7	1.845	1.845	0.131	0.0	132	0.978
1.003	1.133	80.1	54.2	1.770	1.920	0.300	0.0	181	1.214
2.000	1.969	15.5	6.1	0.630	1.970	0.034	0.0	44	1.863
7.000	5.381	213.9	2.5	0.555	2.495	0.014	0.0	17	1.836
3.000	0.770	13.6	9.8	2.050	1.900	0.054	0.0	94	0.836
1.007	1.243	87.8	61.1	3.000	3.050	0.338	0.0	184	1.339
1.001	0.941	37.4	12.5	0.975	1.845	0.069	0.0	89	0.848
1.000	1.149	20.3	7.0	1.250	1.050	0.039	0.0	61	1.048
5.000	1.000	7.9	5.8	0.650	0.650	0.032	0.0	0	∞
1.005	1.170	82.7	61.1	2.420	2.770	0.338	0.0	192	1.276
5.001	3.700	29.1	5.8	0.650	1.950	0.032	0.0	30	2.880
1.004	1.126	79.6	54.2	1.920	2.420	0.300	0.0	182	1.208
6.000	3.125	24.5	3.6	0.380	2.620	0.020	0.0	26	2.249
8.000	4.460	35.0	0.7	0.280	2.620	0.004	0.0	10	1.733
4.000	1.000	7.9	4.9	0.650	0.650	0.027	0.0	0	∞
4.001	2.893	22.7	4.9	0.650	1.950	0.027	0.0	32	2.314
3.001	1.630	28.8	24.2	1.900	1.920	0.134	0.0	106	1.823

Pipeline Schedule

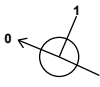
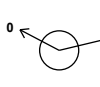
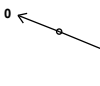
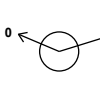
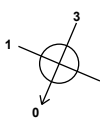
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.006	14.626	112.5	300	Circular	9.900	6.830	2.770	10.000	6.700	3.000
1.002	30.005	200.0	225	Circular	9.300	7.230	1.845	9.150	7.080	1.845
1.003	19.146	191.5	300	Circular	9.150	7.080	1.770	9.200	6.980	1.920
2.000	11.507	15.5	100	Circular	8.700	7.970	0.630	9.300	7.230	1.970
7.000	9.823	6.0	225	Circular	9.300	8.520	0.555	9.600	6.880	2.495
3.000	16.909	169.1	150	Circular	9.500	7.300	2.050	9.250	7.200	1.900
1.007	7.967	159.3	300	Circular	10.000	6.700	3.000	10.000	6.650	3.050
1.001	32.549	191.5	225	Circular	8.600	7.400	0.975	9.300	7.230	1.845
1.000	7.674	76.7	150	Circular	8.900	7.500	1.250	8.600	7.400	1.050
5.000	2.887	0.0	100	Circular	9.400	8.650	0.650	9.400	8.650	0.650
1.005	8.978	179.6	300	Circular	9.600	6.880	2.420	9.900	6.830	2.770
5.001	6.422	4.4	100	Circular	9.400	8.650	0.650	9.250	7.200	1.950
1.004	19.383	193.8	300	Circular	9.200	6.980	1.920	9.600	6.880	2.420
6.000	13.887	6.2	100	Circular	9.600	9.120	0.380	9.600	6.880	2.620
8.000	6.532	3.1	100	Circular	9.400	9.020	0.280	9.600	6.880	2.620
4.000	2.053	0.0	100	Circular	9.200	8.450	0.650	9.200	8.450	0.650
4.001	9.036	7.2	100	Circular	9.200	8.450	0.650	9.250	7.200	1.950
3.001	4.600	38.3	150	Circular	9.250	7.200	1.900	9.150	7.080	1.920

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.006	S13 FC	1200	Manhole	Adoptable	EXMH1	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.003	S8	1200	Manhole	Adoptable	Attenuation #1		Junction	
2.000	Carpark 1		Junction		S3	1200	Manhole	Adoptable
7.000	Carpark 2	1200	Manhole	Adoptable	S12	600	Manhole	Adoptable
3.000	S4	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.007	EXMH1	1200	Manhole	Adoptable	HW_OUT		Junction	
1.001	S1	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.000	RG #1		Junction		S1	1200	Manhole	Adoptable
5.000	RG #3		Junction		S6	450	Manhole	Adoptable
1.005	S12	600	Manhole	Adoptable	S13 FC	1200	Manhole	Adoptable
5.001	S6	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.004	Attenuation #1		Junction		S12	600	Manhole	Adoptable
6.000	Carpark 3		Junction		S12	600	Manhole	Adoptable
8.000	Carpark 4		Junction		S12	600	Manhole	Adoptable
4.000	RG #2		Junction		S5	450	Manhole	Adoptable
4.001	S5	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
3.001	S7	1200	Manhole	Adoptable	S8	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S13 FC	276380.862	189940.684	9.900	3.070	1200	 1	1.005	6.830	300
						0	1.006	6.830	300
EXMH1	276368.799	189948.955	10.000	3.300	1200	 1	1.006	6.700	300
						0	1.007	6.700	300
Carpark 2	276386.501	189922.767	9.300	0.780	1200	 0	7.000	8.520	225
						1	5.000	8.650	100
S6	276415.583	189924.618	9.400	0.750	450	 0	5.001	8.650	100
						1	8.000	6.880	100
S12	276383.942	189932.251	9.600	2.720	600	 2	7.000	6.880	225
						3	6.000	6.880	100
S3	276446.941	189905.322	9.300	2.070	1200	 2	1.005	6.880	300
						1	2.000	7.230	100
S4	276428.100	189937.660	9.500	2.200	1200	 0	1.001	7.230	225
						0	1.002	7.230	225
RG #1	276483.208	189891.948	8.900	1.400		 0	3.000	7.300	150
						0	1.000	7.500	150
RG #2	276431.771	189919.183	9.200	0.750		 0	4.000	8.450	100
						0	4.000	8.450	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
RG #3	276413.442	189926.555	9.400	0.750			0	5.000	8.650	100
S8	276419.684	189917.866	9.150	2.070	1200		1	3.001	7.080	150
							2	1.002	7.080	225
							0	1.003	7.080	300
HW_OUT	276363.469	189954.876	10.000	3.350			1	1.007	6.650	300
S1	276475.744	189890.163	8.600	1.200	1200		1	1.000	7.400	150
							0	1.001	7.400	225
Attenuation #1	276401.974	189925.141	9.200	2.220			1	1.003	6.980	300
							0	1.004	6.980	300
Carpark 3	276397.383	189935.743	9.600	0.480			0	6.000	9.120	100
Carpark 4	276377.864	189929.859	9.400	0.380			0	8.000	9.020	100
Carpark 1	276454.652	189913.863	8.700	0.730			0	2.000	7.970	100
S5	276429.810	189918.575	9.200	0.750	450		1	4.000	8.450	100
							0	4.001	8.450	100
S7	276421.489	189922.097	9.250	2.050	1200		1	5.001	7.200	100
							2	4.001	7.200	100
							3	3.000	7.200	150
							0	3.001	7.200	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Drain Down Time (mins)	240	Check Discharge Rate(s)	x
Summer CV	1.000	Skip Steady State	x	Additional Storage (m³/ha)	20.0	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	10	0

Node S13 FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.006	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0044-1200-2000-1200
Invert Level (m)	6.830	Min Outlet Diameter (m)	0.075
Design Depth (m)	2.000	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.2		

Node S3 Online Orifice Control

Flap Valve	✓	Invert Level (m)	7.230	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.075		

Node Carpark 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	28.800	Depth (m)	0.600
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	8.520	Length (m)	4.900	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)	450	Slope (1:X)	40.0		

Node Attenuation #1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	6.980
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	180.0	0.0	1.200	180.0	0.0	1.201	0.0	0.0

Node Carpark 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	28.800	Depth (m)	0.300
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	9.120	Length (m)	4.875	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)	0	Slope (1:X)	40.0		

Node RG #1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	92.0	0.0	0.500	92.0	0.0	0.501	0.0	0.0

Node RG #1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	7.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	92.0	0.0	0.800	92.0	0.0	0.810	0.0	0.0

Node RG #2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	19.5	0.0	0.800	19.5	0.0	0.801	0.0	0.0

Node RG #3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	8.650
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	5

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	21.4	0.0	0.800	21.4	0.0	0.801	0.0	0.0

Node Carpark 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	48.700	Depth (m)	0.600
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	7.970	Length (m)	4.800	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)		Slope (1:X)	40.0		

Node Carpark 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	4.800	Depth (m)	0.300
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	9.020	Length (m)	7.200	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)	0	Slope (1:X)	40.0		

Results for 100 year +40% CC +10% A 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
1440 minute summer	S13 FC	1200	9.023	2.193	2.7	2.4802	0.0000	SURCHARGED
1440 minute summer	EXMH1	1230	6.725	0.025	1.2	0.0286	0.0000	OK
1440 minute summer	Carpark 2	1230	9.023	0.503	3.2	19.4324	0.0000	FLOOD RISK
1440 minute summer	S6	1200	9.023	0.373	1.9	0.0593	0.0000	SURCHARGED
1440 minute summer	S12	1200	9.023	2.143	4.1	0.6064	0.0000	SURCHARGED
1440 minute summer	S3	1560	8.553	1.323	3.6	1.8911	0.0000	SURCHARGED
30 minute summer	S4	19	9.097	1.797	36.8	3.0020	0.0000	SURCHARGED
1440 minute summer	RG #1	1680	8.553	1.053	6.2	78.0096	0.0000	SURCHARGED
1440 minute summer	RG #2	1200	9.023	0.573	1.6	3.8078	0.0000	FLOOD RISK
30 minute summer	RG #3	20	9.092	0.442	21.8	3.2505	0.0000	SURCHARGED
1440 minute summer	S8	1200	9.023	1.943	10.8	2.9203	0.0000	FLOOD RISK
1440 minute summer	HW_OUT	1230	6.675	0.025	1.2	0.0000	0.0000	OK
1440 minute summer	S1	1560	8.553	1.153	4.0	1.9388	0.0000	FLOOD RISK
1440 minute summer	Attenuation #1	1200	9.023	2.043	11.8	205.2855	0.0000	FLOOD RISK
15 minute summer	Carpark 3	11	9.173	0.053	14.2	0.5470	0.0000	OK
15 minute summer	Carpark 4	10	9.039	0.019	2.8	0.0165	0.0000	OK
1440 minute summer	Carpark 1	1590	8.553	0.583	2.3	37.3031	0.0000	FLOOD RISK
1440 minute summer	S5	1200	9.023	0.573	1.6	0.0911	0.0000	FLOOD RISK
1440 minute summer	S7	1200	9.023	1.823	7.7	2.4722	0.0000	FLOOD RISK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute summer	S13 FC	1.006	EXMH1	1.2	0.474	0.012	0.0386	95.7
1440 minute summer	EXMH1	1.007	HW_OUT	1.2	0.447	0.014	0.0223	
15 minute summer	Carpark 2	7.000	S12	9.7	0.776	0.045	0.2127	
30 minute summer	S6	5.001	S7	16.4	2.092	0.563	0.0502	
15 minute summer	S12	1.005	S13 FC	7.0	0.486	0.085	0.6322	
15 minute summer	S3	Orifice	S8	9.6				
15 minute summer	S4	3.000	S7	31.7	1.803	2.334	0.2977	
15 minute summer	RG #1	1.000	S1	-35.3	-2.046	-1.738	0.1351	
30 minute summer	RG #2	4.000	S5	13.2	1.691	1.681	0.0161	
30 minute summer	RG #3	5.000	S6	15.5	1.975	1.967	0.0226	
15 minute summer	S8	1.003	Attenuation #1	98.5	2.306	1.230	1.3482	
15 minute summer	S1	1.001	S3	-15.2	-0.383	-0.407	1.2945	
15 minute summer	Attenuation #1	1.004	S12	-23.0	-0.498	-0.289	1.3649	
15 minute summer	Carpark 3	6.000	S12	13.7	2.000	0.558	0.0839	
15 minute summer	Carpark 4	8.000	S12	2.8	0.626	0.080	0.0289	
15 minute summer	Carpark 1	2.000	S3	9.2	1.189	0.597	0.0900	
15 minute summer	S5	4.001	S7	14.0	1.819	0.614	0.0707	
15 minute summer	S7	3.001	S8	67.2	3.815	2.331	0.0810	