Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	30	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	5.000
CV	1.000	Preferred Cover Depth (m)	1.200
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)	999.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
2	0.063	5.00	45.100	1200	505876.700	119266.258	1.500
3	0.000		43.000	1200	505821.069	119264.749	1.425
basin b	0.000		43.000		505804.787	119255.274	2.000
5	0.117	5.00	42.136	1200	505797.314	119235.979	1.581
6	0.097	5.00	42.008	1350	505810.127	119222.001	2.208
15	0.091	5.00	43.790	1200	505876.413	119216.709	1.425
17	0.070	5.00	43.223	1200	505876.274	119192.802	1.500
16	0.000		43.473	1200	505876.200	119203.479	1.930
7	0.105	5.00	41.623	1500	505818.124	119204.022	2.548
8	0.131	5.00	40.909	1500	505817.984	119158.342	3.184
9	0.077	5.00	39.512	1500	505782.161	119158.385	2.212
18	0.089	5.00	41.488	1200	505854.114	119126.026	1.588
19	0.071	5.00	40.808	1200	505820.858	119126.268	2.308
20	0.050	5.00	40.149	1200	505820.221	119105.449	2.349
23	0.149	5.00	39.400	1350	505812.236	119076.028	1.950
21	0.000		38.950	1200	505803.833	119100.425	1.870
basin	0.000		38.900		505781.158	119140.144	2.200
FCC	0.000		38.900	1800	505765.828	119123.658	2.250
OUTFALL	0.000		38.500	1800	505744.646	119124.699	1.900

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.001	2	3	55.651	0.600	43.600	41.575	2.025	27.5	225	5.37	149.2
1.002	3	basin b	18.838	0.600	41.575	41.000	0.575	32.8	225	5.51	149.5
1.003	basin b	5	20.827	0.600	41.000	40.630	0.370	56.3	300	5.67	146.1
1.004	5	6	12.079	0.600	40.555	39.800	0.755	16.0	300	5.72	145.5
1.005	6	7	24.796	0.600	39.800	39.150	0.650	38.1	300	5.89	142.8
4.000	15	16	13.232	0.600	42.365	41.618	0.747	17.7	225	5.07	153.4
5.000	17	16	10.677	0.600	41.723	41.543	0.180	59.3	300	5.09	153.0

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)
1.001	2.505	99.6	34.0	1.275	1.200	0.063	0.0	90	2.269
1.002	2.293	91.2	34.0	1.200	1.775	0.063	0.0	95	2.134
1.003	2.099	148.4	33.3	1.700	1.206	0.063	0.0	96	1.706
1.004	3.949	279.2	94.7	1.281	1.908	0.180	0.0	120	3.577
1.005	2.553	180.5	143.0	1.908	2.173	0.277	0.0	202	2.820
4.000	3.123	124.2	50.4	1.200	1.630	0.091	0.0	100	2.966
5.000	2.045	144.5	38.7	1.200	1.630	0.070	0.0	106	1.742

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)
4.001	16	7	58.079	0.600	41.543	39.150	2.393	24.3	300	5.39	149.3
1.006	7	8	39.085	0.600	39.075	38.000	1.075	36.4	375	6.10	138.0
1.007	8	9	35.823	0.600	37.725	37.300	0.425	84.3	525	6.35	136.9
1.008	9	basin	18.269	0.600	37.300	37.000	0.300	60.9	525	6.45	136.4
6.000	18	19	33.257	0.600	39.900	38.500	1.400	23.8	300	5.17	151.1
6.001	19	20	20.829	0.600	38.500	37.950	0.550	37.9	300	5.31	149.7
6.002	20	21	17.141	0.600	37.800	37.218	0.582	29.5	450	5.38	148.8
7.001	23	21	25.804	0.600	37.450	37.305	0.145	178.0	300	5.37	146.3
6.003	21	basin	45.736	0.600	37.080	36.720	0.360	127.0	525	5.77	139.4
6.004	basin	FCC	22.512	0.600	36.700	36.650	0.050	450.2	975	6.70	133.5
1.010	FCC	OUTFALL	21.208	0.600	36.650	36.600	0.050	424.2	825	6.94	130.5

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)
4.001	3.204	226.5	86.9	1.630	2.173	0.161	0.0	129	2.999
1.006	3.013	332.8	270.8	2.173	2.534	0.543	0.0	258	3.341
1.007	2.441	528.3	333.5	2.659	1.687	0.674	0.0	303	2.574
1.008	2.874	622.1	370.2	1.687	1.375	0.751	0.0	292	2.991
6.000	3.239	228.9	48.6	1.288	2.008	0.089	0.0	93	2.591
6.001	2.562	181.1	86.6	2.008	1.899	0.160	0.0	146	2.536
6.002	3.757	597.5	112.9	1.899	1.282	0.210	0.0	131	2.913
7.001	1.175	83.1	78.8	1.650	1.345	0.149	0.0	234	1.330
6.003	1.986	429.8	180.9	1.345	1.655	0.359	0.0	237	1.903
6.004	1.545	1153.3	535.5	1.225	1.275	1.110	0.0	467	1.518
1.010	1.435	767.0	523.5	1.425	1.075	1.110	0.0	502	1.538

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)
1.001	55.651	27.5	225	Circular_Default Sewer Type	45.100	43.600	1.275	43.000	41.575	1.200
1.002	18.838	32.8	225	Circular_Default Sewer Type	43.000	41.575	1.200	43.000	41.000	1.775
1.003	20.827	56.3	300	Circular_Default Sewer Type	43.000	41.000	1.700	42.136	40.630	1.206
1.004	12.079	16.0	300	Circular_Default Sewer Type	42.136	40.555	1.281	42.008	39.800	1.908
1.005	24.796	38.1	300	Circular_Default Sewer Type	42.008	39.800	1.908	41.623	39.150	2.173
4.000	13.232	17.7	225	Circular_Default Sewer Type	43.790	42.365	1.200	43.473	41.618	1.630
5.000	10.677	59.3	300	Circular_Default Sewer Type	43.223	41.723	1.200	43.473	41.543	1.630
4.001	58.079	24.3	300	Circular_Default Sewer Type	43.473	41.543	1.630	41.623	39.150	2.173
1.006	39.085	36.4	375	Circular_Default Sewer Type	41.623	39.075	2.173	40.909	38.000	2.534

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	basin b		Junction	
1.003	basin b		Junction		5	1200	Manhole	Adoptable
1.004	5	1200	Manhole	Adoptable	6	1350	Manhole	Adoptable
1.005	6	1350	Manhole	Adoptable	7	1500	Manhole	Adoptable
4.000	15	1200	Manhole	Adoptable	16	1200	Manhole	Adoptable
5.000	17	1200	Manhole	Adoptable	16	1200	Manhole	Adoptable
4.001	16	1200	Manhole	Adoptable	7	1500	Manhole	Adoptable
1.006	7	1500	Manhole	Adoptable	8	1500	Manhole	Adoptable

Pipeline Schedule

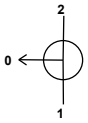
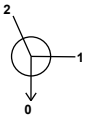
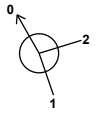
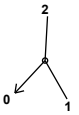
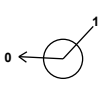
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.007	35.823	84.3	525	Circular_Default Sewer Type	40.909	37.725	2.659	39.512	37.300	1.687
1.008	18.269	60.9	525	Circular_Default Sewer Type	39.512	37.300	1.687	38.900	37.000	1.375
6.000	33.257	23.8	300	Circular_Default Sewer Type	41.488	39.900	1.288	40.808	38.500	2.008
6.001	20.829	37.9	300	Circular_Default Sewer Type	40.808	38.500	2.008	40.149	37.950	1.899
6.002	17.141	29.5	450	Circular_Default Sewer Type	40.149	37.800	1.899	38.950	37.218	1.282
7.001	25.804	178.0	300	Circular_Default Sewer Type	39.400	37.450	1.650	38.950	37.305	1.345
6.003	45.736	127.0	525	Circular_Default Sewer Type	38.950	37.080	1.345	38.900	36.720	1.655
6.004	22.512	450.2	975	Circular_Default Sewer Type	38.900	36.700	1.225	38.900	36.650	1.275
1.010	21.208	424.2	825	Circular_Default Sewer Type	38.900	36.650	1.425	38.500	36.600	1.075

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.007	8	1500	Manhole	Adoptable	9	1500	Manhole	Adoptable
1.008	9	1500	Manhole	Adoptable	basin		Junction	
6.000	18	1200	Manhole	Adoptable	19	1200	Manhole	Adoptable
6.001	19	1200	Manhole	Adoptable	20	1200	Manhole	Adoptable
6.002	20	1200	Manhole	Adoptable	21	1200	Manhole	Adoptable
7.001	23	1350	Manhole	Adoptable	21	1200	Manhole	Adoptable
6.003	21	1200	Manhole	Adoptable	basin		Junction	
6.004	basin		Junction		FCC	1800	Manhole	Adoptable
1.010	FCC	1800	Manhole	Adoptable	OUTFALL	1800	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
2	505876.700	119266.258	45.100	1.500	1200				
						0	1.001	43.600	225
3	505821.069	119264.749	43.000	1.425	1200		1	1.001	41.575	225
									
						0	1.002	41.575	225
basin b	505804.787	119255.274	43.000	2.000		1	1.002	41.000	225
									
						0	1.003	41.000	300
5	505797.314	119235.979	42.136	1.581	1200	1	1.003	40.630	300
									
						0	1.004	40.555	300
6	505810.127	119222.001	42.008	2.208	1350	1	1.004	39.800	300
									
						0	1.005	39.800	300
15	505876.413	119216.709	43.790	1.425	1200				
						0	4.000	42.365	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
17	505876.274	119192.802	43.223	1.500	1200		0	5.000	41.723	300
16	505876.200	119203.479	43.473	1.930	1200		1	5.000	41.543	300
							2	4.000	41.618	225
							0	4.001	41.543	300
7	505818.124	119204.022	41.623	2.548	1500		1	4.001	39.150	300
							2	1.005	39.150	300
							0	1.006	39.075	375
8	505817.984	119158.342	40.909	3.184	1500		1	1.006	38.000	375
							0	1.007	37.725	525
9	505782.161	119158.385	39.512	2.212	1500		1	1.007	37.300	525
							0	1.008	37.300	525
18	505854.114	119126.026	41.488	1.588	1200		0	6.000	39.900	300
19	505820.858	119126.268	40.808	2.308	1200		1	6.000	38.500	300
							0	6.001	38.500	300
20	505820.221	119105.449	40.149	2.349	1200		1	6.001	37.950	300
							0	6.002	37.800	450
23	505812.236	119076.028	39.400	1.950	1350		0	7.001	37.450	300
21	505803.833	119100.425	38.950	1.870	1200		1	7.001	37.305	300
							2	6.002	37.218	450
							0	6.003	37.080	525
basin	505781.158	119140.144	38.900	2.200			1	6.003	36.720	525
							2	1.008	37.000	525
							0	6.004	36.700	975
FCC	505765.828	119123.658	38.900	2.250	1800		1	6.004	36.650	975
							0	1.010	36.650	825
OUTFALL	505744.646	119124.699	38.500	1.900	1800		1	1.010	36.600	825

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year 360 minute (m³)	

Storm Durations

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

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	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node FCC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	36.650	Product Number	CTL-SHE-0092-4900-1900-4900
Design Depth (m)	1.900	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.9	Min Node Diameter (mm)	1200

Node basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	36.700
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	187.0	0.0	2.200	1220.0	0.0

Node basin b Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	41.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	49.7	0.0	2.000	154.5	0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	2	10	43.728	0.128	61.5	0.1447	0.0000	OK
15 minute summer	3	10	41.715	0.140	61.0	0.1588	0.0000	OK
15 minute summer	basin b	13	41.307	0.307	103.7	17.7064	0.0000	SURCHARGED
15 minute summer	5	12	41.278	0.723	158.4	0.8173	0.0000	SURCHARGED
15 minute summer	6	11	41.156	1.356	192.2	1.9402	0.0000	SURCHARGED
15 minute summer	15	10	42.527	0.162	88.9	0.1835	0.0000	OK
15 minute summer	17	10	41.897	0.174	68.4	0.1969	0.0000	OK
15 minute summer	16	11	41.755	0.212	156.5	0.2399	0.0000	OK
15 minute summer	7	11	40.422	1.347	425.6	2.3801	0.0000	SURCHARGED
960 minute winter	8	945	38.614	0.889	40.3	1.5717	0.0000	SURCHARGED
960 minute winter	9	945	38.614	1.314	71.1	2.3227	0.0000	SURCHARGED
15 minute summer	18	10	40.027	0.127	86.9	0.1435	0.0000	OK
15 minute summer	19	10	38.747	0.247	156.0	0.2792	0.0000	OK
960 minute winter	20	960	38.615	0.815	12.6	0.9218	0.0000	SURCHARGED
960 minute winter	23	945	38.615	1.165	8.9	1.6666	0.0000	SURCHARGED
960 minute winter	21	960	38.614	1.534	21.0	1.7347	0.0000	SURCHARGED
960 minute winter	basin	945	38.614	1.914	85.1	1218.4900	0.0000	FLOOD RISK
960 minute winter	FCC	945	38.614	1.964	5.0	4.9996	0.0000	FLOOD RISK
15 minute summer	OUTFALL	1	36.600	0.000	4.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	2	1.001	3	61.0	2.506	0.612	1.3730	
15 minute summer	3	1.002	basin b	61.9	2.694	0.679	0.6040	
15 minute summer	basin b	1.003	5	123.9	2.180	0.835	1.4666	
15 minute summer	5	1.004	6	163.6	2.324	0.586	0.8506	
15 minute summer	6	1.005	7	197.3	2.801	1.093	1.7461	
15 minute summer	15	4.000	16	88.6	3.131	0.713	0.3738	
15 minute summer	17	5.000	16	67.9	1.581	0.470	0.5067	
15 minute summer	16	4.001	7	152.5	2.393	0.673	3.5917	
15 minute summer	7	1.006	8	419.6	3.805	1.261	4.3047	
960 minute winter	8	1.007	9	39.5	1.269	0.075	7.7389	
960 minute winter	9	1.008	basin	69.0	1.100	0.111	3.9467	
15 minute summer	18	6.000	19	86.7	1.901	0.379	1.5026	
15 minute summer	19	6.001	20	154.0	2.686	0.850	1.1938	
960 minute winter	20	6.002	21	12.2	1.174	0.021	2.7159	
960 minute winter	23	7.001	21	9.5	0.641	0.114	1.8171	
960 minute winter	21	6.003	basin	20.8	0.564	0.048	9.8805	
960 minute winter	basin	6.004	FCC	5.0	0.170	0.004	16.7601	
960 minute winter	FCC	Hydro-Brake®	OUTFALL	5.0				309.0