Stormwater Calculations

Site Improvement Plans
SSM Medical Office Building
O'Fallon, Missouri

Project No. 22-9120

September, 2022

Revised Oct. 21, 2022

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STORMWATER CALCULATIONS

Site Improvement Plans

SSM Medical Office Building
O'Fallon, MO 63368
Project No. 22-9120
September 27, 2022

The project consists of a 66,000 s.f. building on a 7.5 acre site. The building will be expanded to 100,000 s.f. in the future. Stormwater design is based on future improvements being counted as impervious areas. Stormwater calculations were prepared following the design requirements of the City of O'Fallon and MSD. Rainfall intensities are from MSD Rules and Regulations Figure 4-1, and Illinois State Water Survey Bulletin 71.

STORM SEWER NETWORK SIZING:
Calculations have been performed modeling the proposed storm sewer network during a 15 year and 100 year storm using Hydraflow Storm Sewers and the Rational Method. A storm duration of 20 minutes was used per MSD requirements. The rainfall intensity and PI Values are from the MSD Rules and Regulations. Calculations can be found later in this report. Storm Sewer Drainage Area Map can be found in Appendix A.

INLET SIZING:
Calculations have been performed modeling the storm inlets during a 15 year storm using Hydraflow Express Extension and the Rational Method. A storm duration of 20 minutes was used per city requirements. The rainfall intensity and PI Values are from the MSD Rules and Regulations. Calculations can be found later in this report.

DETENTION AND WATER QUALITY:
Stormwater detention and water quality are provided by the wet basin on Lot 11B. These calculations and plans were submitted under GR22-000012.

STORM SEWER PIPING

15 YEAR STORM

Cochran

Line No.	Inlet ID	DnStm Ln No	Invert Dn (ft)	Invert Up (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Known Q (cfs)	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	
1	NEW JUNCTION BOX #2	Outfall	582.00	582.21	41.291	0.51	36	4.28	27.13	47.57	5.28	584.86	583.89	583.89	584.95	590.00	
2	NEW CURB INLET #3	1	582.31	583.33	204.500	0.50	30	0.49	22.85	28.96	6.54	583.98	585.00	585.60	590.00	588.15	
3	NEW CURB INLET #7	2	583.43	592.00	221.729	3.87	24	0.51	17.59	44.47	6.26	585.60	593.51 j	593.51	588.15	599.80	
4	NEW CURB INLET #8	3	592.10	602.18	377.324	2.67	15	0.28	5.46	10.55	4.96	593.51	603.13 j	603.13	599.80	607.30	
5	NEW CURB INLET #9	4	602.28	602.63	35.000	1.00	15	2.01	5.18	6.46	5.59	603.13	603.55	603.55	607.30	607.30	
6	NEW JUNCTION BOX #10	5	602.73	603.22	48.820	1.00	15	0.00	3.17	6.47	4.03	603.55	603.94 j	603.94	607.30	609.25	
7	NEW CURB INLET #11	6	603.32	604.29	97.135	1.00	12	2.12	3.17	3.56	5.03	604.06	605.05	605.05	609.25	609.30	
8	Null Structure	7	604.89	607.40	31.687	7.92	12	0.16	0.16	10.02	1.92	605.05	607.56	607.56	609.30	0.00	
9	NEW GRATED INLET #12	7	604.39	605.00	60.730	1.00	12	0.89	0.89	3.57	2.35	605.05	605.39 j	605.39	609.30	608.50	
10	NEW CURB INLET #15	3	592.10	592.45	35.000	1.00	18	3.27	11.62	10.50	6.58	593.60	594.03	594.10	599.80	599.80	
11	NEW GRATED CURB INLET #16	10	592.55	595.12	155.497	1.65	18	1.01	8.35	13.50	5.32	594.10	596.24 j	596.24	599.80	602.90	
12	NEW GRATED CURB INLET #17	11	595.22	596.67	145.005	1.00	18	1.02	7.34	10.50	5.66	596.24	597.72	597.72	602.90	603.00	
13	NEW GRATED CURB INLET #18	12	596.77	597.47	70.141	1.00	15	2.37	6.32	6.45	5.96	597.77	598.48	598.48	603.00	602.90	
14	NEW JUNCTION BOX #19	13	597.57	598.61	104.500	1.00	15	0.00	3.95	6.44	4.43	598.48	599.41 j	599.41	602.90	604.75	
15	NEW CURB INLET #20	14	598.71	598.89	18.192	0.99	12	0.67	3.95	3.54	5.03	599.71	599.89	600.07	604.75	603.90	
16	NEW CURB INLET #21	15	598.99	599.52	52.593	1.01	12	0.49	3.28	3.58	4.20	600.07	600.48	600.52	603.90	605.80	
17	NEW GRATED CURB INLET #22	16	599.62	600.70	108.356	1.00	12	0.26	2.79	3.56	4.20	600.52	601.42 j	601.42	605.80	607.80	
18	NEW GRATED CURB INLET #23	17	600.80	602.43	163.000	1.00	12	1.70	2.53	3.56	4.68	601.42	603.11	603.11	607.80	606.75	
19	NEW CURB INLET #24	18	602.53	603.25	72.095	1.00	12	0.83	0.83	3.56	2.39	603.11	603.63 j	603.63	606.75	606.80	
20	NEW DOUBLE CURB INLET #13	2	583.43	583.88	45.000	1.00	24	0.29	4.77	22.62	1.58	585.60	585.62	585.64	588.15	588.15	
21	NEW AREA INLET #14	20	583.98	584.26	28.176	0.99	24	4.48	4.48	22.55	2.91	585.64	585.00	585.00	588.15	590.00	

Project File: STORM SEWER 15-YEAR 10-20.stm | Number of lines: 21 | Date: 10/20/2022

NOTES: ** Critical depth

STORM SEWER PIPING

100 YEAR STORM

Cochran

Line No.	Inlet ID	DnStm Ln No	Invert Dn (ft)	Invert Up (ft)	Line Length (ft)	Line Slope (%)	Line Size (in)	Known Q (cfs)	Flow Rate (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	HGL Dn (ft)	HGL Up (ft)	HGL Jnct (ft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	
1	NEW JUNCTION BOX #2	Outfall	582.00	582.21	41.291	0.51	36	5.77	36.57	47.57	5.17	585.69	585.81	586.01	584.95	590.00	
2	NEW CURB INLET #3	1	582.31	583.33	204.500	0.50	30	0.66	30.80	28.96	6.28	586.01	587.16	587.71	590.00	588.15	
3	NEW CURB INLET #7	2	583.43	592.00	221.729	3.87	24	0.69	23.72	44.47	7.89	587.71	593.73 j	593.73	588.15	599.80	
4	NEW CURB INLET #8	3	592.10	602.18	377.324	2.67	15	0.38	7.35	10.55	6.26	593.73	603.26 j	603.26	599.80	607.30	
5	NEW CURB INLET #9	4	602.28	602.63	35.000	1.00	15	2.70	6.97	6.46	5.68	603.53	603.94	604.26	607.30	607.30	
6	NEW JUNCTION BOX #10	5	602.73	603.22	48.820	1.00	15	0.00	4.27	6.47	3.48	604.26	604.47	604.59	607.30	609.25	
7	NEW CURB INLET #11	6	603.32	604.29	97.135	1.00	12	2.86	4.27	3.56	5.44	604.59	605.99	606.40	609.25	609.30	
8	Null Structure	7	604.89	607.40	31.687	7.92	12	0.21	0.21	10.02	1.16	606.40	607.59 j	607.59	609.30	0.00	
9	NEW GRATED INLET #12	7	604.39	605.00	60.730	1.00	12	1.20	1.20	3.57	1.53	606.40	606.47	606.50	609.30	608.50	
10	NEW CURB INLET #15	3	592.10	592.45	35.000	1.00	18	4.41	15.68	10.50	8.87	593.73	594.51	594.63	599.80	599.80	
11	NEW GRATED CURB INLET #16	10	592.55	595.12	155.497	1.65	18	1.36	11.27	13.50	6.69	594.63	596.40 j	596.40	599.80	602.90	
12	NEW GRATED CURB INLET #17	11	595.22	596.67	145.005	1.00	18	1.37	9.91	10.50	6.55	596.40	597.88	597.88	602.90	603.00	
13	NEW GRATED CURB INLET #18	12	596.77	597.47	70.141	1.00	15	3.20	8.54	6.45	6.96	598.02	599.25	599.60	603.00	602.90	
14	NEW JUNCTION BOX #19	13	597.57	598.61	104.500	1.00	15	0.00	5.34	6.44	4.35	599.60	600.32	600.45	602.90	604.75	
15	NEW CURB INLET #20	14	598.71	598.89	18.192	0.99	12	0.90	5.34	3.54	6.80	600.45	600.86	601.20	604.75	603.90	
16	NEW CURB INLET #21	15	598.99	599.52	52.593	1.01	12	0.67	4.44	3.58	5.65	601.20	602.02	602.08	603.90	605.80	
17	NEW GRATED CURB INLET #22	16	599.62	600.70	108.356	1.00	12	0.36	3.77	3.56	4.80	602.08	603.29	603.36	605.80	607.80	
18	NEW GRATED CURB INLET #23	17	600.80	602.43	163.000	1.00	12	2.29	3.41	3.56	4.34	603.36	604.86	604.99	607.80	606.75	
19	NEW CURB INLET #24	18	602.53	603.25	72.095	1.00	12	1.12	1.12	3.56	1.43	604.99	605.07	605.10	606.75	606.80	
20	NEW DOUBLE CURB INLET #13	2	583.43	583.88	45.000	1.00	24	0.39	6.42	22.62	2.04	587.71	587.75	587.80	588.15	588.15	
21	NEW AREA INLET #14	20	583.98	584.26	28.176	0.99	24	6.03	6.03	22.55	1.92	587.80	587.82	587.87	588.15	590.00	

Project File: STORM SEWER 100-YEAR 10-20.stm | Number of lines: 21 | Date: 10/20/2022

NOTES: ** Critical depth

CURB INLET SIZING

15 YEAR STORM

Inlet Report

CI #3

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	4.00
Throat Height (in)	=	2.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

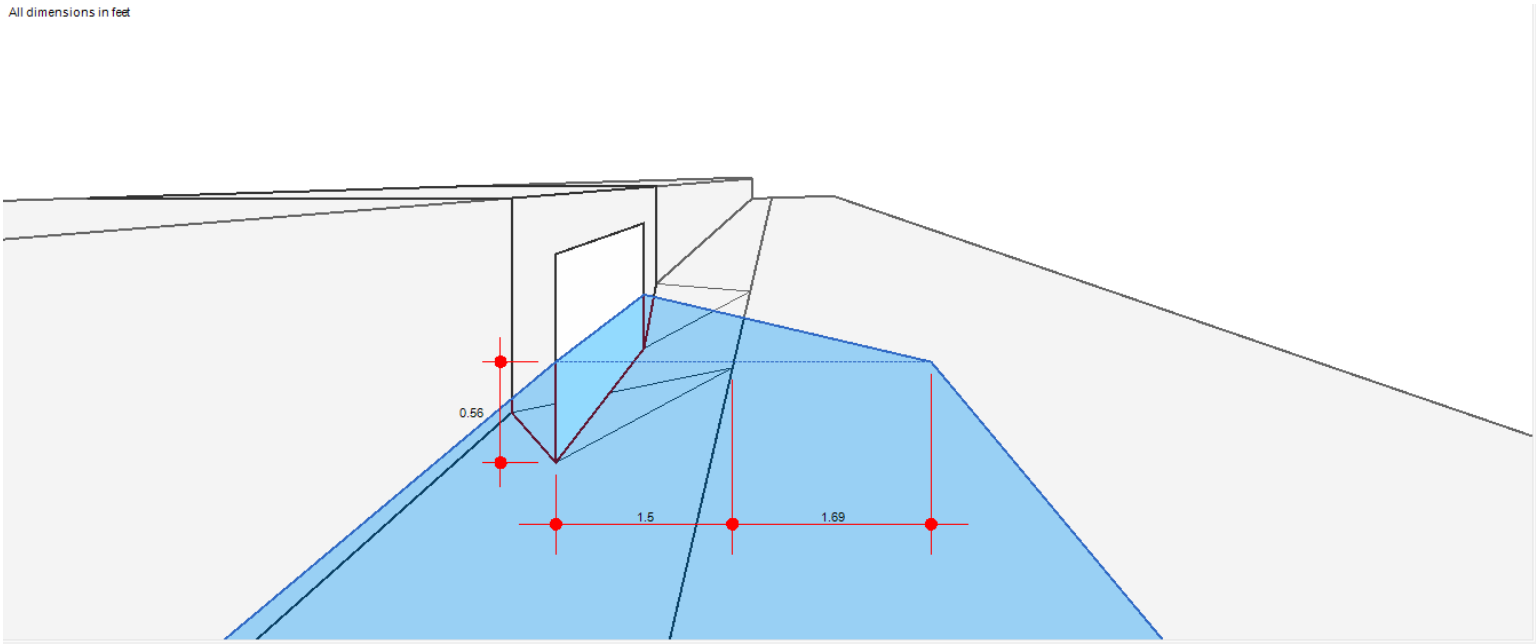
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	6.00
Gutter Width (ft)	=	1.50
Gutter Slope (%)	=	5.70
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	0.27

Highlighted

Q Total (cfs)	=	0.27
Q Capt (cfs)	=	0.27
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.76
Efficiency (%)	=	100
Gutter Spread (ft)	=	3.19
Gutter Vel (ft/s)	=	2.66
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

CI #7

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	4.00
Throat Height (in)	=	2.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

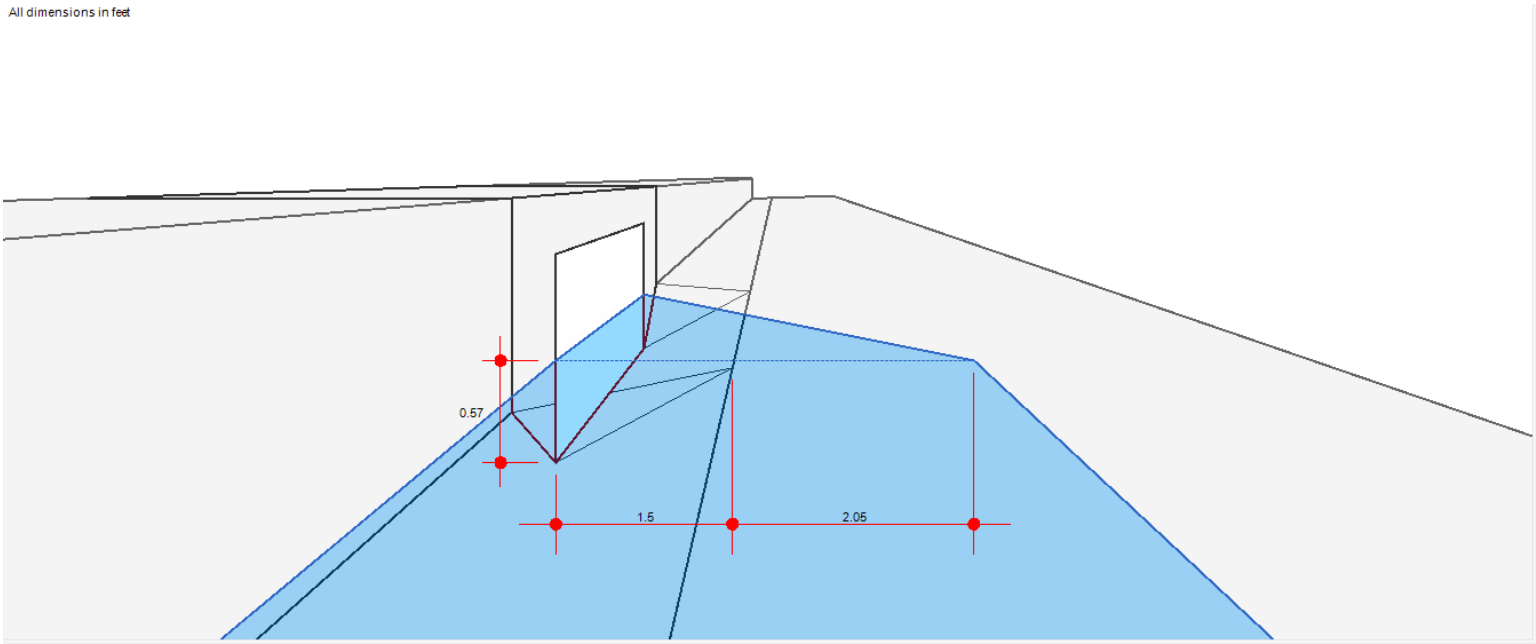
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	6.00
Gutter Width (ft)	=	1.50
Gutter Slope (%)	=	4.50
Gutter n-value	=	0.016

Calculations

Compute by:	Known Q
Q (cfs)	= 0.32

Highlighted

Q Total (cfs)	=	0.32
Q Capt (cfs)	=	0.32
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.85
Efficiency (%)	=	100
Gutter Spread (ft)	=	3.55
Gutter Vel (ft/s)	=	2.54
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

CI #8

Curb Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 2.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

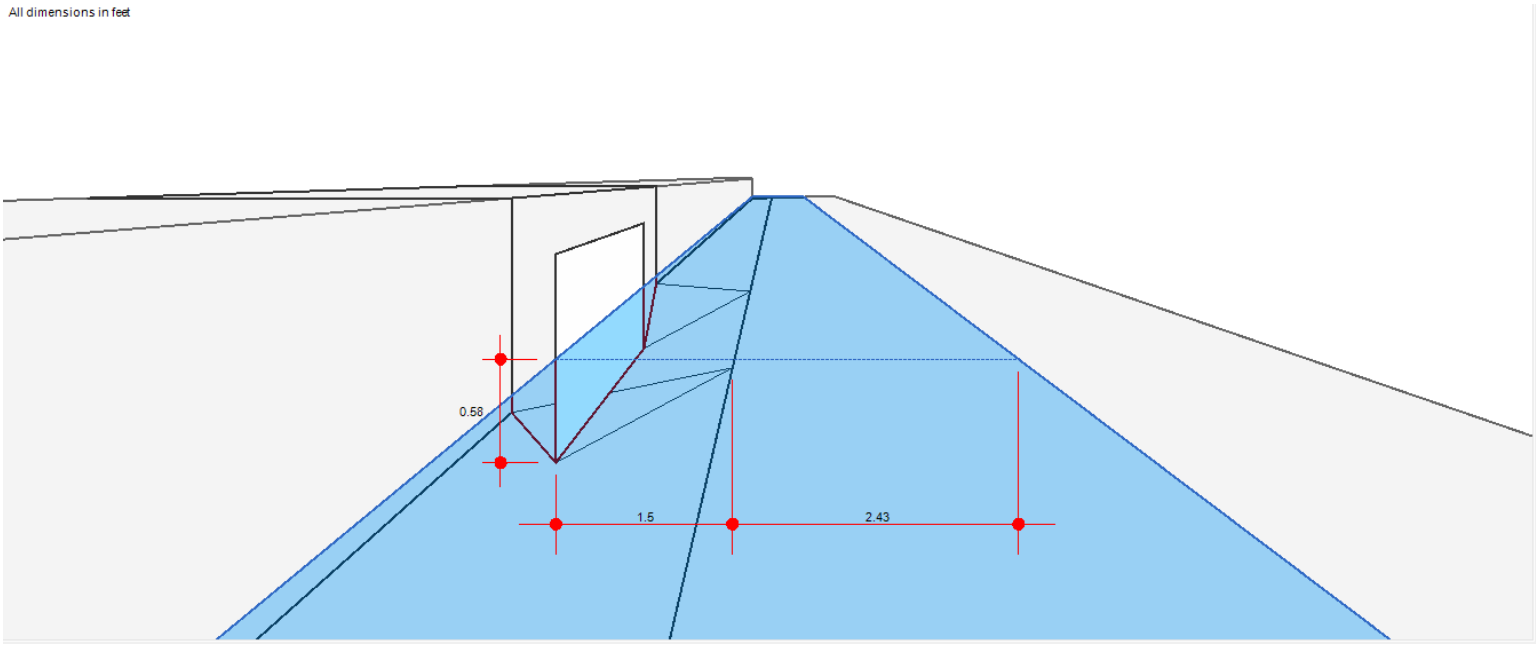
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 6.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 0.34

Highlighted

Q Total (cfs)	= 0.34
Q Capt (cfs)	= 0.34
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 6.94
Efficiency (%)	= 100
Gutter Spread (ft)	= 3.93
Gutter Vel (ft/s)	= 2.54
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

CI #9

Curb Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 2.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

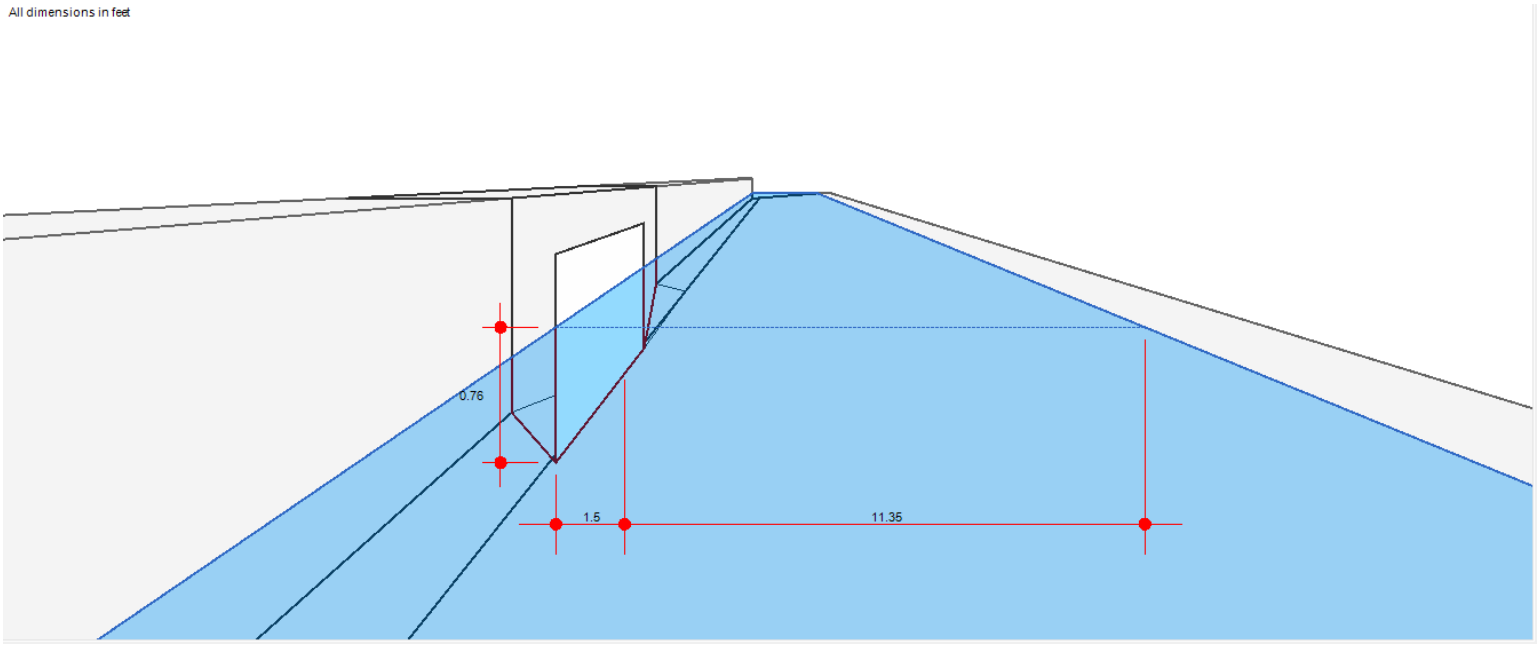
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 6.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.01

Highlighted

Q Total (cfs)	= 2.01
Q Capt (cfs)	= 2.01
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 9.08
Efficiency (%)	= 100
Gutter Spread (ft)	= 12.85
Gutter Vel (ft/s)	= 2.54
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Oct 20 2022

CI #11

Curb Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 2.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

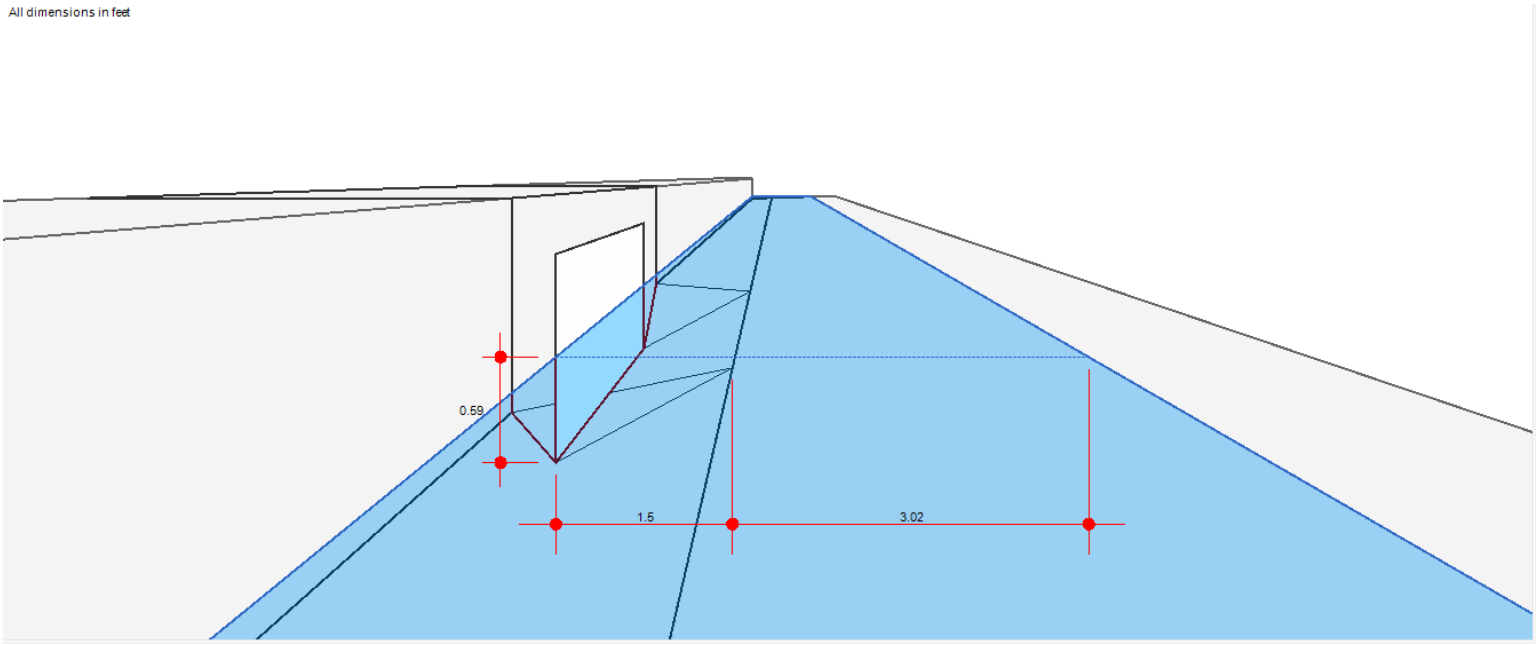
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 6.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 0.42

Highlighted

Q Total (cfs)	= 0.42
Q Capt (cfs)	= 0.42
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 7.09
Efficiency (%)	= 100
Gutter Spread (ft)	= 4.52
Gutter Vel (ft/s)	= 2.81
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

GI #12

Drop Grate Inlet

Location	= Sag
Curb Length (ft)	= -0-
Throat Height (in)	= -0-
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

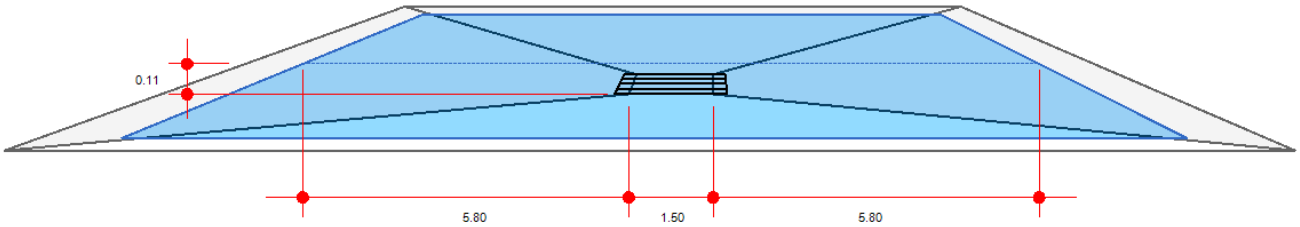
Calculations

Compute by:	Known Q
Q (cfs)	= 0.89

Highlighted

Q Total (cfs)	= 0.89
Q Capt (cfs)	= 0.89
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 1.33
Efficiency (%)	= 100
Gutter Spread (ft)	= 13.11
Gutter Vel (ft/s)	= 2.54
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-

All dimensions in feet



Inlet Report

DCI #13

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	8.00
Throat Height (in)	=	2.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

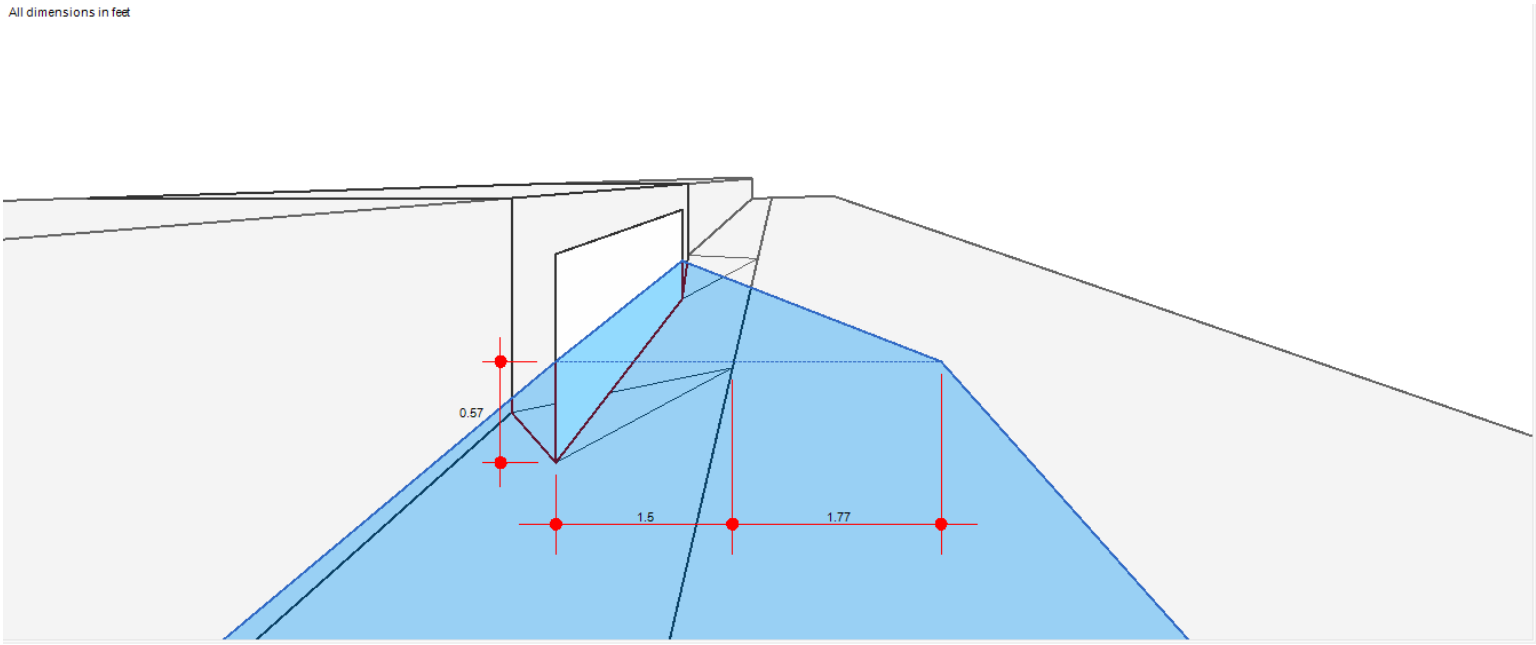
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	6.00
Gutter Width (ft)	=	1.50
Gutter Slope (%)	=	5.70
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	0.29

Highlighted

Q Total (cfs)	=	0.29
Q Capt (cfs)	=	0.29
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	6.78
Efficiency (%)	=	100
Gutter Spread (ft)	=	3.27
Gutter Vel (ft/s)	=	2.71
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

AI #14

Drop Curb Inlet

Location	=	Sag
Curb Length (ft)	=	16.00
Throat Height (in)	=	6.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

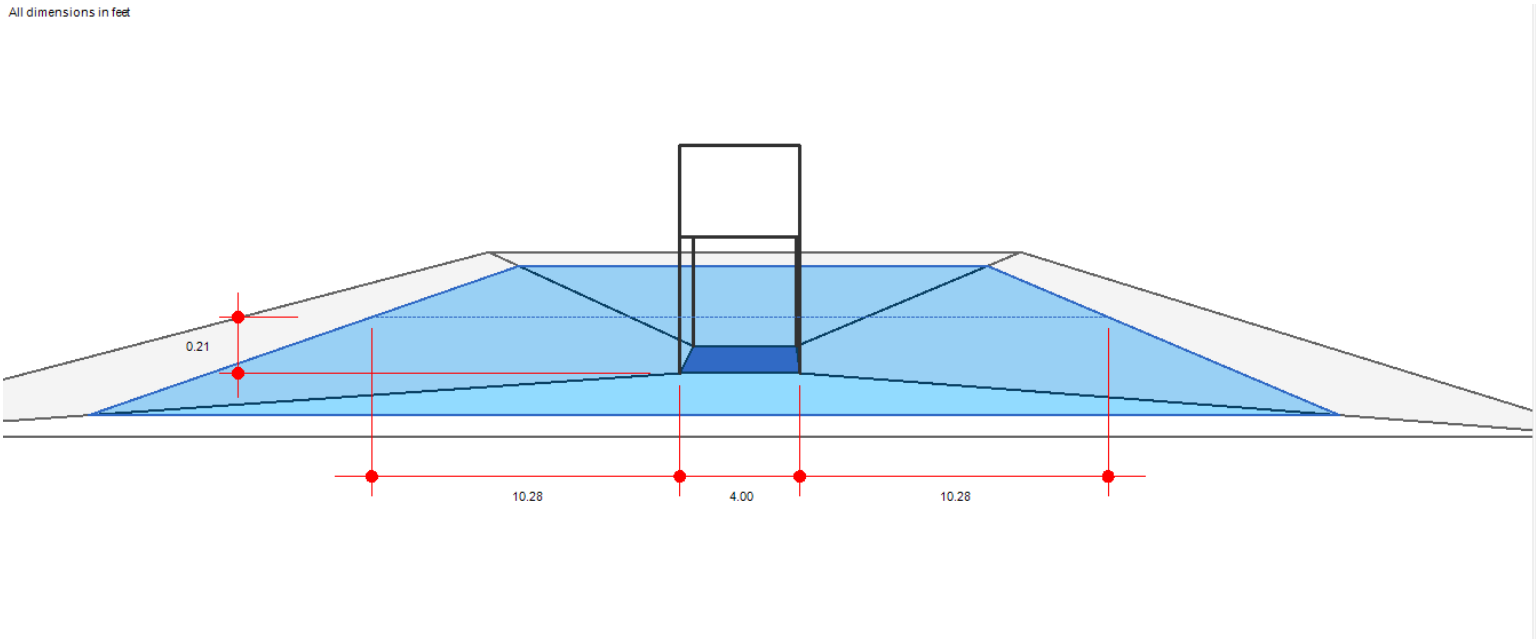
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	-0-
Gutter Width (ft)	=	-0-
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Known Q
Q (cfs)	=	4.48

Highlighted

Q Total (cfs)	=	4.48
Q Capt (cfs)	=	4.48
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	2.47
Efficiency (%)	=	100
Gutter Spread (ft)	=	10.28
Gutter Vel (ft/s)	=	2.66
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

CI #15

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	4.00
Throat Height (in)	=	2.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

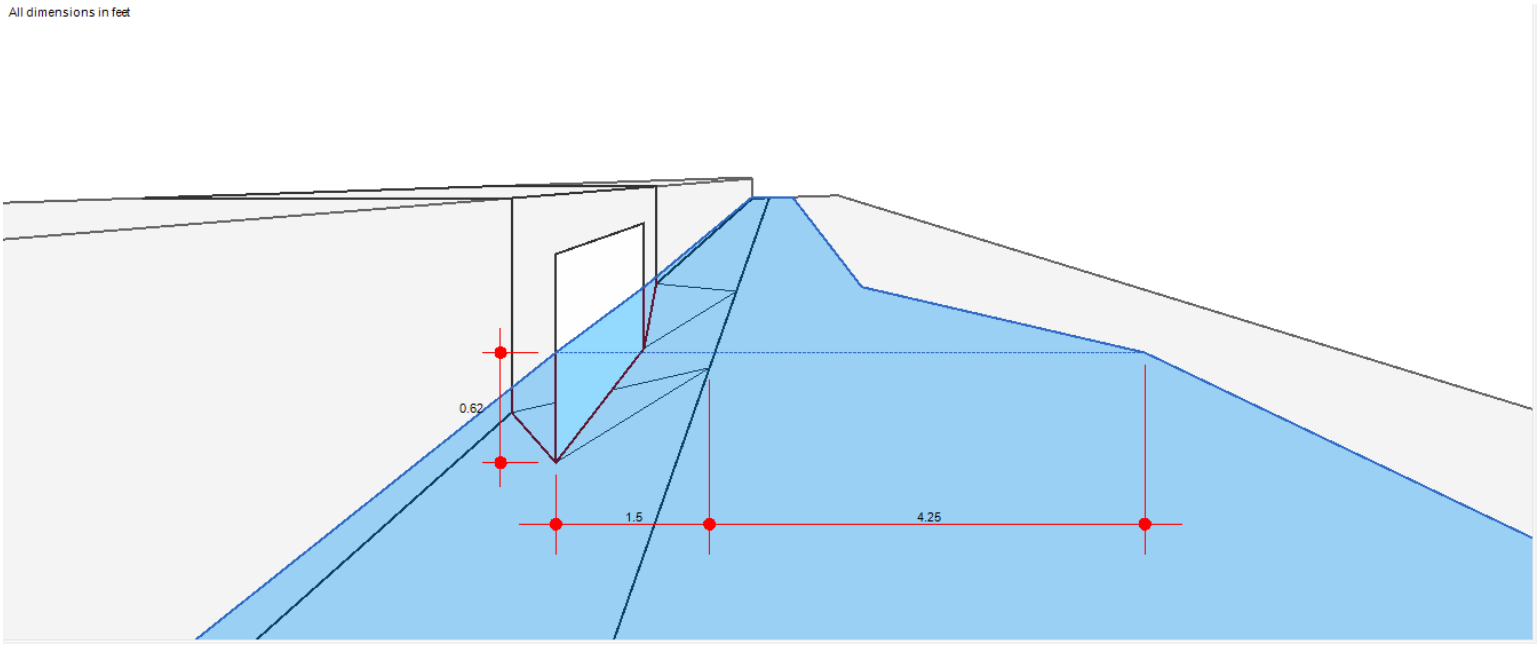
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	6.00
Gutter Width (ft)	=	1.50
Gutter Slope (%)	=	4.50
Gutter n-value	=	0.016

Calculations

Compute by:	Known Q
Q (cfs)	= 1.16

Highlighted

Q Total (cfs)	= 1.16
Q Capt (cfs)	= 0.84
Q Bypass (cfs)	= 0.32
Depth at Inlet (in)	= 7.38
Efficiency (%)	= 73
Gutter Spread (ft)	= 5.75
Gutter Vel (ft/s)	= 3.51
Bypass Spread (ft)	= 3.54
Bypass Depth (in)	= 0.85



Inlet Report

GCI #16

Combination Inlet

Location	= Sag
Curb Length (ft)	= 2.00
Throat Height (in)	= 4.00
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

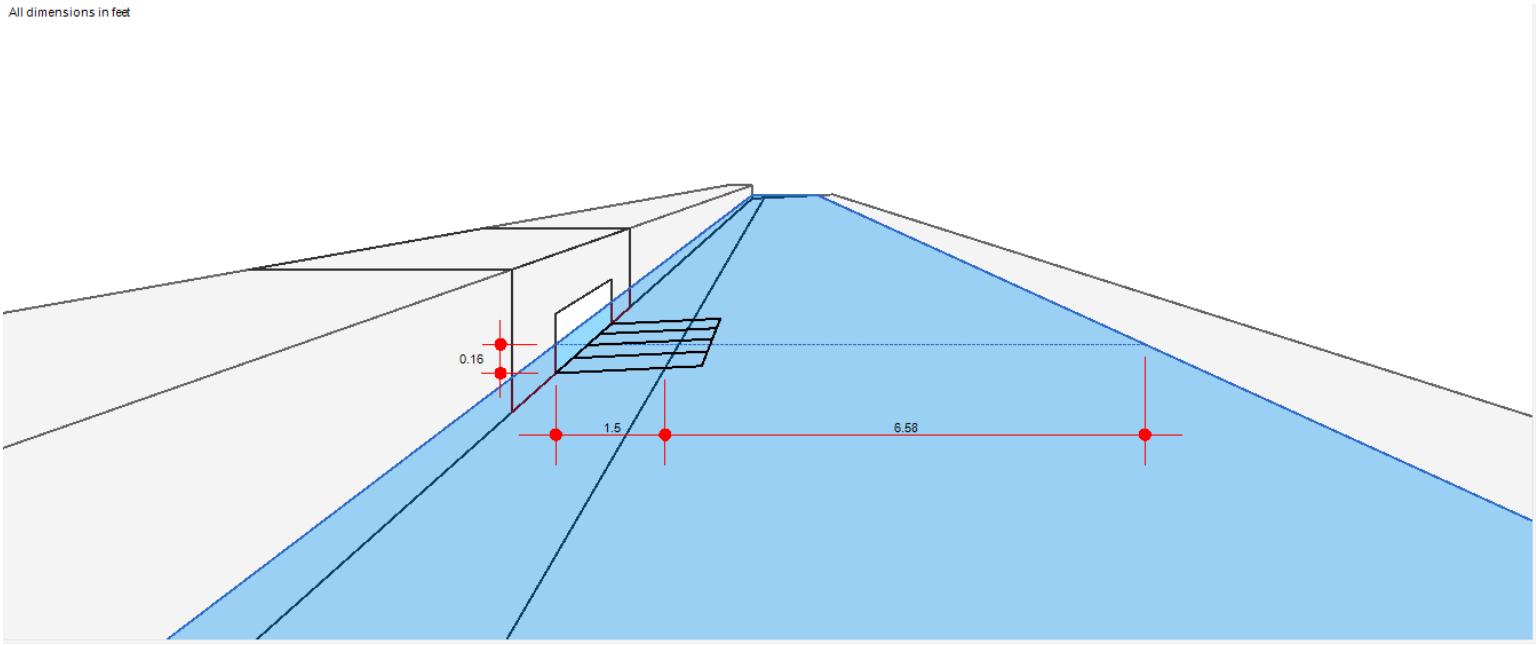
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.01

Highlighted

Q Total (cfs)	= 1.01
Q Capt (cfs)	= 1.01
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 1.94
Efficiency (%)	= 100
Gutter Spread (ft)	= 8.08
Gutter Vel (ft/s)	= 3.51
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

GCI #17

Combination Inlet

Location	= Sag
Curb Length (ft)	= 2.00
Throat Height (in)	= 4.00
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

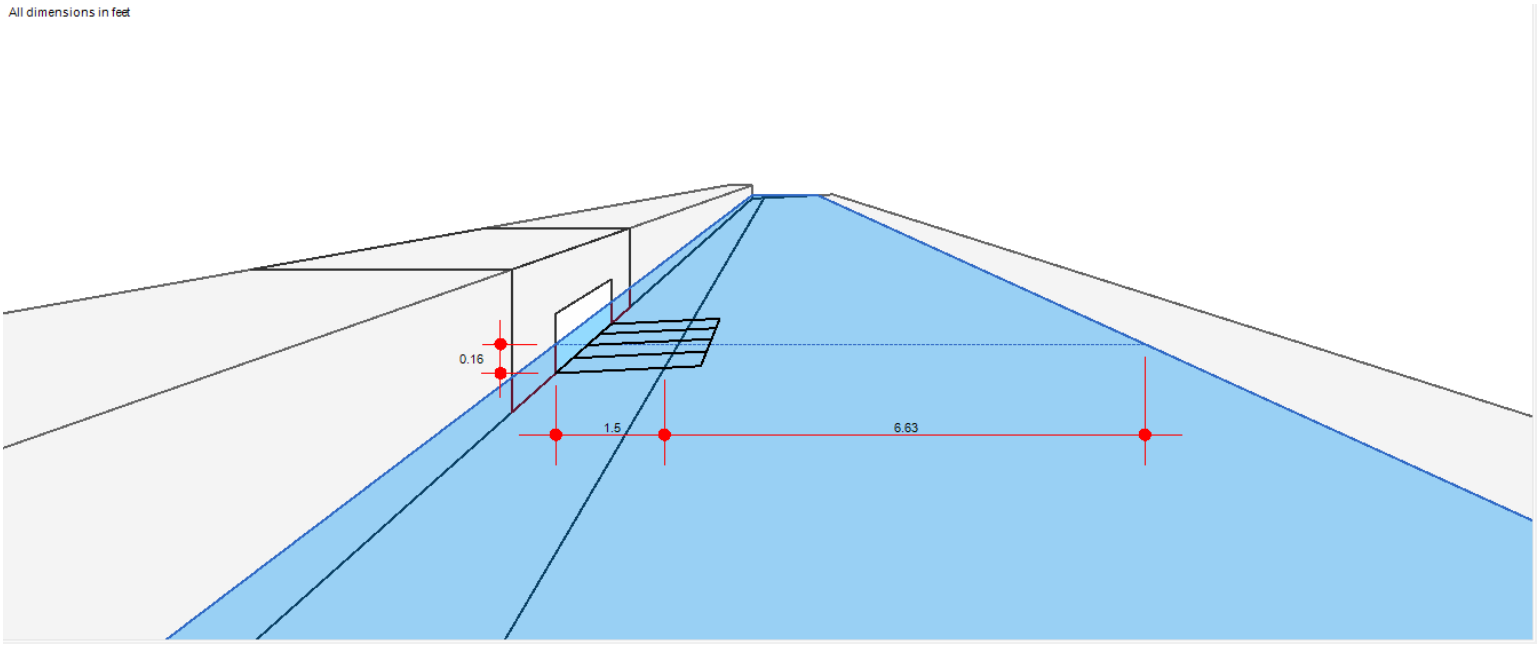
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.02

Highlighted

Q Total (cfs)	= 1.02
Q Capt (cfs)	= 1.02
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 1.95
Efficiency (%)	= 100
Gutter Spread (ft)	= 8.13
Gutter Vel (ft/s)	= 3.51
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

GCI #18

Combination Inlet

Location	= Sag
Curb Length (ft)	= 2.00
Throat Height (in)	= 4.00
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

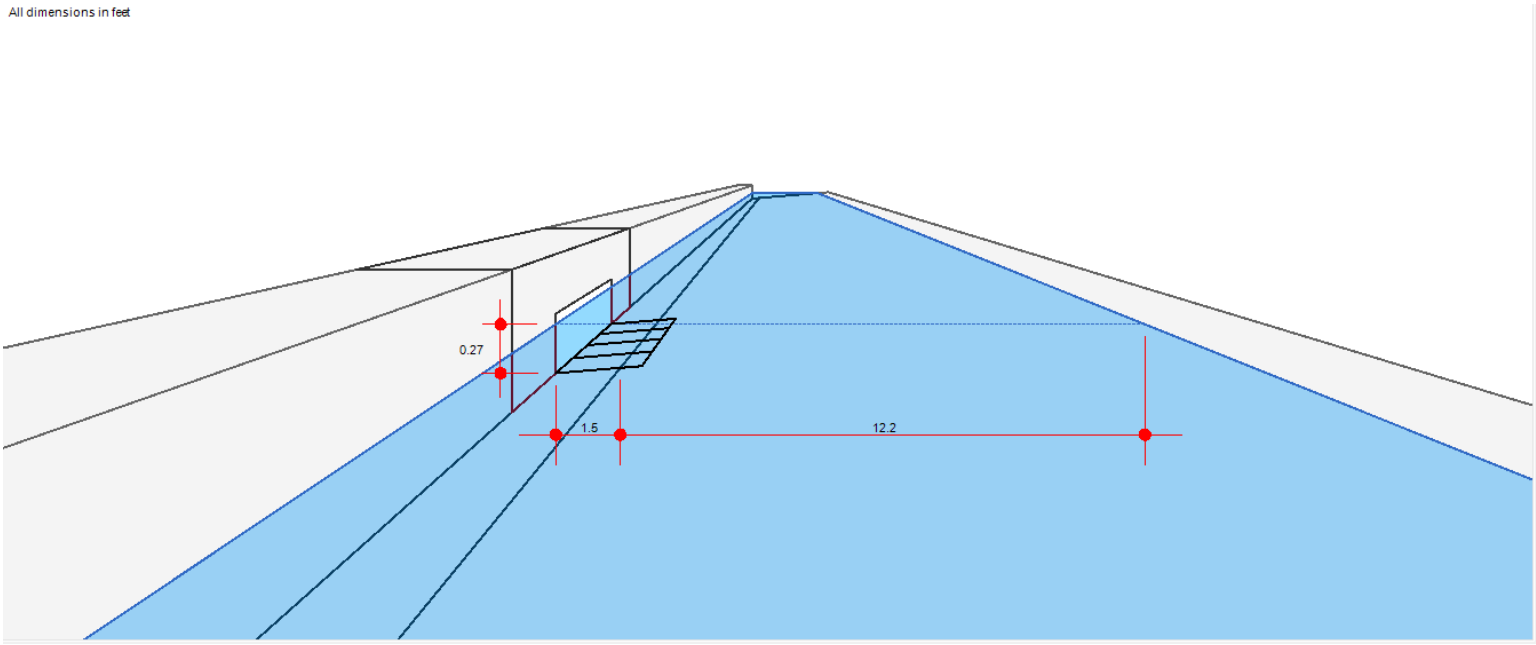
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 2.37

Highlighted

Q Total (cfs)	= 2.37
Q Capt (cfs)	= 2.37
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 3.29
Efficiency (%)	= 100
Gutter Spread (ft)	= 13.70
Gutter Vel (ft/s)	= 3.51
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Oct 20 2022

CI #20

Curb Inlet

Location	=	On grade
Curb Length (ft)	=	4.00
Throat Height (in)	=	2.00
Grate Area (sqft)	=	-0-
Grate Width (ft)	=	-0-
Grate Length (ft)	=	-0-

Gutter

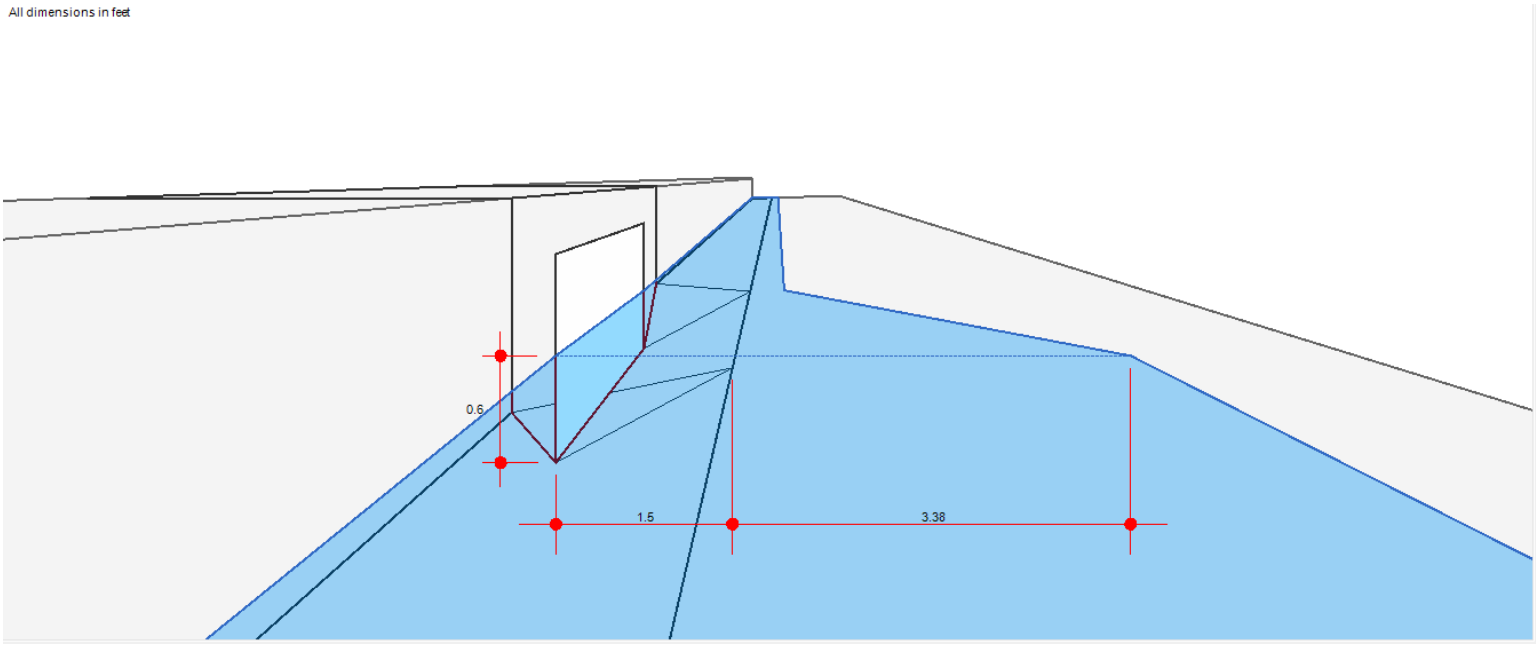
Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	6.00
Gutter Width (ft)	=	1.50
Gutter Slope (%)	=	3.60
Gutter n-value	=	0.016

Calculations

Compute by:		Known Q
Q (cfs)	=	0.67

Highlighted

Q Total (cfs)	=	0.67
Q Capt (cfs)	=	0.61
Q Bypass (cfs)	=	0.06
Depth at Inlet (in)	=	7.17
Efficiency (%)	=	91
Gutter Spread (ft)	=	4.88
Gutter Vel (ft/s)	=	2.81
Bypass Spread (ft)	=	1.98
Bypass Depth (in)	=	0.48



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Oct 20 2022

CI #21

Curb Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 2.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

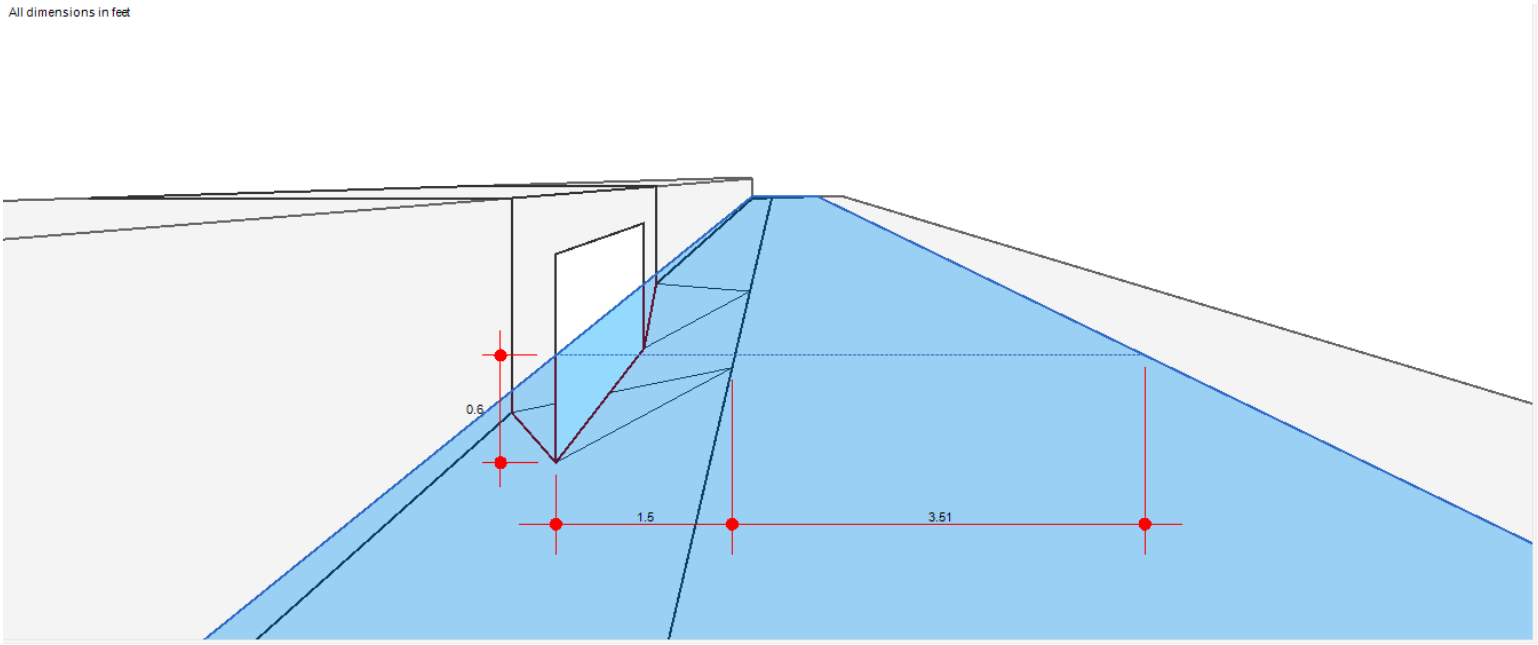
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 6.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 0.49

Highlighted

Q Total (cfs)	= 0.49
Q Capt (cfs)	= 0.49
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 7.20
Efficiency (%)	= 100
Gutter Spread (ft)	= 5.01
Gutter Vel (ft/s)	= 2.81
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

GCI #22

Combination Inlet

Location	= Sag
Curb Length (ft)	= 2.00
Throat Height (in)	= 4.00
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

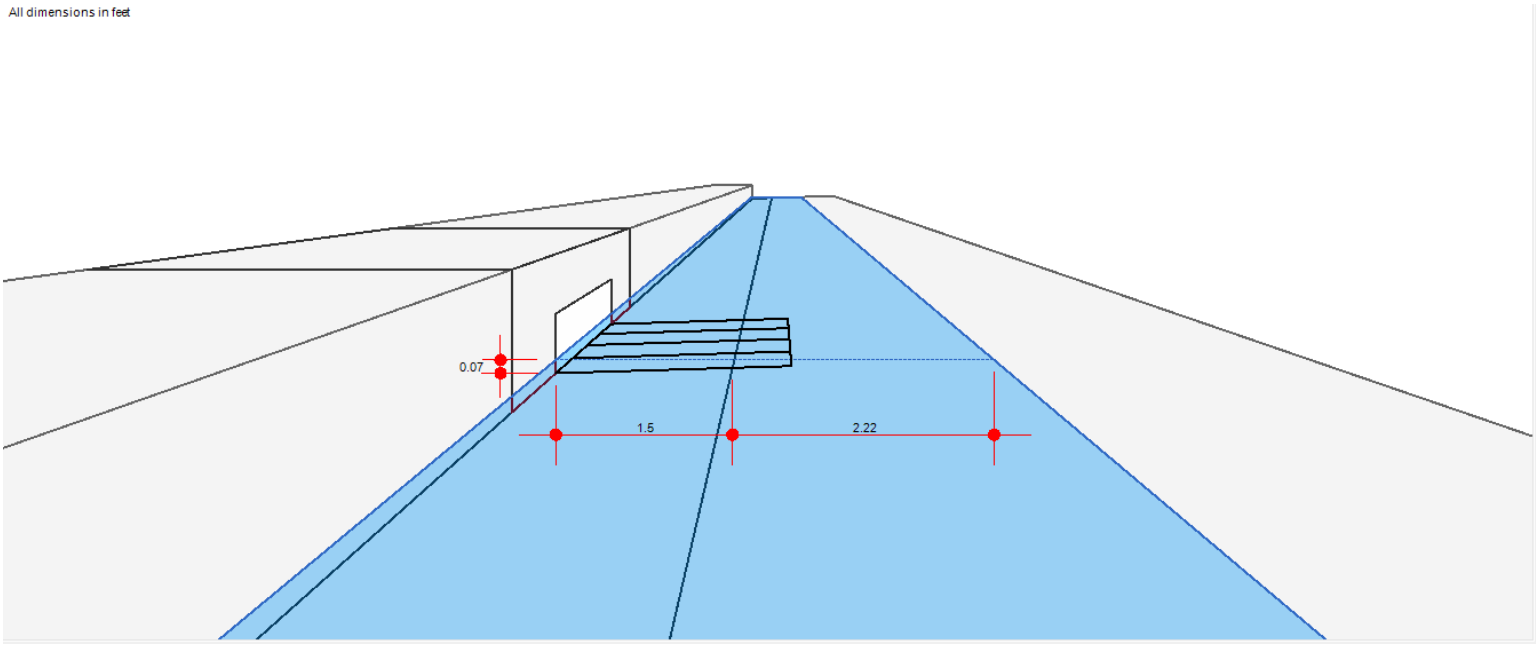
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 0.26

Highlighted

Q Total (cfs)	= 0.26
Q Capt (cfs)	= 0.26
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 0.89
Efficiency (%)	= 100
Gutter Spread (ft)	= 3.72
Gutter Vel (ft/s)	= 2.83
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

GCI #23

Combination Inlet

Location	= Sag
Curb Length (ft)	= 2.00
Throat Height (in)	= 4.00
Grate Area (sqft)	= 4.00
Grate Width (ft)	= 2.00
Grate Length (ft)	= 2.00

Gutter

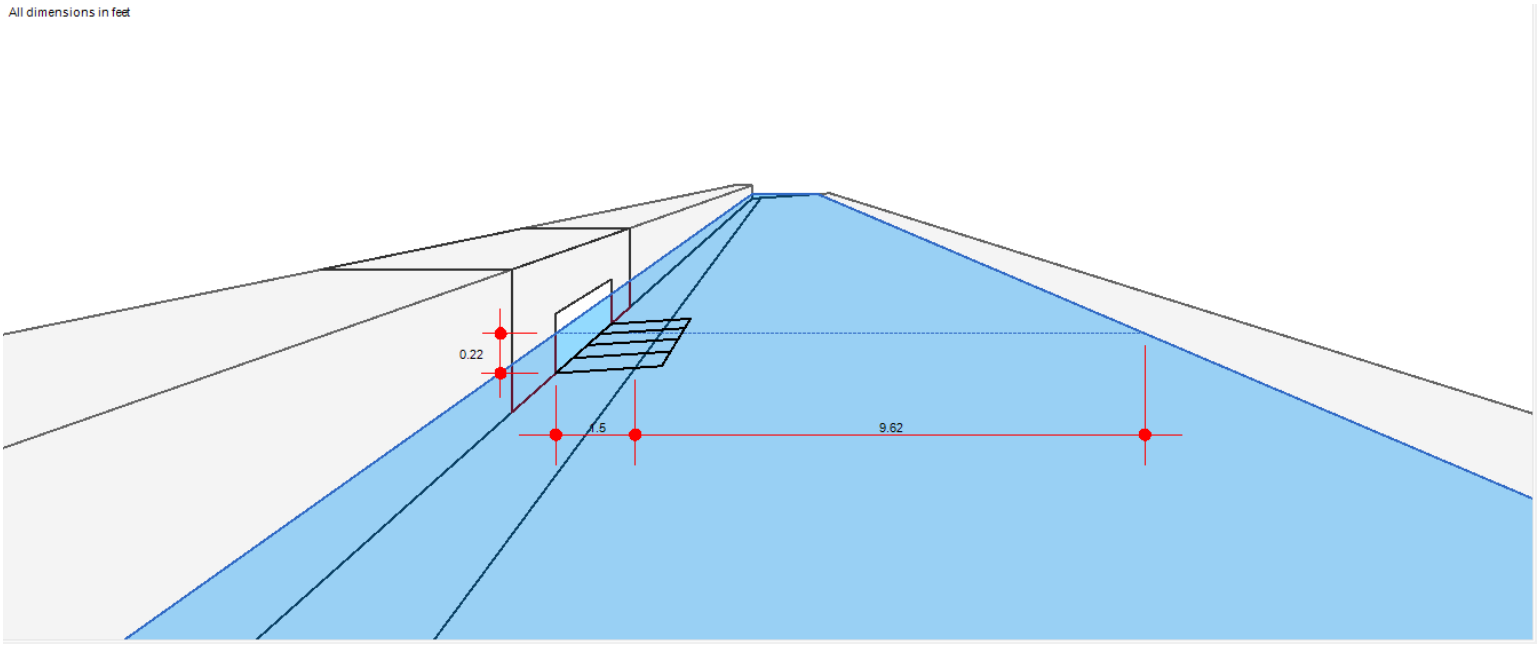
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= -0-
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 1.70

Highlighted

Q Total (cfs)	= 1.70
Q Capt (cfs)	= 1.70
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 2.67
Efficiency (%)	= 100
Gutter Spread (ft)	= 11.12
Gutter Vel (ft/s)	= 2.83
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



Inlet Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Tuesday, Sep 27 2022

CI #24

Curb Inlet

Location	= Sag
Curb Length (ft)	= 4.00
Throat Height (in)	= 2.00
Grate Area (sqft)	= -0-
Grate Width (ft)	= -0-
Grate Length (ft)	= -0-

Gutter

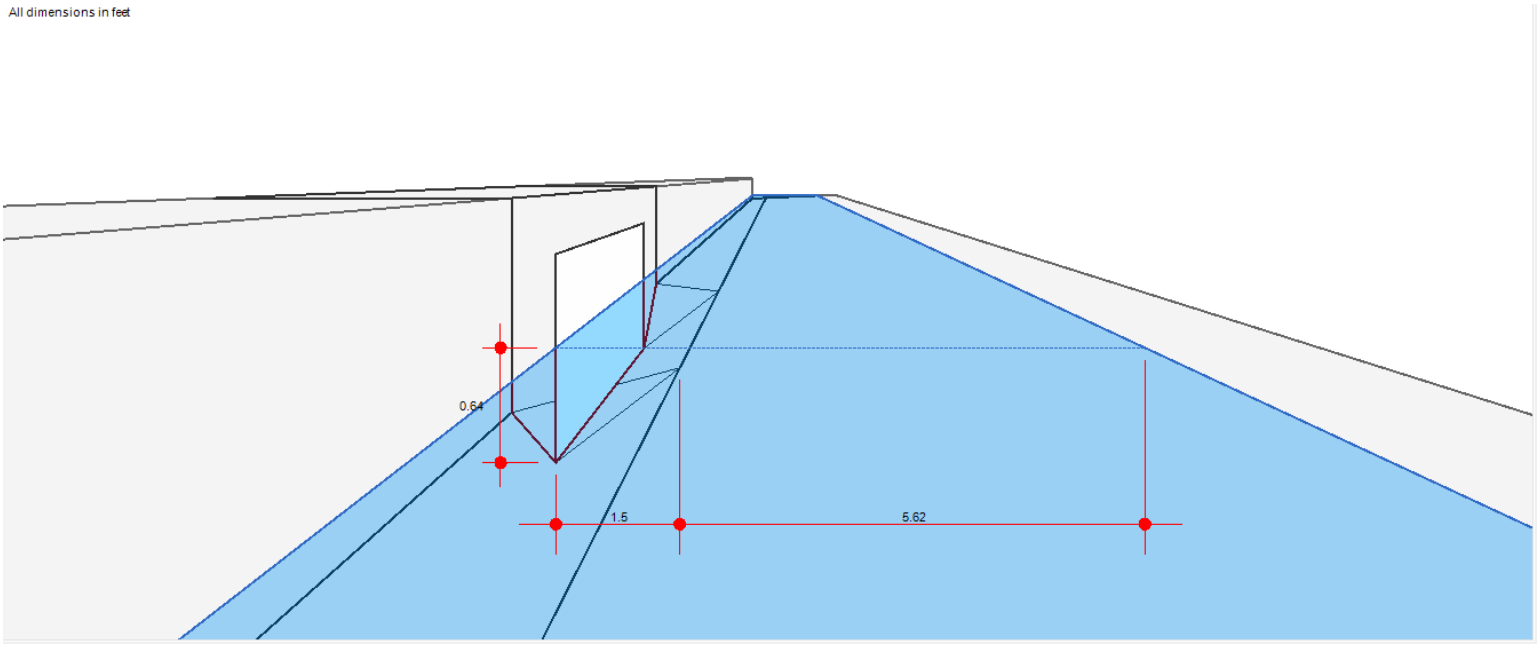
Slope, Sw (ft/ft)	= 0.020
Slope, Sx (ft/ft)	= 0.020
Local Depr (in)	= 6.00
Gutter Width (ft)	= 1.50
Gutter Slope (%)	= -0-
Gutter n-value	= -0-

Calculations

Compute by:	Known Q
Q (cfs)	= 0.83

Highlighted

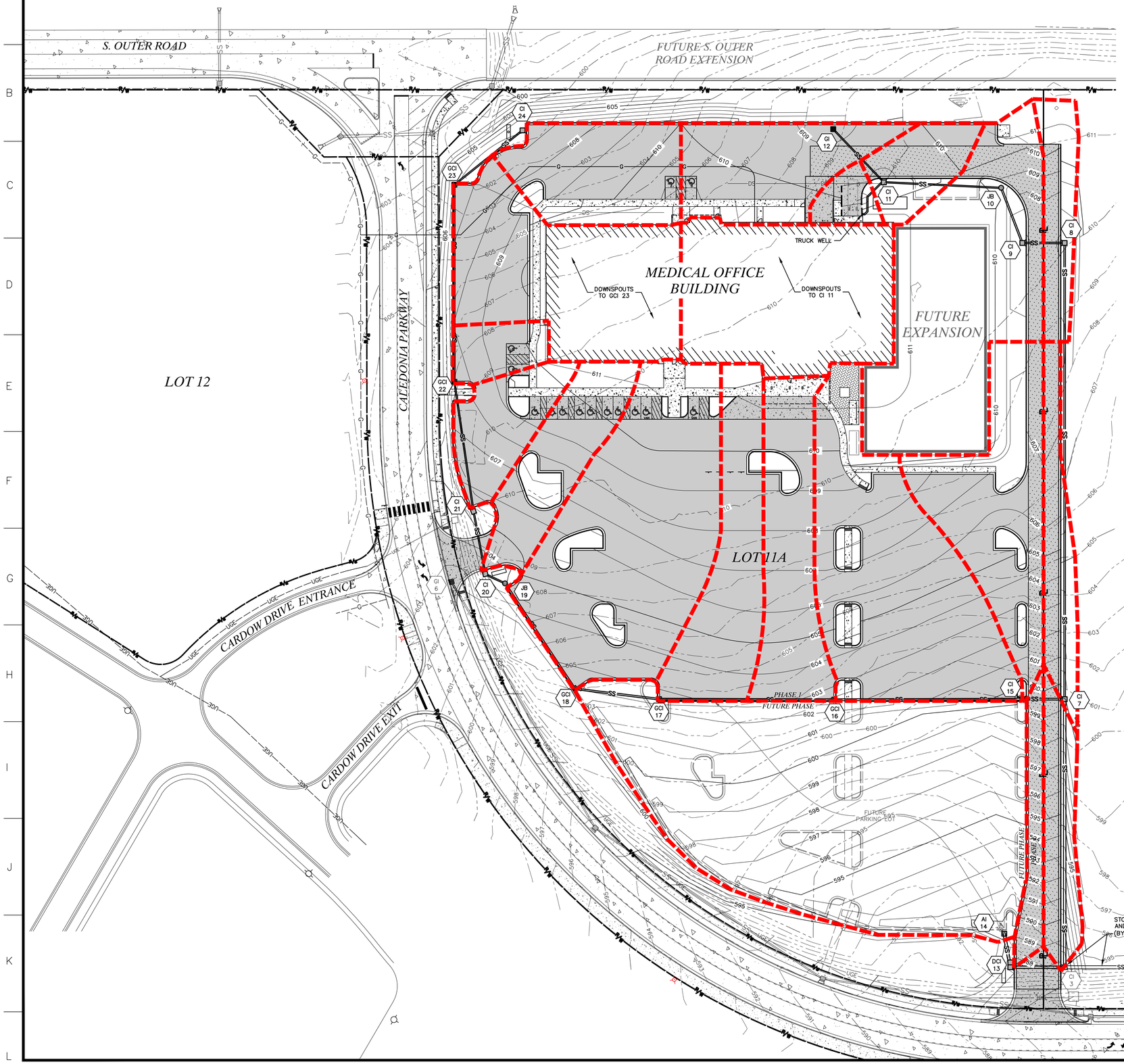
Q Total (cfs)	= 0.83
Q Capt (cfs)	= 0.83
Q Bypass (cfs)	= -0-
Depth at Inlet (in)	= 7.71
Efficiency (%)	= 100
Gutter Spread (ft)	= 7.12
Gutter Vel (ft/s)	= 2.83
Bypass Spread (ft)	= -0-
Bypass Depth (in)	= -0-



APPENDIX A

DRAINAGE AREA MAP

STORM SEWER DRAINAGE MAP



Percent Impervious	20 MIN DURATION 15 YEAR	100 YEAR
5%	1.70	2.29
10%	1.79	2.42
15%	1.89	2.54
20%	2.00	2.70
25%	2.09	2.82
30%	2.19	2.95
35%	2.28	3.07
40%	2.39	3.22
45%	2.48	3.35
50%	2.58	3.47
55%	2.67	3.60
60%	2.76	3.72
65%	2.88	3.88
70%	2.97	4.00
75%	3.06	4.12
80%	3.15	4.25
85%	3.24	4.37
90%	3.36	4.53
95%	3.45	4.65
100%	3.54	4.77

40 0 20 40 80

SCALE: 1"=40'

OCTOBER, 2022

DRAINAGE TABLE

Drainage Area	Inlet Number	AREA (AC.)	% IMPERVIOUS	15 YEAR - 20 MIN P.I. VALUE (CFS/AC.)	15 YEAR - 20 MIN RUNOFF (CFS)	100 YEAR - 20 MIN P.I. VALUE (CFS/AC.)	100 YEAR - 20 MIN RUNOFF (CFS)
1	CI #3	0.14	55%	3.54	0.49	4.77	0.66
2	CI #7	0.14	64%	3.54	0.51	4.77	0.69
3	CI #8	0.12	45%	2.30	0.28	3.10	0.38
4	CI #9	0.64	79%	3.13	2.01	4.22	2.70
5	CI #11	0.60	94%	3.54	2.12	4.77	2.86
6	Truck Well	0.05	82%	3.17	0.16	4.27	0.21
7	GI #12	0.27	90%	3.36	0.89	4.53	1.20
8	DCI #13	0.08	100%	3.54	0.29	4.77	0.39
9	AI #14	1.32	91%	3.38	4.48	4.55	6.03
10	AI #14 FUTURE	2.27	92%	3.40	7.73	4.58	10.42
11	CI #15 N	0.63	89%	3.34	2.11	4.50	2.85
12	CI #15 S	0.39	71%	2.99	1.16	4.02	1.56
13	GCI #16	0.29	95%	3.45	1.01	4.65	1.36
14	GCI #17	0.30	93%	3.41	1.02	4.60	1.37
15	GCI #18	0.70	92%	3.40	2.37	4.58	3.20
16	CI #20	0.21	77%	3.11	0.67	4.20	0.90
17	CI #21	0.15	84%	3.20	0.49	4.32	0.67
18	GCI #22	0.08	90%	3.36	0.26	4.53	0.36
19	GCI #23	0.49	96%	3.47	1.70	4.67	2.29
20	CI #24	0.26	83%	3.20	0.83	4.32	1.12

Q=API
Q= Runoff
A= Area (AC.)
P.I.= (CFS/AC.)

ALL FUTURE IMPROVEMENTS WERE COUNTED AS IMPERVIOUS AREAS.

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OCHRAN
• Civil Engineering • Site Development
• Land Surveying • General Consulting
• Architecture • Master Planning

Missouri State Certificate of Authority Numbers:
Survey : 000380
Engineering : 001655
Architecture: 2002014240

Three working days prior to the start of any excavation on this site, contractor shall contact Missouri One Call for utility location information.

All OSHA rules & regulations established for the type of construction involved on these plans shall be strictly followed (ie. Trenching, Blasting, etc.)

STATE OF MISSOURI
TIMOTHY SCHOWE
NUMBER PE-2018000268
10-21-22
PROFESSIONAL ENGINEER

SITE IMPROVEMENTS
SSM HEALTH
O'FALLON, MISSOURI

DRN. BY:	APP'D. BY:
TML	
DATE: OCT. 21, 2022	
SCALE: 1"=40'	
PROJ. NO.: 22-9120	
DWG. NO.: C8	

STORM SEWER DRAINAGE MAP

DWG NAME: F:\22-9120 - Professional Design Services for the SSM Medical Building in O'Fallon, MO\AutoCad Drawings\9120 - Plan Sheets\13 - STORM DRAINAGE MAP.dwg LAYOUT TAB: STORM PLOTTED ON: Oct 20, 2022 - 2:24pm PLOTTED BY: tschowe