Drainage Pipe Conveyance Calculations

FOR

MainSt NB Phase 1F

North Brunswick Township
Middlesex County, New Jersey

<u>*Owner/Applicant*</u>:
North Brunswick TOD Phase 1F Associates, LLC
2300 US Route 1
North Brunswick, NJ 08902

AND

North Brunswick TOD Associates, LLC
2300 US Route 1
North Brunswick, NJ 08902

March 2022

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TRG Project No. 21-042

The Reynolds Group Inc.

State Certificate of Authorization
Engineering & Land Surveying No. 24GA27969200
Landscape Architecture No. MH000043

Engineers
Landscape Architects
Land Surveyors

SUMMARY:

The amended Phase 1F site plan includes construction of new storm pipes and inlets to capture and convey runoff from the developed site to existing stormwater detention facilities. Pipe calculations are attached and further described below, including an inlet tributary map.

STORM PIPE DESIGN/CALCULATIONS

Existing stormwater basins, basin inflow/outflow pipes and stormwater collection systems were previously installed within the limits of improvements for amended Phase 1F. Existing storm pipes and structures that conflict with proposed buildings will be removed. The pipe analysis involves pipe conveyance capacities for new storm pipe networks as well as existing pipes to remain. The following information was obtained from the original design by Crest Engineering:

- Design storm: 25-year per approved stormwater report
- Existing pipe data: As-built plans

<u>Tributary to Existing Basin (Wet Pond) B</u>

These are the four (4) existing inflow pipes to existing basin B analyzed for Phase 1F amended site plan:

- FES BB-1A, existing 48" pipe, downstream section of wet pond B
- FES BA-6D, existing 30" pipe, downstream section of wet pond B
- FES BA-1, existing 30" pipe, downstream section of wet pond B
- FES BD-1A, existing 30" pipe, upstream section of wet pond B

The Hydraflow® software was used to determine pipe conveyance capacities of existing pipes to remain. Below is the list of existing pipes resulting in <u>inadequate conveyance capacity</u>:

1. Basin inflow - FES BB-1A
   a. 15" pipe from LI BB-6D (prop. saddle connection) to STMH BB-6; Q_{25}=2.9 cfs, $Q_{pipe\ cap.}$=2.6 cfs; surcharge condition, HGL below rim/grate, no overtopping (<u>to remain</u>).
   b. 15" pipe from STMH BB-10A to LI BB-6D (prop. saddle connection) Q_{25}=2.8 cfs, $Q_{pipe\ cap.}$=2.7 cfs; surcharge condition, HGL below rim/grate, no overtopping (<u>to remain</u>).

2. Basin inflow - FES BA-6D
   a. 30" pipe from STMH BA6C to STMH BA6B; Q_{25}=25.4 cfs, $Q_{pipe\ cap.}$=24.1 cfs; surcharge condition, HGL below rim/grate, no overtopping (<u>to remain</u>).

   b. 30” pipe from Inlet CDI BA-6A to STMH BA6B; Q_{25}=25.5 cfs, $Q_{pipe\ cap.}$=21.5 cfs; surcharge condition, HGL below rim, no overtopping (to remain).
   c. 30” pipe from Inlet CDI BA-6 to Inlet CDI BA-6A; Q_{25}=23.7 cfs, $Q_{pipe\ cap.}$=19.9 cfs; surcharge condition, HGL above rim/grate, inlet overtopping; relief pipe proposed (see below).
3. Basin inflow - FES BD-1A
   a. 15” pipe from STMH BDR-7 to Inlet CDI BDR-4; Q_{25}=5.9 cfs, $Q_{pipe\ cap.}$=5.2 cfs; surcharge condition, HGL below rim/grate, no overtopping (to remain).

Note: See attached storm pipe models showing existing and corrected capacity and HGL issues; Scenario #1- without relief pipe, Scenario #2 – relief pipe HGL determination & Scenario #3 – adjusted HGL upstream of MHBA-6A/split flow.

A 24” relief pipe is proposed to divert flow from existing basin inflow structures FES BA-6D (30”) to FES BB-1A (48”). The relief pipe will be installed between STMH BA-6A to Inlet CDI BB-3. See attached calculations, Scenario #2 for relief/diversion pipe. Installation of this pipe will allow noted pipe run to have capacity.

Refer to pipe calculations Scenario #3 for adjusted HGL upstream of STMH BA-6A, resulting from the flow diversion.

Tributary to Existing Basin (Wet Pond) C

These network of existing pipes and structures are located along Tenth Ave, north of Phase 1F, and involve a proposed road connection to Grand Ave. By inspection, the constructed drainage system is consistent with the original approved site plans. This section of the project will be developed in the future, as such, pipe design (full development) will be submitted at that time.

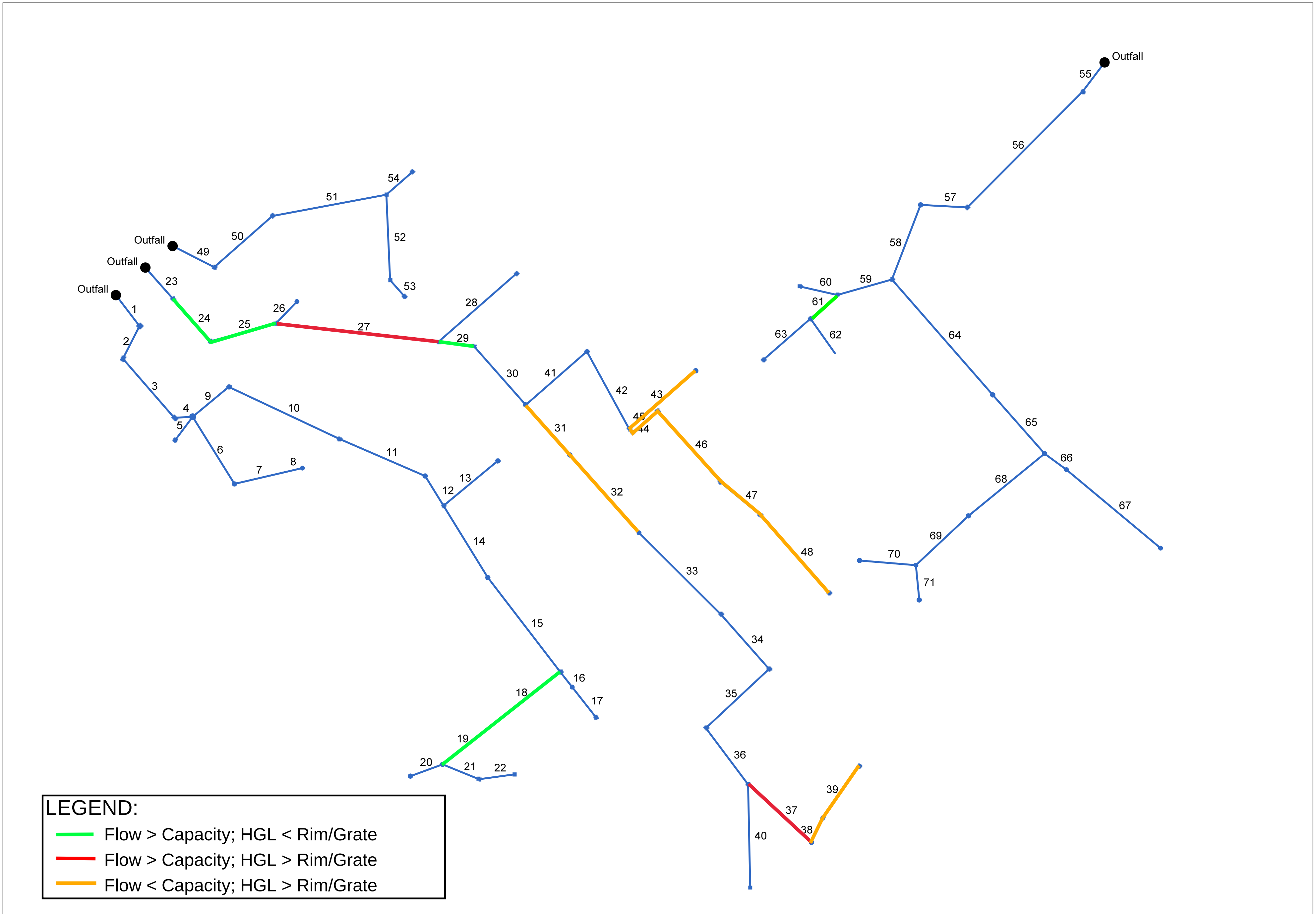
Tributary to Existing Basin (Wet Pond) D

This section of storm pipe system is located at the southeast corner of the project, remainder to Tenth Ave and Main Street to be constructed in the future. By inspection, the constructed drainage system is consistent with the original approved site plans. This section of the project will be developed in the future, as such, pipe design (full development) will be submitted at that time.

Based on the attached pipe calculations, the proposed/modified stormwater networks tributary to wet pond ‘B’ will have adequate capacity to convey the 25-year design storm.

Attachments:
Hydraflow® Output Data – All (3) Scenarios
Hydraflow® Output Data – Split Flow at MH BA-6A
NOAA Point Precipitation, North Brunswick
Inlet Drainage Area, Composite ‘C’ Calculations
Inlet Tributary Drainage Map, Sheet DA-1

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: 21042 Basin B Scenario #1 R0.stm	Number of lines: 71	Date: 1/18/2022

Storm Sewers v2018.30

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	46.873	0.00	8.43	0.00	0.00	8.02	0.0	17.1	4.7	37.51	122.4	2.99	48	0.62	99.05	99.34	108.09	108.12	103.55	110.55	MHBB1 - FESBB1
2	1	44.000	0.20	8.43	0.91	0.18	8.02	10.0	16.9	4.7	37.69	77.07	3.92	42	0.50	103.60	103.82	108.15	108.20	110.55	109.76	CDIBB1A - MHBB
3	2	94.000	0.08	8.23	0.81	0.06	7.84	10.0	16.5	4.7	37.22	77.07	3.87	42	0.50	103.87	104.34	108.26	108.37	109.76	109.76	CDIBB1B - CDIBB
4	3	22.000	0.00	8.15	0.00	0.00	7.78	0.0	16.4	4.8	37.00	77.07	3.85	42	0.50	104.39	104.50	108.49	108.52	109.76	111.00	MHBB12A - CDIB
5	4	35.000	1.18	1.18	0.96	1.13	1.13	10.0	10.0	5.8	6.56	13.89	5.35	15	3.94	106.07	107.45	108.75	109.05	111.00	113.01	CDIBB12B - MHB
6	4	95.000	2.70	3.20	0.96	2.59	3.05	10.0	10.7	5.7	17.26	19.87	3.52	30	0.20	104.99	105.18	108.75	108.89	111.00	111.54	CDIBB12 - MHBB
7	6	59.000	0.00	0.50	0.00	0.00	0.46	0.0	10.2	5.8	2.62	5.46	2.13	15	0.61	106.27	106.63	109.17	109.25	111.54	111.00	EXT - CDIBB12
8	7	24.600	0.50	0.50	0.91	0.46	0.46	10.0	10.0	5.8	2.64	5.46	2.15	15	0.61	106.63	106.78	109.26	109.29	111.00	110.00	CD1BB12F - EXT
9	4	56.222	0.00	3.77	0.00	0.00	3.60	0.0	16.1	4.8	17.23	34.55	3.51	30	0.60	104.55	104.89	108.75	108.83	111.00	111.25	MHBB2 - MHBB1
10	9	146.548	0.34	3.77	0.94	0.32	3.60	10.0	15.5	4.9	17.55	34.43	3.57	30	0.60	104.99	105.87	108.88	109.11	111.25	110.33	CDIBB3 - MHBB2
11	10	112.000	0.29	3.43	0.96	0.28	3.28	10.0	15.0	5.0	16.23	25.19	3.31	30	0.32	105.92	106.28	109.16	109.31	110.33	111.00	CDIBB4 - CDIBB3
12	11	42.000	0.37	3.14	0.99	0.37	3.00	10.0	14.7	5.0	14.94	20.57	3.04	30	0.21	106.28	106.37	109.47	109.51	111.00	112.00	MH BB4A - CDIB
13	12	84.157	0.25	0.25	0.98	0.25	0.25	10.0	10.0	5.8	1.42	4.94	1.16	15	0.50	107.62	108.04	109.66	109.69	112.00	111.06	CDIBB4B - MHBB
14	12	101.288	0.66	2.52	0.93	0.61	2.39	10.0	14.1	5.1	12.12	20.23	2.47	30	0.21	106.37	106.58	109.66	109.73	112.00	111.20	CDIBB5 - MHBB4
15	14	143.000	0.15	1.86	0.99	0.15	1.77	10.0	13.3	5.2	9.22	17.39	2.93	24	0.50	107.25	107.97	109.78	109.97	111.20	112.70	MHBB-6 - CDIBB-
16	15	23.080	0.48	1.11	0.94	0.45	1.07	10.0	10.7	5.7	6.09	8.83	1.94	24	0.13	108.12	108.15	110.10	110.12	112.70	112.92	CDIBB6A - MHBB
17	16	46.150	0.63	0.63	0.99	0.62	0.62	10.0	10.0	5.8	3.61	8.83	1.16	24	0.13	108.15	108.21	110.14	110.15	112.92	114.47	MHBB6B - CDIBB
18	15	102.765	0.06	0.60	0.62	0.04	0.55	10.0	12.7	5.3	2.92	2.58	2.38	15	0.14	108.75	108.89	110.10	110.28	112.70	113.70	LI6D - MHBB6
19	18	76.793	0.00	0.54	0.00	0.00	0.51	0.0	12.1	5.4	2.77	2.65	2.26	15	0.14	108.89	109.00	110.30	110.42	113.70	114.41	MHBB10A - SAD
20	19	41.000	0.33	0.33	0.96	0.32	0.32	10.0	10.0	5.8	1.84	4.09	1.50	15	0.34	109.00	109.14	110.49	110.52	114.41	112.95	CDIBB11 - MHBB
21	19	47.255	0.08	0.21	0.94	0.08	0.20	10.0	11.3	5.6	1.09	3.67	0.89	15	0.28	109.00	109.13	110.49	110.51	114.41	112.95	CDIBB10 - MHBB
22	21	43.000	0.13	0.13	0.93	0.12	0.12	10.0	10.0	5.8	0.70	7.00	0.68	15	1.00	109.23	109.66	110.52	110.52	112.95	112.58	CDIBB10B - CDIB

Project File: 21042 Basin B Scenario #1 R0.stm | Number of lines: 71 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	End	50.000	0.00	5.85	0.00	0.00	5.43	0.0	17.3	4.6	25.22	28.10	5.14	30	0.40	99.01	99.21	108.09	108.25	101.89	110.56	MHBA6A - FESB
24	23	68.000	0.00	5.85	0.00	0.00	5.43	0.0	17.1	4.7	25.36	24.10	5.17	30	0.29	104.90	105.10	108.31	108.53	110.56	110.87	MHBA6B - MHBA
25	24	81.000	0.37	5.85	0.90	0.33	5.43	10.0	16.8	4.7	25.54	21.52	5.20	30	0.23	105.11	105.30	108.92	109.18	110.87	109.60	CDIBA6A - MHBA
26	25	36.754	0.11	0.11	0.89	0.10	0.10	10.0	10.0	5.8	0.57	4.90	0.46	15	0.49	106.55	106.73	109.58	109.59	109.60	109.97	CDIBA6A1 - CDIB
27	25	196.000	0.42	5.37	0.95	0.40	5.00	10.0	16.2	4.8	23.93	17.95	4.88	30	0.16	105.49	105.81	109.58	110.15	109.60	109.92	CDIBA6 - CDIBA6
28	27	124.662	0.58	0.58	0.96	0.56	0.56	10.0	10.0	5.8	3.23	3.71	2.63	15	0.28	107.46	107.81	110.74	111.01	109.92	111.91	CDIBA7 - CDIBA6
29	27	42.981	0.00	4.37	0.00	0.00	4.04	0.0	16.0	4.8	19.45	17.93	3.96	30	0.16	105.91	105.98	110.74	110.82	109.92	110.96	MHBA6C - CDIBA
30	29	94.048	0.09	4.37	0.89	0.08	4.04	10.0	15.6	4.9	19.65	28.24	4.00	30	0.40	106.08	106.46	111.00	111.18	110.96	111.38	CDIB8 - MHBA6C
31	30	80.058	0.58	2.24	0.94	0.55	2.06	10.0	15.2	4.9	10.15	15.49	3.23	24	0.40	106.51	106.83	111.56	111.69	111.38	110.80	CDIBA8A - CDIBA
32	31	125.001	0.28	1.66	0.91	0.25	1.52	10.0	14.4	5.0	7.65	15.50	2.44	24	0.40	106.88	107.38	111.78	111.90	110.80	111.50	CDIBA10 - CDIBA
33	32	138.556	0.00	1.38	0.00	0.00	1.26	0.0	13.3	5.2	6.58	15.44	2.09	24	0.40	107.43	107.98	111.94	112.04	111.50	115.40	MHBA13 - CDIBA
34	33	87.500	0.00	1.38	0.00	0.00	1.26	0.0	12.6	5.3	6.72	15.50	2.14	24	0.40	108.03	108.38	112.05	112.12	115.40	115.20	MHBA18 - MHBA
35	34	103.806	0.00	1.38	0.00	0.00	1.26	0.0	11.8	5.4	6.89	15.59	2.19	24	0.40	108.43	108.85	112.19	112.27	115.20	115.07	MHBA18A - MHB
36	35	84.570	0.00	1.38	0.00	0.00	1.26	0.0	11.5	5.5	6.97	7.21	3.94	18	0.40	108.90	109.24	112.35	112.66	115.07	114.29	MHBBR8 - MHBA
37	36	103.000	0.23	1.07	0.90	0.21	0.97	10.0	11.0	5.6	5.44	5.20	4.43	15	0.55	109.43	110.00	112.82	113.44	114.29	112.97	CDIBBR9 - MHBB
38	37	32.000	0.45	0.84	0.95	0.43	0.76	10.0	10.8	5.6	4.30	4.95	3.50	15	0.50	110.05	110.21	113.90	114.02	112.97	113.00	CDIBA21 - CDIBB
39	38	76.614	0.39	0.39	0.86	0.34	0.34	10.0	10.0	5.8	1.94	4.93	1.58	15	0.50	110.26	110.64	114.11	114.17	113.00	113.50	CDIBA20 - CDIBA
40	36	124.000	0.31	0.31	0.95	0.29	0.29	10.0	10.0	5.8	1.71	4.95	1.39	15	0.50	109.65	110.27	112.82	112.89	114.29	113.06	CDIBA22 - MHBB
41	30	97.370	0.75	2.04	0.96	0.72	1.90	10.0	13.2	5.2	9.90	15.10	3.15	24	0.38	106.80	107.17	111.56	111.72	111.38	110.97	CDIBA9 - CDIBA8
42	41	106.000	0.23	1.29	0.97	0.22	1.18	10.0	12.3	5.4	6.31	8.58	2.01	24	0.12	107.12	107.25	111.87	111.94	110.97	111.64	CDIBA10A - CDIB
43	42	106.000	0.18	0.18	0.96	0.17	0.17	10.0	10.0	5.8	1.00	3.96	0.82	15	0.32	108.05	108.39	112.00	112.02	111.64	111.89	CDIBA11 - CDIBA
44	42	6.000	0.00	0.88	0.00	0.00	0.78	0.0	12.3	5.4	4.19	16.75	2.37	18	2.17	107.80	107.93	112.00	112.01	111.64	111.84	MHBA10 - CDIBA

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Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
45	44	39.754	0.00	0.88	0.00	0.00	0.78	0.0	12.1	5.4	4.22	4.96	3.44	15	0.50	108.05	108.25	112.10	112.24	111.84	112.10	MHBA8C - MHBA
46	45	114.001	0.15	0.88	0.90	0.14	0.78	10.0	11.6	5.5	4.29	4.95	3.50	15	0.50	108.35	108.92	112.43	112.86	112.10	111.92	CDIBA12A -MHB
47	46	62.000	0.31	0.73	0.92	0.29	0.65	10.0	11.2	5.6	3.59	4.95	2.93	15	0.50	109.02	109.33	112.89	113.06	111.92	112.48	CDIBA12 - CDIBA
48	47	124.964	0.42	0.42	0.86	0.36	0.36	10.0	10.0	5.8	2.09	4.93	1.71	15	0.50	109.38	110.00	113.08	113.19	112.48	112.81	CDIBA18A - CDIB
49	End	56.000	0.00	1.80	0.00	0.00	1.66	0.0	13.3	5.2	8.62	22.99	1.76	30	0.27	98.85	99.00	108.09	108.11	101.73	110.40	MHBA2A - FESB
50	49	93.000	0.24	1.80	0.91	0.22	1.66	10.0	12.5	5.3	8.84	13.82	1.80	30	0.10	105.10	105.19	108.16	108.19	110.40	109.83	CDIBA2 - MHBA2
51	50	138.984	0.21	1.56	0.88	0.18	1.44	10.0	11.6	5.5	7.90	12.30	2.51	24	0.25	105.24	105.59	108.24	108.38	109.83	110.00	CDIBA3 - CDIBA2
52	51	102.748	0.68	0.88	0.96	0.65	0.84	10.0	10.5	5.7	4.81	12.33	1.53	24	0.25	105.64	105.90	108.57	108.61	110.00	109.51	CDIBA4 - CDIBA3
53	52	26.000	0.20	0.20	0.96	0.19	0.19	10.0	10.0	5.8	1.11	5.49	0.91	15	0.62	106.52	106.68	108.65	108.65	109.51	109.71	CDIBA5 - CDIBA4
54	51	41.505	0.47	0.47	0.87	0.41	0.41	10.0	10.0	5.8	2.37	9.89	1.93	15	2.00	106.34	107.17	108.57	108.62	110.00	110.00	CDIBA3A -CDIBA
55	End	44.000	0.00	5.34	0.00	0.00	4.98	0.0	14.1	5.1	25.29	32.12	5.15	30	0.52	96.93	97.16	108.10	108.24	101.39	108.66	MHBD1 - FESBD
56	55	196.000	0.36	5.34	0.99	0.36	4.98	10.0	13.4	5.2	25.77	35.62	5.25	30	0.64	104.00	105.26	108.31	108.97	108.66	109.94	MHBD2 - MHBD1
57	56	56.000	0.45	4.98	0.96	0.43	4.62	10.0	13.3	5.2	24.06	33.59	4.90	30	0.57	105.32	105.64	109.31	109.48	109.94	110.06	CDIBDR2A - MHB
58	57	96.000	0.21	4.53	0.86	0.18	4.19	10.0	12.9	5.3	22.05	35.42	4.49	30	0.64	106.10	106.71	109.76	109.99	110.06	112.13	CDIBDR3 - CDIB
59	58	68.000	0.15	1.91	0.85	0.13	1.79	10.0	10.7	5.7	10.11	16.27	3.22	24	0.44	106.71	107.01	110.24	110.36	112.13	112.02	CDIBDR4 - CDIB
60	59	46.000	0.65	0.65	0.96	0.62	0.62	10.0	10.0	5.8	3.62	5.74	2.95	15	0.67	107.82	108.13	110.54	110.66	112.02	111.63	CDIBDR4B - CDI
61	59	43.000	0.00	1.11	0.00	0.00	1.04	0.0	10.6	5.7	5.90	5.23	4.81	15	0.56	107.33	107.57	110.54	110.84	112.02	112.49	MHBDR7 - CDIBD
62	61	51.000	0.62	0.62	0.94	0.58	0.58	10.0	10.0	5.8	3.38	5.46	4.30	12	2.00	108.90	109.92	111.20	111.59	112.49	113.70	LIBRC1 - MHBDR
63	61	75.000	0.49	0.49	0.93	0.46	0.46	10.0	10.0	5.8	2.64	4.78	2.15	15	0.47	107.87	108.22	111.20	111.31	112.49	111.90	CDIBDR4A - MHB
64	58	184.000	0.00	2.41	0.00	0.00	2.22	0.0	12.1	5.4	11.98	13.76	3.81	24	0.32	106.80	107.38	110.24	110.68	112.13	113.00	MHBDR6 - MHBD
65	64	94.000	0.00	2.41	0.00	0.00	2.22	0.0	11.7	5.5	12.13	20.06	3.86	24	0.67	107.38	108.01	110.72	110.95	113.00	112.03	MHBDR6A - MHB
66	65	32.500	0.61	1.13	0.90	0.55	1.02	10.0	11.1	5.6	5.67	7.20	3.21	18	0.40	108.06	108.19	111.06	111.14	112.03	111.64	CDIBDR6A - MHB

Project File: 21042 Basin B Scenario #1 R0.stm | Number of lines: 71 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

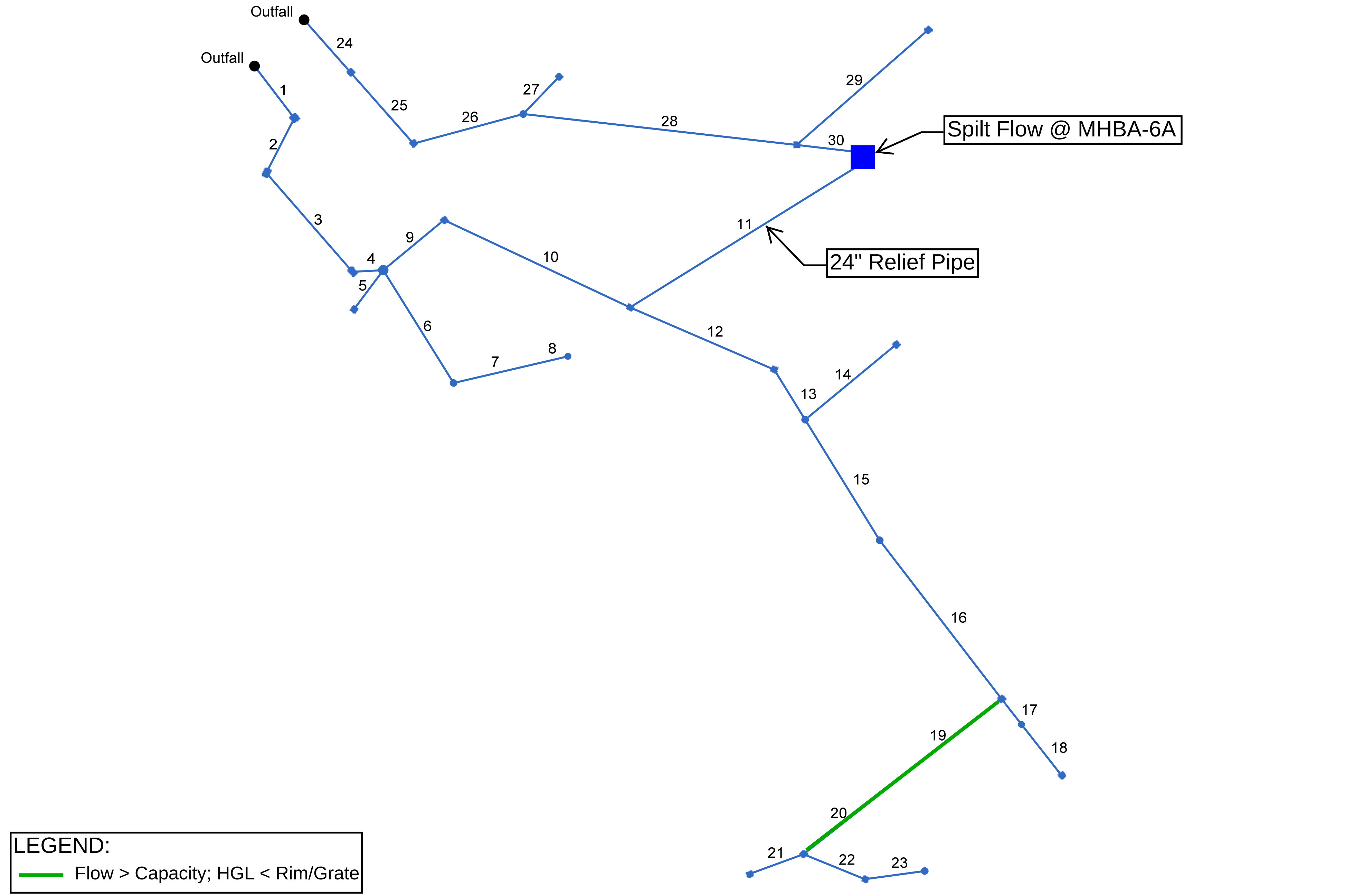
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
67	66	147.002	0.52	0.52	0.90	0.47	0.47	10.0	10.0	5.8	2.71	4.69	2.21	15	0.45	108.44	109.10	111.22	111.45	111.64	111.64	CDIBDR6B - CDI
68	65	117.965	0.27	1.28	0.92	0.25	1.20	10.0	11.2	5.6	6.68	8.05	3.78	18	0.50	108.06	108.65	111.06	111.47	112.03	113.76	MHBDR7 - MHBD
69	68	86.370	0.12	1.01	0.87	0.10	0.95	10.0	10.7	5.7	5.38	8.03	3.05	18	0.50	108.75	109.18	111.50	111.70	113.76	113.00	CDIBDR8 - MHBD
70	69	67.689	0.36	0.36	0.94	0.34	0.34	10.0	10.0	5.8	1.96	4.96	1.60	15	0.50	109.43	109.77	111.87	111.93	113.00	112.76	CDIBDR10 - CDIB
71	69	42.000	0.53	0.53	0.96	0.51	0.51	10.0	10.0	5.8	2.95	4.95	2.40	15	0.50	109.43	109.64	111.87	111.95	113.00	112.52	CDIBDR9 - CDIB

Project File: 21042 Basin B Scenario #1 R0.stm | Number of lines: 71 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: 21042 Basin B Scenario #2 R0.stm	Number of lines: 30	Date: 1/18/2022

Storm Sewer Tabulation

Station Line	Station To Line	Len (ft)	Drng Area Incr (ac)	Drng Area Total (ac)	Rnoff coeff (C)	Area x C Incr	Area x C Total	Tc Inlet (min)	Tc Syst (min)	Rain (I) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe Size (in)	Pipe Slope (%)	Invert Elev Dn (ft)	Invert Elev Up (ft)	HGL Elev Dn (ft)	HGL Elev Up (ft)	Grnd / Rim Elev Dn (ft)	Grnd / Rim Elev Up (ft)	Line ID
1	End	46.873	0.00	8.43	0.00	0.00	8.02	0.0	19.2	4.4	42.37	122.4	3.37	48	0.62	99.05	99.34	108.09	108.12	103.55	110.60	MHBB1 - FESBB1
2	1	44.000	0.20	8.43	0.91	0.18	8.02	10.0	19.0	4.5	42.52	77.07	4.42	42	0.50	103.60	103.82	108.17	108.24	110.60	109.76	CDIBB1A - MHBB
3	2	93.670	0.08	8.23	0.81	0.06	7.84	10.0	18.6	4.5	42.02	77.20	4.37	42	0.50	103.87	104.34	108.31	108.45	109.76	109.76	CDIBB1B - CDIBB
4	3	22.000	0.00	8.15	0.00	0.00	7.78	0.0	18.5	4.5	41.80	77.07	4.35	42	0.50	104.39	104.50	108.53	108.56	109.76	111.00	MHBB12A - CDIB
5	4	35.000	1.18	1.18	0.96	1.13	1.13	10.0	10.0	5.8	6.56	13.89	5.35	15	3.94	106.07	107.45	108.70	109.01	111.00	113.01	CDIBB12B - MHB
6	4	95.000	2.70	3.20	0.96	2.59	3.05	10.0	10.7	5.7	17.26	19.87	3.52	30	0.20	104.99	105.18	108.70	108.85	111.00	111.54	CDIBB12 - MHBB
7	6	59.000	0.00	0.50	0.00	0.00	0.46	0.0	10.2	5.8	2.62	5.46	2.13	15	0.61	106.27	106.63	109.07	109.15	111.54	111.00	EXT - CDIBB12
8	7	24.600	0.50	0.50	0.91	0.46	0.46	10.0	10.0	5.8	2.64	5.46	2.15	15	0.61	106.63	106.78	109.15	109.19	111.00	110.00	CD1BB12F - EXT
9	4	56.222	0.00	3.77	0.00	0.00	3.60	0.0	18.3	4.5	23.08	34.55	4.70	30	0.60	104.55	104.89	108.70	108.86	111.00	111.25	MHBB2 - MHBB1
10	9	146.548	0.34	3.77	0.94	0.32	3.60	10.0	17.8	4.6	23.29	34.43	4.74	30	0.60	104.99	105.87	108.94	109.35	111.25	110.33	CDIBB3 - MHBB2
11	10	199.899	0.00	0.00	0.00	0.00	0.00	16.3	16.3	0.0	6.81	13.42	2.17	24	0.30	105.92	106.52	109.43	109.59	110.33	110.96	MHBA6A -CDIBB
12	10	112.000	0.29	3.43	0.96	0.28	3.28	10.0	15.0	5.0	16.23	25.19	3.31	30	0.32	105.92	106.28	109.43	109.58	110.33	111.00	CDIBB4 - CDIBB3
13	12	42.000	0.37	3.14	0.99	0.37	3.00	10.0	14.7	5.0	14.94	20.57	3.04	30	0.21	106.28	106.37	109.66	109.70	111.00	112.00	MH BB4A - CDIB
14	13	84.157	0.25	0.25	0.98	0.25	0.25	10.0	10.0	5.8	1.42	4.94	1.16	15	0.50	107.62	108.04	109.89	109.92	112.00	111.06	CDIBB4B - MHBB
15	13	101.288	0.66	2.52	0.93	0.61	2.39	10.0	14.1	5.1	12.12	20.23	2.47	30	0.21	106.37	106.58	109.89	109.96	112.00	111.20	CDIBB5 - MHBB4
16	15	143.000	0.15	1.86	0.99	0.15	1.77	10.0	13.3	5.2	9.22	17.39	2.93	24	0.50	107.25	107.97	110.00	110.20	111.20	112.70	MHBB-6 - CDIBB-
17	16	23.080	0.48	1.11	0.94	0.45	1.07	10.0	10.7	5.7	6.09	8.83	1.94	24	0.13	108.12	108.15	110.42	110.43	112.70	112.92	CDIBB6A - MHBB
18	17	46.150	0.63	0.63	0.99	0.62	0.62	10.0	10.0	5.8	3.61	8.83	1.15	24	0.13	108.15	108.21	110.47	110.48	112.92	114.47	MHBB6B - CDIBB
19	16	102.765	0.06	0.60	0.62	0.04	0.55	10.0	12.7	5.3	2.92	2.58	2.38	15	0.14	108.75	108.89	110.42	110.60	112.70	113.70	LI6D - MHBB6
20	19	76.793	0.00	0.54	0.00	0.00	0.51	0.0	12.1	5.4	2.77	2.65	2.26	15	0.14	108.89	109.00	110.60	110.72	113.70	114.41	MHBB10A - SAD
21	20	41.000	0.33	0.33	0.96	0.32	0.32	10.0	10.0	5.8	1.84	4.09	1.50	15	0.34	109.00	109.14	110.84	110.87	114.41	112.95	CDIBB11 - MHBB
22	20	47.255	0.08	0.21	0.94	0.08	0.20	10.0	11.3	5.6	1.09	3.67	0.89	15	0.28	109.00	109.13	110.84	110.86	114.41	112.95	CDIBB10 - MHBB

Project File: 21042 Basin B Scenario #2 R0.stm | Number of lines: 30 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

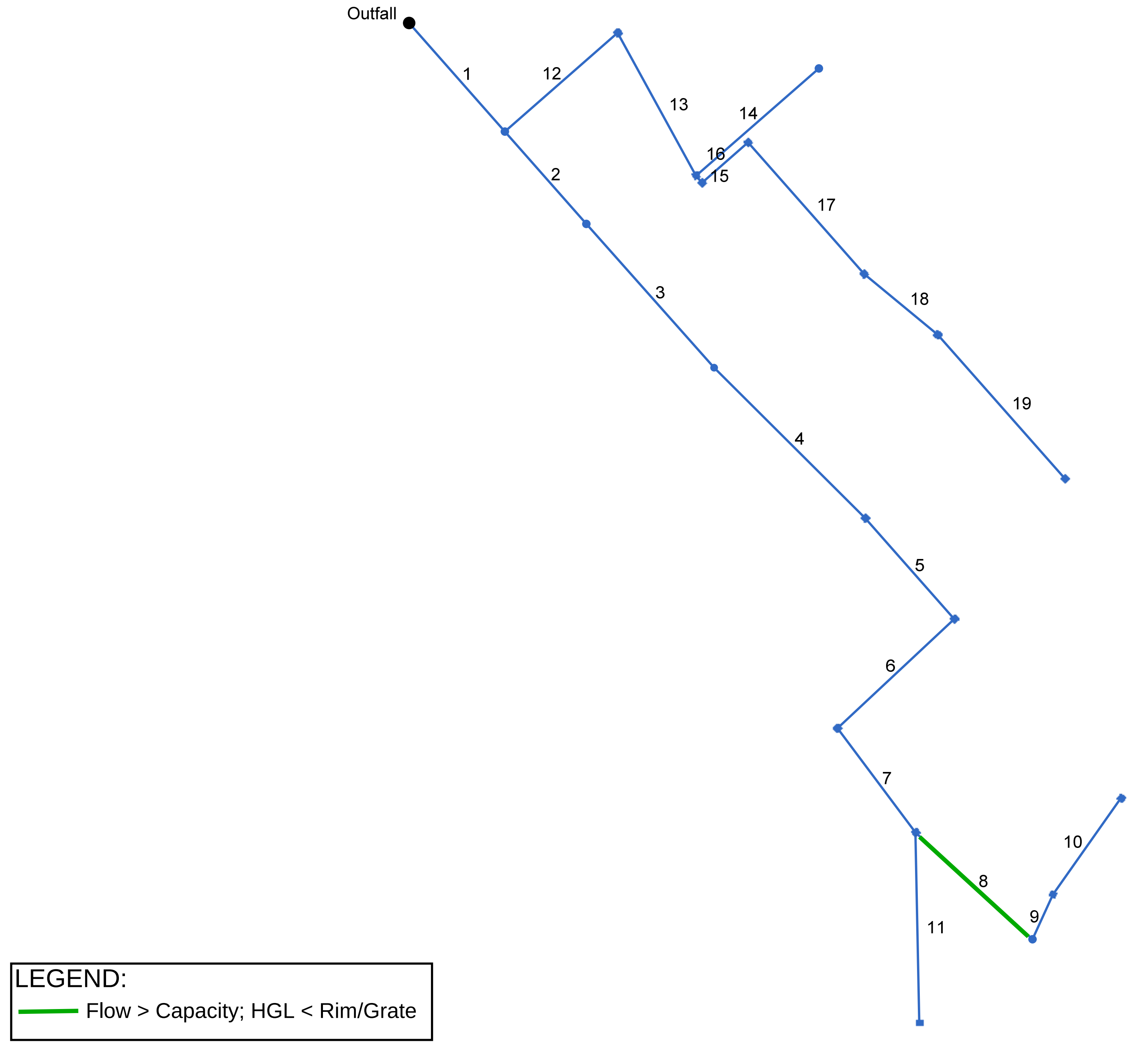
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
23	22	43.000	0.13	0.13	0.93	0.12	0.12	10.0	10.0	5.8	0.70	7.00	0.57	15	1.00	109.23	109.66	110.86	110.87	112.95	112.58	CDIBB10B - CDIB
24	End	50.000	0.00	1.48	0.00	0.00	1.39	0.0	18.2	4.5	18.80	28.10	3.83	30	0.40	99.01	99.21	108.09	108.18	101.89	110.56	MHBA6A - FESB
25	24	68.000	0.00	1.48	0.00	0.00	1.39	0.0	17.9	4.6	18.85	24.10	3.84	30	0.29	104.90	105.10	108.21	108.33	110.56	110.87	MHBA6B - MHBA
26	25	81.000	0.37	1.48	0.90	0.33	1.39	10.0	17.5	4.6	18.91	21.52	3.85	30	0.23	105.11	105.30	108.59	108.74	110.87	109.60	CDIBA6A - MHBA
27	26	36.754	0.11	0.11	0.89	0.10	0.10	10.0	10.0	5.8	0.57	4.90	0.46	15	0.49	106.55	106.73	109.03	109.03	109.60	109.97	CDIBA6A1 - CDIB
28	26	196.000	0.42	1.00	0.95	0.40	0.96	10.0	16.6	4.7	17.03	17.95	3.47	30	0.16	105.49	105.81	109.03	109.32	109.60	109.92	CDIBA6 - CDIBA6
29	28	124.662	0.58	0.58	0.96	0.56	0.56	10.0	10.0	5.8	3.23	3.71	2.63	15	0.28	107.46	107.81	109.55	109.82	109.92	111.91	CDIBA7 - CDIBA6
30	28	42.981	0.00	0.00	0.00	0.00	0.00	16.3	16.3	0.0	12.50	17.93	2.55	30	0.16	105.91	105.98	109.55	109.59	109.92	110.96	MHBA6C - CDIBA

Project File: 21042 Basin B Scenario #2 R0.stm | Number of lines: 30 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD® Civil 3D® Plan



Project File: 21042 Basin B Scenario #3 R0.stm	Number of lines: 19	Date: 1/18/2022

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Dn	Up	Dn	Up	Dn	Up	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	94.048	0.09	4.37	0.89	0.08	4.04	10.0	15.6	4.9	19.65	28.24	4.00	30	0.40	106.08	106.46	109.59	109.77	110.96	111.38	CDIB8 - MHBA6C
2	1	80.058	0.58	2.24	0.94	0.55	2.06	10.0	15.2	4.9	10.15	15.49	3.23	24	0.40	106.51	106.83	110.15	110.29	111.38	110.80	CDIBA8A - CDIBA
3	2	125.001	0.28	1.66	0.91	0.25	1.52	10.0	14.4	5.0	7.65	15.50	2.44	24	0.40	106.88	107.38	110.37	110.49	110.80	111.50	CDIBA10 - CDIBA
4	3	138.556	0.00	1.38	0.00	0.00	1.26	0.0	13.3	5.2	6.58	15.44	2.09	24	0.40	107.43	107.98	110.53	110.63	111.50	115.40	MHBA13 - CDIBA
5	4	87.500	0.00	1.38	0.00	0.00	1.26	0.0	12.6	5.3	6.72	15.50	2.14	24	0.40	108.03	108.38	110.64	110.71	115.40	115.20	MHBA18 - MHBA
6	5	103.806	0.00	1.38	0.00	0.00	1.26	0.0	11.8	5.4	6.89	15.59	2.19	24	0.40	108.43	108.85	110.78	110.85	115.20	115.07	MHBA18A - MHB
7	6	84.570	0.00	1.38	0.00	0.00	1.26	0.0	11.5	5.5	6.97	7.21	3.94	18	0.40	108.90	109.24	110.92	111.24	115.07	114.29	MHBBR8 - MHBA
8	7	103.000	0.23	1.07	0.90	0.21	0.97	10.0	11.0	5.6	5.44	5.20	4.43	15	0.55	109.43	110.00	111.39	112.02	114.29	112.97	CDIBBR9 - MHBB
9	8	32.000	0.45	0.84	0.95	0.43	0.76	10.0	10.8	5.6	4.30	4.95	3.50	15	0.50	110.05	110.21	112.47	112.60	112.97	113.00	CDIBA21 - CDIBB
10	9	76.614	0.39	0.39	0.86	0.34	0.34	10.0	10.0	5.8	1.94	4.93	1.58	15	0.50	110.26	110.64	112.69	112.75	113.00	113.50	CDIBA20 - CDIBA
11	7	124.000	0.31	0.31	0.95	0.29	0.29	10.0	10.0	5.8	1.71	4.95	1.40	15	0.50	109.65	110.27	111.39	111.46	114.29	113.06	CDIBA22 - MHBB
12	1	97.370	0.75	2.04	0.96	0.72	1.90	10.0	13.2	5.2	9.90	15.10	3.15	24	0.38	106.80	107.17	110.15	110.31	111.38	110.97	CDIBA9 - CDIBA8
13	12	106.000	0.23	1.29	0.97	0.22	1.18	10.0	12.3	5.4	6.31	8.58	2.01	24	0.12	107.12	107.25	110.46	110.53	110.97	111.64	CDIBA10A - CDIB
14	13	106.000	0.18	0.18	0.96	0.17	0.17	10.0	10.0	5.8	1.00	3.96	0.82	15	0.32	108.05	108.39	110.59	110.62	111.64	111.89	CDIBA11 - CDIBA
15	13	6.000	0.00	0.88	0.00	0.00	0.78	0.0	12.3	5.4	4.19	16.75	2.37	18	2.17	107.80	107.93	110.59	110.60	111.64	111.84	MHBA10 - CDIBA
16	15	39.754	0.00	0.88	0.00	0.00	0.78	0.0	12.1	5.4	4.22	4.96	3.44	15	0.50	108.05	108.25	110.69	110.83	111.84	112.10	MHBA8C - MHBA
17	16	114.001	0.15	0.88	0.90	0.14	0.78	10.0	11.6	5.5	4.29	4.95	3.50	15	0.50	108.35	108.92	111.02	111.45	112.10	111.92	CDIBA12A -MHB
18	17	62.000	0.31	0.73	0.92	0.29	0.65	10.0	11.2	5.6	3.59	4.95	2.93	15	0.50	109.02	109.33	111.48	111.65	111.92	112.48	CDIBA12 - CDIBA
19	18	124.964	0.42	0.42	0.86	0.36	0.36	10.0	10.0	5.8	2.09	4.93	1.71	15	0.50	109.38	110.00	111.67	111.79	112.48	112.81	CDIBA18A - CDIB

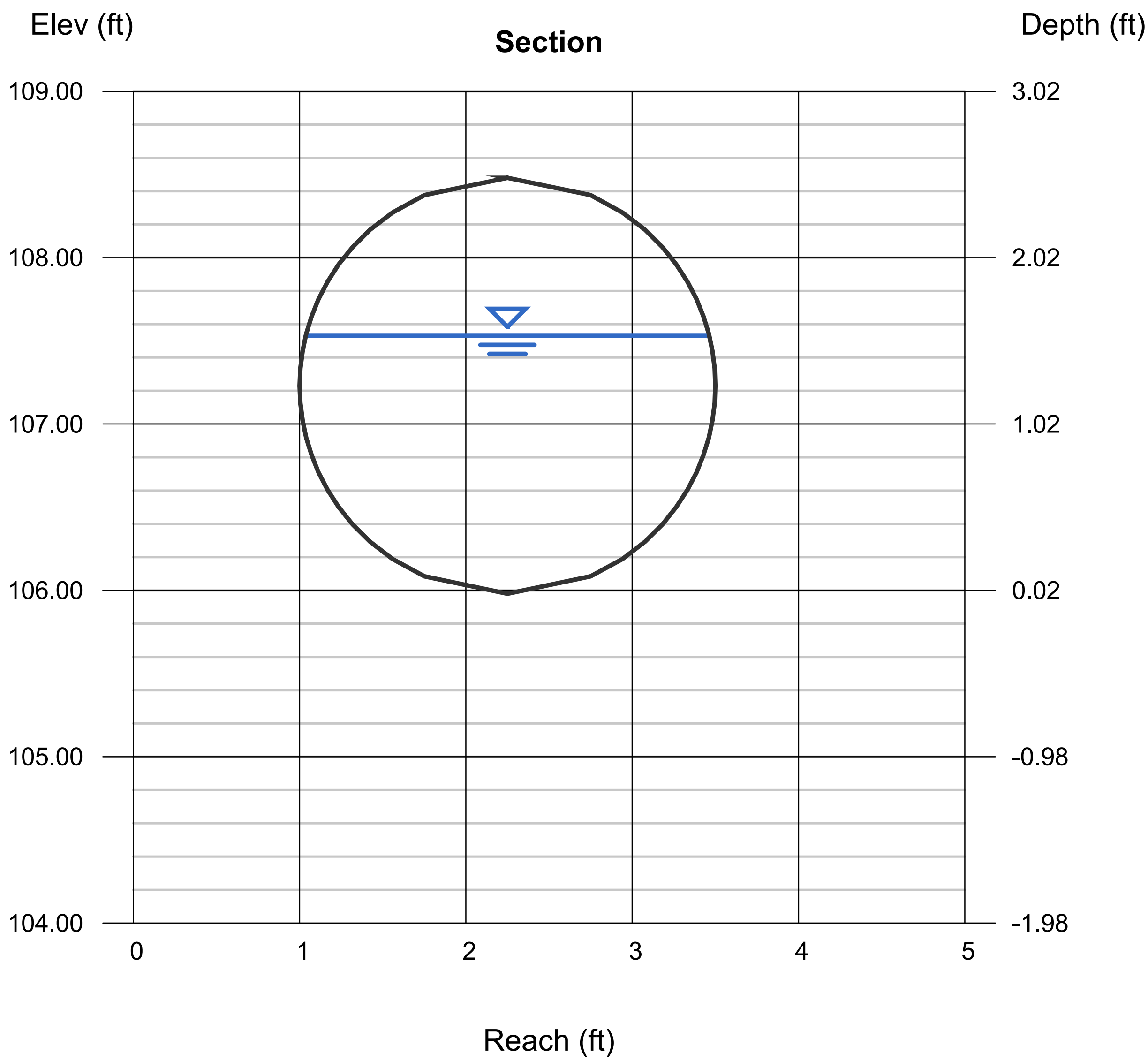
Project File: 21042 Basin B Scenario #3 R0.stm | Number of lines: 19 | Run Date: 1/18/2022

NOTES:Intensity = 55.31 / (Inlet time + 11.00) ^ 0.74; Return period =Yrs. 25 ; c = cir e = ellip b = box

Channel Report

30-INCH HDPE, FROM MHBA-6A TO CDI BA-6

Circular		**Highlighted**	
Diameter (ft)	= 2.50	Depth (ft)	= 1.55
		Q (cfs)	= 12.50
		Area (sqft)	= 3.20
Invert Elev (ft)	= 105.98	Velocity (ft/s)	= 3.90
Slope (%)	= 0.16	Wetted Perim (ft)	= 4.54
N-Value	= 0.012	Crit Depth, Yc (ft)	= 1.19
		Top Width (ft)	= 2.43
Calculations		EGL (ft)	= 1.79
Compute by:	Known Q		
Known Q (cfs)	= 12.50		

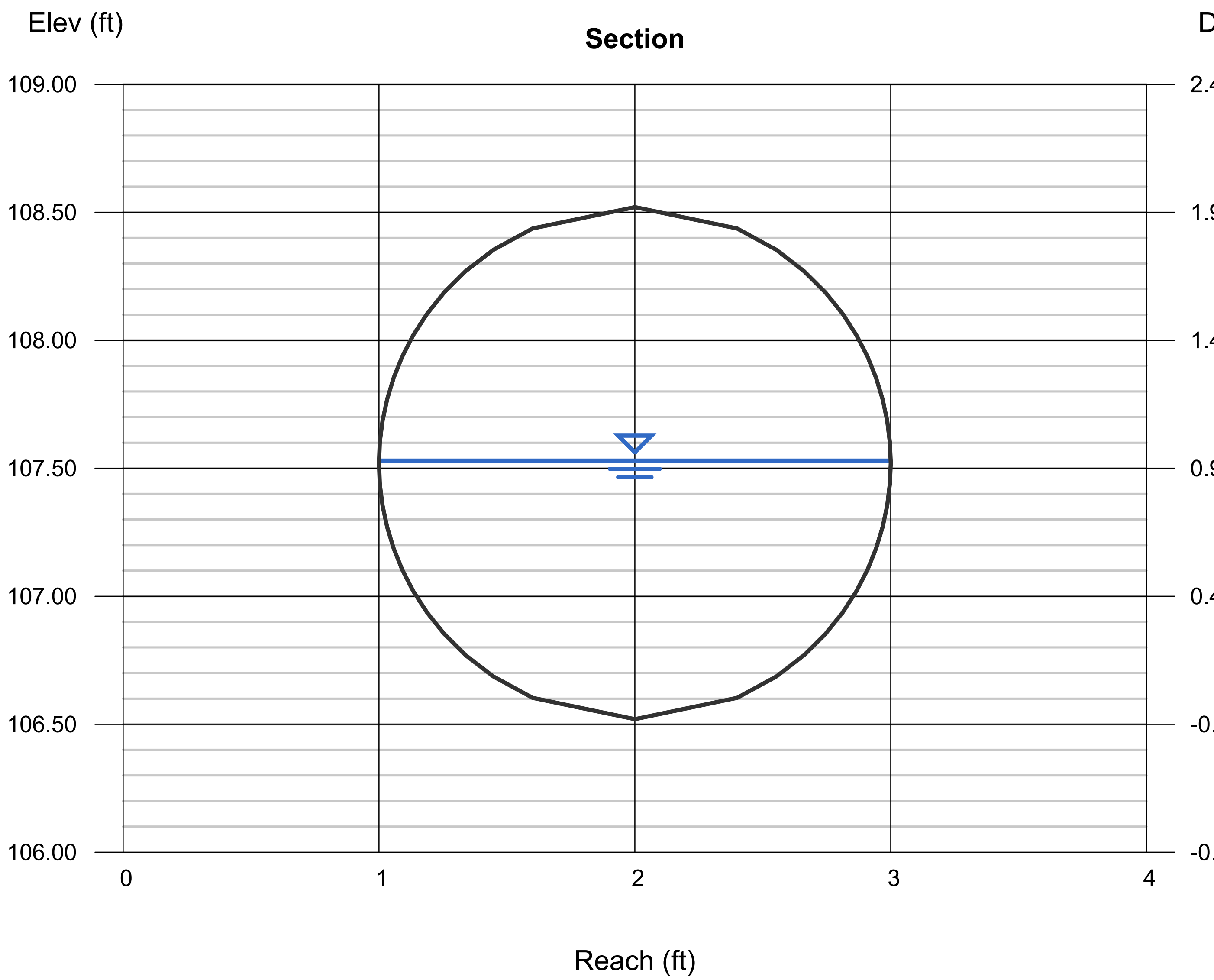


Channel Report

24-INCH HDPE (RELIEF PIPE), FROM MHBA-6A TO CDI BB-3

Circular	
Diameter (ft)	= 2.00
Invert Elev (ft)	= 106.52
Slope (%)	= 0.30
N-Value	= 0.012
Calculations	
Compute by:	Known Q
Known Q (cfs)	= 6.81

Highlighted	
Depth (ft)	= 1.01
Q (cfs)	= 6.810
Area (sqft)	= 1.60
Velocity (ft/s)	= 4.26
Wetted Perim (ft)	= 3.17
Crit Depth, Yc (ft)	= 0.93
Top Width (ft)	= 2.00
EGL (ft)	= 1.29



NOAA Atlas 14, Volume 2, Version 3
Location name: North Brunswick, New Jersey, USA*
Latitude: 40.4396°, Longitude: -74.5047°
Elevation: 111.26 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.00** (3.61-4.43)	**4.76** (4.31-5.27)	**5.65** (5.10-6.25)	**6.30** (5.68-6.96)	**7.09** (6.36-7.82)	**7.64** (6.82-8.42)	**8.20** (7.28-9.05)	**8.70** (7.69-9.62)	**9.34** (8.17-10.3)	**9.80** (8.52-10.9)
10-min	**3.20** (2.89-3.53)	**3.81** (3.45-4.21)	**4.52** (4.09-5.00)	**5.04** (4.54-5.56)	**5.65** (5.06-6.23)	**6.09** (5.43-6.71)	**6.52** (5.79-7.19)	**6.90** (6.10-7.63)	**7.39** (6.46-8.18)	**7.72** (6.71-8.59)
15-min	**2.66** (2.41-2.95)	**3.20** (2.89-3.53)	**3.82** (3.44-4.22)	**4.25** (3.83-4.69)	**4.77** (4.28-5.26)	**5.14** (4.58-5.66)	**5.49** (4.88-6.06)	**5.80** (5.13-6.42)	**6.20** (5.42-6.87)	**6.46** (5.62-7.18)
30-min	**1.83** (1.65-2.02)	**2.21** (2.00-2.44)	**2.71** (2.45-3.00)	**3.08** (2.77-3.40)	**3.53** (3.17-3.90)	**3.87** (3.45-4.27)	**4.20** (3.74-4.64)	**4.52** (3.99-4.99)	**4.93** (4.31-5.46)	**5.23** (4.55-5.82)
60-min	**1.14** (1.03-1.26)	**1.38** (1.25-1.53)	**1.74** (1.57-1.92)	**2.00** (1.81-2.21)	**2.35** (2.11-2.60)	**2.62** (2.34-2.89)	**2.90** (2.57-3.20)	**3.17** (2.80-3.50)	**3.54** (3.10-3.92)	**3.82** (3.32-4.25)
2-hr	**0.696** (0.624-0.774)	**0.847** (0.761-0.940)	**1.08** (0.966-1.19)	**1.25** (1.12-1.39)	**1.50** (1.33-1.66)	**1.70** (1.50-1.88)	**1.90** (1.67-2.10)	**2.11** (1.85-2.34)	**2.41** (2.08-2.69)	**2.65** (2.27-2.96)
3-hr	**0.514** (0.462-0.574)	**0.626** (0.564-0.699)	**0.796** (0.715-0.887)	**0.928** (0.831-1.03)	**1.11** (0.990-1.24)	**1.26** (1.12-1.40)	**1.42** (1.25-1.57)	**1.58** (1.38-1.76)	**1.81** (1.56-2.01)	**1.99** (1.69-2.22)
6-hr	**0.329** (0.296-0.369)	**0.400** (0.359-0.447)	**0.507** (0.454-0.565)	**0.595** (0.531-0.661)	**0.720** (0.636-0.798)	**0.825** (0.725-0.913)	**0.938** (0.816-1.04)	**1.06** (0.912-1.17)	**1.23** (1.05-1.37)	**1.38** (1.16-1.53)
12-hr	**0.198** (0.177-0.224)	**0.241** (0.215-0.271)	**0.307** (0.273-0.345)	**0.363** (0.322-0.407)	**0.446** (0.392-0.499)	**0.518** (0.452-0.578)	**0.597** (0.515-0.665)	**0.684** (0.582-0.763)	**0.813** (0.680-0.909)	**0.924** (0.760-1.03)
24-hr	**0.114** (0.105-0.125)	**0.138** (0.127-0.151)	**0.177** (0.162-0.194)	**0.210** (0.192-0.231)	**0.261** (0.237-0.285)	**0.305** (0.274-0.333)	**0.353** (0.315-0.386)	**0.408** (0.359-0.447)	**0.490** (0.425-0.538)	**0.561** (0.478-0.617)
2-day	**0.066** (0.060-0.073)	**0.080** (0.073-0.088)	**0.102** (0.093-0.113)	**0.121** (0.110-0.133)	**0.149** (0.134-0.164)	**0.172** (0.154-0.190)	**0.198** (0.176-0.218)	**0.227** (0.199-0.250)	**0.269** (0.233-0.297)	**0.304** (0.260-0.338)
3-day	**0.047** (0.043-0.051)	**0.056** (0.052-0.062)	**0.072** (0.066-0.079)	**0.085** (0.077-0.093)	**0.104** (0.094-0.114)	**0.119** (0.107-0.131)	**0.137** (0.122-0.150)	**0.155** (0.137-0.171)	**0.183** (0.159-0.202)	**0.206** (0.177-0.228)
4-day	**0.037** (0.034-0.041)	**0.045** (0.041-0.049)	**0.057** (0.052-0.062)	**0.067** (0.061-0.073)	**0.081** (0.074-0.089)	**0.093** (0.084-0.102)	**0.106** (0.095-0.116)	**0.120** (0.106-0.131)	**0.140** (0.123-0.154)	**0.157** (0.136-0.173)
7-day	**0.025** (0.023-0.027)	**0.030** (0.028-0.032)	**0.037** (0.034-0.040)	**0.043** (0.040-0.047)	**0.052** (0.047-0.056)	**0.059** (0.054-0.064)	**0.067** (0.060-0.072)	**0.075** (0.067-0.082)	**0.087** (0.077-0.095)	**0.096** (0.084-0.106)
10-day	**0.020** (0.018-0.021)	**0.024** (0.022-0.025)	**0.029** (0.027-0.031)	**0.033** (0.031-0.036)	**0.039** (0.036-0.043)	**0.045** (0.041-0.048)	**0.050** (0.045-0.054)	**0.056** (0.050-0.060)	**0.063** (0.057-0.069)	**0.070** (0.062-0.077)
20-day	**0.013** (0.013-0.014)	**0.016** (0.015-0.017)	**0.019** (0.018-0.020)	**0.021** (0.020-0.023)	**0.025** (0.023-0.026)	**0.027** (0.025-0.029)	**0.030** (0.028-0.032)	**0.033** (0.030-0.035)	**0.036** (0.033-0.039)	**0.039** (0.035-0.042)
30-day	**0.011** (0.011-0.012)	**0.013** (0.012-0.014)	**0.015** (0.015-0.016)	**0.017** (0.016-0.018)	**0.019** (0.018-0.020)	**0.021** (0.020-0.022)	**0.023** (0.021-0.024)	**0.024** (0.023-0.026)	**0.026** (0.025-0.028)	**0.028** (0.026-0.030)
45-day	**0.009** (0.009-0.010)	**0.011** (0.011-0.012)	**0.013** (0.012-0.013)	**0.014** (0.013-0.015)	**0.016** (0.015-0.017)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)	**0.019** (0.018-0.020)	**0.021** (0.019-0.022)	**0.022** (0.020-0.023)
60-day	**0.008** (0.008-0.009)	**0.010** (0.009-0.010)	**0.011** (0.011-0.012)	**0.012** (0.012-0.013)	**0.014** (0.013-0.014)	**0.015** (0.014-0.015)	**0.016** (0.015-0.016)	**0.016** (0.016-0.017)	**0.017** (0.016-0.018)	**0.018** (0.017-0.019)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

INLET DRAINAGE AREA
COMPOSITE "C" CALCULATIONS

HSG 'C' OPEN SPACE = 0.51; IMPV. = 0.99

HSG 'D' OPEN SPACE = 0.65; IMPV. = 0.99

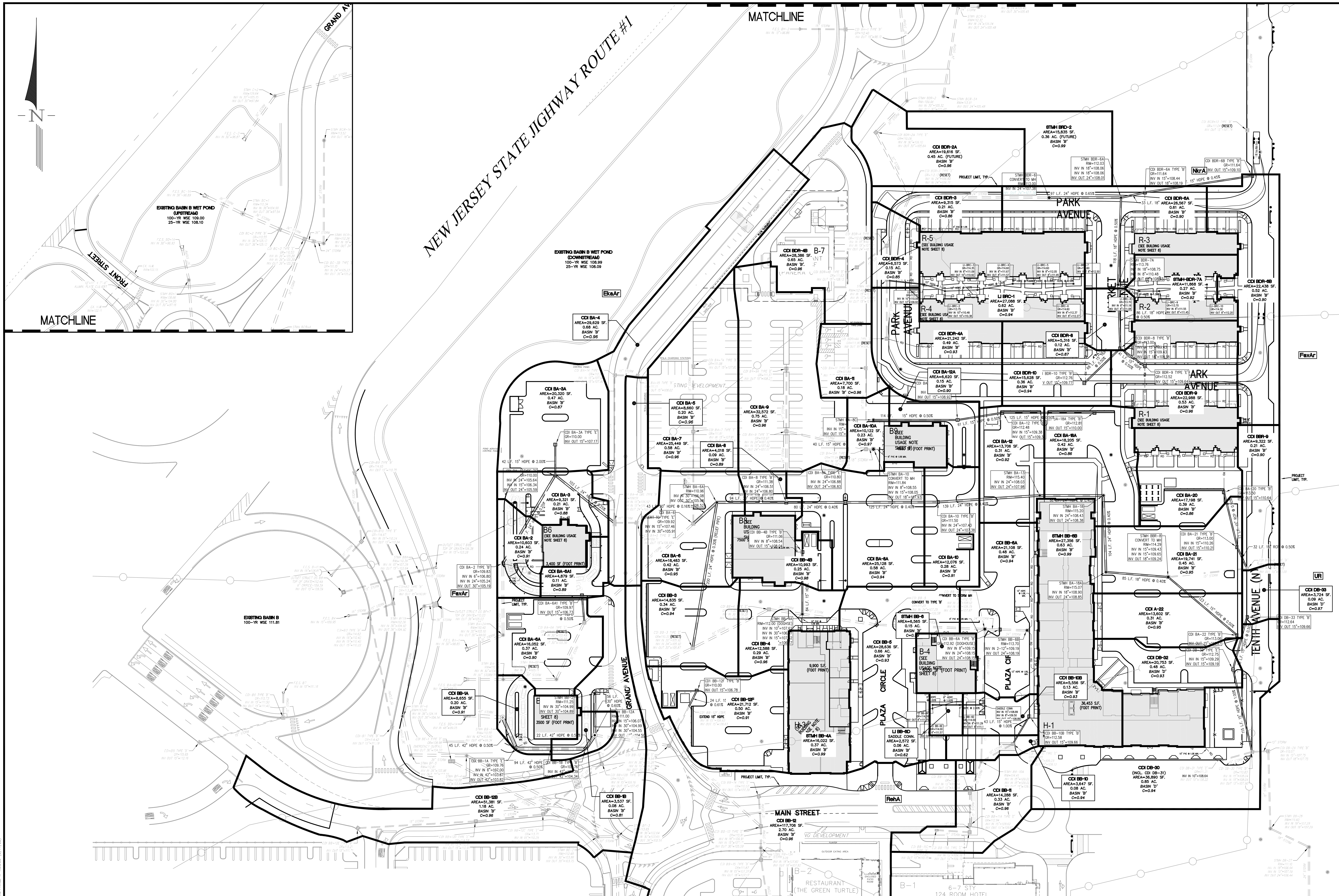
LINE No. *Scenario #1*	STRUCTURE	AREA *(SF)*	O.S. (C) *(SF)*	O.S. (D) *(SF)*	IMPV. (C) *(SF)*	IMPV. (D) *(SF)*	"C"	AREA *(Ac.)*
EXISTING BASIN B								
1	**MH BB-1**							
2	**CDI BB-1A**	8,655	0	2,058	0	6,597	***0.91***	**0.20**
3	**CDI BB-1B**	3,537	0	1,897	0	1,640	***0.81***	**0.08**
4	**MH BB-12A**							
5	**CDI BB-12B**	51,381					***0.96***	**1.18**
6	**CDI BB-12**	117,706	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**2.70**
7	**EXT**	Move existing inlet & extend pipe, maintain existing pipe slope						
8	**CDI BB-12F**	21,712	900	3,947	2,956	13,909	***0.91***	**0.50**
9	**MH BB-2**							
10	**CDI BB-3**	14,835	0	1,999	0	12,836	***0.94***	**0.34**
11	**CDI BB-4**	12,588	0	1,051	0	11,537	***0.96***	**0.29**
12	**MH BB-4A**	16,022	0	0	3,977	12,045	***0.99***	**0.37**
13	**CDI BB-4B**	10,993	0	223	0	10,770	***0.98***	**0.25**
14	**CDI BB-5**	28,636	1,680	2,628	5,491	18,837	***0.93***	**0.66**
15	**MH BB-6**	6,565	0	0	0	6,565	***0.99***	**0.15**
16	**CDI BB-6A**	21,108	97	3,247	20	17,744	***0.94***	**0.48**
17	**MH BB-6B**	27,356	0	0	0	27,356	***0.99***	**0.63**
18	**LI-6D**	2,572	1,873	158	10	531	***0.62***	**0.06**
19	**MH BB-10A**							
20	**CDI BB-11**	14,288	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**0.33**
21	**CDI BB-10**	3,647	410	0	3,237	0	***0.94***	**0.08**
22	**CDI BB-10B**	5,556	736	0	4,481	339	***0.93***	**0.13**
23	**MH BA-6C**							
24	**MH BA-6B**							
25	**CDI BA-6A**	16,052	0	4,204	0	11,848	***0.90***	**0.37**
26	**CDI BA-6A1**	4,879	0	1,376	0	3,503	***0.89***	**0.11**
27	**CDI BA-6**	18,483	0	2,446	0	16,037	***0.95***	**0.42**
28	**CDI BA-7**	25,449	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**0.58**
29	**MH BA-6A**							
30	**CDI BA-8**	4,018	0	1,171	0	2,847	***0.89***	**0.09**
31	**CDI BA-8A**	25,128	0	3,734	0	21,394	***0.94***	**0.58**
32	**CDI BA-10**	12,076	0	2,915	0	9,161	***0.91***	**0.28**
33	**MH BA-13**							
34	**MH BA-18**							
35	**MH BA-18A**							
36	**MH BBR-8**							

INLET DRAINAGE AREA
COMPOSITE "C" CALCULATIONS

HSG 'C' OPEN SPACE = 0.51; IMPV. = 0.99

HSG 'D' OPEN SPACE = 0.65; IMPV. = 0.99

LINE No. *Scenario #1*	STRUCTURE	AREA *(SF)*	O.S. (C) *(SF)*	O.S. (D) *(SF)*	IMPV. (C) *(SF)*	IMPV. (D) *(SF)*	"C"	AREA *(Ac.)*
EXISTING BASIN B								
37	**CDI BBR-9**	9,322	614	1,709	929	6,810	***0.97***	**0.21**
38	**CDI BA-21**	19,741	0	2,226	0	17,515	***0.95***	**0.45**
39	**CDI BA-20**	17,198	0	6,779	0	10,419	***0.86***	**0.39**
40	**CDI BA-22**	13,602	0	1,410	0	12,192	***0.95***	**0.31**
41	**CDI BA-9**	32,572	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**0.75**
42	**CDI BA-10A**	10,122	0	637	0	9,485	***0.97***	**0.23**
43	**CDI BA-11**	7,700	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**0.18**
44	**MH BA-8B**							
45	**MH BA-8C**							
46	**CDI BA-12A**	6,620	0	1,680	0	4,940	***0.90***	**0.15**
47	**CDI BA-12**	13,706	0	2,704	0	11,002	***0.92***	**0.31**
48	**CDI BA-18A**	18,205	0	6,873	0	11,332	***0.86***	**0.42**
49	**MH BA-2A**							
50	**CDI BA-2**	10,603	430	1,911	457	7,805	***0.91***	**0.24**
51	**CDI BA-3**	9,321	1,067	1,570	4,040	2,644	***0.88***	**0.21**
52	**CDI BA-4**	29,629					***0.96***	**0.68**
53	**CDI BA-5**	8,660	Runoff Coeff. 'C' obtained from CREST Engineering design				***0.96***	**0.20**
54	**CDI BA-3A**	20,320	0	6,909	0	13,411	***0.87***	**0.47**
55	**MH BD-1**							
56	**MH BDR-2**	15,835					***0.99***	**0.36**
57	**CDI BDR-2A**	19,616					***0.96***	**0.45**
58	**CDI BDR-3**	9,315	2,446	0	6,869	0	***0.86***	**0.21**
59	**CDI BDR-4**	6,573	1,319	805	2,762	1,687	***0.85***	**0.15**
60	**CDI BDR-4B**	28,386					***0.96***	**0.65**
61	**MH BDR-7**							
62	**LI BRC-1**	27,088	2,328	968	16,137	7,655	***0.94***	**0.62**
63	**CDI BDR-4A**	21,242	0	3,831	0	17,411	***0.93***	**0.49**
64	**MH BDR-6**							
65	**MH BDR-6A**							
66	**CDI BDR-6A**	26,567	5,045	0	21,522	0	***0.90***	**0.61**
67	**CDI BDR-6B**	22,438	2,759	1,744	11,289	6,646	***0.90***	**0.52**
68	**MH BDR-7A**	11,868	1,682	0	9,832	354	***0.92***	**0.27**
69	**CDI BDR-8**	5,316	793	739	1,673	2,111	***0.87***	**0.12**
70	**CDI BDR-10**	15,628	0	2,230	0	13,398	***0.94***	**0.36**
71	**CDI BDR-9**	22,988	0	2,125	0	20,863	***0.96***	**0.53**



GENERAL NOTES:

1. SITE INFORMATION SHOWN ARE BASED UPON APPROVED SITE PLANS, SUBDIVISION PLAN AND AS-BUILT PLANS PREPARED BY CREST ENGINEERING.
   1.1. PRELIMINARY AND FINAL SITE PLANS DATED 8/2/2011, LAST REVISED 7/12/16.
   1.2. SUBDIVISION PLAN: ALTA/NSPS LAND TITLE SURVEY FOR LOTS 36.01, 38, 39, 40, 44.01, 45.01, 47, 48, 48.01, 49, 50.01, 50.02, 50.03, 51, 52, 53, 54, 55, 56, 57.01, 58, 59 & 60; BLOCK 141, SIGNED BY GARY P. YURO, P.L.S. No. 43251, DATED 6/1/2021, NO REVISION
   1.3. AS-BUILT PLANS: PANEL 'D' DATED 9/16/2013, LOTS 5.04, 7.01, 7.03 & 23; BLOCK 148, SIGNED BY GARY P. YURO, P.L.S. No. 43251, SHEET 4 OF 8, DATED 9/16/2013, LAST REVISED 8/20/2014; PANEL 'E' DATED 9/16/2013, LOTS 5.04, 7.01, 7.03 & 23; BLOCK 148, SIGNED BY GARY P. YURO, P.L.S. No. 43251, SHEET 5 OF 8, DATED 9/16/2013, LAST REVISED 6/10/2014.
2. HYDRAULIC CALCULATIONS PREPARED BY CREST ENGINEERING DATED AUGUST 2011, REVISED FROM NOVEMBER 2011 TO FEBRUARY 2012, 52 PAGES TOTAL.

PROTECT YOURSELF
A PHONE CALL CAN BE YOUR INSURANCE POLICY
CALL BEFORE YOU DIG! 1-800-272-1000
GARDEN STATE UNDERGROUND LOCATION STOP
THE STATE OF NEW JERSEY REQUIRES NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE STATE.

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

revisions		
no.	date	description

LEGEND

- GAS VALVE
- GAS METER
- WATER VALVE
- HYDRANT
- WATER METER
- CURB STOP
- FIRE DEPT. CONNECTION
- DRAINAGE MH
- CURB INLET
- LAWN INLET
- SANITARY MH
- CLEANOUT
- BOLLARD
- SIGN
- LIGHT
- MAIL BOX
- GUY WIRE
- UTILITY POLE
- ELECTRIC MH
- CONIFEROUS TREE
- DECIDUOUS TREE
- FENCE
- RAILING
- WALL
- GATE POST
- WATER LINE
- GAS LINE
- ELECTRIC LINE
- SANITARY LINE
- OVERHEAD WIRES

PROPOSED LEGEND

- SOIL LINES
- XXXX SOIL SYMBOLS
- DRAINAGE AREA LIMIT LINE

SOILS

MAP UNIT SYMBOL	MAP UNIT NAME
EkaAr	Elkton loam to 2 percent slopes, rarley flooded
FavAr	Fallsington bedrock substratum variant loam, 0 to 2 percent slopes, rarely flooded
NkrA	Nixon moderately well drained variant loam, 0 to 2 percent slopes
RehA	Reaville silt loam, 0 to 2 percent slopes
UR	Urban Land

Engineers
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Land Surveyors
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Raritan, N.J. 08869
908-722-1500
Fax 908-722-7035
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F. Mitchel Ardman, P.E., P.P.
Jeffrey D. Reynolds, P.L.A.

ADONIS E. CRISPO
N.J. PROFESSIONAL ENGINEER LIC. NO. 44152

project
AMENDED PRELIMINARY AND FINAL SITE PLAN
PHASE 1F
BLOCK 141
LOTS 31.02,36.01,38,39,40,44.01,45.01,47,48,48.01,49,50.01,50.02,50.03,51,52,53,54,55,56,57.01,58,59,60,63.01,123
NORTH BRUNSWICK TOWNSHIP
MIDDLESEX COUNTY, NEW JERSEY

drawing title
PROPOSED INLET TRIBUTARY MAP

job number 21-042	drawing number DA-1
scale 1"=50'	
checked by FMA/AEC	
drawn by AR	
date 03/09/22	sheet 1 of 1