

THE POINT – SOUTH PKG 3

ROLESVILLE, NORTH CAROLINA

STORM DRAINAGE CALCULATIONS

PROJECT NUMBER: AWH-20000.02
DESIGNED BY: T. DABOLT, EI
CHECKED BY: T. O'DANIEL, PE

DATE: NOVEMBER 17, 2023



MCADAMS

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THE POINT SOUTH – PKG 3

STORM DRAINAGE SYSTEM CALCULATIONS

GENERAL DESCRIPTION

The Point site is located along NC HWY 401 (Louisburg Road) and west of East Young Street in Rolesville, North Carolina. The proposed development at The Point is approximately 300 acres, divided into two sections with one to the north of NC HWY 401 (The Point – North) and another to the south of NC HWY 401 (The Point - South). This storm drainage analysis includes CD Package 2 of the “The Point – South” only. The total development will consist of approximately 804 lots, a mixture of townhomes and various types of single-family housing, thirteen stormwater control measures, sidewalks, roadways, greenway trail, and associated infrastructure and various amenities.

The Point South – Pkg 3 development is located within the Neuse River basin with the site’s stormwater runoff draining into Harris Creek. The proposed development shall be subject to storm drainage requirements set forth in the Rolesville Unified Development Ordinance.

CALCULATION METHODOLOGY

- > Rainfall data for the Rolesville, NC region was taken from NOAA Atlas 14. This data describes a depth-duration-frequency (DDF) table describing rainfall depth versus time for varying return periods in the Rolesville, NC area. These rainfall depths are entered into the “Stormwater Studio” application to determine design flows associated with the storm drainage system. Please reference the rainfall data section within this report for additional information.
- > The time of concentration was calculated using the Kirpich Method.
- > The existing on-site topography used in the analysis is from a field survey by The John R. McAdams Company, Inc. and local GIS data.
- > For each individual storm drainage inlet, a drainage area was measured as well as assigning impervious surface percentage. From this impervious percentage, a rational c factor was calculated based on 0.95 for impervious areas. For drainage areas with a combination of both pervious (Open Space and Lawns, C=0.35) and impervious areas, a composite “c” factor was interpolated.
- > The pipes were sized using “Stormwater Studio 2021 Ver. 3.0.0.25”. This program accepts the input data from each inlet, as well as physical characteristics of the storm system to be designed, and calculates flow rates and pipe sizes throughout the system. The final results of this program as well as calculated pipe sizes and hydraulic grade lines may be found in the appropriate section of this report. The minimum pipe size was 15” unless otherwise shown on the plans. Pipe material is RCP or HDPE as indicated on the plans.

- > The inlet types included for this project are primarily NCDOT type combination catch basins with curb inlets and grates. The calculations include an analysis to determine gutter spread at these inlets based on a 4-in per hour rainfall intensity.
- > The storm water network was analyzed for the 10-year storm event using a starting time of concentration of 5 minutes.
- > The various inlet types are shown on the stormwater detail sheets, within the plan set. Flared end sections or Endwalls are used at discharge points. Headwalls or structures are used at inlet points. Velocity dissipators are provided at discharge points to prevent erosion and scour in these areas. The dissipators have been sized using the NYDOT method.
- > For Wall Drains, the pipes were sized using “Studio Express” by “Hydrology Studio Ver. 1.0.0.10”. This program accepts the input data from each inlet, as well as physical characteristics of the storm system to be designed, and calculates flow rates and pipe sizes throughout the system. The final results of this program as well as calculated pipe sizes may be found in the appropriate section of this report. The minimum pipe size was 8” unless otherwise shown on the plans. Pipe material is PVC as indicated on the plans.

PRECIPITATION FREQUENCY DATA TABLES



NOAA Atlas 14, Volume 2, Version 3
Location name: Wake Forest, North Carolina, USA*
Latitude: 35.9088°, Longitude: -78.4485°
Elevation: 405.98 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	4.84 (4.43-5.29)	5.62 (5.15-6.14)	6.41 (5.87-6.98)	7.19 (6.58-7.85)	7.98 (7.27-8.70)	8.62 (7.81-9.40)	9.18 (8.28-10.0)	9.68 (8.68-10.6)	10.2 (9.10-11.2)	10.7 (9.46-11.7)
10-min	3.86 (3.54-4.23)	4.49 (4.12-4.91)	5.13 (4.70-5.59)	5.75 (5.26-6.28)	6.36 (5.80-6.94)	6.86 (6.22-7.48)	7.29 (6.58-7.95)	7.67 (6.88-8.37)	8.09 (7.19-8.84)	8.45 (7.45-9.25)
15-min	3.22 (2.95-3.52)	3.77 (3.45-4.12)	4.32 (3.96-4.72)	4.85 (4.44-5.29)	5.38 (4.90-5.86)	5.79 (5.25-6.31)	6.14 (5.54-6.70)	6.45 (5.78-7.04)	6.79 (6.04-7.42)	7.07 (6.23-7.74)
30-min	2.21 (2.02-2.42)	2.60 (2.38-2.84)	3.07 (2.81-3.35)	3.51 (3.21-3.83)	3.98 (3.63-4.34)	4.36 (3.96-4.75)	4.71 (4.24-5.13)	5.02 (4.50-5.48)	5.40 (4.80-5.90)	5.73 (5.05-6.27)
60-min	1.38 (1.26-1.51)	1.63 (1.50-1.78)	1.97 (1.80-2.15)	2.29 (2.09-2.50)	2.65 (2.41-2.89)	2.96 (2.68-3.22)	3.24 (2.92-3.53)	3.52 (3.16-3.84)	3.88 (3.45-4.23)	4.18 (3.68-4.57)
2-hr	0.805 (0.732-0.888)	0.957 (0.874-1.05)	1.17 (1.06-1.28)	1.37 (1.25-1.50)	1.61 (1.46-1.77)	1.83 (1.64-2.00)	2.03 (1.81-2.22)	2.24 (1.99-2.45)	2.52 (2.21-2.75)	2.76 (2.40-3.02)
3-hr	0.568 (0.516-0.629)	0.676 (0.617-0.746)	0.828 (0.753-0.913)	0.980 (0.889-1.08)	1.16 (1.05-1.28)	1.33 (1.19-1.46)	1.49 (1.33-1.64)	1.66 (1.47-1.82)	1.89 (1.65-2.08)	2.10 (1.81-2.31)
6-hr	0.342 (0.312-0.378)	0.407 (0.372-0.448)	0.499 (0.455-0.548)	0.591 (0.537-0.648)	0.705 (0.637-0.772)	0.808 (0.726-0.884)	0.912 (0.811-0.996)	1.02 (0.900-1.11)	1.17 (1.02-1.27)	1.31 (1.12-1.43)
12-hr	0.200 (0.183-0.221)	0.238 (0.219-0.262)	0.293 (0.269-0.322)	0.350 (0.319-0.383)	0.420 (0.381-0.459)	0.485 (0.436-0.528)	0.551 (0.490-0.599)	0.622 (0.547-0.675)	0.719 (0.622-0.781)	0.809 (0.690-0.880)
24-hr	0.119 (0.111-0.128)	0.144 (0.134-0.155)	0.181 (0.168-0.195)	0.210 (0.195-0.227)	0.251 (0.232-0.270)	0.283 (0.261-0.304)	0.316 (0.290-0.340)	0.350 (0.321-0.378)	0.398 (0.362-0.429)	0.436 (0.395-0.471)
2-day	0.069 (0.064-0.074)	0.083 (0.078-0.090)	0.104 (0.097-0.112)	0.120 (0.111-0.129)	0.142 (0.132-0.153)	0.160 (0.147-0.172)	0.178 (0.164-0.192)	0.197 (0.180-0.212)	0.223 (0.203-0.241)	0.243 (0.220-0.263)
3-day	0.049 (0.046-0.052)	0.059 (0.055-0.063)	0.073 (0.068-0.078)	0.084 (0.078-0.090)	0.099 (0.092-0.107)	0.112 (0.103-0.120)	0.124 (0.114-0.133)	0.137 (0.126-0.147)	0.155 (0.141-0.167)	0.169 (0.154-0.183)
4-day	0.039 (0.036-0.041)	0.046 (0.043-0.050)	0.057 (0.054-0.061)	0.066 (0.062-0.071)	0.078 (0.072-0.083)	0.088 (0.081-0.094)	0.097 (0.090-0.104)	0.107 (0.099-0.115)	0.121 (0.111-0.130)	0.132 (0.120-0.142)
7-day	0.026 (0.024-0.027)	0.031 (0.029-0.033)	0.037 (0.035-0.040)	0.043 (0.040-0.046)	0.050 (0.047-0.054)	0.056 (0.052-0.060)	0.062 (0.057-0.066)	0.068 (0.063-0.073)	0.077 (0.070-0.082)	0.084 (0.076-0.090)
10-day	0.020 (0.019-0.022)	0.024 (0.023-0.026)	0.029 (0.027-0.031)	0.033 (0.031-0.035)	0.039 (0.036-0.041)	0.043 (0.040-0.046)	0.047 (0.044-0.050)	0.051 (0.047-0.055)	0.057 (0.053-0.061)	0.062 (0.057-0.066)
20-day	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.019 (0.018-0.020)	0.022 (0.020-0.023)	0.025 (0.023-0.026)	0.027 (0.025-0.029)	0.030 (0.028-0.032)	0.032 (0.030-0.035)	0.036 (0.033-0.038)	0.039 (0.036-0.041)
30-day	0.011 (0.011-0.012)	0.013 (0.013-0.014)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.020 (0.018-0.021)	0.021 (0.020-0.023)	0.023 (0.022-0.025)	0.025 (0.023-0.026)	0.027 (0.025-0.029)	0.029 (0.027-0.031)
45-day	0.010 (0.009-0.010)	0.011 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.020 (0.018-0.021)	0.021 (0.020-0.023)	0.022 (0.021-0.024)
60-day	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.011 (0.011-0.012)	0.013 (0.012-0.013)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.018-0.020)

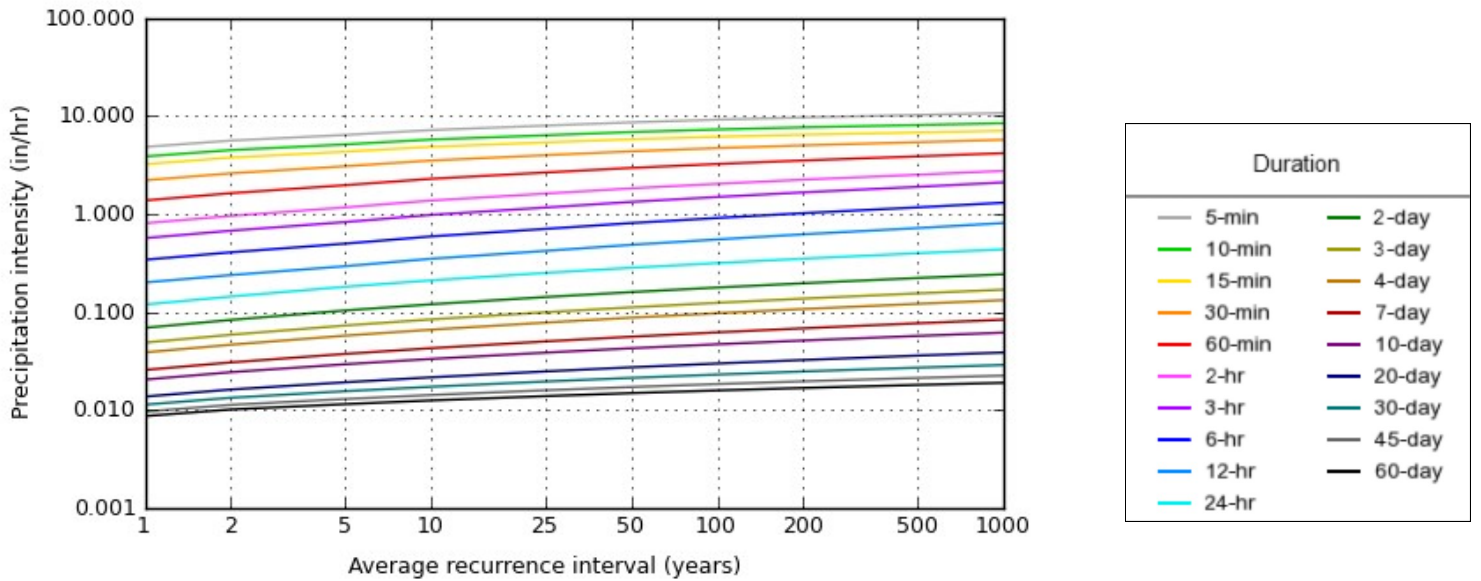
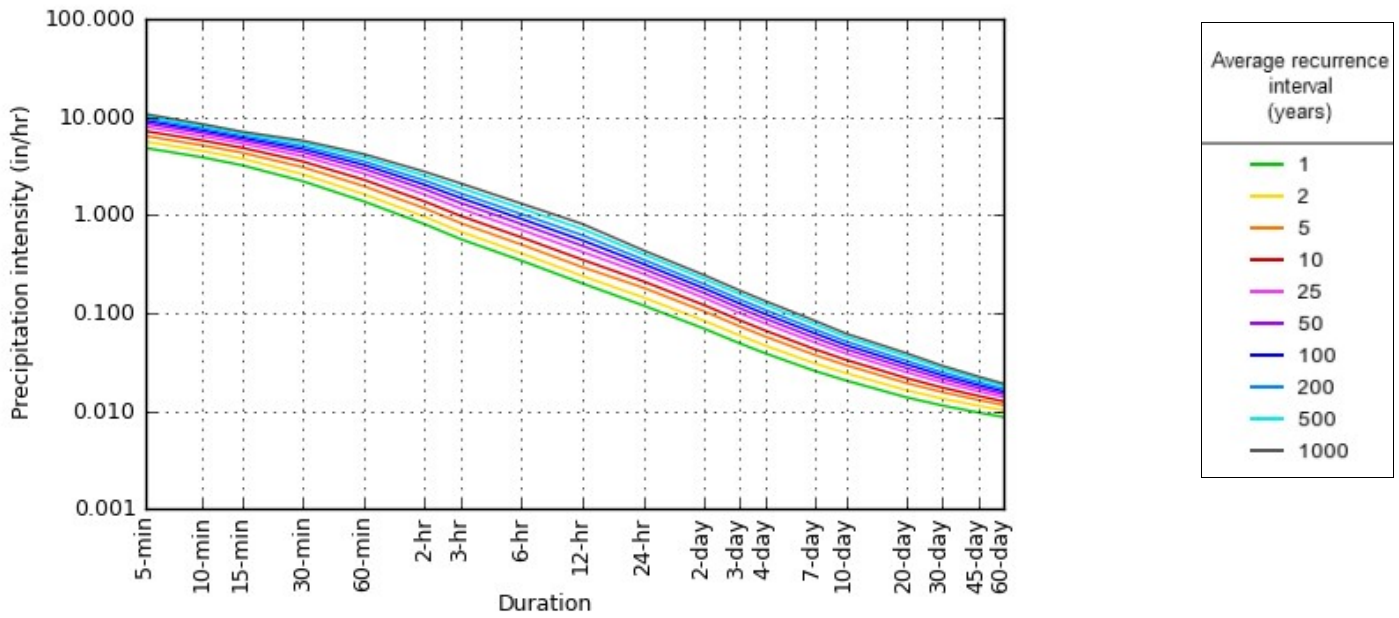
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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

PDS-based intensity-duration-frequency (IDF) curves

Latitude: 35.9088°, Longitude: -78.4485°



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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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IDF Report

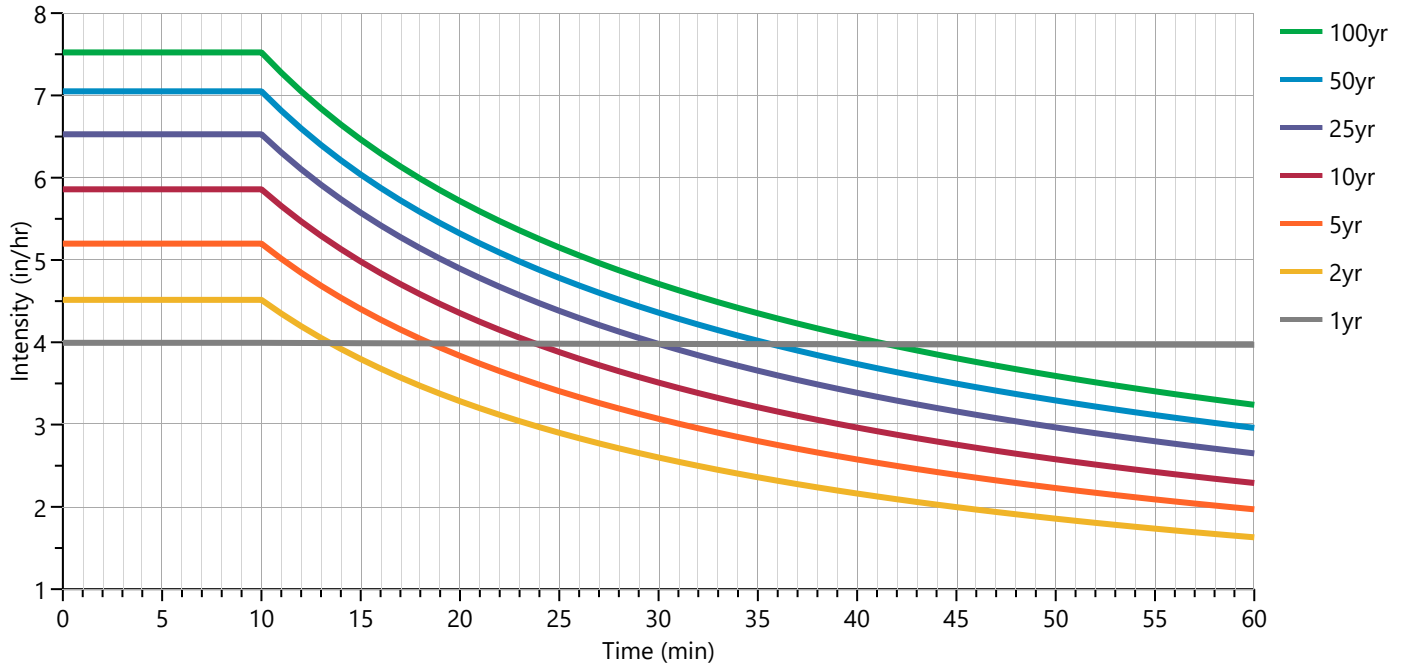
Equation Coefficients	Intensity = B / (Tc + D)^E (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
B	4.0388	71.7923	0.0000	70.2128	67.8360	62.7327	55.6315	53.3810	
D	5.5000	13.0000	0.0000	12.7000	12.0000	11.1000	9.9000	9.4000	
E	0.0041	0.8822	0.0000	0.8337	0.7923	0.7421	0.6907	0.6608	

Minimum Tc = 10 minutes

Tc (min)	Intensity Values (in/hr)								
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
Cf	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
5	3.99	4.52	0	5.20	5.86	6.53	7.05	7.52	
10	3.99	4.52	0	5.20	5.86	6.53	7.05	7.52	
15	3.99	3.80	0	4.40	4.98	5.57	6.04	6.46	
20	3.99	3.28	0	3.83	4.35	4.89	5.32	5.72	
25	3.98	2.90	0	3.41	3.88	4.38	4.78	5.15	
30	3.98	2.60	0	3.07	3.51	3.98	4.36	4.71	
35	3.98	2.36	0	2.80	3.21	3.65	4.02	4.35	
40	3.98	2.16	0	2.58	2.96	3.39	3.74	4.06	
45	3.97	2.00	0	2.39	2.76	3.16	3.50	3.81	
50	3.97	1.86	0	2.23	2.58	2.97	3.29	3.59	
55	3.97	1.74	0	2.09	2.42	2.80	3.12	3.40	
60	3.97	1.63	0	1.97	2.29	2.65	2.96	3.24	

Cf = Correction Factor applied to Rational Method runoff coefficient.

The Point IDF Curves



DRAINAGE AREA MAP

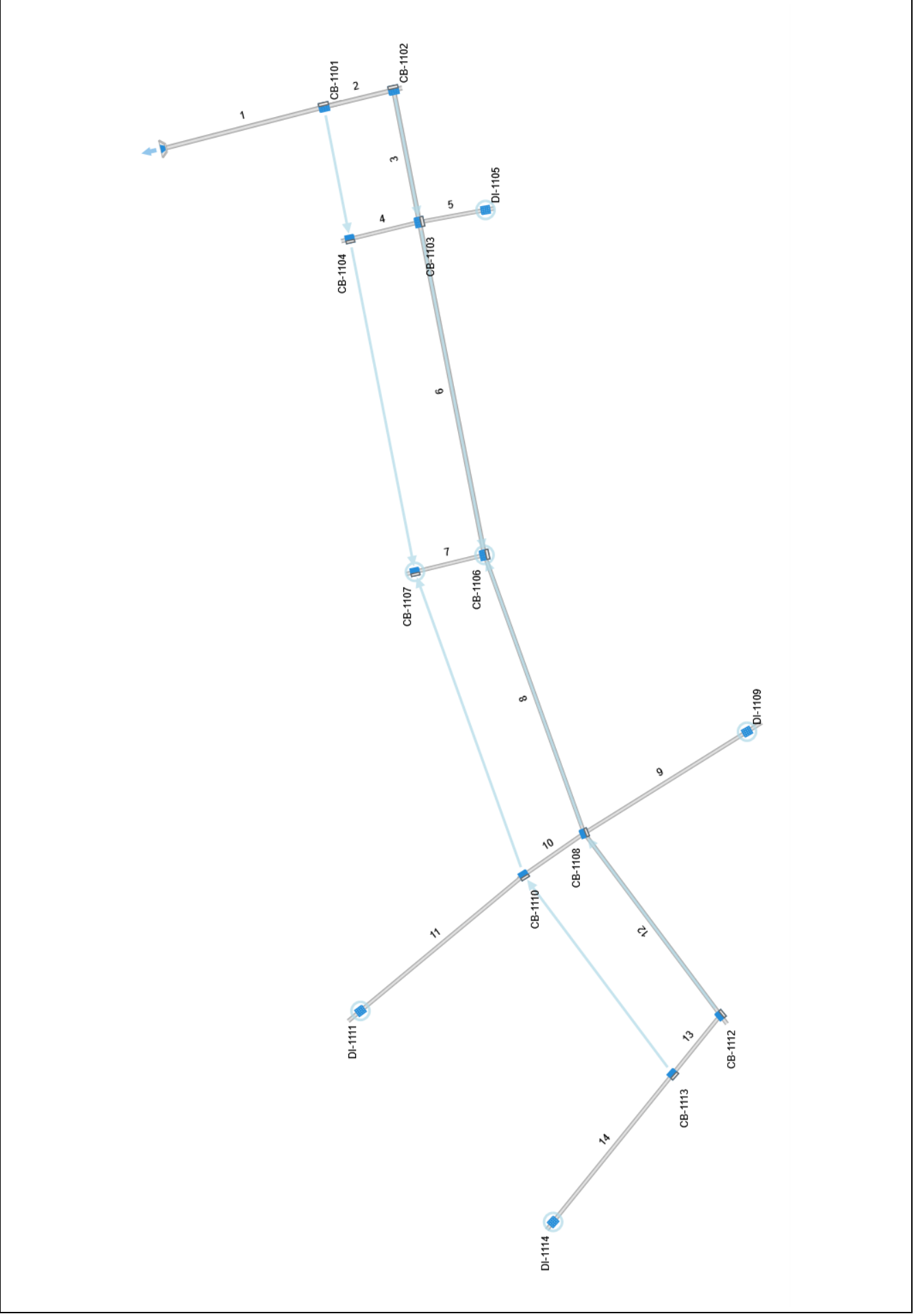
SYSTEM 1100 – REPORTS AND PROFILES

Plan View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023



Storm Sewer Tabulation

Project Name: SD-1100

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1100-1101	73.82	0.070	2.780	0.90	0.06	2.11	5.0	6.89	5.86	12.36	44.83	4.28	24	3.93	312.90	310.00	314.49	314.35	323.93	312.33	1
1101-1102	32.50	0.170	2.710	0.80	0.14	2.05	5.0	6.81	5.86	11.99	19.84	4.80	24	0.77	313.25	313.00	314.62	314.63	323.93	323.93	2
1102-1103	55.29	0.040	2.540	0.85	0.03	1.91	5.0	6.66	5.86	11.20	18.30	5.83	24	0.65	313.72	313.35	314.91	314.52	322.17	323.93	3
1103-1104	32.50	0.040	0.040	0.85	0.03	0.03	5.0	5.00	5.86	0.20	6.26	2.04	15	0.94	317.90	317.60	318.08	317.75	322.17	322.17	4
1103-1105	30.60	0.830	0.830	0.65	0.54	0.54	5.0	5.00	5.86	3.16	5.00	2.78	15	0.60	314.40	314.22	315.43	315.39	317.05	322.17	5
1103-1106	139.35	0.190	1.630	0.85	0.16	1.30	5.0	6.23	5.86	7.64	17.52	3.96	24	0.60	314.65	313.82	315.63	315.37	320.31	322.17	6
1106-1107	32.50	0.200	0.200	0.85	0.17	0.17	5.0	5.00	5.86	1.00	7.14	3.33	15	1.22	316.06	315.66	316.46	316.00	320.31	320.31	7
1106-1108	122.60	0.170	1.240	0.85	0.14	0.97	5.0	5.82	5.86	5.69	8.13	4.71	18	0.60	315.49	314.75	316.40	315.79	321.90	320.31	8
1108-1109	85.15	0.140	0.140	0.65	0.09	0.09	5.0	5.00	5.86	0.53	4.80	0.86	15	0.55	316.32	315.85	316.81	316.80	320.00	321.90	9
1108-1110	32.50	0.210	0.330	0.85	0.18	0.26	5.0	5.48	5.86	1.50	6.84	3.70	15	1.12	317.55	317.19	318.04	317.62	321.90	321.90	10
1110-1111	92.93	0.120	0.120	0.65	0.08	0.08	5.0	5.00	5.86	0.46	7.02	1.60	15	1.18	318.75	317.65	319.02	318.21	323.00	321.90	11
1108-1112	97.01	0.190	0.600	0.85	0.16	0.48	5.0	5.64	5.86	2.81	14.47	6.31	15	5.02	320.66	315.79	321.33	316.18	325.40	321.90	12
1112-1113	32.50	0.260	0.410	0.85	0.22	0.32	5.0	5.50	5.86	1.87	5.00	2.74	15	0.60	320.96	320.76	321.56	321.55	325.40	325.40	13
1113-1114	81.47	0.150	0.150	0.65	0.10	0.10	5.0	5.00	5.86	0.57	5.03	1.57	15	0.61	321.55	321.06	321.87	321.77	325.80	325.40	14

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: Storm System 1100.sws

Energy Grade Line Calculations

Project Name: SD-1100

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream						Pipe		Junction				
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)	Energy Loss (ft)
1	24	12.36	310.00	2.00	3.14	314.35	3.94	0.24	314.59	73.82	312.90	1.59	2.67	314.49	4.62	0.33	314.82	0.013	0.229	314.51	314.84	0.02
2	24	11.99	313.00	1.63	2.75	314.63	4.36	0.30	314.93	32.50	313.25	1.37	2.29	314.62	5.23	0.43	315.05	0.013	0.115	314.68	315.10	0.06
3	24	11.20	313.35	1.16†	1.90	314.52	5.90	0.54	315.19	55.29	313.72	1.19	1.95	314.91	5.75	0.51	315.42	0.013	0.230	314.94	315.46	0.04
4	15	0.20	317.60	0.16‡	0.09	317.75	2.23	0.08	317.83	32.50	317.90	0.18²	0.11	318.08	1.85	0.05	318.13	0.013	0.305	318.08	318.13	0.00
5	15	3.16	314.22	1.17	1.20	315.39	2.64	0.11	315.50	30.60	314.40	1.03	1.09	315.43	2.91	0.13	315.57	0.013	0.068	315.47	315.60	0.03
6	24	7.64	313.82	1.55	2.62	315.37	2.92	0.13	315.50	139.35	314.65	0.98²	1.53	315.63	5.00	0.39	316.02	0.013	0.517	315.63	316.02	0.00
7	15	1.00	315.66	0.34‡	0.27	316.00	3.71	0.21	316.20	32.50	316.06	0.40²	0.34	316.46	2.95	0.14	316.59	0.013	0.397	316.46	316.59	0.00
8	18	5.69	314.75	1.04	1.31	315.79	4.35	0.29	316.09	122.60	315.49	0.91²	1.12	316.40	5.07	0.40	316.80	0.013	0.711	316.40	316.80	0.00
9	15	0.53	315.85	0.95	1.00	316.80	0.53	0.00	316.80	85.15	316.32	0.49	0.45	316.81	1.19	0.02	316.83	0.013	0.031	316.82	316.84	0.01
10	15	1.50	317.19	0.43‡	0.37	317.62	4.05	0.25	317.85	32.50	317.55	0.49²	0.45	318.04	3.36	0.18	318.22	0.013	0.365	318.04	318.22	0.00
11	15	0.46	317.65	0.56	0.53	318.21	0.86	0.01	318.22	92.93	318.75	0.27²	0.20	319.02	2.34	0.08	319.11	0.013	0.883	319.02	319.11	0.00
12	15	2.81	315.79	0.40‡	0.33	316.18	8.43	1.11	316.84	97.01	320.66	0.67²	0.67	321.33	4.19	0.27	321.60	0.013	4.767	321.33	321.60	0.00
13	15	1.87	320.76	0.79	0.81	321.55	2.30	0.08	321.63	32.50	320.96	0.60	0.59	321.56	3.19	0.16	321.72	0.013	0.088	321.62	321.78	0.06
14	15	0.57	321.06	0.72	0.73	321.77	0.79	0.01	321.78	81.47	321.55	0.32	0.24	321.87	2.34	0.09	321.95	0.013	0.171	321.92	322.01	0.05

Notes: Return Period = 10-yrs. ² Critical depth. ‡ Supercritical.

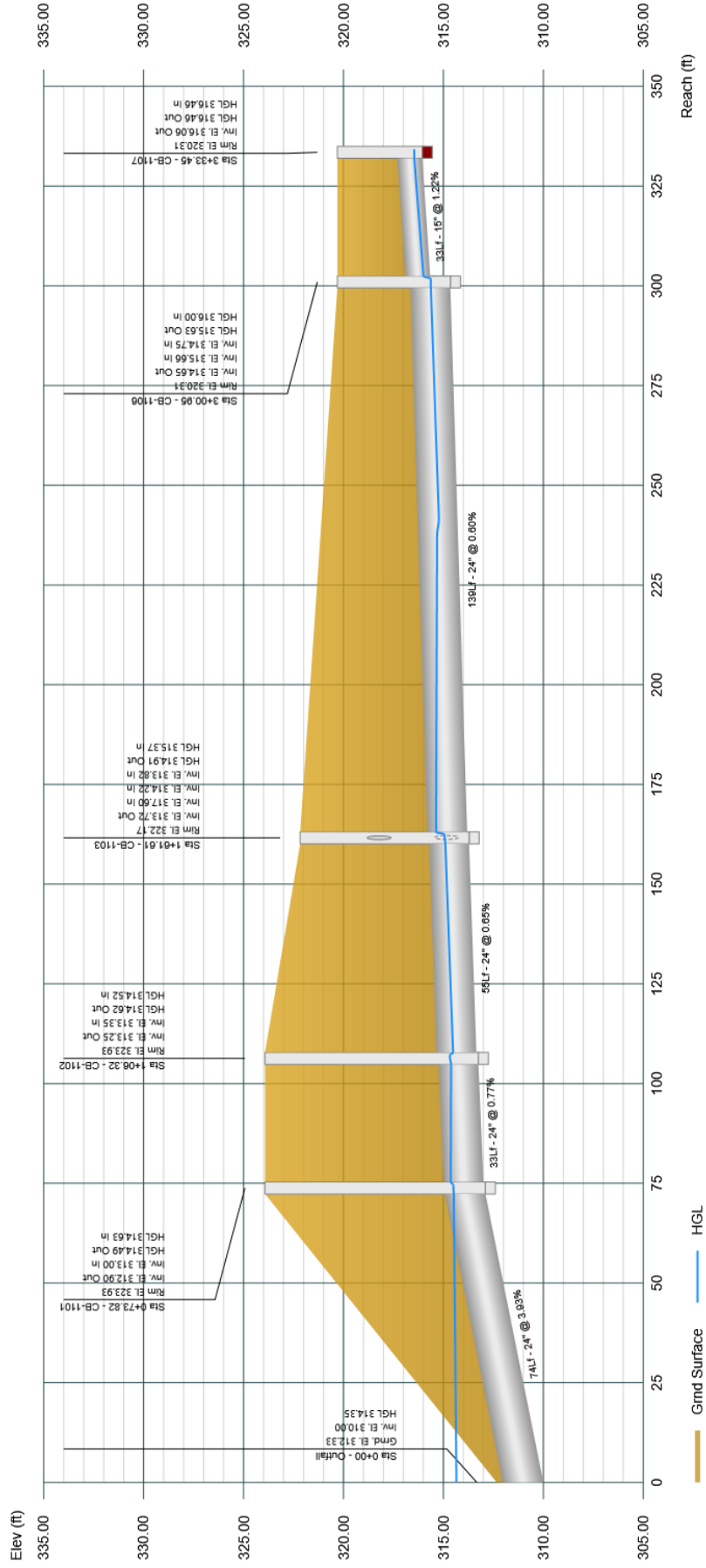
Project File: Storm System 1100.sws

Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023

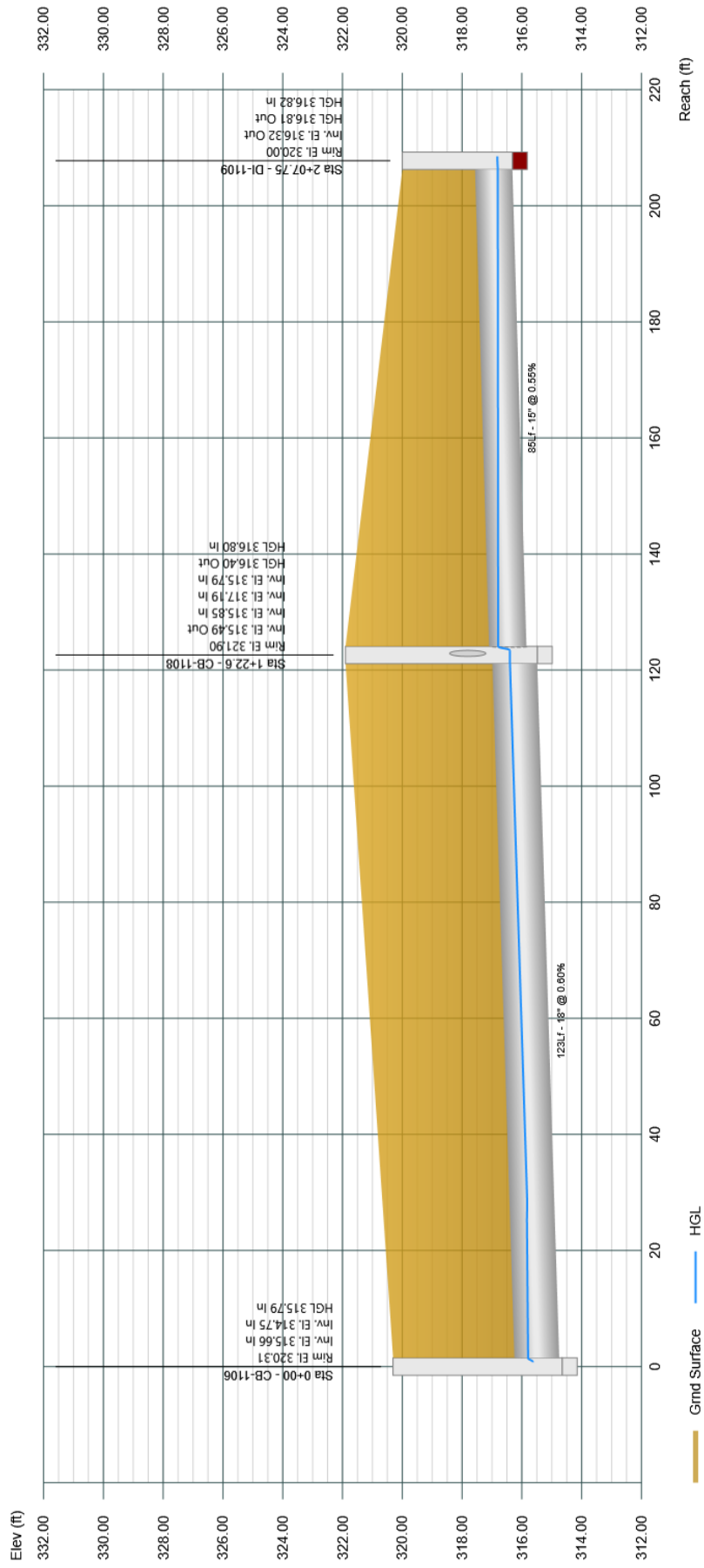


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023

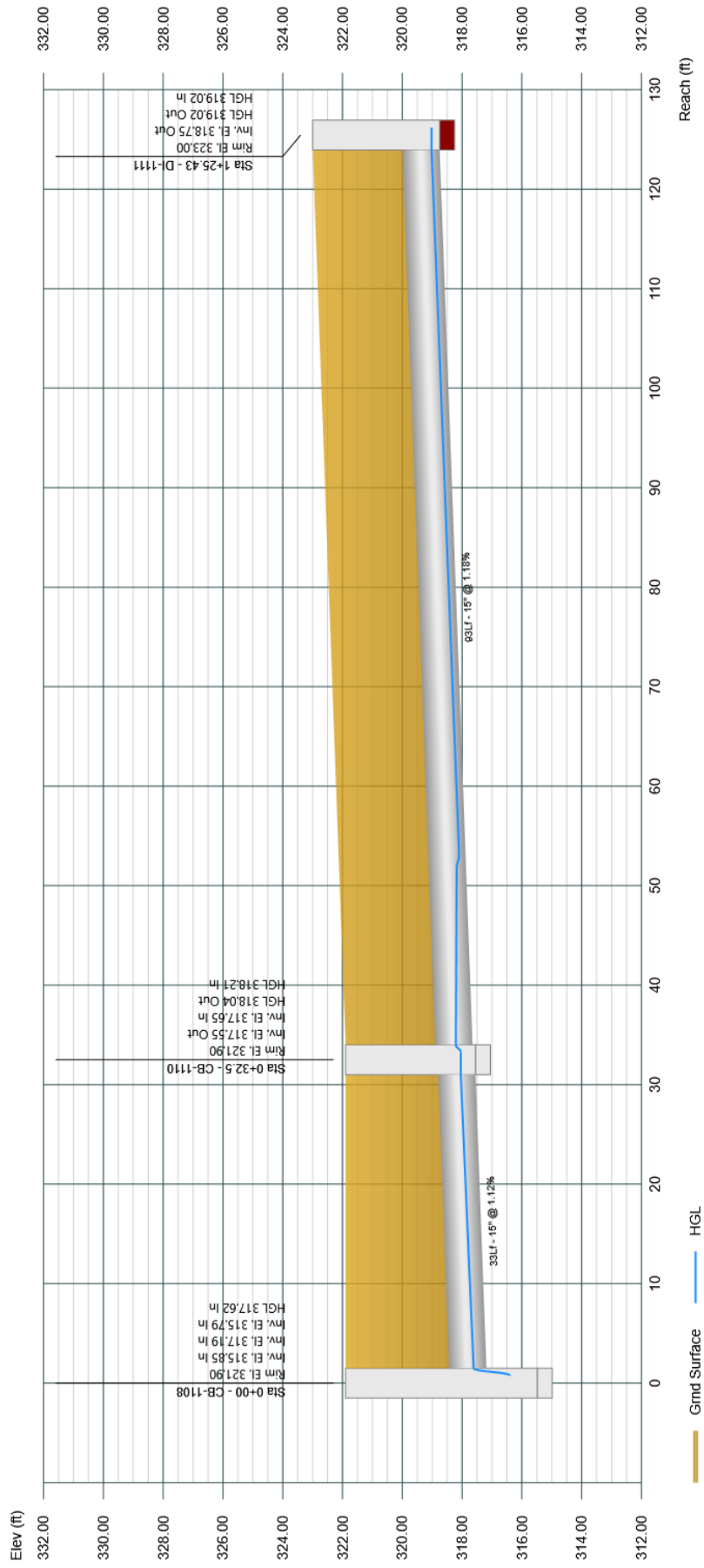


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023

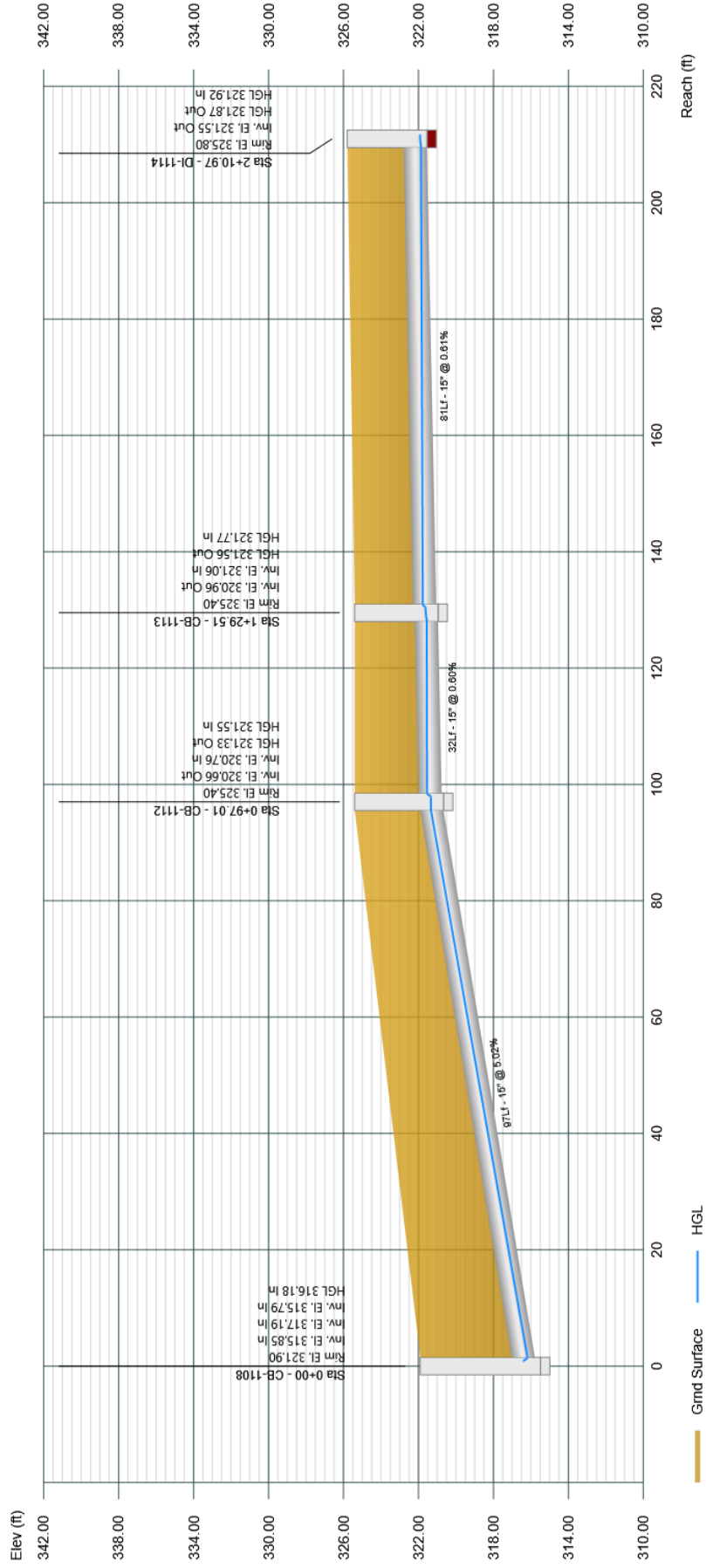


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023



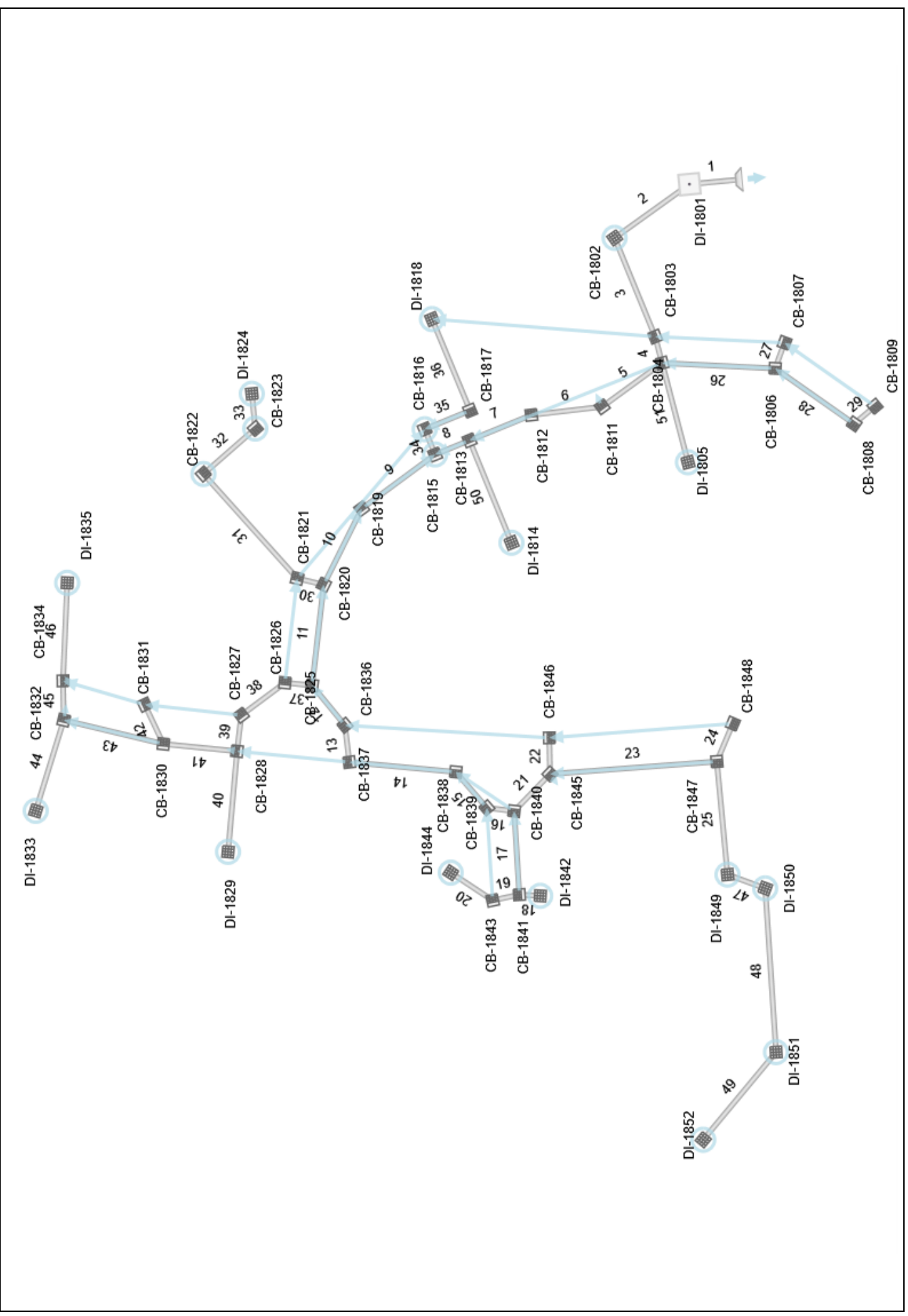
SYSTEM 1800 – REPORTS AND PROFILES

Plan View

Project Name: SD-1800

Stormwater Studio 2023 v 3.0.0.32

11-17-2023



Storm Sewer Tabulation

Project Name: SD-1800

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1800-1801	41.55	0.000	10.300	0.00	0.00	7.82	5.0	8.28	5.86	45.82	445.73	4.16	48	9.63	302.00	298.00	304.92	305.00	311.00	302.00	1
1801-1802	82.56	0.110	10.300	0.65	0.07	7.82	5.0	8.21	5.86	45.82	444.22	5.88	48	9.56	310.00	302.10	312.00	305.14	324.00	311.00	2
1802-1803	95.68	0.190	10.190	0.85	0.16	7.75	5.0	8.14	5.86	45.40	401.49	11.60	48	7.81	317.57	310.10	319.57	311.21	340.27	324.00	3
1803-1804	24.50	0.150	10.000	0.85	0.13	7.59	5.0	8.09	5.86	44.46	111.27	7.24	48	0.60	317.83	317.69	319.82	319.64	340.27	340.27	4
1810-1811	66.48	0.160	8.670	0.95	0.15	6.58	5.0	7.95	5.86	38.54	81.38	7.40	42	0.65	318.74	318.30	320.64	320.13	337.97	337.61	5
1811-1812	63.93	0.140	8.510	0.85	0.12	6.43	5.0	7.81	5.86	37.65	77.93	6.51	42	0.60	319.22	318.84	321.10	321.06	334.87	337.97	6
1812-1813	60.00	0.110	8.370	0.85	0.09	6.31	5.0	7.69	5.86	36.95	80.08	7.26	42	0.63	319.70	319.32	321.56	321.12	333.78	334.87	7
1813-1815	33.36	0.220	7.260	0.85	0.19	5.56	5.0	7.62	5.86	32.59	92.18	5.06	42	0.84	319.98	319.70	322.05	322.13	342.67	340.36	12
1815-1819	81.83	0.110	6.320	0.85	0.09	4.79	5.0	7.44	5.86	28.09	51.66	6.97	36	0.60	320.97	320.48	322.66	322.12	342.86	342.67	13
1819-1820	76.21	0.080	6.210	0.85	0.07	4.70	5.0	7.26	5.86	27.54	51.66	6.92	36	0.60	321.53	321.07	323.20	322.70	342.86	342.67	13
1820-1825	90.84	0.070	5.700	0.85	0.06	4.29	5.0	7.05	5.86	25.13	51.66	6.73	36	0.60	322.18	321.63	323.77	323.17	342.86	342.67	13
1825-1836	46.32	0.300	4.420	0.85	0.26	3.30	5.0	7.00	5.86	19.34	138.52	7.97	36	4.31	335.96	333.96	337.36	334.92	342.86	342.67	13
1836-1837	33.27	0.140	4.120	0.85	0.12	3.05	5.0	6.94	5.86	17.85	53.20	6.91	30	1.68	337.26	336.70	338.67	337.91	342.86	342.67	13
1837-1838	95.89	0.140	3.960	0.85	0.12	2.93	5.0	6.70	5.86	17.15	31.77	6.27	30	0.60	337.94	337.36	339.32	338.70	342.86	342.67	13
1838-1839	42.50	0.050	3.840	0.85	0.04	2.81	5.0	6.65	5.86	16.45	83.34	7.90	30	4.13	339.80	338.04	341.15	338.98	342.86	342.67	13
1839-1840	24.73	0.070	3.790	0.85	0.06	2.77	5.0	6.61	5.86	16.20	59.95	6.77	30	2.14	340.43	339.90	341.78	341.03	342.86	342.67	13
1840-1841	75.01	0.220	0.770	0.85	0.19	0.59	5.0	5.47	5.86	3.44	6.46	4.82	15	1.00	342.13	341.38	342.87	342.05	342.86	342.67	13
1841-1842	18.79	0.270	0.270	0.65	0.18	0.18	5.0	5.00	5.86	1.03	15.72	2.00	15	5.92	343.34	342.23	343.75	343.18	342.86	342.67	13
1841-1843	24.50	0.210	0.280	0.85	0.18	0.22	5.0	5.35	5.86	1.31	5.00	1.45	15	0.60	342.38	342.23	343.18	343.18	342.86	342.67	13
1843-1844	45.04	0.070	0.070	0.65	0.05	0.05	5.0	5.00	5.86	0.27	5.00	0.46	15	0.60	342.75	342.48	343.25	343.25	342.86	342.67	13
1836-1841	46.26	0.260	2.950	0.85	0.22	2.12	5.0	6.48	5.86	12.42	31.77	5.57	30	0.60	341.04	340.76	342.22	341.90	342.86	342.67	13
1845-1846	32.50	0.280	0.280	0.85	0.24	0.24	5.0	5.00	5.86	1.39	5.00	3.34	15	0.60	342.54	342.35	343.02	342.80	342.86	342.67	13

Notes: IDF File = The Point IDF, Return Period = 10-yrs. Project File: SD-1800.sws

Storm Sewer Tabulation

Project Name: SD-1800
11-17-2023

Stormwater Studio 2023 v 3.0.0.32

Line ID	Length (ft)	Drng Area		Rational (C)	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1845-1847	150.07	0.260	2.410	0.85	0.22	1.66	5.0	6.24	5.86	9.73	38.77	7.44	24	2.94	346.20	341.79	347.31	342.52	352.13	346.79	23
1847-1848	36.89	0.210	0.210	0.85	0.18	0.18	5.0	5.00	5.86	1.05	10.20	3.83	15	2.50	348.72	347.80	349.13	348.10	352.97	352.13	24
1847-1849	101.79	0.260	1.940	0.65	0.17	1.26	5.0	5.95	5.86	7.39	20.19	4.10	24	0.80	347.11	346.30	348.07	347.66	354.00	352.13	25
1804-1806	101.52	0.150	0.580	0.85	0.13	0.49	5.0	5.34	5.86	2.89	14.82	6.45	15	5.27	341.37	336.02	342.05	336.42	345.72	340.27	26
1806-1807	24.50	0.180	0.180	0.85	0.15	0.15	5.0	5.00	5.86	0.90	6.48	0.90	15	1.01	341.47	341.22	342.32	342.32	345.72	345.72	27
1806-1808	86.54	0.090	0.250	0.85	0.08	0.21	5.0	5.14	5.86	1.25	14.54	2.29	15	5.07	345.86	341.47	346.31	342.31	350.36	345.72	28
1808-1809	24.50	0.160	0.160	0.85	0.14	0.14	5.0	5.00	5.86	0.80	5.00	2.83	15	0.60	346.11	345.96	346.47	346.30	350.36	350.36	29
1820-1821	24.49	0.080	0.430	0.85	0.07	0.34	5.0	6.06	5.86	2.01	5.00	3.74	15	0.60	326.32	326.18	326.90	326.74	337.50	337.50	30
1821-1822	125.80	0.060	0.350	0.95	0.06	0.28	5.0	5.48	5.86	1.61	5.00	3.52	15	0.60	327.18	326.42	327.69	326.92	332.20	337.50	31
1822-1823	61.82	0.100	0.290	0.95	0.10	0.22	5.0	5.18	5.86	1.28	5.00	3.29	15	0.60	327.65	327.28	328.10	327.71	332.00	332.20	32
1823-1824	31.36	0.190	0.190	0.65	0.12	0.12	5.0	5.00	5.86	0.72	5.00	2.16	15	0.60	327.94	327.75	328.28	328.23	333.00	332.00	33
1815-1816	24.50	0.350	0.720	0.85	0.30	0.58	5.0	5.75	5.86	3.41	5.00	4.38	15	0.60	329.19	329.04	329.94	329.80	333.62	333.62	34
1816-1817	43.96	0.220	0.370	0.85	0.19	0.28	5.0	5.55	5.86	1.67	5.00	1.68	15	0.60	329.55	329.29	330.39	330.38	333.90	333.62	35
1817-1818	88.84	0.150	0.150	0.65	0.10	0.10	5.0	5.00	5.86	0.57	5.00	1.37	15	0.60	330.18	329.65	330.53	330.46	335.30	333.90	36
1825-1826	24.50	0.010	1.210	0.85	0.01	0.93	5.0	6.62	5.86	5.44	8.13	4.96	18	0.60	323.82	323.68	324.72	324.56	340.36	340.36	37
1826-1827	48.76	0.040	1.200	0.85	0.03	0.92	5.0	6.46	5.86	5.39	8.13	4.96	18	0.60	324.22	323.92	325.11	324.81	339.34	340.36	38
1827-1828	32.51	0.150	1.160	0.85	0.13	0.89	5.0	6.35	5.86	5.19	8.13	4.38	18	0.60	324.51	324.32	325.40	325.36	339.31	339.34	39
1828-1829	90.58	0.210	0.210	0.65	0.14	0.14	5.0	5.00	5.86	0.80	7.13	3.21	15	1.22	335.60	334.50	335.96	334.79	342.00	339.31	40
1828-1830	66.41	0.100	0.800	0.85	0.09	0.62	5.0	6.10	5.86	3.64	5.00	3.88	15	0.60	325.16	324.76	325.96	325.79	336.19	339.31	41
1830-1831	39.01	0.110	0.110	0.85	0.09	0.09	5.0	5.00	5.86	0.55	5.00	2.57	15	0.60	330.91	330.68	331.21	330.96	335.16	336.19	42
1830-1832	91.90	0.150	0.590	0.85	0.13	0.44	5.0	5.72	5.86	2.60	5.00	3.09	15	0.60	325.81	325.26	326.48	326.33	331.98	336.19	43
1832-1833	85.11	0.150	0.150	0.65	0.10	0.10	5.0	5.00	5.86	0.57	10.69	1.56	15	2.74	328.24	325.91	328.54	326.78	332.70	331.98	44

Notes: IDF File = The Point IDF, Return Period = 10-yrs. Project File: SD-1800.sws

Storm Sewer Tabulation

Project Name: SD-1800

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1832-1834	35.20	0.150	0.290	0.85	0.13	0.22	5.0	5.55	5.86	1.28	5.00	1.71	326.12	325.91	326.77	326.77	331.33	331.98	331.33	331.98	45
1834-1835	87.94	0.140	0.140	0.65	0.09	0.09	5.0	5.00	5.86	0.53	5.00	2.56	326.75	326.22	327.04	326.50	331.00	331.33	331.00	331.33	46
1849-1850	36.00	0.380	1.680	0.65	0.25	1.09	5.0	5.87	5.86	6.40	12.73	5.79	347.66	347.21	348.63	348.05	353.01	354.00	353.01	354.00	47
1850-1851	147.13	0.840	1.300	0.65	0.55	0.84	5.0	5.43	5.86	4.95	9.84	4.05	348.86	347.76	349.71	348.95	354.37	353.01	354.37	353.01	48
1851-1852	102.14	0.460	0.460	0.65	0.30	0.30	5.0	5.00	5.86	1.75	5.53	3.73	349.75	349.11	350.28	349.60	354.54	354.37	354.54	354.37	49
1813-1814	99.21	1.000	1.000	0.65	0.65	0.65	5.0	5.00	5.86	3.81	15.30	5.45	330.00	328.20	330.74	328.75	334.50	333.78	334.50	333.78	50
1804-1805	91.94	0.600	0.600	0.65	0.39	0.39	5.0	5.00	5.86	2.28	9.12	4.80	334.83	333.27	335.43	333.72	339.08	340.27	339.08	340.27	51

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: SD-1800.sws

Energy Grade Line Calculations

Project Name: SD-1900

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream						Pipe		Junction			
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)
1	18	6.92	300.50	1.50	1.77	305.00	3.92	0.24	305.24	46.84	305.10	1.00 ²	1.26	5.50	0.47	306.58	0.013	1.338	306.11	306.58	0.00
2	18	6.92	313.50	0.52‡	0.55	314.02	12.58	2.46	314.98	61.67	319.50	1.00 ²	1.26	5.50	0.47	320.97	0.013	6.000	320.50	320.97	0.00
3	18	6.08	346.00	0.60‡	0.67	346.60	9.13	1.30	347.36	93.76	349.56	0.94 ²	1.17	5.21	0.42	350.93	0.013	3.563	350.50	350.93	0.00
4	15	4.04	349.96	0.60‡	0.59	350.56	6.90	0.74	351.13	166.36	353.26	0.80 ²	0.83	4.84	0.36	354.43	0.013	3.298	354.06	354.43	0.00
5	15	3.74	353.36	0.64‡	0.63	354.00	5.91	0.54	354.48	43.21	354.07	0.77 ²	0.80	4.69	0.34	355.18	0.013	0.704	354.84	355.18	0.00
6	15	3.34	354.17	0.73‡	0.74	354.90	4.49	0.31	355.23	32.50	354.37	0.73	0.75	4.46	0.31	355.41	0.013	0.178	355.16	355.47	0.06
7	15	3.09	354.47	0.70‡	0.71	355.17	4.36	0.30	355.51	68.52	354.89	0.71	0.72	4.32	0.29	355.89	0.013	0.375	355.65	355.94	0.06
8	15	2.89	354.99	0.51‡	0.47	355.50	6.21	0.60	355.99	34.23	355.89	0.68 ²	0.68	4.24	0.28	356.85	0.013	0.865	356.57	356.85	0.00
9	12	1.49	355.99	0.51‡	0.41	356.50	3.65	0.21	356.87	143.09	356.89	0.52 ²	0.41	3.63	0.20	357.61	0.013	0.738	357.41	357.61	0.00
10	15	1.00	349.81	1.11	1.15	350.92	0.87	0.01	350.93	24.50	349.96	0.96	1.01	0.98	0.02	350.94	0.013	0.005	350.93	350.95	0.01

Notes: Return Period = 10-yrs. ² Critical depth. ‡ Supercritical.

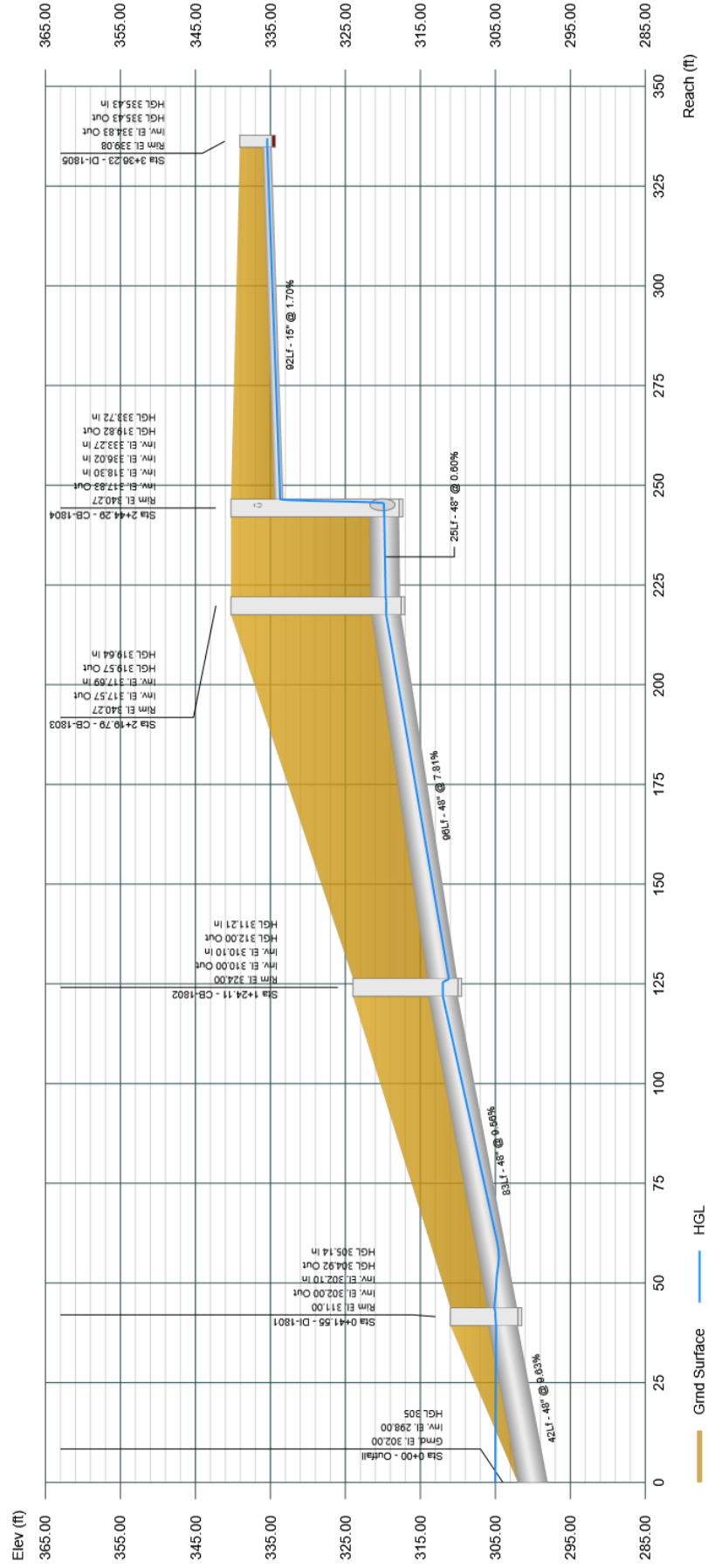
Project File: SD-1900.sws

Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

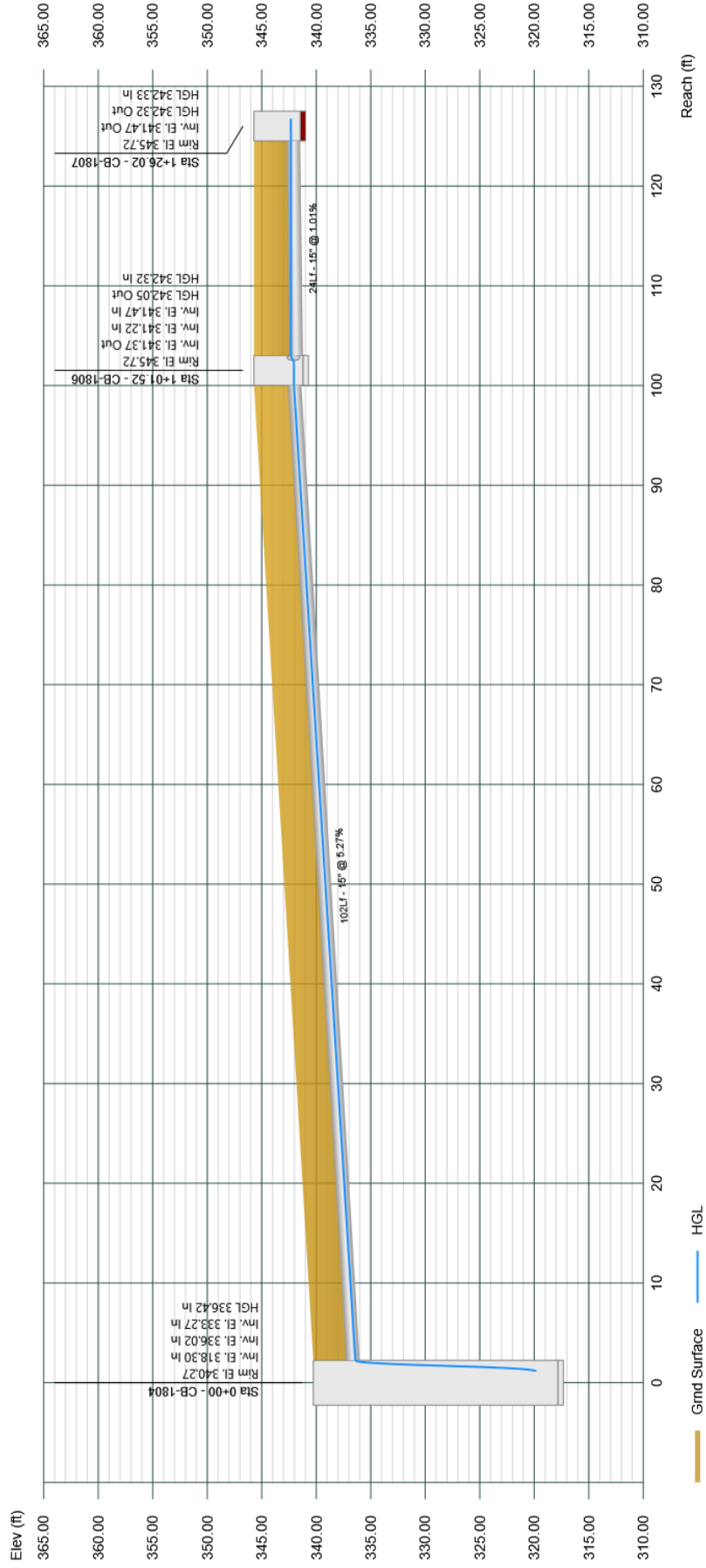


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

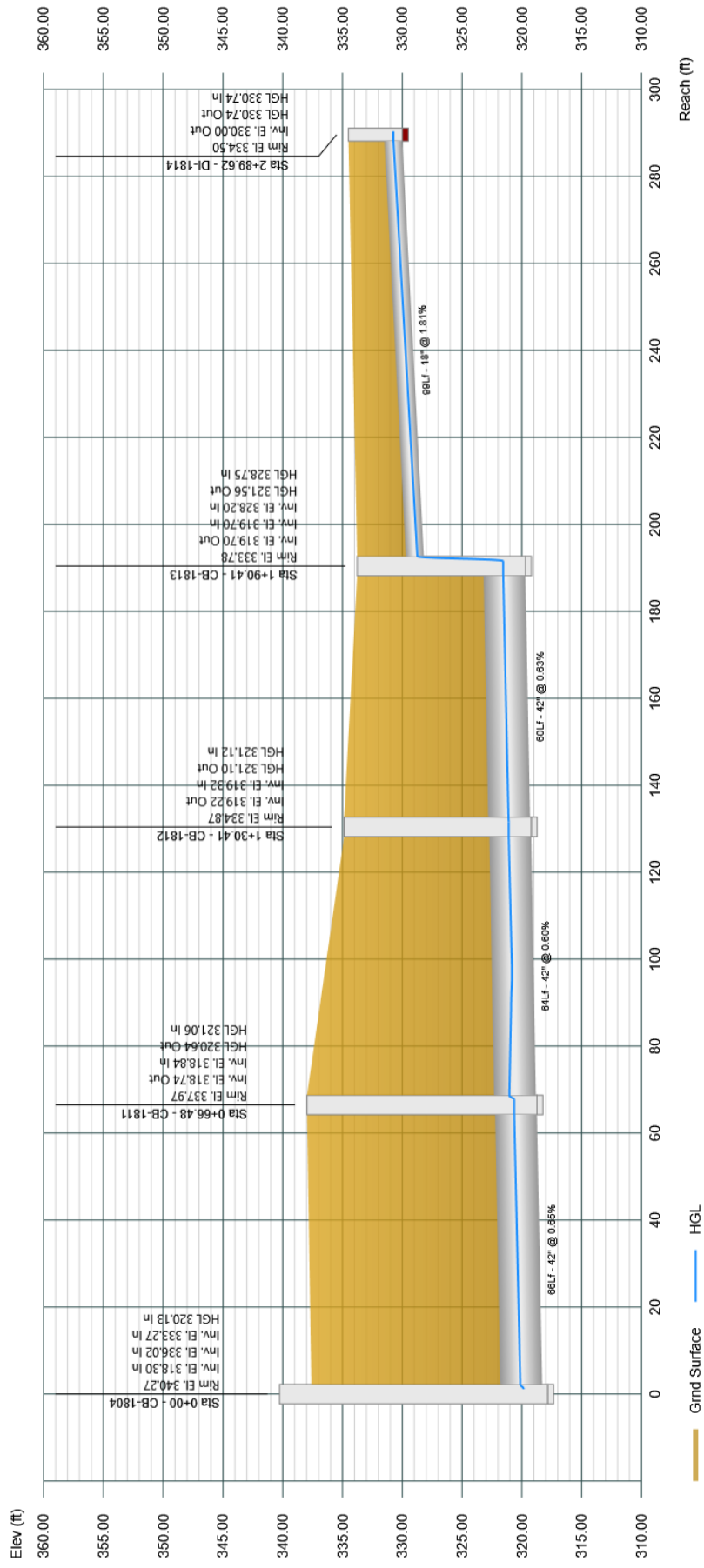


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

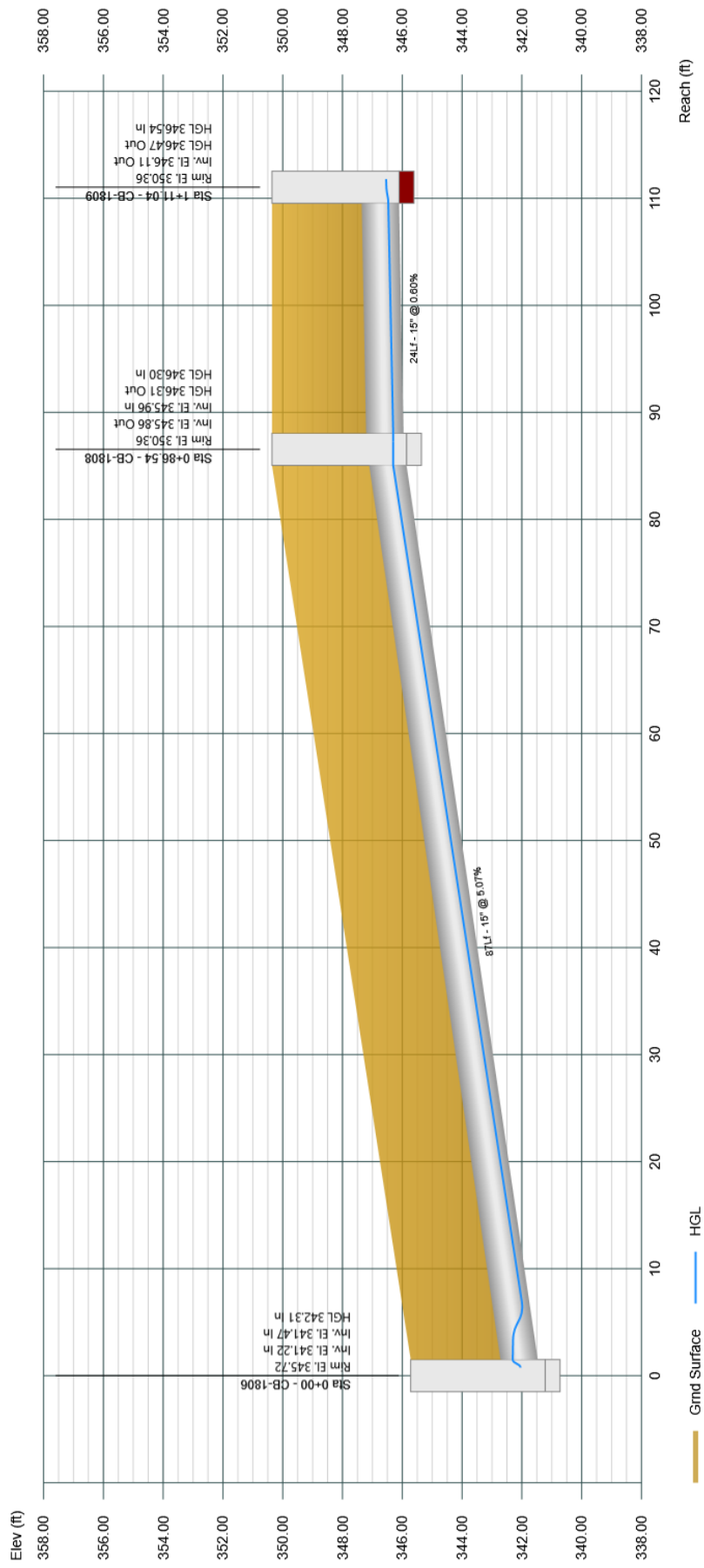


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

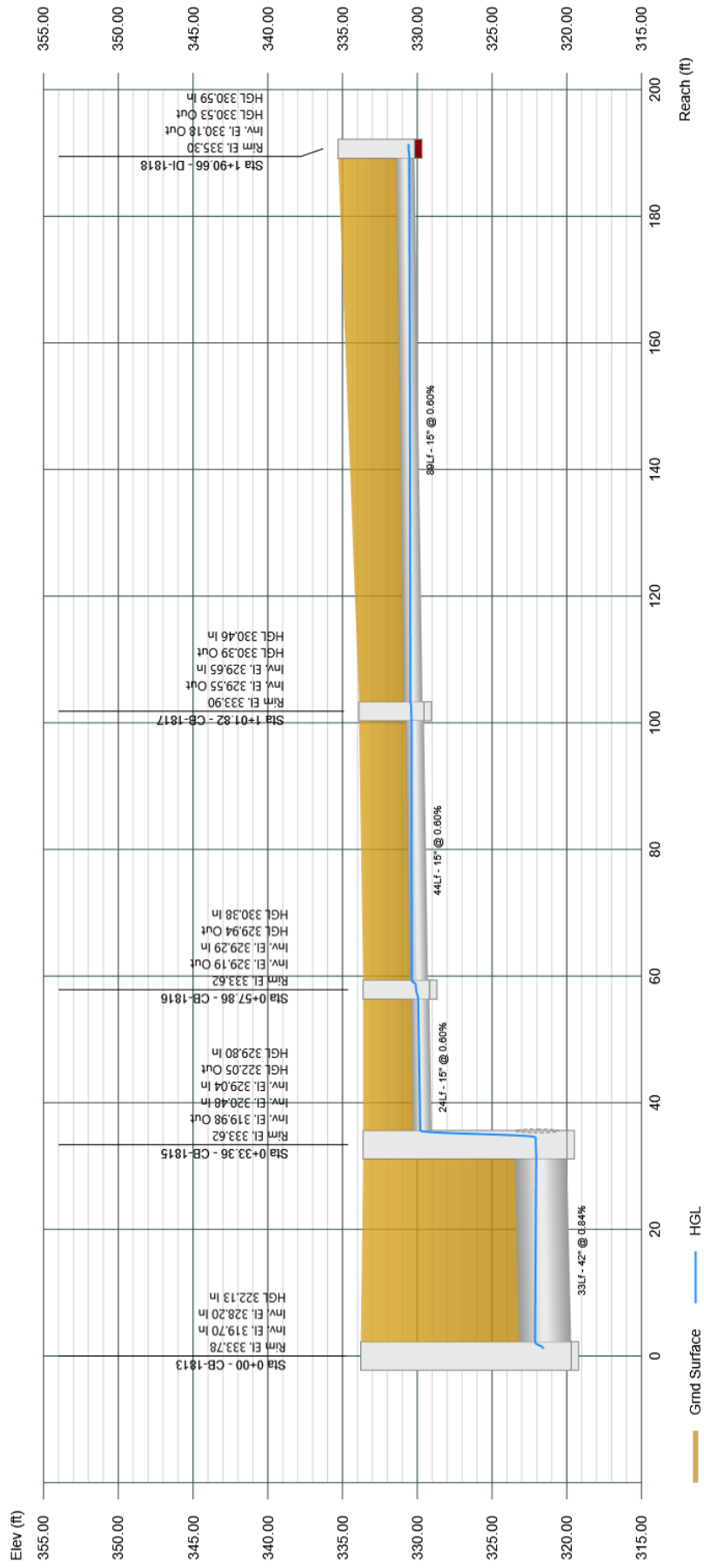


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

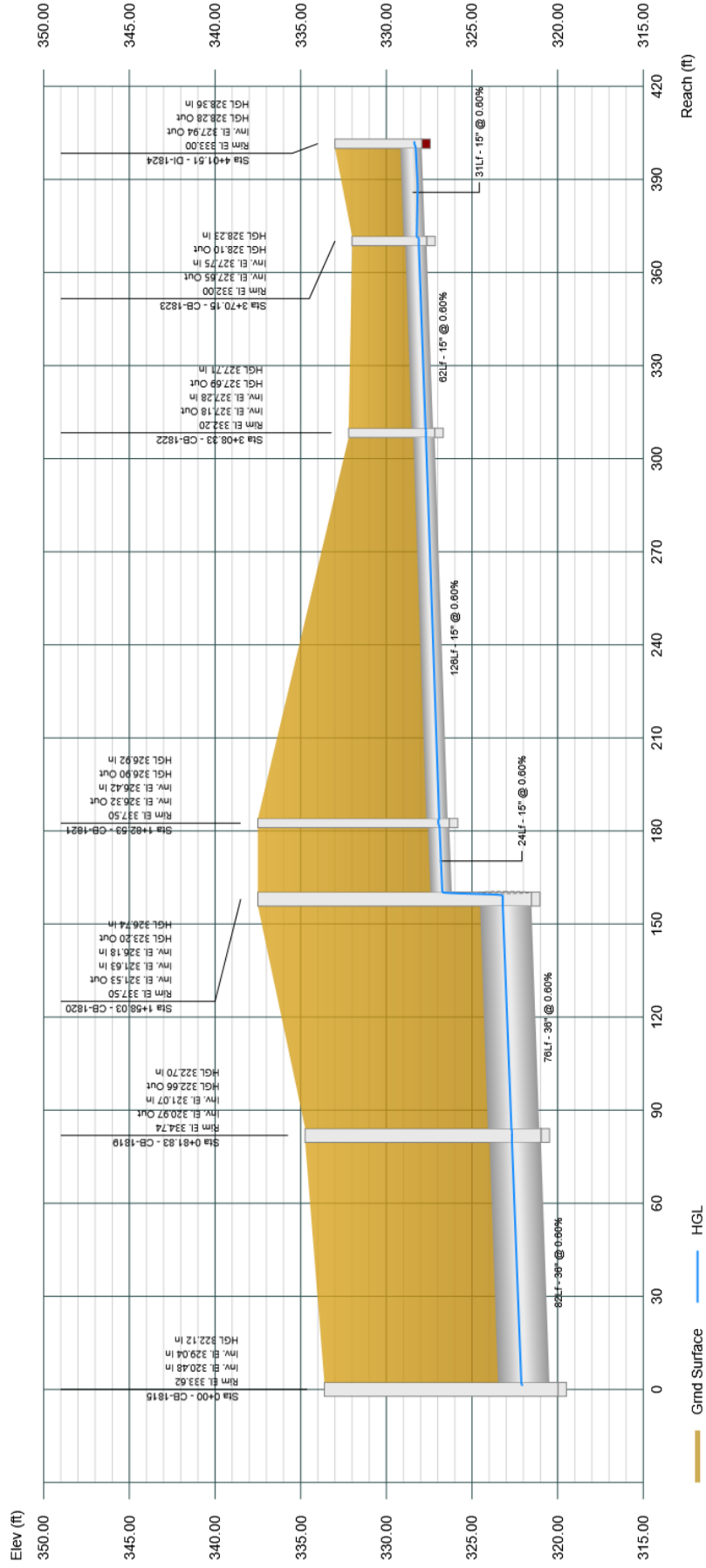


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

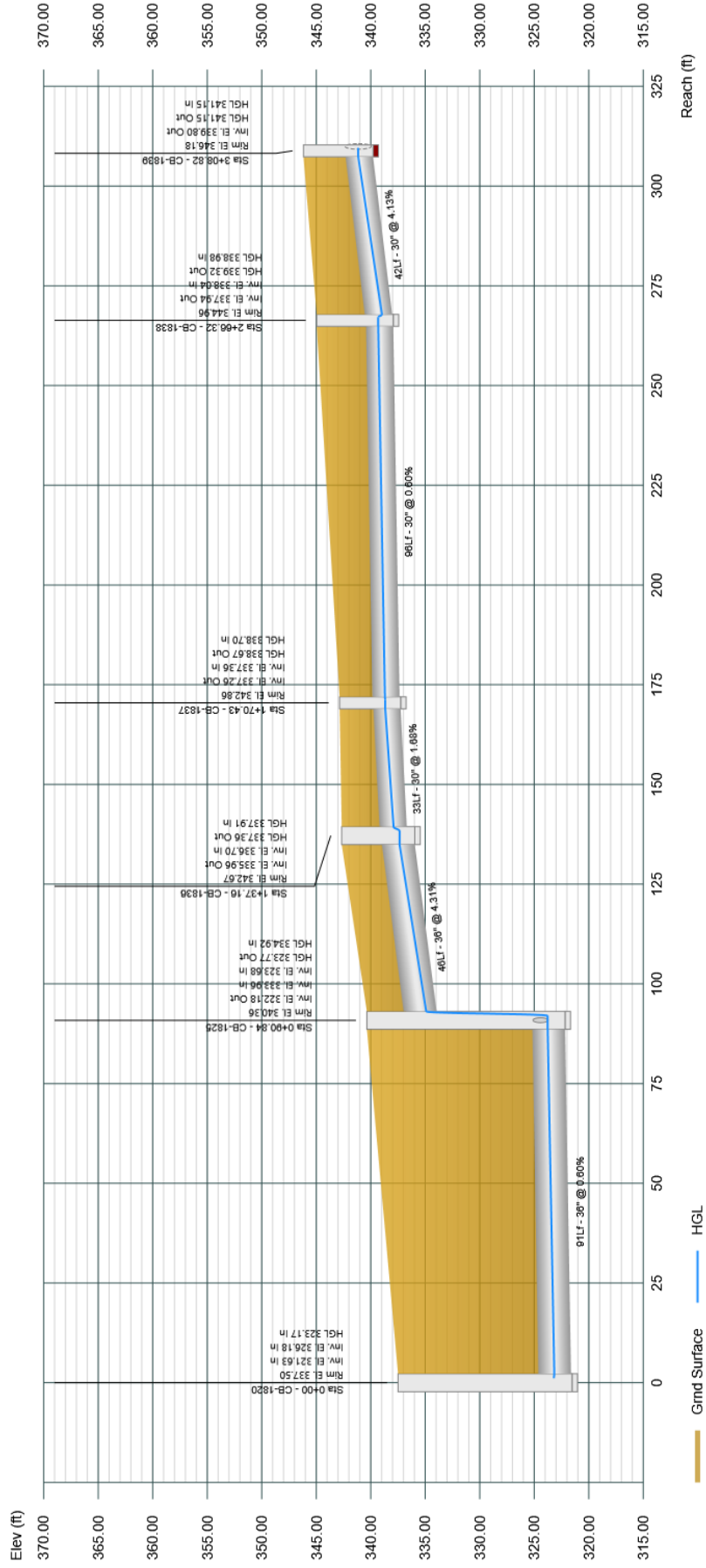


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

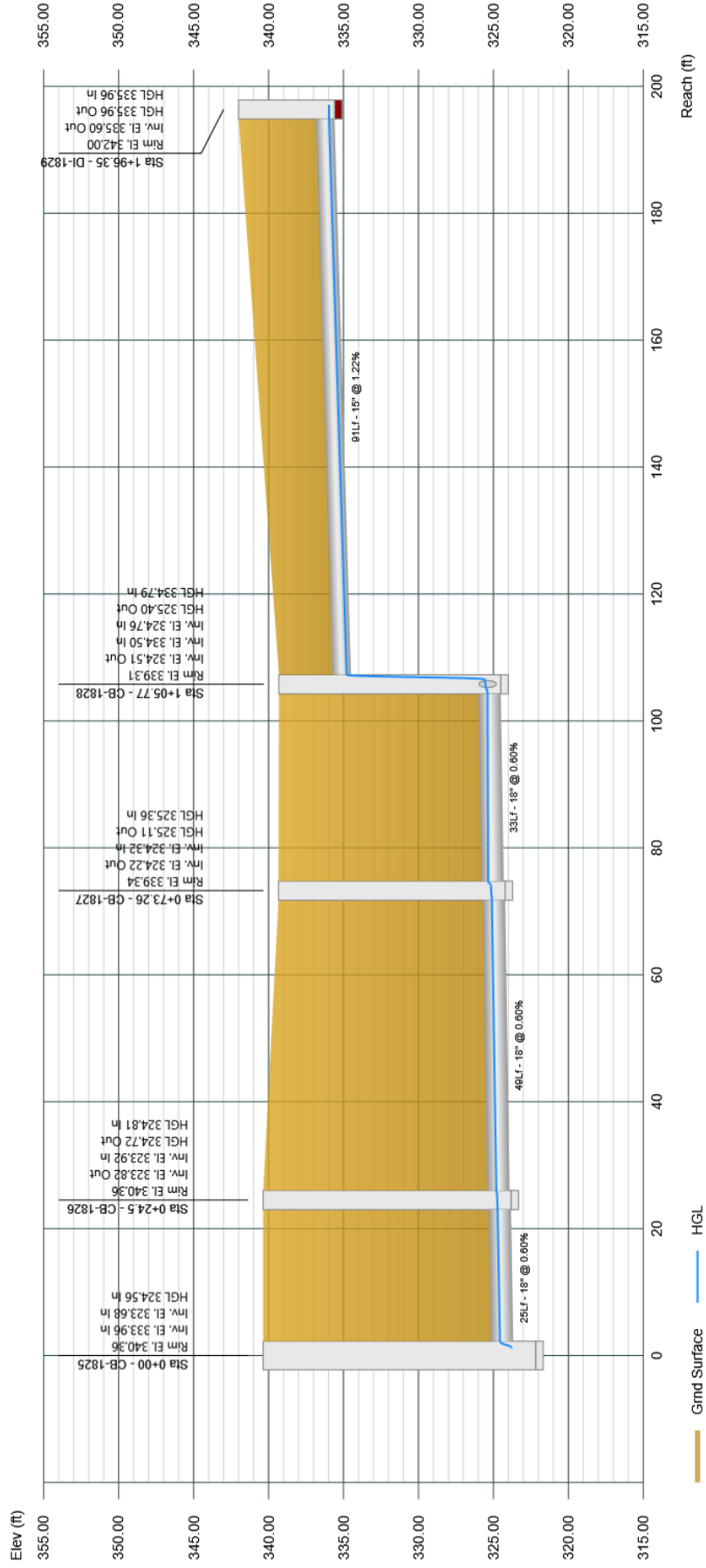


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

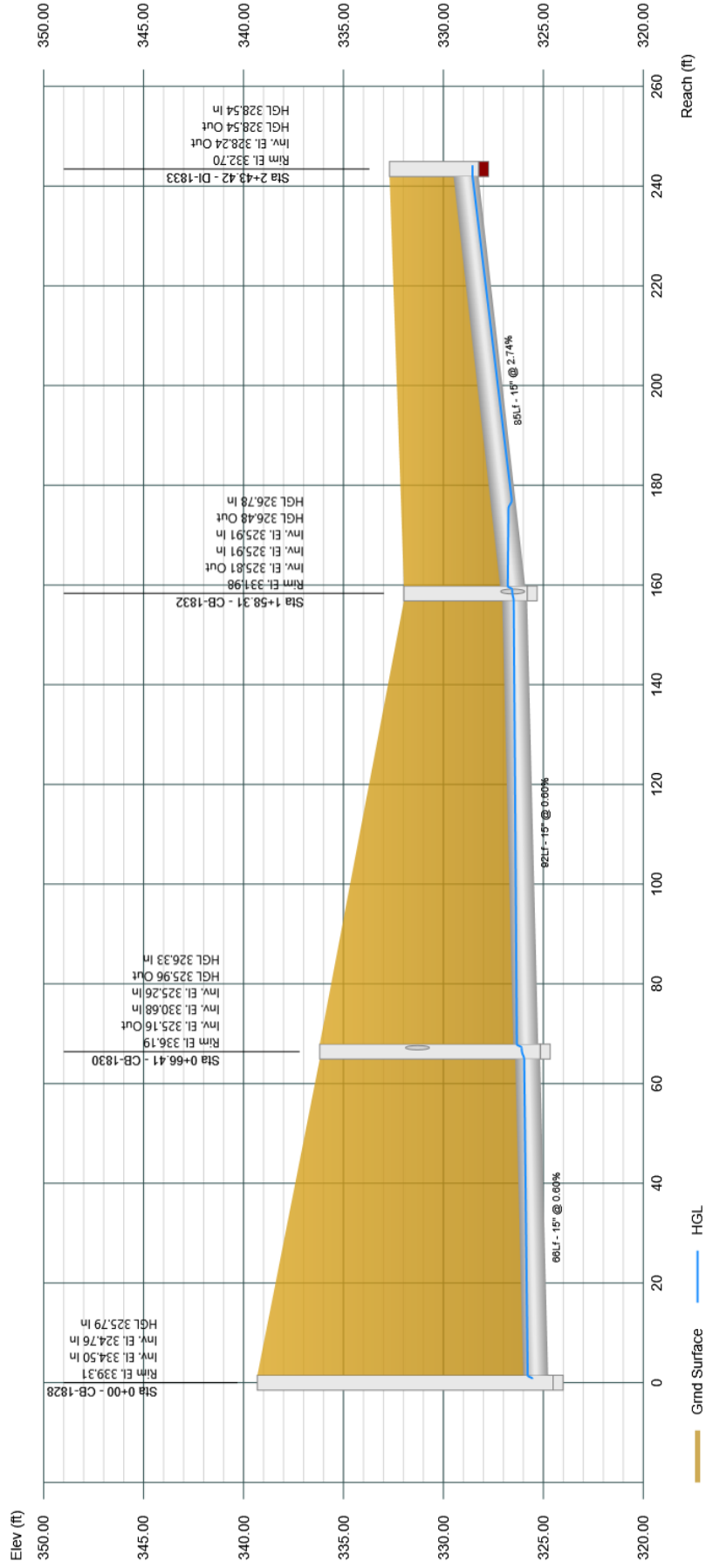


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

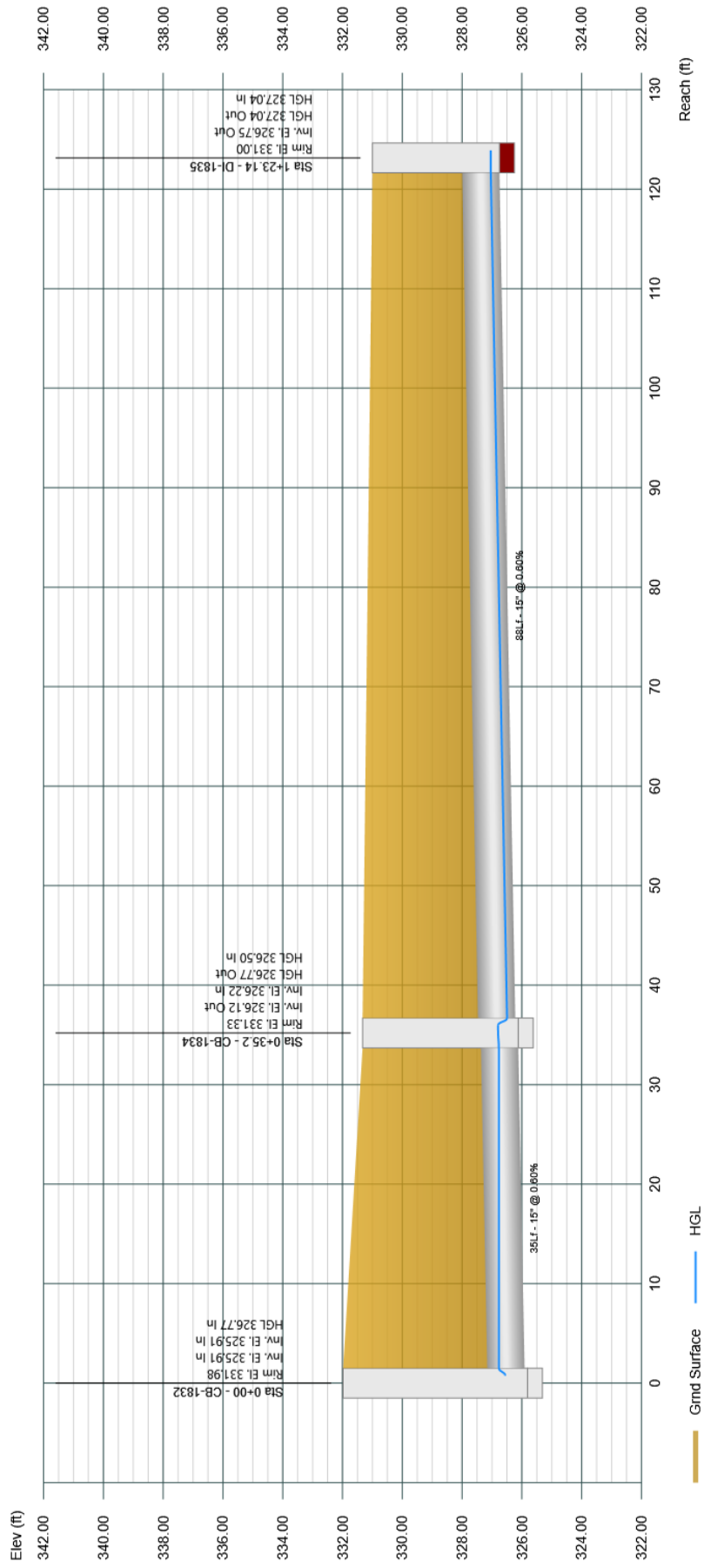


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

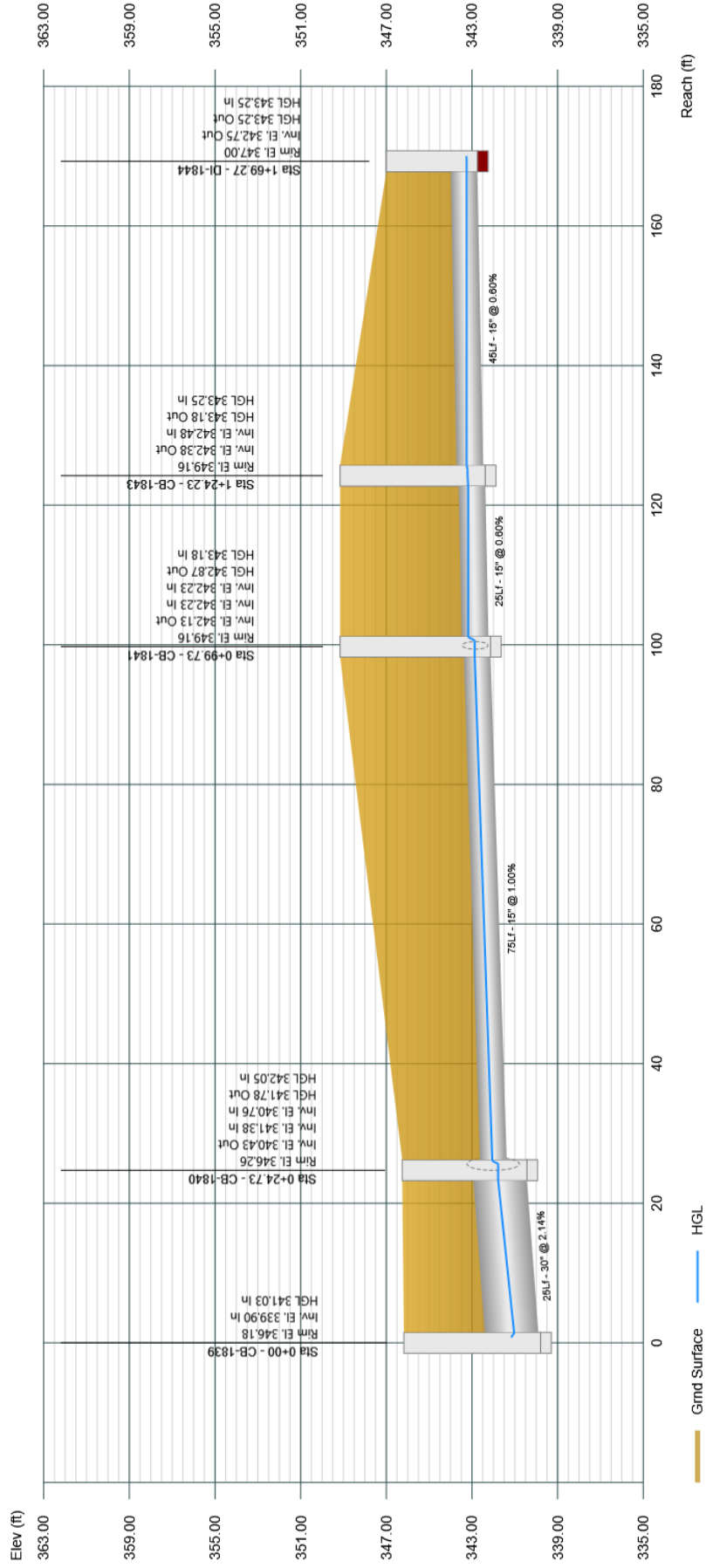


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

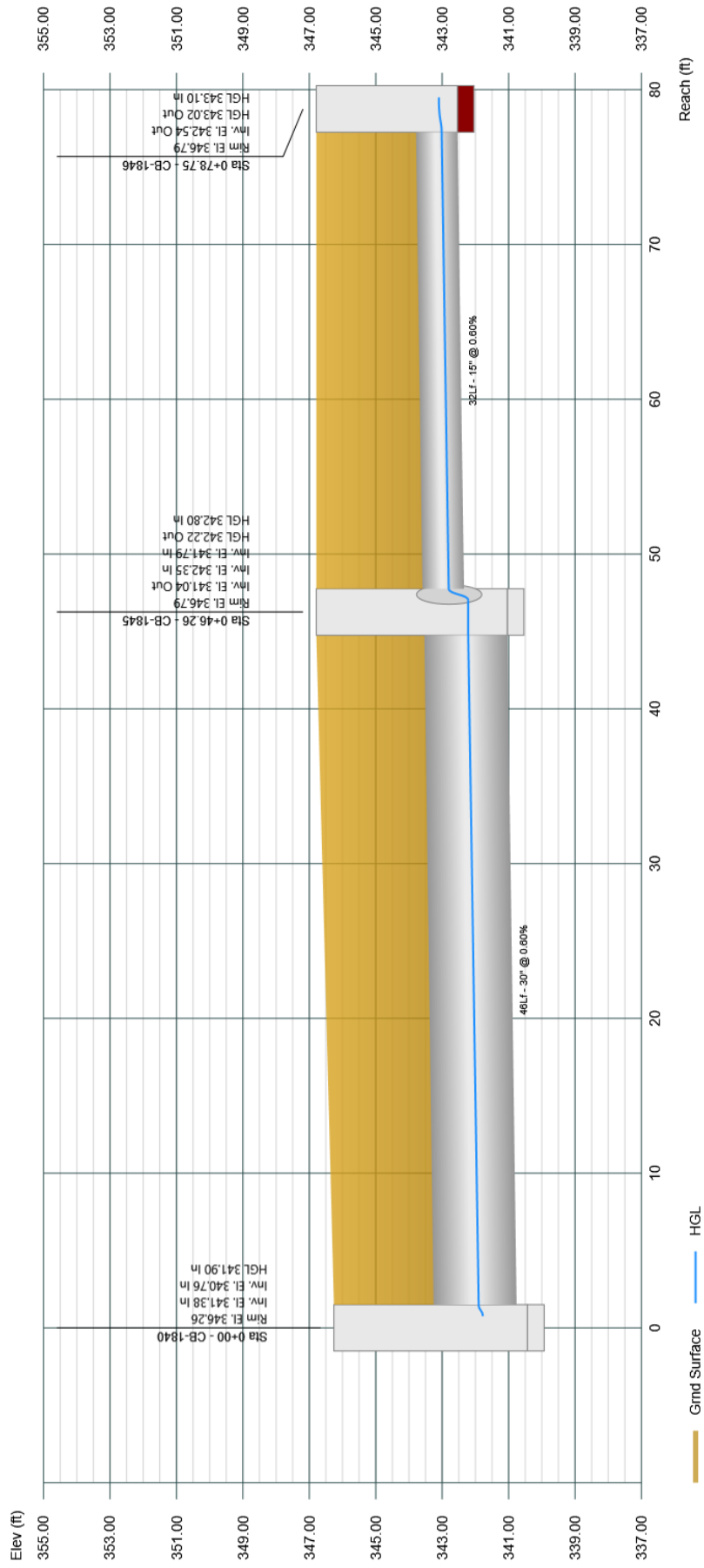


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

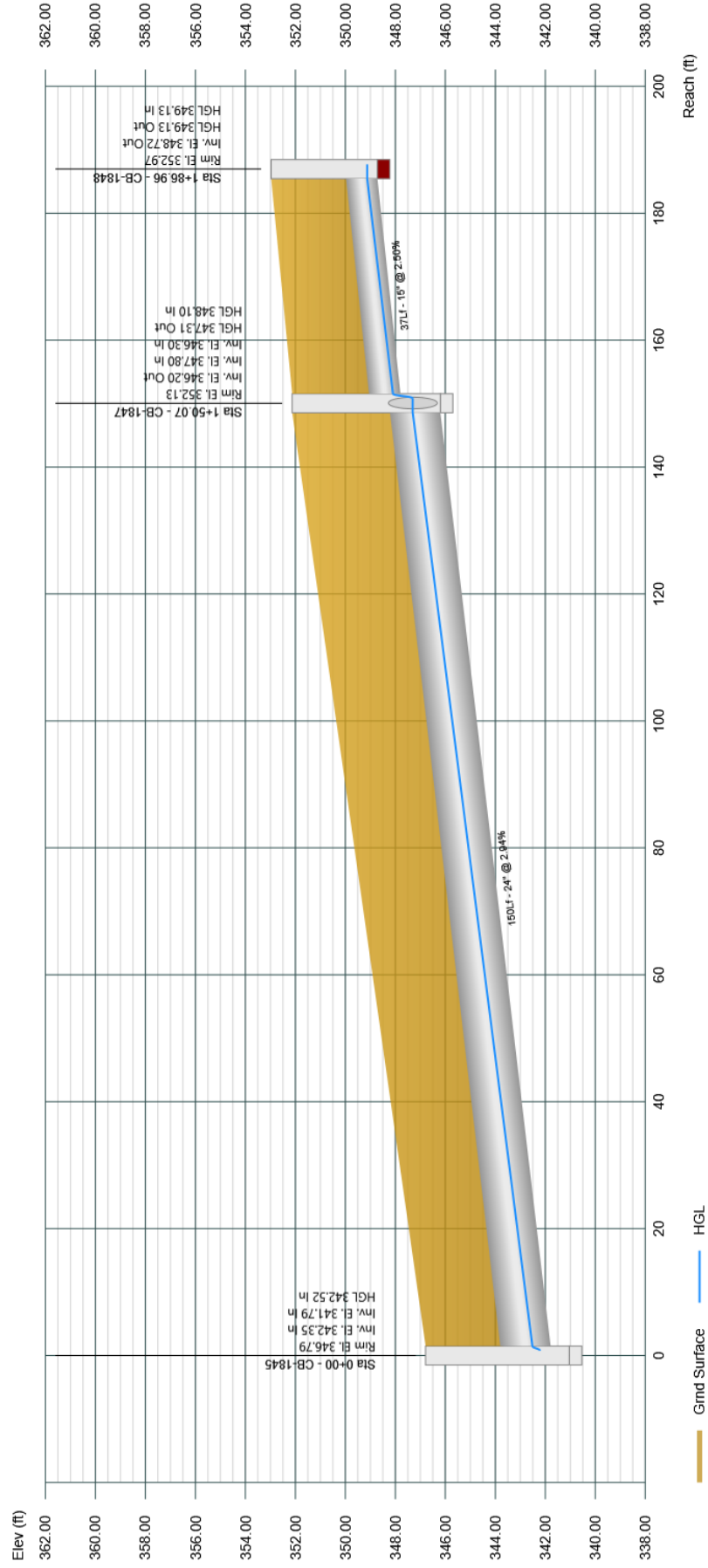


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

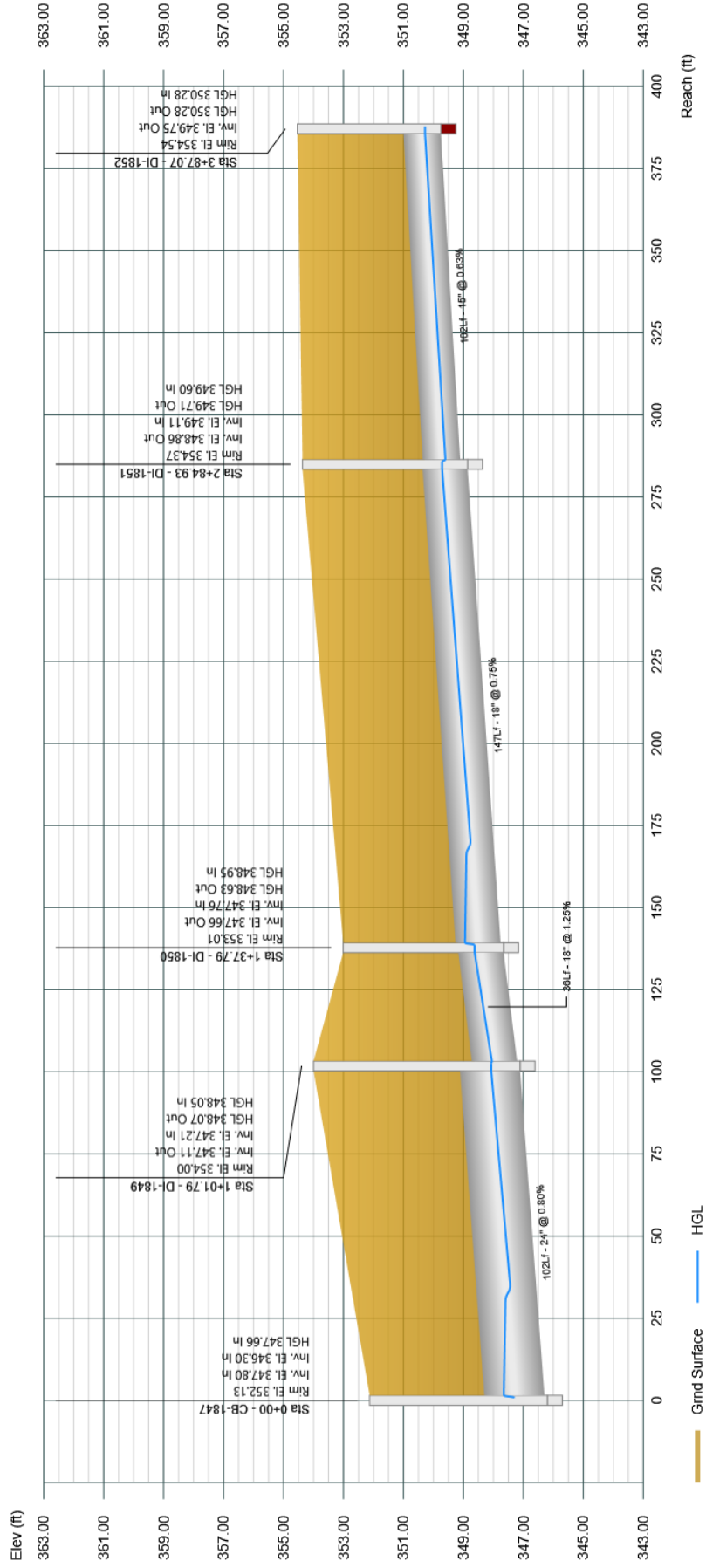


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023



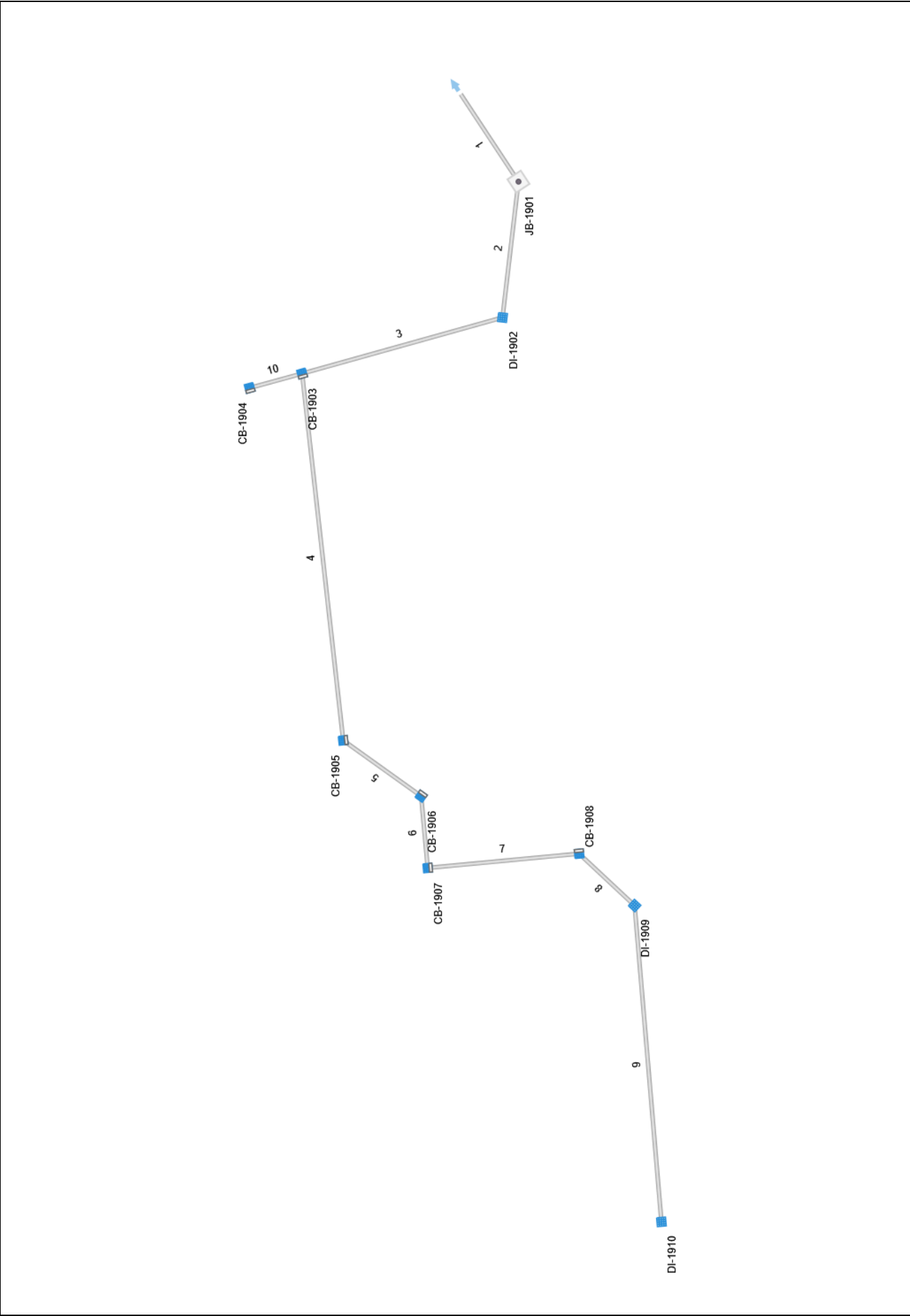
SYSTEM 1900 – REPORTS AND PROFILES

Plan View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1900

11-17-2023



Storm Sewer Tabulation

Project Name: SD-1900

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1900-1901	46.84	0.000	1.620	0.00	0.00	1.18	5.0	6.84	5.86	6.92	32.91	4.71	18	9.82	305.10	300.50	306.11	305.00	318.00	302.00	1
1901-1902	61.67	0.220	1.620	0.65	0.14	1.18	5.0	6.77	5.86	6.92	32.76	9.04	18	9.73	319.50	313.50	320.50	314.02	350.50	318.00	2
1902-1903	93.76	0.210	1.400	0.85	0.18	1.04	5.0	6.62	5.86	6.08	20.47	7.17	18	3.80	349.56	346.00	350.50	346.60	354.21	350.50	3
1903-1905	166.36	0.060	0.990	0.85	0.05	0.69	5.0	6.23	5.86	4.04	9.09	5.87	15	1.98	353.26	349.96	354.06	350.56	360.90	354.21	4
1905-1906	43.21	0.080	0.930	0.85	0.07	0.64	5.0	6.12	5.86	3.74	8.27	5.30	15	1.64	354.07	353.36	354.84	354.00	363.64	360.90	5
1906-1907	32.50	0.050	0.850	0.85	0.04	0.57	5.0	6.00	5.86	3.34	5.00	4.47	15	0.60	354.37	354.17	355.10	354.90	363.64	363.64	6
1907-1908	68.52	0.040	0.800	0.85	0.03	0.53	5.0	5.73	5.86	3.09	5.07	4.34	15	0.62	354.89	354.47	355.60	355.17	366.34	363.64	7
1908-1909	34.23	0.370	0.760	0.65	0.24	0.49	5.0	5.66	5.86	2.89	10.46	5.22	15	2.63	355.89	354.99	356.57	355.50	360.09	366.34	8
1909-1910	143.09	0.390	0.390	0.65	0.25	0.25	5.0	5.00	5.86	1.49	2.82	3.64	12	0.63	356.89	355.99	357.41	356.50	361.00	360.09	9
1903-1904	24.50	0.200	0.200	0.85	0.17	0.17	5.0	5.00	5.86	1.00	5.00	0.93	15	0.60	349.96	349.81	350.92	350.92	354.21	354.21	10

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: SD-1900.sws

Energy Grade Line Calculations

Project Name: SD-1900

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream						Pipe		Junction			
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)
1	18	6.92	300.50	1.50	1.77	305.00	3.92	0.24	305.24	46.84	305.10	1.00 ²	1.26	5.50	0.47	306.58	0.013	1.338	306.11	306.58	0.00
2	18	6.92	313.50	0.52‡	0.55	314.02	12.58	2.46	314.98	61.67	319.50	1.00 ²	1.26	5.50	0.47	320.97	0.013	6.000	320.50	320.97	0.00
3	18	6.08	346.00	0.60‡	0.67	346.60	9.13	1.30	347.36	93.76	349.56	0.94 ²	1.17	5.21	0.42	350.93	0.013	3.563	350.50	350.93	0.00
4	15	4.04	349.96	0.60‡	0.59	350.56	6.90	0.74	351.13	166.36	353.26	0.80 ²	0.83	4.84	0.36	354.43	0.013	3.298	354.06	354.43	0.00
5	15	3.74	353.36	0.64‡	0.63	354.00	5.91	0.54	354.48	43.21	354.07	0.77 ²	0.80	4.69	0.34	355.18	0.013	0.704	354.84	355.18	0.00
6	15	3.34	354.17	0.73‡	0.74	354.90	4.49	0.31	355.23	32.50	354.37	0.73	0.75	4.46	0.31	355.41	0.013	0.178	355.16	355.47	0.06
7	15	3.09	354.47	0.70‡	0.71	355.17	4.36	0.30	355.51	68.52	354.89	0.71	0.72	4.32	0.29	355.89	0.013	0.375	355.65	355.94	0.06
8	15	2.89	354.99	0.51‡	0.47	355.50	6.21	0.60	355.99	34.23	355.89	0.68 ²	0.68	4.24	0.28	356.85	0.013	0.865	356.57	356.85	0.00
9	12	1.49	355.99	0.51‡	0.41	356.50	3.65	0.21	356.87	143.09	356.89	0.52 ²	0.41	3.63	0.20	357.61	0.013	0.738	357.41	357.61	0.00
10	15	1.00	349.81	1.11	1.15	350.92	0.87	0.01	350.93	24.50	349.96	0.96	1.01	0.98	0.02	350.94	0.013	0.005	350.93	350.95	0.01

Notes: Return Period = 10-yrs. ² Critical depth. ‡ Supercritical.

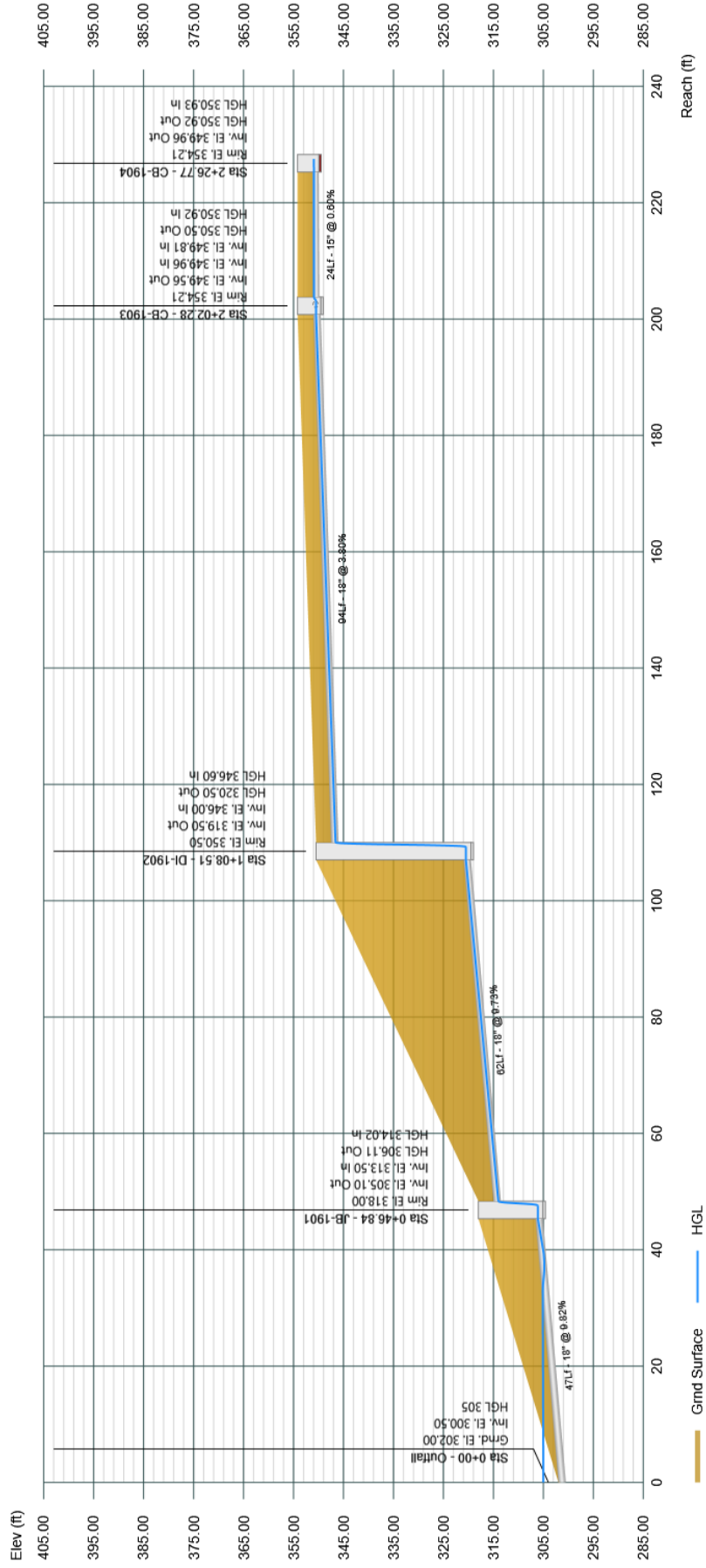
Project File: SD-1900.sws

Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1900

11-17-2023

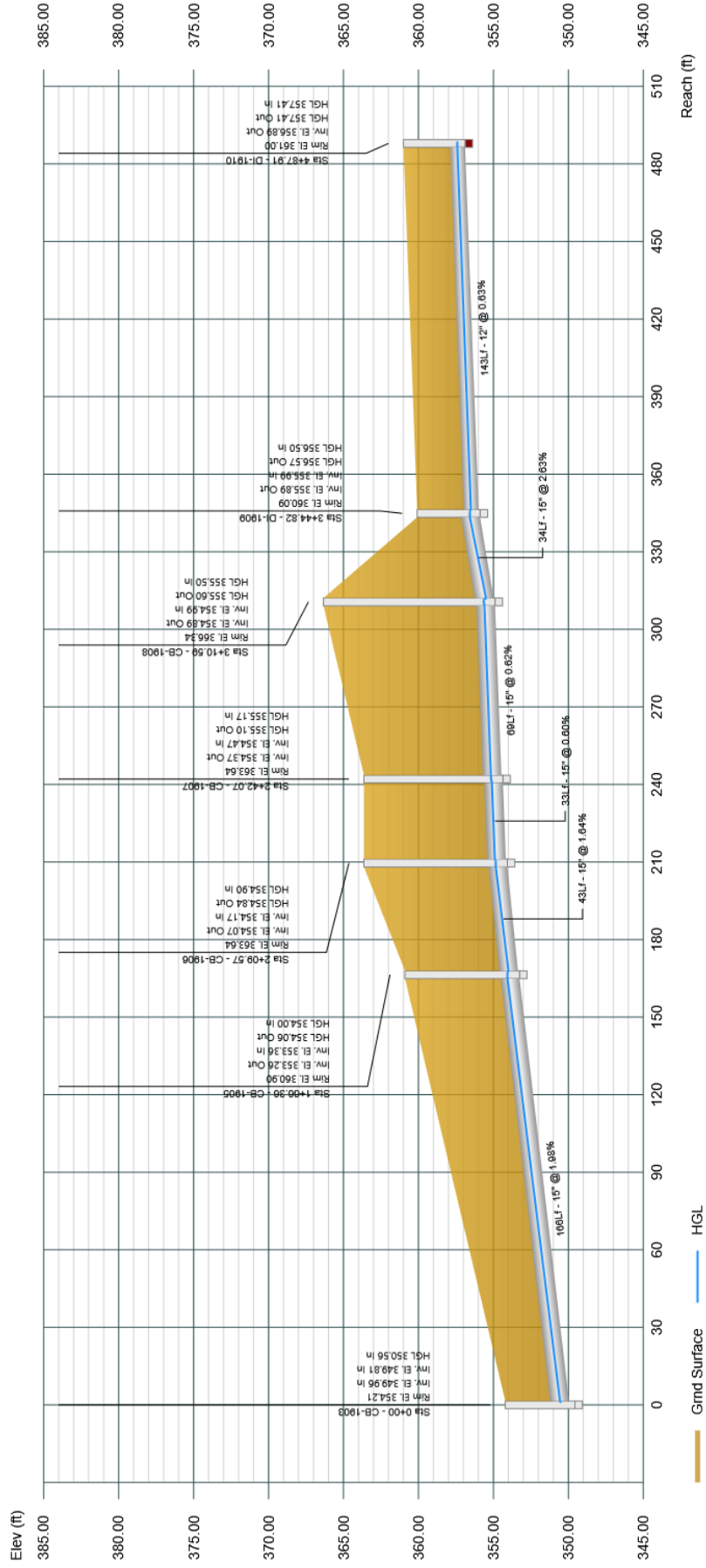


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1900

11-17-2023



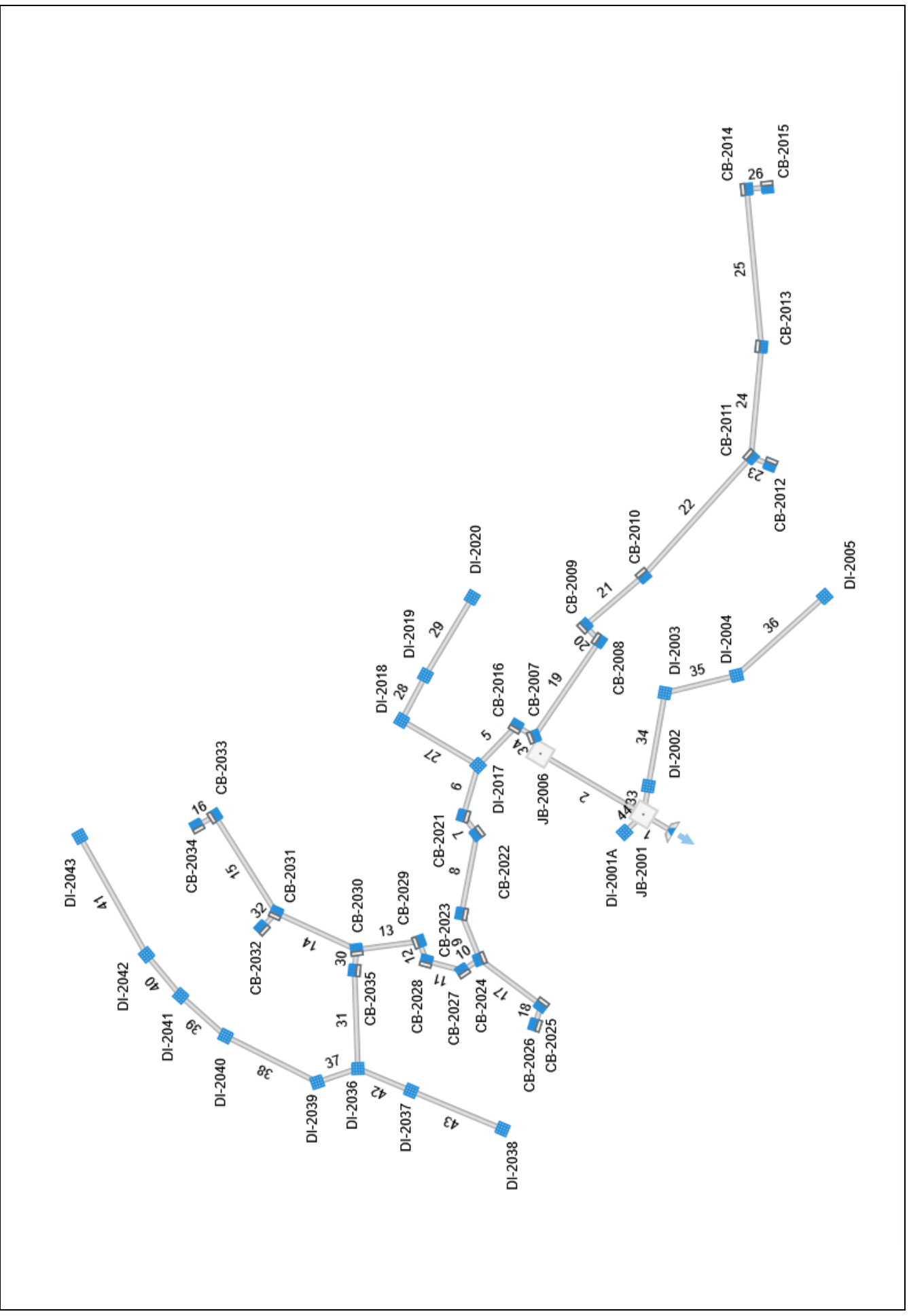
SYSTEM 2000 – REPORTS AND PROFILES

Plan View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023



Storm Sewer Tabulation

Project Name: SD-2000
11-17-2023

Stormwater Studio 2023 v 3.0.0.32

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
2000-2001	33.86	0.000	9.960	0.00	0.00	7.18	5.0	8.18	5.86	42.04	204.82	4.51	42	4.14	341.90	340.50	345.02	345.00	348.50	344.00	1
2001-2006	141.63	0.000	7.530	0.00	0.00	5.60	5.0	8.03	5.86	32.79	214.53	5.15	42	4.55	348.44	342.00	350.19	345.29	359.40	348.50	2
2006-2007	21.59	0.300	7.530	0.85	0.26	5.60	5.0	7.99	5.86	32.79	77.93	6.81	42	0.60	348.67	348.54	350.43	350.28	359.17	359.40	3
2007-2016	24.50	0.310	5.970	0.85	0.26	4.27	5.0	7.43	5.86	25.02	99.65	5.54	36	2.23	349.32	348.77	350.91	350.96	359.17	359.17	4
2016-2017	65.00	0.020	5.660	0.75	0.02	4.01	5.0	7.31	5.86	23.48	68.72	5.73	36	1.06	350.11	349.42	351.65	351.29	359.80	359.17	5
2017-2021	62.10	0.220	4.090	0.85	0.19	2.98	5.0	7.22	5.86	17.49	67.31	7.75	30	2.69	354.67	353.00	356.07	354.02	360.74	359.80	6
2021-2022	26.46	0.090	3.870	0.85	0.08	2.80	5.0	7.15	5.86	16.39	31.77	6.07	30	0.60	355.40	355.24	356.76	356.58	361.01	360.74	7
2022-2023	96.60	0.070	3.780	0.85	0.06	2.72	5.0	6.95	5.86	15.94	43.56	6.66	30	1.13	356.60	355.51	357.93	356.65	364.57	361.01	8
2023-2024	57.88	0.080	3.710	0.85	0.07	2.66	5.0	6.83	5.86	15.59	39.88	6.34	30	0.95	357.25	356.70	358.57	357.89	366.73	364.57	9
2024-2027	24.48	0.110	3.430	0.85	0.09	2.42	5.0	6.76	5.86	14.20	31.77	4.88	30	0.60	357.49	357.35	358.84	358.88	366.73	366.73	10
2027-2028	44.38	0.090	3.320	0.85	0.08	2.33	5.0	6.64	5.86	13.65	31.77	5.76	30	0.60	357.86	357.59	359.09	358.79	366.06	366.73	11
2028-2029	24.50	0.050	3.230	0.85	0.04	2.25	5.0	6.58	5.86	13.20	31.77	5.63	30	0.60	358.11	357.96	359.33	359.15	366.06	366.06	12
2029-2030	74.84	0.060	3.180	0.85	0.05	2.21	5.0	6.37	5.86	12.95	31.77	5.25	30	0.60	358.65	358.21	359.86	359.52	369.24	366.06	13
2030-2031	104.88	0.080	0.530	0.85	0.07	0.45	5.0	5.44	5.86	2.64	24.78	6.11	18	5.57	367.49	361.65	368.11	362.00	374.62	369.24	14
2031-2033	135.85	0.130	0.300	0.85	0.11	0.26	5.0	5.13	5.86	1.49	13.72	5.18	15	4.52	376.51	370.37	376.99	370.66	381.01	374.62	15
2033-2034	24.50	0.170	0.170	0.85	0.14	0.14	5.0	5.00	5.86	0.85	5.00	2.85	15	0.60	376.76	376.61	377.14	376.97	381.01	381.01	16
2024-2025	91.07	0.090	0.200	0.85	0.08	0.17	5.0	5.15	5.86	1.00	11.58	4.19	15	3.21	365.41	362.48	365.81	362.74	369.91	366.73	17
2025-2026	24.49	0.110	0.110	0.85	0.09	0.09	5.0	5.00	5.86	0.55	5.00	2.55	15	0.60	365.66	365.51	365.96	365.79	369.91	369.91	18
2007-2008	137.33	0.160	1.260	0.85	0.14	1.07	5.0	7.54	5.86	6.27	8.13	5.08	18	0.60	353.01	352.19	354.00	353.17	361.28	359.17	19
2008-2009	24.50	0.090	1.100	0.85	0.08	0.94	5.0	7.45	5.86	5.48	8.13	3.62	18	0.60	353.26	353.11	354.40	354.37	361.28	361.28	20
2009-2010	91.12	0.070	1.010	0.85	0.06	0.86	5.0	7.14	5.86	5.03	8.13	4.82	18	0.60	353.90	353.36	354.76	354.21	363.73	361.28	21
2010-2011	189.88	0.230	0.940	0.85	0.20	0.80	5.0	6.47	5.86	4.68	8.13	4.17	18	0.60	355.14	354.00	355.97	355.02	363.79	363.73	22

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: SD-2000.sws

Storm Sewer Tabulation

Project Name: SD-2000

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
2011-2012	24.50	0.270	0.270	0.85	0.23	0.23	5.0	5.00	5.86	1.34	6.48	3.50	15	1.01	359.54	359.29	360.00	359.71	363.79	363.79	23
2011-2013	131.06	0.020	0.440	0.85	0.02	0.37	5.0	5.92	5.86	2.19	5.00	3.87	15	0.60	356.18	355.39	356.77	355.97	364.40	363.79	24
2013-2014	187.31	0.150	0.420	0.85	0.13	0.36	5.0	5.12	5.86	2.09	5.00	3.82	15	0.60	357.40	356.28	357.98	356.84	361.90	364.40	25
2014-2015	24.50	0.270	0.270	0.85	0.23	0.23	5.0	5.00	5.86	1.34	5.00	2.50	15	0.60	357.65	357.50	358.15	358.15	361.90	361.90	26
2017-2018	105.02	0.750	1.550	0.65	0.49	1.01	5.0	5.69	5.86	5.90	7.54	6.18	15	1.36	352.99	351.56	353.96	352.42	358.20	359.80	27
2018-2019	60.08	0.450	0.800	0.65	0.29	0.52	5.0	5.52	5.86	3.05	7.73	3.40	15	1.43	353.95	353.09	354.65	354.42	357.00	358.20	28
2019-2020	107.77	0.350	0.350	0.65	0.23	0.23	5.0	5.00	5.86	1.33	5.00	3.33	15	0.60	354.70	354.05	355.16	354.49	358.00	357.00	29
2030-2035	24.50	0.130	2.590	0.85	0.11	1.71	5.0	6.30	5.86	10.02	17.52	5.53	24	0.60	359.30	359.15	360.43	360.27	369.24	369.24	30
2035-2036	116.37	0.480	2.460	0.65	0.31	1.60	5.0	6.03	5.86	9.37	11.51	6.70	18	1.20	361.20	359.80	362.37	360.86	365.00	369.24	31
2031-2032	24.50	0.150	0.150	0.85	0.13	0.13	5.0	5.00	5.86	0.75	8.13	1.01	18	0.60	367.74	367.59	368.33	368.33	374.62	374.62	32
2001-2002	33.91	0.270	1.240	0.65	0.18	0.81	5.0	6.29	5.86	4.72	8.81	2.73	18	0.60	344.01	343.80	345.38	345.34	347.83	348.50	33
2002-2003	112.05	0.120	0.970	0.65	0.08	0.63	5.0	5.90	5.86	3.69	8.81	3.09	18	0.60	344.78	344.11	345.56	345.47	350.36	347.83	34
2003-2004	87.55	0.350	0.850	0.65	0.23	0.55	5.0	5.58	5.86	3.24	5.42	4.49	15	0.60	345.40	344.88	346.12	345.58	348.00	350.36	35
2004-2005	140.03	0.500	0.500	0.65	0.33	0.33	5.0	5.00	5.86	1.90	2.99	4.01	12	0.60	346.39	345.55	346.98	346.13	348.48	348.00	36
2036-2039	50.79	0.310	1.340	0.65	0.20	0.87	5.0	5.87	5.86	5.10	8.81	4.90	18	0.60	362.00	361.70	362.87	362.54	366.09	365.00	37
2039-2040	121.54	0.160	1.030	0.65	0.10	0.67	5.0	5.68	5.86	3.92	25.90	7.04	18	5.18	368.30	362.00	369.06	362.42	371.86	366.09	38
2040-2041	71.37	0.110	0.870	0.65	0.07	0.57	5.0	5.53	5.86	3.31	11.23	3.58	15	2.58	369.42	367.58	370.15	369.29	373.77	371.86	39
2041-2042	63.26	0.340	0.760	0.65	0.22	0.49	5.0	5.40	5.86	2.89	12.06	5.67	15	2.97	371.40	369.52	372.08	369.98	375.50	373.77	40
2042-2043	160.74	0.420	0.420	0.65	0.27	0.27	5.0	5.00	5.86	1.60	6.34	5.10	12	2.70	375.84	371.50	376.37	371.85	379.84	375.50	41
2036-2037	68.29	0.310	0.640	0.65	0.20	0.42	5.0	5.54	5.86	2.44	6.77	3.16	15	1.10	362.70	361.95	363.32	362.94	366.17	365.00	42
2037-2038	117.57	0.330	0.330	0.65	0.21	0.21	5.0	5.00	5.86	1.26	3.01	3.52	12	0.61	363.52	362.80	363.99	363.25	367.34	366.17	43
2001-2001A	30.88	1.190	1.190	0.65	0.77	0.77	5.0	5.00	5.86	4.53	8.81	2.71	18	0.60	344.09	343.90	345.37	345.34	347.35	348.50	44

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: SD-2000.sws

Energy Grade Line Calculations

Project Name: SD-2000

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream						Pipe		Junction			
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)
1	42	42.04	340.50	3.50	9.62	345.00	4.37	0.30	345.30	33.86	3.12	9.05	345.02	4.65	0.34	345.35	0.013	0.057	345.07	345.41	0.05
2	42	32.79	342.00	3.29	9.38	345.29	3.49	0.19	345.48	141.63	1.75 ²	4.82	350.19	6.80	0.72	350.91	0.013	5.434	350.19	350.91	0.00
3	42	32.79	348.54	1.74 [‡]	4.78	350.28	6.87	0.73	351.04	21.59	1.76	4.85	350.43	6.76	0.71	351.14	0.013	0.106	350.47	351.18	0.04
4	36	25.02	348.77	2.19	5.53	350.96	4.52	0.32	351.28	24.50	1.59 ²	3.82	350.91	6.55	0.67	351.58	0.013	0.300	350.91	351.58	0.00
5	36	23.48	349.42	1.87	4.63	351.29	5.07	0.40	351.69	65.00	1.54 ²	3.67	351.65	6.40	0.64	352.29	0.013	0.602	351.65	352.29	0.00
6	30	17.49	353.00	1.02 [‡]	1.88	354.02	9.30	1.34	354.99	62.10	1.40 ²	2.82	356.07	6.20	0.60	356.67	0.013	1.673	356.07	356.67	0.00
7	30	16.39	355.24	1.34 [‡]	2.67	356.58	6.14	0.59	357.16	26.46	1.36	2.73	356.76	6.01	0.56	357.32	0.013	0.159	356.79	357.35	0.03
8	30	15.94	355.51	1.14 [‡]	2.17	356.65	7.34	0.84	357.44	96.60	1.33 ²	2.67	357.93	5.98	0.56	358.49	0.013	1.050	357.93	358.49	0.00
9	30	15.59	356.70	1.19 [‡]	2.31	357.89	6.75	0.71	358.58	57.88	1.32 ²	2.63	358.57	5.93	0.55	359.11	0.013	0.528	358.57	359.11	0.00
10	30	14.20	357.35	1.54	3.16	358.88	4.49	0.31	359.20	24.48	1.35	2.70	358.84	5.27	0.43	359.27	0.013	0.075	358.87	359.30	0.03
11	30	13.65	357.59	1.20 [‡]	2.33	358.79	5.87	0.54	359.38	44.38	1.23 ²	2.42	359.09	5.65	0.50	359.59	0.013	0.213	359.09	359.59	0.00
12	30	13.20	357.96	1.19 [‡]	2.31	359.15	5.71	0.51	359.67	24.50	1.22	2.38	359.33	5.55	0.48	359.80	0.013	0.135	359.35	359.82	0.02
13	30	12.95	358.21	1.31	2.61	359.52	4.96	0.38	359.90	74.84	1.20 ²	2.34	359.86	5.54	0.48	360.34	0.013	0.435	359.86	360.34	0.00
14	18	2.64	361.65	0.35 [‡]	0.31	362.00	8.39	1.09	362.50	104.88	0.62 ²	0.69	368.11	3.83	0.23	368.34	0.013	5.839	368.11	368.34	0.00
15	15	1.49	370.37	0.29 [‡]	0.21	370.66	7.01	0.76	371.03	135.85	0.49 ²	0.45	376.99	3.36	0.18	377.17	0.013	6.135	376.99	377.17	0.00
16	15	0.85	376.61	0.35 [‡]	0.28	376.97	2.98	0.14	377.18	24.50	0.38	0.31	377.14	2.72	0.11	377.25	0.013	0.069	377.21	377.32	0.07
17	15	1.00	362.48	0.26 [‡]	0.18	362.74	5.42	0.46	363.01	91.07	0.40 ²	0.34	365.81	2.95	0.14	365.94	0.013	2.926	365.81	365.94	0.00
18	15	0.55	365.51	0.28 ³	0.20	365.79	2.67	0.11	365.95	24.49	0.30	0.23	365.96	2.43	0.09	366.05	0.013	0.102	366.01	366.11	0.05
19	18	6.27	352.19	0.99 ³	1.24	353.17	5.08	0.40	353.58	137.33	0.99	1.23	354.00	5.08	0.40	354.40	0.013	0.824	354.10	354.50	0.10
20	18	5.48	353.11	1.26	1.59	354.37	3.46	0.19	354.56	24.50	1.15	1.45	354.40	3.78	0.22	354.63	0.013	0.070	354.43	354.65	0.02
21	18	5.03	353.36	0.85 [‡]	1.04	354.21	4.84	0.36	354.70	91.12	0.86	1.05	354.76	4.80	0.36	355.12	0.013	0.419	354.82	355.18	0.06
22	18	4.68	354.00	1.02	1.28	355.02	3.65	0.21	355.23	189.88	0.83 ²	1.00	355.97	4.69	0.34	356.31	0.013	1.079	355.97	356.31	0.00

Notes: Return Period = 10-yrs. ² Critical depth. ³ Normal depth. ‡ Supercritical. Project File: SD-2000.sws

Energy Grade Line Calculations

Project Name: SD-2000

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream						Pipe		Junction			
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)
23	15	1.34	359.29	0.42†	0.36	359.71	3.76	0.22	359.92	24.50	0.46²	0.41	360.00	3.24	0.16	360.17	0.013	0.247	360.00	360.17	0.00
24	15	2.19	355.39	0.58†	0.56	355.97	3.92	0.24	356.34	131.06	0.59²	0.57	356.77	3.82	0.23	357.00	0.013	0.661	356.77	357.00	0.00
25	15	2.09	356.28	0.57†	0.54	356.84	3.88	0.23	357.09	187.31	0.58²	0.56	357.98	3.76	0.22	358.20	0.013	1.111	357.98	358.20	0.00
26	15	1.34	357.50	0.65	0.64	358.15	2.09	0.07	358.22	24.50	0.50	0.46	358.15	2.90	0.13	358.28	0.013	0.065	358.22	358.35	0.06
27	15	5.90	351.56	0.86†	0.90	352.42	6.59	0.67	353.05	105.02	0.97²	1.02	353.96	5.76	0.52	354.48	0.013	1.430	353.96	354.48	0.00
28	15	3.05	353.09	1.25	1.23	354.42	2.48	0.10	354.52	60.08	0.70²	0.71	354.65	4.32	0.29	354.94	0.013	0.422	354.65	354.94	0.00
29	15	1.33	354.05	0.44†	0.39	354.49	3.43	0.18	354.95	107.77	0.46²	0.41	355.16	3.23	0.16	355.32	0.013	0.371	355.16	355.32	0.00
30	24	10.02	359.15	1.11†	1.80	360.27	5.57	0.48	360.75	24.50	1.13	1.82	360.43	5.50	0.47	360.90	0.013	0.147	360.48	360.95	0.05
31	18	9.37	359.80	1.06†	1.33	360.86	7.05	0.77	361.60	116.37	1.17²	1.48	362.37	6.34	0.63	362.99	0.013	1.398	362.37	362.99	0.00
32	18	0.75	367.59	0.74	0.87	368.33	0.86	0.01	368.34	24.50	0.59	0.65	368.33	1.16	0.02	368.35	0.013	0.009	368.35	368.37	0.02
33	18	4.72	343.80	1.50	1.77	345.34	2.67	0.11	345.45	33.91	1.38	1.70	345.38	2.78	0.12	345.50	0.012	0.054	345.40	345.52	0.01
34	18	3.69	344.11	1.36	1.69	345.47	2.19	0.07	345.54	112.05	0.78	0.93	345.56	3.99	0.25	345.80	0.012	0.262	345.58	345.83	0.03
35	15	3.24	344.88	0.70†	0.71	345.58	4.56	0.32	345.90	87.55	0.72²	0.73	346.12	4.42	0.30	346.43	0.012	0.525	346.12	346.43	0.00
36	12	1.90	345.55	0.58³	0.47	346.13	4.04	0.25	346.47	140.03	0.59²	0.48	346.98	3.99	0.25	347.23	0.012	0.761	346.98	347.23	0.00
37	18	5.10	361.70	0.84†	1.02	362.54	4.99	0.39	363.05	50.79	0.87	1.06	362.87	4.80	0.36	363.23	0.012	0.184	362.93	363.29	0.06
38	18	3.92	362.00	0.42†	0.40	362.42	9.69	1.46	363.33	121.54	0.76²	0.89	369.06	4.40	0.30	369.36	0.012	6.033	369.06	369.36	0.00
39	15	3.31	367.58	1.25	1.23	369.29	2.70	0.11	369.41	71.37	0.73²	0.74	370.15	4.46	0.31	370.46	0.012	1.055	370.15	370.46	0.00
40	15	2.89	369.52	0.46†	0.41	369.98	7.11	0.79	370.50	63.26	0.68²	0.68	372.08	4.24	0.28	372.36	0.012	1.859	372.08	372.36	0.00
41	12	1.60	371.50	0.35†	0.25	371.85	6.48	0.65	372.39	160.74	0.54²	0.43	376.37	3.73	0.22	376.59	0.012	4.199	376.37	376.59	0.00
42	15	2.44	361.95	0.99	1.04	362.94	2.34	0.09	363.02	68.29	0.62²	0.61	363.32	3.97	0.25	363.57	0.013	0.547	363.32	363.57	0.00
43	12	1.26	362.80	0.45†	0.35	363.25	3.62	0.20	363.59	117.57	0.48²	0.37	363.99	3.41	0.18	364.17	0.012	0.582	363.99	364.17	0.00
44	18	4.53	343.90	1.44	1.74	345.34	2.60	0.11	345.45	30.88	1.28	1.60	345.37	2.83	0.12	345.49	0.012	0.044	345.40	345.52	0.03

Notes: Return Period = 10-yrs. ² Critical depth. ³ Normal depth. † Supercritical.

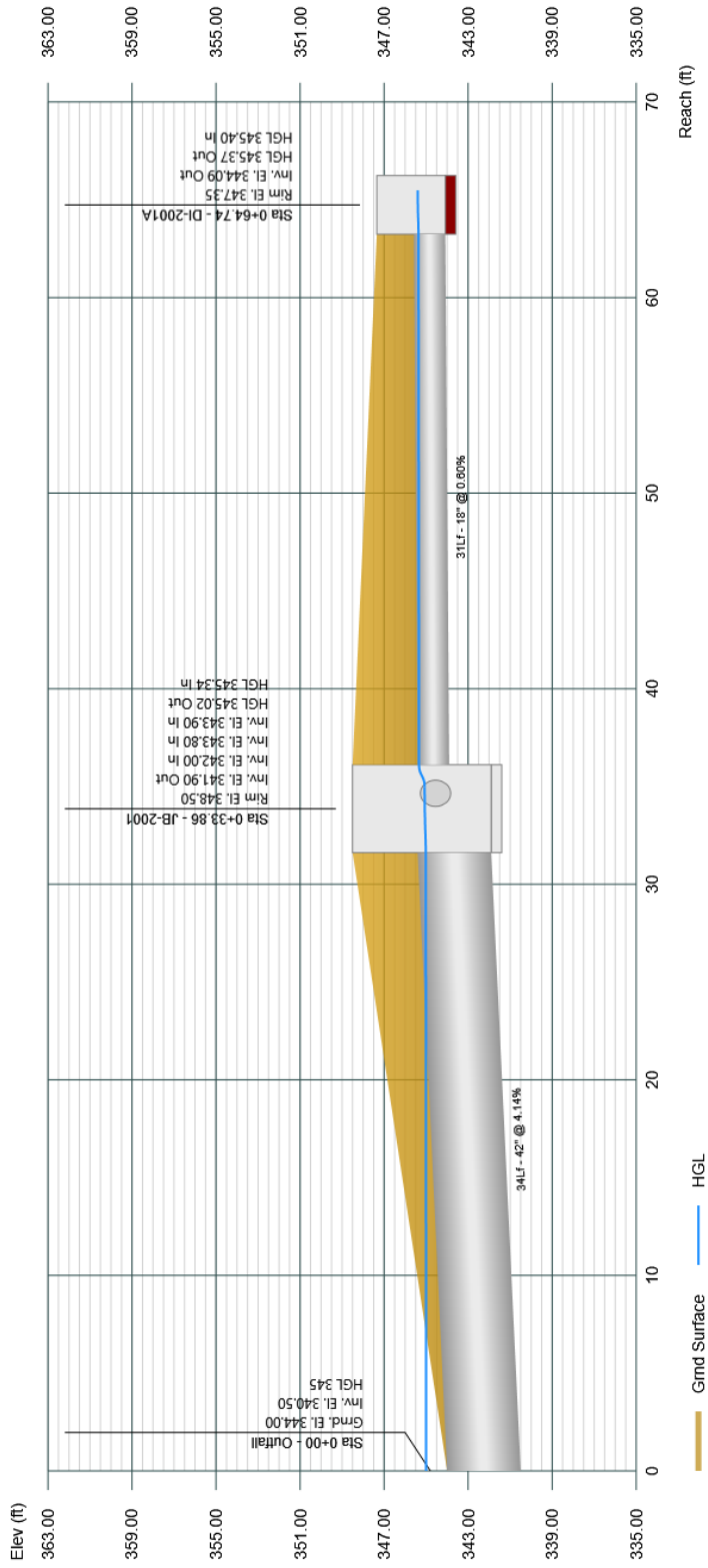
Project File: SD-2000.sws

Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

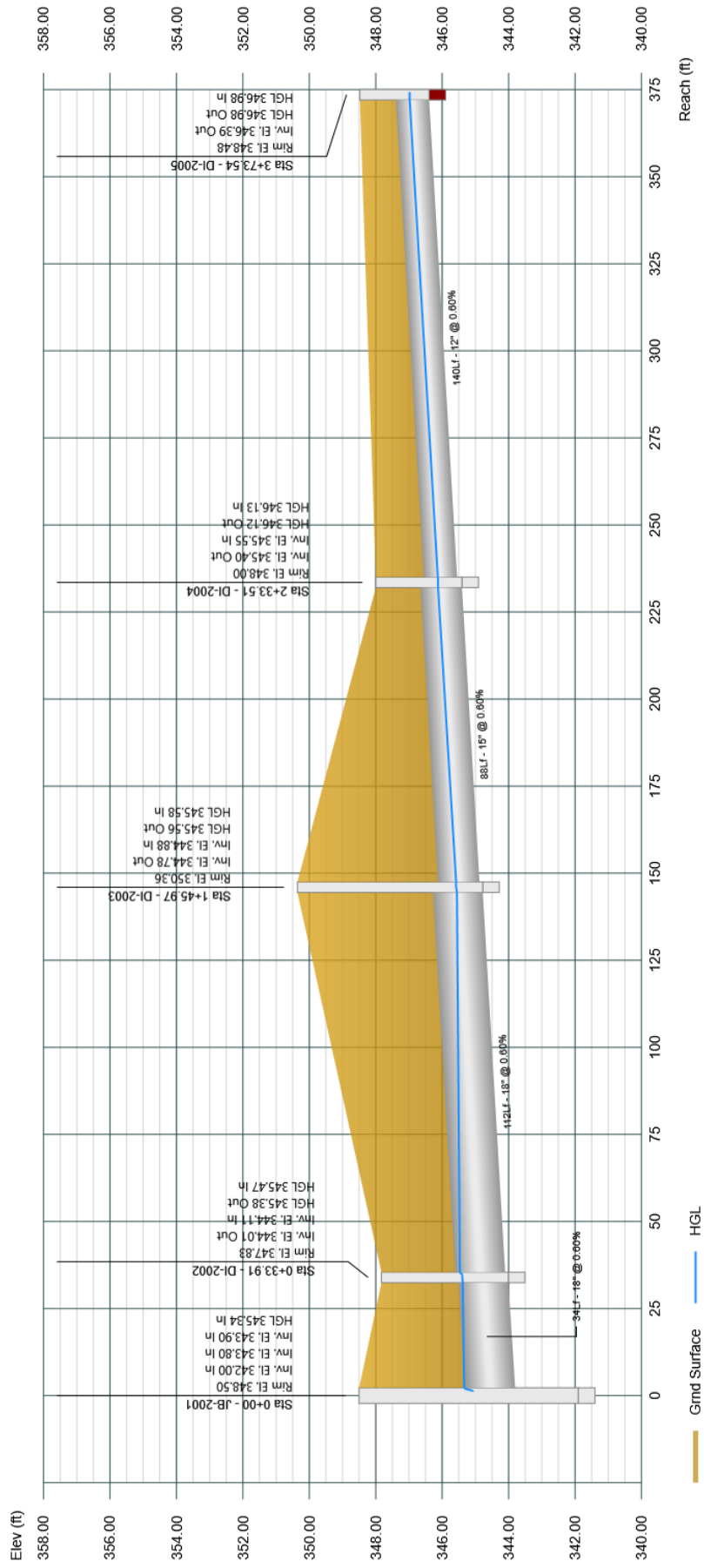


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

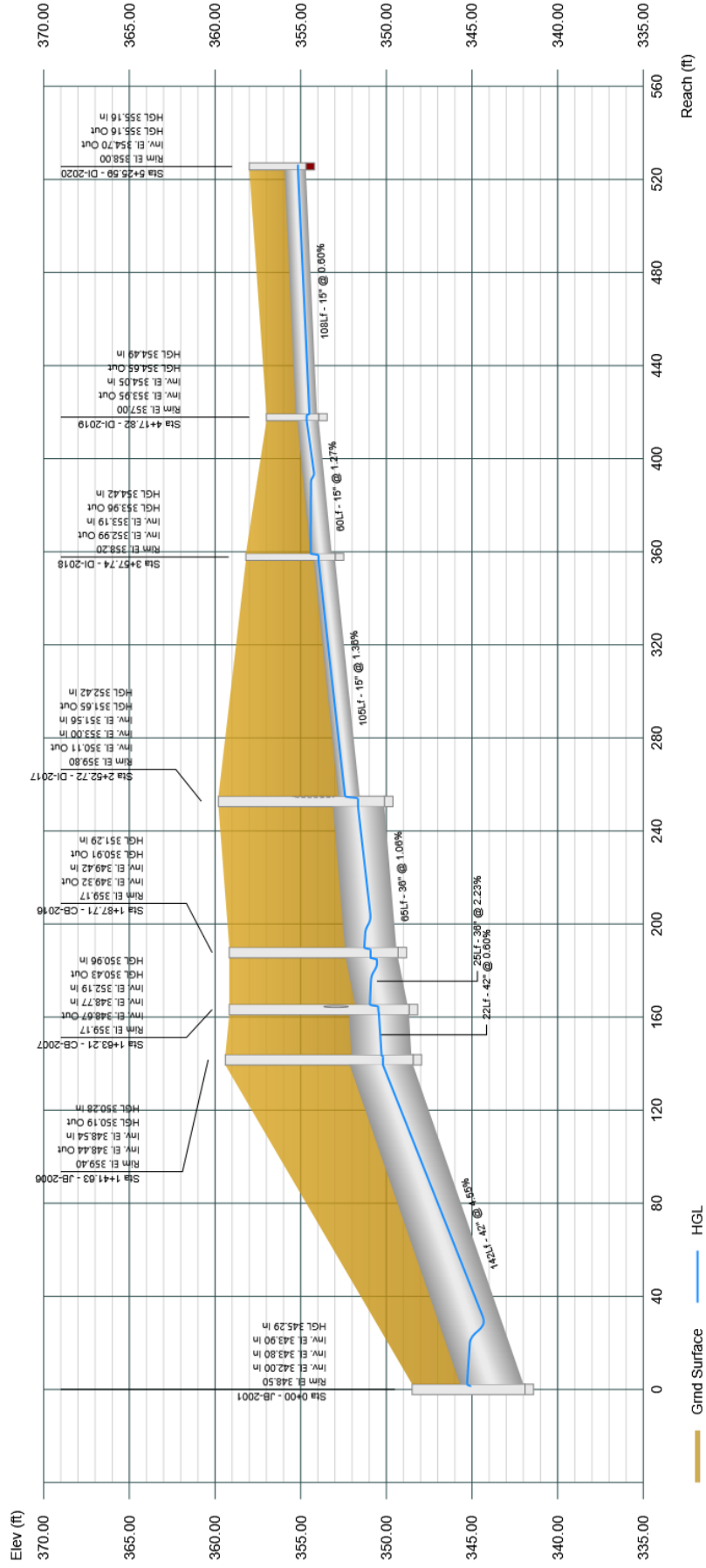


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

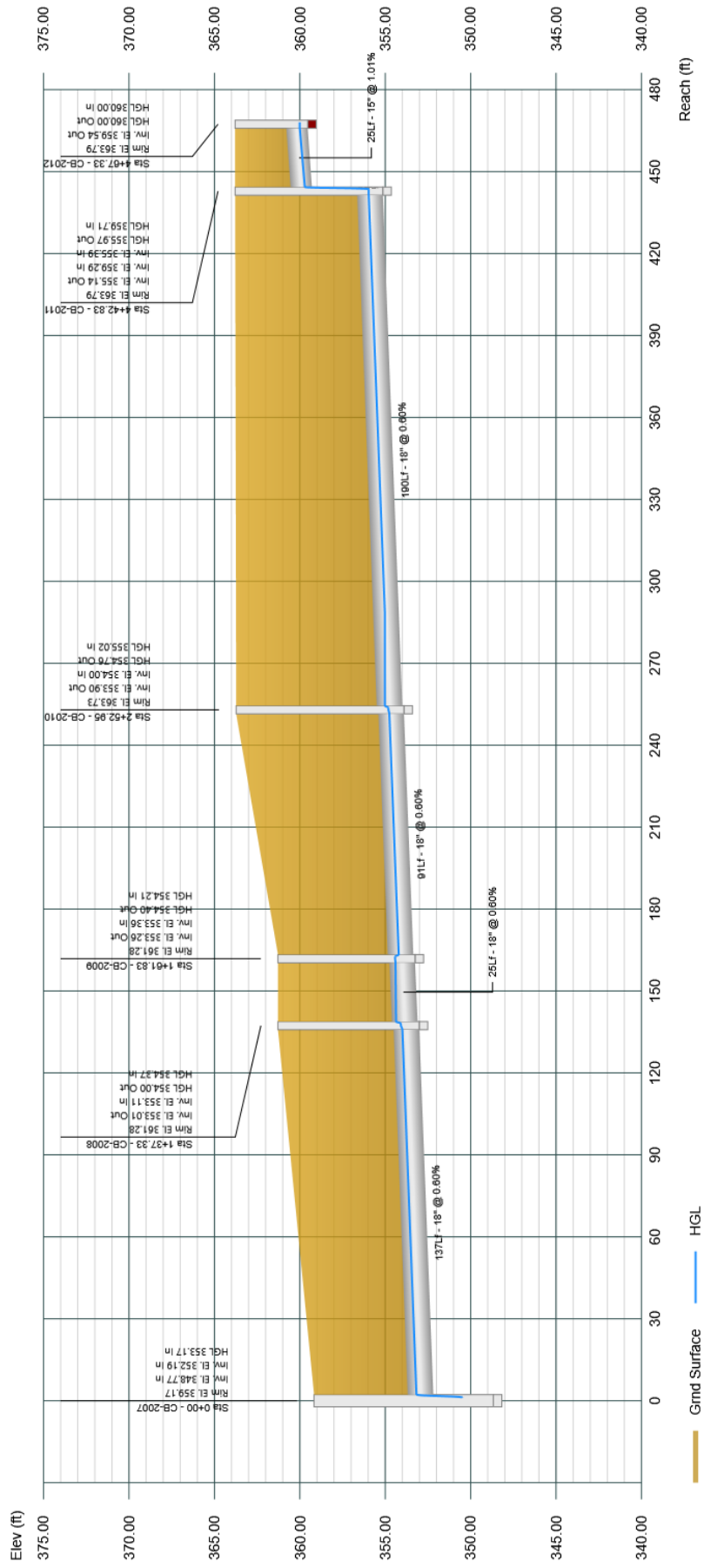


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

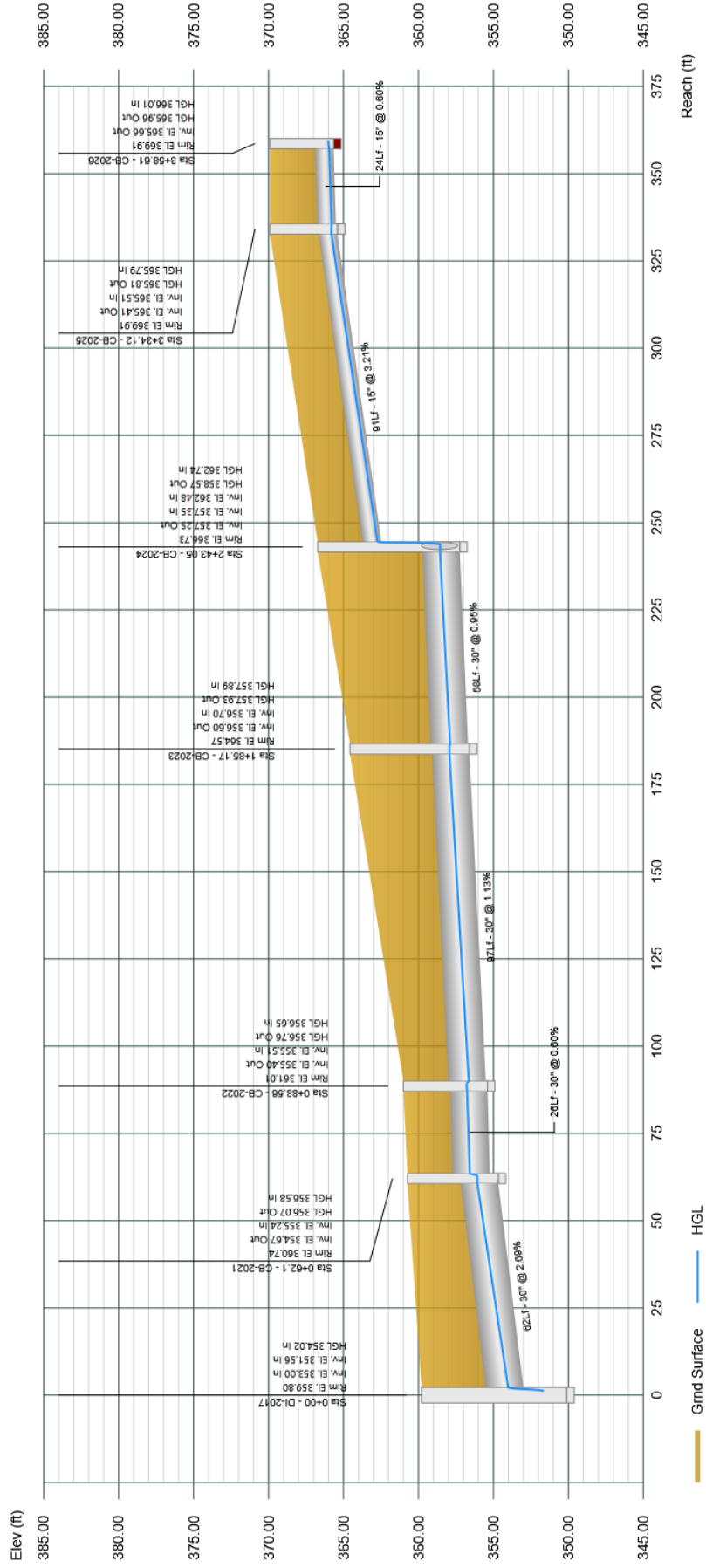


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

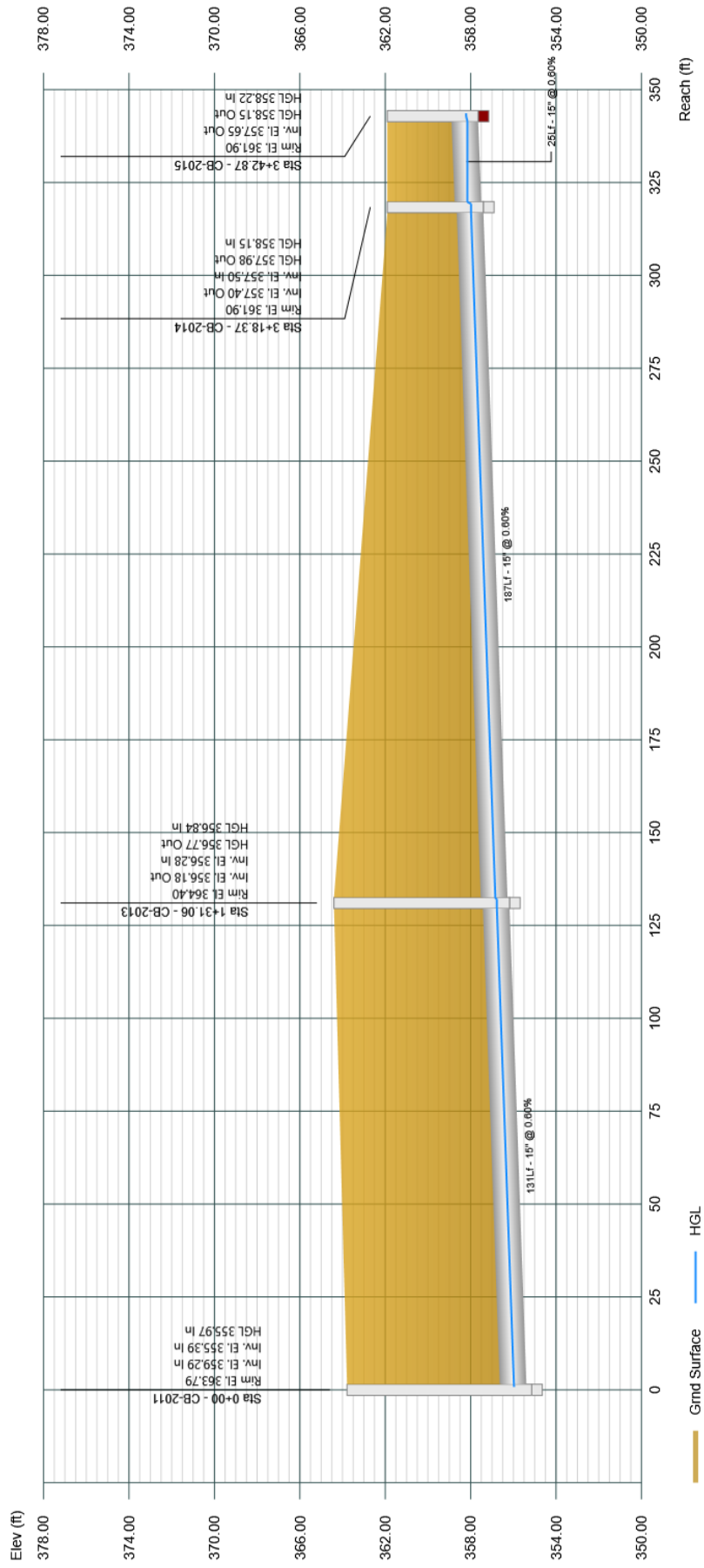


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

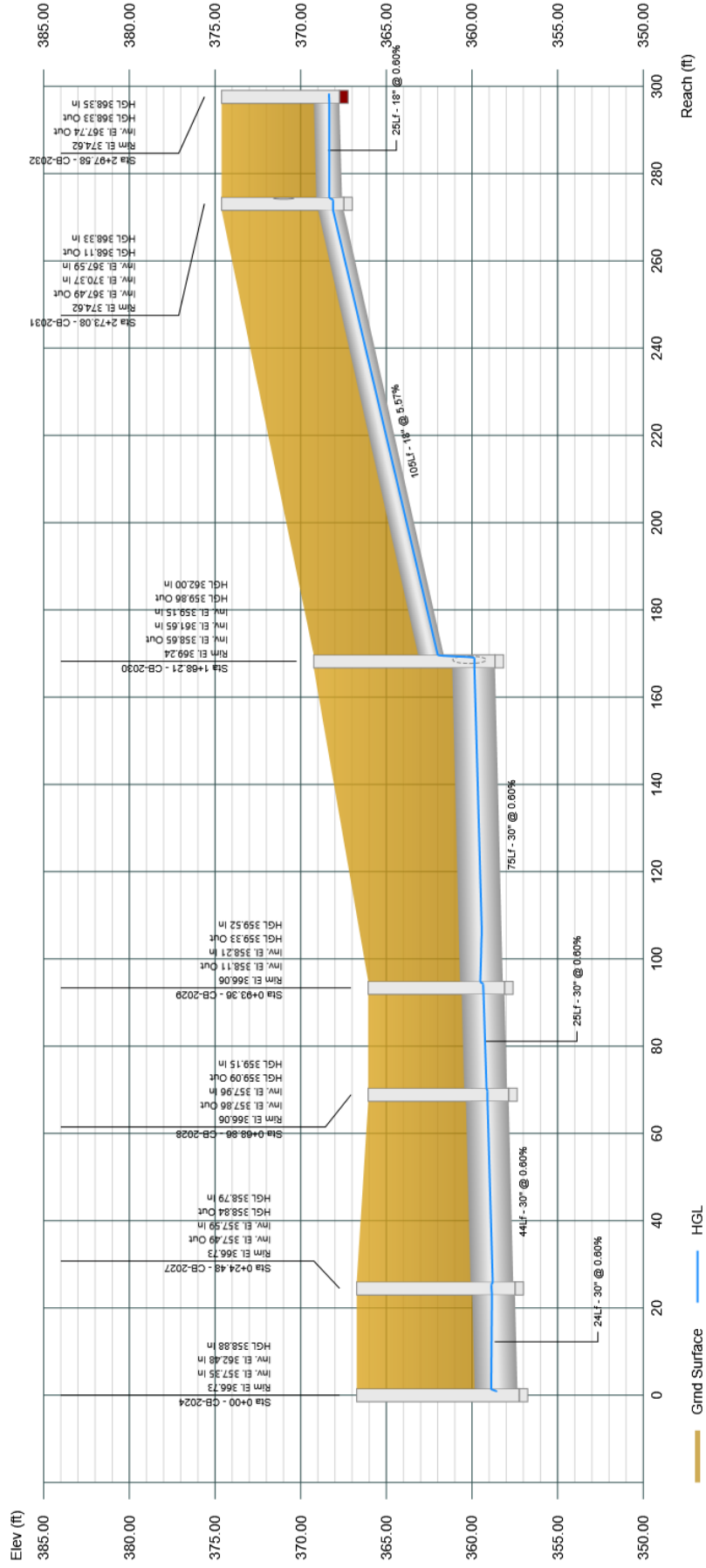


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

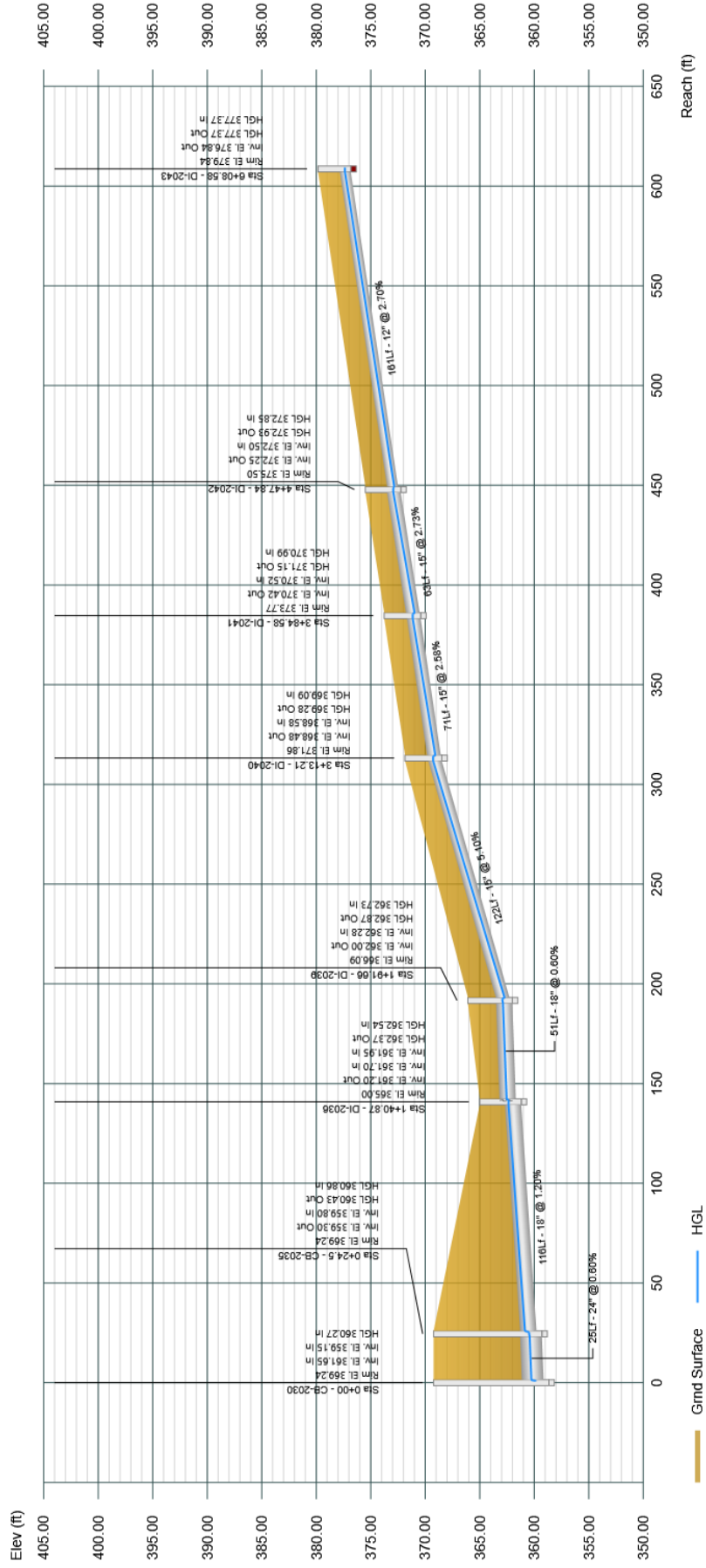


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

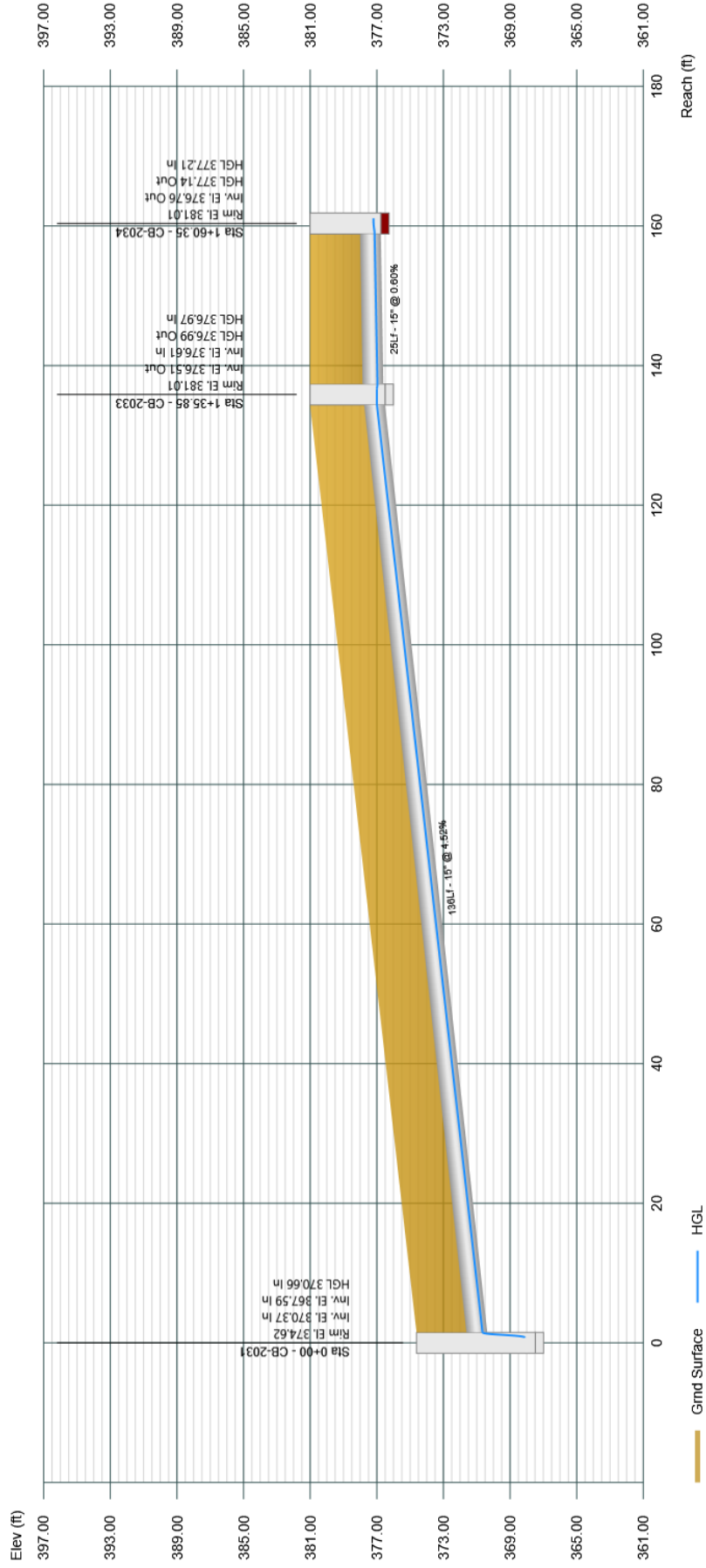


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

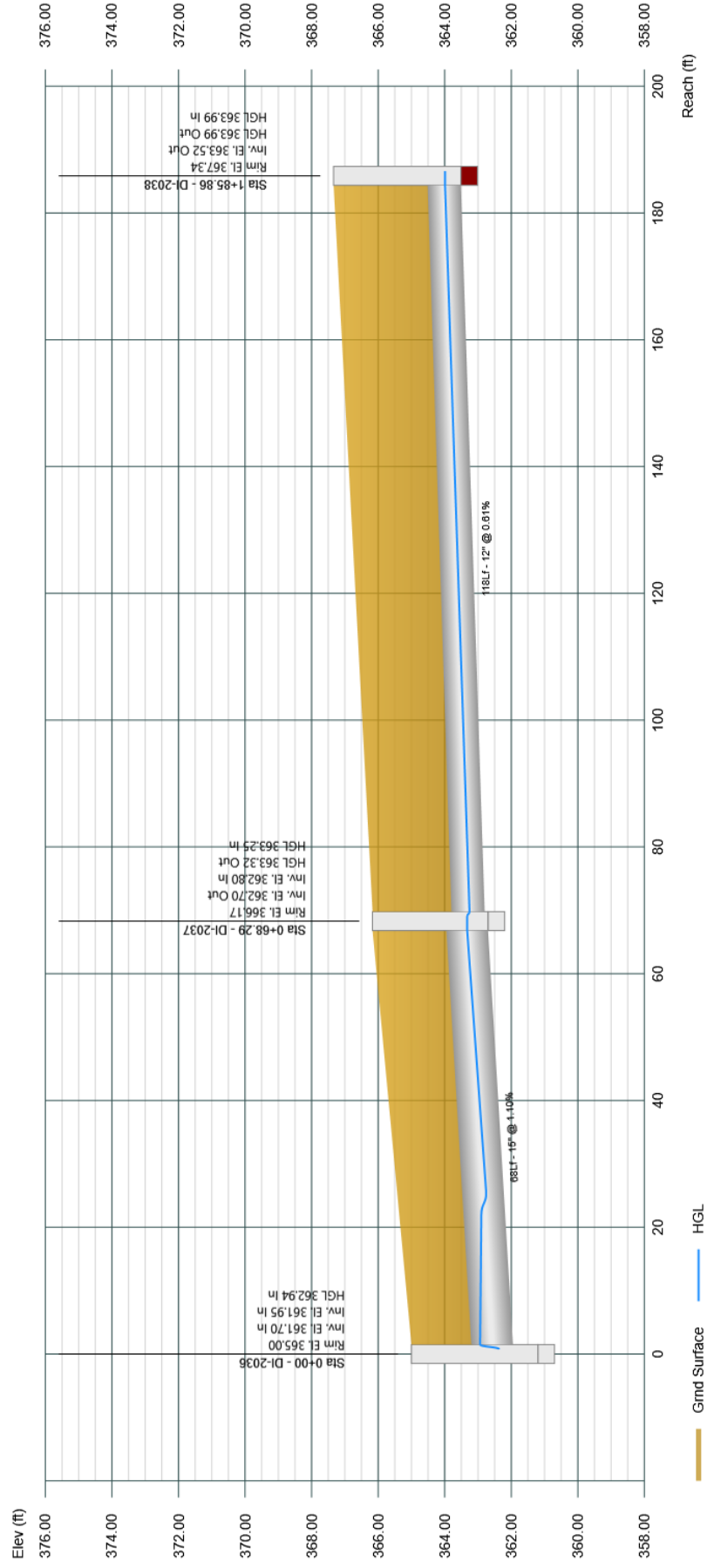


Profile View

Stormwater Studio 2023 v 3.0.0.32

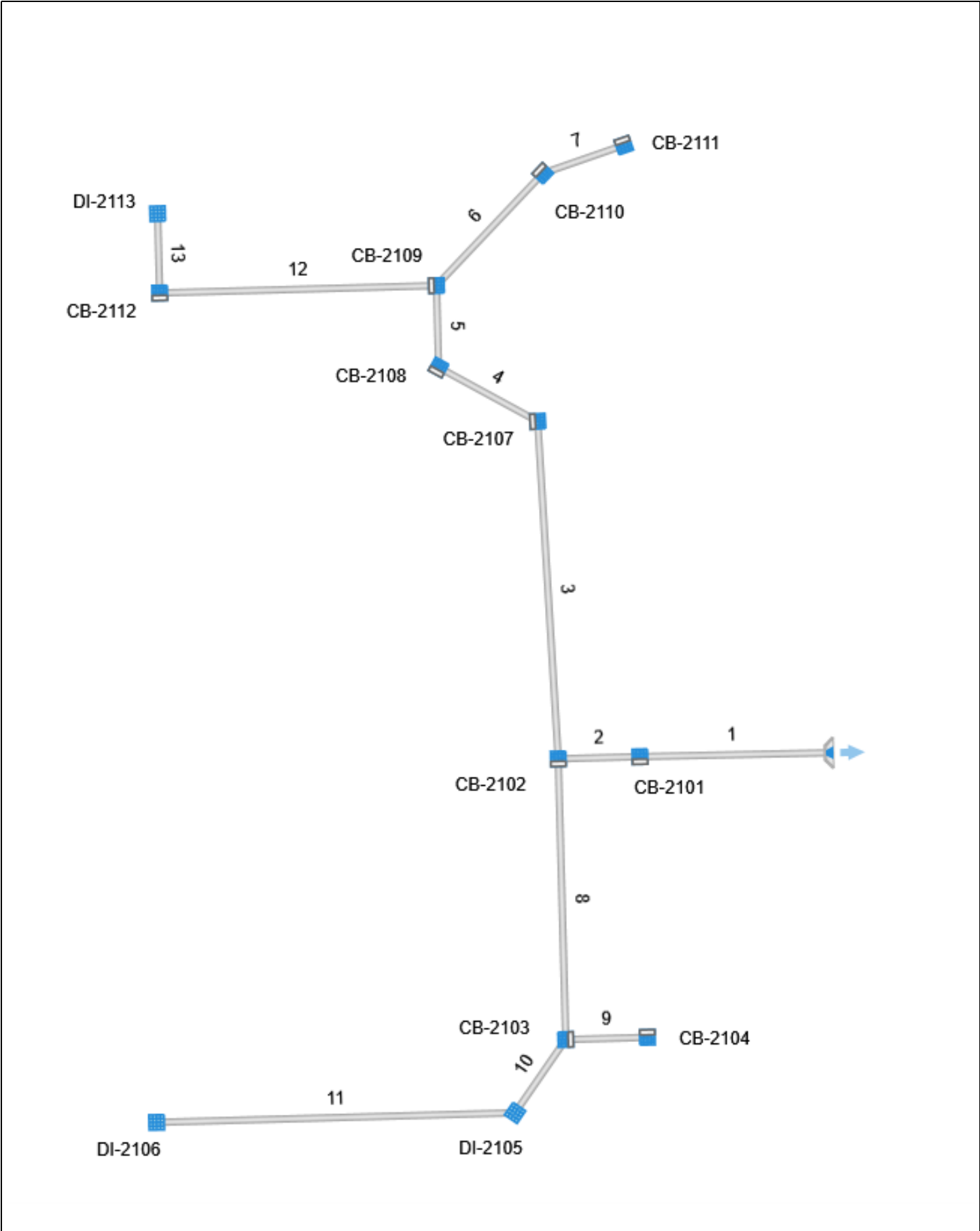
Project Name: SD-2000

11-17-2023



SYSTEM 2100 – REPORTS AND PROFILES

Plan View



Storm Sewer Tabulation

Project Name: SD-2100

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line ID	Length (ft)	Drng Area		Rational (C)	C x A		Tc		Intensity (in/hr)	Total Q (cfs)	Capacity (cfs)	Velocity (ft/s)	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
2100-2101	55.27	0.150	1.690	0.85	0.13	1.32	5.0	5.99	5.86	7.71	32.36	5.07	18	9.50	345.25	340.00	346.31	345.00	367.12	349.00	1
2101-2102	24.50	0.100	1.540	0.85	0.09	1.19	5.0	5.92	5.86	6.96	8.93	5.51	18	0.72	359.49	359.31	360.50	360.32	367.12	367.12	2
2102-2107	101.24	0.080	0.650	0.85	0.07	0.52	5.0	5.66	5.86	3.07	9.00	5.28	15	1.94	364.84	362.87	365.54	363.40	369.29	367.12	3
2107-2108	33.81	0.080	0.570	0.85	0.07	0.46	5.0	5.56	5.86	2.67	7.14	4.49	15	1.22	365.35	364.94	366.01	365.51	370.15	369.29	4
2108-2109	24.50	0.060	0.490	0.85	0.05	0.39	5.0	5.48	5.86	2.27	7.68	4.29	15	1.42	365.80	365.45	366.40	365.97	370.15	370.15	5
2109-2110	46.32	0.060	0.120	0.85	0.05	0.10	5.0	5.15	5.86	0.60	5.00	1.13	15	0.60	366.18	365.90	366.64	366.63	370.15	370.15	6
2110-2111	25.71	0.060	0.060	0.85	0.05	0.05	5.0	5.00	5.86	0.30	6.79	1.48	15	1.11	366.56	366.28	366.78	366.67	370.81	370.71	7
2102-2103	84.07	0.090	0.790	0.85	0.08	0.58	5.0	5.55	5.86	3.40	8.13	2.83	18	0.60	360.24	359.74	361.05	360.99	365.35	367.12	8
2103-2104	24.50	0.050	0.050	0.85	0.04	0.04	5.0	5.00	5.86	0.25	10.89	1.11	15	2.84	361.10	360.40	361.30	361.26	365.35	365.35	9
2103-2105	26.70	0.190	0.650	0.85	0.16	0.46	5.0	5.45	5.86	2.70	5.42	4.18	15	0.60	360.51	360.34	361.17	360.98	365.50	365.35	10
2105-2106	107.50	0.460	0.460	0.65	0.30	0.30	5.0	5.00	5.86	1.75	2.99	3.90	12	0.60	361.35	360.71	361.91	361.26	363.76	365.50	11
2109-2112	83.00	0.020	0.310	0.85	0.02	0.23	5.0	5.11	5.86	1.37	5.42	3.43	15	0.60	366.40	365.90	366.87	366.34	372.78	370.15	12
2112-2113	23.75	0.290	0.290	0.75	0.22	0.22	5.0	5.00	5.86	1.27	2.99	3.49	12	0.60	366.64	366.50	367.12	366.96	369.05	372.78	13

Notes: IDF File = The Point IDF, Return Period = 10-yrs.

Project File: SD-2100.sws

Energy Grade Line Calculations

Project Name: SD-2100

Stormwater Studio 2023 v 3.0.0.32

11-17-2023

Line No	Line Size (in)	Q (cfs)	Downstream						Length (ft)	Upstream							Pipe		Junction			
			Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)		EGL Elev (ft)	Invert Elev (ft)	Depth (ft)	Area (sqft)	HGL Elev (ft)	Vel (ft/s)	Vel Head (ft)	EGL Elev (ft)	n Value	Energy Loss (ft)	HGLa Elev (ft)	EGLa Elev (ft)	Energy Loss (ft)
1	18	7.71	340.00	1.50	1.77	345.00	4.36	0.30	345.30	55.27	345.25	1.06 ²	1.33	346.31	5.78	0.52	346.83	0.013	1.532	346.31	346.83	0.00
2	18	6.96	359.31	1.01 ¹	1.26	360.32	5.52	0.47	360.79	24.50	359.49	1.01	1.27	360.50	5.50	0.47	360.97	0.013	0.177	360.57	361.04	0.07
3	15	3.07	362.87	0.53 [‡]	0.49	363.40	6.22	0.60	363.86	101.24	364.84	0.70 ²	0.71	365.54	4.33	0.29	365.83	0.013	1.967	365.54	365.83	0.00
4	15	2.67	364.94	0.57 [‡]	0.55	365.51	4.88	0.37	365.87	33.81	365.35	0.65 ²	0.65	366.01	4.11	0.26	366.27	0.013	0.402	366.01	366.27	0.00
5	15	2.27	365.45	0.52 [‡]	0.48	365.97	4.72	0.35	366.30	24.50	365.80	0.60 ²	0.59	366.40	3.87	0.23	366.64	0.013	0.337	366.40	366.64	0.00
6	15	0.60	365.90	0.73	0.74	366.63	0.80	0.01	366.64	46.32	366.18	0.46	0.41	366.64	1.46	0.03	366.67	0.013	0.030	366.65	366.68	0.01
7	15	0.30	366.28	0.40	0.33	366.67	0.89	0.01	366.68	25.71	366.56	0.22 ²	0.14	366.78	2.07	0.07	366.85	0.013	0.161	366.78	366.85	0.00
8	18	3.40	359.74	1.25	1.58	360.99	2.15	0.07	361.07	84.07	360.24	0.81	0.97	361.05	3.50	0.19	361.24	0.013	0.178	361.07	361.26	0.02
9	15	0.25	360.40	0.86	0.90	361.26	0.28	0.00	361.26	24.50	361.10	0.20	0.13	361.30	1.94	0.06	361.36	0.013	0.097	361.35	361.41	0.05
10	15	2.70	360.34	0.64 [‡]	0.63	360.98	4.27	0.28	361.30	26.70	360.51	0.66	0.66	361.17	4.10	0.26	361.43	0.012	0.125	361.24	361.51	0.08
11	12	1.75	360.71	0.55 [‡]	0.44	361.26	3.94	0.24	361.54	107.50	361.35	0.56 ²	0.45	361.91	3.86	0.23	362.14	0.012	0.605	361.91	362.14	0.00
12	15	1.37	365.90	0.44 [‡]	0.38	366.34	3.60	0.20	366.65	83.00	366.40	0.47 ²	0.42	366.87	3.27	0.17	367.03	0.012	0.379	366.87	367.03	0.00
13	12	1.27	366.50	0.46 [‡]	0.36	366.96	3.57	0.20	367.16	23.75	366.64	0.48	0.37	367.12	3.41	0.18	367.30	0.012	0.143	367.19	367.37	0.07

Notes: Return Period = 10-yrs. ¹ Critical depth. ² Critical depth. [‡] Supercritical.

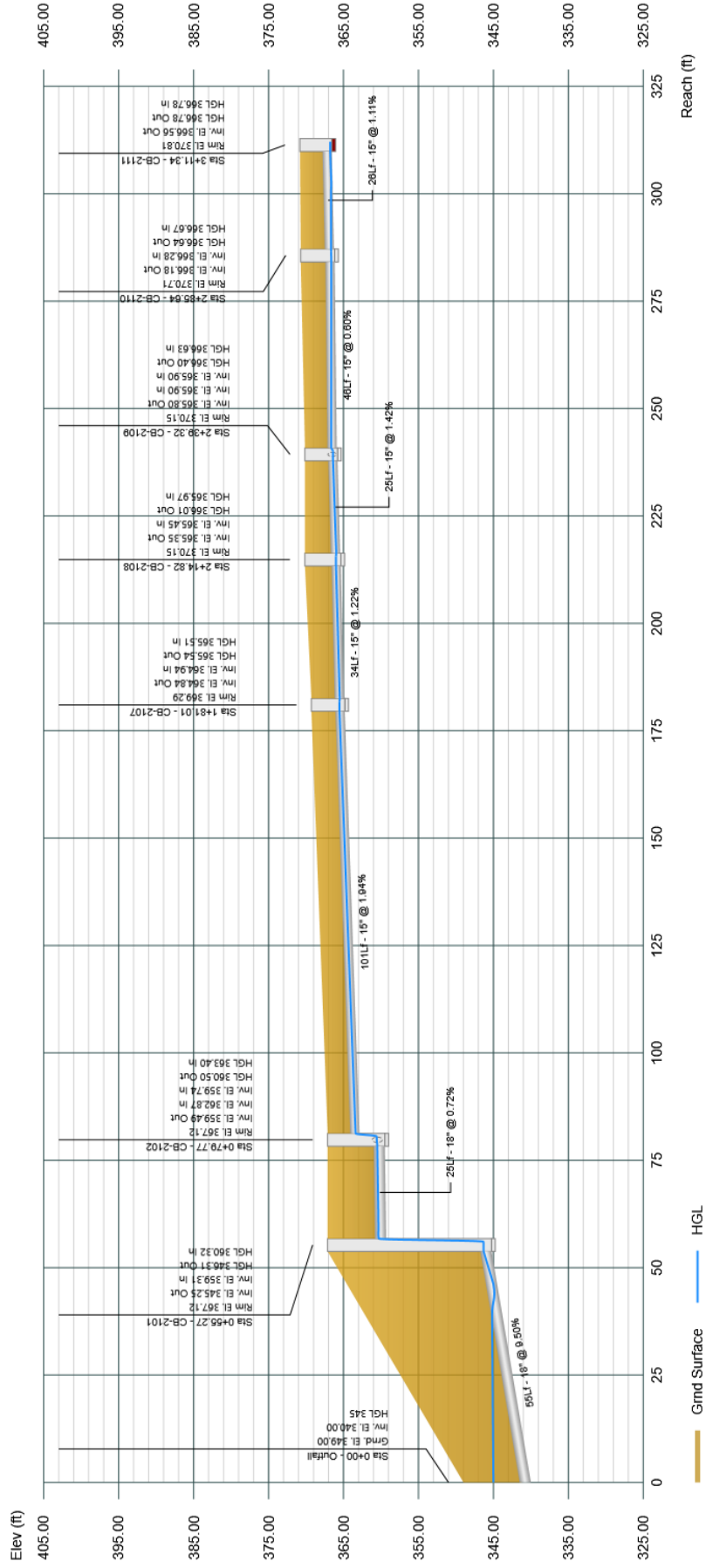
Project File: SD-2100.sws

Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2100

11-17-2023

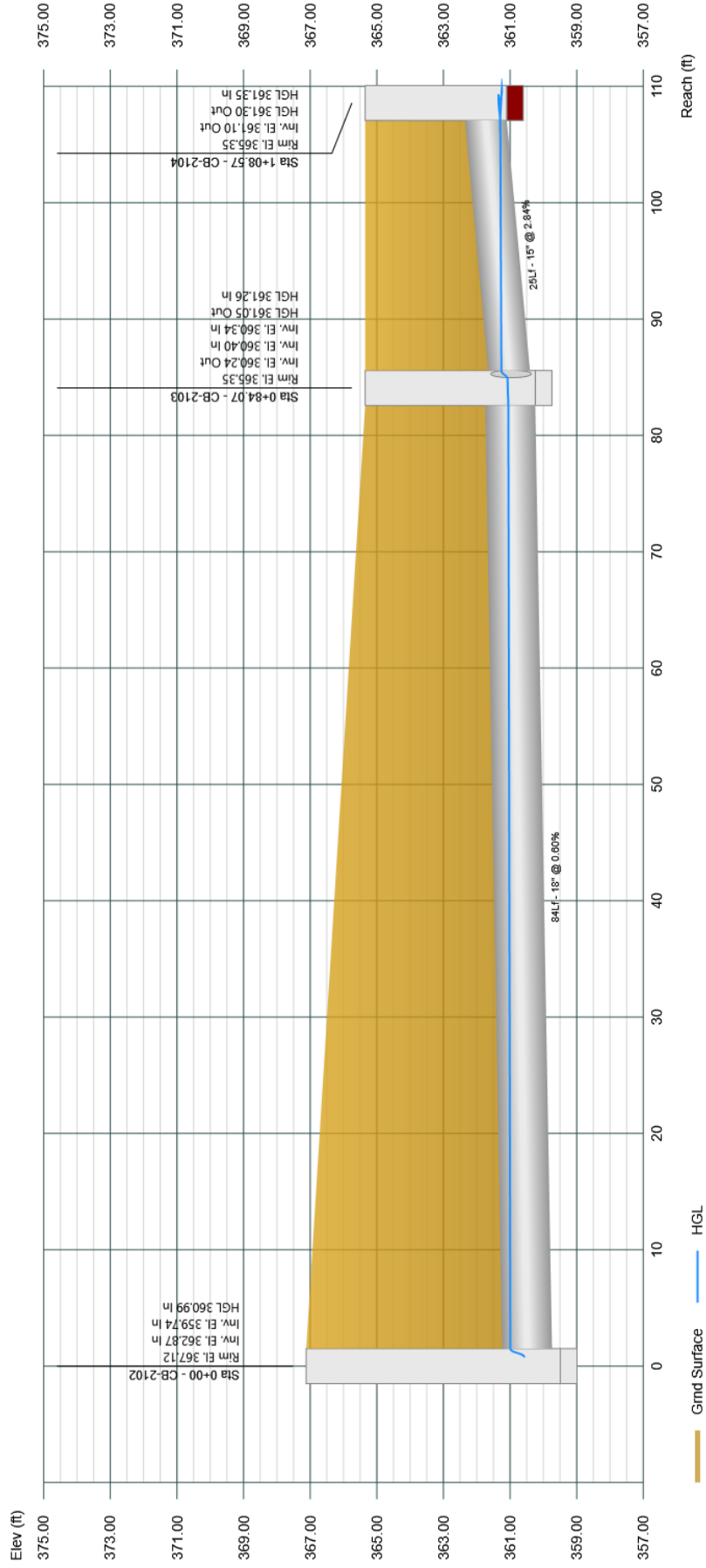


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2100

11-17-2023

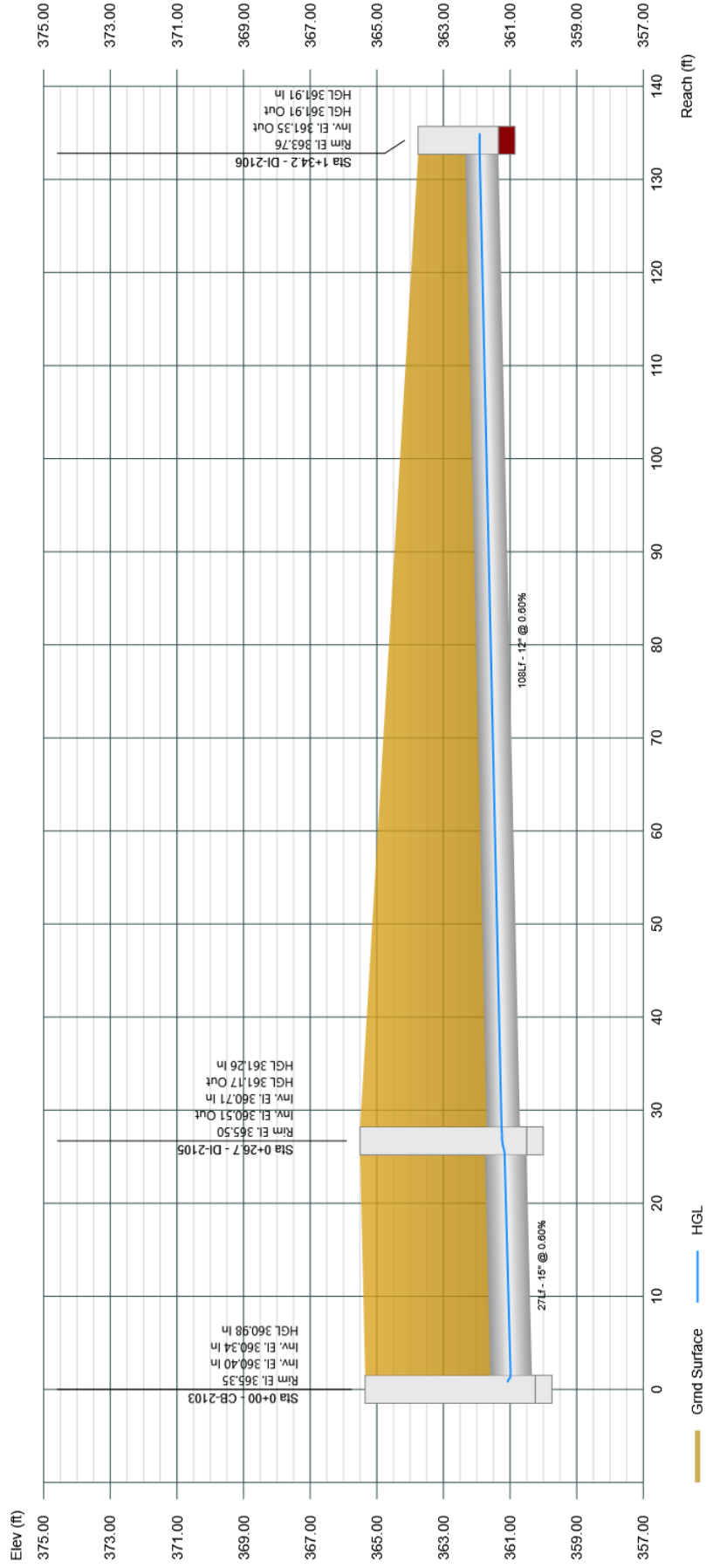


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2100

11-17-2023

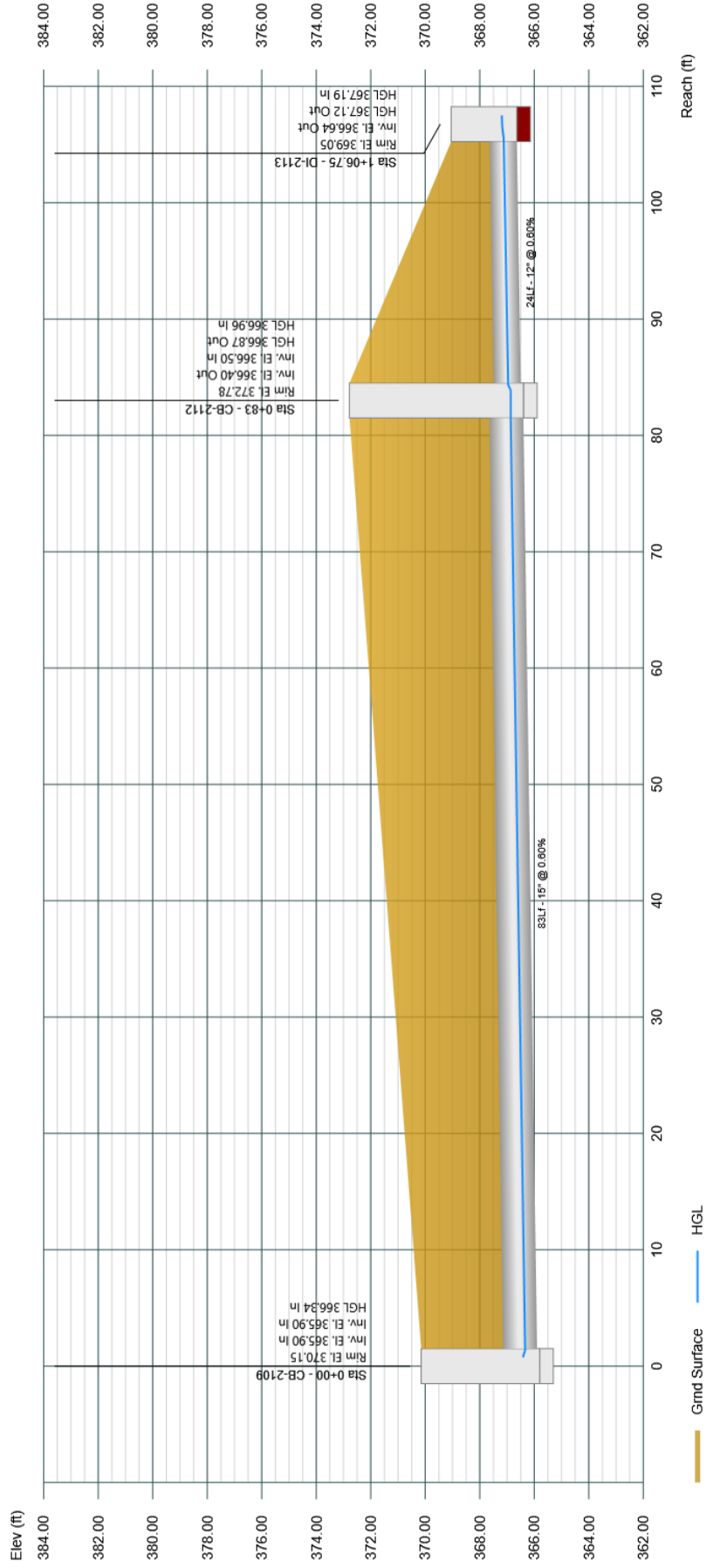


Profile View

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2100

11-17-2023



VELOCITY DISSIPATOR CALCULATIONS

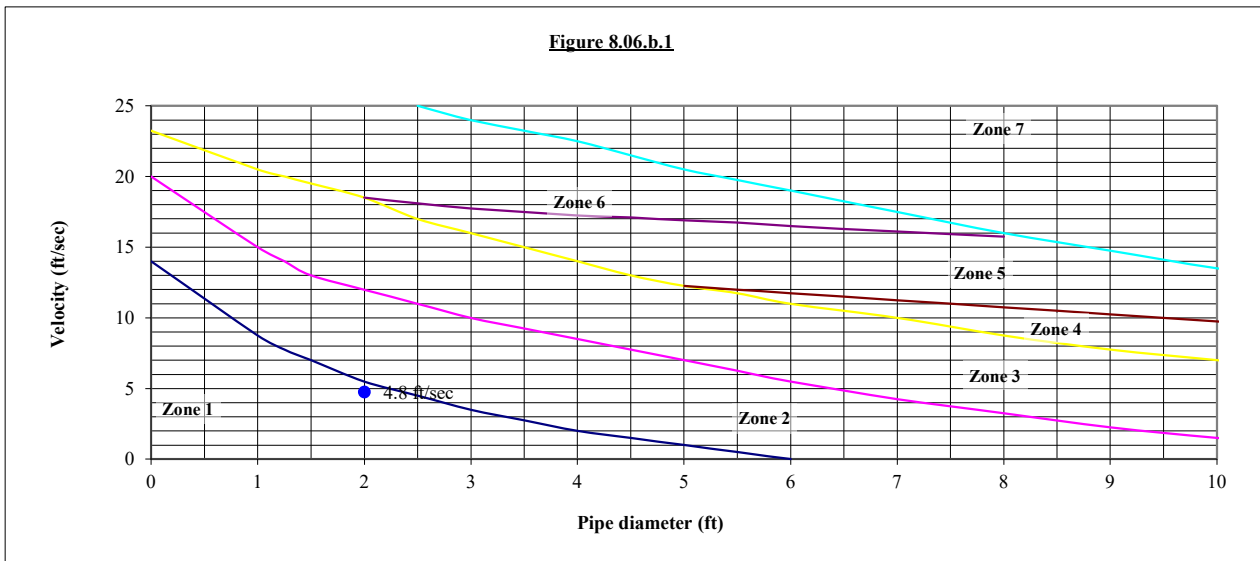


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: EW-1100

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	14.01	cfs
Pipe diameter =	24	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	4.77	ft/sec



Zone from graph above = 2

Outlet pipe diameter	24 in.
Outlet flowrate	14.0 cfs
Outlet velocity	4.8 ft/sec
Material	Class B

Length =	12.0 ft.
Width =	6.8 ft.
Stone diameter =	6 in.
Thickness =	18 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

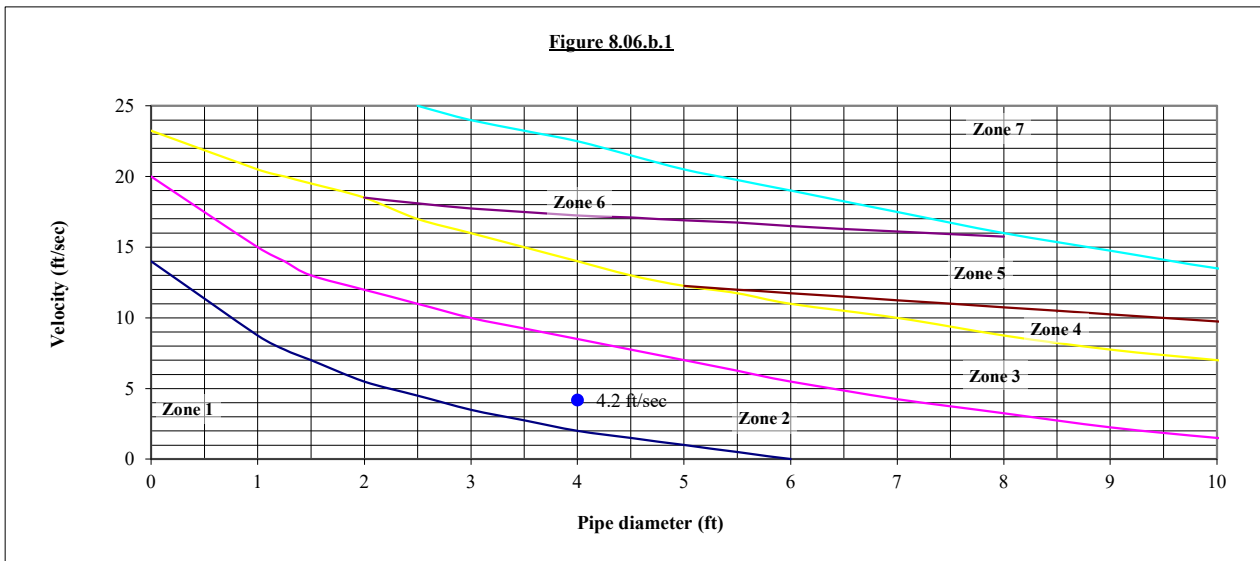


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: EW-1800

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	45.96	cfs
Pipe diameter =	48	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	4.18	ft/sec



Zone from graph above = 2

Outlet pipe diameter	48 in.
Outlet flowrate	46.0 cfs
Outlet velocity	4.2 ft/sec
Material	Class B

Length =	24.0 ft.
Width =	13.6 ft.
Stone diameter =	6 in.
Thickness =	18 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

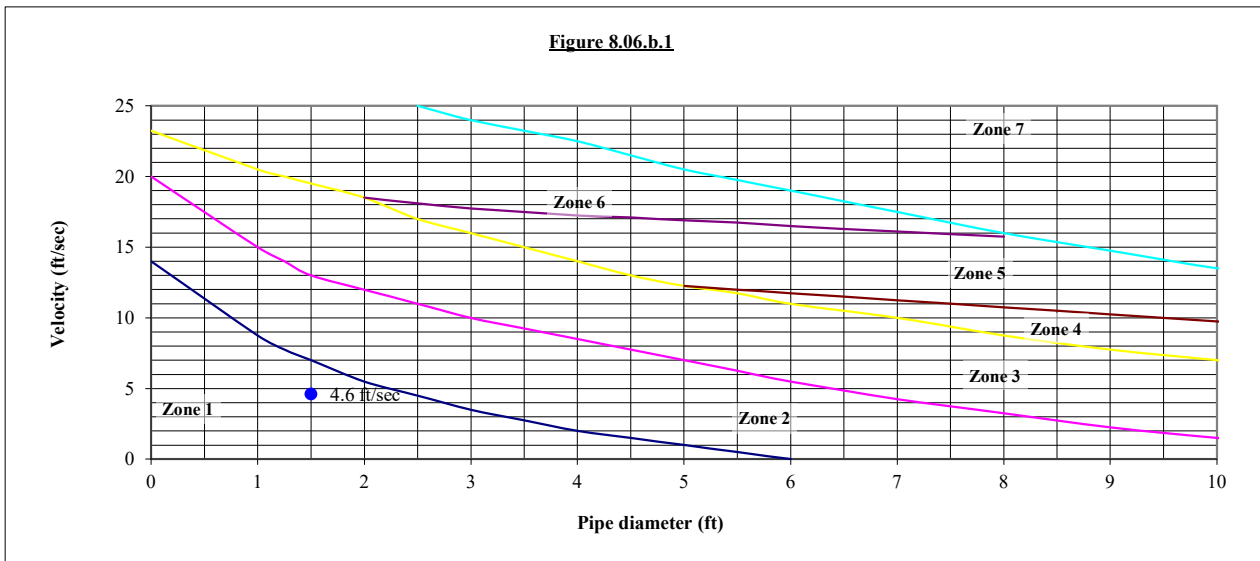


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: EW-1900

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	6.73	cfs
Pipe diameter =	18	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	4.63	ft/sec



Zone from graph above = 2

Outlet pipe diameter	18 in.
Outlet flowrate	6.7 cfs
Outlet velocity	4.6 ft/sec
Material	Class B

Length	9.0 ft.
Width	5.1 ft.
Stone diameter	6 in.
Thickness	18 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

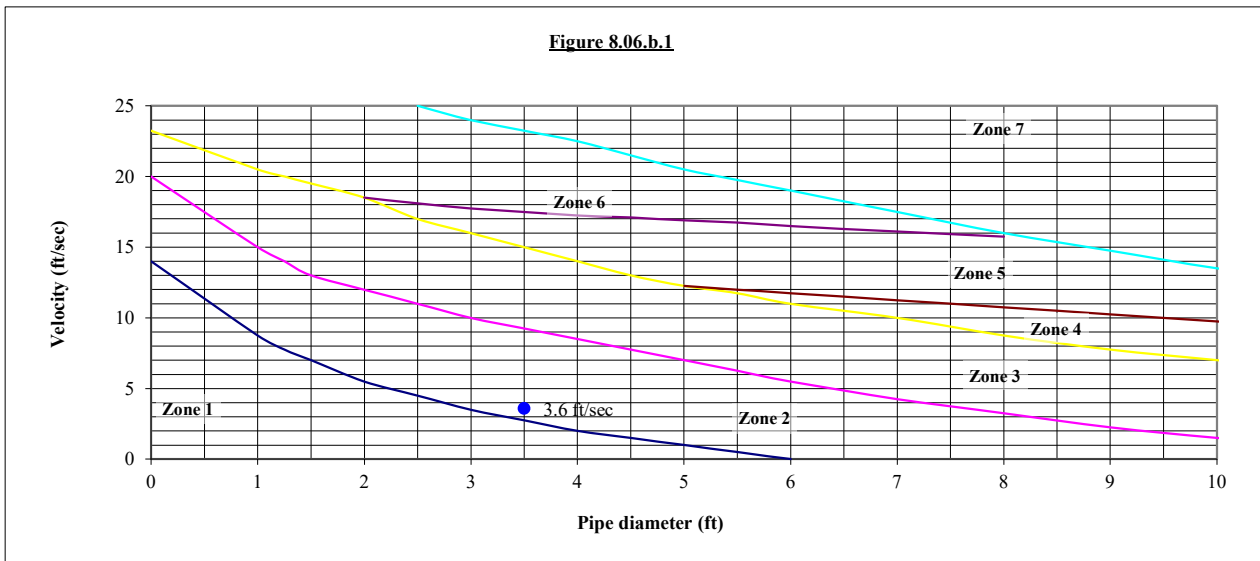


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: EW-2000

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	33.56	cfs
Pipe diameter =	42	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	3.6	ft/sec



Zone from graph above = 2

Outlet pipe diameter	42 in.
Outlet flowrate	33.6 cfs
Outlet velocity	3.6 ft/sec
Material	Class B

Length =	21.0 ft.
Width =	11.9 ft.
Stone diameter =	6 in.
Thickness =	18 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

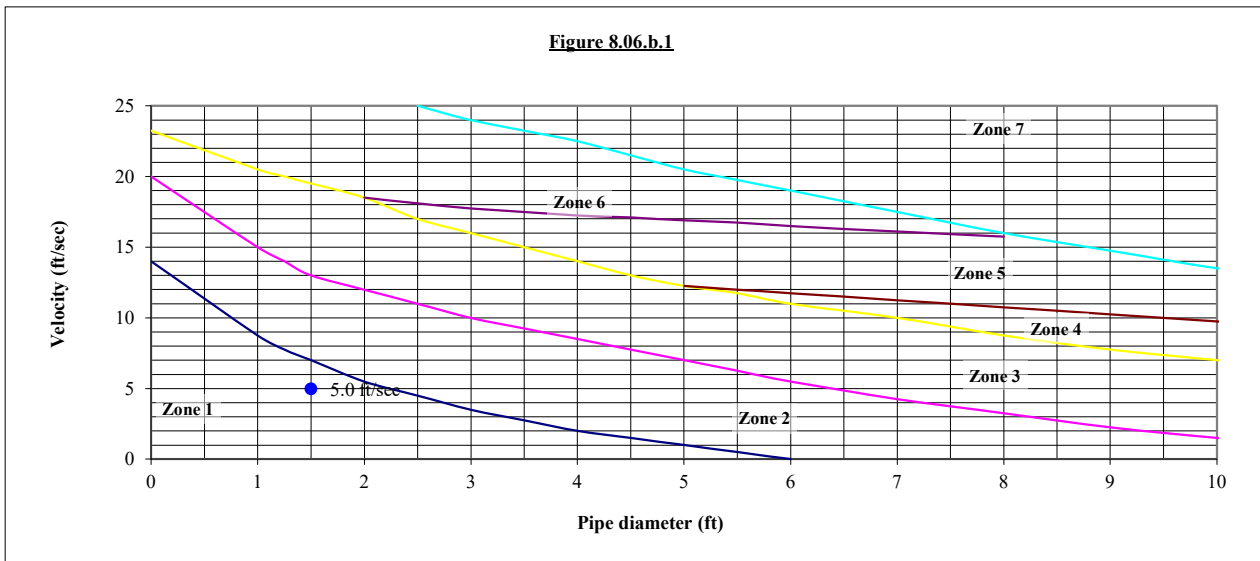


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: EW-2100

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	7.56	cfs
Pipe diameter =	18	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	5	ft/sec



Zone from graph above = 2

Outlet pipe diameter	18 in.
Outlet flowrate	7.6 cfs
Outlet velocity	5.0 ft/sec
Material	Class B

Length	9.0 ft.
Width	5.1 ft.
Stone diameter	6 in.
Thickness	18 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

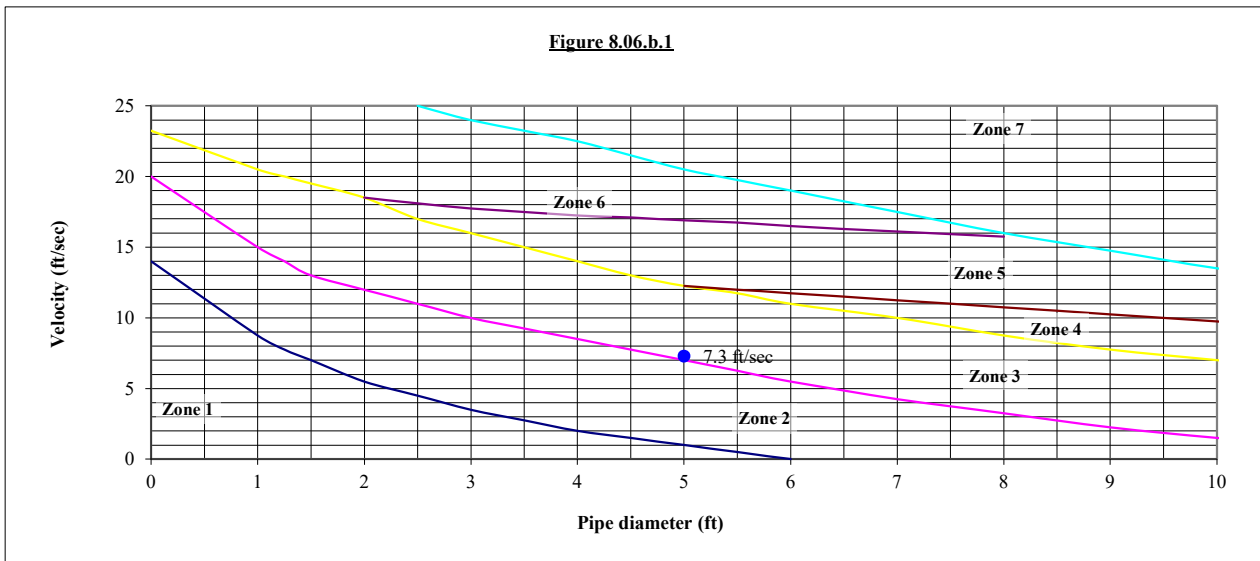


DESIGN OF RIPRAP OUTLET PROTECTION WORKSHEET

Project: The Point - CD Package 3
 Project Number: AWH-20000
 Outlet Number: Culvert

Date: 10/11/2023
 Calculated By: TD

Outlet flowrate =	72.1	cfs
Pipe diameter =	60	inches
Number of pipes =	1	
Pipe separation =	0	feet
Outlet Velocity =	7.3	ft/sec



Zone from graph above = 3

Outlet pipe diameter	60 in.
Outlet flowrate	72.1 cfs
Outlet velocity	7.3 ft/sec
Material	Class I

Length =	40.0 ft.
Width =	21.0 ft.
Stone diameter =	13 in.
Thickness =	24 in.

Zone	Material	Diameter	Thickness	Length	Width
1	Class A	3	12	4 x D(o)	3 x D(o)
2	Class B	6	18	6 x D(o)	3 x D(o)
3	Class I	13	24	8 x D(o)	3 x D(o)
4	Class I	13	24	8 x D(o)	3 x D(o)
5	Class II	23	36	10 x D(o)	3 x D(o)
6	Class II	23	36	10 x D(o)	3 x D(o)
7	Special study required				

- Calculations based on NY DOT method - Pages 8.06.05 through 8.06.06 in NC Erosion Control Manual
- Outlet velocity based on full-flow velocity

INLET/GUTTER SPREAD REPORTS

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1100

11-17-2023

Line No	Inlet		Q				Curb			Grate			Gutter							Inlet			Byp Line No					
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)
1	CB-1101	Combination	0.25	0.00	0.25	0.00	3.0	3.00	3.00	2.00	-	0.010	2.00	0.040	0.020	0.013	0.10	3.15	0.16	1.28	0.16	1.28	0.16	1.28	2.5	2.5	2.5	4
2	CB-1102	Combination	0.54	0.00	0.48	0.06	3.0	3.00	3.00	2.00	-	0.010	2.00	0.040	0.020	0.013	0.13	4.70	0.21	1.70	0.21	1.70	0.21	1.70	2.5	2.5	2.5	3
3	CB-1103	Combination	0.14	0.06	0.19	0.00	3.0	3.00	3.00	2.00	-	0.010	2.00	0.040	0.020	0.013	0.09	2.70	0.14	1.16	0.14	1.16	0.14	1.16	2.5	2.5	2.5	6
4	CB-1104	Combination	0.14	0.00	0.14	0.00	3.0	3.00	3.00	2.00	-	0.010	2.00	0.040	0.020	0.013	0.08	2.20	0.13	1.02	0.13	1.02	0.13	1.02	2.5	2.5	2.5	7
5	DJ-1105	Drop Grate	2.15	0.00	2.15	0.00	-	-	2.00	2.00	4.00	Sag	2.00	0.020	0.020	0.013	0.24	26.27	0.24	26.27	0.24	26.27	0.24	26.27	0.0	0.0	0.0	0
6	CB-1106	Combination	0.64	0.01	0.66	0.00	3.0	3.00	3.00	2.00	0.45	Sag	2.00	0.050	0.020	0.013	0.19	6.50	0.19	6.50	0.19	6.50	0.19	6.50	0.0	0.0	0.0	0
7	CB-1107	Combination	0.68	0.05	0.73	0.00	3.0	3.00	3.00	2.00	0.52	Sag	2.00	0.050	0.020	0.013	0.19	6.50	0.19	6.50	0.19	6.50	0.19	6.50	0.0	0.0	0.0	0
8	CB-1108	Combination	0.58	0.01	0.57	0.01	3.0	3.00	3.00	2.00	-	0.026	2.00	0.050	0.020	0.013	0.13	3.45	0.13	3.45	0.13	3.45	0.13	3.45	0.0	0.0	0.0	6
9	DJ-1109	Drop Grate	0.36	0.00	0.36	0.00	-	-	2.00	2.00	0.22	Sag	2.00	0.050	0.020	0.013	0.37	39.02	0.37	39.02	0.37	39.02	0.37	39.02	0.0	0.0	0.0	0
10	CB-1110	Combination	0.71	0.04	0.70	0.05	3.0	3.00	3.00	2.00	-	0.024	2.00	0.050	0.020	0.013	0.14	4.10	0.14	4.10	0.14	4.10	0.14	4.10	0.0	0.0	0.0	7
11	DJ-1111	Drop Grate	0.31	0.00	0.31	0.00	-	-	2.00	2.00	0.19	Sag	2.00	0.050	0.020	0.013	0.37	39.02	0.37	39.02	0.37	39.02	0.37	39.02	0.0	0.0	0.0	0
12	CB-1112	Combination	0.64	0.00	0.64	0.01	3.0	3.00	3.00	2.00	-	0.046	2.00	0.050	0.020	0.013	0.12	3.00	0.12	3.00	0.12	3.00	0.12	3.00	0.0	0.0	0.0	8
13	CB-1113	Combination	0.88	0.00	0.84	0.04	3.0	3.00	3.00	2.00	-	0.042	2.00	0.050	0.020	0.013	0.14	3.80	0.14	3.80	0.14	3.80	0.14	3.80	0.0	0.0	0.0	10
14	DJ-1114	Drop Grate	0.39	0.00	0.39	0.00	-	-	2.00	2.00	0.24	Sag	2.00	0.050	0.020	0.013	0.37	39.02	0.37	39.02	0.37	39.02	0.37	39.02	0.0	0.0	0.0	0

Notes: Return Period = 1-yr. All curb inlets are inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: Storm System 1100-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter						Inlet			Byp Line No				
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depth (ft)	Spread (ft)	Depth (ft)	Byp Line No
1	DI-1801	Manhole	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	CB-1802	Drop Grate	0.29	0.00	0.29	0.00	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.06	8.30	0.06	8.30	0.06	8.30	0.06	8.30	0	
3	CB-1803	Combination	0.64	0.01	0.65	0.00	3.0	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.12	2.95	0.17	1.35	2.5	2.95	0.17	1.35	36	
4	CB-1804	Combination	0.51	0.00	0.51	0.00	3.0	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.11	2.45	0.15	1.23	2.5	2.45	0.15	1.23	7	
5	CB-1811	Combination	0.61	0.00	0.59	0.02	3.0	3.00	2.00	-	0.027	2.00	0.050	0.020	0.013	0.13	3.45	0.18	1.47	2.5	3.45	0.18	1.47	0	
6	CB-1812	Combination	0.48	0.00	0.48	0.00	3.0	3.00	2.00	-	0.027	2.00	0.050	0.020	0.013	0.12	2.95	0.17	1.34	2.5	2.95	0.17	1.34	7	
7	CB-1813	Combination	0.37	0.00	0.37	0.00	3.0	3.00	2.00	-	0.013	2.00	0.050	0.020	0.013	0.12	3.20	0.18	1.42	2.5	3.20	0.18	1.42	8	
8	CB-1815	Combination	0.75	0.00	0.75	0.00	3.0	3.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.12	2.79	0.26	2.79	2.5	2.79	0.26	2.79	7	
9	CB-1819	Combination	0.37	0.00	0.37	0.00	3.0	3.00	2.00	-	0.027	2.00	0.050	0.020	0.013	0.11	2.45	0.15	1.23	2.5	2.45	0.15	1.23	8	
10	CB-1820	Combination	0.27	0.00	0.27	0.00	3.0	3.00	2.00	-	0.036	2.00	0.050	0.020	0.013	0.09	1.82	0.13	1.03	2.5	1.82	0.13	1.03	9	
11	CB-1825	Combination	0.24	0.14	0.38	0.00	3.0	3.00	2.00	-	0.023	2.00	0.050	0.020	0.013	0.11	2.65	0.11	2.65	0.0	2.65	0.11	2.65	10	
12	CB-1836	Combination	1.02	0.09	0.97	0.14	3.0	3.00	2.00	-	0.027	2.00	0.050	0.020	0.013	0.16	4.85	0.23	1.84	2.5	4.85	0.23	1.84	11	
13	CB-1837	Combination	0.48	0.00	0.47	0.01	3.0	3.00	2.00	-	0.026	2.00	0.050	0.020	0.013	0.12	2.95	0.17	1.35	2.5	2.95	0.17	1.35	39	
14	CB-1838	Combination	0.48	0.00	0.47	0.00	3.0	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.12	3.20	0.18	1.41	2.5	3.20	0.18	1.41	13	
15	CB-1839	Combination	0.17	0.01	0.18	0.00	3.0	3.00	2.00	-	0.026	2.00	0.050	0.020	0.013	0.08	1.68	0.12	0.95	2.5	1.68	0.12	0.95	14	
16	CB-1840	Combination	0.24	0.02	0.26	0.00	3.0	3.00	2.00	-	0.027	2.00	0.050	0.020	0.013	0.10	1.90	0.13	1.07	2.5	1.90	0.13	1.07	14	
17	CB-1841	Combination	0.75	0.00	0.73	0.02	3.0	3.00	2.00	-	0.050	2.00	0.050	0.020	0.013	0.12	3.20	0.18	1.42	2.5	3.20	0.18	1.42	16	
18	DI-1842	Drop Grate	0.70	0.00	0.70	0.00	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.11	13.48	0.11	13.48	0.0	13.48	0.11	13.48	0	
19	CB-1843	Combination	0.71	0.00	0.70	0.01	3.0	3.00	2.00	-	0.045	2.00	0.050	0.020	0.013	0.13	3.25	0.18	1.43	2.5	3.25	0.18	1.43	15	
20	DI-1844	Drop Grate	0.18	0.00	0.18	0.00	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.05	6.66	0.05	6.66	0.0	6.66	0.05	6.66	0	
21	CB-1845	Combination	0.88	0.03	0.83	0.09	3.0	3.00	2.00	-	0.025	2.00	0.050	0.020	0.013	0.15	4.50	0.22	1.74	2.5	4.50	0.22	1.74	0	
22	CB-1846	Combination	0.95	0.01	0.87	0.09	3.0	3.00	2.00	-	0.026	2.00	0.050	0.020	0.013	0.15	4.60	0.22	1.76	2.5	4.60	0.22	1.76	12	

Notes: Return Period = 1-yr. All curb inlets are Inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-1800-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter						Inlet			Byp Line No			
	Id	Type	Catch (cfs)	Carry (cfs)	Cap't (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depth (ft)	Spread (ft)	Depr (in)
23	CB-1847	Combination	0.88	0.00	0.85	0.03	3.0	3.00	3.00	2.00	-	0.046	2.00	0.050	0.020	0.013	0.13	3.70	0.19	1.53	0.19	2.5	2.5	21
24	CB-1848	Combination	0.71	0.00	0.70	0.01	3.0	3.00	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.12	3.15	0.17	1.40	0.17	1.40	2.5	22
25	DI-1849	Drop Grate	0.67	0.00	0.67	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.11	13.19	0.11	13.19	0.11	13.19	0.0	0
26	CB-1806	Combination	0.51	0.00	0.51	0.00	3.0	3.00	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.11	2.45	0.15	1.23	0.15	1.23	2.5	4
27	CB-1807	Combination	0.61	0.00	0.61	0.01	3.0	3.00	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.12	2.80	0.16	1.32	0.16	1.32	2.5	3
28	CB-1808	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.09	1.80	0.13	1.01	0.13	1.01	2.5	26
29	CB-1809	Combination	0.54	0.00	0.54	0.00	3.0	3.00	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.11	2.60	0.16	1.26	0.16	1.26	2.5	27
30	CB-1821	Combination	0.27	0.00	0.27	0.00	3.0	3.00	3.00	2.00	-	0.036	2.00	0.050	0.020	0.013	0.09	1.82	0.13	1.03	0.13	1.03	2.5	34
31	CB-1822	Combination	0.23	0.00	0.23	0.00	3.0	3.00	3.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.05	0.92	0.19	1.56	0.19	1.56	2.5	0
32	CB-1823	Combination	0.38	0.00	0.38	0.00	3.0	3.00	3.00	2.00	0.23	Sag	2.00	0.050	0.020	0.013	0.23	8.29	0.37	8.29	0.37	8.29	2.5	0
33	DI-1824	Drop Grate	0.49	0.00	0.49	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.09	11.08	0.09	11.08	0.09	11.08	0.0	0
34	CB-1816	Combination	1.19	0.08	1.27	0.00	3.0	3.00	3.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.18	5.79	0.32	5.79	0.32	5.79	2.5	0
35	CB-1817	Combination	0.75	0.00	0.67	0.08	3.0	3.00	3.00	2.00	-	0.013	2.00	0.050	0.020	0.013	0.16	4.85	0.23	1.84	0.23	1.84	2.5	34
36	DI-1818	Drop Grate	0.39	0.00	0.39	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.08	9.79	0.08	9.79	0.08	9.79	0.0	0
37	CB-1826	Combination	0.03	0.00	0.03	0.00	3.0	3.00	3.00	2.00	-	0.023	2.00	0.050	0.020	0.013	0.05	0.92	0.05	0.92	0.05	0.92	0.0	30
38	CB-1827	Combination	0.14	0.00	0.14	0.00	3.0	3.00	3.00	2.00	-	0.044	2.00	0.050	0.020	0.013	0.07	1.36	0.10	0.77	0.10	0.77	2.5	42
39	CB-1828	Combination	0.51	0.01	0.52	0.00	3.0	3.00	3.00	2.00	-	0.044	2.00	0.050	0.020	0.013	0.11	2.60	0.16	1.26	0.16	1.26	2.5	0
40	DI-1829	Drop Grate	0.55	0.00	0.55	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.10	11.70	0.10	11.70	0.10	11.70	0.0	0
41	CB-1830	Combination	0.34	0.00	0.34	0.00	3.0	3.00	3.00	2.00	-	0.048	2.00	0.050	0.020	0.013	0.09	1.88	0.13	1.06	0.13	1.06	2.5	43
42	CB-1831	Combination	0.37	0.00	0.37	0.00	3.0	3.00	3.00	2.00	-	0.048	2.00	0.050	0.020	0.013	0.10	1.96	0.14	1.10	0.14	1.10	2.5	45
43	CB-1832	Combination	0.51	0.00	0.51	0.00	3.0	3.00	3.00	2.00	-	0.048	2.00	0.050	0.020	0.013	0.11	2.50	0.15	1.24	0.15	1.24	2.5	0
44	DI-1833	Drop Grate	0.39	0.00	0.39	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.08	9.75	0.08	9.75	0.08	9.75	0.0	0

Notes: Return Period = 1-yr. All curb inlets are Inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-1800-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1800

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter							Inlet			Byp Line No			
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)		Spread (ft)	Depth (ft)	Spread (ft)
45	CB-1834	Combination	0.51	0.00	0.51	0.00	3.0	3.00	3.00	2.00	-	0.048	2.00	0.050	0.020	0.013	0.11	2.50	0.15	1.24	2.5	0.15	1.24	2.5	0
46	DI-1835	Drop Grate	0.36	0.00	0.36	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.07	9.40	0.07	9.40	0.07	9.40	0.07	9.40	0
47	DI-1850	Drop Grate	0.99	0.00	0.99	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.14	16.41	0.14	16.41	0.14	16.41	0.14	16.41	25
48	DI-1851	Drop Grate	2.18	0.00	2.18	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.24	26.47	0.24	26.47	0.24	26.47	0.24	26.47	47
49	DI-1852	Drop Grate	1.19	0.00	1.19	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.16	18.37	0.16	18.37	0.16	18.37	0.16	18.37	48
50	DI-1814	Drop Grate	2.60	0.00	2.60	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.27	29.48	0.27	29.48	0.27	29.48	0.27	29.48	7
51	DI-1805	Drop Grate	1.56	0.00	1.56	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.20	21.55	0.20	21.55	0.20	21.55	0.20	21.55	4

Notes: Return Period = 1-yr. All curb inlets are inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-1800-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-1900

11-17-2023

Line No	Inlet		Q			Curb		Grate			Gutter						Inlet			Byp Line No				
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)		Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)
1	JB-1901	Manhole	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	DI-1902	Drop Grate	0.57	0.00	0.57	0.00	-	2.00	2.00	0.25	Sag	2.00	0.050	0.020	0.013	0.013	0.70	71.99	0.70	71.99	0.70	71.99	0.0	0
3	CB-1903	Combination	0.71	0.00	0.70	0.01	3.0	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.013	0.12	3.15	0.12	3.15	0.12	3.15	0.0	0
4	CB-1905	Combination	0.20	0.00	0.20	0.00	3.0	3.00	2.00	-	0.017	2.00	0.050	0.020	0.013	0.013	0.09	1.88	0.09	1.88	0.09	1.88	0.0	3
5	CB-1906	Combination	0.27	0.00	0.27	0.00	3.0	3.00	2.00	-	0.042	2.00	0.050	0.020	0.013	0.013	0.09	1.78	0.09	1.78	0.09	1.78	0.0	4
6	CB-1907	Combination	0.17	0.00	0.17	0.00	3.0	3.00	2.00	-	0.042	2.00	0.050	0.020	0.013	0.013	0.07	1.50	0.07	1.50	0.07	1.50	0.0	4
7	CB-1908	Combination	0.14	0.00	0.14	0.00	3.0	3.00	2.00	-	0.034	2.00	0.050	0.020	0.013	0.013	0.07	1.42	0.11	0.73	0.11	0.73	3.0	6
8	DI-1909	Drop Grate	0.96	0.00	0.96	0.00	-	2.00	2.00	0.79	Sag	2.00	0.050	0.020	0.013	0.013	0.20	22.27	0.20	22.27	0.20	22.27	0.0	0
9	DI-1910	Drop Grate	1.01	0.00	1.01	0.00	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.013	0.15	16.67	0.15	16.67	0.15	16.67	3.0	8
10	CB-1904	Combination	0.68	0.00	0.68	0.00	3.0	3.00	2.00	-	0.049	2.00	0.050	0.020	0.013	0.013	0.12	3.05	0.12	3.05	0.12	3.05	0.0	0

Notes: Return Period = 1-yr. All curb inlets are inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-1900-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter						Inlet			Byp Line No					
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)
1	JB-2001	Manhole	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	JB-2006	Manhole	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	CB-2007	Combination	1.02	0.00	1.02	0.00	3.0	3.00	3.00	2.00	0.62	Sag	2.00	0.050	0.020	0.013	0.25	9.29	0.39	9.29	0.39	9.29	0.39	9.29	2.5	0
4	CB-2016	Combination	1.05	0.04	1.09	0.00	3.0	3.00	3.00	2.00	0.64	Sag	2.00	0.050	0.020	0.013	0.26	9.79	0.40	9.79	0.40	9.79	0.40	9.79	2.5	0
5	DI-2017	Drop Grate	0.06	0.00	0.06	0.00	-	-	2.00	2.00	0.04	Sag	2.00	0.050	0.020	0.013	0.37	39.02	0.37	39.02	0.37	39.02	0.37	39.02	0.0	0
6	CB-2021	Combination	0.75	0.00	0.70	0.04	3.0	3.00	3.00	2.00	-	0.026	2.00	0.050	0.020	0.013	0.14	4.00	0.20	4.00	0.20	4.00	0.20	4.00	2.5	4
7	CB-2022	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.028	2.00	0.050	0.020	0.013	0.10	2.00	0.14	2.00	0.14	2.00	0.14	2.00	2.5	3
8	CB-2023	Combination	0.24	0.00	0.24	0.00	3.0	3.00	3.00	2.00	-	0.037	2.00	0.050	0.020	0.013	0.09	1.74	0.12	1.74	0.12	1.74	0.12	1.74	2.5	7
9	CB-2024	Combination	0.27	0.00	0.27	0.00	3.0	3.00	3.00	2.00	-	0.037	2.00	0.050	0.020	0.013	0.09	1.82	0.13	1.82	0.13	1.82	0.13	1.82	2.5	8
10	CB-2027	Combination	0.37	0.01	0.39	0.00	3.0	3.00	3.00	2.00	-	0.032	2.00	0.050	0.020	0.013	0.11	2.35	0.11	2.35	0.11	2.35	0.11	2.35	0.0	6
11	CB-2028	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.028	2.00	0.050	0.020	0.013	0.10	2.00	0.14	2.00	0.14	2.00	0.14	2.00	2.5	6
12	CB-2029	Combination	0.17	0.00	0.17	0.00	3.0	3.00	3.00	2.00	-	0.029	2.00	0.050	0.020	0.013	0.08	1.60	0.11	1.60	0.11	1.60	0.11	1.60	2.5	6
13	CB-2030	Combination	0.20	0.00	0.20	0.00	3.0	3.00	3.00	2.00	-	0.050	2.00	0.050	0.020	0.013	0.08	1.54	0.11	1.54	0.11	1.54	0.11	1.54	2.5	12
14	CB-2031	Combination	0.27	0.00	0.27	0.00	3.0	3.00	3.00	2.00	-	0.050	2.00	0.050	0.020	0.013	0.09	1.72	0.12	1.72	0.12	1.72	0.12	1.72	2.5	13
15	CB-2033	Combination	0.44	0.00	0.44	0.00	3.0	3.00	3.00	2.00	-	0.043	2.00	0.050	0.020	0.013	0.11	2.30	0.15	2.30	0.15	2.30	0.15	2.30	2.5	14
16	CB-2034	Combination	0.58	0.00	0.58	0.00	3.0	3.00	3.00	2.00	-	0.043	2.00	0.050	0.020	0.013	0.12	2.85	0.17	2.85	0.17	2.85	0.17	2.85	2.5	32
17	CB-2025	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.025	2.00	0.050	0.020	0.013	0.10	2.10	0.14	2.10	0.14	2.10	0.14	2.10	2.5	9
18	CB-2026	Combination	0.37	0.00	0.36	0.01	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.021	0.14	3.75	0.19	3.75	0.19	3.75	0.19	3.75	2.5	10
19	CB-2008	Combination	0.54	0.00	0.54	0.00	3.0	3.00	3.00	2.00	-	0.030	2.00	0.050	0.020	0.013	0.12	3.10	0.17	3.10	0.17	3.10	0.17	3.10	2.5	3
20	CB-2009	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.028	2.00	0.050	0.020	0.013	0.10	2.05	0.14	2.05	0.14	2.05	0.14	2.05	2.5	4
21	CB-2010	Combination	0.24	0.00	0.24	0.00	3.0	3.00	3.00	2.00	-	0.020	2.00	0.050	0.020	0.013	0.10	1.94	0.14	1.94	0.14	1.94	0.14	1.94	2.5	20
22	CB-2011	Combination	0.78	0.00	0.78	0.00	3.0	3.00	3.00	2.00	0.48	Sag	2.00	0.050	0.020	0.013	0.24	8.79	0.38	8.79	0.38	8.79	0.38	8.79	2.5	0

Notes: Return Period = 1-yr. All curb inlets are Inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-2000-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2000

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter							Inlet			Byp Line No		
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)		Spread (ft)	Depth (ft)
23	CB-2012	Combination	0.92	0.12	1.04	0.00	3.0	3.00	3.00	2.00	0.56	Sag	2.00	0.050	0.020	0.013	0.27	10.29	0.41	10.29	0.41	10.29	0.41	0
24	CB-2013	Combination	0.07	0.00	0.07	0.00	3.0	3.00	3.00	2.00	-	0.004	2.00	0.050	0.020	0.013	0.08	1.62	0.11	0.91	0.11	0.91	0.11	22
25	CB-2014	Combination	0.51	0.00	0.51	0.00	3.0	3.00	2.00	2.00	-	0.014	2.00	0.050	0.020	0.013	0.14	3.75	0.20	1.41	0.20	1.41	0.20	24
26	CB-2015	Combination	0.92	0.00	0.79	0.12	3.0	3.00	3.00	2.00	-	0.014	2.00	0.050	0.020	0.013	0.16	5.20	0.24	1.93	0.24	1.93	0.24	23
27	DI-2018	Drop Grate	1.95	0.00	1.95	0.00	-	-	2.00	2.00	1.37	Sag	2.00	0.050	0.020	0.013	0.28	29.81	0.28	29.81	0.28	29.81	0.28	0
28	DI-2019	Drop Grate	1.17	0.00	1.17	0.00	-	-	2.00	2.00	0.82	Sag	2.00	0.050	0.020	0.013	0.28	29.81	0.28	29.81	0.28	29.81	0.28	0
29	DI-2020	Drop Grate	0.91	0.00	0.91	0.00	-	-	2.00	2.00	0.64	Sag	2.00	0.050	0.020	0.013	0.28	29.81	0.28	29.81	0.28	29.81	0.28	0
30	CB-2035	Combination	0.44	0.00	0.44	0.00	3.0	3.00	3.00	2.00	-	0.044	2.00	0.050	0.020	0.013	0.11	2.30	0.15	1.19	0.15	1.19	0.15	11
31	DI-2036	Drop Grate	1.25	0.00	1.25	0.00	-	-	2.00	2.00	3.22	Sag	2.00	0.050	0.020	0.013	0.17	18.84	0.17	18.84	0.17	18.84	0.17	0
32	CB-2032	Combination	0.51	0.00	0.51	0.00	3.0	3.00	3.00	2.00	-	0.044	2.00	0.050	0.020	0.013	0.11	2.55	0.16	1.26	0.16	1.26	0.16	30
33	DI-2002	Drop Grate	0.70	0.00	0.70	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	13.48	0.11	13.48	0.11	13.48	0.11	1
34	DI-2003	Drop Grate	0.31	0.00	0.31	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.07	8.68	0.07	8.68	0.07	8.68	0.07	33
35	DI-2004	Drop Grate	0.91	0.00	0.91	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.14	15.64	0.14	15.64	0.14	15.64	0.14	34
36	DI-2005	Drop Grate	1.30	0.00	1.30	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.17	19.31	0.17	19.31	0.17	19.31	0.17	35
37	DI-2039	Drop Grate	0.80	0.00	0.80	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	14.58	0.13	14.58	0.13	14.58	0.13	31
38	DI-2040	Drop Grate	0.42	0.00	0.42	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.08	10.09	0.08	10.09	0.08	10.09	0.08	37
39	DI-2041	Drop Grate	0.29	0.00	0.29	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.06	8.30	0.06	8.30	0.06	8.30	0.06	38
40	DI-2042	Drop Grate	0.88	0.00	0.88	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	15.38	0.13	15.38	0.13	15.38	0.13	39
41	DI-2043	Drop Grate	1.09	0.00	1.09	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.15	17.41	0.15	17.41	0.15	17.41	0.15	40
42	DI-2037	Drop Grate	0.80	0.00	0.80	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	14.58	0.13	14.58	0.13	14.58	0.13	31
43	DI-2038	Drop Grate	0.86	0.00	0.86	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	15.12	0.13	15.12	0.13	15.12	0.13	42
44		Drop Grate	3.09	0.00	3.09	0.00	-	-	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.33	35.05	0.33	35.05	0.33	35.05	0.33	1

Notes: Return Period = 1-yr. All curb inlets are Inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-2000-SPREAD.sws

Inlet Report

Stormwater Studio 2023 v 3.0.0.32

Project Name: SD-2100

11-17-2023

Line No	Inlet		Q				Curb		Grate			Gutter						Inlet			Byp Line No			
	Id	Type	Catch (cfs)	Carry (cfs)	Capt (cfs)	Byp (cfs)	Ht (in)	L (ft)	L (ft)	W (ft)	Area (sqft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)		Depth (ft)	Spread (ft)	Depr (in)
1	CB-2101	Combination	0.51	0.00	0.50	0.01	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.13	3.35	0.18	1.44	0.18	1.44	2.5	9
2	CB-2102	Combination	0.34	0.00	0.34	0.00	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.11	2.50	0.15	1.24	0.15	1.24	2.5	8
3	CB-2107	Combination	0.27	0.00	0.27	0.00	3.0	3.00	3.00	2.00	-	0.036	2.00	0.050	0.020	0.013	0.09	1.84	0.13	1.04	0.13	1.04	2.5	2
4	CB-2108	Combination	0.27	0.00	0.27	0.00	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.10	2.05	0.14	1.14	0.14	1.14	2.5	3
5	CB-2109	Combination	0.20	0.00	0.20	0.00	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.09	1.82	0.13	1.03	0.13	1.03	2.5	3
6	CB-2110	Combination	0.20	0.00	0.20	0.00	3.0	3.00	3.00	2.00	-	0.014	2.00	0.050	0.020	0.013	0.10	1.96	0.14	1.10	0.14	1.10	2.5	3
7	CB-2111	Combination	0.20	0.00	0.20	0.00	3.0	3.00	3.00	2.00	-	0.012	2.00	0.050	0.020	0.013	0.10	2.05	0.14	1.14	0.14	1.14	2.5	1
8	CB-2103	Combination	0.31	0.00	0.31	0.00	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.11	2.30	0.15	1.19	0.15	1.19	2.5	0
9	CB-2104	Combination	0.17	0.01	0.18	0.00	3.0	3.00	3.00	2.00	-	0.021	2.00	0.050	0.020	0.013	0.09	1.72	0.12	0.97	0.12	0.97	2.5	0
10	DI-2105	Drop Grate	0.64	0.00	0.64	0.00	-	2.00	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.11	12.86	0.11	12.86	0.11	12.86	3.0	8
11	DI-2106	Drop Grate	1.19	0.00	1.19	0.00	-	2.00	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.16	18.37	0.16	18.37	0.16	18.37	3.0	10
12	CB-2112	Combination	0.07	0.00	0.07	0.00	3.0	3.00	2.00	2.00	-	0.020	2.00	0.050	0.020	0.013	0.06	1.22	0.08	0.68	0.08	0.68	2.5	5
13	DI-2113	Drop Grate	0.87	0.00	0.87	0.00	-	2.00	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.13	15.24	0.13	15.24	0.13	15.24	3.0	12

Notes: Return Period = 1-yr. All curb inlets are inclined throat. Clogging Factors (%): Curb on Grade = 0; Curb in Sag = 50; Grate on Grade = 0; Grate in Sag = 50.

Project File: SD-2100-SPREAD.sws