



WithersRavenel  
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# Storm Drainage Calculations

**Broadmoor**

**Town of Rolesville**

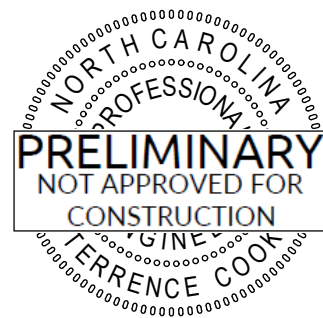
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WithersRavenel Project No. 23-0045

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Terrence Cook, PE

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## Storm Drainage Narrative

Broadmoor is located at 1321 Rolesville Road in Rolesville, NC. The site in its existing conditions is undeveloped, mostly wooded with HSG 'B', 'C' & 'D' soils. The proposed development consists of 253 lots and associated roads and infrastructure. A 10-yr HGL analysis and 4"/hr gutter spread analysis have been performed for all the storm drainage associated with the project. These calculations are attached to this narrative.

# 1. SCM 1: 10-YR Storm Drainage Chart

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
1	Dp-Grate	DI - 151	Outfall	0.21	12.6	5.57	0.70	11.97	40.94	70.230	30	0.013	1.00	357.70	357.00	361.82	359.29	361.30	361.24
2	Dp-Grate	DI - 152	1	0.23	11.7	5.73	0.70	11.47	30.12	139.010	30	0.013	0.54	358.55	357.80	364.49	361.82	361.48	361.37
3	Dp-Grate	DI - 153	2	0.07	10.1	6.03	0.70	11.09	30.57	224.960	30	0.013	0.56	359.90	358.65	366.59	364.49	361.66	361.53
4	Dp-Grate	DI - 154	3	0.22	9.8	6.09	0.70	10.92	16.99	70.885	24	0.013	0.56	360.80	360.40	367.25	366.59	361.98 j	361.73
5	Comb.	CB - 155	4	0.34	9.1	6.23	0.70	10.21	16.94	142.662	24	0.013	0.56	361.70	360.90	367.67	367.25	362.84	362.02
6	Comb.	CB - 156	5	0.24	8.6	6.34	0.70	8.87	20.64	84.049	24	0.013	0.83	362.50	361.80	368.83	367.67	363.56	362.84
7	Comb.	CB - 157	6	0.12	7.7	6.54	0.70	8.06	22.10	146.583	24	0.013	0.96	364.00	362.60	370.29	368.83	365.01	363.56
8	Dp-Grate	DI - 160	7	0.42	6.5	6.82	0.70	3.87	7.24	115.467	15	0.013	1.26	366.20	364.75	368.73	370.29	366.99	365.40
9	Dp-Grate	DI - 161	8	0.39	5.0	7.25	0.70	1.98	7.02	149.000	15	0.012	1.01	367.80	366.30	370.62	368.73	368.36 j	366.99
10	Comb.	CB - 158	7	0.13	6.8	6.77	0.70	3.93	23.67	73.024	24	0.013	1.10	364.90	364.10	371.02	370.29	365.59 j	365.01
11	Comb.	CB - 162	10	0.45	5.0	7.25	0.70	2.28	7.95	29.000	15	0.013	1.52	366.09	365.65	371.02	371.02	366.69	366.11
12	Comb.	CB - 159	10	0.25	5.0	7.25	0.70	1.27	14.51	75.976	18	0.013	1.91	366.85	365.40	371.78	371.02	367.27	365.70
13	Comb.	CB - 101	Outfall	0.20	9.4	6.17	0.70	15.85	81.11	81.139	36	0.013	1.48	357.20	356.00	364.40	358.33	361.29	361.24
14	Comb.	CB - 102	13	0.03	8.8	6.30	0.70	14.63	46.95	114.463	30	0.013	1.31	359.20	357.70	365.72	364.40	361.52	361.39
15	Comb.	CB - 103	14	0.02	8.7	6.32	0.70	8.68	26.23	22.299	24	0.013	1.35	360.00	359.70	366.53	365.72	361.72	361.72
16	Comb.	CB - 104	15	0.17	8.5	6.36	0.70	8.64	18.78	29.000	24	0.013	0.69	360.30	360.10	366.06	366.53	361.35	361.89
17	Comb.	CB - 105	16	0.09	8.0	6.47	0.70	8.02	21.10	80.421	24	0.013	0.87	361.10	360.40	366.87	366.06	362.11	361.35
18	Comb.	CB - 106	17	0.22	7.7	6.53	0.70	7.68	22.37	40.904	24	0.013	0.98	361.60	361.20	367.20	366.87	362.58	362.11
19	Dp-Grate	DI - 107	18	0.04	7.5	6.59	0.70	4.11	12.60	38.208	18	0.013	1.44	362.65	362.10	367.74	367.20	363.43	362.69
20	Dp-Grate	DI - 108	19	0.64	7.1	6.69	0.70	3.98	6.01	80.712	15	0.013	0.87	363.60	362.90	366.12	367.74	364.41	363.64
21	Dp-Grate	DI - 109	20	0.21	5.0	7.25	0.70	1.07	7.85	108.304	15	0.013	1.48	365.30	363.70	367.82	366.12	365.71 j	364.41
22	Comb.	CB - 114	18	0.23	6.2	6.91	0.70	2.76	6.52	103.000	15	0.013	1.02	363.40	362.35	368.20	367.20	364.07	362.92
23	Comb.	CB - 115	22	0.34	5.0	7.25	0.70	1.73	6.69	102.500	15	0.013	1.07	364.60	363.50	369.23	368.20	365.12 j	364.07

Project File: SCM1.stm

Number of lines: 28

Date: 10/30/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# Pipes

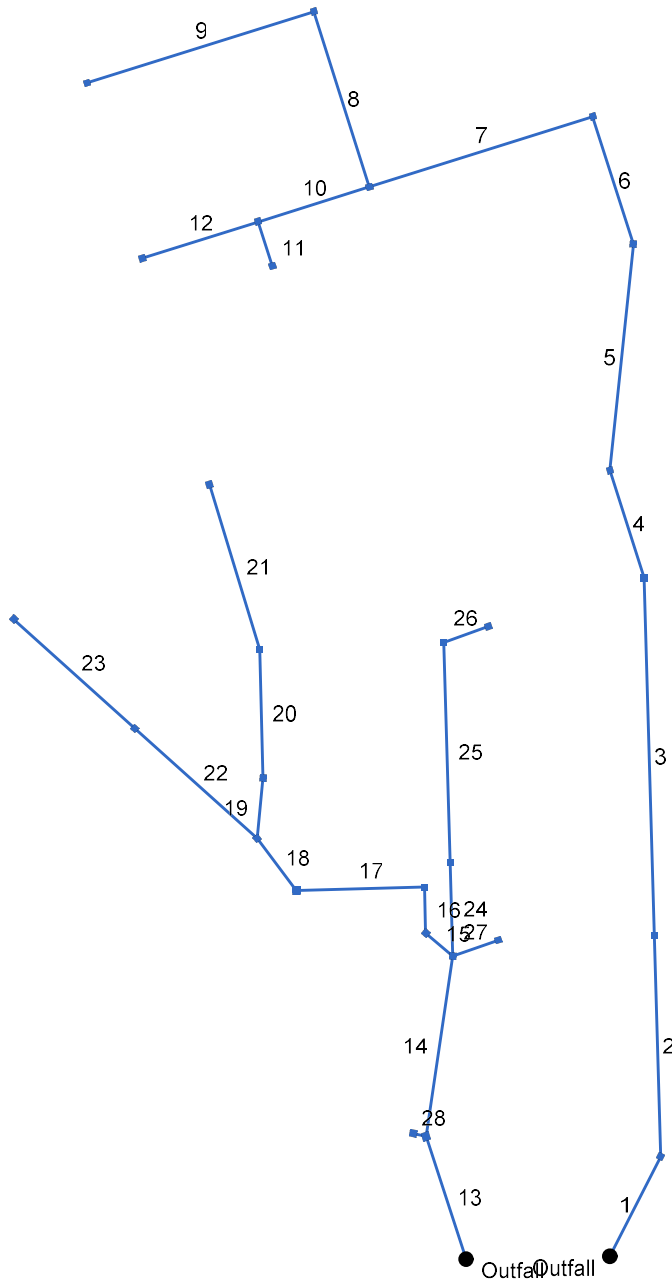
Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
24	Comb.	CB - 111	14	0.19	6.0	6.97	0.70	4.88	6.78	59.000	15	0.013	1.10	361.10	360.45	366.32	365.72	362.00 j	361.72
25	Comb.	CB - 112	24	0.38	5.3	7.17	0.70	4.06	6.02	138.206	15	0.013	0.87	362.40	361.20	367.71	366.32	363.22	362.00
26	Comb.	CB - 113	25	0.43	5.0	7.25	0.70	2.18	6.46	29.946	15	0.013	1.00	362.80	362.50	367.78	367.71	363.39 j	363.22
27	Comb.	CB - 116	14	0.33	5.0	7.25	0.70	1.67	8.68	30.442	15	0.013	1.81	361.00	360.45	365.82	365.72	361.70	361.72
28	Comb.	CB - 110	13	0.15	5.0	7.25	0.70	0.76	11.42	8.000	15	0.013	3.13	359.70	359.45	364.39	364.40	361.39	361.39

Project File: SCM1.stm	Number of lines: 28	Date: 10/30/2024
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NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

## 2. SCM 1: 10-YR HGL Profiles

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



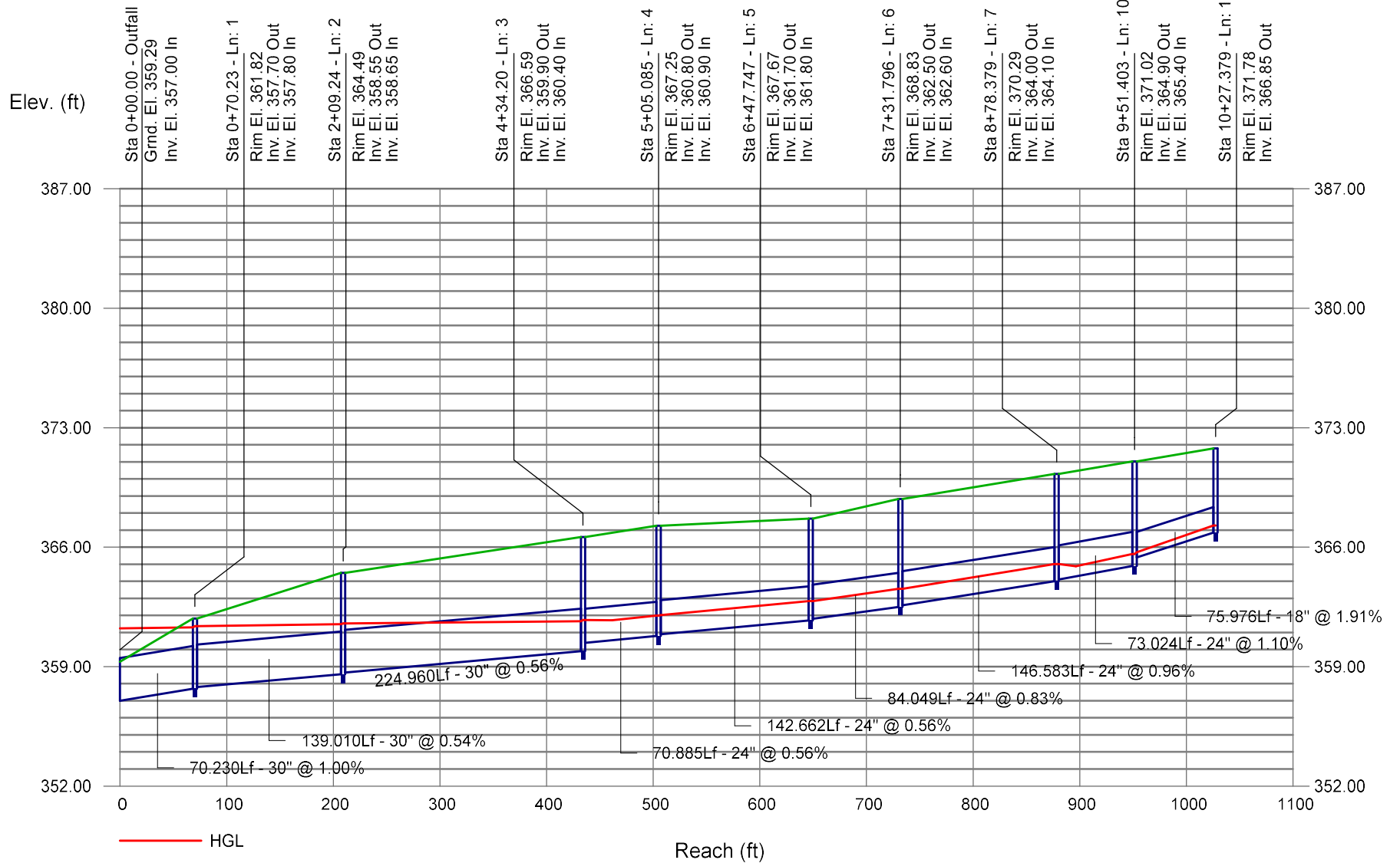
Project File: SCM1.stm

Number of lines: 28

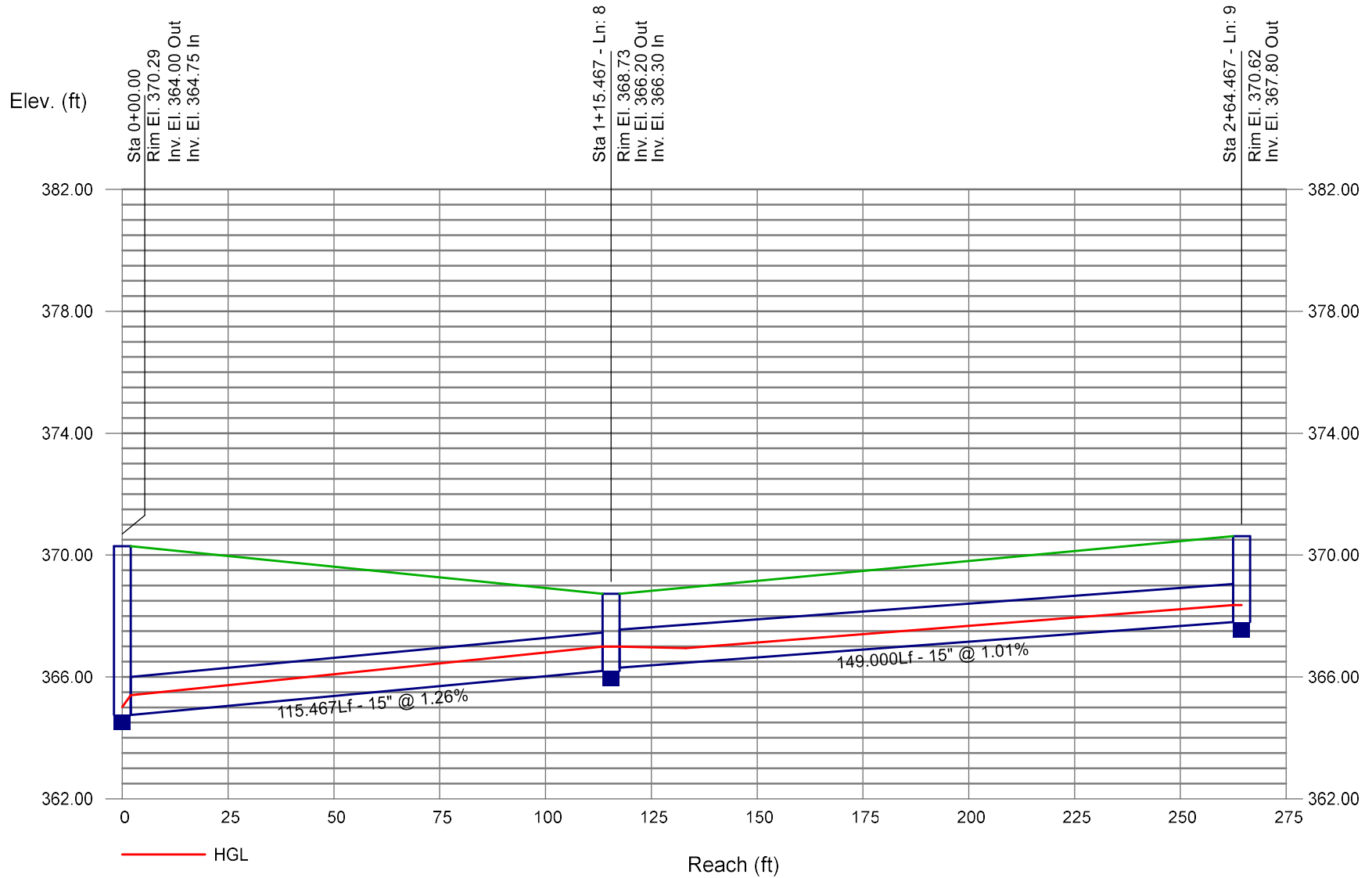
Date: 10/30/2024



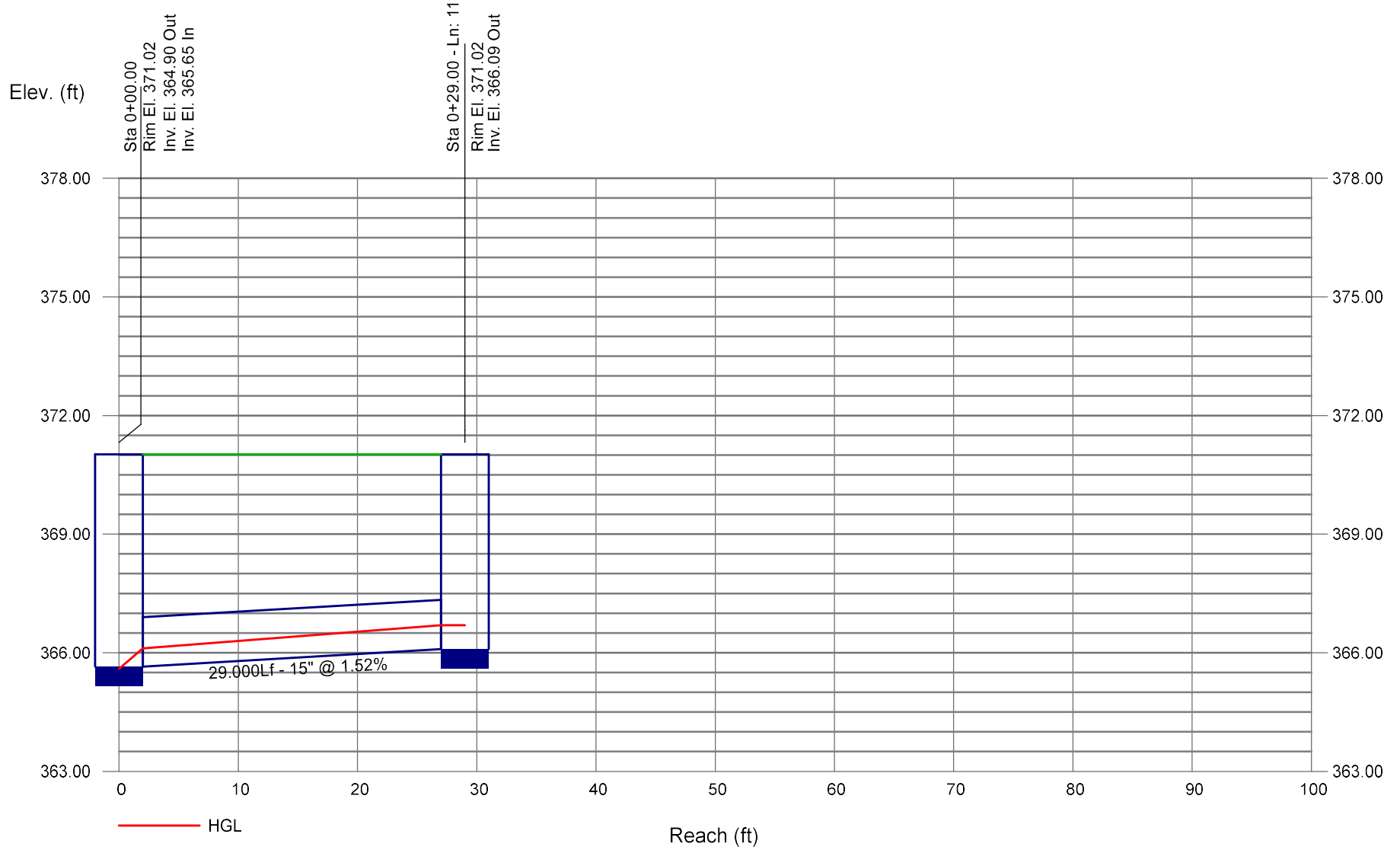
# Storm Sewer Profile



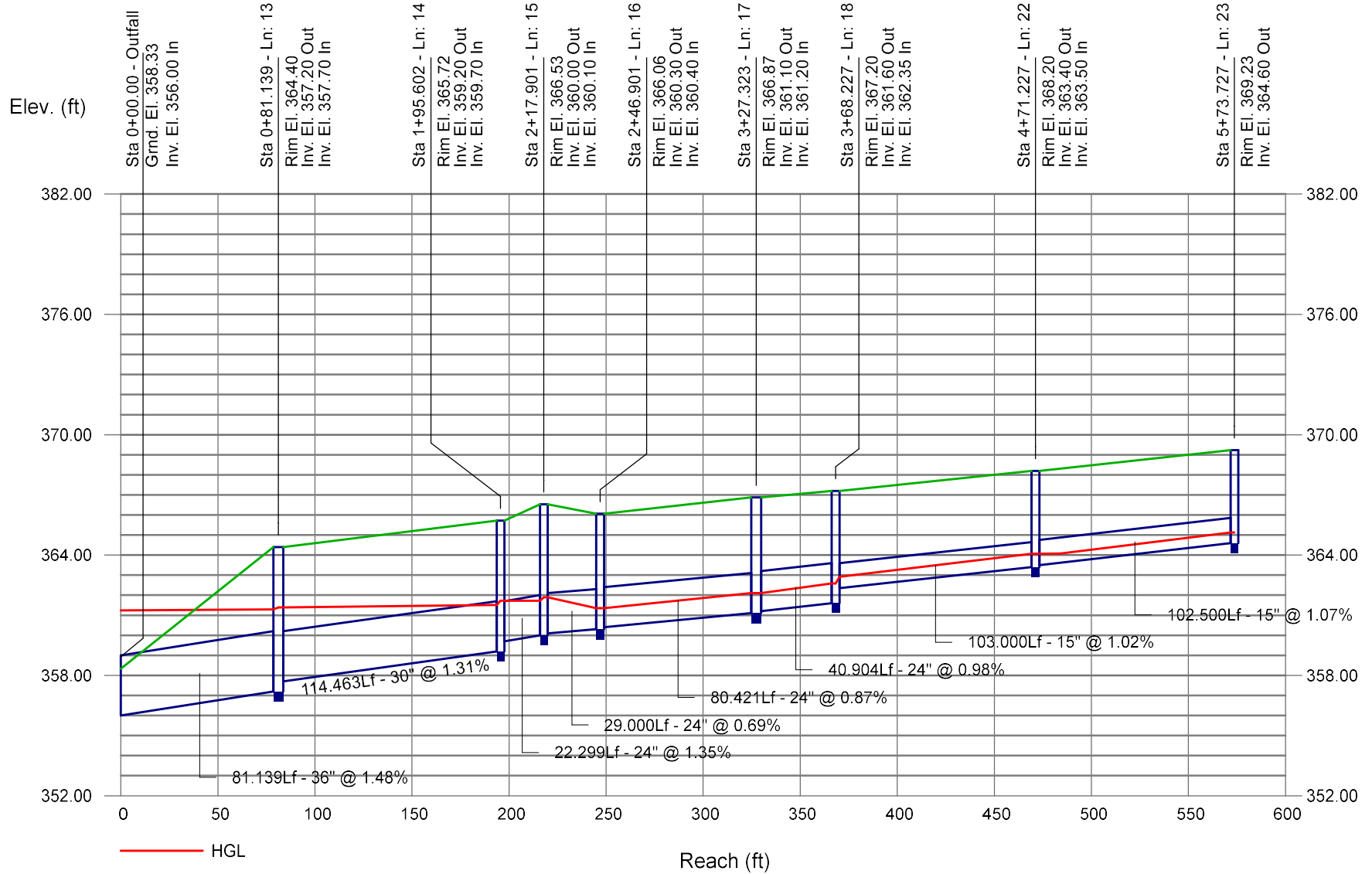
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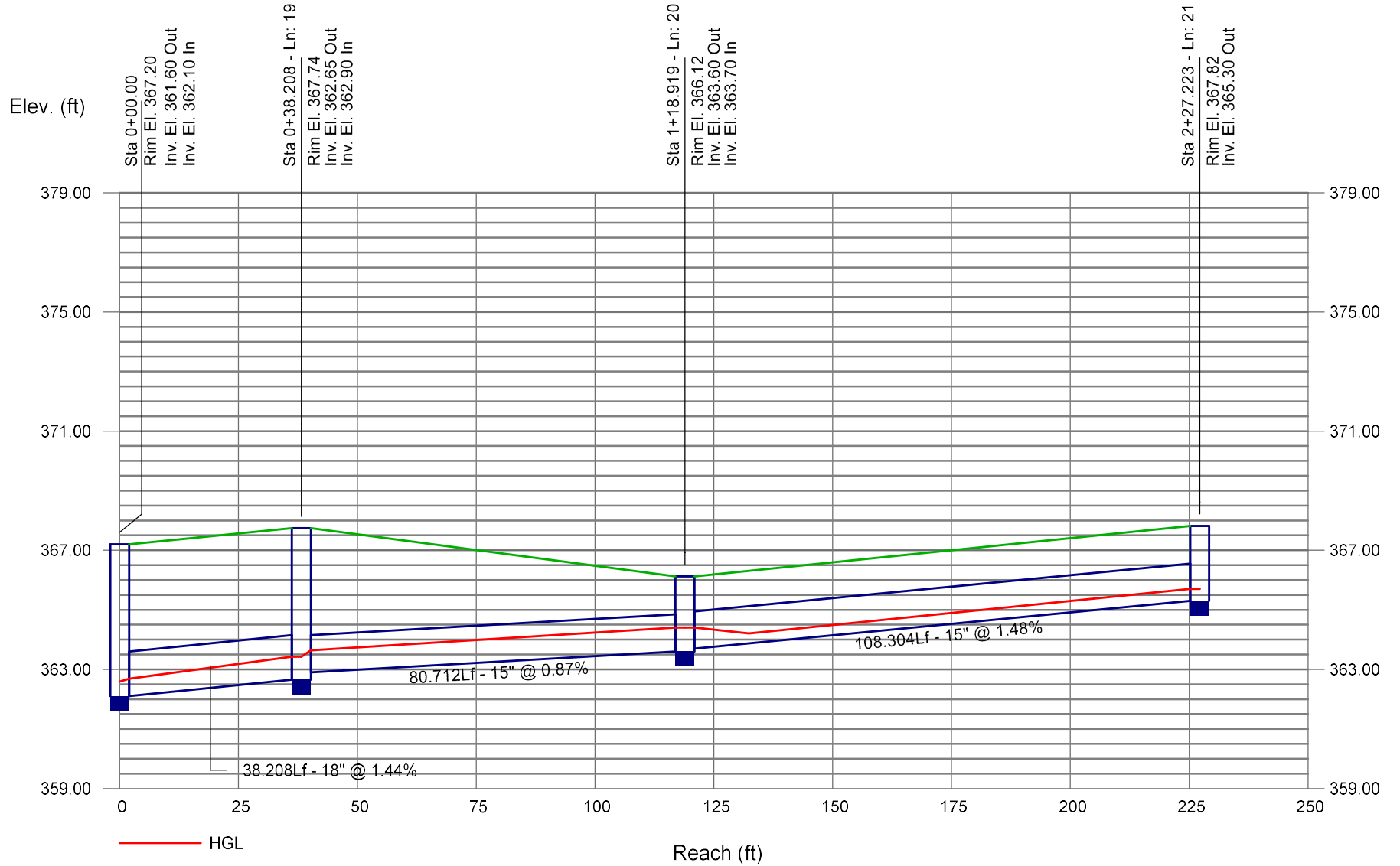
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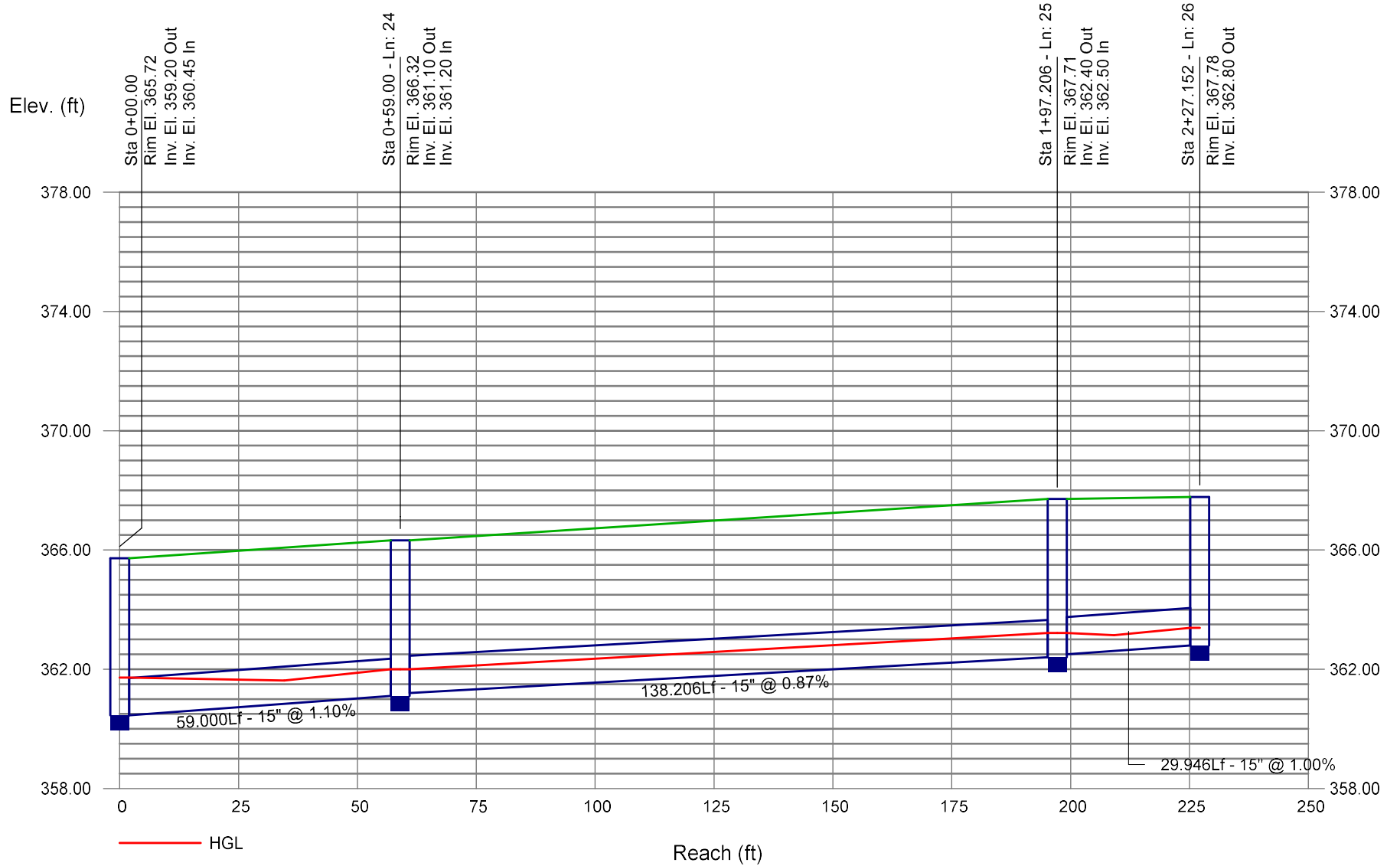
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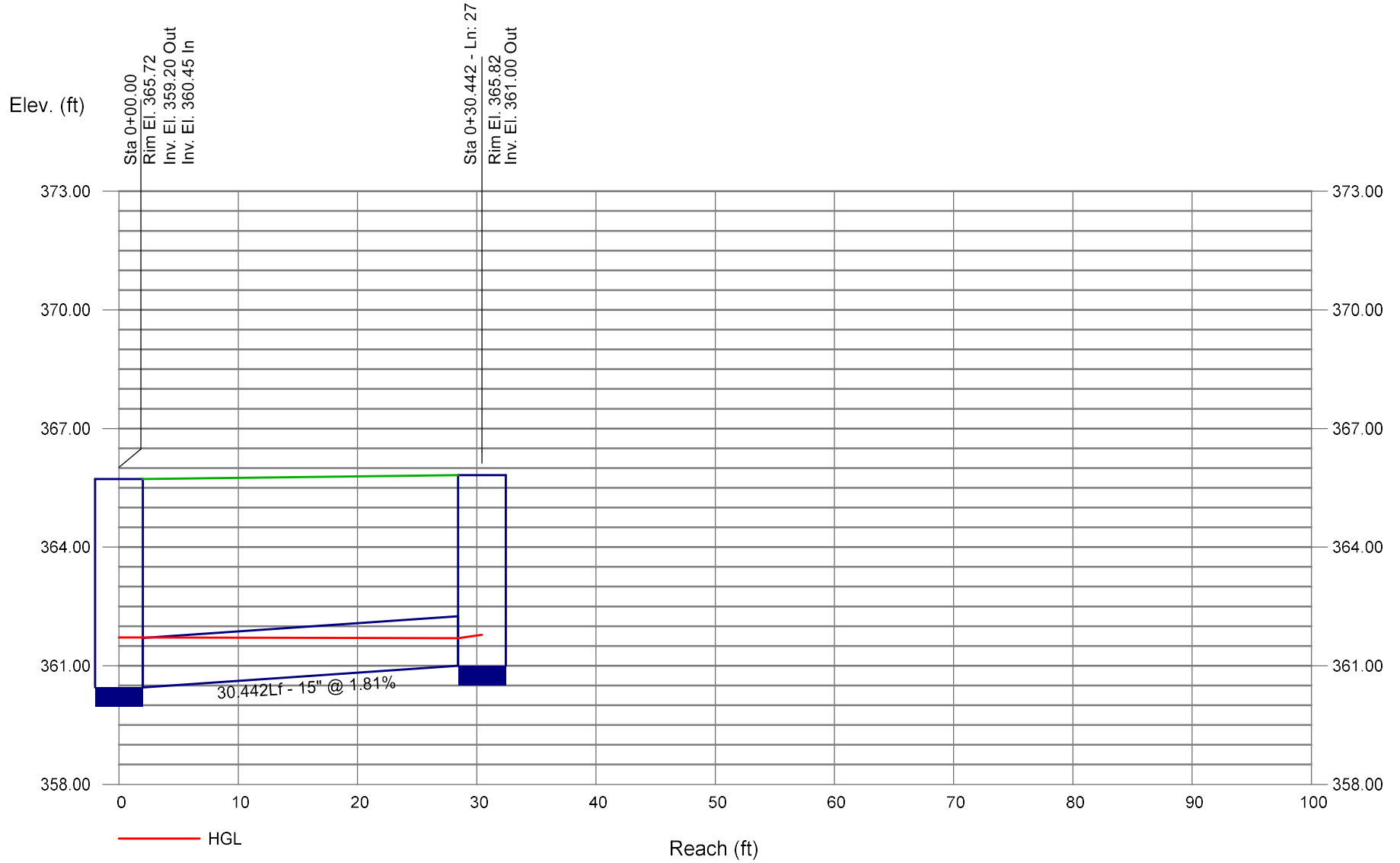
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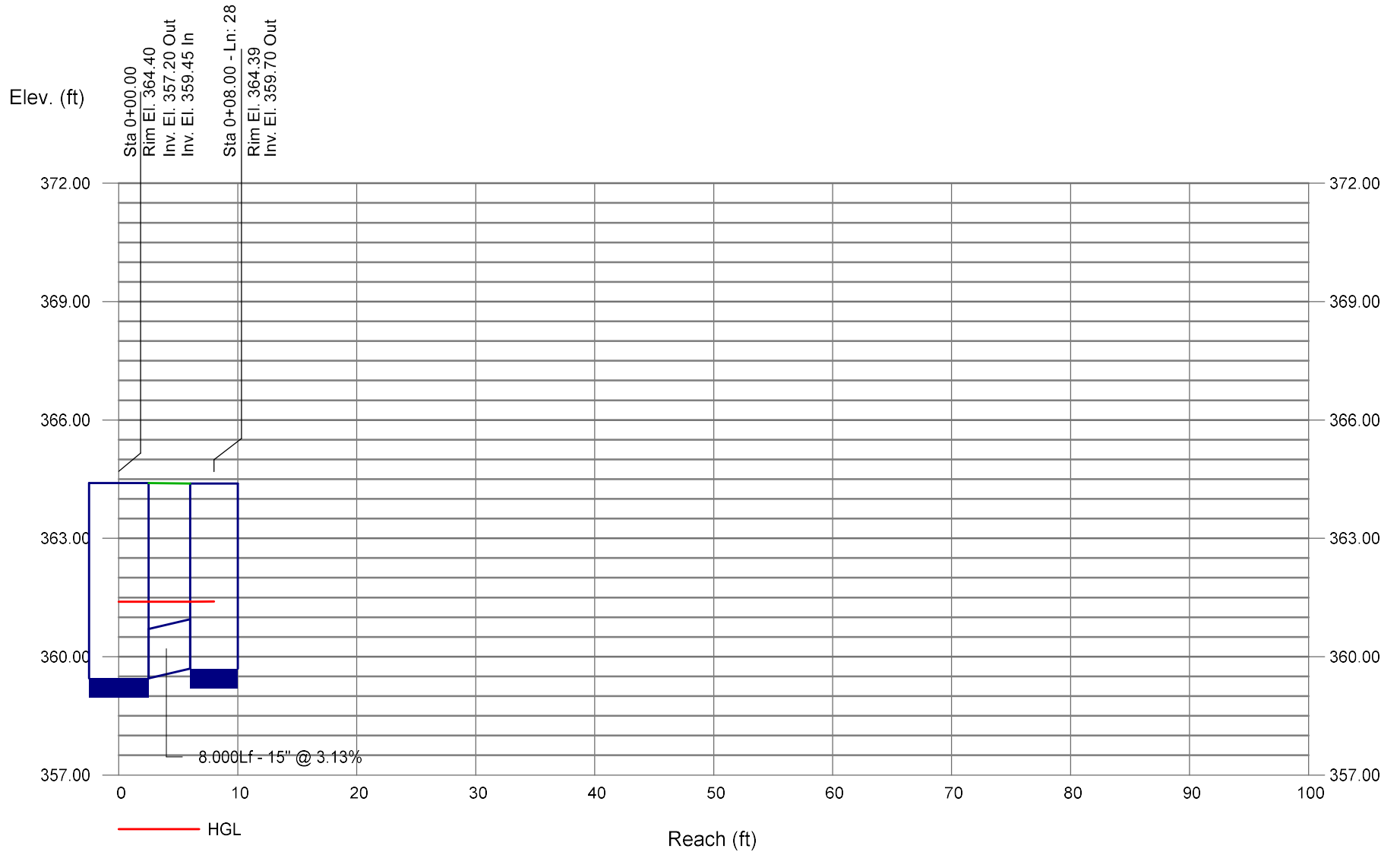
# Storm Sewer Profile



# Storm Sewer Profile



# Storm Sewer Profile





### 3. SCM 1: 4"/Hour Gutter Spread Chart

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
1	DI - 151	Dp-Grate	Sag	0.21	5.0	4.00	0.70	0.59	0.07	0.66	0.66	9.46
2	DI - 152	Dp-Grate	1	0.23	5.0	4.00	0.70	0.64	0.01	0.58	0.58	9.71
3	DI - 153	Dp-Grate	2	0.07	5.0	4.00	0.70	0.20	0.10	0.28	0.28	7.81
4	DI - 154	Dp-Grate	3	0.22	5.0	4.00	0.70	0.62	0.18	0.69	0.69	10.67
5	CB - 155	Comb.	4	0.34	5.0	4.00	0.70	0.95	0.09	0.87	0.87	5.20
6	CB - 156	Comb.	5	0.24	5.0	4.00	0.70	0.67	0.02	0.60	0.60	5.03
7	CB - 157	Comb.	6	0.12	5.0	4.00	0.70	0.34	0.04	0.35	0.35	3.70
8	DI - 160	Dp-Grate	Sag	0.42	5.0	4.00	0.70	1.18	0.19	1.37	1.37	12.88
9	DI - 161	Dp-Grate	8	0.39	5.0	4.00	0.70	1.09	0.00	0.90	0.90	10.67
10	CB - 158	Comb.	7	0.13	5.0	4.00	0.70	0.36	0.10	0.43	0.43	4.14
11	CB - 162	Comb.	25	0.45	5.0	4.00	0.70	1.26	0.00	0.96	0.96	6.58
12	CB - 159	Comb.	10	0.25	5.0	4.00	0.70	0.70	0.00	0.60	0.60	5.06
13	CB - 101	Comb.	28	0.20	5.0	4.00	0.70	0.56	0.27	0.70	0.70	5.49
14	CB - 102	Comb.	28	0.03	5.0	4.00	0.70	0.08	0.15	0.23	0.23	2.87
15	CB - 103	Comb.	Sag	0.02	5.0	4.00	0.70	0.06	0.00	0.06	0.06	0.49
16	CB - 104	Comb.	Sag	0.17	5.0	4.00	0.70	0.48	0.00	0.48	0.48	1.68
17	CB - 105	Comb.	16	0.09	5.0	4.00	0.70	0.25	0.00	0.25	0.25	2.98
18	CB - 106	Comb.	Sag	0.22	5.0	4.00	0.70	0.62	0.00	0.62	0.62	1.92
19	DI - 107	Dp-Grate	20	0.04	5.0	4.00	0.70	0.11	0.00	0.11	0.11	4.95
20	DI - 108	Dp-Grate	Sag	0.64	5.0	4.00	0.70	1.79	0.06	1.85	1.85	14.86
21	DI - 109	Dp-Grate	20	0.21	5.0	4.00	0.70	0.59	0.00	0.53	0.53	8.76
22	CB - 114	Comb.	Sag	0.23	5.0	4.00	0.70	0.64	0.00	0.64	0.64	1.97
23	CB - 115	Comb.	Sag	0.34	5.0	4.00	0.70	0.95	0.00	0.95	0.95	2.09

Project File: SCM1.stm	Number of lines: 28	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
24	CB - 111	Comb.	14	0.19	5.0	4.00	0.70	0.53	0.34	0.72	0.72	5.60
25	CB - 112	Comb.	24	0.38	5.0	4.00	0.70	1.06	0.30	1.02	1.02	6.80
26	CB - 113	Comb.	27	0.43	5.0	4.00	0.70	1.20	0.00	0.93	0.93	6.45
27	CB - 116	Comb.	13	0.33	5.0	4.00	0.70	0.92	0.28	0.93	0.93	6.44
28	CB - 110	Comb.	Sag	0.15	5.0	4.00	0.70	0.42	0.14	0.56	0.56	1.83

Project File: SCM1.stm	Number of lines: 28	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

## 4. SCM 2: 10-YR Storm Drainage Chart

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
1	Comb.	CB - 201	Outfall	0.38	14.4	5.29	0.60	53.64	98.01	52.684	42	0.013	0.95	357.50	357.00	365.06	360.96	359.79	360.18
2	Comb.	CB - 202	1	0.25	14.3	5.31	0.60	52.56	83.54	29.002	42	0.013	0.69	357.80	357.60	365.06	365.06	360.07	359.79
3	Comb.	CB - 203	2	0.33	14.3	5.31	0.60	21.06	74.27	8.063	36	0.013	1.24	358.40	358.30	365.06	365.06	359.87	360.07
4	Comb.	CB - 204	3	0.12	13.2	5.49	0.60	20.67	65.70	200.937	36	0.013	0.97	360.45	358.50	366.94	365.06	361.91	359.87
5	Comb.	CB - 205	4	0.16	12.7	5.57	0.60	20.01	66.51	85.464	36	0.013	0.99	361.40	360.55	367.88	366.94	362.83	361.91
6	Comb.	CB - 206	5	0.15	12.3	5.63	0.60	19.70	37.31	96.667	30	0.013	0.83	362.70	361.90	368.95	367.88	364.20	363.19
7	Comb.	CB - 207	6	0.12	11.9	5.70	0.60	18.93	41.56	87.660	30	0.013	1.03	363.70	362.80	369.92	368.95	365.17	364.20
8	Comb.	CB - 208	7	0.05	11.5	5.77	0.70	18.76	44.11	95.089	30	0.013	1.16	364.90	363.80	370.95	369.92	366.37	365.17
9	Comb.	CB - 209	8	0.32	11.1	5.83	0.60	18.75	32.46	79.814	30	0.013	0.63	365.50	365.00	372.06	370.95	366.97	366.37
10	Comb.	CB - 210	9	0.13	11.0	5.86	0.60	17.71	61.74	30.891	30	0.013	2.27	366.30	365.60	372.18	372.06	367.72	366.97
11	Comb.	CB - 211	10	0.37	10.6	5.94	0.60	10.65	22.91	87.705	24	0.013	1.03	367.70	366.80	373.29	372.18	368.87	367.76
12	Comb.	CB - 212	11	0.17	9.4	6.17	0.60	9.70	22.24	227.567	24	0.013	0.97	370.00	367.80	376.03	373.29	371.11	368.87
13	Comb.	CB - 213	12	0.17	8.8	6.30	0.60	9.26	16.88	107.703	24	0.013	0.56	370.70	370.10	377.36	376.03	371.79	371.16
14	Comb.	CB - 214	13	0.43	8.4	6.39	0.60	7.59	10.61	107.661	18	0.013	1.02	372.30	371.20	378.68	377.36	373.37	372.14
15	Comb.	CB - 215	14	0.28	8.0	6.48	0.60	6.03	10.53	89.493	18	0.013	1.01	373.30	372.40	379.82	378.68	374.25 j	373.37
16	Comb.	CB - 216	15	0.43	7.8	6.52	0.60	4.97	10.68	29.000	18	0.013	1.03	373.70	373.40	379.82	379.82	374.56	374.25
17	Comb.	CB - 217	16	0.06	7.4	6.61	0.60	3.33	9.37	44.003	18	0.013	0.80	374.15	373.80	380.65	379.82	374.85 j	374.56
18	Comb.	CB - 218	17	0.05	6.9	6.74	0.60	3.16	5.10	88.151	15	0.013	0.62	374.95	374.40	383.02	380.65	375.66	375.11
19	Dp-Grate	DI - 219	18	0.32	6.4	6.85	0.60	3.00	4.86	61.860	15	0.013	0.57	375.40	375.05	378.72	383.02	376.11	375.76
20	Dp-Grate	DI - 220	19	0.41	5.0	7.25	0.60	1.78	5.21	126.067	15	0.012	0.56	376.20	375.50	378.57	378.72	376.73 j	376.25
21	Comb.	CB - 260	13	0.30	5.0	7.25	0.60	1.30	6.46	29.000	15	0.013	1.00	372.40	372.11	377.36	377.36	372.85	372.49
22	Dp-Grate	DI - 256	10	0.04	6.5	6.85	0.60	7.89	18.65	102.986	24	0.013	0.68	367.50	366.80	371.19	372.18	368.50	367.72
23	Dp-Grate	DI - 257	22	0.49	6.1	6.94	0.60	7.82	8.41	128.054	15	0.012	1.44	370.10	368.25	372.51	371.19	371.21	369.20

Project File: 20241226\_SCM2.stm

Number of lines: 60

Date: 12/27/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
24	Dp-Grate	DI - 258	23	0.65	5.7	7.05	0.60	5.88	6.98	120.501	15	0.012	1.00	371.40	370.20	373.77	372.51	372.38 j	371.21
25	Dp-Grate	DI - 259	24	0.74	5.0	7.25	0.60	3.22	8.69	110.183	15	0.012	1.54	373.20	371.50	376.01	373.77	373.92 j	372.38
26	Dp-Grate	DI - 233	2	0.36	8.8	6.30	0.60	27.06	54.34	120.500	36	0.013	0.66	359.10	358.30	363.38	365.06	360.78 j	360.07
27	Dp-Grate	DI - 234	26	0.31	8.7	6.31	0.60	22.49	36.93	14.472	30	0.012	0.69	359.70	359.60	363.24	363.38	361.31	361.01
28	Comb.	CB - 235	27	0.41	8.3	6.39	0.70	19.41	21.33	140.500	24	0.013	0.89	361.45	360.20	367.06	363.24	363.03	361.70
29	Comb.	CB - 236	28	0.28	6.8	6.75	0.60	9.23	19.17	250.648	24	0.013	0.72	363.35	361.55	369.35	367.06	364.43 j	363.03
30	Comb.	CB - 237	29	0.47	6.7	6.78	0.70	8.12	10.68	29.000	18	0.013	1.03	364.15	363.85	369.35	369.35	365.25	364.83
31	Comb.	CB - 238	30	0.07	6.5	6.83	0.60	5.94	8.65	44.247	18	0.013	0.68	364.55	364.25	369.61	369.35	365.49	365.25
32	Comb.	CB - 239	31	0.02	5.6	7.06	0.60	5.47	7.20	94.500	15	0.012	1.06	365.80	364.80	372.65	369.61	366.75	365.62
33	Dp-Grate	DI - 240	32	0.32	5.4	7.13	0.60	5.43	7.46	61.500	15	0.012	1.14	366.60	365.90	369.98	372.65	367.54	366.75
34	Dp-Grate	DI - 241	33	0.95	5.0	7.25	0.60	4.13	7.63	84.000	15	0.012	1.19	367.70	366.70	370.00	369.98	368.52 j	367.54
35	Comb.	CB - 221	2	0.08	10.9	5.88	0.60	8.79	38.37	159.905	30	0.013	0.88	360.20	358.80	366.79	365.06	361.19 j	360.07
36	Comb.	CB - 222	35	0.12	10.1	6.02	0.60	8.71	31.31	85.806	30	0.013	0.58	360.80	360.30	367.94	366.79	361.78	361.20
37	Comb.	CB - 223	36	0.11	9.3	6.19	0.60	7.28	32.42	80.026	30	0.013	0.62	361.40	360.90	369.02	367.94	362.30	361.78
38	Comb.	CB - 224	37	0.09	8.4	6.38	0.60	7.09	32.41	80.055	30	0.013	0.62	362.00	361.50	370.10	369.02	362.88	362.30
39	Comb.	CB - 225	38	0.02	7.5	6.60	0.70	6.28	29.94	75.072	30	0.013	0.53	362.50	362.10	371.09	370.10	363.33	362.88
40	Comb.	CB - 226	39	0.03	6.9	6.73	0.70	6.32	31.13	43.390	30	0.013	0.58	362.85	362.60	370.90	371.09	363.68	363.36
41	Comb.	CB - 227	40	0.02	6.7	6.79	0.70	6.23	18.78	29.000	24	0.013	0.69	363.55	363.35	370.90	370.90	364.43	364.14
42	Comb.	CB - 228	41	0.03	6.3	6.89	0.70	6.22	17.09	43.798	24	0.013	0.57	363.90	363.65	371.79	370.90	364.78	364.49
43	Comb.	CB - 229	42	0.24	5.6	7.07	0.70	6.23	7.85	143.298	18	0.013	0.56	365.20	364.40	370.71	371.79	366.21	365.41
44	Comb.	CB - 230	43	0.49	5.6	7.08	0.70	5.06	8.30	8.000	18	0.013	0.63	365.35	365.30	370.71	370.71	366.21	366.40
45	Comb.	CB - 231	44	0.44	5.4	7.14	0.70	2.65	5.36	29.000	15	0.013	0.69	365.80	365.60	370.71	370.71	366.45	366.22
46	Comb.	CB - 232	45	0.09	5.0	7.25	0.70	0.46	7.17	8.100	15	0.013	1.23	366.30	366.20	370.71	370.71	366.56	366.45

Project File: 20241226\_SCM2.stm

Number of lines: 60

Date: 12/27/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
47	Comb.	CB - 253	38	0.15	5.0	7.25	0.70	0.76	6.57	29.010	15	0.013	1.03	365.20	364.90	370.09	370.10	365.54	365.19
48	Comb.	CB - 251	31	0.09	5.0	7.25	0.60	0.39	5.36	29.000	15	0.013	0.69	365.00	364.80	369.61	369.61	365.24	365.49
49	Comb.	CB - 242	28	0.35	8.2	6.42	0.70	6.77	8.70	29.114	18	0.013	0.69	362.15	361.95	367.06	367.06	363.16 j	363.03
50	Dp-Grate	DI - 243	49	0.21	7.4	6.60	0.60	3.17	4.82	125.500	15	0.013	0.56	363.10	362.40	365.28	367.06	363.83	363.16
51	Dp-Grate	DI - 244	50	0.24	6.8	6.77	0.60	2.40	6.83	84.000	15	0.012	0.95	364.00	363.20	366.01	365.28	364.62 j	364.25
52	Dp-Grate	DI - 245	51	0.35	5.0	7.25	0.60	1.52	8.43	130.989	15	0.012	1.45	366.00	364.10	367.86	366.01	366.49 j	364.62
53	Comb.	CB - 255	6	0.14	5.0	7.25	0.60	0.61	8.04	29.000	15	0.013	1.55	364.40	363.95	368.95	368.95	364.70	364.20
54	Comb.	CB - 252	36	0.33	5.0	7.25	0.60	1.44	6.57	29.000	15	0.013	1.03	363.00	362.70	367.95	367.94	363.47	363.10
55	Comb.	CB - 250	49	0.47	5.0	7.25	0.70	2.38	11.42	8.000	15	0.013	3.13	362.65	362.40	367.06	367.06	363.27 j	363.16
56	Comb.	CB - 254	4	0.17	5.0	7.25	0.60	0.74	6.57	29.000	15	0.013	1.03	362.50	362.20	366.94	366.94	362.84	362.48
57	Comb.	CB - 249	28	0.47	5.0	7.25	0.70	2.38	16.14	8.000	15	0.013	6.25	362.70	362.20	367.07	367.06	363.32 j	363.03
58	Dp-Grate	DI - 247	26	0.58	7.6	6.57	0.60	3.39	5.85	107.117	15	0.012	0.70	361.60	360.85	364.11	363.38	362.34	361.53
59	Dp-Grate	DI - 248	58	0.28	5.0	7.25	0.60	1.22	7.59	153.000	15	0.012	1.18	363.50	361.70	365.82	364.11	363.93 j	362.34
60	Dp-Grate	DI - 246	27	0.57	5.0	7.25	0.60	2.48	7.45	92.663	15	0.012	1.13	362.00	360.95	364.40	363.24	362.63	361.45

Project File: 20241226\_SCM2.stm

Number of lines: 60

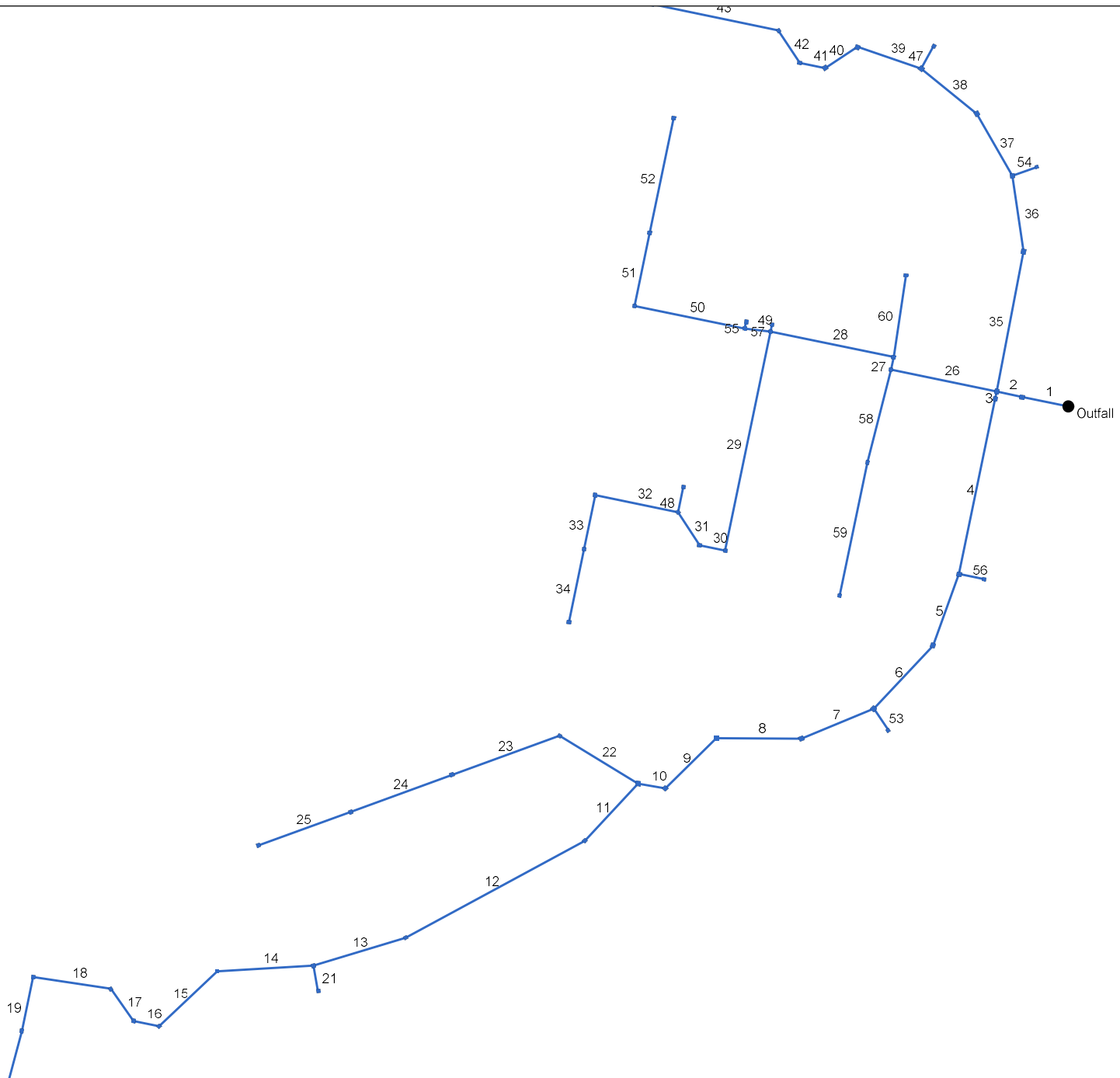
Date: 12/27/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

## 5. SCM 2: 10-YR HGL Profiles



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

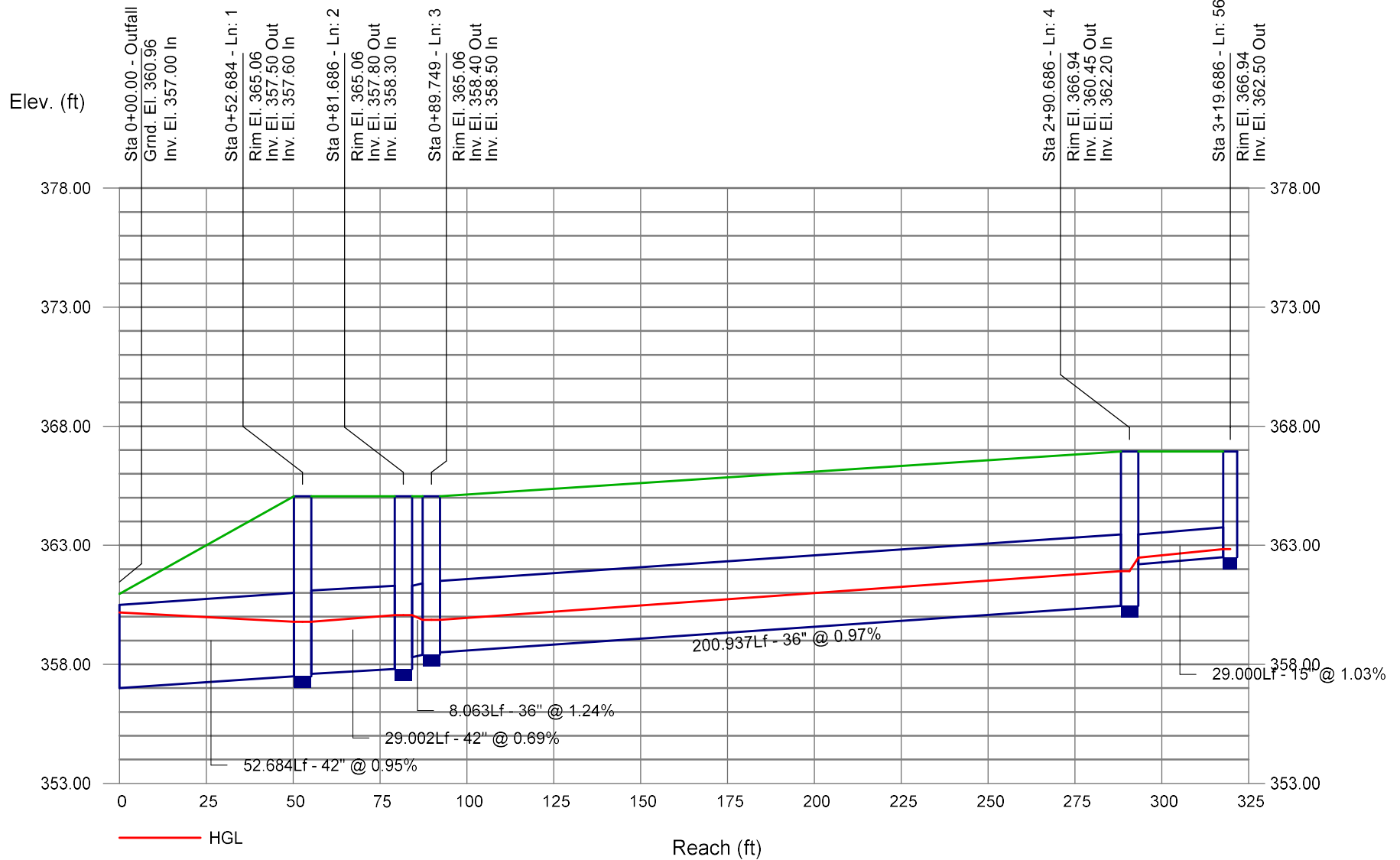


Project File: 20241226\_SCM2.stm

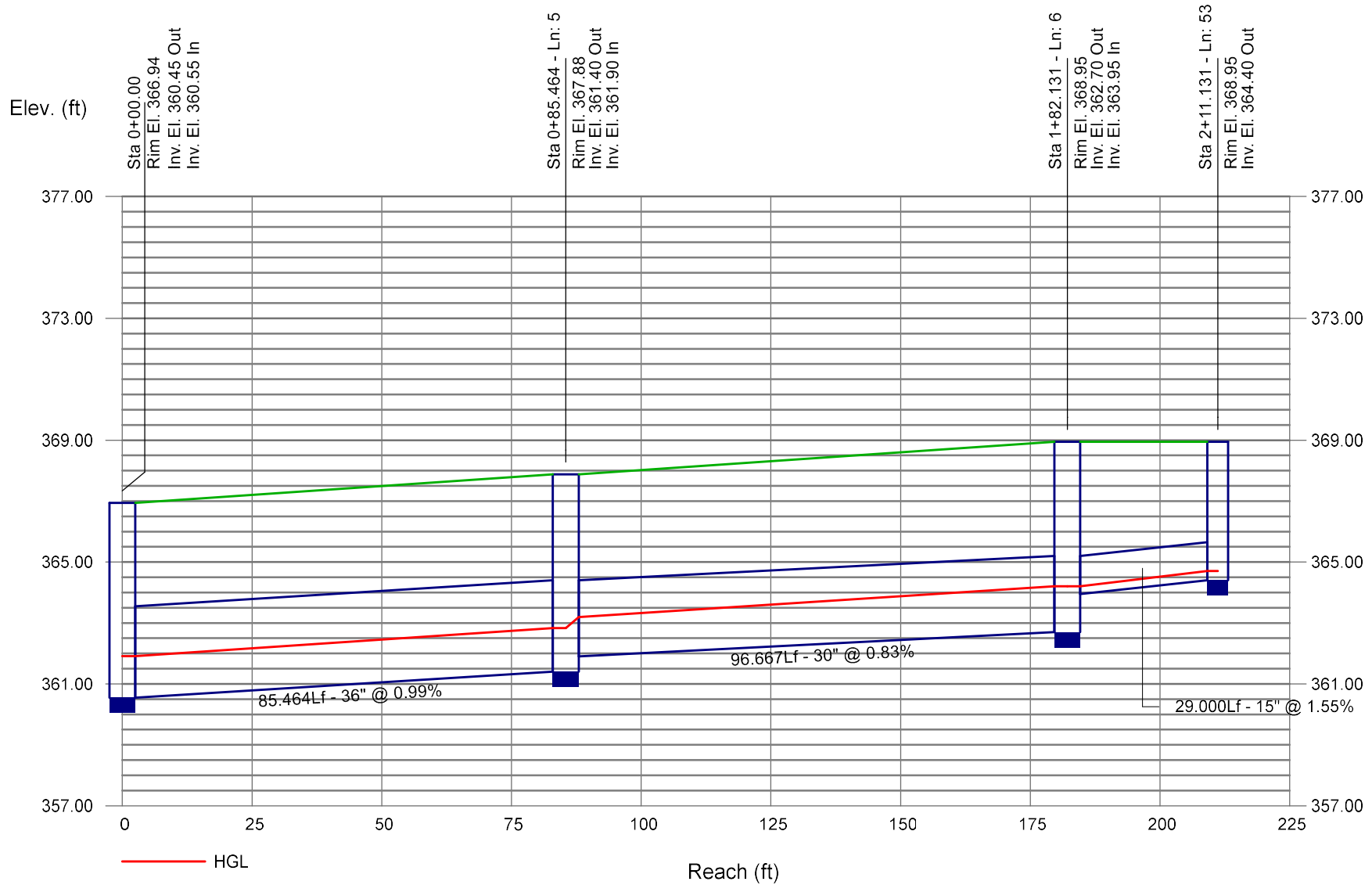
Number of lines: 60

Date: 12/31/2024

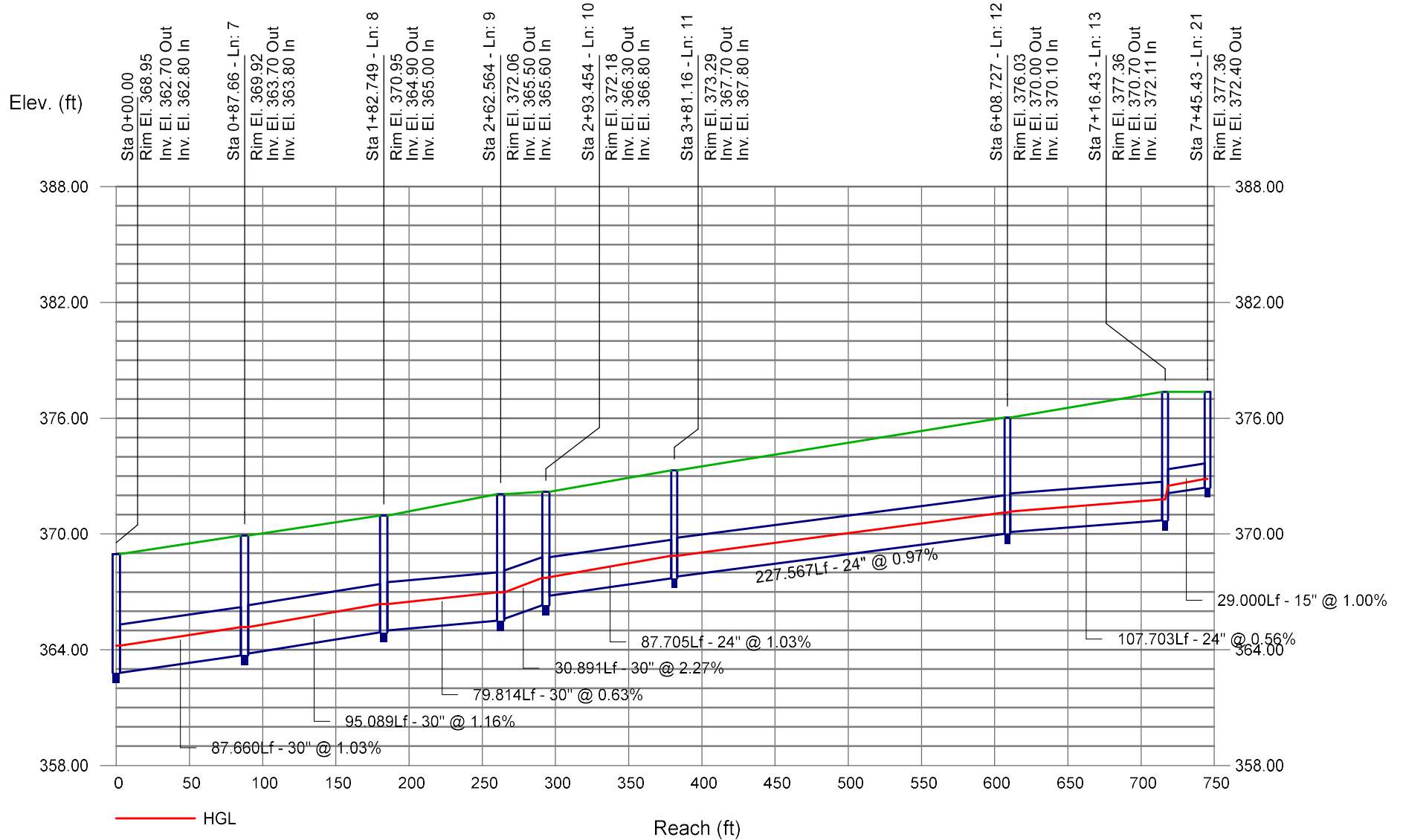
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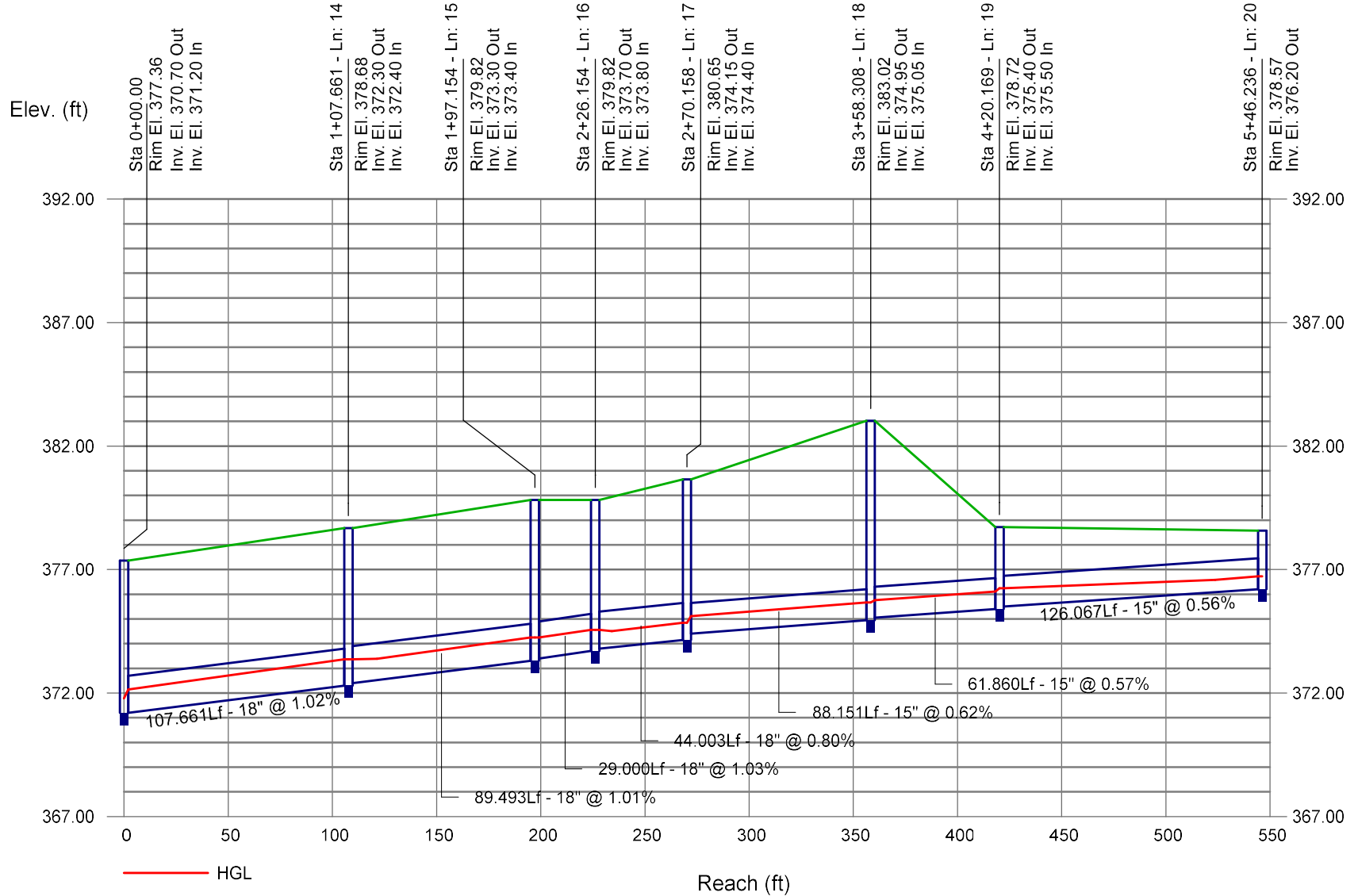
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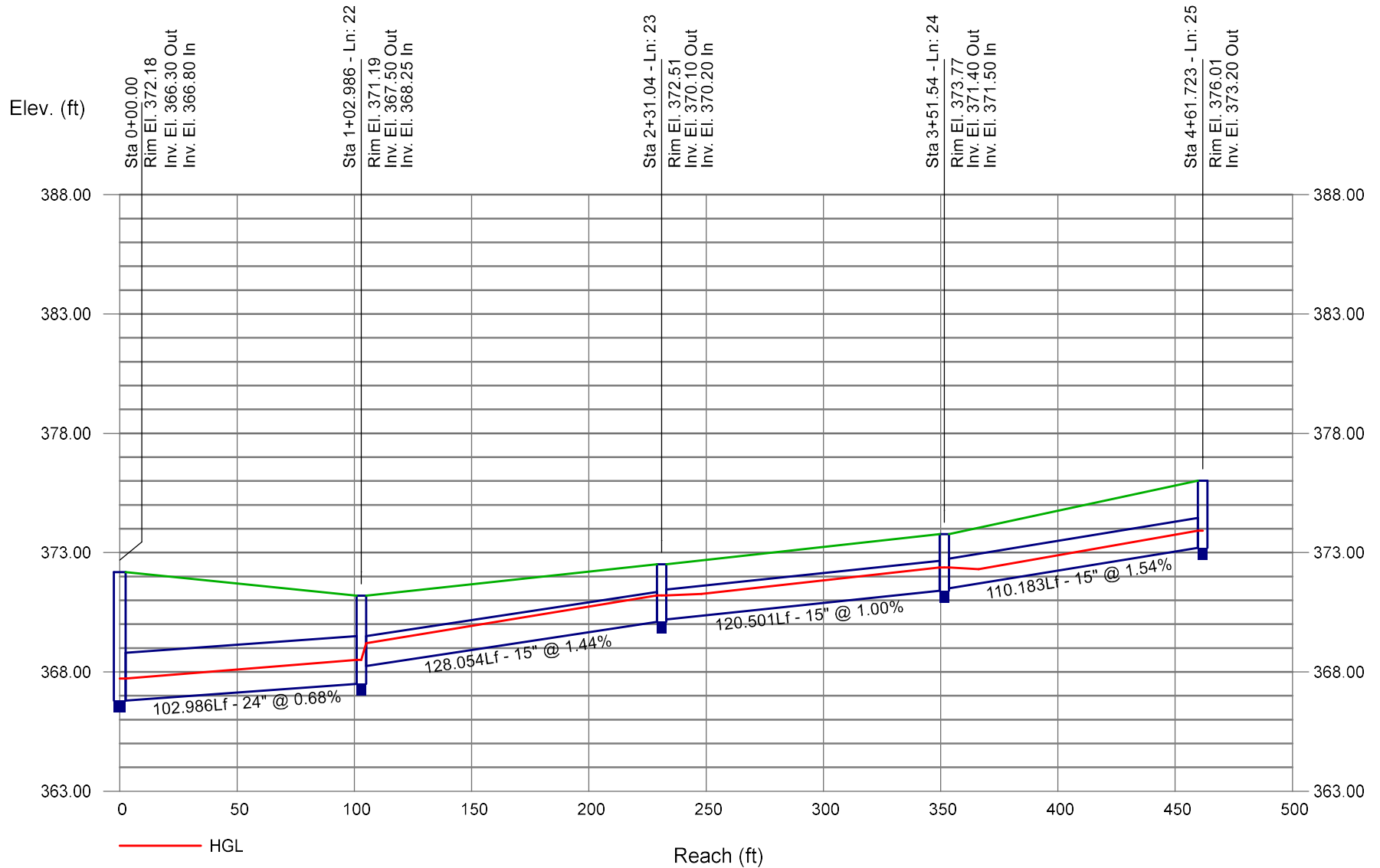
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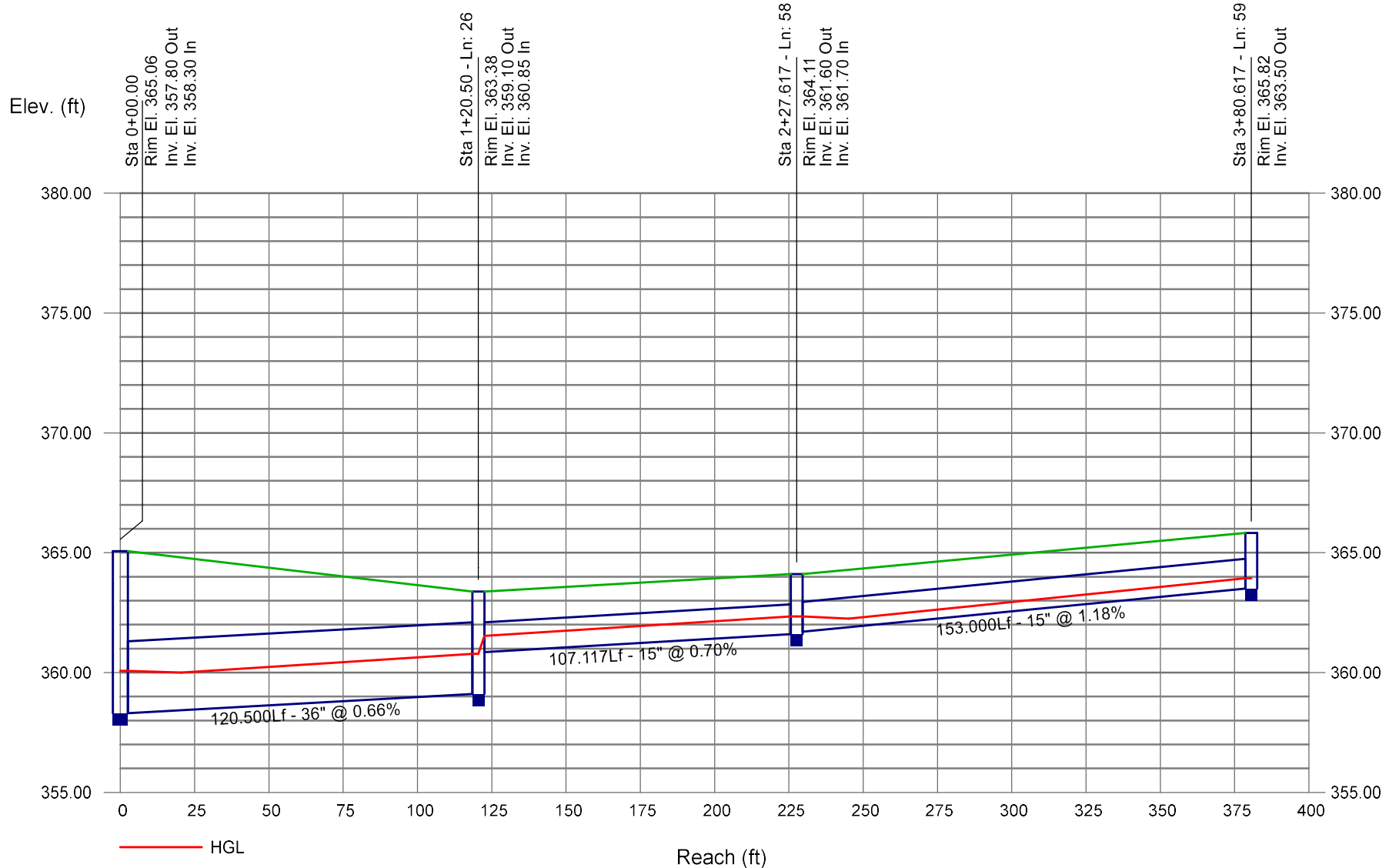
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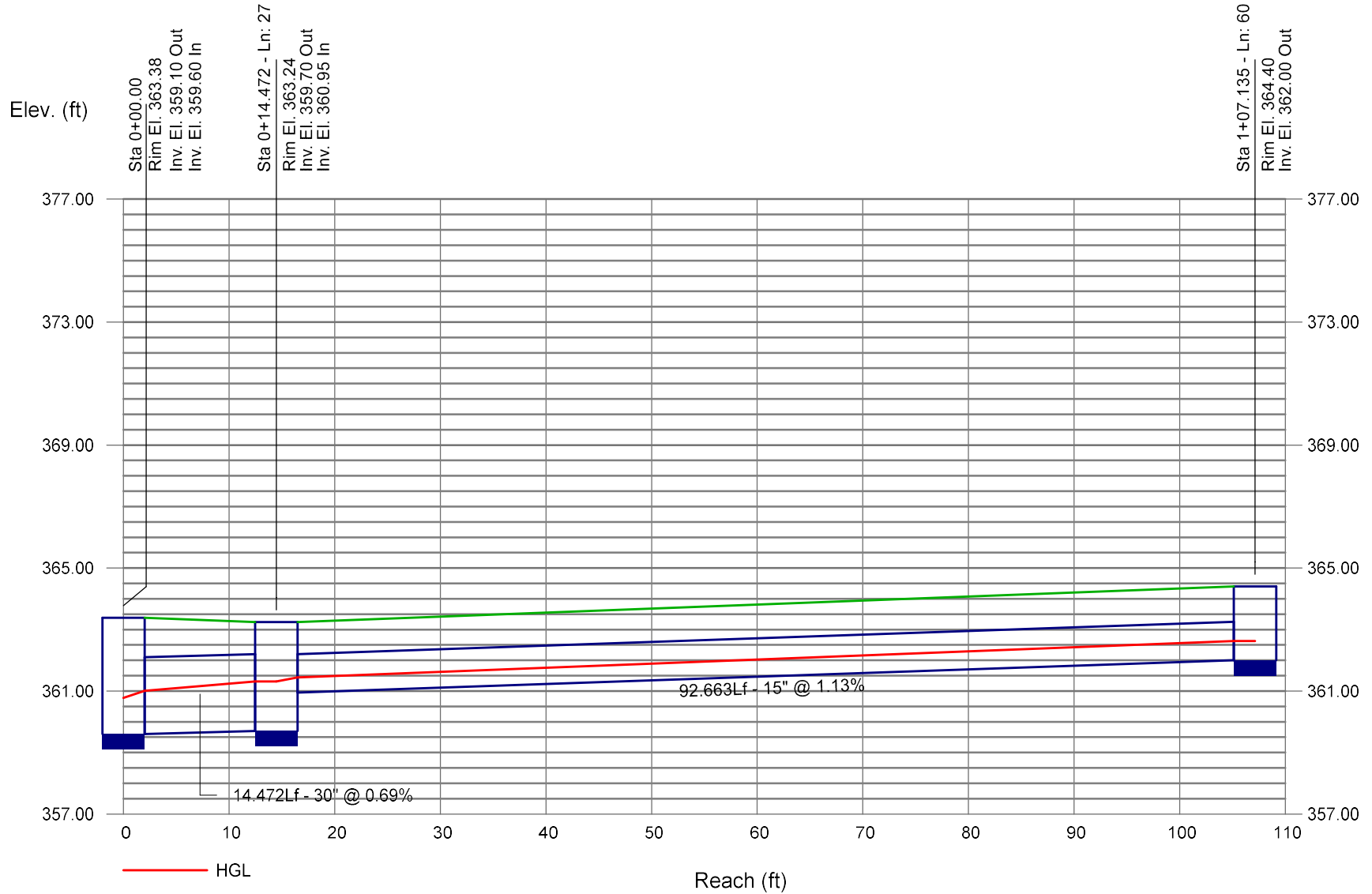
# Storm Sewer Profile



# Storm Sewer Profile

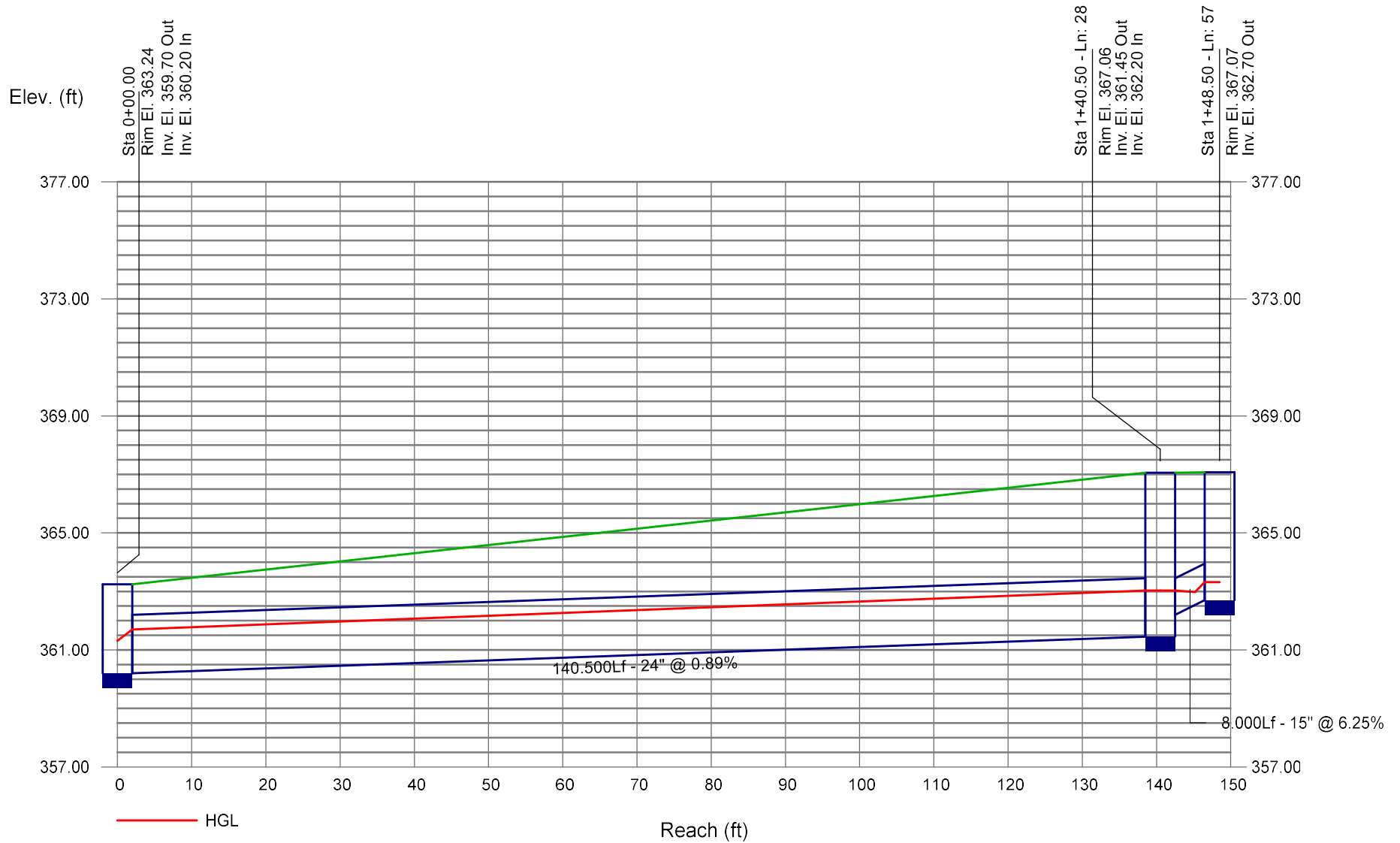


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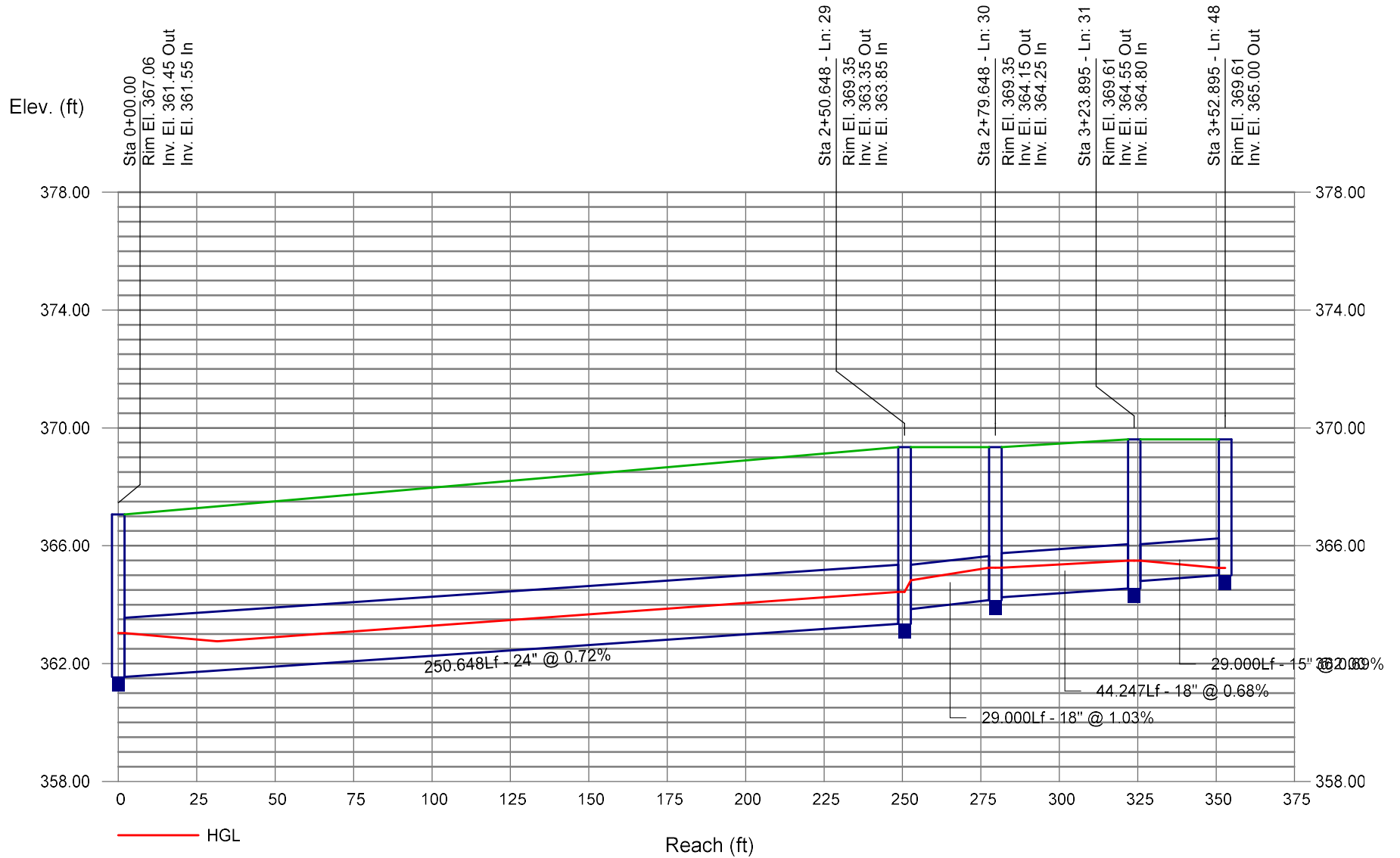




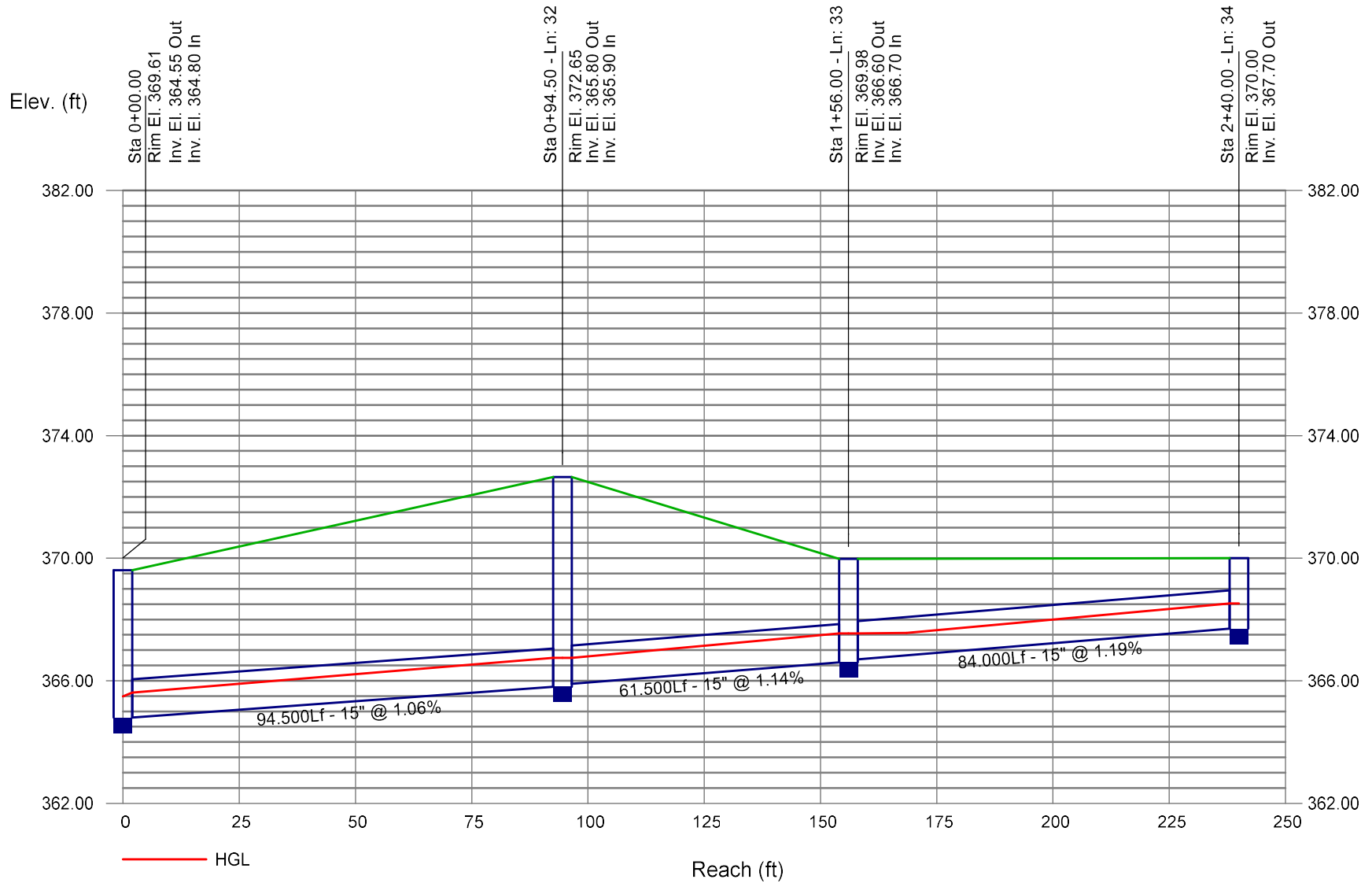
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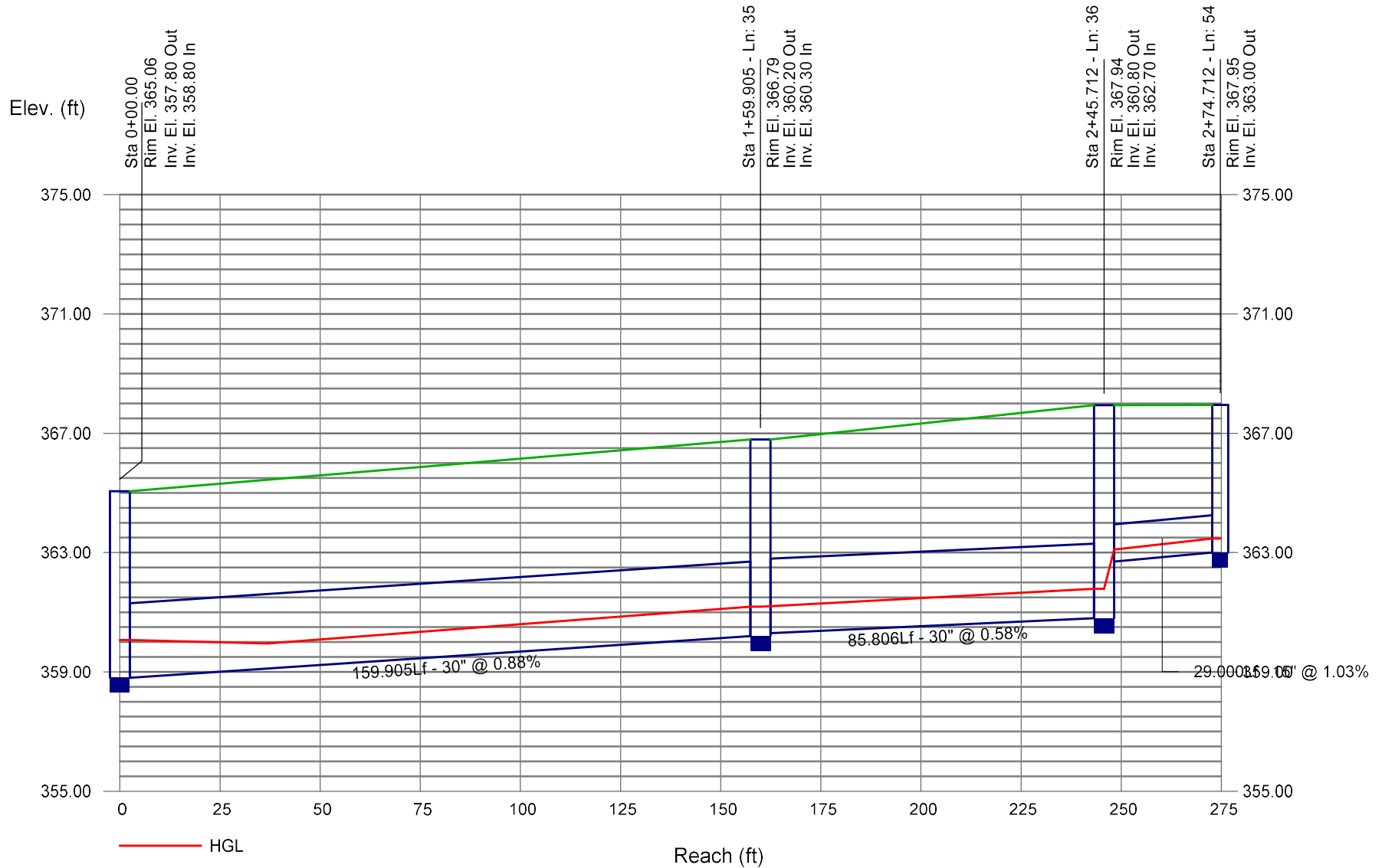
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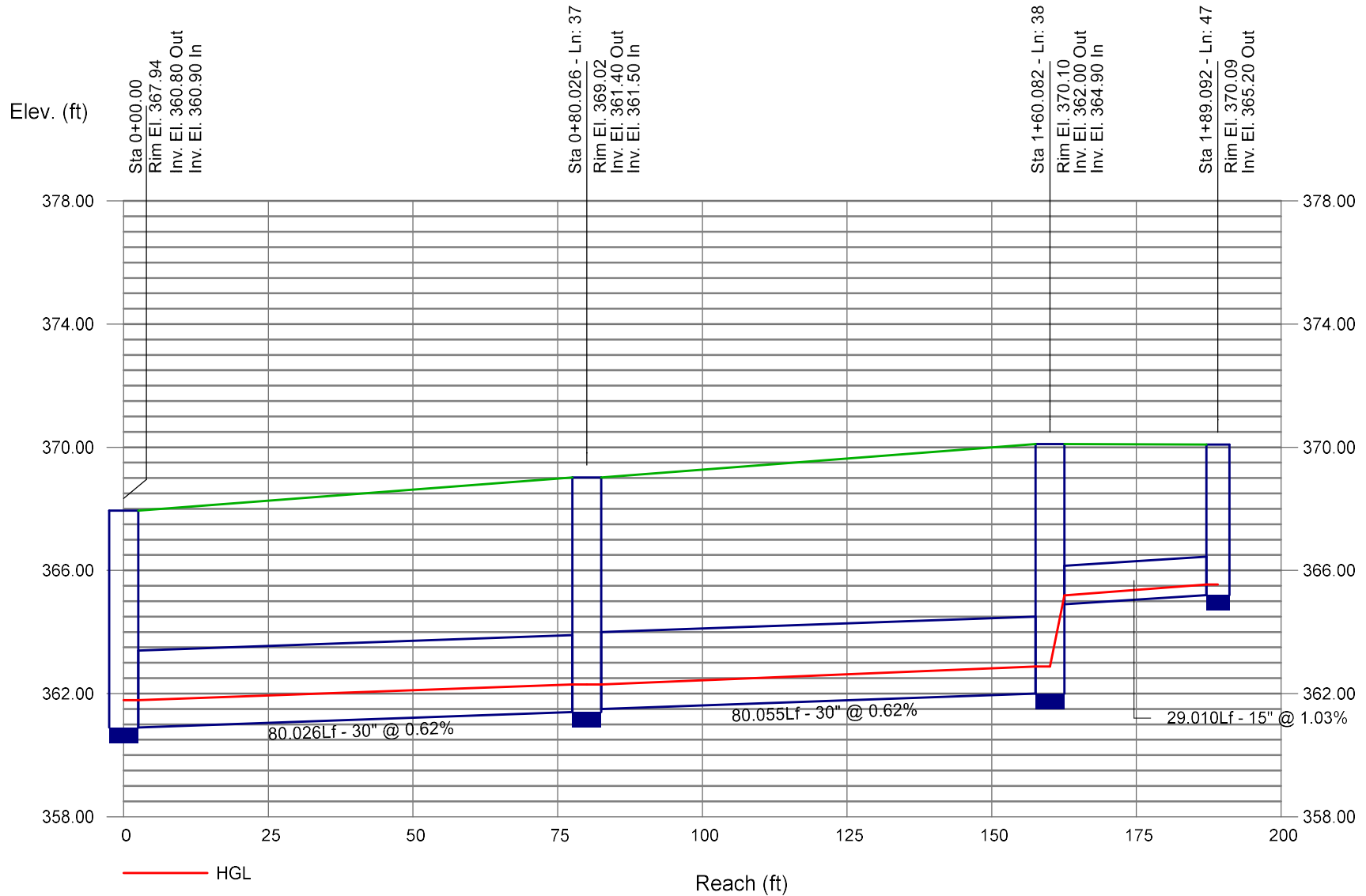
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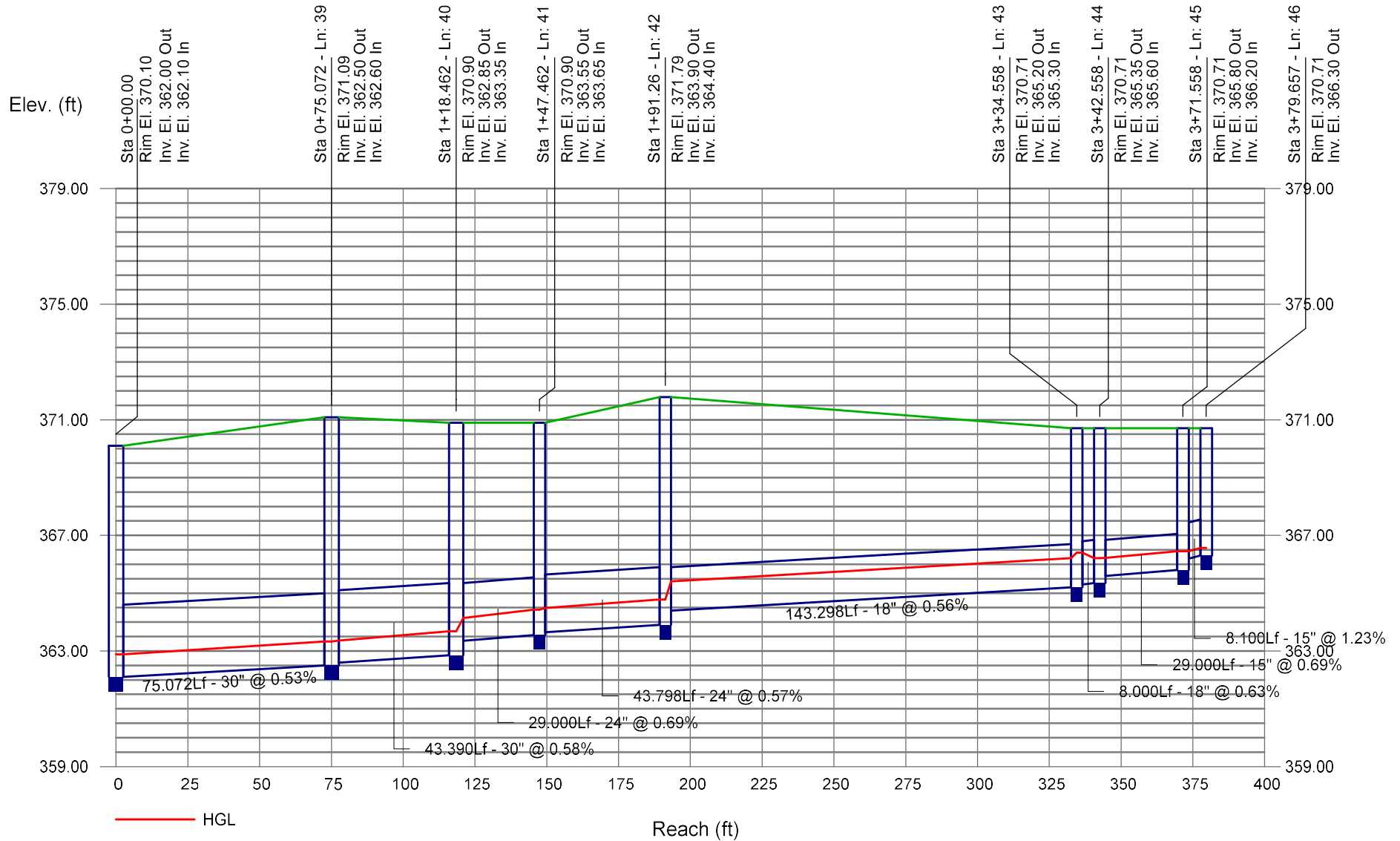
# Storm Sewer Profile



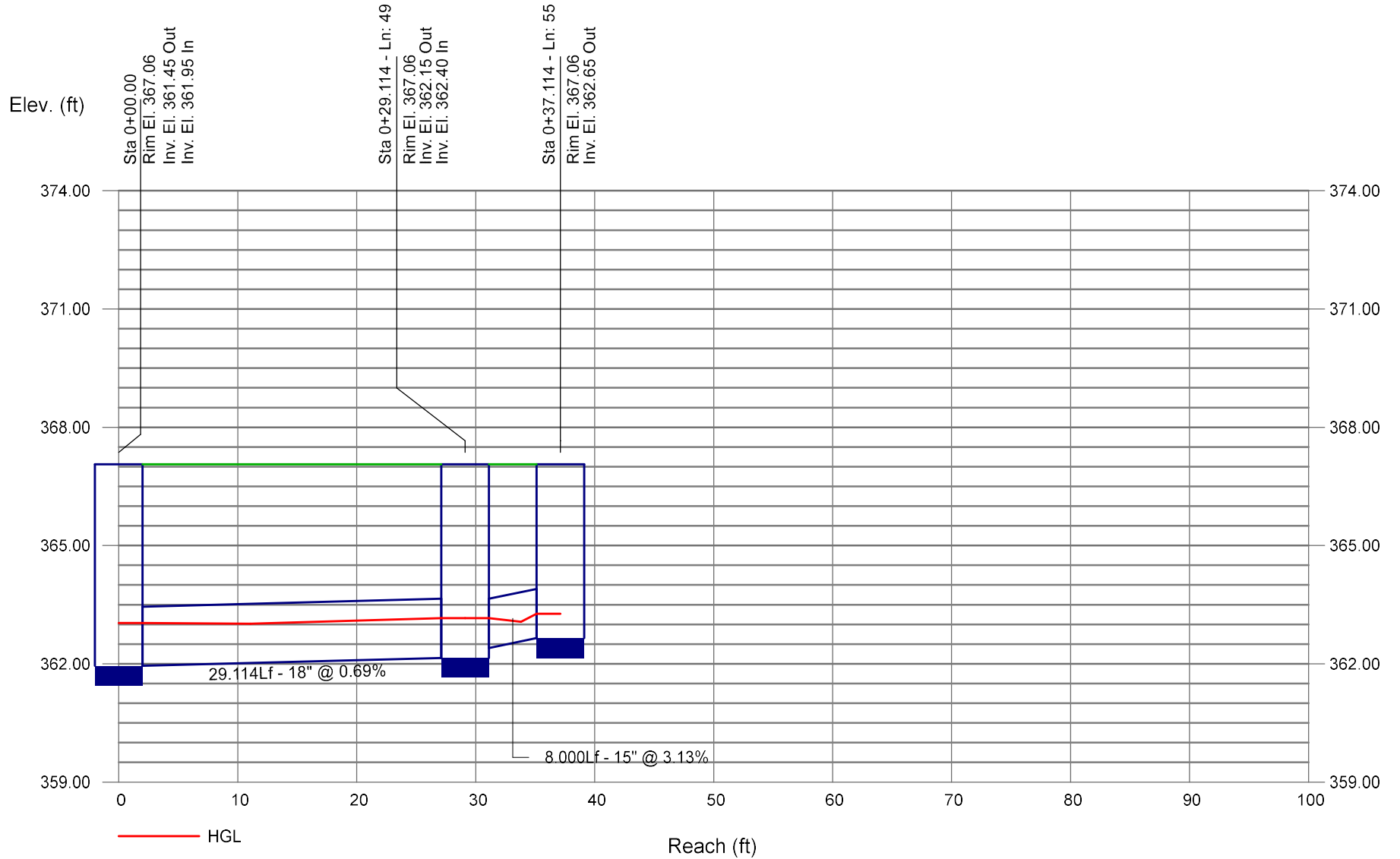
# Storm Sewer Profile



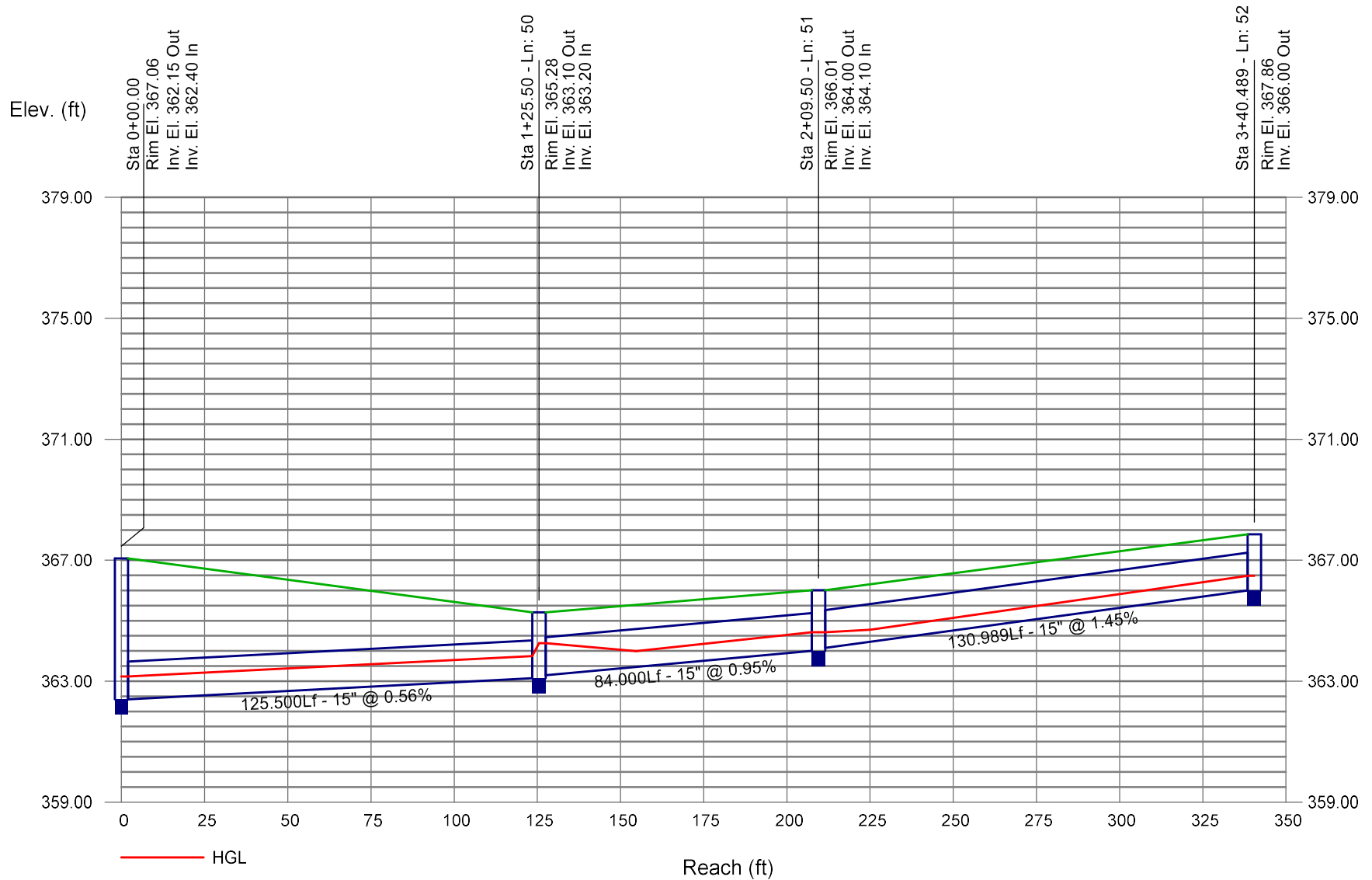
# Storm Sewer Profile



# Storm Sewer Profile



# Storm Sewer Profile





## 6. SCM 2: 4"/Hour Gutter Spread Chart

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
1	CB - 201	Comb.	Sag	0.38	5.0	4.00	0.60	0.91	0.05	0.96	0.96	2.11
2	CB - 202	Comb.	Sag	0.25	5.0	4.00	0.60	0.60	0.00	0.60	0.60	1.89
3	CB - 203	Comb.	Sag	0.33	5.0	4.00	0.60	0.79	0.01	0.80	0.80	2.00
4	CB - 204	Comb.	3	0.12	5.0	4.00	0.60	0.29	0.02	0.30	0.30	3.37
5	CB - 205	Comb.	4	0.16	5.0	4.00	0.60	0.38	0.02	0.38	0.38	3.86
6	CB - 206	Comb.	5	0.15	5.0	4.00	0.60	0.36	0.01	0.35	0.35	3.69
7	CB - 207	Comb.	6	0.12	5.0	4.00	0.60	0.29	0.00	0.28	0.28	3.22
8	CB - 208	Comb.	7	0.05	5.0	4.00	0.70	0.14	0.00	0.14	0.14	2.01
9	CB - 209	Comb.	53	0.32	5.0	4.00	0.60	0.77	0.12	0.74	0.74	5.42
10	CB - 210	Comb.	30	0.13	5.0	4.00	0.60	0.31	0.16	0.44	0.44	4.00
11	CB - 211	Comb.	10	0.37	5.0	4.00	0.60	0.89	0.03	0.76	0.76	5.51
12	CB - 212	Comb.	11	0.17	5.0	4.00	0.60	0.41	0.07	0.44	0.44	4.01
13	CB - 213	Comb.	12	0.17	5.0	4.00	0.60	0.41	0.20	0.54	0.54	4.54
14	CB - 214	Comb.	13	0.43	5.0	4.00	0.60	1.03	0.00	0.83	0.83	5.80
15	CB - 215	Comb.	21	0.28	5.0	4.00	0.60	0.67	0.00	0.59	0.59	4.84
16	CB - 216	Comb.	Sag	0.43	5.0	4.00	0.60	1.03	0.00	1.03	1.03	2.42
17	CB - 217	Comb.	16	0.06	5.0	4.00	0.60	0.14	0.00	0.14	0.14	1.96
18	CB - 218	Comb.	17	0.05	5.0	4.00	0.60	0.12	0.00	0.12	0.12	1.83
19	DI - 219	Dp-Grate	Sag	0.32	5.0	4.00	0.60	0.77	0.16	0.93	0.93	10.87
20	DI - 220	Dp-Grate	19	0.41	5.0	4.00	0.60	0.98	0.00	0.82	0.82	9.71
21	CB - 260	Comb.	9	0.30	5.0	4.00	0.60	0.72	0.08	0.68	0.68	5.18
22	DI - 256	Dp-Grate	34	0.04	5.0	4.00	0.60	0.10	0.36	0.42	0.42	7.81
23	DI - 257	Dp-Grate	22	0.49	5.0	4.00	0.60	1.18	0.47	1.29	1.29	13.52

Project File: 20241226\_SCM2.stm

Number of lines: 60

Date: 12/27/2024

NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
24	DI - 258	Dp-Grate	23	0.65	5.0	4.00	0.60	1.56	0.41	1.50	1.50	14.48
25	DI - 259	Dp-Grate	24	0.74	5.0	4.00	0.60	1.78	0.00	1.36	1.36	13.52
26	DI - 233	Dp-Grate	Sag	0.36	5.0	4.00	0.60	0.86	0.00	0.86	0.86	10.53
27	DI - 234	Dp-Grate	Sag	0.31	5.0	4.00	0.60	0.74	0.00	0.74	0.74	9.91
28	CB - 235	Comb.	Sag	0.41	5.0	4.00	0.70	1.15	0.09	1.24	1.24	3.24
29	CB - 236	Comb.	28	0.28	5.0	4.00	0.60	0.67	0.00	0.58	0.58	4.97
30	CB - 237	Comb.	Sag	0.47	5.0	4.00	0.70	1.32	0.03	1.35	1.35	3.67
31	CB - 238	Comb.	Sag	0.07	5.0	4.00	0.60	0.17	0.00	0.17	0.17	0.94
32	CB - 239	Comb.	31	0.02	5.0	4.00	0.60	0.05	0.00	0.05	0.05	1.01
33	DI - 240	Dp-Grate	Sag	0.32	5.0	4.00	0.60	0.77	0.67	1.44	1.44	13.18
34	DI - 241	Dp-Grate	33	0.95	5.0	4.00	0.60	2.28	0.03	1.64	1.64	13.52
35	CB - 221	Comb.	2	0.08	5.0	4.00	0.60	0.19	0.01	0.20	0.20	2.38
36	CB - 222	Comb.	35	0.12	5.0	4.00	0.60	0.29	0.00	0.29	0.29	3.04
37	CB - 223	Comb.	36	0.11	5.0	4.00	0.60	0.26	0.00	0.26	0.26	2.87
38	CB - 224	Comb.	37	0.09	5.0	4.00	0.60	0.22	0.00	0.22	0.22	2.52
39	CB - 225	Comb.	38	0.02	5.0	4.00	0.70	0.06	0.00	0.06	0.06	1.37
40	CB - 226	Comb.	57	0.03	5.0	4.00	0.70	0.08	0.00	0.08	0.08	1.55
41	CB - 227	Comb.	55	0.02	5.0	4.00	0.70	0.06	0.00	0.06	0.06	1.34
42	CB - 228	Comb.	43	0.03	5.0	4.00	0.70	0.08	0.00	0.08	0.08	1.66
43	CB - 229	Comb.	Sag	0.24	5.0	4.00	0.70	0.67	0.00	0.67	0.67	2.00
44	CB - 230	Comb.	Sag	0.49	5.0	4.00	0.70	1.37	0.00	1.37	1.37	3.76
45	CB - 231	Comb.	Sag	0.44	5.0	4.00	0.70	1.23	0.00	1.23	1.23	3.22
46	CB - 232	Comb.	Sag	0.09	5.0	4.00	0.70	0.25	0.00	0.25	0.25	1.18

Project File: 20241226_SCM2.stm	Number of lines: 60	Date: 12/27/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
47	CB - 253	Comb.	54	0.15	5.0	4.00	0.70	0.42	0.00	0.40	0.40	3.73
48	CB - 251	Comb.	49	0.09	5.0	4.00	0.60	0.22	0.00	0.22	0.22	1.94
49	CB - 242	Comb.	Sag	0.35	5.0	4.00	0.70	0.98	0.00	0.98	0.98	2.21
50	DI - 243	Dp-Grate	Sag	0.21	5.0	4.00	0.60	0.50	0.08	0.58	0.58	9.03
51	DI - 244	Dp-Grate	50	0.24	5.0	4.00	0.60	0.58	0.11	0.61	0.61	9.71
52	DI - 245	Dp-Grate	51	0.35	5.0	4.00	0.60	0.84	0.00	0.73	0.73	10.67
53	CB - 255	Comb.	56	0.14	5.0	4.00	0.60	0.34	0.15	0.45	0.45	4.25
54	CB - 252	Comb.	1	0.33	5.0	4.00	0.60	0.79	0.02	0.80	0.80	2.82
55	CB - 250	Comb.	Sag	0.47	5.0	4.00	0.70	1.32	0.00	1.32	1.32	3.55
56	CB - 254	Comb.	1	0.17	5.0	4.00	0.60	0.41	0.04	0.42	0.42	4.09
57	CB - 249	Comb.	Sag	0.47	5.0	4.00	0.70	1.32	0.00	1.32	1.32	3.55
58	DI - 247	Dp-Grate	Sag	0.58	5.0	4.00	0.60	1.39	0.00	1.39	1.39	12.98
59	DI - 248	Dp-Grate	Sag	0.28	5.0	4.00	0.60	0.67	0.00	0.67	0.67	9.52
60	DI - 246	Dp-Grate	Sag	0.57	5.0	4.00	0.60	1.37	0.00	1.37	1.37	12.88

Project File: 20241226_SCM2.stm	Number of lines: 60	Date: 12/27/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

## 7. SCM 3: 10-YR Storm Drainage Chart

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
1	Dp-Grate	DI - 301	Outfall	0.24	14.3	5.32	0.60	21.32	92.31	65.143	30	0.013	5.07	358.30	355.00	366.95	358.29	359.87 j	357.53
2	Dp-Grate	DI - 302	1	0.05	13.8	5.39	0.60	20.83	63.17	130.682	30	0.013	2.37	361.50	358.40	369.98	366.95	363.05	359.87
3	Dp-Grate	DI - 303	2	0.04	13.6	5.42	0.60	20.79	30.24	55.180	30	0.013	0.54	361.90	361.60	369.61	369.98	363.45	363.12
4	Comb.	CB - 304	3	0.09	13.2	5.49	0.60	20.90	32.20	113.591	30	0.013	0.62	362.70	362.00	371.54	369.61	364.25	363.47
5	Comb.	CB - 305	4	0.11	12.6	5.58	0.60	19.98	30.02	149.355	30	0.013	0.54	363.60	362.80	373.10	371.54	365.12	364.29
6	Comb.	CB - 306	5	0.17	12.0	5.68	0.60	12.45	30.13	169.000	24	0.013	1.78	367.10	364.10	374.80	373.10	368.37	365.12
7	Comb.	CB - 307	6	0.09	11.5	5.76	0.60	10.86	30.34	105.608	24	0.013	1.80	369.10	367.20	375.86	374.80	370.28	368.37
8	Comb.	CB - 308	7	0.43	11.3	5.80	0.60	10.61	18.81	43.355	24	0.013	0.69	369.50	369.20	376.49	375.86	370.67	370.28
9	Comb.	CB - 309	8	0.43	11.2	5.83	0.60	9.16	18.78	29.000	24	0.013	0.69	369.80	369.60	376.49	376.49	370.88	370.67
10	Comb.	CB - 310	9	0.19	10.9	5.87	0.60	7.72	18.82	43.328	24	0.013	0.69	370.20	369.90	376.76	376.49	371.19	370.88
11	Comb.	CB - 311	10	0.22	10.0	6.04	0.60	6.49	17.77	121.542	24	0.013	0.62	371.05	370.30	377.98	376.76	371.95	371.19
12	Comb.	CB - 312	11	0.14	8.3	6.39	0.60	3.87	24.26	134.782	24	0.013	1.15	372.70	371.15	379.34	377.98	373.39 j	371.95
13	Comb.	CB - 313	12	0.14	7.0	6.70	0.60	3.50	18.18	92.839	24	0.013	0.65	373.40	372.80	380.34	379.34	374.05	373.39
14	Comb.	CB - 314	13	0.29	6.8	6.77	0.60	2.96	9.75	29.020	18	0.013	0.86	374.15	373.90	380.34	380.34	374.80	374.47
15	Comb.	CB - 315	14	0.33	6.2	6.90	0.60	1.82	4.93	47.957	15	0.013	0.58	374.68	374.40	380.05	380.34	375.22	374.93
16	Comb.	CB - 316	15	0.11	5.0	7.25	0.60	0.48	5.62	29.001	15	0.013	0.76	375.00	374.78	380.05	380.05	375.27 j	375.22
17	Comb.	CB - 317	5	0.28	9.3	6.18	0.60	8.20	15.10	29.000	18	0.013	2.07	365.20	364.60	373.10	373.10	366.31	365.39
18	Dp-Grate	DI - 318	17	0.28	8.8	6.29	0.60	7.28	14.96	128.098	18	0.013	2.03	367.90	365.30	371.34	373.10	368.94	366.31
19	Dp-Grate	DI - 319	18	0.38	8.4	6.38	0.60	6.31	11.81	86.997	18	0.013	1.26	369.10	368.00	372.11	371.34	370.07	368.94
20	Dp-Grate	DI - 320	19	0.35	7.7	6.54	0.60	4.98	10.37	123.000	18	0.013	0.98	370.40	369.20	373.34	372.11	371.26 j	370.07
21	Dp-Grate	DI - 321	20	0.34	7.1	6.69	0.60	3.70	6.51	123.000	15	0.013	1.02	371.90	370.65	374.58	373.34	372.68	371.32
22	Dp-Grate	DI - 322	21	0.21	6.0	6.96	0.60	2.42	6.38	123.000	15	0.013	0.98	373.20	372.00	375.81	374.58	373.82 j	372.68
23	Dp-Grate	DI - 323	22	0.37	5.0	7.25	0.60	1.61	6.50	82.000	15	0.013	1.01	374.13	373.30	376.59	375.81	374.63 j	373.82

Project File: SCM3 CHECK.stm

Number of lines: 42

Date: 10/30/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
24	Comb.	CB - 326	11	0.34	5.0	7.25	0.60	1.48	6.03	31.016	15	0.013	0.87	373.07	372.80	378.09	377.98	373.55	373.22
25	Dp-Grate	DI - 327	11	0.22	5.0	7.25	0.60	0.96	5.27	73.500	15	0.013	0.67	372.39	371.90	374.73	377.98	372.77	372.26
26	Comb.	CB - 325	10	0.21	5.0	7.25	0.60	0.91	6.40	30.530	15	0.013	0.98	371.80	371.50	376.86	376.76	372.17	371.82
27	Comb.	CB - 324	6	0.34	5.0	7.25	0.60	1.48	6.00	29.000	15	0.013	0.86	369.75	369.50	374.80	374.80	370.23	369.92
28	Dp-Grate	DI - 351	Outfall	0.08	10.6	5.94	0.60	17.02	88.27	34.256	36	0.013	1.75	355.10	354.50	363.68	358.33	357.52	357.53
29	Dp-Grate	DI - 352	28	0.12	9.5	6.15	0.60	17.35	49.52	163.276	36	0.013	0.55	356.10	355.20	363.46	363.68	357.43	357.70
30	Comb.	CB - 353	29	0.28	8.5	6.36	0.60	17.47	49.48	145.371	36	0.013	0.55	357.00	356.20	364.32	363.46	358.34	357.43
31	Comb.	CB - 361	30	0.52	5.7	7.04	0.60	4.01	29.11	163.007	24	0.013	1.66	360.70	358.00	366.57	364.32	361.40	358.50
32	Comb.	CB - 328	4	0.29	5.0	7.25	0.60	1.26	6.56	38.780	15	0.013	1.03	366.50	366.10	370.35	371.54	366.94	366.47
33	Comb.	CB - 354	30	0.35	8.4	6.39	0.60	11.15	22.95	29.129	24	0.013	1.03	358.30	358.00	364.32	364.32	359.50	358.98
34	Comb.	CB - 355	33	0.21	8.3	6.40	0.60	9.83	21.93	10.636	24	0.013	0.94	358.50	358.40	364.30	364.32	359.62	359.50
35	Dp-Grate	DI - 356	34	0.48	7.6	6.57	0.60	9.26	16.67	128.929	24	0.013	0.54	359.30	358.60	362.45	364.30	360.39	359.67
36	Dp-Grate	DI - 357	35	0.39	7.2	6.67	0.60	5.20	6.69	107.000	15	0.013	1.07	361.10	359.95	363.67	362.45	362.02	360.78
37	Dp-Grate	DI - 358	36	0.38	6.4	6.87	0.60	3.75	8.09	153.000	15	0.013	1.57	363.60	361.20	366.09	363.67	364.38 j	362.02
38	Dp-Grate	DI - 359	37	0.53	5.0	7.25	0.60	2.31	8.09	153.000	15	0.013	1.57	366.10	363.70	368.51	366.09	366.71 j	364.38
39	Comb.	CB - 365	35	0.04	5.4	7.14	0.60	2.44	21.65	82.327	18	0.013	4.25	363.30	359.80	368.90	362.45	363.89	360.39
40	Comb.	CB - 366	39	0.53	5.0	7.25	0.60	2.31	9.85	30.675	18	0.013	0.88	363.67	363.40	369.13	368.90	364.24	363.89
41	Comb.	CB - 364	31	0.43	5.0	7.25	0.60	1.87	10.53	45.728	18	0.013	1.01	361.66	361.20	367.13	366.57	362.17	361.63
42	Comb.	CB - 360	30	0.44	5.0	7.25	0.60	1.91	6.30	10.502	15	0.013	0.95	359.80	359.70	364.30	364.32	360.35	360.17

Project File: SCM3 CHECK.stm

Number of lines: 42

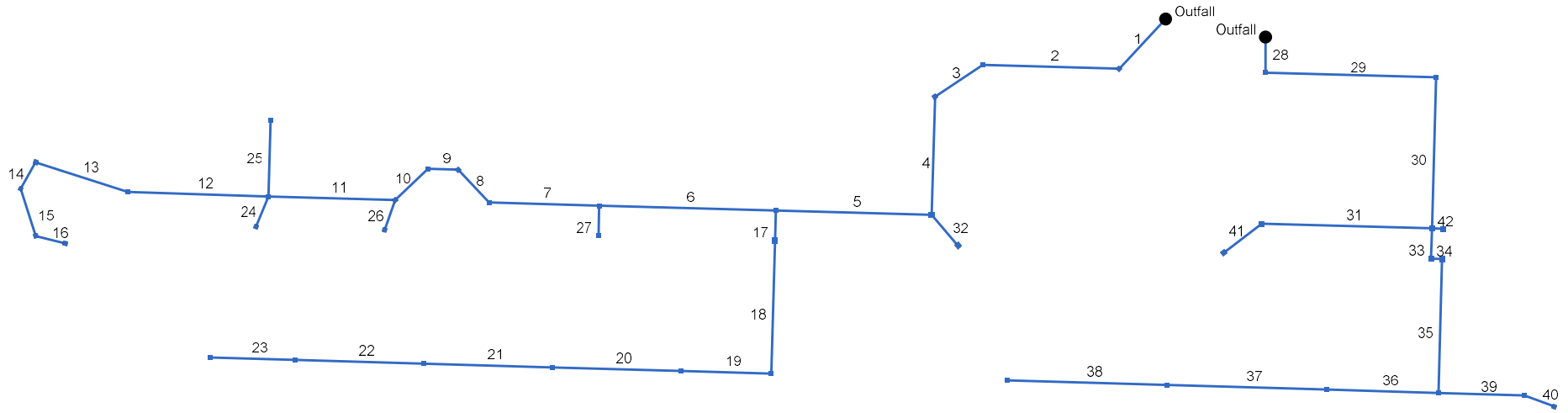
Date: 10/30/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

## 8. SCM 3: 10-YR HGL Profiles



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

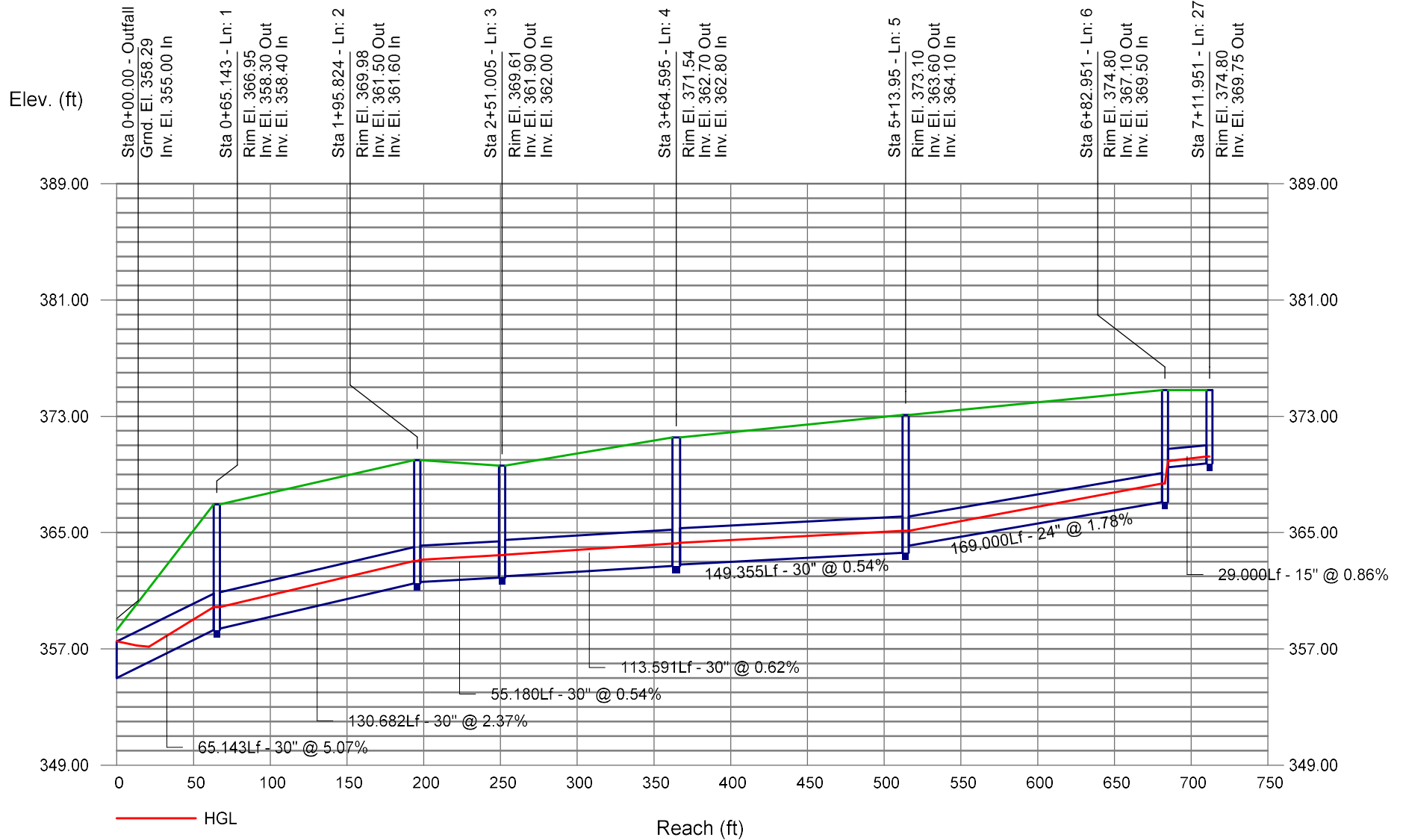


Project File: SCM3 CHECK.stm

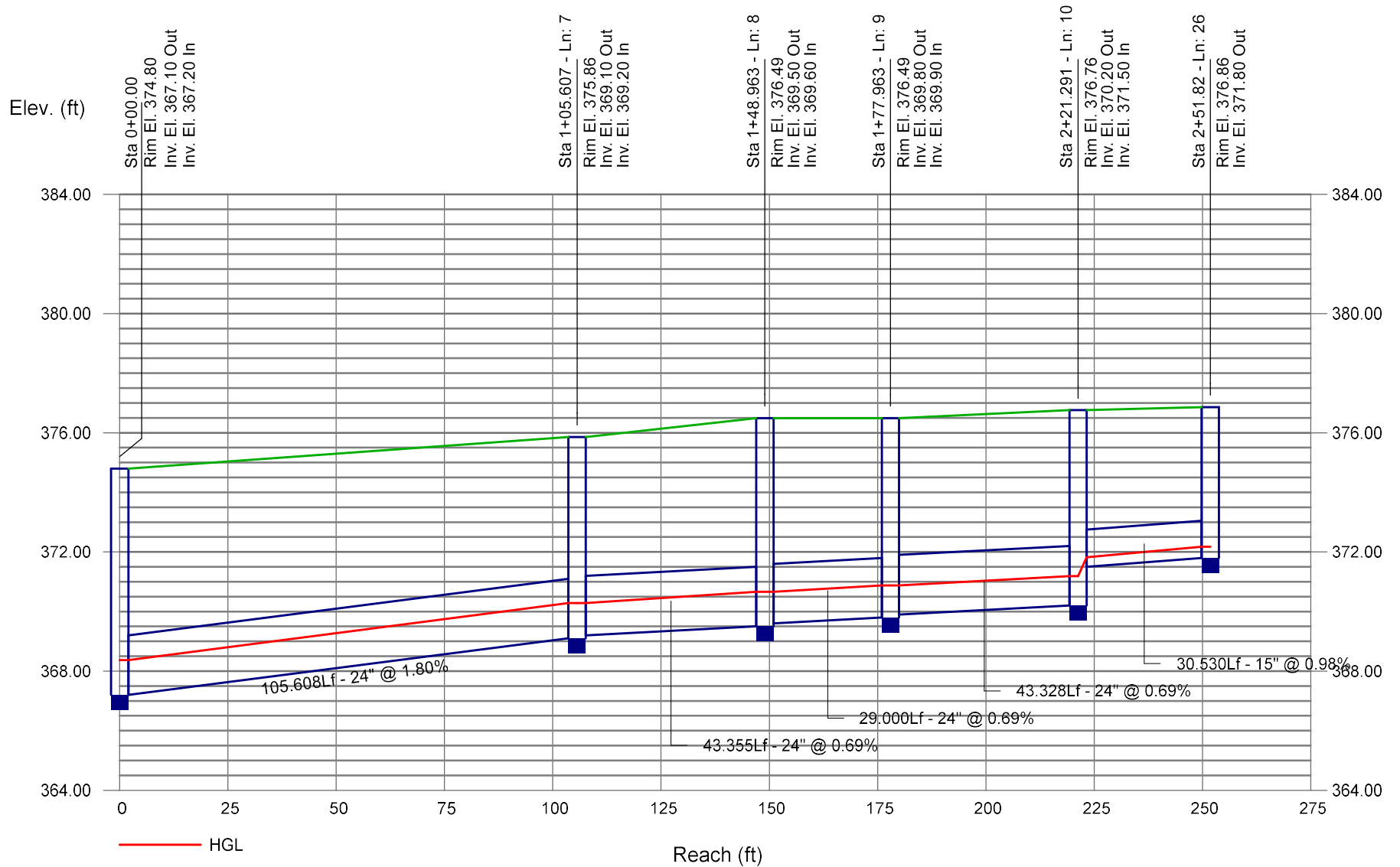
Number of lines: 42

Date: 10/30/2024

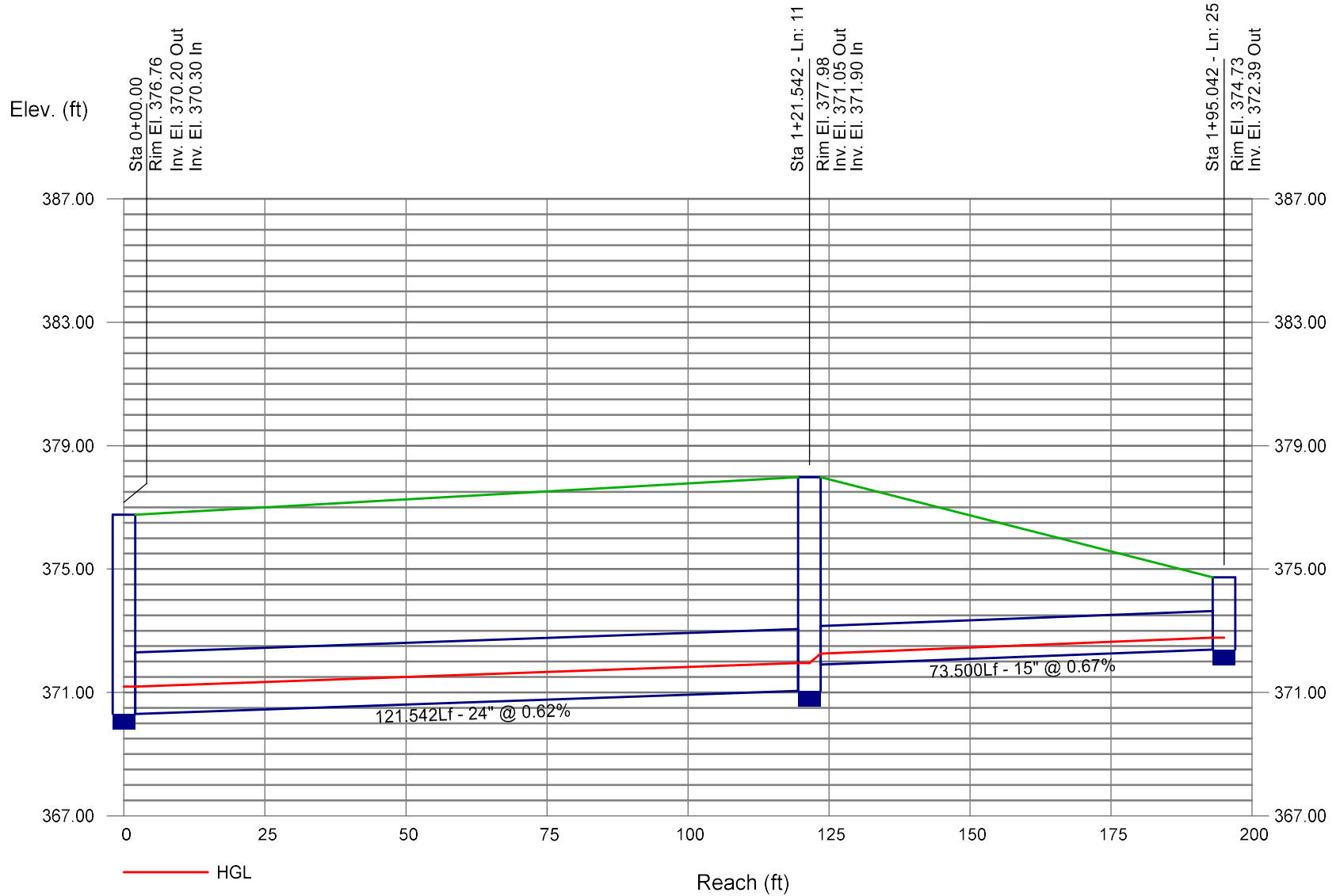
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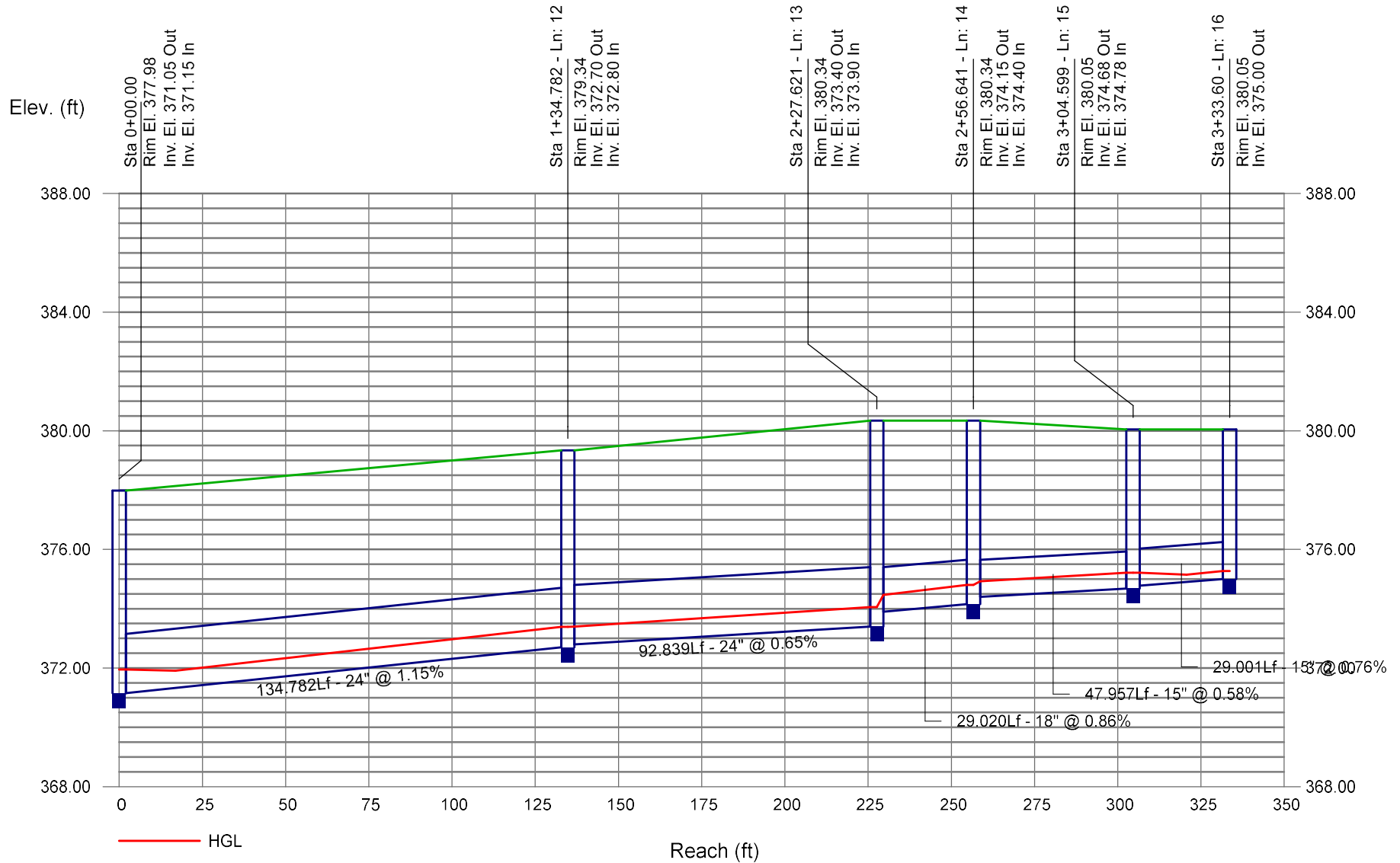
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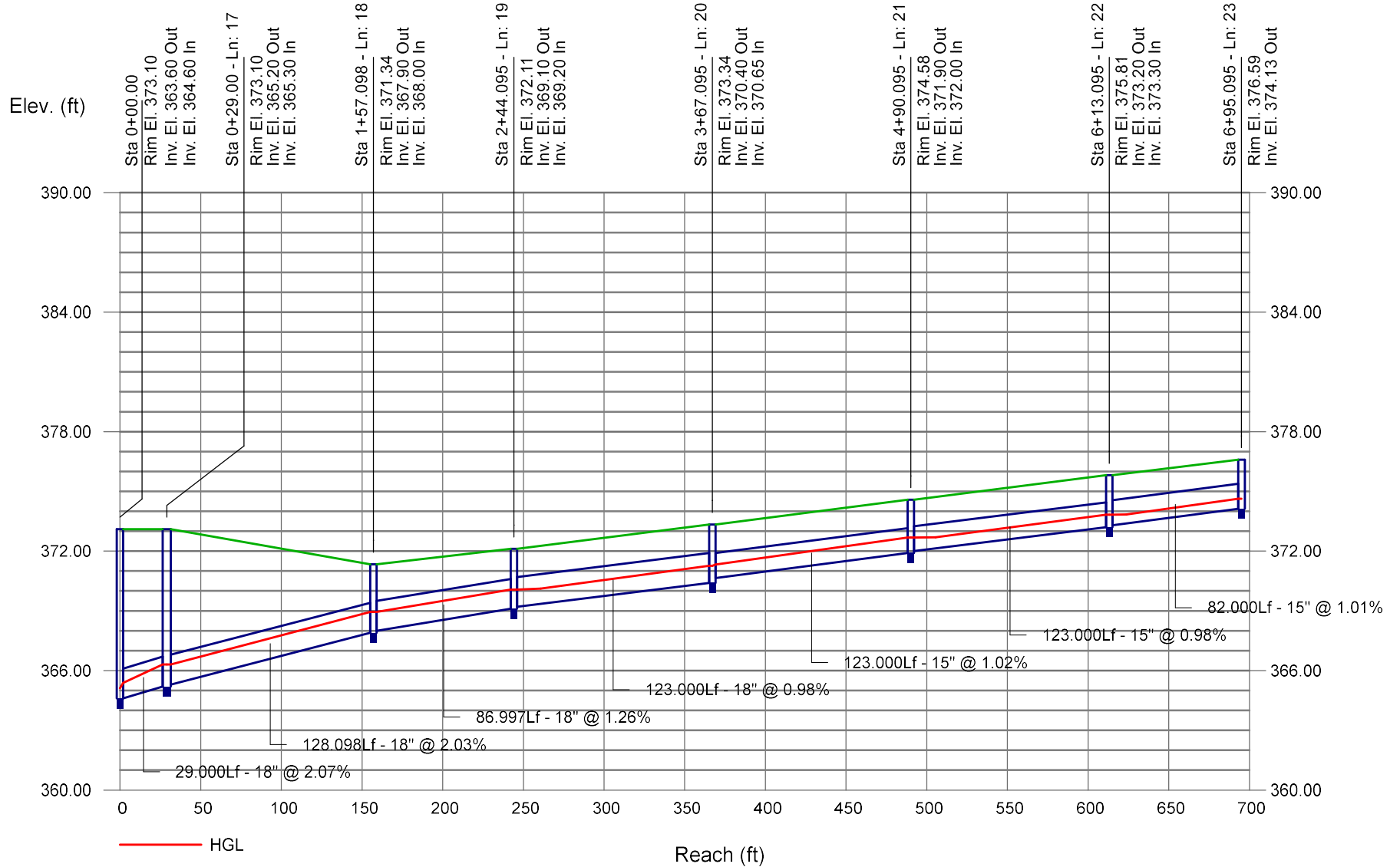
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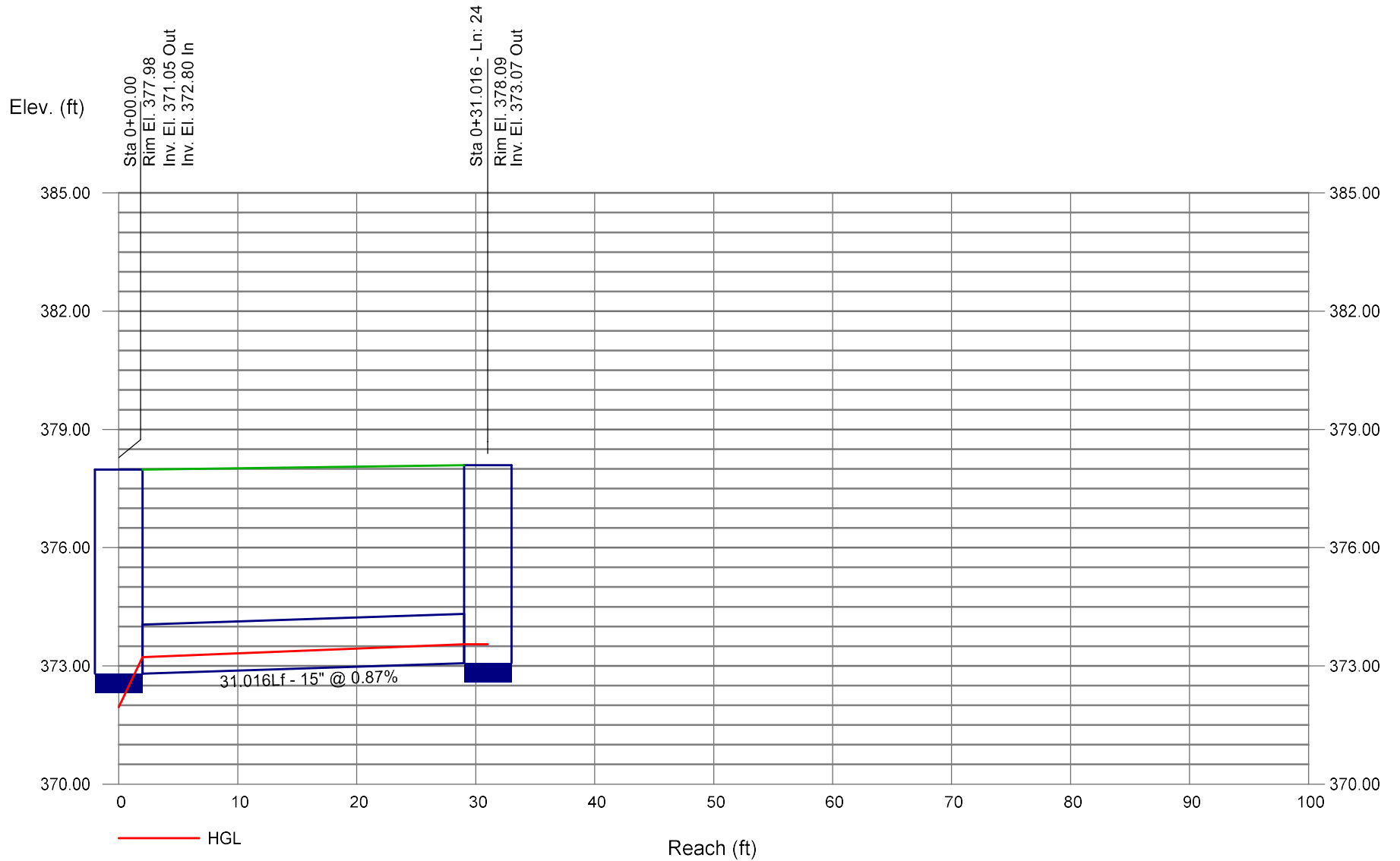
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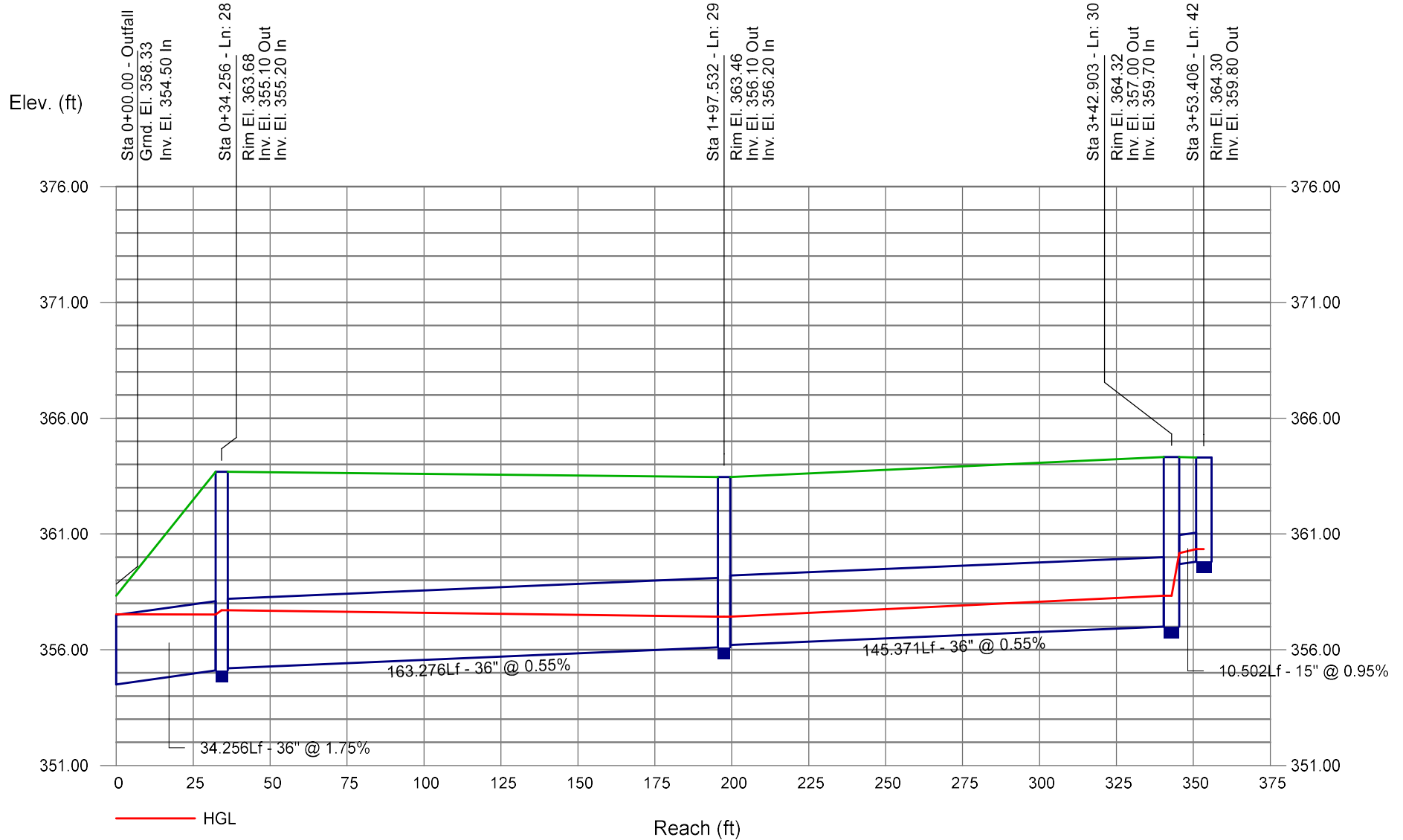
# Storm Sewer Profile



# Storm Sewer Profile

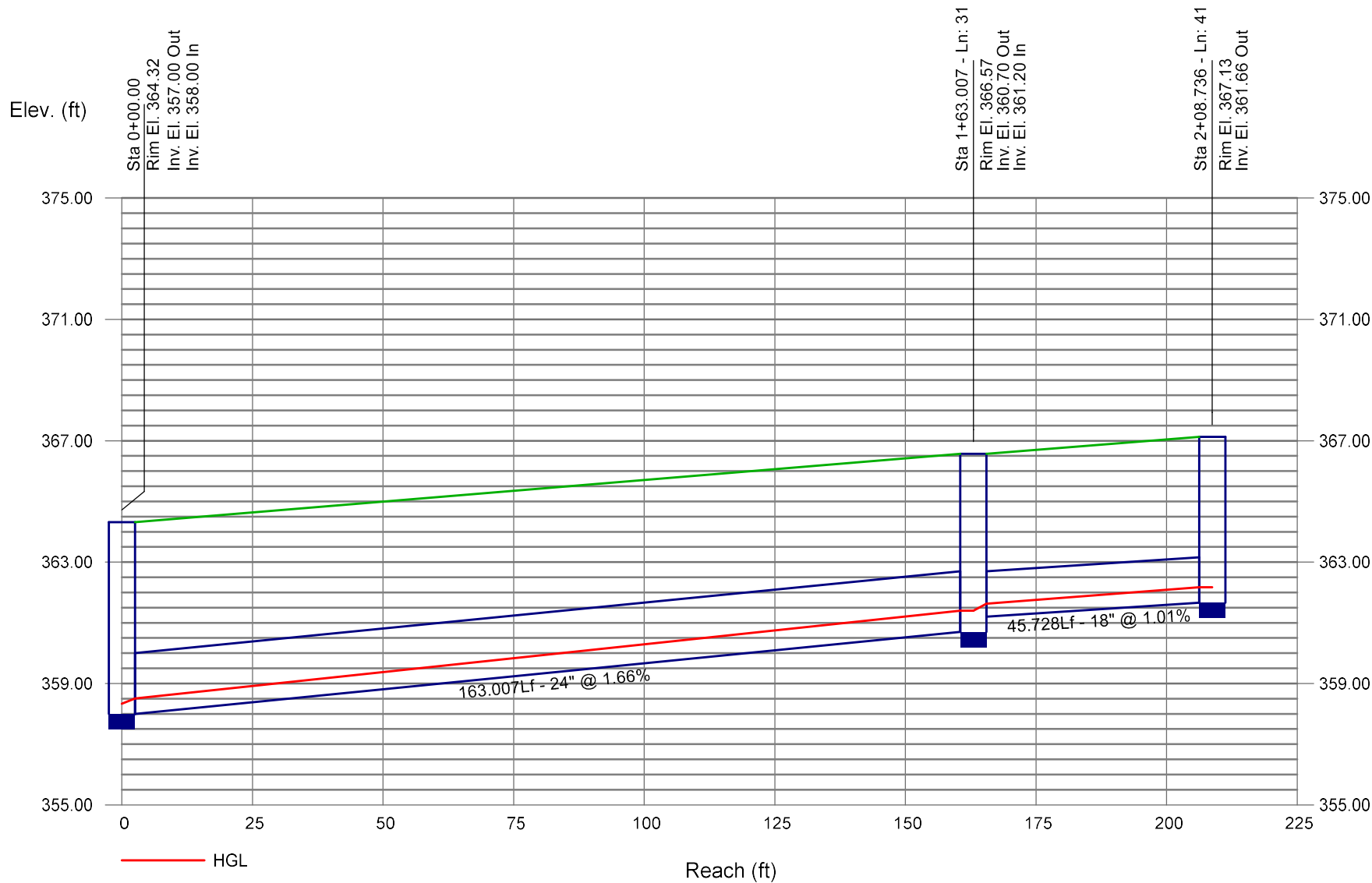


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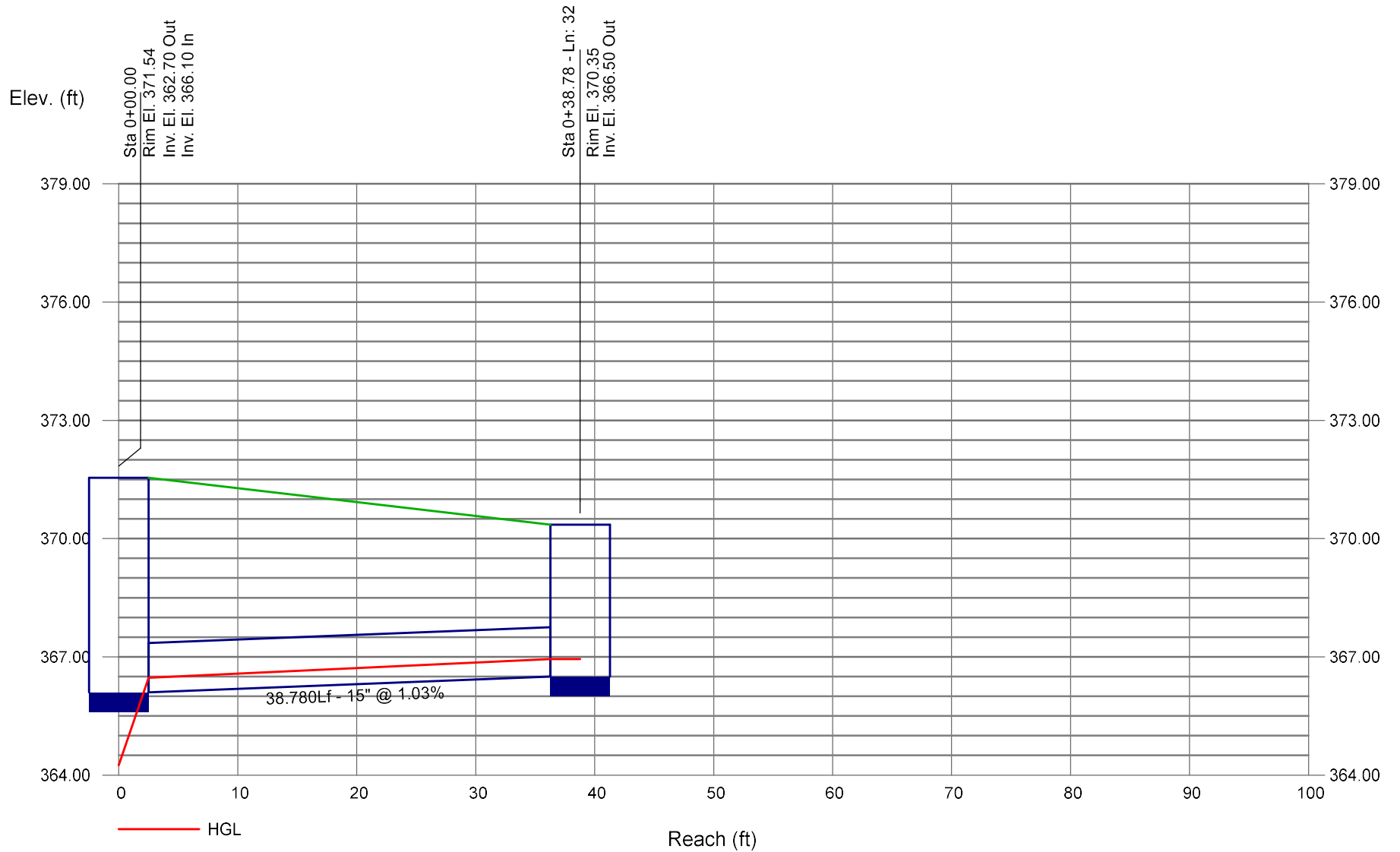




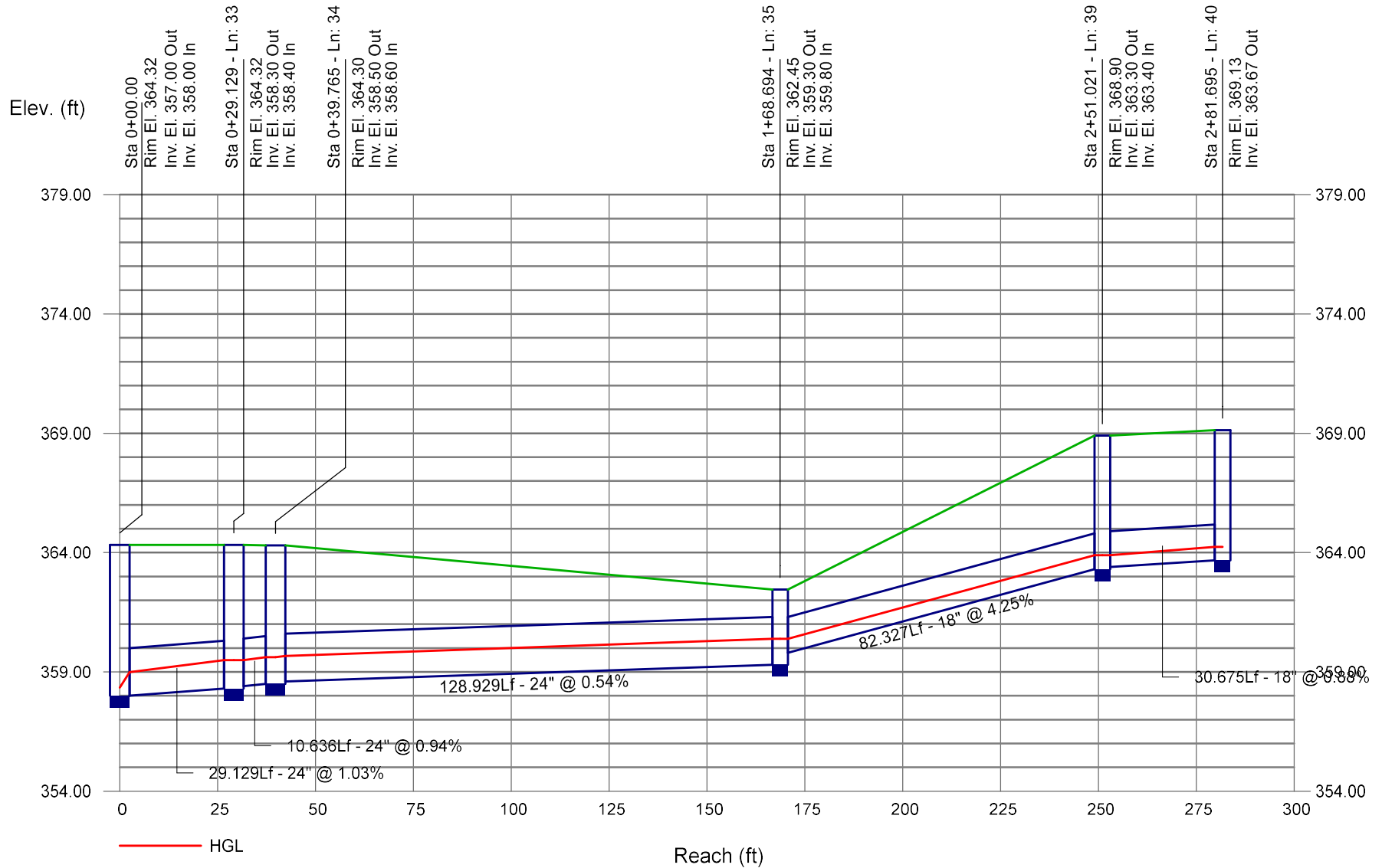
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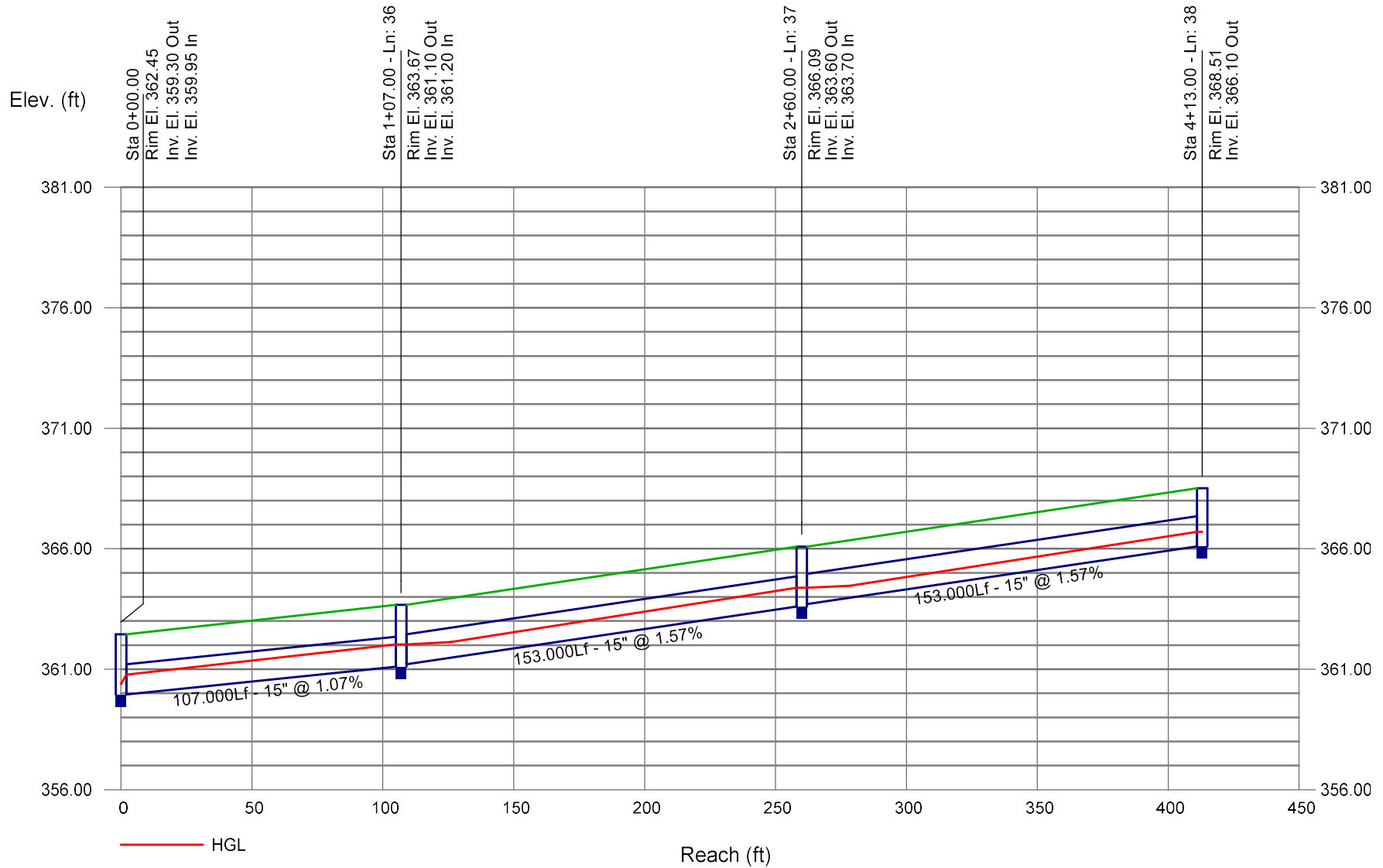
# Storm Sewer Profile



# Storm Sewer Profile



# Storm Sewer Profile



## 9. SCM 3: 4"/Hour Gutter Spread Chart

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
1	DI - 301	Dp-Grate	Offsite	0.24	5.0	4.00	0.60	0.58	0.00	0.52	0.52	8.76
2	DI - 302	Dp-Grate	Offsite	0.05	5.0	4.00	0.60	0.12	0.00	0.12	0.12	4.95
3	DI - 303	Dp-Grate	Offsite	0.04	5.0	4.00	0.60	0.10	0.00	0.10	0.10	4.95
4	CB - 304	Comb.	31	0.09	5.0	4.00	0.60	0.22	0.01	0.22	0.22	2.41
5	CB - 305	Comb.	4	0.11	5.0	4.00	0.60	0.26	0.00	0.26	0.26	3.06
6	CB - 306	Comb.	Offsite	0.17	5.0	4.00	0.60	0.41	0.03	0.40	0.40	4.01
7	CB - 307	Comb.	6	0.09	5.0	4.00	0.60	0.22	0.20	0.39	0.39	3.92
8	CB - 308	Comb.	7	0.43	5.0	4.00	0.60	1.03	0.00	0.83	0.83	5.69
9	CB - 309	Comb.	Sag	0.43	5.0	4.00	0.60	1.03	0.03	1.07	1.07	2.57
10	CB - 310	Comb.	9	0.19	5.0	4.00	0.60	0.46	0.00	0.42	0.42	4.12
11	CB - 311	Comb.	Offsite	0.22	5.0	4.00	0.60	0.53	0.02	0.49	0.49	4.49
12	CB - 312	Comb.	11	0.14	5.0	4.00	0.60	0.34	0.01	0.33	0.33	3.59
13	CB - 313	Comb.	12	0.14	5.0	4.00	0.60	0.34	0.00	0.32	0.32	3.51
14	CB - 314	Comb.	Sag	0.29	5.0	4.00	0.60	0.70	0.00	0.70	0.70	2.00
15	CB - 315	Comb.	Sag	0.33	5.0	4.00	0.60	0.79	0.00	0.79	0.79	2.00
16	CB - 316	Comb.	24	0.11	5.0	4.00	0.60	0.26	0.00	0.26	0.26	3.06
17	CB - 317	Comb.	32	0.28	5.0	4.00	0.60	0.67	0.16	0.71	0.71	4.99
18	DI - 318	Dp-Grate	Sag	0.28	5.0	4.00	0.60	0.67	0.17	0.84	0.84	10.41
19	DI - 319	Dp-Grate	18	0.38	5.0	4.00	0.60	0.91	0.14	0.88	0.88	11.62
20	DI - 320	Dp-Grate	19	0.35	5.0	4.00	0.60	0.84	0.13	0.83	0.83	11.62
21	DI - 321	Dp-Grate	20	0.34	5.0	4.00	0.60	0.82	0.07	0.76	0.76	10.67
22	DI - 322	Dp-Grate	21	0.21	5.0	4.00	0.60	0.50	0.13	0.57	0.57	9.71
23	DI - 323	Dp-Grate	22	0.37	5.0	4.00	0.60	0.89	0.00	0.76	0.76	10.67

Project File: SCM3 CHECK.stm	Number of lines: 42	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
24	CB - 326	Comb.	26	0.34	5.0	4.00	0.60	0.82	0.01	0.69	0.69	5.45
25	DI - 327	Dp-Grate	Sag	0.22	5.0	4.00	0.60	0.53	0.00	0.53	0.53	8.70
26	CB - 325	Comb.	27	0.21	5.0	4.00	0.60	0.50	0.13	0.56	0.56	4.85
27	CB - 324	Comb.	17	0.34	5.0	4.00	0.60	0.82	0.08	0.74	0.74	5.66
28	DI - 351	Dp-Grate	Offsite	0.08	5.0	4.00	0.60	0.19	0.00	0.19	0.19	5.90
29	DI - 352	Dp-Grate	Sag	0.12	5.0	4.00	0.60	0.29	0.00	0.29	0.29	7.14
30	CB - 353	Comb.	42	0.28	5.0	4.00	0.60	0.67	0.27	0.76	0.76	5.79
31	CB - 361	Comb.	30	0.52	5.0	4.00	0.60	1.25	0.00	0.98	0.98	5.91
32	CB - 328	Comb.	41	0.29	5.0	4.00	0.60	0.70	0.12	0.70	0.70	4.88
33	CB - 354	Comb.	34	0.35	5.0	4.00	0.60	0.84	0.23	0.85	0.85	6.12
34	CB - 355	Comb.	Sag	0.21	5.0	4.00	0.60	0.50	0.22	0.73	0.73	2.00
35	DI - 356	Dp-Grate	Sag	0.48	5.0	4.00	0.60	1.15	0.20	1.36	1.36	12.83
36	DI - 357	Dp-Grate	35	0.39	5.0	4.00	0.60	0.94	0.22	0.95	0.95	11.62
37	DI - 358	Dp-Grate	36	0.38	5.0	4.00	0.60	0.91	0.26	0.95	0.95	10.67
38	DI - 359	Dp-Grate	37	0.53	5.0	4.00	0.60	1.27	0.00	1.01	1.01	10.67
39	CB - 365	Comb.	34	0.04	5.0	4.00	0.60	0.10	0.00	0.10	0.10	1.49
40	CB - 366	Comb.	42	0.53	5.0	4.00	0.60	1.27	0.00	1.02	1.02	5.50
41	CB - 364	Comb.	33	0.43	5.0	4.00	0.60	1.03	0.11	0.92	0.92	5.70
42	CB - 360	Comb.	Sag	0.44	5.0	4.00	0.60	1.06	0.42	1.48	1.48	4.16

Project File: SCM3 CHECK.stm	Number of lines: 42	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

## 10. SCM 4: 10-YR Storm Drainage Chart



# Pipes

Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
1	Dp-Grate	DI - 401	Outfall	0.18	16.8	4.97	0.70	15.28	32.60	167.197	30	0.012	0.54	363.40	362.50	373.33	365.79	365.34	365.20
2	Dp-Grate	DI - 402	1	0.13	14.0	5.35	0.70	9.63	18.26	171.000	24	0.012	0.56	364.85	363.90	374.46	373.33	365.96 j	365.68
3	Dp-Grate	DI - 403	2	0.16	13.2	5.48	0.70	9.36	17.73	171.801	24	0.012	0.52	365.85	364.95	374.27	374.46	366.94	365.98
4	Comb.	CB - 404	3	0.08	12.6	5.57	0.70	8.90	16.78	118.130	24	0.013	0.55	366.60	365.95	372.28	374.27	367.66	366.99
5	Comb.	CB - 419	4	0.03	12.3	5.63	0.70	5.91	9.15	85.609	18	0.013	0.76	367.75	367.10	374.68	372.28	368.69	367.98
6	Comb.	CB - 420	5	0.39	12.0	5.68	0.70	5.53	8.48	61.313	18	0.013	0.65	368.25	367.85	374.86	374.68	369.16	368.73
7	Comb.	CB - 421	6	0.32	11.9	5.70	0.70	3.99	6.57	29.000	15	0.013	1.03	368.80	368.50	374.86	374.86	369.61	369.20
8	Comb.	CB - 422	7	0.26	11.7	5.74	0.70	2.73	4.97	33.758	15	0.013	0.59	369.10	368.90	374.99	374.86	369.76 j	369.61
9	Dp-Grate	DI - 423	8	0.33	10.6	5.92	0.70	1.74	5.34	103.022	15	0.012	0.58	369.80	369.20	372.23	374.99	370.32 j	369.76
10	Dp-Grate	DI - 415	9	0.09	5.0	7.25	0.70	0.46	9.56	125.935	15	0.012	1.87	372.25	369.90	374.75	372.23	372.51 j	370.32
11	Dp-Grate	DI - 451	Outfall	0.73	11.7	5.72	0.70	11.46	51.82	38.884	36	0.012	0.51	362.70	362.50	369.53	366.33	363.77	365.20
12	Comb.	CB - 452	11	0.12	9.1	6.22	0.70	9.28	50.95	222.786	36	0.013	0.58	364.10	362.80	371.48	369.53	365.06 j	363.77
13	Comb.	CB - 458	12	0.06	5.7	7.06	0.70	1.19	8.51	204.596	15	0.013	1.74	369.40	365.85	374.67	371.48	369.83	366.17
14	Comb.	CB - 459	13	0.18	5.0	7.25	0.70	0.91	6.52	29.435	15	0.013	1.02	369.80	369.50	374.76	374.67	370.17	369.83
15	Comb.	CB - 408	1	0.38	16.0	5.07	0.70	5.82	30.07	107.500	24	0.013	1.77	365.80	363.90	374.16	373.33	366.65 j	365.68
16	Comb.	CB - 409	15	0.04	15.4	5.15	0.70	4.54	19.39	68.000	24	0.013	0.74	366.40	365.90	373.48	374.16	367.15 j	366.65
17	Comb.	CB - 410	16	0.55	15.2	5.19	0.70	4.43	18.78	29.000	24	0.013	0.69	366.70	366.50	373.48	373.48	367.44	367.16
18	Comb.	CB - 411	17	0.12	14.8	5.25	0.70	2.46	7.90	44.196	18	0.013	0.57	367.45	367.20	373.03	373.48	368.04	367.78
19	Comb.	CB - 412	18	0.02	13.8	5.39	0.70	1.74	9.02	74.500	18	0.013	0.74	368.10	367.55	374.02	373.03	368.60	368.04
20	Comb.	CB - 417	19	0.04	10.5	5.95	0.70	0.29	15.50	39.005	18	0.013	2.18	369.05	368.20	374.54	374.02	369.25 j	368.60
21	Comb.	CB - 418	20	0.03	5.0	7.25	0.70	0.15	5.52	41.004	15	0.013	0.73	369.60	369.30	374.54	374.54	369.75	369.44
22	Comb.	CB - 424	5	0.08	5.0	7.25	0.70	0.41	10.64	66.281	15	0.013	2.72	371.00	369.20	375.68	374.68	371.25	369.37
23	Dp-Grate	DI - 413	19	0.21	11.1	5.84	0.70	1.51	13.69	17.657	18	0.013	1.70	368.50	368.20	371.35	374.02	368.96	368.60

Project File: SCM4.stm

Number of lines: 33

Date: 10/30/2024

NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# Pipes

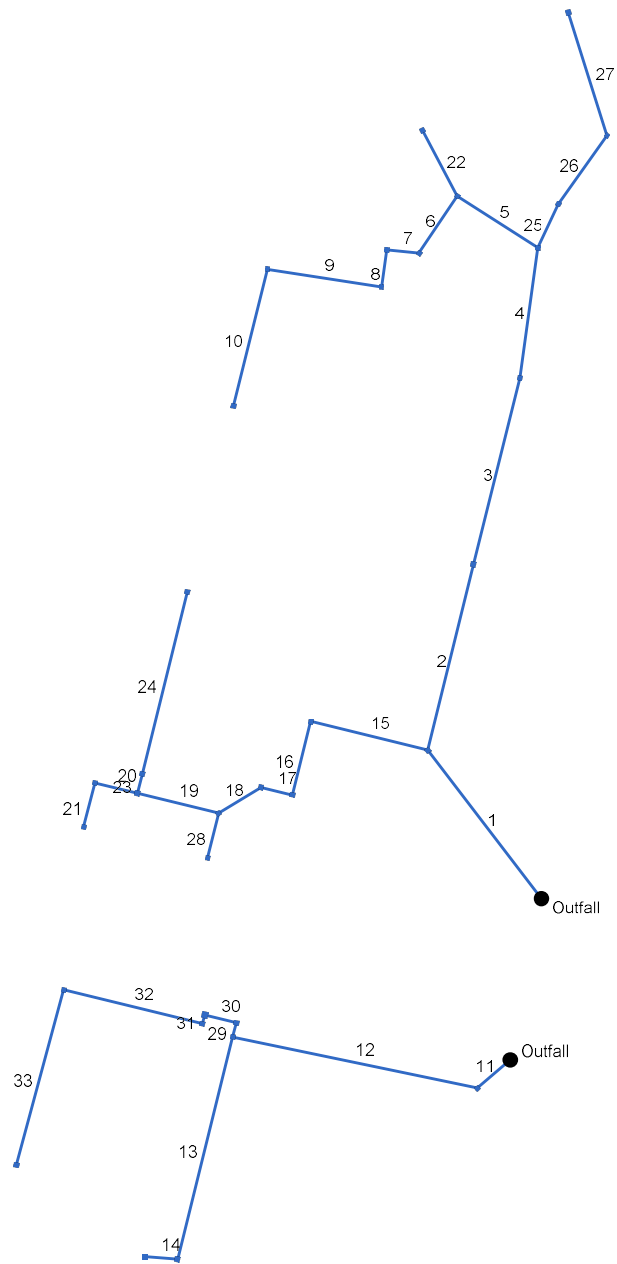
Line No.	Junct Type	Inlet ID	DnStm Ln No	Drng Area (ac)	Tc (min)	i Sys (in/hr)	Runoff Coeff (C)	Total Runoff (cfs)	Capac Full (cfs)	Line Length (ft)	Line Size (in)	n-val Pipe	Line Slope (%)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)
24	Dp-Grate	DI - 414	23	0.16	5.0	7.25	0.70	0.81	13.72	168.344	18	0.012	1.46	371.05	368.60	373.64	371.35	371.39 j	368.96
25	Comb.	CB - 405	4	0.02	6.7	6.79	0.70	3.33	5.39	43.114	15	0.013	0.70	367.60	367.30	373.06	372.28	368.33	368.01
26	Comb.	CB - 406	25	0.30	6.2	6.91	0.70	3.29	5.26	75.320	15	0.013	0.66	368.20	367.70	373.27	373.06	368.93	368.42
27	Dp-Grate	DI - 407	26	0.38	5.0	7.25	0.70	1.93	5.03	115.500	15	0.013	0.61	369.00	368.30	371.71	373.27	369.55 j	368.93
28	Comb.	CB - 416	18	0.09	5.0	7.25	0.70	0.46	8.20	41.000	18	0.013	0.61	367.80	367.55	373.03	373.03	368.05 j	368.04
29	Comb.	CB - 453	12	0.13	7.8	6.51	0.70	8.07	19.54	13.394	24	0.013	0.75	365.20	365.10	371.48	371.48	366.21	366.00
30	Comb.	CB - 454	29	0.25	7.7	6.54	0.70	7.50	9.75	29.001	18	0.013	0.86	365.95	365.70	371.48	371.48	367.01	366.69
31	Comb.	CB - 455	30	0.36	7.7	6.54	0.70	6.37	11.74	8.000	18	0.013	1.25	366.15	366.05	371.47	371.48	367.13	367.01
32	Dp-Grate	DI - 456	31	0.69	6.9	6.73	0.70	4.85	7.78	127.500	18	0.013	0.55	366.95	366.25	369.65	371.47	367.80 j	367.13
33	Dp-Grate	DI - 457	32	0.34	5.0	7.25	0.70	1.73	8.49	162.929	15	0.012	1.47	369.70	367.30	372.17	369.65	370.22 j	368.31

Project File: SCM4.stm	Number of lines: 33	Date: 10/30/2024
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NOTES: Intensity = 86.72 / (Inlet time + 15.30) ^ 0.82 -- Return period = 10 Yrs. ; \*\* Critical depth

# 11. SCM 4: 10-YR HGL Profiles

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

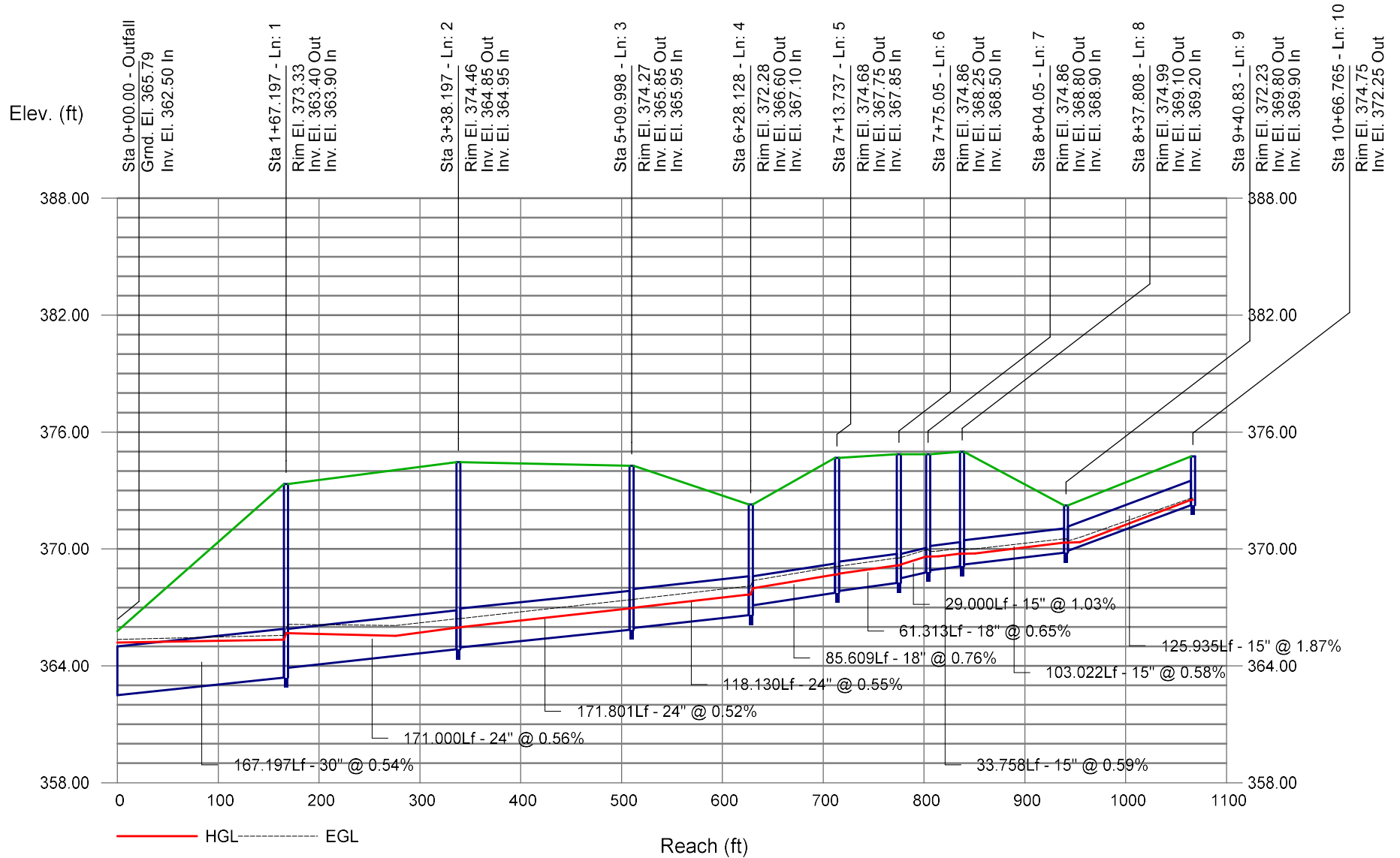


Project File: SCM4.stm

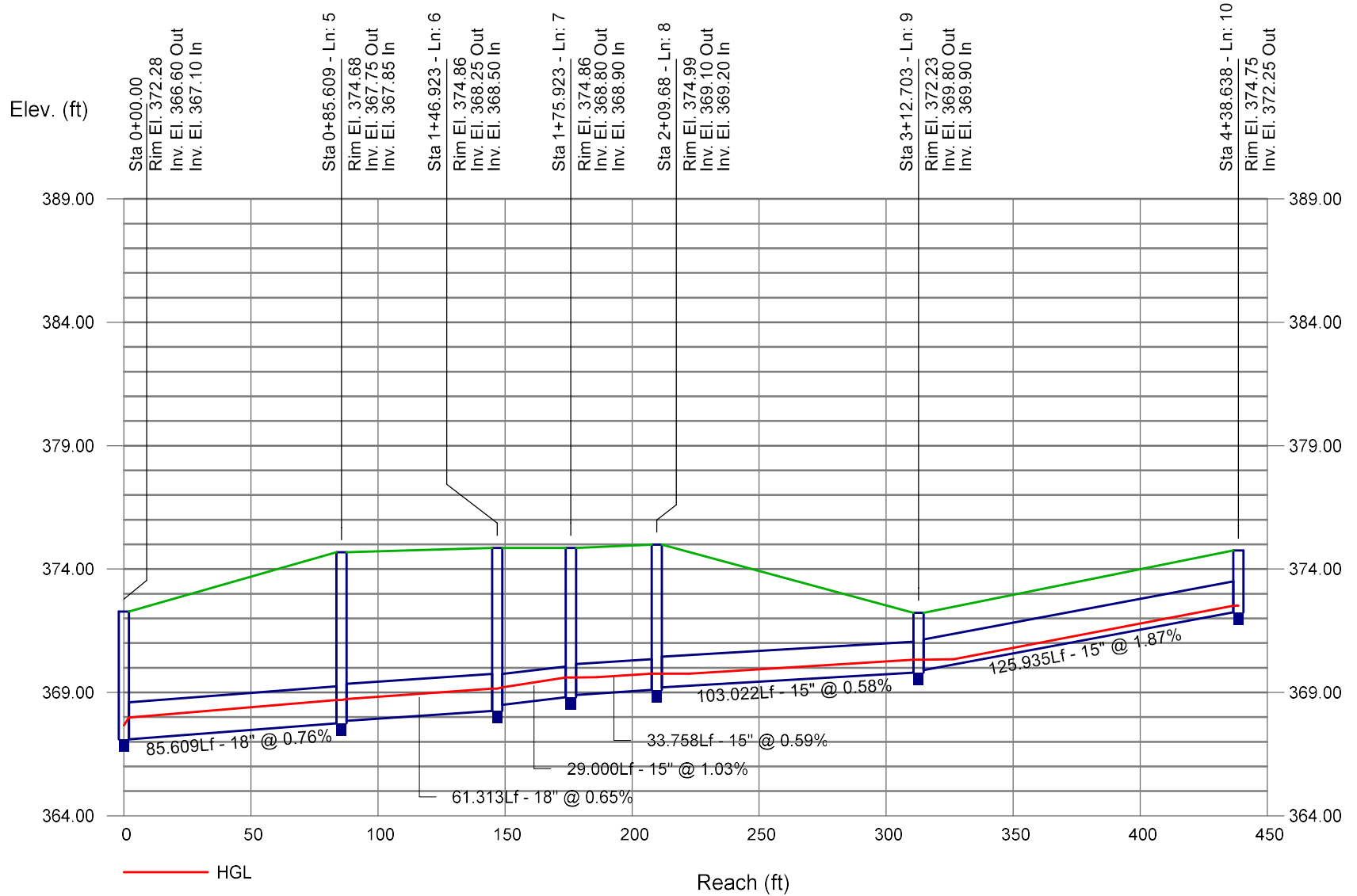
Number of lines: 33

Date: 10/30/2024

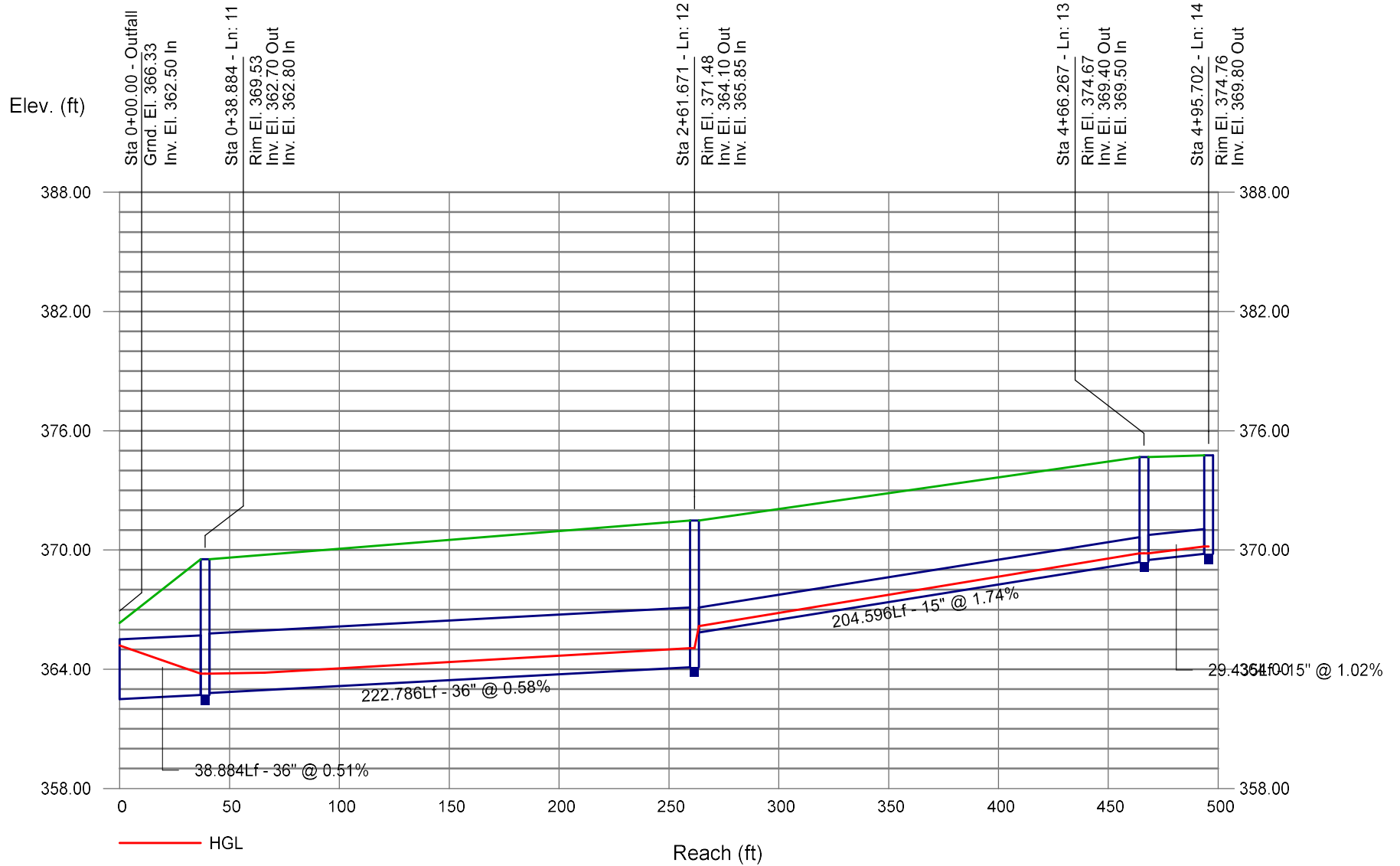
# Storm Sewer Profile



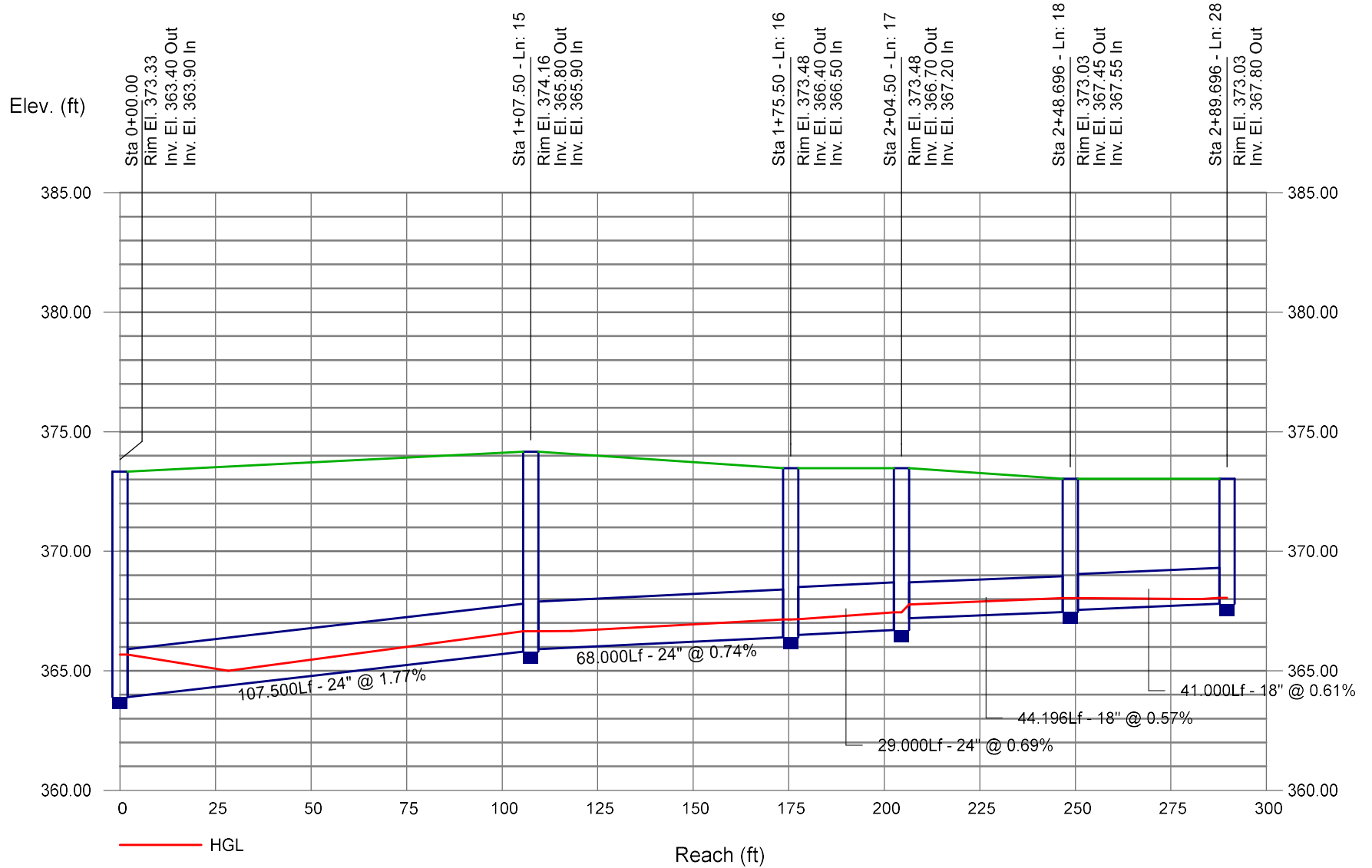
# Storm Sewer Profile



# Storm Sewer Profile

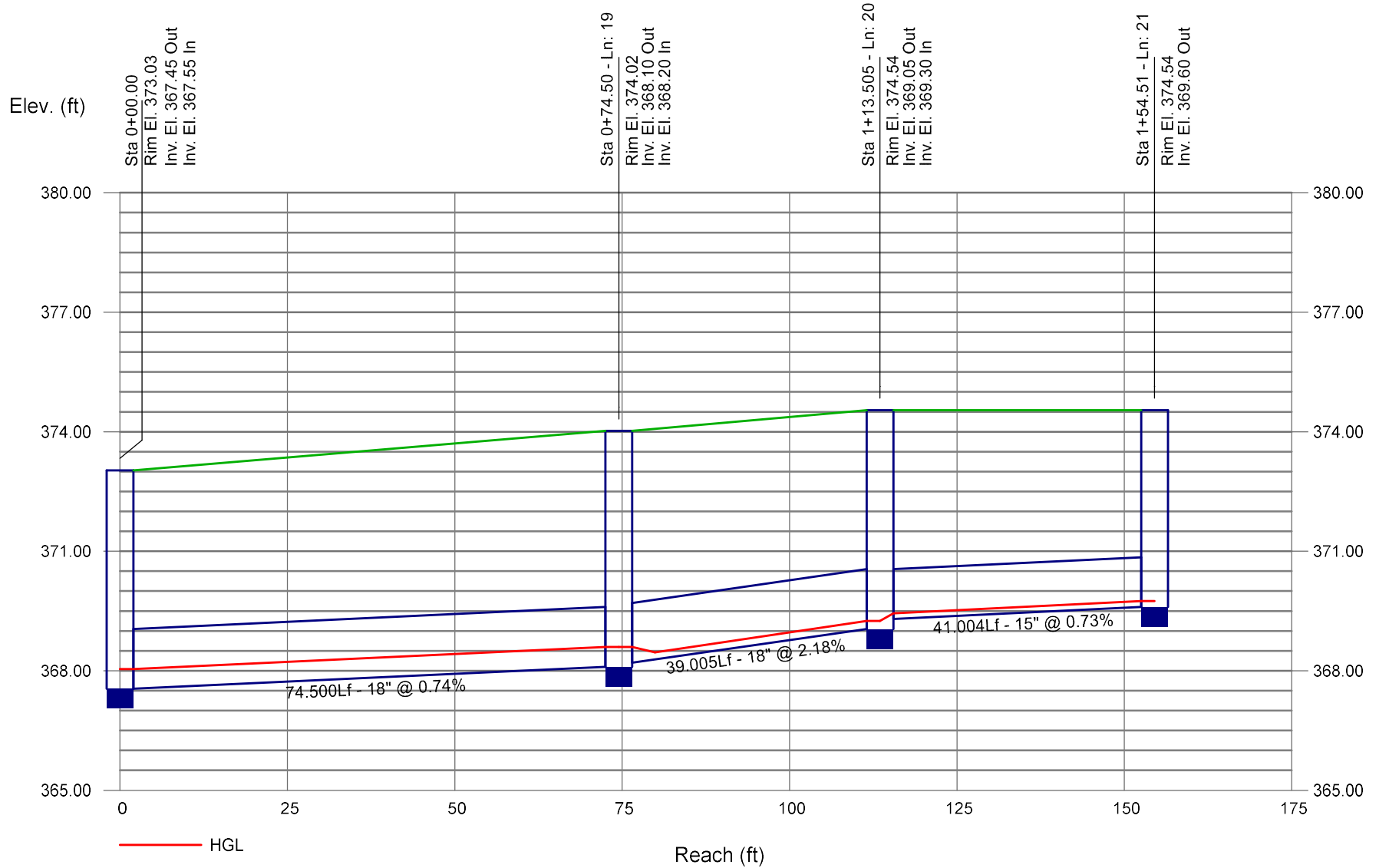


# Storm Sewer Profile

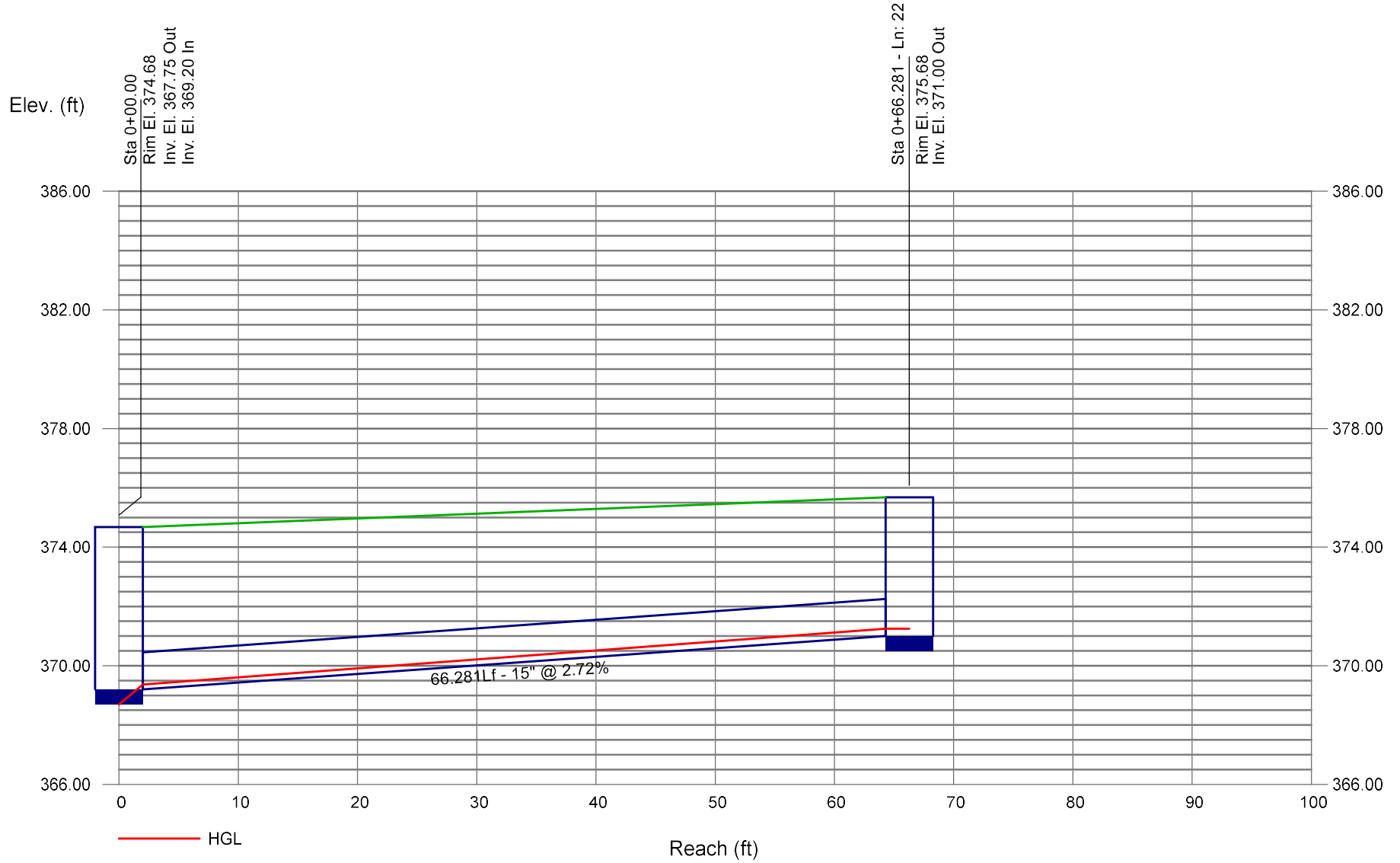




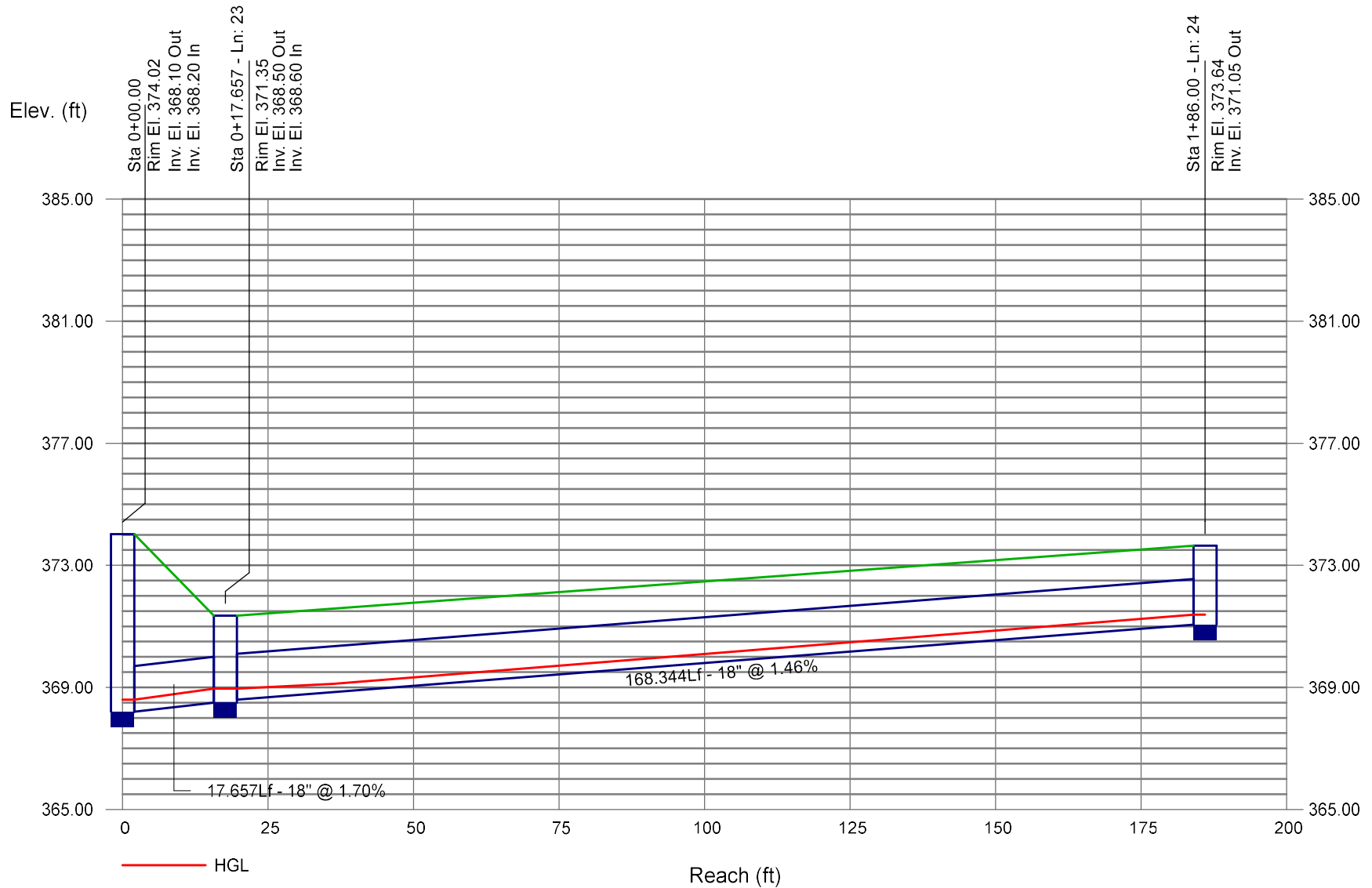
# Storm Sewer Profile



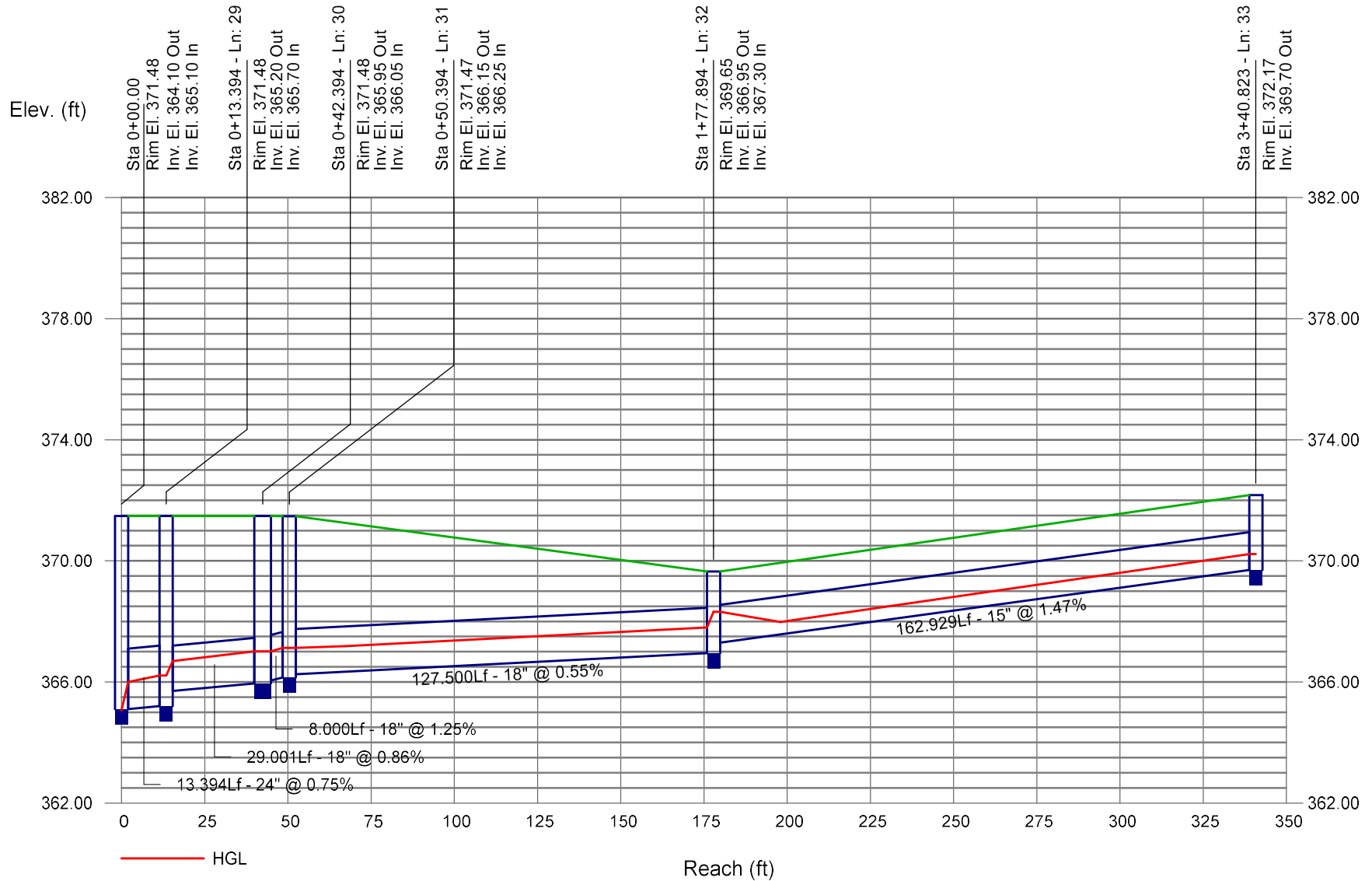
# Storm Sewer Profile



# Storm Sewer Profile



# Storm Sewer Profile



## 12. SCM 4: 4"/Hour Gutter Spread Chart

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
1	DI - 401	Dp-Grate	Offsite	0.18	5.0	4.00	0.70	0.50	0.02	0.48	0.48	8.76
2	DI - 402	Dp-Grate	1	0.13	5.0	4.00	0.70	0.36	0.00	0.34	0.34	7.81
3	DI - 403	Dp-Grate	Sag	0.16	5.0	4.00	0.70	0.45	0.00	0.45	0.45	8.22
4	CB - 404	Comb.	Offsite	0.08	5.0	4.00	0.70	0.22	0.00	0.22	0.22	1.89
5	CB - 419	Comb.	4	0.03	5.0	4.00	0.70	0.08	0.00	0.09	0.09	1.67
6	CB - 420	Comb.	Sag	0.39	5.0	4.00	0.70	1.09	0.00	1.09	1.09	2.67
7	CB - 421	Comb.	Sag	0.32	5.0	4.00	0.70	0.90	0.10	1.00	1.00	2.29
8	CB - 422	Comb.	7	0.26	5.0	4.00	0.70	0.73	0.00	0.62	0.62	5.16
9	DI - 423	Dp-Grate	Sag	0.33	5.0	4.00	0.70	0.92	0.01	0.93	0.93	10.86
10	DI - 415	Dp-Grate	9	0.09	5.0	4.00	0.70	0.25	0.00	0.25	0.25	6.86
11	DI - 451	Dp-Grate	Offsite	0.73	5.0	4.00	0.70	2.04	0.00	1.54	1.54	14.48
12	CB - 452	Comb.	Sag	0.12	5.0	4.00	0.70	0.34	0.02	0.36	0.36	1.43
13	CB - 458	Comb.	12	0.06	5.0	4.00	0.70	0.17	0.00	0.17	0.17	1.93
14	CB - 459	Comb.	31	0.18	5.0	4.00	0.70	0.50	0.00	0.47	0.47	3.73
15	CB - 408	Comb.	16	0.38	5.0	4.00	0.70	1.06	0.00	0.84	0.84	6.11
16	CB - 409	Comb.	29	0.04	5.0	4.00	0.70	0.11	0.22	0.32	0.32	3.50
17	CB - 410	Comb.	18	0.55	5.0	4.00	0.70	1.54	0.00	1.12	1.12	7.17
18	CB - 411	Comb.	Sag	0.12	5.0	4.00	0.70	0.34	0.42	0.76	0.76	2.00
19	CB - 412	Comb.	18	0.02	5.0	4.00	0.70	0.06	0.00	0.06	0.06	1.35
20	CB - 417	Comb.	19	0.04	5.0	4.00	0.70	0.11	0.00	0.11	0.11	1.75
21	CB - 418	Comb.	28	0.03	5.0	4.00	0.70	0.08	0.00	0.08	0.08	1.57
22	CB - 424	Comb.	5	0.08	5.0	4.00	0.70	0.22	0.00	0.22	0.22	2.78
23	DI - 413	Dp-Grate	Sag	0.21	5.0	4.00	0.70	0.59	0.03	0.62	0.62	9.24

Project File: SCM4.stm	Number of lines: 33	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

# Spread

Line No.	Inlet ID	Junct Type	Byp Ln No	Drng Area (ac)	Inlet Time (min)	i Inlet (in/hr)	Runoff Coeff (C)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Capt (cfs)	Gutter Spread (ft)
24	DI - 414	Dp-Grate	23	0.16	5.0	4.00	0.70	0.45	0.00	0.42	0.42	8.76
25	CB - 405	Comb.	Offsite	0.02	5.0	4.00	0.70	0.06	0.00	0.06	0.06	1.13
26	CB - 406	Comb.	Offsite	0.30	5.0	4.00	0.70	0.84	0.00	0.70	0.70	5.50
27	DI - 407	Dp-Grate	Offsite	0.38	5.0	4.00	0.70	1.06	0.00	0.88	0.88	10.67
28	CB - 416	Comb.	30	0.09	5.0	4.00	0.70	0.25	0.00	0.25	0.25	2.73
29	CB - 453	Comb.	12	0.13	5.0	4.00	0.70	0.36	0.01	0.36	0.36	3.73
30	CB - 454	Comb.	31	0.25	5.0	4.00	0.70	0.70	0.00	0.61	0.61	5.07
31	CB - 455	Comb.	Sag	0.36	5.0	4.00	0.70	1.01	0.13	1.13	1.13	2.84
32	DI - 456	Dp-Grate	Sag	0.69	5.0	4.00	0.70	1.93	0.15	2.09	2.09	15.76
33	DI - 457	Dp-Grate	32	0.34	5.0	4.00	0.70	0.95	0.00	0.80	0.80	9.71

Project File: SCM4.stm	Number of lines: 33	Date: 10/30/2024
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NOTES: Intensity = 4.00 / (Inlet time + 0.10) ^ 0.00 -- Return period = 3 Yrs. ; \*\* Critical depth

### 13. Storm Drainage Area Map



J:\2024\04\04\_Plan\_WithersRavenel\Assemblies\CAD\Tables\DA\Map\ColorTables - DA Map - 250x500.dwg, Tuesday, December 31, 2025 9:52:58 PM - TDC&K

