

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)	0.200
CV	0.750	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)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
RE10	0.041	5.00	4.250	1200	561439.342	175109.446	1.088
S20	0.035	5.00	4.220	1200	561462.288	175131.465	1.270
Ex. SMH2	0.021	5.00	4.180	1200	561450.371	175145.479	1.370
S30	0.083	5.00	4.190	1200	561433.359	175172.739	1.648
Ex. SMH3	0.053	5.00	4.100	1200	561419.765	175187.146	1.723
RE20	0.053	5.00	4.160	1200	561424.983	175119.913	0.871
S70	0.067	5.00	4.160	1200	561388.743	175160.529	1.389
Ex. SMH4	0.210	5.00	4.100	1200	561388.496	175224.698	2.626
FCC-Pump	0.150	5.00	4.100	1500	561379.366	175229.945	2.724
Outfall Break			3.500	1200	561476.223	175313.076	2.704

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)
1.000	RE10	S20	31.802	0.600	3.162	2.950	0.212	150.0	300	5.41	50.0
1.001	S20	Ex. SMH2	18.396	0.600	2.950	2.810	0.140	131.4	300	5.64	50.0
1.002	Ex. SMH2	S30	32.133	0.600	2.810	2.542	0.268	119.9	300	6.01	50.0
1.003	S30	Ex. SMH3	19.808	0.600	2.542	2.377	0.165	120.0	300	6.24	49.8
2.000	RE20	S70	54.433	0.600	3.289	2.771	0.518	105.0	300	5.59	50.0
2.001	S70	Ex. SMH3	40.876	0.600	2.771	2.531	0.240	170.0	300	6.16	50.0
1.004	Ex. SMH3	Ex. SMH4	48.866	0.600	2.377	1.474	0.903	54.1	300	6.62	48.3
1.005	Ex. SMH4	FCC-Pump	10.530	0.600	1.474	1.426	0.048	220.0	300	6.79	47.7
1.006	FCC-Pump	Outfall Break	127.640	0.600	1.376	0.796	0.580	220.0	350	8.61	42.1

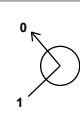
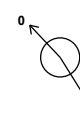
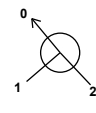
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.281	90.6	5.6	0.788	0.970	0.041	0.0	50	0.718
1.001	1.370	96.8	10.3	0.970	1.070	0.076	0.0	66	0.902
1.002	1.434	101.4	13.1	1.070	1.348	0.097	0.0	72	0.997
1.003	1.434	101.4	24.3	1.348	1.423	0.180	0.0	99	1.183
2.000	1.534	108.4	7.2	0.571	1.089	0.053	0.0	52	0.878
2.001	1.203	85.0	16.3	1.089	1.269	0.120	0.0	89	0.935
1.004	2.142	151.4	46.3	1.423	2.326	0.353	0.0	113	1.889
1.005	1.056	74.6	72.8	2.326	2.374	0.563	0.0	241	1.197
1.006	1.165	112.1	81.3	2.374	2.354	0.713	0.0	222	1.266

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	31.802	150.0	300	Circular	4.250	3.162	0.788	4.220	2.950	0.970
1.001	18.396	131.4	300	Circular	4.220	2.950	0.970	4.180	2.810	1.070
1.002	32.133	119.9	300	Circular	4.180	2.810	1.070	4.190	2.542	1.348
1.003	19.808	120.0	300	Circular	4.190	2.542	1.348	4.100	2.377	1.423
2.000	54.433	105.0	300	Circular	4.160	3.289	0.571	4.160	2.771	1.089
2.001	40.876	170.0	300	Circular	4.160	2.771	1.089	4.100	2.531	1.269
1.004	48.866	54.1	300	Circular	4.100	2.377	1.423	4.100	1.474	2.326
1.005	10.530	220.0	300	Circular	4.100	1.474	2.326	4.100	1.426	2.374
1.006	127.640	220.0	350	Circular	4.100	1.376	2.374	3.500	0.796	2.354

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE10	1200	Manhole	Adoptable	S20	1200	Manhole	Adoptable
1.001	S20	1200	Manhole	Adoptable	Ex. SMH2	1200	Manhole	Adoptable
1.002	Ex. SMH2	1200	Manhole	Adoptable	S30	1200	Manhole	Adoptable
1.003	S30	1200	Manhole	Adoptable	Ex. SMH3	1200	Manhole	Adoptable
2.000	RE20	1200	Manhole	Adoptable	S70	1200	Manhole	Adoptable
2.001	S70	1200	Manhole	Adoptable	Ex. SMH3	1200	Manhole	Adoptable
1.004	Ex. SMH3	1200	Manhole	Adoptable	Ex. SMH4	1200	Manhole	Adoptable
1.005	Ex. SMH4	1200	Manhole	Adoptable	FCC-Pump	1500	Manhole	Adoptable
1.006	FCC-Pump	1500	Manhole	Adoptable	Outfall Break	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RE10	561439.342	175109.446	4.250	1.088	1200				
						0	1.000	3.162	300
S20	561462.288	175131.465	4.220	1.270	1200		1	1.000	2.950
						0	1.001	2.950	300
Ex. SMH2	561450.371	175145.479	4.180	1.370	1200		1	1.001	2.810
						0	1.002	2.810	300
S30	561433.359	175172.739	4.190	1.648	1200		1	1.002	2.542
						0	1.003	2.542	300
Ex. SMH3	561419.765	175187.146	4.100	1.723	1200		1	2.001	2.531
						2	1.003	2.377	300
						0	1.004	2.377	300
RE20	561424.983	175119.913	4.160	0.871	1200				
						0	2.000	3.289	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S70	561388.743	175160.529	4.160	1.389	1200		1	2.000	2.771 300
Ex. SMH4	561388.496	175224.698	4.100	2.626	1200		1	1.004	1.474 300
FCC-Pump	561379.366	175229.945	4.100	2.724	1500		1	1.005	1.426 300
Outfall Break	561476.223	175313.076	3.500	2.704	1200		1	1.006	1.376 350

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	1.4
Summer CV	0.750	Drain Down Time (mins)	240	30 year (l/s)	3.7
Winter CV	0.840	Additional Storage (m³/ha)	20.0	100 year (l/s)	4.9
Analysis Speed	Normal	Check Discharge Rate(s)	✓	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 %)
2	0	0	0
30	0	0	0
100	20	0	0
100	40	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)	0.710	Betterment (%)	0
SAAR (mm)	549	QBar	1.5
Soil Index	3	Q 1 year (l/s)	
SPR	0.37	Q 30 year (l/s)	
Region	7	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Node FCC-Pump Online Pump Control

Flap Valve	x	Design Depth (m)	0.600	Switch off depth (m)	0.300
Replaces Downstream Link	✓	Design Flow (l/s)	19.8		
Invert Level (m)	1.376	Switch on depth (m)	0.600		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.300	0.000	0.600	19.800

Node FCC-Pump Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.376
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	240

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	200.0	0.0	1.500	200.0	0.0	1.501	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	107.434	30.400	30 year 480 minute winter	17.198	6.841
2 year 15 minute winter	75.392	30.400	30 year 600 minute summer	20.988	5.741
2 year 30 minute summer	68.244	19.311	30 year 600 minute winter	14.340	5.741
2 year 30 minute winter	47.891	19.311	30 year 720 minute summer	18.547	4.971
2 year 60 minute summer	44.651	11.800	30 year 720 minute winter	12.465	4.971
2 year 60 minute winter	29.665	11.800	30 year 960 minute summer	15.026	3.957
2 year 120 minute summer	30.830	8.147	30 year 960 minute winter	9.954	3.957
2 year 120 minute winter	20.483	8.147	30 year 1440 minute summer	10.680	2.862
2 year 180 minute summer	24.616	6.335	30 year 1440 minute winter	7.178	2.862
2 year 180 minute winter	16.001	6.335	100 year +20% CC 15 minute summer	446.610	126.375
2 year 240 minute summer	19.785	5.229	100 year +20% CC 15 minute winter	313.411	126.375
2 year 240 minute winter	13.145	5.229	100 year +20% CC 30 minute summer	289.629	81.955
2 year 360 minute summer	15.230	3.919	100 year +20% CC 30 minute winter	203.249	81.955
2 year 360 minute winter	9.900	3.919	100 year +20% CC 60 minute summer	191.773	50.680
2 year 480 minute summer	11.954	3.159	100 year +20% CC 60 minute winter	127.409	50.680
2 year 480 minute winter	7.942	3.159	100 year +20% CC 120 minute summer	114.935	30.374
2 year 600 minute summer	9.724	2.660	100 year +20% CC 120 minute winter	76.360	30.374
2 year 600 minute winter	6.644	2.660	100 year +20% CC 180 minute summer	87.503	22.517
2 year 720 minute summer	8.600	2.305	100 year +20% CC 180 minute winter	56.879	22.517
2 year 720 minute winter	5.780	2.305	100 year +20% CC 240 minute summer	68.928	18.216
2 year 960 minute summer	6.950	1.830	100 year +20% CC 240 minute winter	45.794	18.216
2 year 960 minute winter	4.603	1.830	100 year +20% CC 360 minute summer	52.541	13.521
2 year 1440 minute summer	4.938	1.323	100 year +20% CC 360 minute winter	34.153	13.521
2 year 1440 minute winter	3.319	1.323	100 year +20% CC 480 minute summer	41.434	10.950
30 year 15 minute summer	290.376	82.166	100 year +20% CC 480 minute winter	27.528	10.950
30 year 15 minute winter	203.773	82.166	100 year +20% CC 600 minute summer	33.951	9.286
30 year 30 minute summer	186.550	52.787	100 year +20% CC 600 minute winter	23.198	9.286
30 year 30 minute winter	130.912	52.787	100 year +20% CC 720 minute summer	30.251	8.108
30 year 60 minute summer	122.545	32.385	100 year +20% CC 720 minute winter	20.331	8.108
30 year 60 minute winter	81.416	32.385	100 year +20% CC 960 minute summer	24.766	6.522
30 year 120 minute summer	74.213	19.612	100 year +20% CC 960 minute winter	16.406	6.522
30 year 120 minute winter	49.305	19.612	100 year +20% CC 1440 minute summer	17.720	4.749
30 year 180 minute summer	56.408	14.516	100 year +20% CC 1440 minute winter	11.909	4.749
30 year 180 minute winter	36.666	14.516	100 year +40% CC 15 minute summer	521.045	147.438
30 year 240 minute summer	44.213	11.684	100 year +40% CC 15 minute winter	365.646	147.438
30 year 240 minute winter	29.374	11.684	100 year +40% CC 30 minute summer	337.901	95.614
30 year 360 minute summer	33.263	8.560	100 year +40% CC 30 minute winter	237.123	95.614
30 year 360 minute winter	21.622	8.560	100 year +40% CC 60 minute summer	223.735	59.127
30 year 480 minute summer	25.886	6.841	100 year +40% CC 60 minute winter	148.644	59.127

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 120 minute summer	134.091	35.436	100 year +40% CC 480 minute winter	32.116	12.775
100 year +40% CC 120 minute winter	89.087	35.436	100 year +40% CC 600 minute summer	39.610	10.834
100 year +40% CC 180 minute summer	102.086	26.270	100 year +40% CC 600 minute winter	27.064	10.834
100 year +40% CC 180 minute winter	66.359	26.270	100 year +40% CC 720 minute summer	35.293	9.459
100 year +40% CC 240 minute summer	80.416	21.252	100 year +40% CC 720 minute winter	23.719	9.459
100 year +40% CC 240 minute winter	53.427	21.252	100 year +40% CC 960 minute summer	28.894	7.609
100 year +40% CC 360 minute summer	61.298	15.774	100 year +40% CC 960 minute winter	19.140	7.609
100 year +40% CC 360 minute winter	39.845	15.774	100 year +40% CC 1440 minute summer	20.674	5.541
100 year +40% CC 480 minute summer	48.339	12.775	100 year +40% CC 1440 minute winter	13.894	5.541

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE10	10	3.212	0.050	5.7	0.0940	0.0000	OK
15 minute winter	S20	11	3.017	0.067	10.3	0.1131	0.0000	OK
15 minute winter	Ex. SMH2	11	2.882	0.072	12.9	0.1032	0.0000	OK
15 minute winter	S30	11	2.646	0.104	23.8	0.2217	0.0000	OK
15 minute winter	Ex. SMH3	11	2.490	0.113	46.3	0.1967	0.0000	OK
15 minute winter	RE20	11	3.340	0.051	7.3	0.1208	0.0000	OK
15 minute winter	S70	11	2.859	0.088	16.3	0.1851	0.0000	OK
600 minute summer	Ex. SMH4	450	1.976	0.502	11.5	1.3704	0.0000	SURCHARGED
600 minute summer	FCC-Pump	450	1.976	0.600	13.8	121.7070	0.0000	SURCHARGED
15 minute summer	Outfall Break	1	0.796	0.000	0.0	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)
15 minute winter	RE10	1.000	S20	5.5	0.574	0.061	0.3077	
15 minute winter	S20	1.001	Ex. SMH2	10.2	0.828	0.106	0.2271	
15 minute winter	Ex. SMH2	1.002	S30	13.0	0.757	0.128	0.5542	
15 minute winter	S30	1.003	Ex. SMH3	23.9	1.047	0.236	0.4529	
15 minute winter	Ex. SMH3	1.004	Ex. SMH4	46.2	1.016	0.305	2.1567	
15 minute winter	RE20	2.000	S70	7.0	0.585	0.065	0.6887	
15 minute winter	S70	2.001	Ex. SMH3	15.5	0.915	0.182	0.6933	
600 minute summer	Ex. SMH4	1.005	FCC-Pump	10.8	0.458	0.145	0.7415	
600 minute summer	FCC-Pump	Pump	Outfall Break	15.5				70.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE10	10	3.244	0.082	15.3	0.1545	0.0000	OK
15 minute winter	S20	10	3.066	0.116	28.1	0.1959	0.0000	OK
15 minute winter	Ex. SMH2	11	2.931	0.121	35.4	0.1736	0.0000	OK
15 minute winter	S30	12	2.839	0.297	65.5	0.6342	0.0000	OK
15 minute winter	Ex. SMH3	12	2.768	0.391	124.6	0.6829	0.0000	SURCHARGED
15 minute winter	RE20	10	3.374	0.085	19.8	0.1999	0.0000	OK
15 minute winter	S70	11	2.924	0.153	44.3	0.3216	0.0000	OK
180 minute winter	Ex. SMH4	132	2.235	0.761	47.7	2.0763	0.0000	SURCHARGED
180 minute winter	FCC-Pump	132	2.231	0.855	59.2	173.4010	0.0000	SURCHARGED
15 minute summer	Outfall Break	1	0.796	0.000	0.0	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)
15 minute winter	RE10	1.000	S20	15.0	0.741	0.166	0.6494	
15 minute winter	S20	1.001	Ex. SMH2	27.5	1.069	0.284	0.4737	
15 minute winter	Ex. SMH2	1.002	S30	35.3	0.929	0.348	1.5241	
15 minute winter	S30	1.003	Ex. SMH3	64.1	1.211	0.633	1.3935	
15 minute winter	Ex. SMH3	1.004	Ex. SMH4	114.5	1.626	0.756	3.4411	
15 minute winter	RE20	2.000	S70	19.4	0.746	0.179	1.4299	
15 minute winter	S70	2.001	Ex. SMH3	45.2	1.169	0.532	1.8917	
180 minute winter	Ex. SMH4	1.005	FCC-Pump	46.5	0.746	0.623	0.7415	
180 minute winter	FCC-Pump	Pump	Outfall Break	19.8				196.3

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE10	12	3.655	0.493	29.1	0.9289	0.0000	SURCHARGED
15 minute winter	S20	12	3.647	0.697	43.3	1.1716	0.0000	SURCHARGED
15 minute winter	Ex. SMH2	12	3.627	0.817	49.0	1.1748	0.0000	SURCHARGED
15 minute winter	S30	12	3.574	1.032	83.8	2.2074	0.0000	SURCHARGED
15 minute winter	Ex. SMH3	12	3.439	1.062	132.6	1.8546	0.0000	SURCHARGED
15 minute winter	RE20	13	3.537	0.248	30.4	0.5818	0.0000	OK
15 minute winter	S70	13	3.499	0.728	68.3	1.5249	0.0000	SURCHARGED
240 minute winter	Ex. SMH4	184	2.758	1.284	60.0	3.5048	0.0000	SURCHARGED
240 minute winter	FCC-Pump	184	2.755	1.379	74.4	279.6672	0.0000	SURCHARGED
15 minute summer	Outfall Break	1	0.796	0.000	19.8	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)
15 minute winter	RE10	1.000	S20	23.2	0.807	0.257	2.2395	
15 minute winter	S20	1.001	Ex. SMH2	38.3	1.132	0.396	1.2954	
15 minute winter	Ex. SMH2	1.002	S30	48.6	0.917	0.479	2.2628	
15 minute winter	S30	1.003	Ex. SMH3	76.8	1.225	0.758	1.3949	
15 minute winter	Ex. SMH3	1.004	Ex. SMH4	135.0	1.917	0.892	3.4411	
15 minute winter	RE20	2.000	S70	29.9	0.826	0.276	3.6103	
15 minute winter	S70	2.001	Ex. SMH3	54.5	1.143	0.641	2.8785	
240 minute winter	Ex. SMH4	1.005	FCC-Pump	58.4	0.829	0.782	0.7415	
240 minute winter	FCC-Pump	Pump	Outfall Break	19.8				367.4

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.33%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE10	13	4.203	1.041	44.1	1.9624	0.0000	FLOOD RISK
15 minute winter	S20	13	4.197	1.247	46.9	2.0978	0.0000	FLOOD RISK
15 minute winter	Ex. SMH2	13	4.173	1.363	45.8	1.9598	0.0000	FLOOD RISK
15 minute winter	S30	13	4.105	1.563	91.3	3.3427	0.0000	FLOOD RISK
240 minute winter	Ex. SMH3	188	4.077	1.700	44.5	2.9684	0.0000	FLOOD RISK
15 minute winter	RE20	13	4.116	0.827	35.5	1.9428	0.0000	FLOOD RISK
15 minute winter	S70	13	4.087	1.316	74.0	2.7593	0.0000	FLOOD RISK
240 minute winter	Ex. SMH4	188	4.073	2.599	68.8	7.0961	0.0000	FLOOD RISK
240 minute winter	FCC-Pump	188	4.070	2.694	85.2	307.8264	0.0000	FLOOD RISK
15 minute summer	Outfall Break	1	0.796	0.000	19.8	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)
15 minute winter	RE10	1.000	S20	24.8	0.850	0.274	2.2395	
15 minute winter	S20	1.001	Ex. SMH2	35.3	1.126	0.365	1.2954	
15 minute winter	Ex. SMH2	1.002	S30	47.0	0.932	0.464	2.2628	
15 minute winter	S30	1.003	Ex. SMH3	84.2	1.237	0.831	1.3949	
240 minute winter	Ex. SMH3	1.004	Ex. SMH4	43.0	0.779	0.284	3.4411	
15 minute winter	RE20	2.000	S70	31.8	0.816	0.293	3.8331	
15 minute winter	S70	2.001	Ex. SMH3	54.1	1.081	0.637	2.8785	
240 minute winter	Ex. SMH4	1.005	FCC-Pump	66.8	0.948	0.895	0.7415	
240 minute winter	FCC-Pump	Pump	Outfall Break	19.8				425.1