



Stormwater Management Report

FOR
Proposed Industrial Redevelopment

Block 70.01, Lots 1.01, 1.02, 4.02 & 4.03
Borough of Wallington
Bergen County, New Jersey

November 8, 2019

Prepared For

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Project Name: Proposed Industrial Redevelopment

Project Location: Borough of Wallington, Bergen County, New Jersey

The following table summarizes typical additional information that can be found throughout this Stormwater Management Report, Appendices and Supplemental Reports as indicated.

Description	Information	Location of Information
Total Amount of Land Disturbed on Site	±19.52 Acres	Page # 3
Acreage of Total Impervious Surfaces	±21.08 Acres Full Buildout	Page # 3
Type of Basin Proposed	N/A	N/A
Runoff Quantity Reqs & Attenuation	2-, 10- and 100-Years Storms	Page # 4
Water Quality Reqs & Method	N/A – Less than 0.25 acres new impervious	Page # 4
Groundwater Recharge Reqs & Method	N/A – Impacted soil	Page #5
Runoff Quantity Calculations	HydroCAD Output	Appendix # 01
Stormwater Conveyance System	25-year storm	Appendix # 02
Groundwater Recharge Calculations	N/A	N/A
Water Quality Calculations	N/A	N/A
USGS, Soil Survey Location Map	Online Mapping	Appendix # 03
Existing, Proposed and Inlet Area Map	Watershed Maps	Appendix # 04
Operations and Maintenance Manual	Operations and Maintenance Manual	(Separate Document)



LIMITATION: The sole purpose of this report and the associated services performed by Maser Consulting P.A. (Maser Consulting) is to undertake a hydrologic assessment for the proposed warehouse and office development in accordance with the scope of services set out in the contract between Maser Consulting and Umdasch Real Estate USA, Ltd.

Maser Consulting derived the data in this report from a variety of sources. The sources are identified at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Maser Consulting has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose of the project and by reference to applicable standards, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Maser Consulting for use of any part of this report in any other context.

This report has been prepared on behalf of, and for the exclusive use of Umdasch Real Estate USA, Ltd., and is subject to, and issued in connection with, the provisions of the agreement between Maser Consulting and Umdasch Real Estate USA, Ltd.



INTRODUCTION:

This Stormwater Management Report for the proposed warehouse and office development located at 520 Main Avenue in Wallington, New Jersey, has been prepared by Maser Consulting for Umdasch Real Estate USA, Ltd. Maser Consulting performed a hydrological assessment for the aforementioned property, also defined as Block 70.01, Lots 1.01, 1.02, 4.02 & 4.03 on the Borough of Wallington Tax Maps. The site currently is 26.10 acres in size and is comprised of several industrial buildings with appurtenant site improvements throughout and is primarily paved. Under the current application, the applicant proposes to construct three new buildings for warehousing and office with typical appurtenant site improvements, which will result in a total disturbance of 19.52 acres. It is important to note that the impervious/gravel coverage on site will be reduced in the proposed condition as compared to the existing condition. Below is a breakdown of the impervious/gravel and pervious coverages on site for the existing and proposed conditions.

Coverage Type	Existing Conditions	Proposed Conditions	Difference
Impervious/Gravel	22.42 ac	21.08 ac	-1.34 ac
Pervious	3.68 ac	5.02 ac	+1.34 ac
Total	26.1 ac	26.1 ac	-

PURPOSE:

This report assesses the hydrologic aspects and the stormwater drainage conditions as a result of the proposed warehouse and office development, including building, parking and streets, landscaping areas, stormwater management facilities, associated utilities, and related site improvements.

The focus of the study is the identification of the existing drainage characteristics in comparison to post-development conditions. Calculations documenting the design of the stormwater management system are illustrated on the Site Plan drawing documents, prepared by Maser Consulting.

METHOD:

Generally, the majority of the stormwater runoff from the site is collected by inlets throughout the site and piped to the storm conveyance system in Main Avenue. Additionally, there is a small portion of the site at the northern end that discharges via overland flow to Main Avenue and flows down the steep road to the northeast. There is also a ridge line in the southern portion of the site that separates the runoff in the southwest portion of the site which gets collected by on-site inlets and piped toward Main Avenue further southwest than the other connection previously mentioned. Therefore, the existing site is divided into three (3) watersheds based upon the direction of surface runoff and available subsurface storm sewer information. However, since the storm conveyance for the majority of the site and the small portion of overland flow to Main Avenue ultimately discharge to the same point, only two (2) design points are studied. Existing Watershed 1 consists of the majority of the site where stormwater runoff is collected and piped to the conveyance system in Main Avenue, Existing Watershed 2 is the north portion of the site that flows to Main Avenue via overland flow, and Existing Watershed 3 is the southwest portion of



the site that is collected and piped to Main Avenue further to the southwest. The area, curve number, and time of concentration for each existing watershed can be seen in the HydroCAD output included in the Appendix.

Under proposed conditions, the site will generally mimic the existing drainage patterns with the two design points. The overall decrease in impervious/gravel cover contributes to the reduction of peak flows, which will be discussed later in the Stormwater Quantity section of this report. New inlets and pipes, as well as some existing inlets and pipes, will be utilized to convey the stormwater runoff adequately to the design points as a result of the proposed improvements. The area, curve number, and time of concentration for each proposed watershed and sub-watershed can be seen in the HydroCAD output included in the Appendix.

STORMWATER QUANTITY:

1.1 Stormwater Management

As mentioned above, peak flow attenuation of the stormwater runoff at each design point was accomplished due to the decrease in impervious/gravel coverage from predevelopment to post-development conditions. Full HydroCAD output calculations are provided in the appendix. The results are summarized in the table below.

1.2 Grand Summary Table

<i>Description</i>	<i>2 Year Storm</i>	<i>10 Year Storm</i>	<i>100 Year Storm</i>
A. Existing Conditions			
Watershed 1 (North/East)	55.30 cfs	86.23 cfs	146.37 cfs
Watershed 2 (Southwest)	11.99 cfs	20.11 cfs	35.86 cfs
B. Proposed Conditions			
Watershed 1 (North/East)	54.46 cfs	85.68 cfs	146.24 cfs
Watershed 2 (Southwest)	11.93 cfs	20.01 cfs	35.69 cfs

According to §420-4.F(1)(c) in order to control stormwater runoff quantity impacts, the design engineer has three options.

One of the options is to demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2-, 10-, and 100-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events. Hydrographs comparing the pre- and post-construction discharge for each design point are included in the Appendix of this report demonstrating that this requirement is met.

1.3 Conveyance System

Pipe sizing calculations have been performed using the Rational Method and 25-year design storm for capacity verification. Calculations supporting pipe sizing, including profiles which depict the hydraulic grade line are attached in the Appendix of this report.



STORMWATER QUALITY:

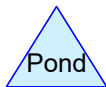
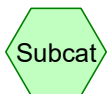
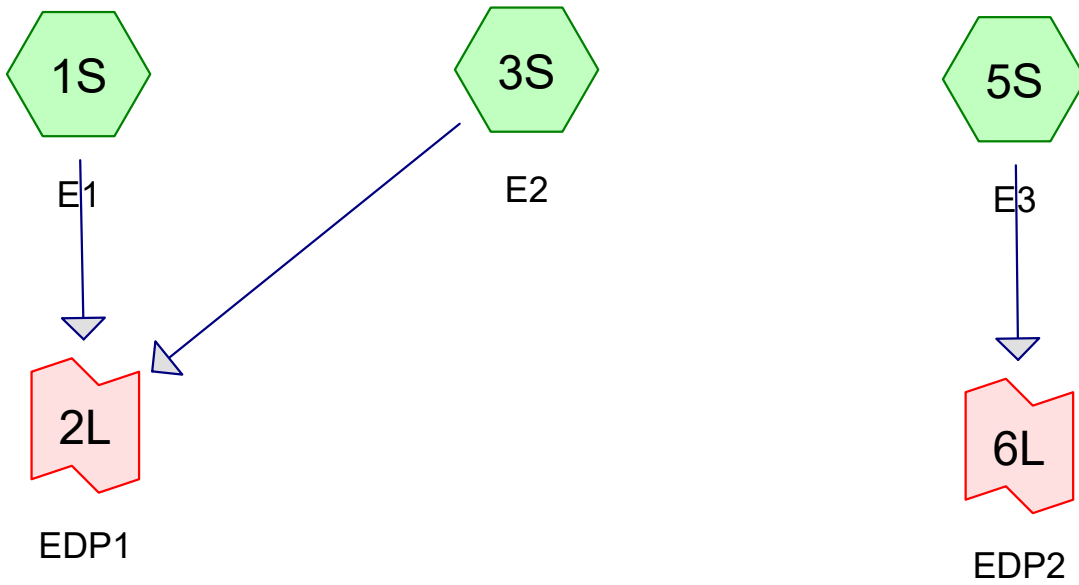
As per Ordinance §320-4.G.(1), stormwater management measures shall only be required for water quality control if an additional ¼ acre of impervious surface is being proposed on a development site. As this project proposes a reduction of impervious surfaces, stormwater quality is not required for this site.

ANNUAL GROUNDWATER RECHARGE:

As per Ordinance §320-4.F(1)(b)[3], the groundwater recharge requirement does not apply to projects with stormwater from areas of high pollutant loading or industrial stormwater exposed to source material. Since the subject property is an existing contaminated industrial site, the groundwater recharge requirement does not apply.

CONCLUSION & ATTACHMENTS:

As discussed above, water quantity mitigation is provided for all Watersheds for all storm events studied in accordance with NJDEP regulations. Water quality treatment is not required for this project as the impervious coverage decreases from predevelopment to post-development conditions. Groundwater recharge is not required for this project as the site is contaminated. As such, there should be no adverse impacts due to stormwater, on-site or off-site, as a result of the proposed development. Included in the appendix of this report is the HydroCAD output for back-up on both the existing and proposed conditions. Additionally, the Existing and Proposed Drainage Area Maps, an Inlet Area Map and a Pipe Capacity Report are provided in the appendix as well.



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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.117	74	>75% Grass cover, Good, HSG C (5S)
0.504	80	>75% Grass cover, Good, HSG D (1S, 3S)
3.344	96	Gravel surface, HSG D (1S)
19.075	98	Paved parking, HSG D (1S, 3S, 5S)
2.374	70	Woods, Good, HSG C (1S, 5S)
0.683	79	Woods/grass comb., Good, HSG D (1S, 3S, 5S)
26.097	94	TOTAL AREA

191108_Umdasch-Wallington

Type III 24-hr 2-Year Rainfall=3.34"

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Page 3

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: E1

Runoff Area=19.794 ac 74.70% Impervious Runoff Depth>2.88"
Flow Length=495' Tc=10.4 min CN=96 Runoff=53.29 cfs 4.756 af

Subcatchment3S: E2

Runoff Area=0.891 ac 51.63% Impervious Runoff Depth>2.21"
Flow Length=333' Tc=8.2 min CN=89 Runoff=2.10 cfs 0.164 af

Subcatchment5S: E3

Runoff Area=5.412 ac 70.75% Impervious Runoff Depth>2.29"
Flow Length=897' Tc=11.4 min CN=90 Runoff=11.99 cfs 1.035 af

Link 2L: EDP1

Inflow=55.30 cfs 4.920 af
Primary=55.30 cfs 4.920 af

Link 6L: EDP2

Inflow=11.99 cfs 1.035 af
Primary=11.99 cfs 1.035 af

Total Runoff Area = 26.097 ac Runoff Volume = 5.955 af Average Runoff Depth = 2.74"
26.91% Pervious = 7.022 ac 73.09% Impervious = 19.075 ac

Summary for Subcatchment 1S: E1

Runoff = 53.29 cfs @ 12.14 hrs, Volume= 4.756 af, Depth> 2.88"

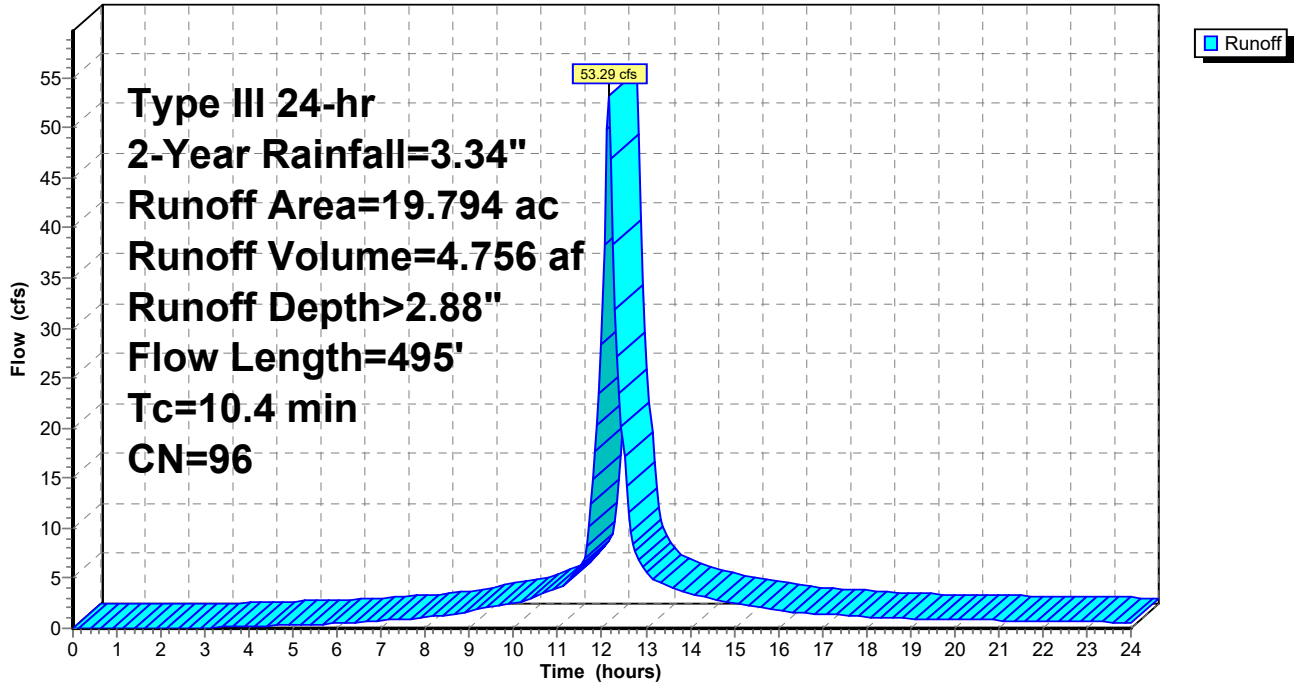
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
14.786	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.428	79	Woods/grass comb., Good, HSG D
1.156	70	Woods, Good, HSG C
3.344	96	Gravel surface, HSG D
19.794	96	Weighted Average
5.008		25.30% Pervious Area
14.786		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2200	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.3	61	0.5578	3.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	17	0.1311	1.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	11	0.4031	3.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	85	0.0456	4.33		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.4	221	0.0166	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.4	495	Total			

Subcatchment 1S: E1

Hydrograph



Summary for Subcatchment 3S: E2

Runoff = 2.10 cfs @ 12.12 hrs, Volume= 0.164 af, Depth> 2.21"

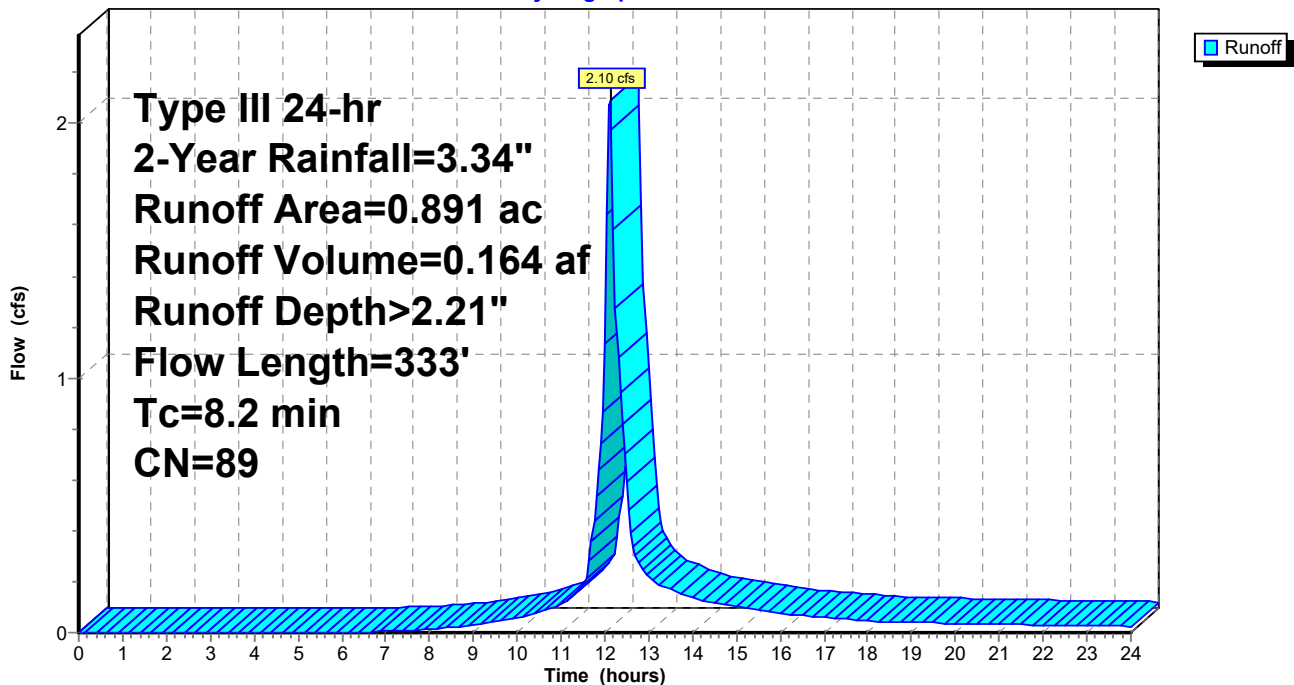
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
0.460	98	Paved parking, HSG D
0.424	80	>75% Grass cover, Good, HSG D
0.007	79	Woods/grass comb., Good, HSG D
0.000	77	Woods, Good, HSG D
0.891	89	Weighted Average
0.431		48.37% Pervious Area
0.460		51.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	81	0.0270	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.3	52	0.0231	3.09		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.2	333	Total			

Subcatchment 3S: E2

Hydrograph



Summary for Subcatchment 5S: E3

Runoff = 11.99 cfs @ 12.16 hrs, Volume= 1.035 af, Depth> 2.29"

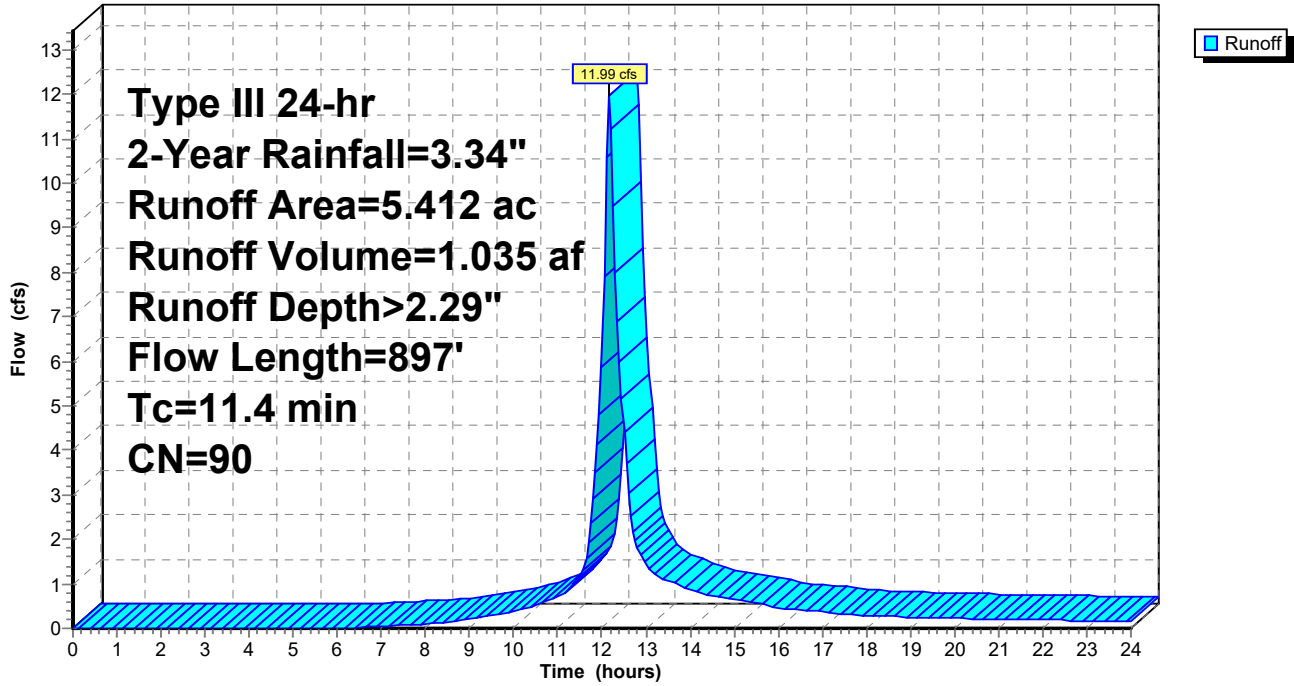
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
3.829	98	Paved parking, HSG D
0.117	74	>75% Grass cover, Good, HSG C
0.248	79	Woods/grass comb., Good, HSG D
1.218	70	Woods, Good, HSG C
5.412	90	Weighted Average
1.583		29.25% Pervious Area
3.829		70.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 5S: E3

Hydrograph



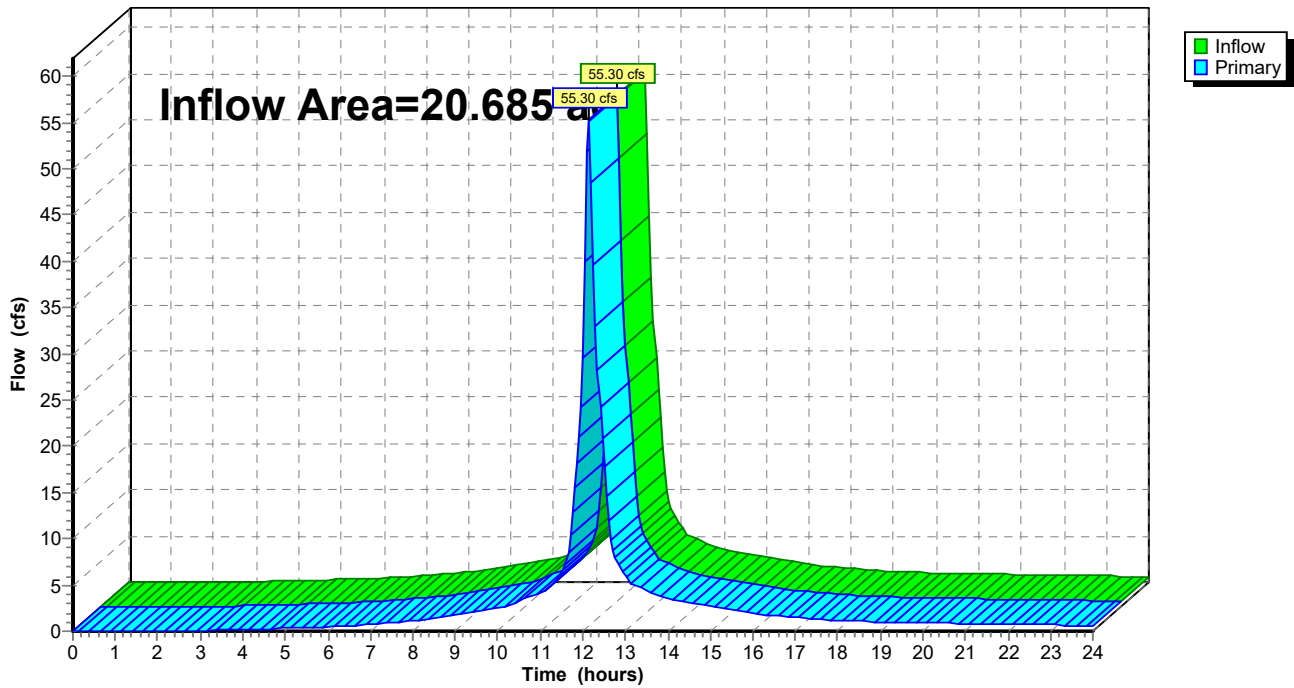
Summary for Link 2L: EDP1

Inflow Area = 20.685 ac, 73.71% Impervious, Inflow Depth > 2.85" for 2-Year event
Inflow = 55.30 cfs @ 12.14 hrs, Volume= 4.920 af
Primary = 55.30 cfs @ 12.14 hrs, Volume= 4.920 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: EDP1

Hydrograph



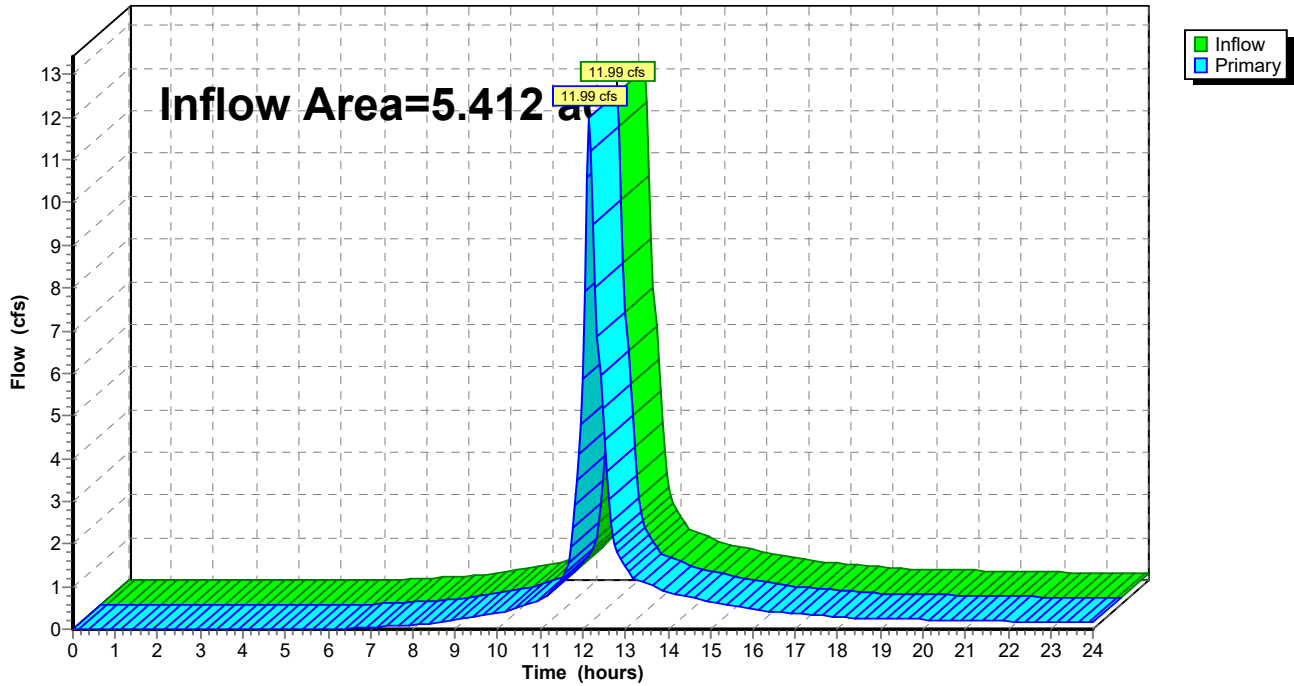
Summary for Link 6L: EDP2

Inflow Area = 5.412 ac, 70.75% Impervious, Inflow Depth > 2.29" for 2-Year event
Inflow = 11.99 cfs @ 12.16 hrs, Volume= 1.035 af
Primary = 11.99 cfs @ 12.16 hrs, Volume= 1.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 6L: EDP2

Hydrograph



191108_Umdasch-Wallington

Type III 24-hr 10-Year Rainfall=5.07"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: E1 Runoff Area=19.794 ac 74.70% Impervious Runoff Depth>4.60"
Flow Length=495' Tc=10.4 min CN=96 Runoff=82.83 cfs 7.582 af

Subcatchment3S: E2 Runoff Area=0.891 ac 51.63% Impervious Runoff Depth>3.83"
Flow Length=333' Tc=8.2 min CN=89 Runoff=3.57 cfs 0.285 af

Subcatchment5S: E3 Runoff Area=5.412 ac 70.75% Impervious Runoff Depth>3.94"
Flow Length=897' Tc=11.4 min CN=90 Runoff=20.11 cfs 1.776 af

Link 2L: EDP1 Inflow=86.23 cfs 7.866 af
Primary=86.23 cfs 7.866 af

Link 6L: EDP2 Inflow=20.11 cfs 1.776 af
Primary=20.11 cfs 1.776 af

Total Runoff Area = 26.097 ac Runoff Volume = 9.642 af Average Runoff Depth = 4.43"
26.91% Pervious = 7.022 ac 73.09% Impervious = 19.075 ac

Summary for Subcatchment 1S: E1

Runoff = 82.83 cfs @ 12.14 hrs, Volume= 7.582 af, Depth> 4.60"

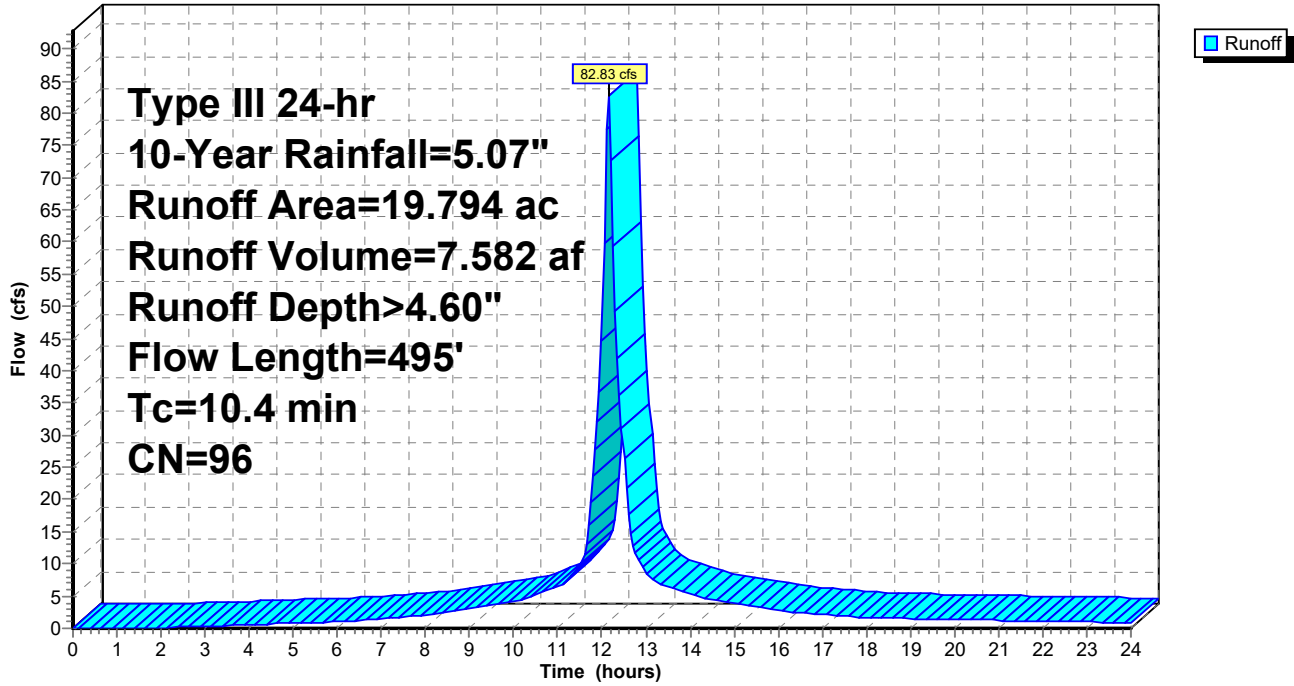
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
14.786	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.428	79	Woods/grass comb., Good, HSG D
1.156	70	Woods, Good, HSG C
3.344	96	Gravel surface, HSG D
19.794	96	Weighted Average
5.008		25.30% Pervious Area
14.786		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2200	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.3	61	0.5578	3.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	17	0.1311	1.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	11	0.4031	3.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	85	0.0456	4.33		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.4	221	0.0166	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.4	495	Total			

Subcatchment 1S: E1

Hydrograph



Summary for Subcatchment 3S: E2

Runoff = 3.57 cfs @ 12.11 hrs, Volume= 0.285 af, Depth> 3.83"

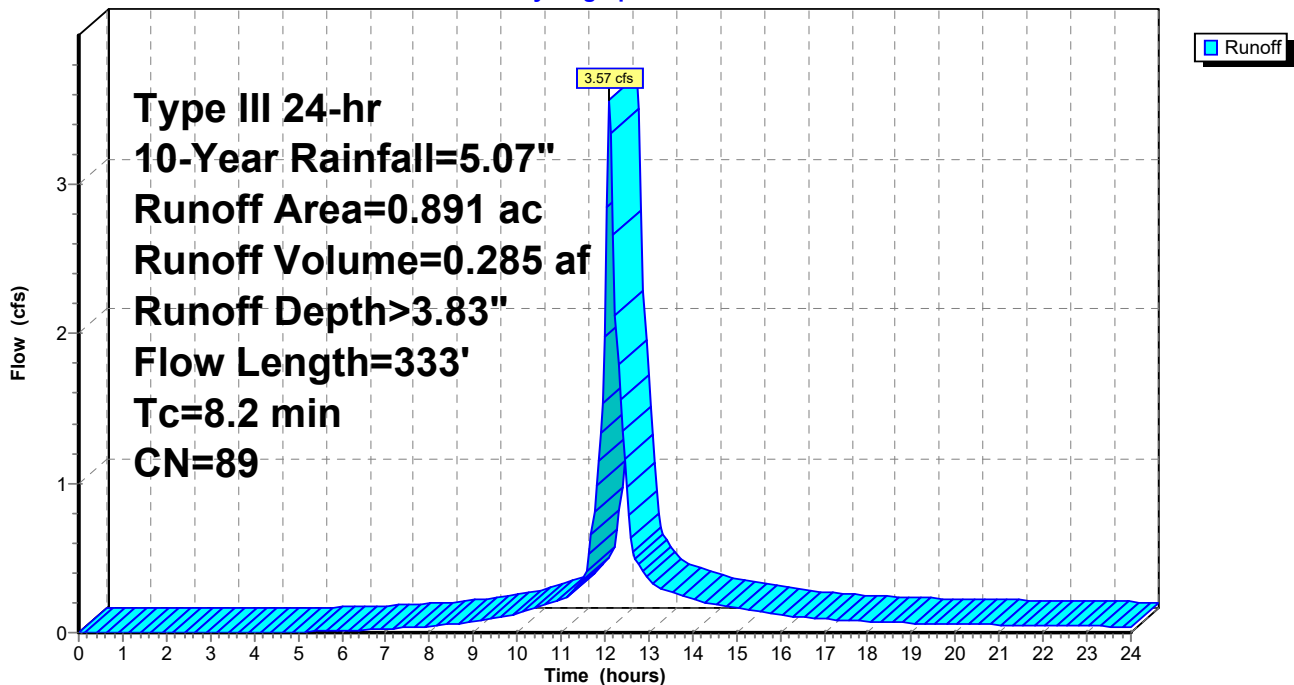
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
0.460	98	Paved parking, HSG D
0.424	80	>75% Grass cover, Good, HSG D
0.007	79	Woods/grass comb., Good, HSG D
0.000	77	Woods, Good, HSG D
0.891	89	Weighted Average
0.431		48.37% Pervious Area
0.460		51.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	81	0.0270	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.3	52	0.0231	3.09		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.2	333	Total			

Subcatchment 3S: E2

Hydrograph



Summary for Subcatchment 5S: E3

Runoff = 20.11 cfs @ 12.16 hrs, Volume= 1.776 af, Depth> 3.94"

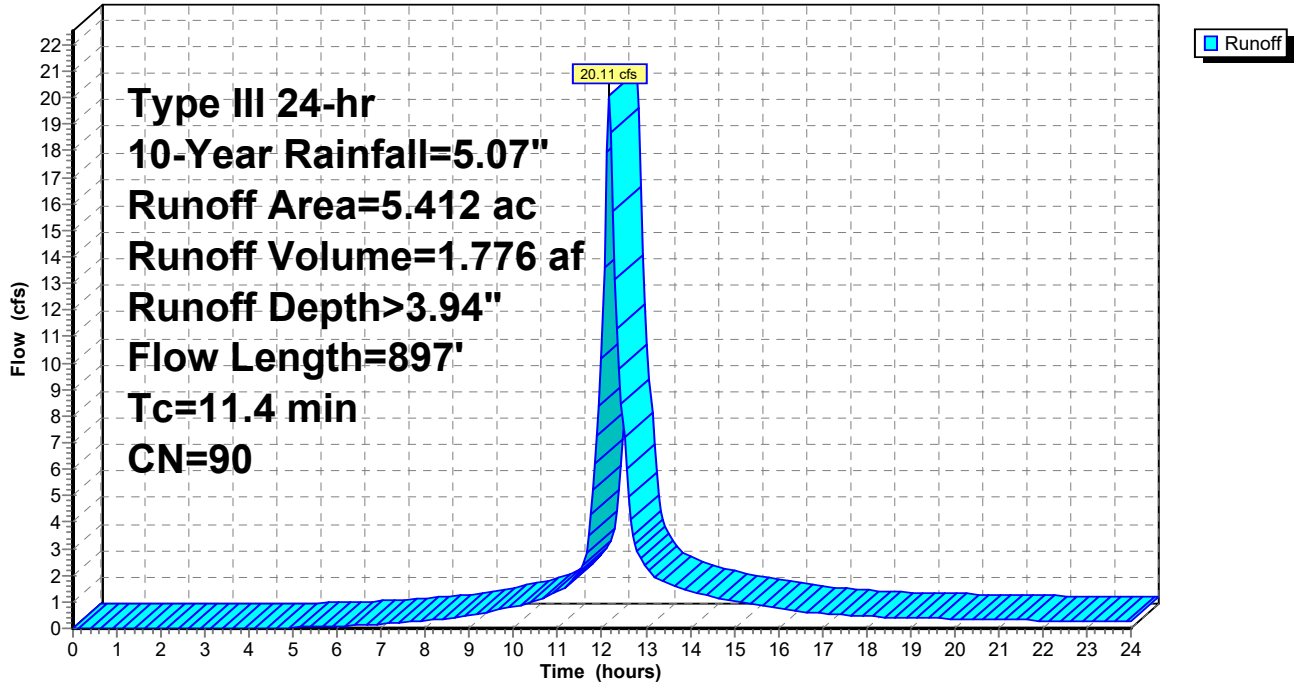
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Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
3.829	98	Paved parking, HSG D
0.117	74	>75% Grass cover, Good, HSG C
0.248	79	Woods/grass comb., Good, HSG D
1.218	70	Woods, Good, HSG C
5.412	90	Weighted Average
1.583		29.25% Pervious Area
3.829		70.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 5S: E3

Hydrograph



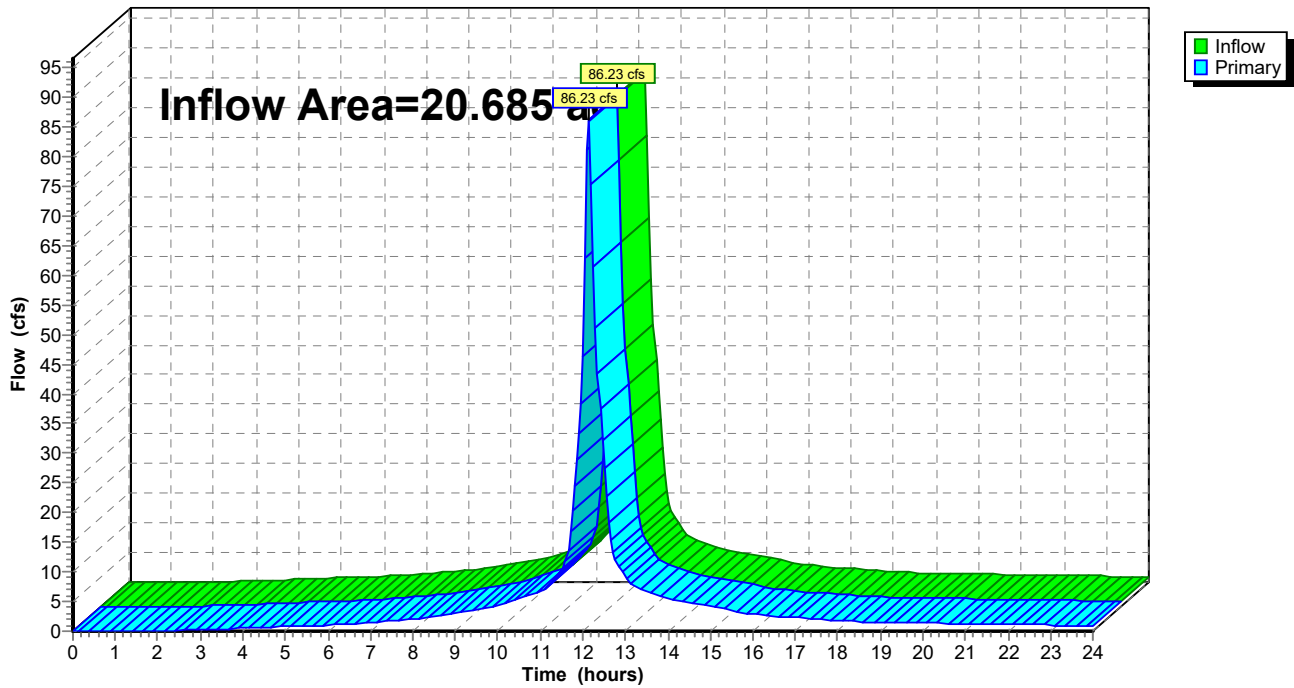
Summary for Link 2L: EDP1

Inflow Area = 20.685 ac, 73.71% Impervious, Inflow Depth > 4.56" for 10-Year event
Inflow = 86.23 cfs @ 12.14 hrs, Volume= 7.866 af
Primary = 86.23 cfs @ 12.14 hrs, Volume= 7.866 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: EDP1

Hydrograph



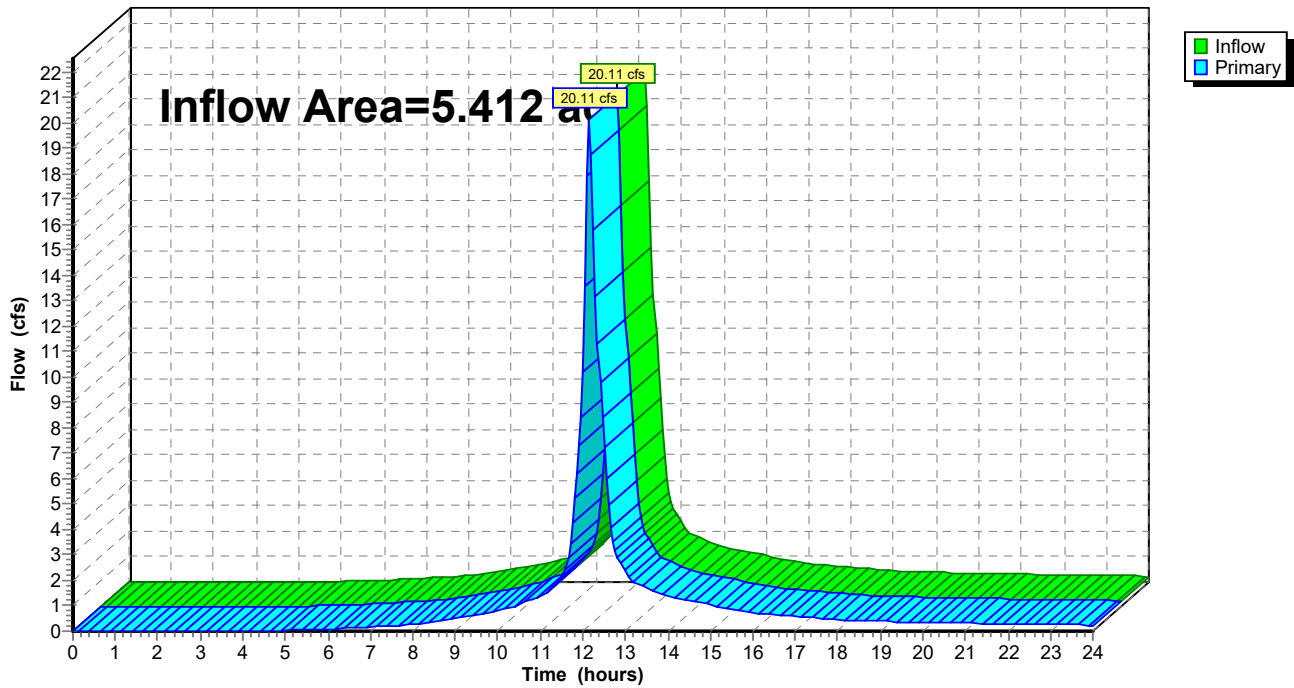
Summary for Link 6L: EDP2

Inflow Area = 5.412 ac, 70.75% Impervious, Inflow Depth > 3.94" for 10-Year event
Inflow = 20.11 cfs @ 12.16 hrs, Volume= 1.776 af
Primary = 20.11 cfs @ 12.16 hrs, Volume= 1.776 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 6L: EDP2

Hydrograph



191108_Umdasch-Wallington

Type III 24-hr 100-Year Rainfall=8.47"

Prepared by Maser Consulting PA

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: E1

Runoff Area=19.794 ac 74.70% Impervious Runoff Depth>7.98"
Flow Length=495' Tc=10.4 min CN=96 Runoff=140.25 cfs 13.163 af

Subcatchment3S: E2

Runoff Area=0.891 ac 51.63% Impervious Runoff Depth>7.14"
Flow Length=333' Tc=8.2 min CN=89 Runoff=6.42 cfs 0.530 af

Subcatchment5S: E3

Runoff Area=5.412 ac 70.75% Impervious Runoff Depth>7.26"
Flow Length=897' Tc=11.4 min CN=90 Runoff=35.86 cfs 3.273 af

Link 2L: EDP1

Inflow=146.37 cfs 13.693 af
Primary=146.37 cfs 13.693 af

Link 6L: EDP2

Inflow=35.86 cfs 3.273 af
Primary=35.86 cfs 3.273 af

Total Runoff Area = 26.097 ac Runoff Volume = 16.966 af Average Runoff Depth = 7.80"
26.91% Pervious = 7.022 ac 73.09% Impervious = 19.075 ac

Summary for Subcatchment 1S: E1

Runoff = 140.25 cfs @ 12.14 hrs, Volume= 13.163 af, Depth> 7.98"

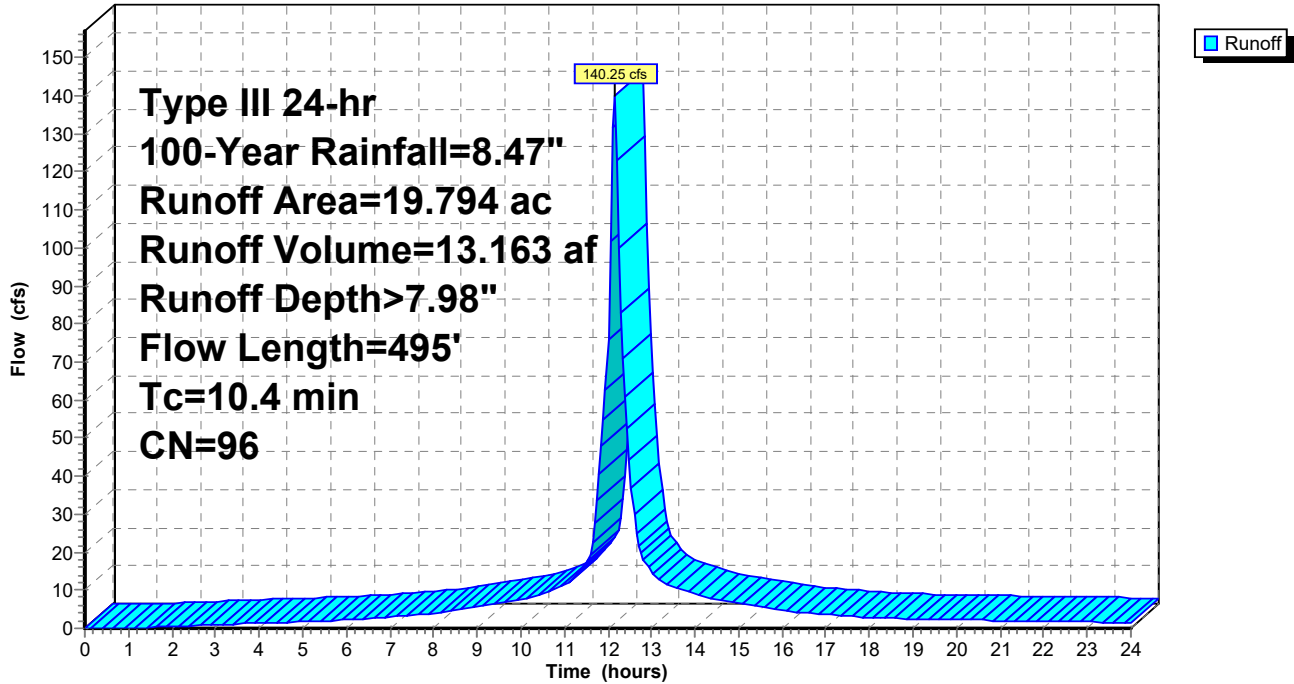
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
14.786	98	Paved parking, HSG D
0.080	80	>75% Grass cover, Good, HSG D
0.428	79	Woods/grass comb., Good, HSG D
1.156	70	Woods, Good, HSG C
3.344	96	Gravel surface, HSG D
19.794	96	Weighted Average
5.008		25.30% Pervious Area
14.786		74.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2200	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.3	61	0.5578	3.73		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.2	17	0.1311	1.81		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.1	11	0.4031	3.17		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.3	85	0.0456	4.33		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.4	221	0.0166	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
10.4	495	Total			

Subcatchment 1S: E1

Hydrograph



Summary for Subcatchment 3S: E2

Runoff = 6.42 cfs @ 12.11 hrs, Volume= 0.530 af, Depth> 7.14"

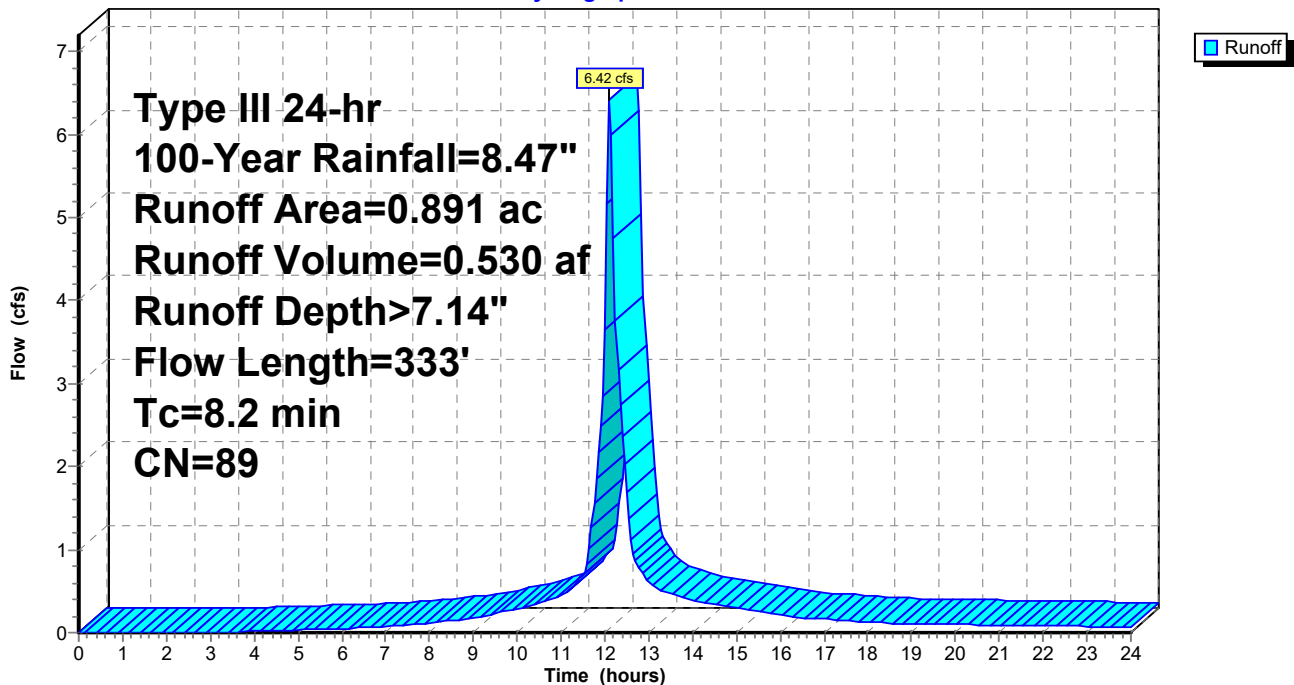
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
0.460	98	Paved parking, HSG D
0.424	80	>75% Grass cover, Good, HSG D
0.007	79	Woods/grass comb., Good, HSG D
0.000	77	Woods, Good, HSG D
0.891	89	Weighted Average
0.431		48.37% Pervious Area
0.460		51.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	81	0.0270	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.3	52	0.0231	3.09		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.7	200	0.0500	4.54		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.2	333	Total			

Subcatchment 3S: E2

Hydrograph



Summary for Subcatchment 5S: E3

Runoff = 35.86 cfs @ 12.15 hrs, Volume= 3.273 af, Depth> 7.26"

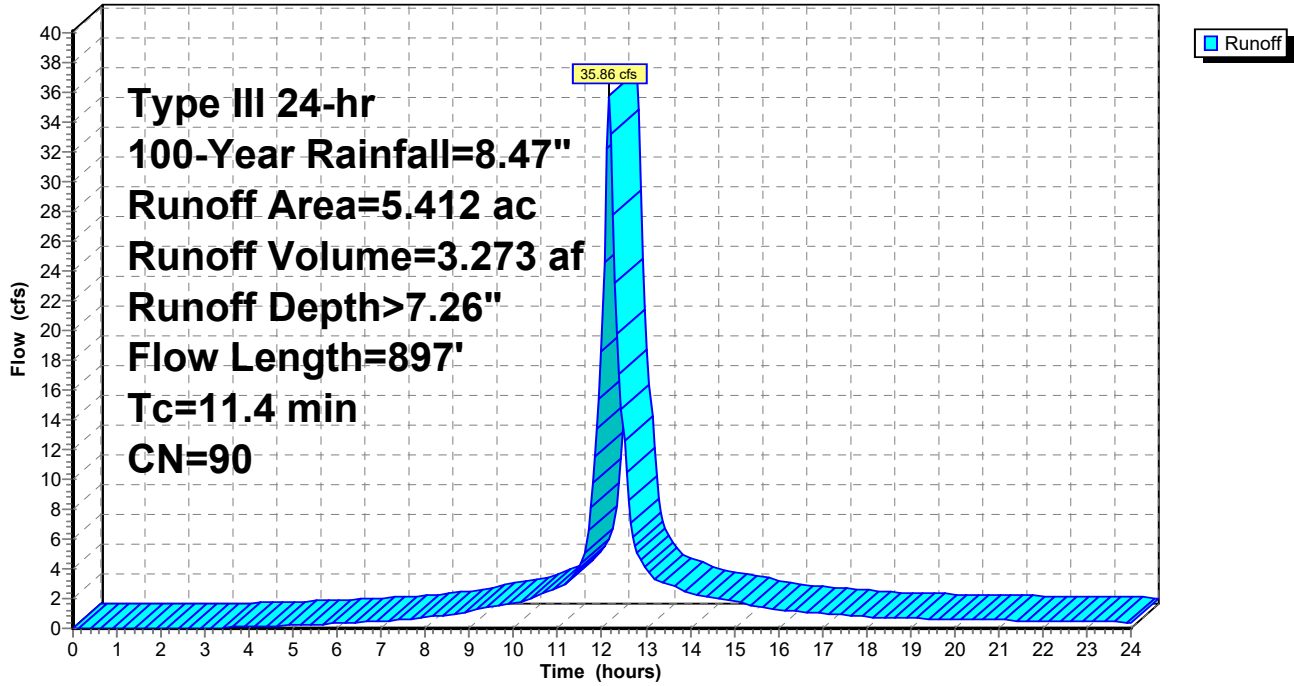
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
3.829	98	Paved parking, HSG D
0.117	74	>75% Grass cover, Good, HSG C
0.248	79	Woods/grass comb., Good, HSG D
1.218	70	Woods, Good, HSG C
5.412	90	Weighted Average
1.583		29.25% Pervious Area
3.829		70.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 5S: E3

Hydrograph



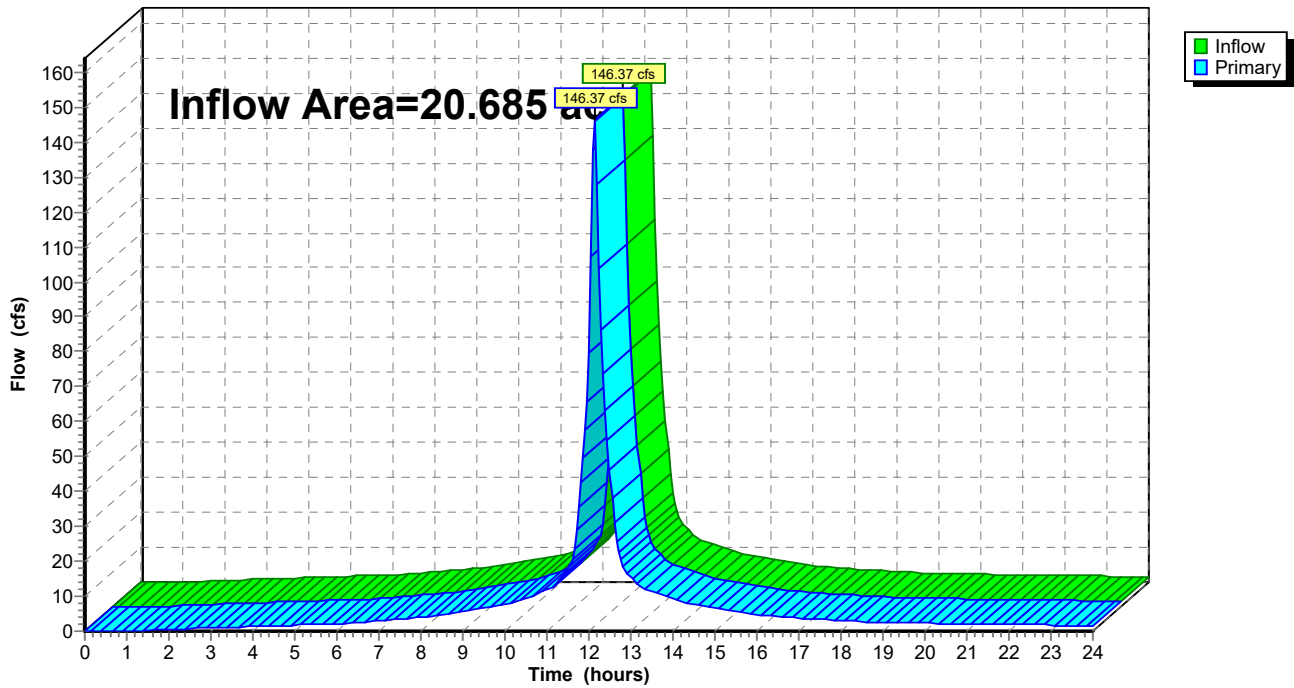
Summary for Link 2L: EDP1

Inflow Area = 20.685 ac, 73.71% Impervious, Inflow Depth > 7.94" for 100-Year event
Inflow = 146.37 cfs @ 12.14 hrs, Volume= 13.693 af
Primary = 146.37 cfs @ 12.14 hrs, Volume= 13.693 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 2L: EDP1

Hydrograph



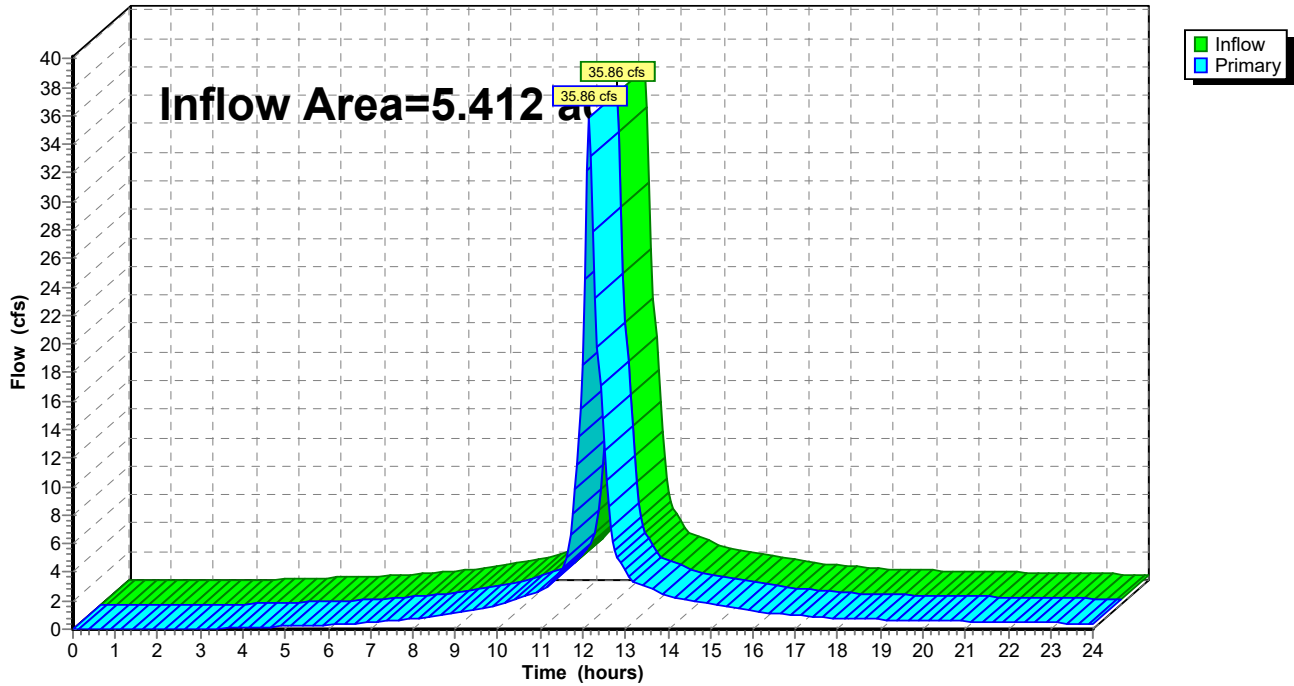
Summary for Link 6L: EDP2

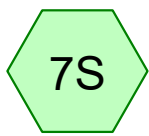
Inflow Area = 5.412 ac, 70.75% Impervious, Inflow Depth > 7.26" for 100-Year event
Inflow = 35.86 cfs @ 12.15 hrs, Volume= 3.273 af
Primary = 35.86 cfs @ 12.15 hrs, Volume= 3.273 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 6L: EDP2

Hydrograph

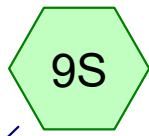




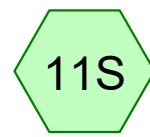
P1



PDP1



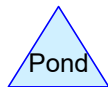
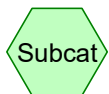
P2



P3



PDP2



Routing Diagram for 191108_Umdasch-Wallington
Prepared by Maser Consulting PA, Printed 11/8/2019
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191108_Umdasch-Wallington

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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.580	74	>75% Grass cover, Good, HSG C (7S, 11S)
2.343	80	>75% Grass cover, Good, HSG D (7S, 9S, 11S)
21.085	98	Paved parking, HSG D (7S, 9S, 11S)
1.757	70	Woods, Good, HSG C (7S, 11S)
0.332	79	Woods/grass comb., Good, HSG D (7S, 11S)
26.097	94	TOTAL AREA

191108_Umdasch-Wallington

Type III 24-hr 2-Year Rainfall=3.34"

Prepared by Maser Consulting PA

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: P1

Runoff Area=20.449 ac 84.63% Impervious Runoff Depth>2.78"
Flow Length=105' Tc=10.3 min CN=95 Runoff=53.99 cfs 4.734 af

Subcatchment9S: P2

Runoff Area=0.262 ac 15.27% Impervious Runoff Depth>1.72"
Flow Length=127' Tc=8.2 min CN=83 Runoff=0.48 cfs 0.038 af

Subcatchment11S: P3

Runoff Area=5.386 ac 69.44% Impervious Runoff Depth>2.29"
Flow Length=897' Tc=11.4 min CN=90 Runoff=11.93 cfs 1.030 af

Link 8L: PDP1

Inflow=54.46 cfs 4.772 af
Primary=54.46 cfs 4.772 af

Link 12L: PDP2

Inflow=11.93 cfs 1.030 af
Primary=11.93 cfs 1.030 af

Total Runoff Area = 26.097 ac Runoff Volume = 5.802 af Average Runoff Depth = 2.67"
19.21% Pervious = 5.012 ac 80.79% Impervious = 21.085 ac

Summary for Subcatchment 7S: P1

Runoff = 53.99 cfs @ 12.14 hrs, Volume= 4.734 af, Depth> 2.78"

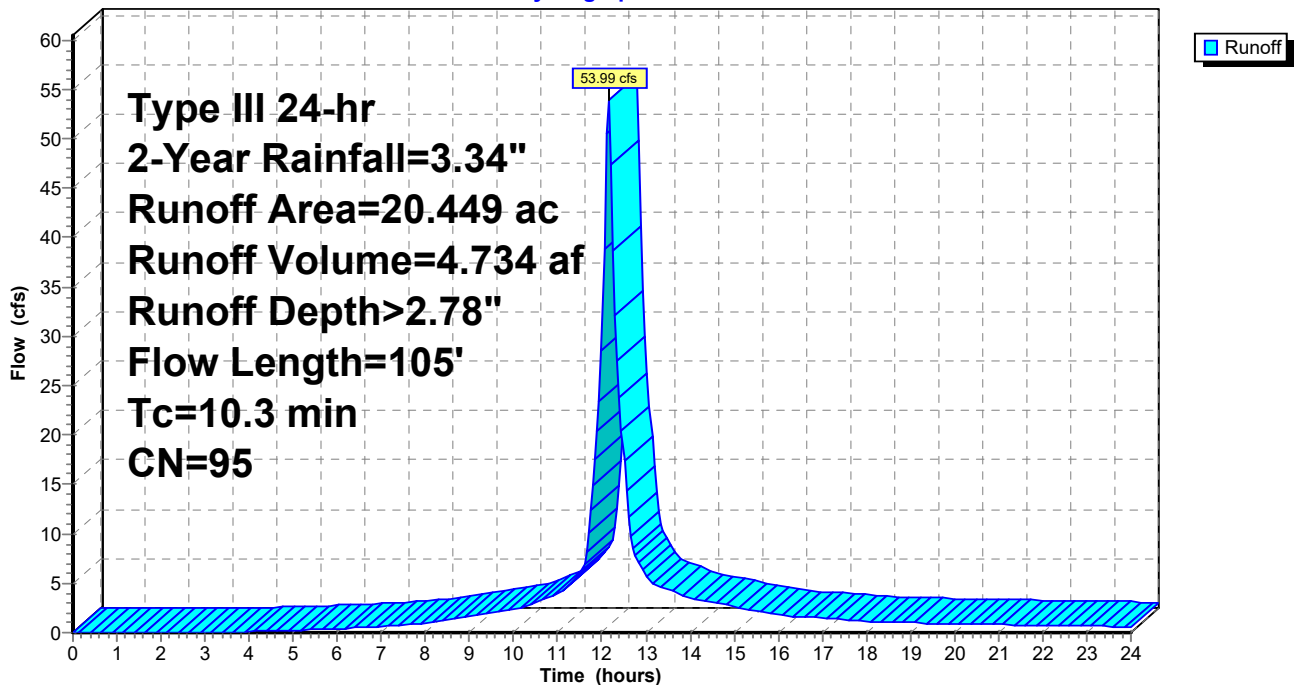
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
17.305	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.474	74	>75% Grass cover, Good, HSG C
1.865	80	>75% Grass cover, Good, HSG D
0.194	79	Woods/grass comb., Good, HSG D
0.611	70	Woods, Good, HSG C
20.449	95	Weighted Average
3.144		15.37% Pervious Area
17.305		84.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0166	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.0	5	0.0165	2.07		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.3	105	Total			

Subcatchment 7S: P1

Hydrograph



Summary for Subcatchment 9S: P2

Runoff = 0.48 cfs @ 12.12 hrs, Volume= 0.038 af, Depth> 1.72"

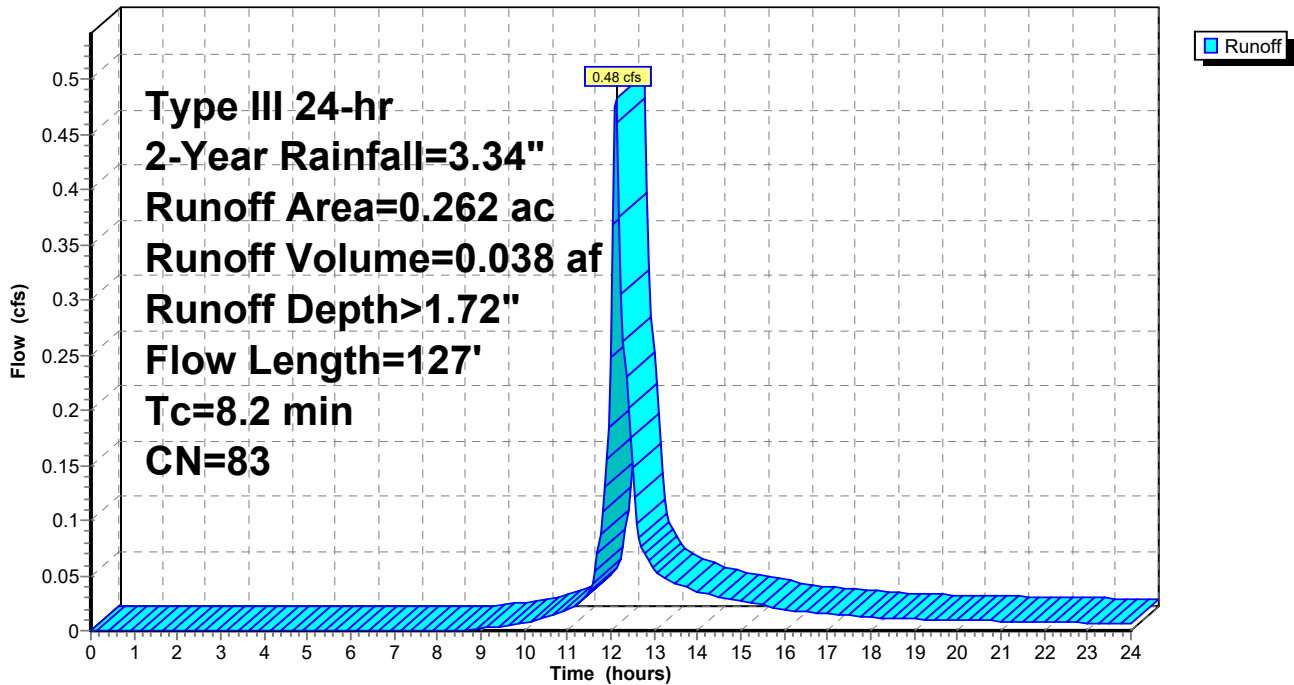
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
0.040	98	Paved parking, HSG D
0.222	80	>75% Grass cover, Good, HSG D
0.262	83	Weighted Average
0.222		84.73% Pervious Area
0.040		15.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	88	0.0235	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.1	39	0.2820	8.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.2	127	Total			

Subcatchment 9S: P2

Hydrograph



Summary for Subcatchment 11S: P3

Runoff = 11.93 cfs @ 12.16 hrs, Volume= 1.030 af, Depth> 2.29"

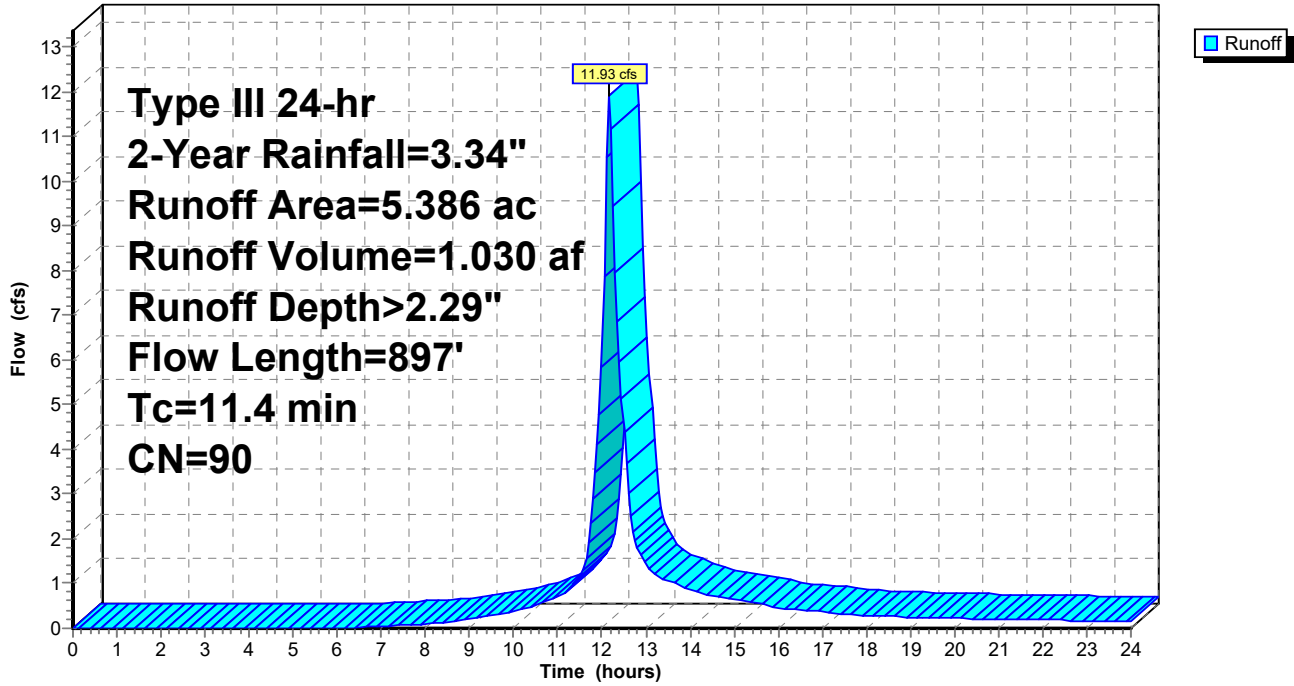
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-Year Rainfall=3.34"

Area (ac)	CN	Description
3.740	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.106	74	>75% Grass cover, Good, HSG C
0.256	80	>75% Grass cover, Good, HSG D
0.138	79	Woods/grass comb., Good, HSG D
1.146	70	Woods, Good, HSG C
5.386	90	Weighted Average
1.646		30.56% Pervious Area
3.740		69.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 11S: P3

Hydrograph



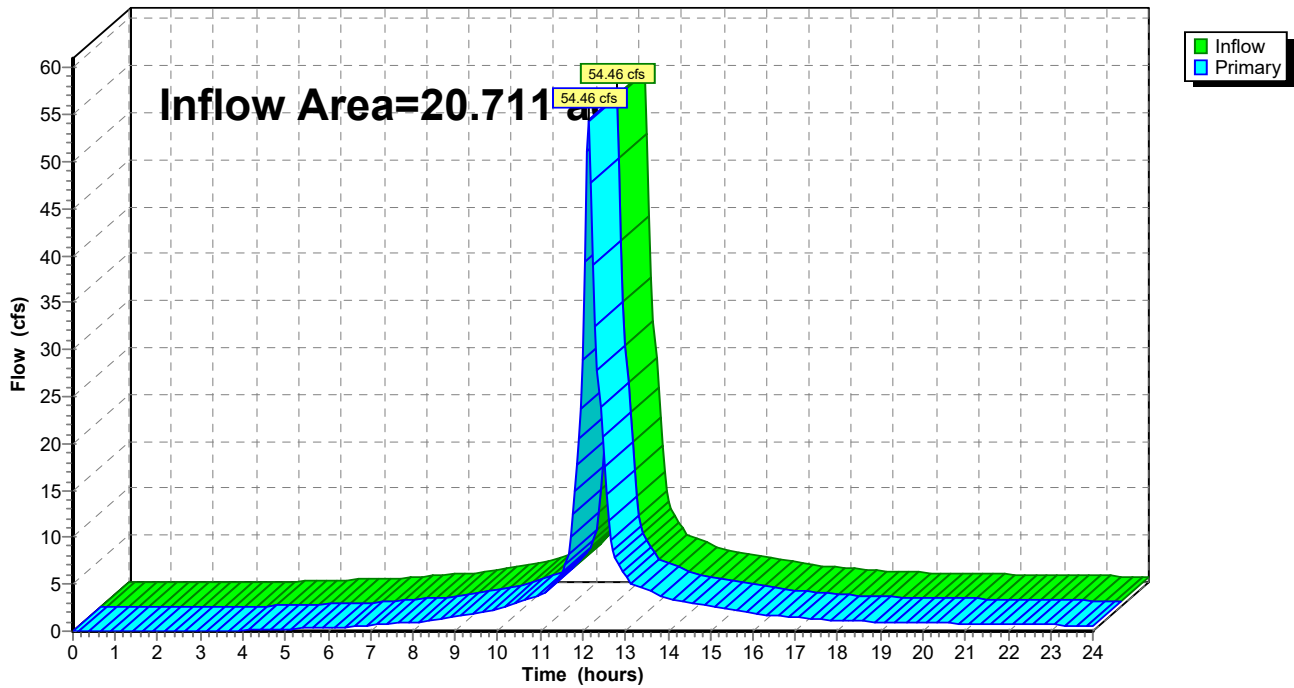
Summary for Link 8L: PDP1

Inflow Area = 20.711 ac, 83.75% Impervious, Inflow Depth > 2.76" for 2-Year event
Inflow = 54.46 cfs @ 12.14 hrs, Volume= 4.772 af
Primary = 54.46 cfs @ 12.14 hrs, Volume= 4.772 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: PDP1

Hydrograph



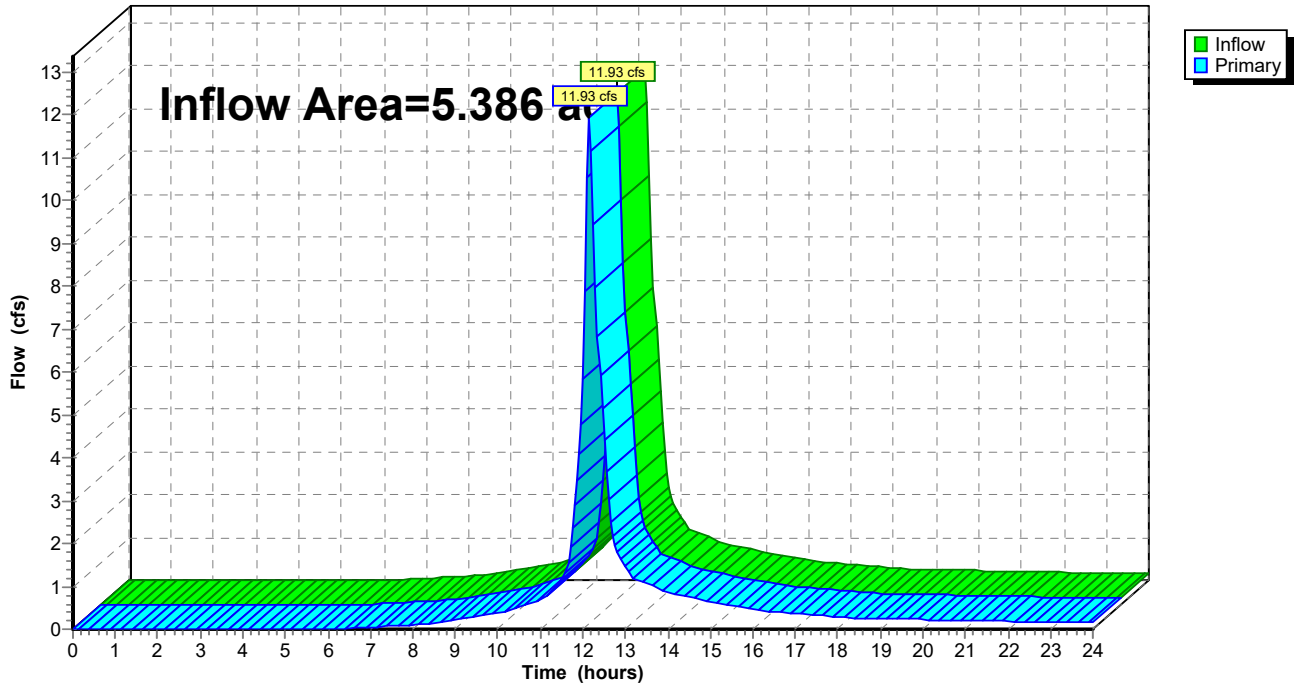
Summary for Link 12L: PDP2

Inflow Area = 5.386 ac, 69.44% Impervious, Inflow Depth > 2.29" for 2-Year event
Inflow = 11.93 cfs @ 12.16 hrs, Volume= 1.030 af
Primary = 11.93 cfs @ 12.16 hrs, Volume= 1.030 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 12L: PDP2

Hydrograph



191108_Umdasch-Wallington

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Type III 24-hr 10-Year Rainfall=5.07"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: P1

Runoff Area=20.449 ac 84.63% Impervious Runoff Depth>4.48"
Flow Length=105' Tc=10.3 min CN=95 Runoff=84.81 cfs 7.640 af

Subcatchment9S: P2

Runoff Area=0.262 ac 15.27% Impervious Runoff Depth>3.23"
Flow Length=127' Tc=8.2 min CN=83 Runoff=0.91 cfs 0.071 af

Subcatchment11S: P3

Runoff Area=5.386 ac 69.44% Impervious Runoff Depth>3.94"
Flow Length=897' Tc=11.4 min CN=90 Runoff=20.01 cfs 1.767 af

Link 8L: PDP1

Inflow=85.68 cfs 7.710 af
Primary=85.68 cfs 7.710 af

Link 12L: PDP2

Inflow=20.01 cfs 1.767 af
Primary=20.01 cfs 1.767 af

Total Runoff Area = 26.097 ac Runoff Volume = 9.477 af Average Runoff Depth = 4.36"
19.21% Pervious = 5.012 ac 80.79% Impervious = 21.085 ac

Summary for Subcatchment 7S: P1

Runoff = 84.81 cfs @ 12.14 hrs, Volume= 7.640 af, Depth> 4.48"

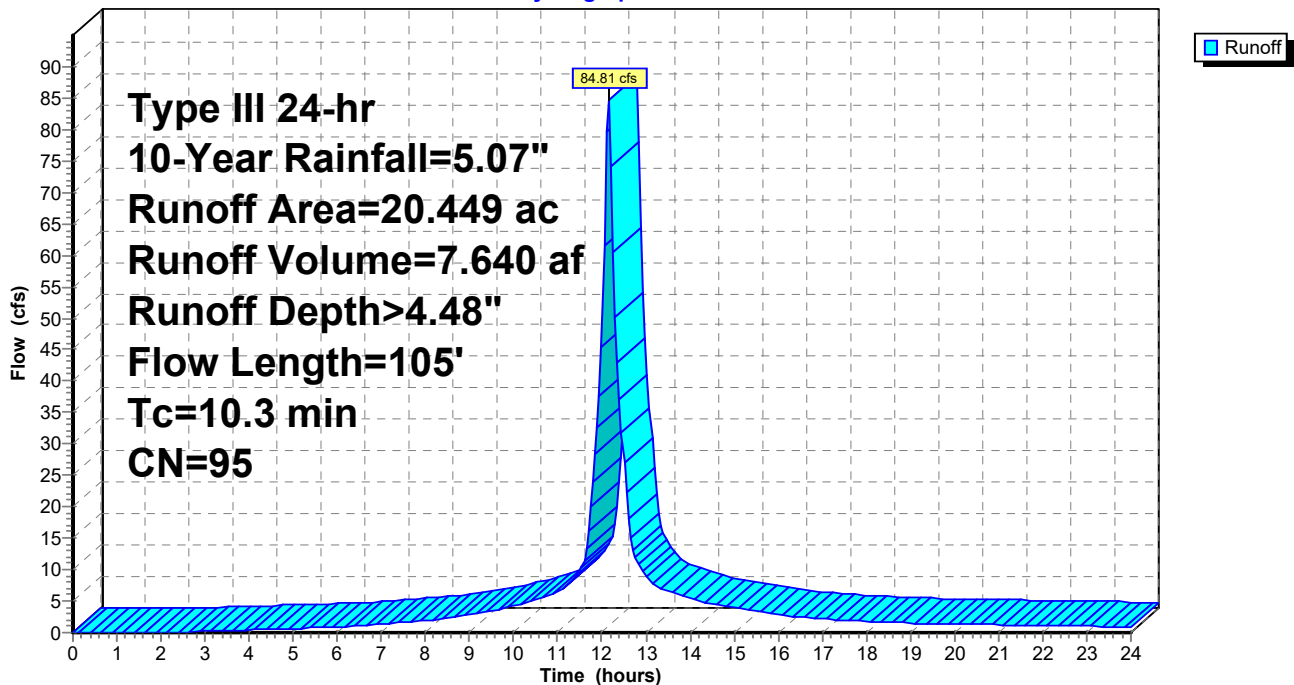
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
17.305	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.474	74	>75% Grass cover, Good, HSG C
1.865	80	>75% Grass cover, Good, HSG D
0.194	79	Woods/grass comb., Good, HSG D
0.611	70	Woods, Good, HSG C
20.449	95	Weighted Average
3.144		15.37% Pervious Area
17.305		84.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0166	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.0	5	0.0165	2.07		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.3	105	Total			

Subcatchment 7S: P1

Hydrograph



Summary for Subcatchment 9S: P2

Runoff = 0.91 cfs @ 12.12 hrs, Volume= 0.071 af, Depth> 3.23"

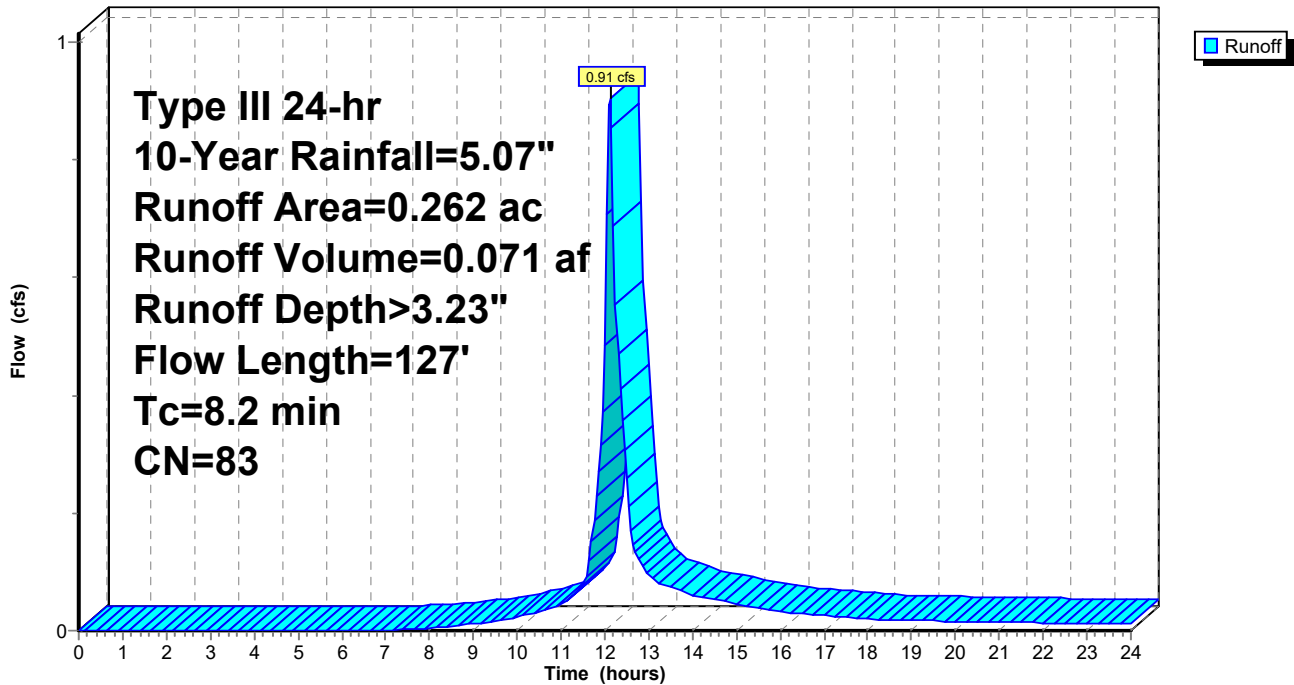
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
0.040	98	Paved parking, HSG D
0.222	80	>75% Grass cover, Good, HSG D
0.262	83	Weighted Average
0.222		84.73% Pervious Area
0.040		15.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	88	0.0235	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.1	39	0.2820	8.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.2	127	Total			

Subcatchment 9S: P2

Hydrograph



Summary for Subcatchment 11S: P3

Runoff = 20.01 cfs @ 12.16 hrs, Volume= 1.767 af, Depth> 3.94"

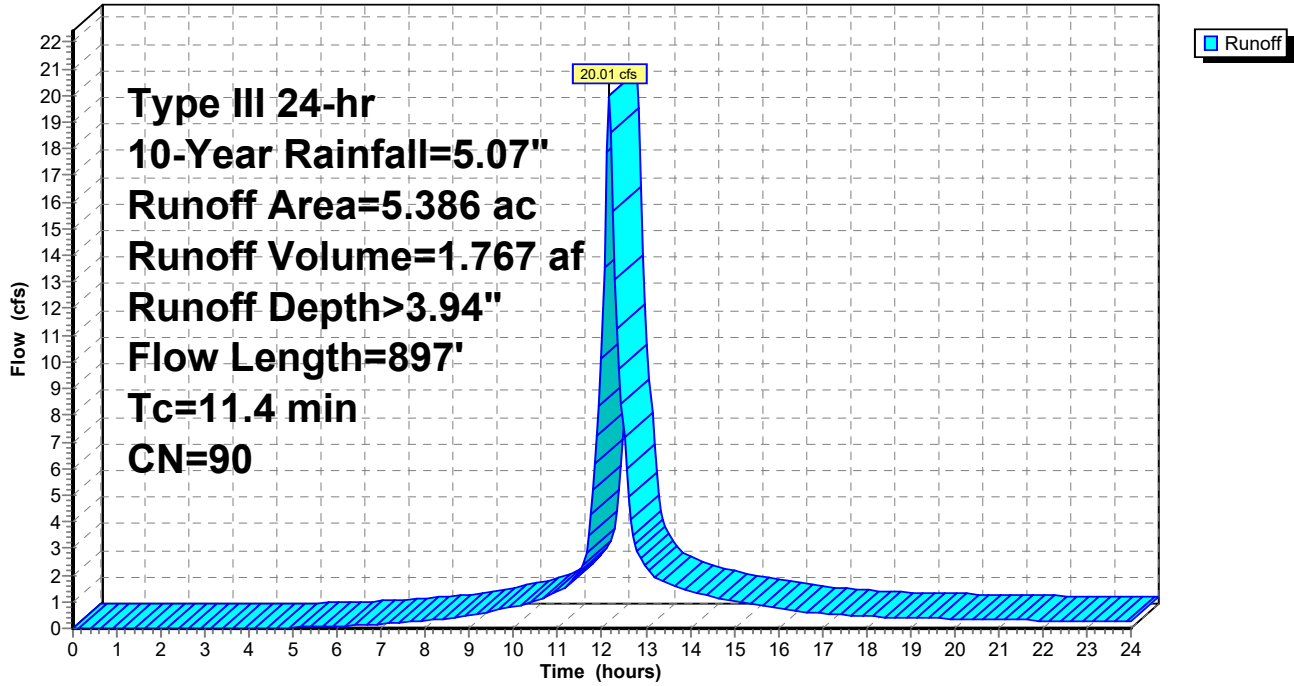
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-Year Rainfall=5.07"

Area (ac)	CN	Description
3.740	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.106	74	>75% Grass cover, Good, HSG C
0.256	80	>75% Grass cover, Good, HSG D
0.138	79	Woods/grass comb., Good, HSG D
1.146	70	Woods, Good, HSG C
5.386	90	Weighted Average
1.646		30.56% Pervious Area
3.740		69.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 11S: P3

Hydrograph



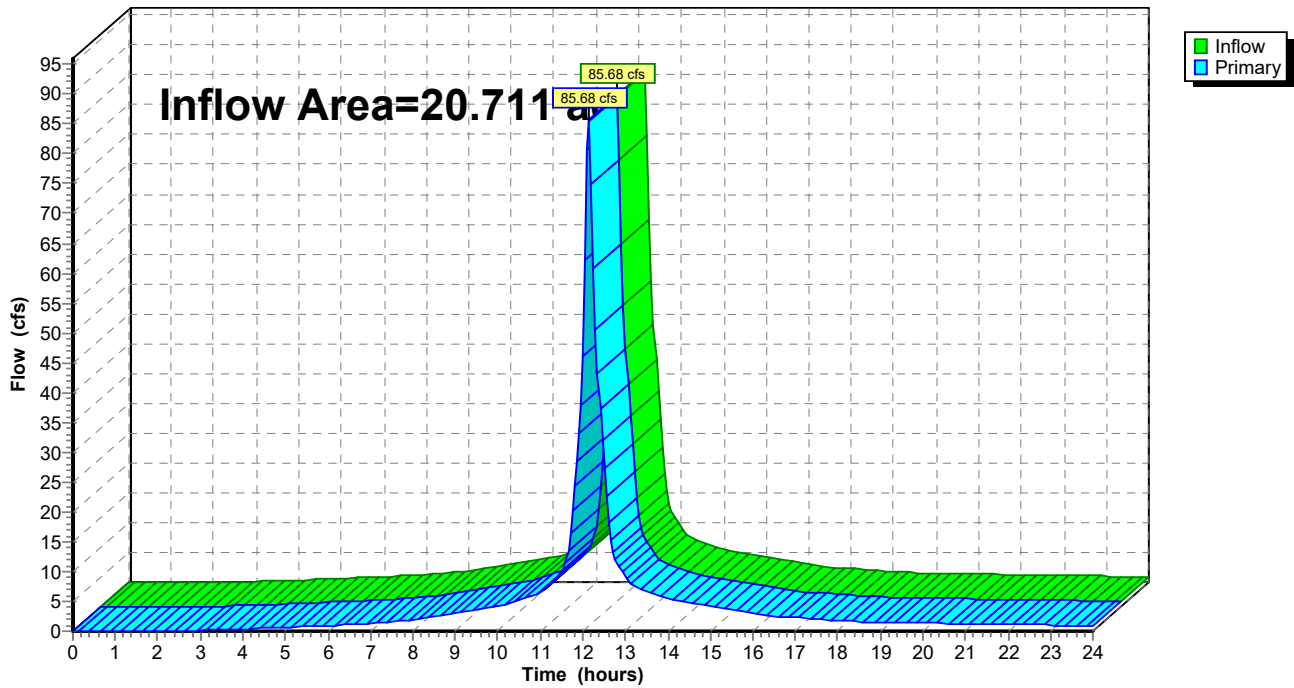
Summary for Link 8L: PDP1

Inflow Area = 20.711 ac, 83.75% Impervious, Inflow Depth > 4.47" for 10-Year event
Inflow = 85.68 cfs @ 12.14 hrs, Volume= 7.710 af
Primary = 85.68 cfs @ 12.14 hrs, Volume= 7.710 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: PDP1

Hydrograph



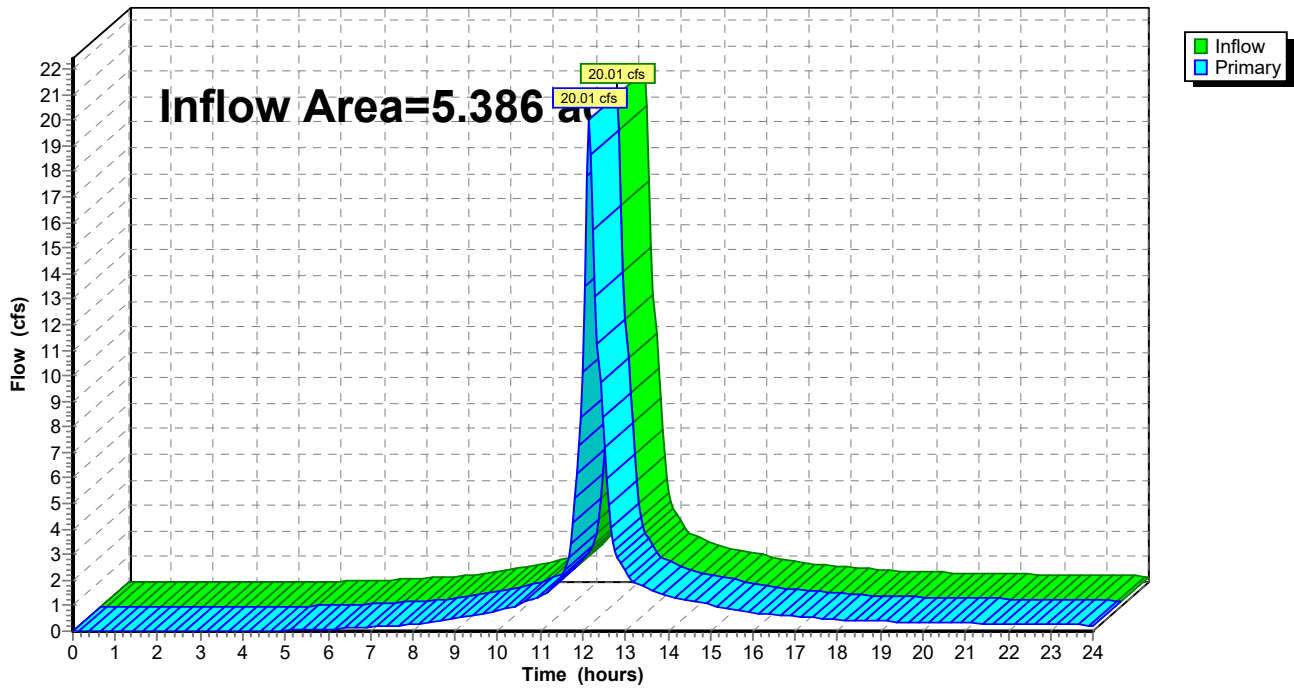
Summary for Link 12L: PDP2

Inflow Area = 5.386 ac, 69.44% Impervious, Inflow Depth > 3.94" for 10-Year event
Inflow = 20.01 cfs @ 12.16 hrs, Volume= 1.767 af
Primary = 20.01 cfs @ 12.16 hrs, Volume= 1.767 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 12L: PDP2

Hydrograph



191108_Umdasch-Wallington

Type III 24-hr 100-Year Rainfall=8.47"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment7S: P1 Runoff Area=20.449 ac 84.63% Impervious Runoff Depth>7.86"
Flow Length=105' Tc=10.3 min CN=95 Runoff=144.55 cfs 13.394 af

Subcatchment9S: P2 Runoff Area=0.262 ac 15.27% Impervious Runoff Depth>6.42"
Flow Length=127' Tc=8.2 min CN=83 Runoff=1.75 cfs 0.140 af

Subcatchment11S: P3 Runoff Area=5.386 ac 69.44% Impervious Runoff Depth>7.26"
Flow Length=897' Tc=11.4 min CN=90 Runoff=35.69 cfs 3.258 af

Link 8L: PDP1 Inflow=146.24 cfs 13.534 af
Primary=146.24 cfs 13.534 af

Link 12L: PDP2 Inflow=35.69 cfs 3.258 af
Primary=35.69 cfs 3.258 af

Total Runoff Area = 26.097 ac Runoff Volume = 16.791 af Average Runoff Depth = 7.72"
19.21% Pervious = 5.012 ac 80.79% Impervious = 21.085 ac

Summary for Subcatchment 7S: P1

Runoff = 144.55 cfs @ 12.14 hrs, Volume= 13.394 af, Depth> 7.86"

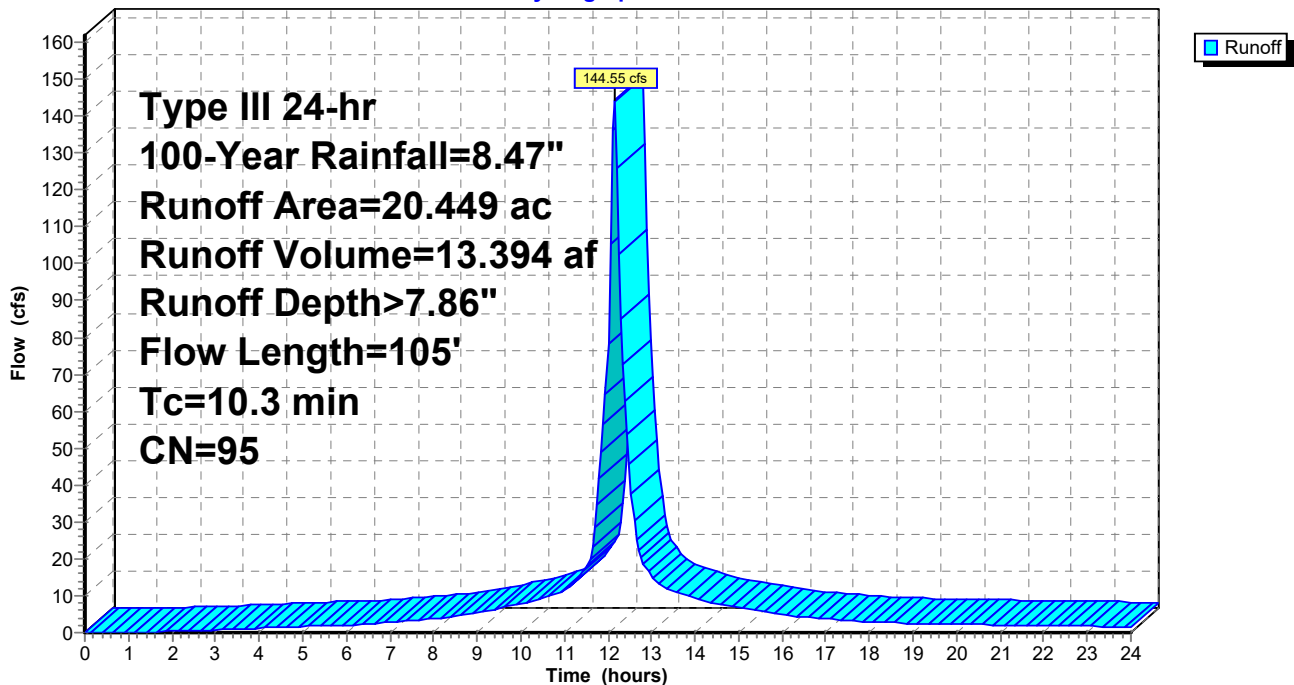
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
17.305	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.474	74	>75% Grass cover, Good, HSG C
1.865	80	>75% Grass cover, Good, HSG D
0.194	79	Woods/grass comb., Good, HSG D
0.611	70	Woods, Good, HSG C
20.449	95	Weighted Average
3.144		15.37% Pervious Area
17.305		84.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	100	0.0166	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.0	5	0.0165	2.07		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.3	105	Total			

Subcatchment 7S: P1

Hydrograph



Summary for Subcatchment 9S: P2

Runoff = 1.75 cfs @ 12.11 hrs, Volume= 0.140 af, Depth> 6.42"

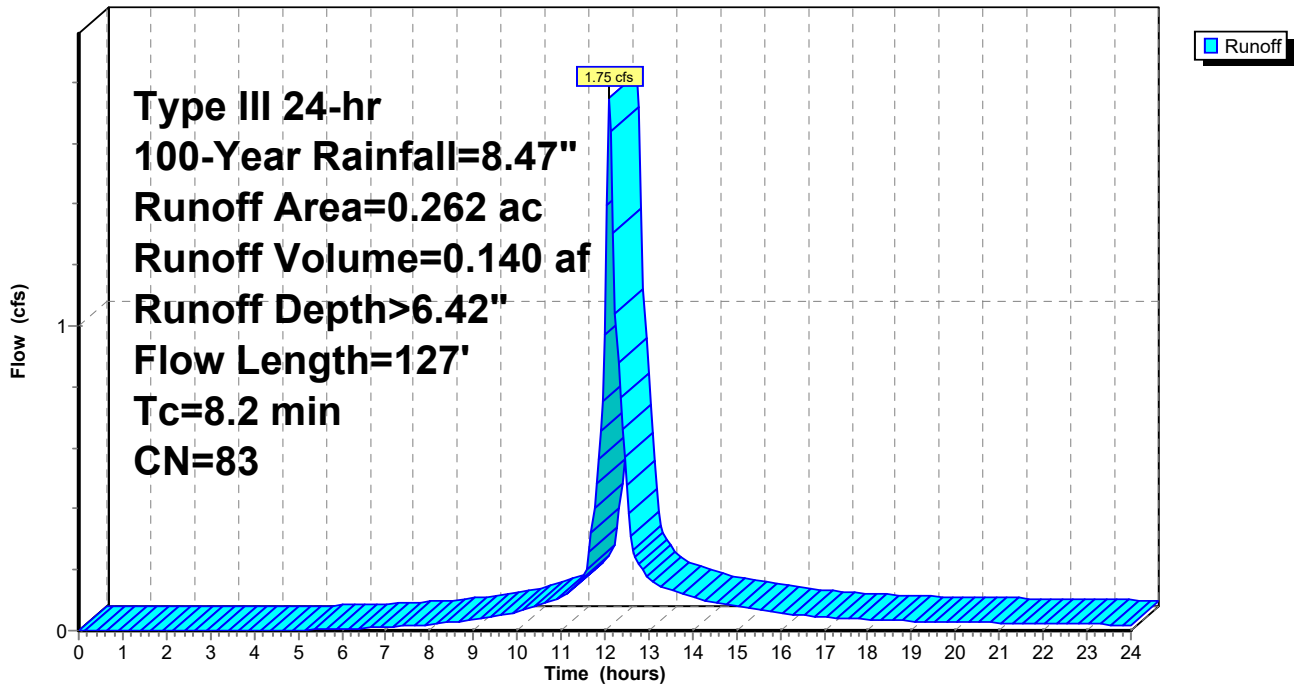
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
0.040	98	Paved parking, HSG D
0.222	80	>75% Grass cover, Good, HSG D
0.262	83	Weighted Average
0.222		84.73% Pervious Area
0.040		15.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	88	0.0235	0.18		Sheet Flow, Grass: Short n= 0.150 P2= 3.34"
0.1	39	0.2820	8.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
8.2	127	Total			

Subcatchment 9S: P2

Hydrograph



Summary for Subcatchment 11S: P3

Runoff = 35.69 cfs @ 12.15 hrs, Volume= 3.258 af, Depth> 7.26"

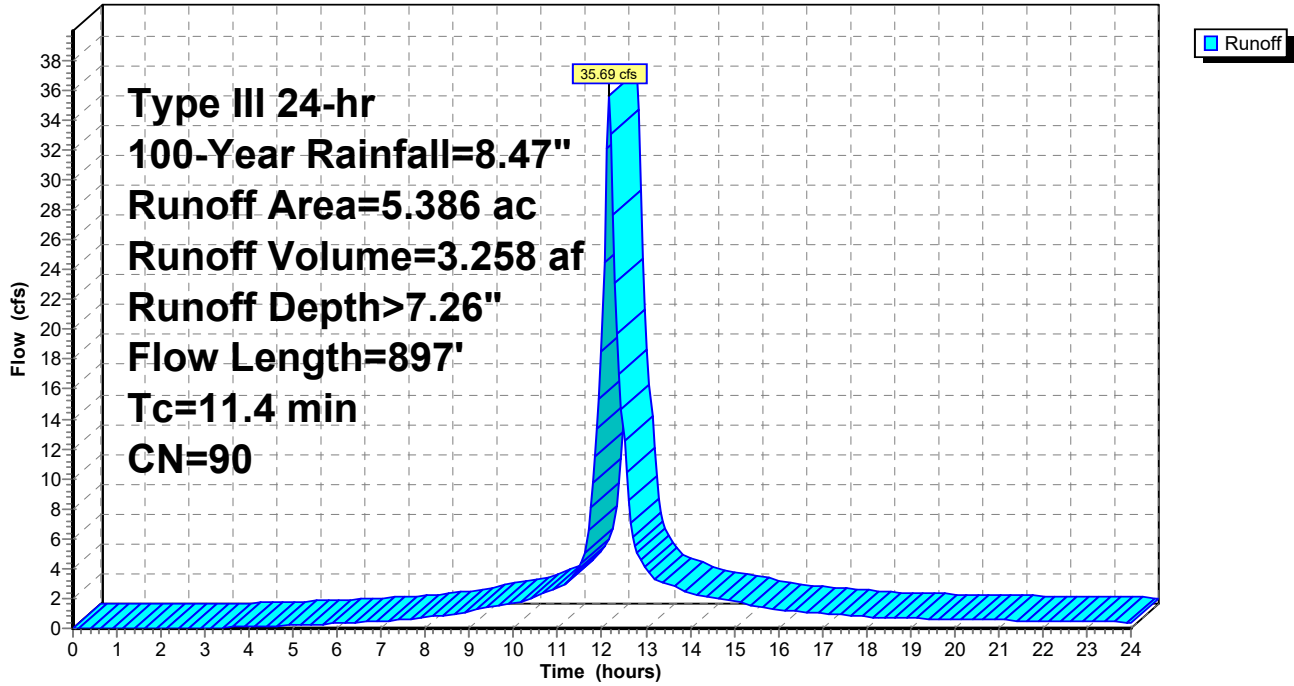
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-Year Rainfall=8.47"

Area (ac)	CN	Description
3.740	98	Paved parking, HSG D
0.000	96	Gravel surface, HSG D
0.106	74	>75% Grass cover, Good, HSG C
0.256	80	>75% Grass cover, Good, HSG D
0.138	79	Woods/grass comb., Good, HSG D
1.146	70	Woods, Good, HSG C
5.386	90	Weighted Average
1.646		30.56% Pervious Area
3.740		69.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	96	0.6110	0.31		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.34"
0.1	16	0.4400	3.32		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.4	71	0.0423	3.31		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.4	60	0.0167	2.62		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.8	171	0.0059	1.56		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	126	0.0080	1.82		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.3	87	0.0576	4.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.5	216	0.0139	2.39		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	54	0.0065	1.64		Shallow Concentrated Flow, Paved Kv= 20.3 fps
11.4	897	Total			

Subcatchment 11S: P3

Hydrograph



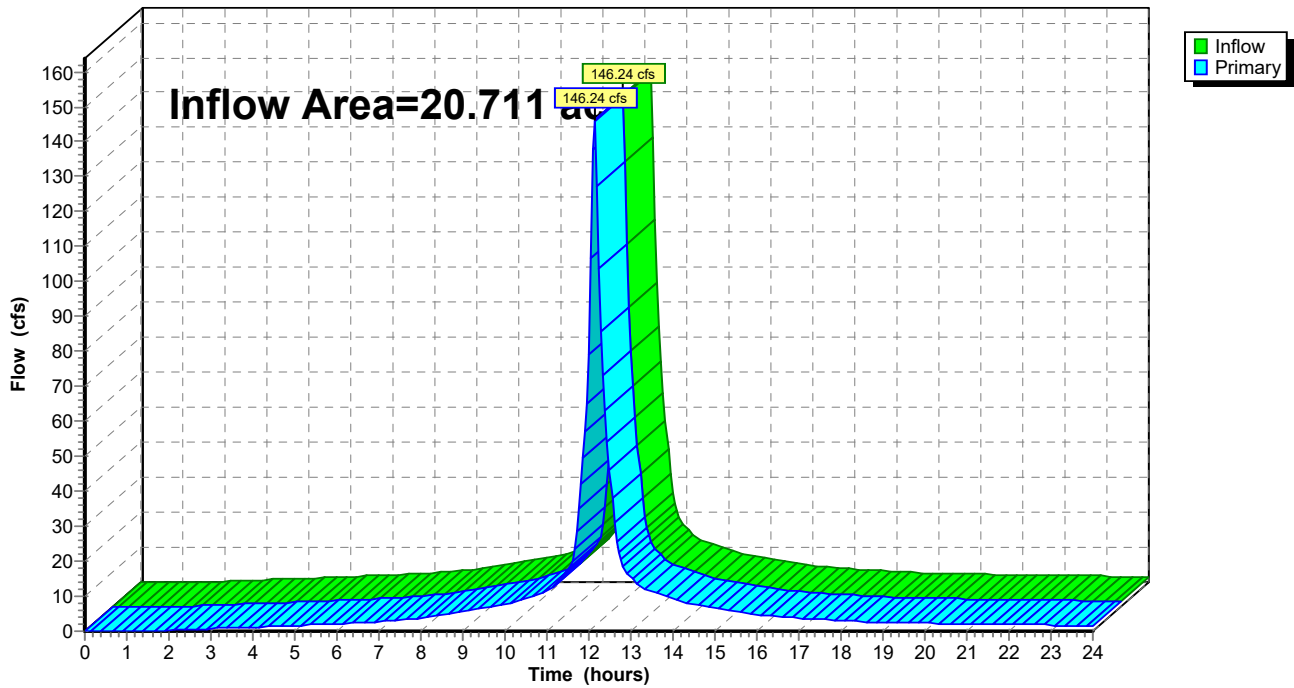
Summary for Link 8L: PDP1

Inflow Area = 20.711 ac, 83.75% Impervious, Inflow Depth > 7.84" for 100-Year event
Inflow = 146.24 cfs @ 12.14 hrs, Volume= 13.534 af
Primary = 146.24 cfs @ 12.14 hrs, Volume= 13.534 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 8L: PDP1

Hydrograph



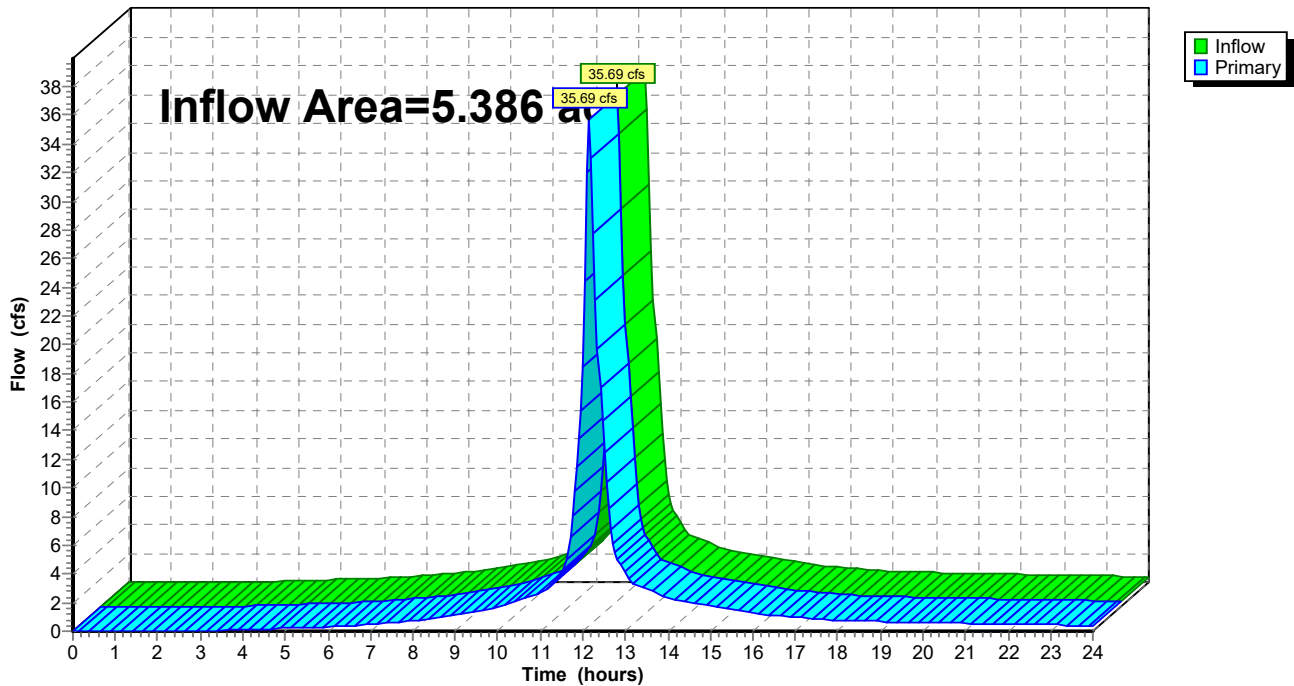
Summary for Link 12L: PDP2

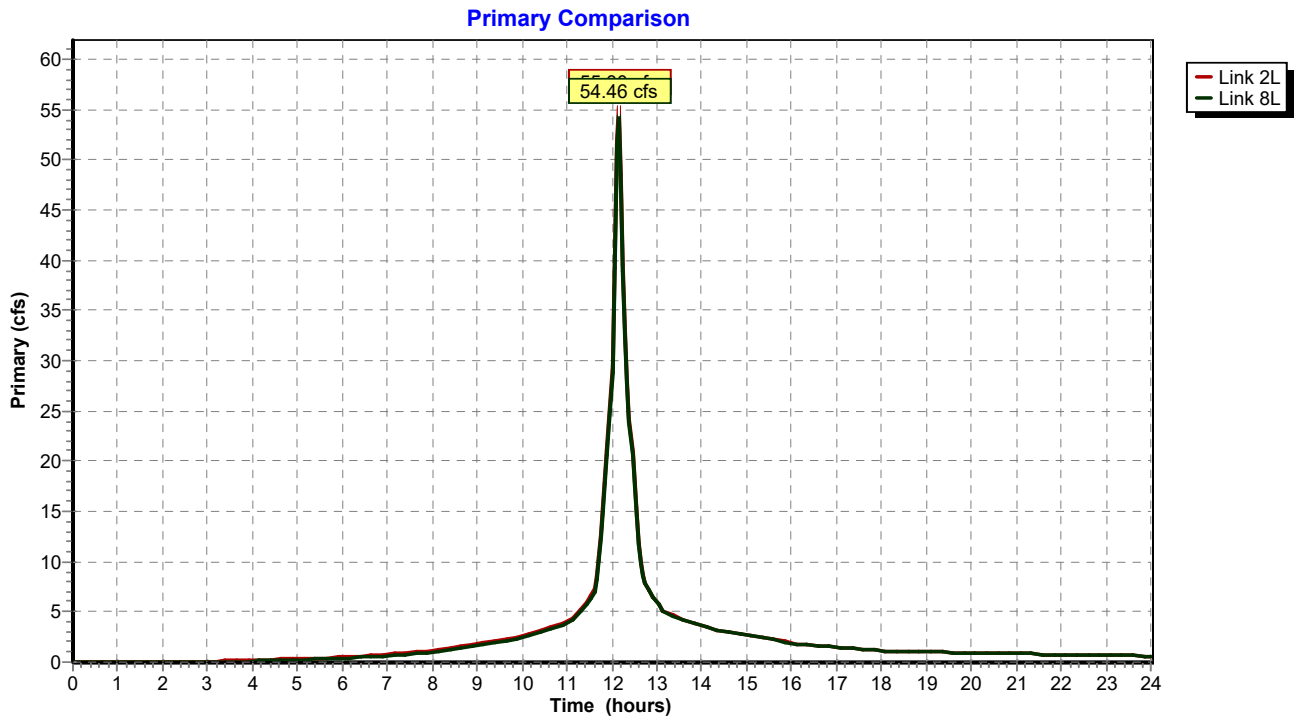
Inflow Area = 5.386 ac, 69.44% Impervious, Inflow Depth > 7.26" for 100-Year event
Inflow = 35.69 cfs @ 12.15 hrs, Volume= 3.258 af
Primary = 35.69 cfs @ 12.15 hrs, Volume= 3.258 af, Atten= 0%, Lag= 0.0 min

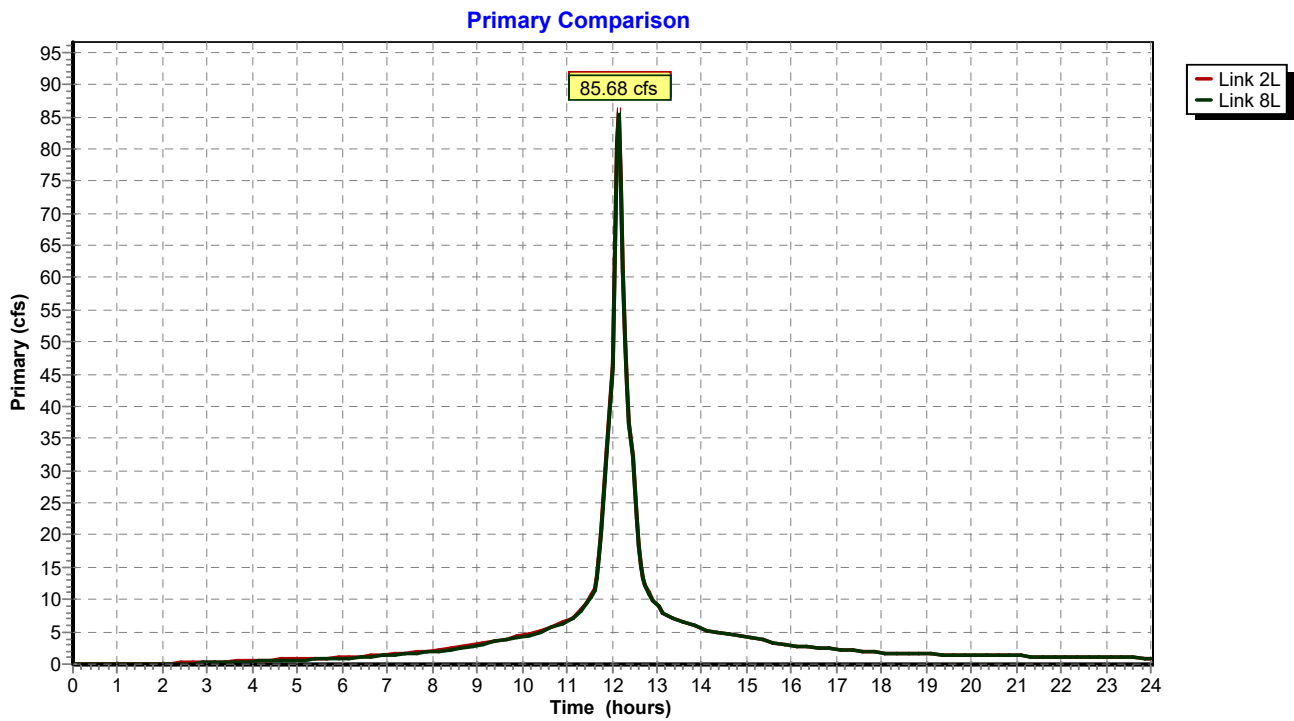
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

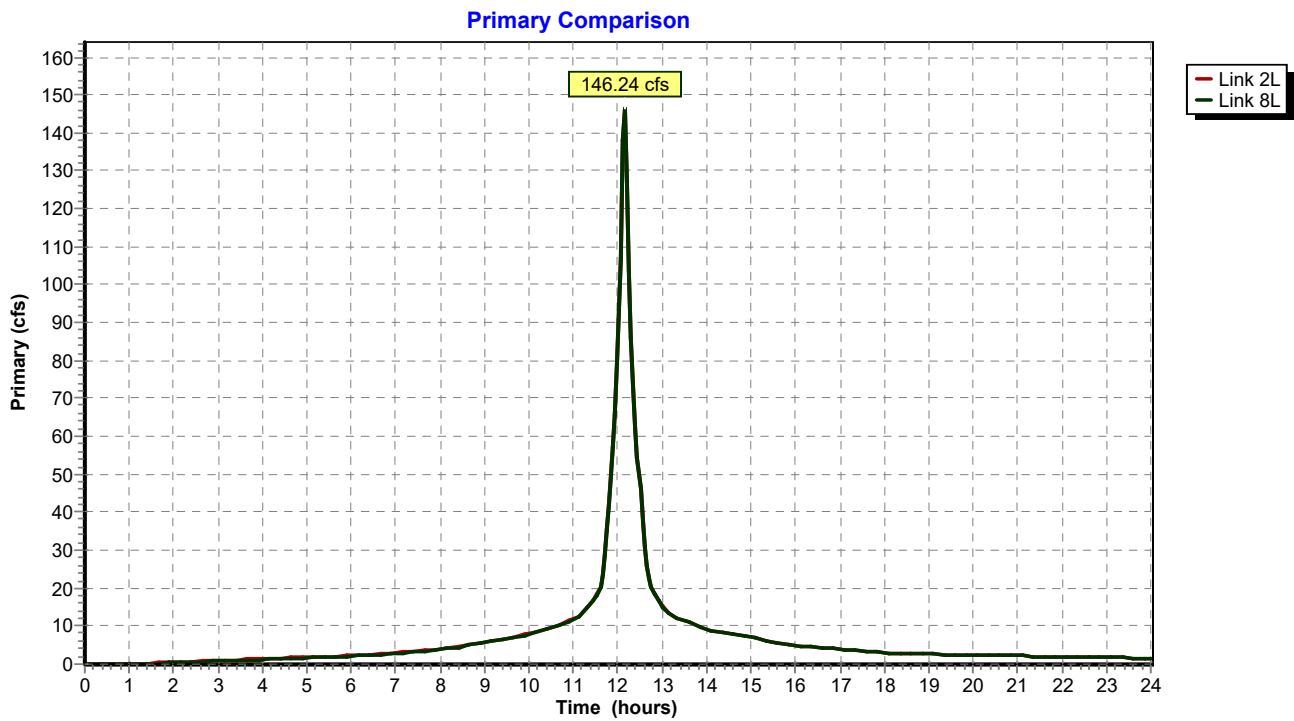
Link 12L: PDP2

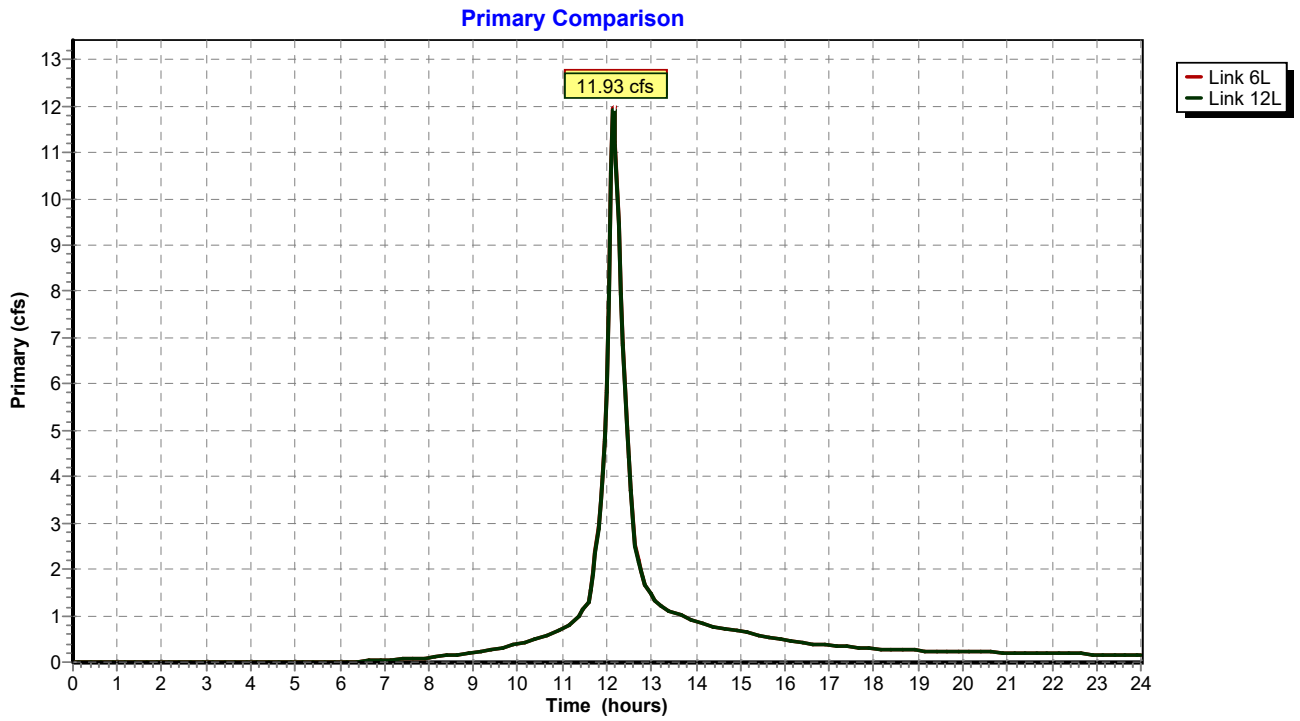
Hydrograph

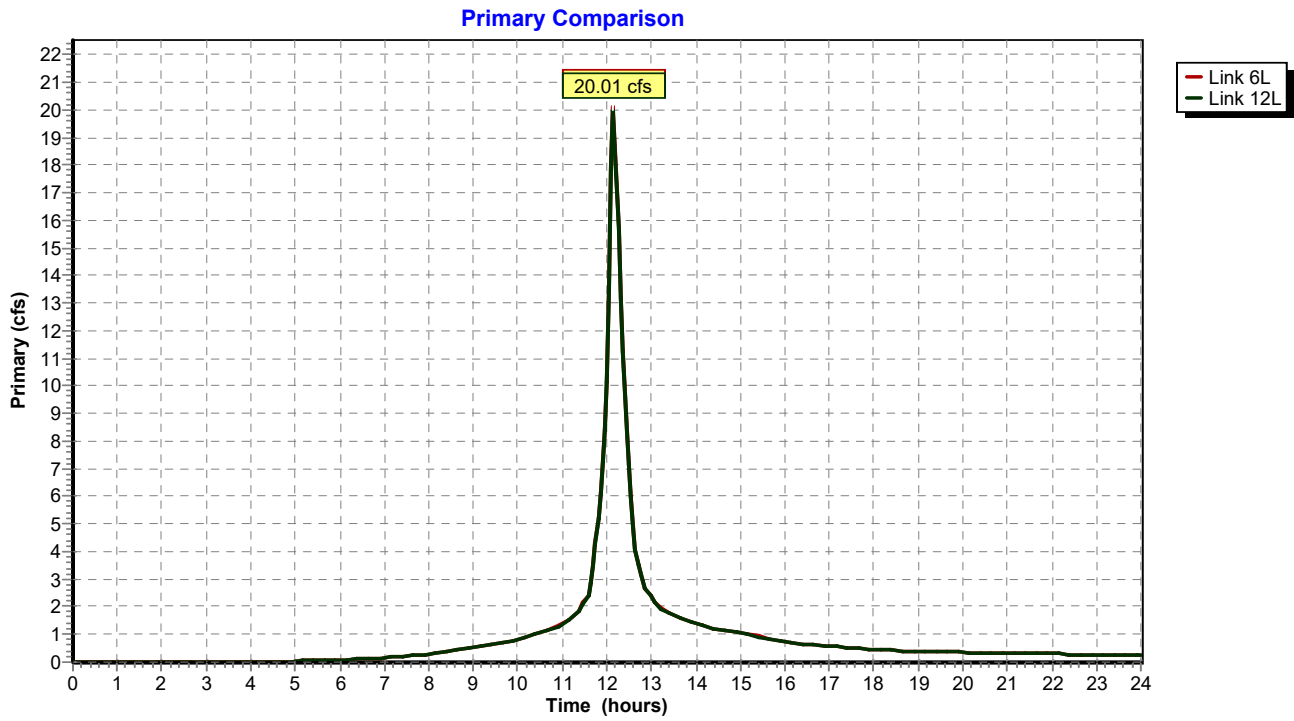


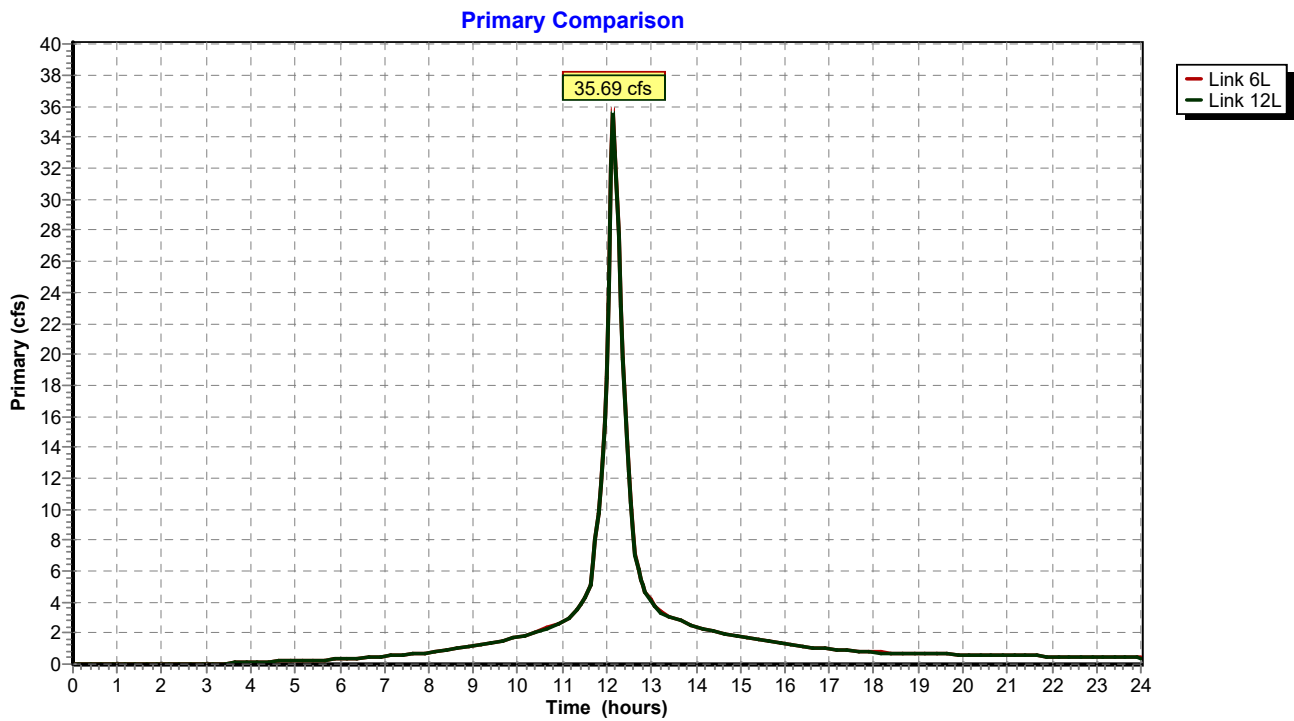












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Type III 24-hr 2-Year Rainfall=3.34"

Printed 11/8/2019

Primary Comparison

Time (hours)	Link 2L (cfs)	Link 8L (cfs)	Time (hours)	Link 2L (cfs)	Link 8L (cfs)
0.00	0.00	0.00	13.00	5.95	5.89
0.25	0.00	0.00	13.25	4.84	4.80
0.50	0.00	0.00	13.50	4.40	4.37
0.75	0.00	0.00	13.75	4.00	3.97
1.00	0.00	0.00	14.00	3.59	3.57
1.25	0.00	0.00	14.25	3.27	3.25
1.50	0.00	0.00	14.50	3.07	3.05
1.75	0.00	0.00	14.75	2.88	2.86
2.00	0.00	0.00	15.00	2.68	2.67
2.25	0.00	0.00	15.25	2.49	2.47
2.50	0.00	0.00	15.50	2.29	2.28
2.75	0.01	0.00	15.75	2.10	2.08
3.00	0.05	0.00	16.00	1.90	1.89
3.25	0.08	0.01	16.25	1.75	1.74
3.50	0.11	0.03	16.50	1.66	1.65
3.75	0.15	0.06	16.75	1.58	1.57
4.00	0.18	0.10	17.00	1.49	1.48
4.25	0.22	0.13	17.25	1.40	1.40
4.50	0.25	0.16	17.50	1.32	1.31
4.75	0.29	0.20	17.75	1.23	1.23
5.00	0.33	0.23	18.00	1.15	1.14
5.25	0.37	0.27	18.25	1.09	1.08
5.50	0.40	0.31	18.50	1.06	1.05
5.75	0.44	0.34	18.75	1.03	1.03
6.00	0.48	0.38	19.00	1.01	1.00
6.25	0.53	0.43	19.25	0.98	0.98
6.50	0.60	0.49	19.50	0.96	0.95
6.75	0.67	0.56	19.75	0.93	0.93
7.00	0.75	0.63	20.00	0.91	0.90
7.25	0.83	0.71	20.25	0.88	0.88
7.50	0.92	0.79	20.50	0.86	0.86
7.75	1.01	0.87	20.75	0.84	0.84
8.00	1.10	0.96	21.00	0.83	0.82
8.25	1.22	1.08	21.25	0.81	0.80
8.50	1.39	1.24	21.50	0.79	0.78
8.75	1.57	1.41	21.75	0.77	0.76
9.00	1.76	1.60	22.00	0.75	0.75
9.25	1.96	1.79	22.25	0.73	0.73
9.50	2.16	1.99	22.50	0.71	0.71
9.75	2.37	2.19	22.75	0.69	0.69
10.00	2.58	2.40	23.00	0.67	0.67
10.25	2.87	2.68	23.25	0.65	0.65
10.50	3.26	3.07	23.50	0.63	0.63
10.75	3.67	3.48	23.75	0.61	0.61
11.00	4.09	3.89	24.00	0.59	0.59
11.25	4.93	4.71			
11.50	6.39	6.14			
11.75	12.82	12.43			
12.00	29.52	28.87			
12.25	39.57	38.93			
12.50	17.72	17.50			
12.75	7.91	7.82			

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Type III 24-hr 10-Year Rainfall=5.07"

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Primary Comparison

Time (hours)	Link 2L (cfs)	Link 8L (cfs)	Time (hours)	Link 2L (cfs)	Link 8L (cfs)
0.00	0.00	0.00	13.00	9.16	9.12
0.25	0.00	0.00	13.25	7.45	7.43
0.50	0.00	0.00	13.50	6.77	6.75
0.75	0.00	0.00	13.75	6.15	6.13
1.00	0.00	0.00	14.00	5.52	5.51
1.25	0.00	0.00	14.25	5.03	5.01
1.50	0.00	0.00	14.50	4.72	4.70
1.75	0.00	0.00	14.75	4.42	4.41
2.00	0.05	0.00	15.00	4.12	4.11
2.25	0.10	0.01	15.25	3.82	3.81
2.50	0.16	0.06	15.50	3.52	3.51
2.75	0.22	0.11	15.75	3.22	3.21
3.00	0.28	0.17	16.00	2.92	2.91
3.25	0.34	0.22	16.25	2.68	2.68
3.50	0.40	0.28	16.50	2.55	2.54
3.75	0.46	0.34	16.75	2.42	2.41
4.00	0.52	0.40	17.00	2.28	2.28
4.25	0.59	0.46	17.25	2.15	2.15
4.50	0.65	0.52	17.50	2.02	2.02
4.75	0.71	0.58	17.75	1.89	1.89
5.00	0.77	0.64	18.00	1.76	1.76
5.25	0.83	0.70	18.25	1.67	1.66
5.50	0.89	0.76	18.50	1.62	1.62
5.75	0.96	0.82	18.75	1.58	1.58
6.00	1.02	0.88	19.00	1.55	1.54
6.25	1.10	0.97	19.25	1.51	1.50
6.50	1.22	1.08	19.50	1.47	1.46
6.75	1.35	1.20	19.75	1.43	1.43
7.00	1.48	1.33	20.00	1.39	1.39
7.25	1.61	1.46	20.25	1.35	1.35
7.50	1.75	1.60	20.50	1.32	1.32
7.75	1.89	1.73	20.75	1.29	1.29
8.00	2.03	1.88	21.00	1.26	1.26
8.25	2.23	2.07	21.25	1.24	1.23
8.50	2.51	2.35	21.50	1.21	1.20
8.75	2.81	2.63	21.75	1.18	1.17
9.00	3.11	2.93	22.00	1.15	1.14
9.25	3.42	3.24	22.25	1.12	1.12
9.50	3.73	3.55	22.50	1.09	1.09
9.75	4.05	3.87	22.75	1.06	1.06
10.00	4.37	4.19	23.00	1.03	1.03
10.25	4.81	4.63	23.25	1.00	1.00
10.50	5.43	5.25	23.50	0.97	0.97
10.75	6.06	5.88	23.75	0.94	0.94
11.00	6.71	6.53	24.00	0.91	0.91
11.25	8.01	7.82			
11.50	10.32	10.10			
11.75	20.50	20.18			
12.00	46.52	46.02			
12.25	61.40	60.89			
12.50	27.35	27.17			
12.75	12.19	12.12			

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Type III 24-hr 100-Year Rainfall=8.47"

Printed 11/8/2019

Primary Comparison

Time (hours)	Link 2L (cfs)	Link 8L (cfs)	Time (hours)	Link 2L (cfs)	Link 8L (cfs)
0.00	0.00	0.00	13.00	15.42	15.40
0.25	0.00	0.00	13.25	12.55	12.53
0.50	0.00	0.00	13.50	11.40	11.39
0.75	0.00	0.00	13.75	10.34	10.34
1.00	0.00	0.00	14.00	9.29	9.29
1.25	0.07	0.00	14.25	8.45	8.45
1.50	0.22	0.06	14.50	7.93	7.93
1.75	0.35	0.18	14.75	7.43	7.42
2.00	0.46	0.29	15.00	6.92	6.92
2.25	0.57	0.40	15.25	6.42	6.41
2.50	0.69	0.51	15.50	5.91	5.91
2.75	0.80	0.63	15.75	5.40	5.40
3.00	0.92	0.74	16.00	4.90	4.90
3.25	1.03	0.85	16.25	4.51	4.50
3.50	1.14	0.96	16.50	4.28	4.28
3.75	1.25	1.07	16.75	4.06	4.06
4.00	1.36	1.18	17.00	3.84	3.84
4.25	1.47	1.29	17.25	3.62	3.62
4.50	1.57	1.40	17.50	3.40	3.40
4.75	1.68	1.50	17.75	3.18	3.18
5.00	1.78	1.61	18.00	2.96	2.96
5.25	1.88	1.71	18.25	2.80	2.80
5.50	1.97	1.81	18.50	2.73	2.73
5.75	2.07	1.91	18.75	2.66	2.66
6.00	2.17	2.01	19.00	2.60	2.60
6.25	2.31	2.15	19.25	2.53	2.53
6.50	2.52	2.37	19.50	2.46	2.46
6.75	2.75	2.59	19.75	2.40	2.40
7.00	2.97	2.81	20.00	2.33	2.33
7.25	3.21	3.04	20.25	2.27	2.27
7.50	3.44	3.28	20.50	2.22	2.22
7.75	3.67	3.52	20.75	2.17	2.17
8.00	3.91	3.76	21.00	2.12	2.12
8.25	4.25	4.09	21.25	2.07	2.07
8.50	4.74	4.58	21.50	2.02	2.02
8.75	5.25	5.09	21.75	1.97	1.97
9.00	5.76	5.60	22.00	1.92	1.93
9.25	6.28	6.12	22.25	1.88	1.88
9.50	6.80	6.64	22.50	1.83	1.83
9.75	7.32	7.17	22.75	1.78	1.78
10.00	7.85	7.70	23.00	1.73	1.73
10.25	8.59	8.44	23.25	1.68	1.68
10.50	9.63	9.49	23.50	1.63	1.63
10.75	10.69	10.55	23.75	1.58	1.58
11.00	11.77	11.63	24.00	1.53	1.53
11.25	13.99	13.85			
11.50	17.91	17.76			
11.75	35.37	35.18			
12.00	79.48	79.22			
12.25	103.90	103.52			
12.50	46.12	45.98			
12.75	20.53	20.48			

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Prepared by Maser Consulting PA

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Type III 24-hr 2-Year Rainfall=3.34"

Printed 11/8/2019

Primary Comparison

Time (hours)	Link 6L (cfs)	Link 12L (cfs)	Time (hours)	Link 6L (cfs)	Link 12L (cfs)
0.00	0.00	0.00	13.00	1.45	1.44
0.25	0.00	0.00	13.25	1.17	1.17
0.50	0.00	0.00	13.50	1.07	1.06
0.75	0.00	0.00	13.75	0.97	0.97
1.00	0.00	0.00	14.00	0.88	0.87
1.25	0.00	0.00	14.25	0.80	0.79
1.50	0.00	0.00	14.50	0.75	0.75
1.75	0.00	0.00	14.75	0.70	0.70
2.00	0.00	0.00	15.00	0.66	0.65
2.25	0.00	0.00	15.25	0.61	0.61
2.50	0.00	0.00	15.50	0.56	0.56
2.75	0.00	0.00	15.75	0.52	0.51
3.00	0.00	0.00	16.00	0.47	0.47
3.25	0.00	0.00	16.25	0.43	0.43
3.50	0.00	0.00	16.50	0.41	0.41
3.75	0.00	0.00	16.75	0.39	0.39
4.00	0.00	0.00	17.00	0.37	0.36
4.25	0.00	0.00	17.25	0.35	0.34
4.50	0.00	0.00	17.50	0.33	0.32
4.75	0.00	0.00	17.75	0.30	0.30
5.00	0.00	0.00	18.00	0.28	0.28
5.25	0.00	0.00	18.25	0.27	0.27
5.50	0.00	0.00	18.50	0.26	0.26
5.75	0.00	0.00	18.75	0.25	0.25
6.00	0.00	0.00	19.00	0.25	0.25
6.25	0.01	0.01	19.25	0.24	0.24
6.50	0.02	0.02	19.50	0.24	0.24
6.75	0.03	0.03	19.75	0.23	0.23
7.00	0.04	0.04	20.00	0.22	0.22
7.25	0.05	0.05	20.25	0.22	0.22
7.50	0.07	0.07	20.50	0.21	0.21
7.75	0.08	0.08	20.75	0.21	0.21
8.00	0.10	0.10	21.00	0.20	0.20
8.25	0.12	0.12	21.25	0.20	0.20
8.50	0.15	0.15	21.50	0.19	0.19
8.75	0.18	0.18	21.75	0.19	0.19
9.00	0.21	0.21	22.00	0.19	0.18
9.25	0.25	0.25	22.25	0.18	0.18
9.50	0.29	0.29	22.50	0.18	0.18
9.75	0.33	0.33	22.75	0.17	0.17
10.00	0.38	0.38	23.00	0.17	0.17
10.25	0.44	0.44	23.25	0.16	0.16
10.50	0.52	0.52	23.50	0.16	0.16
10.75	0.61	0.61	23.75	0.15	0.15
11.00	0.71	0.70	24.00	0.15	0.15
11.25	0.87	0.87			
11.50	1.18	1.17			
11.75	2.37	2.36			
12.00	5.87	5.84			
12.25	9.50	9.45			
12.50	4.43	4.41			
12.75	1.96	1.95			

191108_Umdasch-Wallington

Prepared by Maser Consulting PA

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Type III 24-hr 10-Year Rainfall=5.07"

Printed 11/8/2019

Primary Comparison

Time (hours)	Link 6L (cfs)	Link 12L (cfs)	Time (hours)	Link 6L (cfs)	Link 12L (cfs)
0.00	0.00	0.00	13.00	2.33	2.32
0.25	0.00	0.00	13.25	1.88	1.87
0.50	0.00	0.00	13.50	1.71	1.70
0.75	0.00	0.00	13.75	1.55	1.55
1.00	0.00	0.00	14.00	1.40	1.39
1.25	0.00	0.00	14.25	1.27	1.26
1.50	0.00	0.00	14.50	1.19	1.19
1.75	0.00	0.00	14.75	1.12	1.11
2.00	0.00	0.00	15.00	1.04	1.04
2.25	0.00	0.00	15.25	0.97	0.96
2.50	0.00	0.00	15.50	0.89	0.89
2.75	0.00	0.00	15.75	0.82	0.81
3.00	0.00	0.00	16.00	0.74	0.74
3.25	0.00	0.00	16.25	0.68	0.68
3.50	0.00	0.00	16.50	0.65	0.64
3.75	0.00	0.00	16.75	0.61	0.61
4.00	0.00	0.00	17.00	0.58	0.58
4.25	0.00	0.00	17.25	0.55	0.54
4.50	0.01	0.01	17.50	0.51	0.51
4.75	0.02	0.02	17.75	0.48	0.48
5.00	0.03	0.03	18.00	0.45	0.45
5.25	0.05	0.05	18.25	0.42	0.42
5.50	0.06	0.06	18.50	0.41	0.41
5.75	0.07	0.07	18.75	0.40	0.40
6.00	0.09	0.09	19.00	0.39	0.39
6.25	0.10	0.10	19.25	0.38	0.38
6.50	0.12	0.12	19.50	0.37	0.37
6.75	0.14	0.14	19.75	0.36	0.36
7.00	0.17	0.17	20.00	0.35	0.35
7.25	0.19	0.19	20.25	0.34	0.34
7.50	0.22	0.22	20.50	0.34	0.33
7.75	0.25	0.25	20.75	0.33	0.33
8.00	0.28	0.28	21.00	0.32	0.32
8.25	0.32	0.32	21.25	0.31	0.31
8.50	0.38	0.38	21.50	0.31	0.31
8.75	0.44	0.44	21.75	0.30	0.30
9.00	0.51	0.50	22.00	0.29	0.29
9.25	0.58	0.57	22.25	0.28	0.28
9.50	0.65	0.65	22.50	0.28	0.28
9.75	0.73	0.72	22.75	0.27	0.27
10.00	0.81	0.80	23.00	0.26	0.26
10.25	0.91	0.91	23.25	0.25	0.25
10.50	1.05	1.05	23.50	0.25	0.25
10.75	1.21	1.20	23.75	0.24	0.24
11.00	1.37	1.36	24.00	0.23	0.23
11.25	1.66	1.65			
11.50	2.18	2.17			
11.75	4.29	4.27			
12.00	10.17	10.12			
12.25	15.74	15.67			
12.50	7.20	7.16			
12.75	3.16	3.15			

191108_Umdasch-Wallington

Type III 24-hr 100-Year Rainfall=8.47"

Prepared by Maser Consulting PA

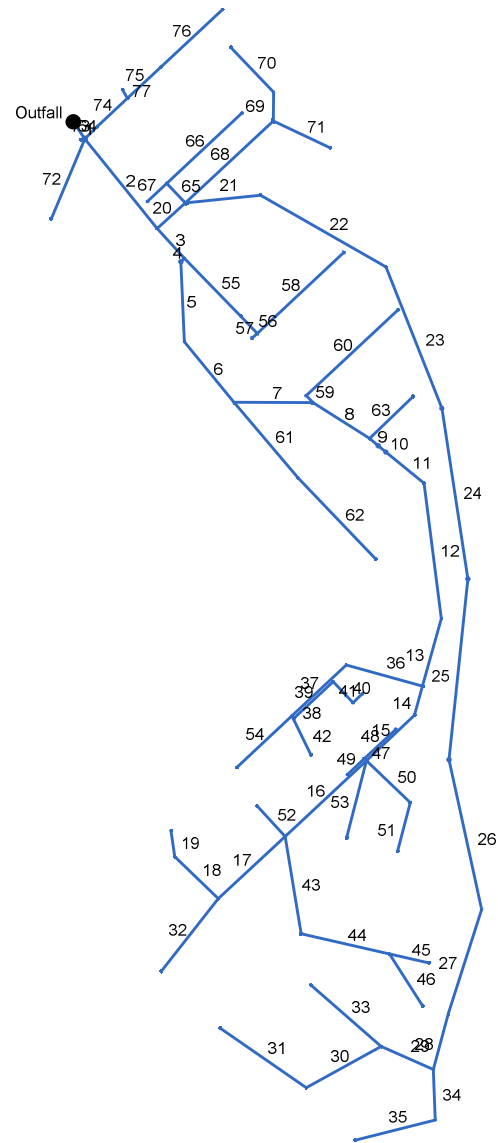
Printed 11/8/2019

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Primary Comparison

Time (hours)	Link 6L (cfs)	Link 12L (cfs)	Time (hours)	Link 6L (cfs)	Link 12L (cfs)
0.00	0.00	0.00	13.00	4.03	4.01
0.25	0.00	0.00	13.25	3.25	3.24
0.50	0.00	0.00	13.50	2.95	2.93
0.75	0.00	0.00	13.75	2.68	2.67
1.00	0.00	0.00	14.00	2.41	2.40
1.25	0.00	0.00	14.25	2.19	2.18
1.50	0.00	0.00	14.50	2.05	2.04
1.75	0.00	0.00	14.75	1.92	1.91
2.00	0.00	0.00	15.00	1.79	1.78
2.25	0.00	0.00	15.25	1.66	1.65
2.50	0.00	0.00	15.50	1.53	1.53
2.75	0.00	0.00	15.75	1.40	1.40
3.00	0.02	0.02	16.00	1.27	1.27
3.25	0.04	0.04	16.25	1.17	1.16
3.50	0.06	0.06	16.50	1.11	1.10
3.75	0.09	0.09	16.75	1.05	1.05
4.00	0.11	0.11	17.00	0.99	0.99
4.25	0.14	0.14	17.25	0.94	0.93
4.50	0.16	0.16	17.50	0.88	0.88
4.75	0.19	0.18	17.75	0.82	0.82
5.00	0.21	0.21	18.00	0.77	0.76
5.25	0.24	0.24	18.25	0.72	0.72
5.50	0.26	0.26	18.50	0.71	0.70
5.75	0.29	0.29	18.75	0.69	0.69
6.00	0.31	0.31	19.00	0.67	0.67
6.25	0.35	0.35	19.25	0.65	0.65
6.50	0.39	0.39	19.50	0.64	0.63
6.75	0.44	0.44	19.75	0.62	0.62
7.00	0.50	0.49	20.00	0.60	0.60
7.25	0.55	0.55	20.25	0.59	0.59
7.50	0.61	0.60	20.50	0.58	0.57
7.75	0.67	0.66	20.75	0.56	0.56
8.00	0.73	0.72	21.00	0.55	0.55
8.25	0.81	0.80	21.25	0.54	0.53
8.50	0.92	0.91	21.50	0.52	0.52
8.75	1.04	1.04	21.75	0.51	0.51
9.00	1.17	1.16	22.00	0.50	0.50
9.25	1.30	1.29	22.25	0.49	0.48
9.50	1.43	1.43	22.50	0.47	0.47
9.75	1.57	1.56	22.75	0.46	0.46
10.00	1.71	1.70	23.00	0.45	0.45
10.25	1.90	1.89	23.25	0.43	0.43
10.50	2.16	2.15	23.50	0.42	0.42
10.75	2.43	2.42	23.75	0.41	0.41
11.00	2.71	2.70	24.00	0.40	0.39
11.25	3.23	3.22			
11.50	4.20	4.18			
11.75	8.07	8.04			
12.00	18.58	18.49			
12.25	27.83	27.69			
12.50	12.55	12.49			
12.75	5.48	5.46			

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



Project File: 191108_PipeSizing.stm

Number of lines: 77

Date: 11/8/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	34	56	MH	0.00	0.00	0.00	6.0	23.04	1.69	23.61	36	Cir	0.013	1.00	35.03	P-73
2	1	190	-5	DrGrt	0.00	0.01	0.74	6.0	23.78	1.61	26.83	36	Cir	0.013	1.50	39.01	P-72
3	2	67	-3	DrGrt	0.00	0.60	0.90	6.0	26.73	3.08	28.78	36	Cir	0.013	1.60	38.45	E-22
4	3	8	88	MH	0.00	0.00	0.00	6.0	28.88	0.88	28.95	36	Cir	0.012	0.79	38.62	P-65
5	4	133	-49	DrGrt	0.00	0.49	0.81	6.0	29.05	0.56	29.79	36	Cir	0.012	0.97	38.80	P-64
6	5	129	-37	DrGrt	0.00	0.71	0.87	6.0	29.89	0.57	30.62	36	Cir	0.012	1.29	39.50	P-38
7	6	129	-51	DrGrt	0.00	0.40	0.88	6.0	30.72	0.56	31.45	36	Cir	0.012	1.50	40.60	P-47
8	7	110	32	DrGrt	0.00	0.79	0.87	6.0	31.45	0.57	32.08	36	Cir	0.012	1.47	41.00	P-122
9	8	19	8	MH	0.00	0.00	0.00	6.0	32.48	1.12	32.69	36	Cir	0.013	0.15	41.10	E-17
10	9	16	0	MH	0.00	0.00	0.00	6.0	32.84	0.99	33.00	36	Cir	0.013	0.15	41.41	E-16
11	10	81	-1	DrGrt	0.00	0.63	0.86	6.0	33.00	1.66	34.35	36	Cir	0.013	1.10	42.18	E-15
12	11	226	43	DrGrt	0.00	0.07	0.90	6.0	34.40	0.43	35.37	30	Cir	0.013	0.66	45.58	E-14
13	12	116	23	DrGrt	0.00	0.33	0.81	6.0	35.47	0.67	36.24	30	Cir	0.013	1.50	45.49	E-13 (1)
14	13	50	0	DrGrt	0.00	0.28	0.87	6.0	36.24	0.68	36.58	30	Cir	0.013	0.86	45.22	E-13
15	14	109	31	DrGrt	0.00	0.00	0.90	6.0	37.13	0.52	37.70	30	Cir	0.013	2.95	45.88	E-12
16	15	183	1	DrGrt	0.00	0.03	0.90	6.0	37.90	0.99	39.72	30	Cir	0.013	1.50	45.67	E-11
17	16	150	0	DrGrt	0.00	0.45	0.81	6.0	40.07	2.09	43.21	24	Cir	0.013	2.15	47.70	E-10
18	17	99	87	DrGrt	0.00	0.67	0.78	6.0	43.65	1.50	45.14	18	Cir	0.013	1.00	48.71	E-47
19	18	44	38	DrGrt	0.00	0.05	0.90	6.0	45.30	0.05	45.32	12	Cir	0.013	1.00	47.57	E-45
20	2	63	-93	DrGrt	0.00	0.46	0.79	6.0	26.83	1.01	27.46	36	Cir	0.012	1.50	34.90	P-71
21	20	124	36	DrGrt	0.00	0.52	0.87	6.0	27.56	1.00	28.80	30	Cir	0.012	0.96	37.10	P-79
22	21	238	36	DrGrt	0.00	0.12	0.87	6.0	28.80	1.00	31.18	30	Cir	0.012	1.01	41.00	P-78
23	22	250	39	MH	0.00	0.00	0.00	6.0	31.18	0.78	33.14	30	Cir	0.012	0.26	35.39	P-148

Project File: 191108_PipeSizing.stm

Number of lines: 77

Date: 11/8/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
24	23	285	13	MH	0.00	0.00	0.00	6.0	33.14	0.79	35.39	30	Cir	0.012	0.30	45.21	P-154
25	24	300	15	MH	0.00	0.00	0.00	6.0	35.39	0.79	37.76	30	Cir	0.012	0.36	45.84	P-153
26	25	253	-18	DrGrt	0.00	0.71	0.90	6.0	37.76	0.80	39.78	30	Cir	0.012	0.83	45.05	P-152 (1)
27	26	181	30	DrGrt	0.00	0.34	0.90	6.0	39.78	0.75	41.13	30	Cir	0.012	0.50	46.23	P-152
28	27	95	-3	DrGrt	0.00	0.36	0.90	6.0	41.13	0.75	41.85	30	Cir	0.012	1.74	47.33	P-151 (1)
29	28	94	99	DrGrt	0.00	0.46	0.00	6.0	41.95	0.71	42.62	30	Cir	0.012	1.76	47.45	P-151 (2)
30	29	140	-53	DrGrt	0.00	0.59	0.77	6.0	42.72	0.82	43.87	24	Cir	0.012	1.37	48.31	P-151
31	30	172	64	DrGrt	0.00	0.61	0.66	6.0	43.97	0.82	45.39	15	Cir	0.012	1.00	49.39	P-156
32	17	152	-9	DrGrt	0.00	0.53	0.50	6.0	43.65	1.69	46.22	15	Cir	0.012	1.00	49.72	P-221
33	29	154	17	DrGrt	0.00	0.56	0.87	6.0	42.72	1.00	44.26	15	Cir	0.012	1.00	47.76	P-223
34	28	83	-17	DrGrt	0.00	0.47	0.60	6.0	41.95	0.75	42.58	18	Cir	0.012	1.47	46.87	P-217
35	34	136	78	DrGrt	0.00	0.56	0.75	6.0	42.68	2.00	45.40	18	Cir	0.012	1.00	48.95	P-222
36	13	130	90	DrGrt	0.00	0.18	0.81	6.0	36.24	1.15	37.74	30	Cir	0.012	1.32	45.10	P-25
37	36	122	-59	DrGrt	0.00	0.10	0.60	6.0	37.84	1.00	39.07	24	Cir	0.012	2.40	45.10	P-24
38	37	5	-90	MH	0.00	0.00	0.95	6.0	40.89	1.00	40.94	8	Cir	0.012	1.00	45.98	P-117
39	38	88	-90	MH	0.00	0.00	0.00	6.0	40.94	1.00	41.82	8	Cir	0.012	1.00	45.99	P-116
40	39	48	90	MH	0.00	0.12	0.95	6.0	41.82	0.99	42.29	8	Cir	0.012	1.00	46.00	P-115
41	40	21	-90	MH	0.00	0.02	0.95	6.0	42.29	1.00	42.50	8	Cir	0.012	1.00	46.00	P-114
42	37	72	-73	DrGrt	0.00	0.44	0.90	6.0	41.43	1.00	42.15	18	Cir	0.012	1.00	45.43	P-82
43	16	163	-56	DrGrt	0.00	0.02	0.90	6.0	39.82	0.39	40.46	30	Cir	0.013	1.41	45.96	E-39
44	43	149	-68	DrGrt	0.00	0.45	0.90	6.0	40.66	0.22	40.99	30	Cir	0.013	1.12	46.36	E-40
45	44	66	0	DrGrt	0.00	0.04	0.90	6.0	41.04	0.92	41.65	24	Cir	0.013	1.00	45.40	E-41
46	44	102	45	DrGrt	0.00	0.06	0.90	6.0	40.99	0.62	41.62	24	Cir	0.013	1.00	44.87	P-147

Project File: 191108_PipeSizing.stm

Number of lines: 77

Date: 11/8/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
47	15	5	90	MH	0.00	0.00	0.00	6.0	41.25	1.03	41.30	8	Cir	0.012	1.00	45.94	P-108
48	47	70	90	MH	0.00	0.06	0.95	6.0	41.30	0.99	42.00	8	Cir	0.012	1.00	45.97	P-107
49	47	39	-90	MH	0.00	0.08	0.95	6.0	41.30	1.01	41.69	8	Cir	0.012	1.00	45.94	P-109
50	15	100	-92	DrGrt	0.00	1.22	0.87	6.0	37.86	1.82	39.67	24	Cir	0.013	1.34	44.37	E-35
51	50	84	60	DrGrt	0.00	0.44	0.90	6.0	40.07	0.69	40.65	18	Cir	0.013	1.00	45.28	E-36
52	16	68	91	DrGrt	0.00	0.34	0.90	6.0	40.07	2.17	41.55	18	Cir	0.013	1.00	46.58	E-38
53	15	132	-32	DrGrt	0.00	0.75	0.90	6.0	39.93	0.71	40.87	18	Cir	0.013	1.00	45.57	E-37
54	37	124	0	DrGrt	0.00	0.24	0.75	6.0	39.17	1.00	40.41	15	Cir	0.012	1.00	46.70	P-52
55	3	133	-2	DrGrt	0.00	0.00	0.00	6.0	28.83	0.12	28.99	36	Cir	0.013	0.50	40.13	E-21
56	55	39	1	MH	0.00	0.00	0.90	6.0	34.66	0.99	35.05	12	Cir	0.012	1.00	40.87	P-91
57	56	12	90	MH	0.00	0.03	0.95	6.0	35.05	1.02	35.17	12	Cir	0.012	1.00	40.77	P-92
58	56	195	-90	MH	0.00	0.26	0.95	6.0	35.05	1.00	37.00	12	Cir	0.012	1.00	40.91	P-90
59	7	16	-133	MH	0.00	0.00	0.00	6.0	34.87	0.38	34.93	12	Cir	0.012	1.00	40.90	P-100
60	59	207	90	MH	0.00	0.29	0.95	6.0	34.93	1.00	37.00	12	Cir	0.012	1.00	40.92	P-99
61	6	163	-1	DrGrt	0.00	0.19	0.87	6.0	30.82	2.00	34.09	24	Cir	0.012	0.50	41.93	P-220
62	61	184	-3	DrGrt	0.00	0.19	0.87	6.0	34.19	2.00	37.88	18	Cir	0.012	1.00	44.12	P-219
63	8	99	-76	DrGrt	0.00	0.55	0.86	6.0	32.58	0.83	33.41	24	Cir	0.013	1.00	40.51	E-30
64	1	6	114	Comb	0.00	0.27	0.74	6.0	32.00	3.26	32.21	12	Cir	0.013	1.00	33.31	P-155
65	20	44	-91	MH	0.00	0.00	0.00	6.0	30.87	0.99	31.31	12	Cir	0.012	1.00	36.93	P-84
66	65	169	90	MH	0.00	0.25	0.95	6.0	31.31	1.00	33.00	12	Cir	0.012	1.00	36.93	P-83
67	65	44	-90	MH	0.00	0.08	0.95	6.0	31.31	1.01	31.75	12	Cir	0.012	1.00	36.90	P-85
68	20	198	-1	DrGrt	0.00	0.39	0.81	6.0	27.56	1.04	29.62	24	Cir	0.013	1.42	35.00	P-70
69	68	47	-47	DrGrt	0.00	0.21	0.81	6.0	29.70	0.91	30.13	18	Cir	0.013	1.10	34.90	P-68

Project File: 191108_PipeSizing.stm

Number of lines: 77

Date: 11/8/2019

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
70	69	103	-43	DrGrt	0.00	0.02	0.90	6.0	30.21	0.94	31.18	18	Cir	0.013	1.00	35.02	P-34
71	68	103	69	Comb	0.00	0.30	0.87	6.0	30.07	2.00	32.14	15	Cir	0.013	1.00	0.00	P-80
72	1	143	56	Comb	0.00	0.43	0.90	6.0	29.41	1.50	31.56	18	Cir	0.013	1.00	37.00	P-42
73	1	28	-101	DrGrt	0.00	0.13	0.81	6.0	27.53	0.85	27.77	18	Cir	0.013	0.50	34.70	P-76
74	73	69	1	Comb	0.00	0.03	0.81	6.0	27.85	0.99	28.53	18	Cir	0.013	1.47	34.98	P-75 (1)
75	74	75	0	DrGrt	0.00	0.22	0.81	6.0	28.63	0.85	29.27	18	Cir	0.013	0.50	34.35	P-75
76	75	139	0	DrGrt	0.00	0.31	0.81	6.0	29.35	0.90	30.60	18	Cir	0.013	1.00	33.65	P-74
77	74	17	-77	Comb	0.00	0.05	0.85	6.0	28.63	1.19	28.83	12	Cir	0.012	1.00	34.28	P-218

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Number of lines: 77

Date: 11/8/2019

Line No.	Line ID	Capac Full (cfs)	Flow Rate (cfs)	Runoff Coeff (C)	i Inlet (in/hr)	Drng Area (ac)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Junct Type
1	P-73	86.63	62.17	0.00	0.00	0.00	36	Cir	34	23.04	23.61	1.69	25.79	26.15	n/a	26.15	Outfall	MH
2	P-72	84.56	58.12	0.74	7.49	0.01	36	Cir	190	23.78	26.83	1.61	26.15	29.30	n/a	29.30	1	Dp-Grate
3	E-22	117.06	39.54	0.90	7.49	0.60	36	Cir	67	26.73	28.78	3.08	29.30	30.83 j	n/a	30.83	2	Dp-Grate
4	P-65	67.59	36.42	0.00	0.00	0.00	36	Cir	8	28.88	28.95	0.88	30.83	30.91	0.68	30.91	3	MH
5	P-64	53.99	36.64	0.81	7.49	0.49	36	Cir	133	29.05	29.79	0.56	30.91	31.76	0.84	31.76	4	Dp-Grate
6	P-38	54.39	35.32	0.87	7.49	0.71	36	Cir	129	29.89	30.62	0.57	31.76	32.55	n/a	32.55	5	Dp-Grate
7	P-47	54.29	31.84	0.88	7.49	0.40	36	Cir	129	30.72	31.45	0.56	32.55	33.28 j	n/a	33.28	6	Dp-Grate
8	P-122	54.64	29.56	0.87	7.49	0.79	36	Cir	110	31.45	32.08	0.57	33.28	33.84 j	n/a	33.84	7	Dp-Grate
9	E-17	70.66	25.03	0.00	0.00	0.00	36	Cir	19	32.48	32.69	1.12	33.84	34.30	n/a	34.30	8	MH
10	E-16	66.42	25.06	0.00	0.00	0.00	36	Cir	16	32.84	33.00	0.99	34.30	34.61	n/a	34.61	9	MH
11	E-15	86.05	25.19	0.86	7.49	0.63	36	Cir	81	33.00	34.35	1.66	34.61	35.97	n/a	35.97	10	Dp-Grate
12	E-14	26.89	23.28	0.90	7.49	0.07	30	Cir	226	34.40	35.37	0.43	36.20	37.17	0.39	37.56	11	Dp-Grate
13	E-13 (1)	33.48	23.14	0.81	7.49	0.33	30	Cir	116	35.47	36.24	0.67	37.56	37.88 j	n/a	37.88	12	Dp-Grate
14	E-13	33.90	18.43	0.87	7.49	0.28	30	Cir	50	36.24	36.58	0.68	37.88	38.03 j	n/a	38.03	13	Dp-Grate
15	E-12	29.68	17.56	0.90	0.00	0.00	30	Cir	109	37.13	37.70	0.52	38.51	39.12	n/a	39.12	14	Dp-Grate
16	E-11	40.88	8.53	0.90	7.49	0.03	30	Cir	183	37.90	39.72	0.99	39.12	40.69 j	n/a	40.69	15	Dp-Grate
17	E-10	32.70	8.21	0.81	7.49	0.45	24	Cir	150	40.07	43.21	2.09	40.75	44.23	n/a	44.23	16	Dp-Grate
18	E-47	12.86	3.98	0.78	7.49	0.67	18	Cir	99	43.65	45.14	1.50	44.23	45.90	n/a	45.90	17	Dp-Grate
19	E-45	0.76	0.34	0.90	7.49	0.05	12	Cir	44	45.30	45.32	0.05	45.90	45.91	0.01	45.92	18	Dp-Grate
20	P-71	72.43	19.87	0.79	7.49	0.46	36	Cir	63	26.83	27.46	1.01	29.30	28.89	n/a	28.89	2	Dp-Grate
21	P-79	44.43	20.77	0.87	7.49	0.52	30	Cir	124	27.56	28.80	1.00	28.89	30.35	n/a	30.35	20	Dp-Grate
22	P-78	44.47	18.90	0.87	7.49	0.12	30	Cir	238	28.80	31.18	1.00	30.35	32.65 j	n/a	32.65	21	Dp-Grate
23	P-148	39.31	18.93	0.00	0.00	0.00	30	Cir	250	31.18	33.14	0.78	32.65	34.61	n/a	34.61	22	MH

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Number of lines: 77

Date: 11/8/2019

NOTES: Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99 -- Return period = 25 Yrs. ; ** Critical depth

Line No.	Line ID	Capac Full (cfs)	Flow Rate (cfs)	Runoff Coeff (C)	i Inlet (in/hr)	Drng Area (ac)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Junct Type
24	P-154	39.46	19.64	0.00	0.00	0.00	30	Cir	285	33.14	35.39	0.79	34.61	36.89	n/a	36.89	23	MH
25	P-153	39.49	20.40	0.00	0.00	0.00	30	Cir	300	35.39	37.76	0.79	36.89	39.29	n/a	39.29	24	MH
26	P-152 (1)	39.72	21.05	0.90	7.49	0.71	30	Cir	253	37.76	39.78	0.80	39.29	41.34	0.55	41.34	25	Dp-Grate
27	P-152	38.41	17.50	0.90	7.49	0.34	30	Cir	181	39.78	41.13	0.75	41.34	42.54 j	n/a	42.54	26	Dp-Grate
28	P-151 (1)	38.60	15.76	0.90	7.49	0.36	30	Cir	95	41.13	41.85	0.75	42.54	43.19 j	n/a	43.19	27	Dp-Grate
29	P-151 (2)	37.55	9.20	0.00	0.00	0.46	30	Cir	94	41.95	42.62	0.71	43.19	43.63 j	n/a	43.63	28	Dp-Grate
30	P-151	22.17	6.13	0.77	7.49	0.59	24	Cir	140	42.72	43.87	0.82	43.63	44.75 j	n/a	44.75	29	Dp-Grate
31	P-156	6.35	3.01	0.66	7.49	0.61	15	Cir	172	43.97	45.39	0.82	44.75	46.09 j	n/a	46.09	30	Dp-Grate
32	P-221	9.10	1.98	0.50	7.49	0.53	15	Cir	152	43.65	46.22	1.69	44.23	46.78 j	n/a	46.78	17	Dp-Grate
33	P-223	6.99	3.65	0.87	7.49	0.56	15	Cir	154	42.72	44.26	1.00	43.63	45.03 j	n/a	45.03	29	Dp-Grate
34	P-217	9.88	5.00	0.60	7.49	0.47	18	Cir	83	41.95	42.58	0.75	43.19	43.44 j	n/a	43.44	28	Dp-Grate
35	P-222	16.11	3.14	0.75	7.49	0.56	18	Cir	136	42.68	45.40	2.00	43.44	46.07 j	n/a	46.07	34	Dp-Grate
36	P-25	47.69	6.12	0.81	7.49	0.18	30	Cir	130	36.24	37.74	1.15	37.88	38.56 j	n/a	38.56	13	Dp-Grate
37	P-24	24.55	5.36	0.60	7.49	0.10	24	Cir	122	37.84	39.07	1.00	38.56	39.89	0.74	39.89	36	Dp-Grate
38	P-117	1.31	0.93	0.95	0.00	0.00	8	Cir	5	40.89	40.94	1.00	41.31	41.40	0.21	41.40	37	MH
39	P-116	1.31	0.95	0.00	0.00	0.00	8	Cir	88	40.94	41.82	1.00	41.40	42.28	n/a	42.28	38	MH
40	P-115	1.30	0.96	0.95	7.49	0.12	8	Cir	48	41.82	42.29	0.99	42.28	42.76	0.21	42.76	39	MH
41	P-114	1.31	0.14	0.95	7.49	0.02	8	Cir	21	42.29	42.50	1.00	42.76	42.67	n/a	42.67	40	MH
42	P-82	11.38	2.96	0.90	7.49	0.44	18	Cir	72	41.43	42.15	1.00	41.95	42.80	n/a	42.80	37	Dp-Grate
43	E-39	25.71	2.32	0.90	7.49	0.02	30	Cir	163	39.82	40.46	0.39	40.69	40.96 j	n/a	41.20	16	Dp-Grate
44	E-40	19.31	2.44	0.90	7.49	0.45	30	Cir	149	40.66	40.99	0.22	41.26	41.59	0.13	41.72	43	Dp-Grate
45	E-41	21.69	0.28	0.90	7.49	0.04	24	Cir	66	41.04	41.65	0.92	41.72	41.83 j	n/a	41.83	44	Dp-Grate
46	P-147	17.77	0.40	0.90	7.49	0.06	24	Cir	102	40.99	41.62	0.62	41.72	41.84 j	n/a	41.84	44	Dp-Grate

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Number of lines: 77

Date: 11/8/2019

NOTES: Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99 -- Return period = 25 Yrs. ; ** Critical depth

Line No.	Line ID	Capac Full (cfs)	Flow Rate (cfs)	Runoff Coeff (C)	i Inlet (in/hr)	Drng Area (ac)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Junct Type
47	P-108	1.33	0.96	0.00	0.00	0.00	8	Cir	5	41.25	41.30	1.03	41.67	41.76	0.21	41.76	15	MH
48	P-107	1.30	0.43	0.95	7.49	0.06	8	Cir	70	41.30	42.00	0.99	41.76	42.30 j	n/a	42.30	47	MH
49	P-109	1.32	0.57	0.95	7.49	0.08	8	Cir	39	41.30	41.69	1.01	41.76	42.04 j	n/a	42.04	47	MH
50	E-35	30.50	10.56	0.87	7.49	1.22	24	Cir	100	37.86	39.67	1.82	39.12	40.83 j	n/a	40.83	15	Dp-Grate
51	E-36	8.75	2.96	0.90	7.49	0.44	18	Cir	84	40.07	40.65	0.69	40.83	41.30 j	n/a	41.30	50	Dp-Grate
52	E-38	15.46	2.29	0.90	7.49	0.34	18	Cir	68	40.07	41.55	2.17	40.69	42.12 j	n/a	42.12	16	Dp-Grate
53	E-37	8.87	5.05	0.90	7.49	0.75	18	Cir	132	39.93	40.87	0.71	40.74	41.73	0.36	41.73	15	Dp-Grate
54	P-52	7.00	1.35	0.75	7.49	0.24	15	Cir	124	39.17	40.41	1.00	39.89	40.87 j	n/a	40.87	37	Dp-Grate
55	E-21	23.13	1.94	0.00	0.00	0.00	36	Cir	133	28.83	28.99	0.12	30.83	30.83	0.00	30.83	3	Dp-Grate
56	P-91	3.85	1.96	0.90	0.00	0.00	12	Cir	39	34.66	35.05	0.99	35.17	35.65	0.25	35.65	55	MH
57	P-92	3.90	0.21	0.95	7.49	0.03	12	Cir	12	35.05	35.17	1.02	35.65	35.36	n/a	35.36	56	MH
58	P-90	3.86	1.85	0.95	7.49	0.26	12	Cir	195	35.05	37.00	1.00	35.65	37.58 j	n/a	37.58	56	MH
59	P-100	2.36	1.96	0.00	0.00	0.00	12	Cir	16	34.87	34.93	0.38	35.57	35.62	0.18	35.80	7	MH
60	P-99	3.86	2.06	0.95	7.49	0.29	12	Cir	207	34.93	37.00	1.00	35.80	37.61 j	n/a	37.61	59	MH
61	P-220	34.65	2.11	0.87	7.49	0.19	24	Cir	163	30.82	34.09	2.00	32.55	34.59 j	n/a	34.59	6	Dp-Grate
62	P-219	16.09	1.24	0.87	7.49	0.19	18	Cir	184	34.19	37.88	2.00	34.59	38.30	0.15	38.30	61	Dp-Grate
63	E-30	20.67	3.52	0.86	7.49	0.55	24	Cir	99	32.58	33.41	0.83	33.84	34.07 j	n/a	34.07	8	Dp-Grate
64	P-155	6.43	1.49	0.74	7.49	0.27	12	Cir	6	32.00	32.21	3.26	32.33	32.73	n/a	32.73	1	Comb.
65	P-84	3.84	2.24	0.00	0.00	0.00	12	Cir	44	30.87	31.31	0.99	31.42	31.95	n/a	31.95	20	MH
66	P-83	3.85	1.78	0.95	7.49	0.25	12	Cir	169	31.31	33.00	1.00	31.95	33.57 j	n/a	33.57	65	MH
67	P-85	3.88	0.57	0.95	7.49	0.08	12	Cir	44	31.31	31.75	1.01	31.95	32.06 j	n/a	32.06	65	MH
68	P-70	23.07	2.98	0.81	7.49	0.39	24	Cir	198	27.56	29.62	1.04	28.89	30.22 j	n/a	30.22	20	Dp-Grate
69	P-68	10.03	0.75	0.81	7.49	0.21	18	Cir	47	29.70	30.13	0.91	30.22	30.45 j	n/a	30.45	68	Dp-Grate

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Number of lines: 77

Date: 11/8/2019

NOTES: Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99 -- Return period = 25 Yrs. ; ** Critical depth

Line No.	Line ID	Capac Full (cfs)	Flow Rate (cfs)	Runoff Coeff (C)	i Inlet (in/hr)	Drng Area (ac)	Line Size (in)	Line Type	Line Length (ft)	Invert Dn (ft)	Invert Up (ft)	Line Slope (%)	HGL Dn (ft)	HGL Up (ft)	Minor Loss (ft)	HGL Jnct (ft)	DnStm Ln No	Junct Type
70	P-34	10.19	0.13	0.90	7.49	0.02	18	Cir	103	30.21	31.18	0.94	30.45	31.31 j	n/a	31.31	69	Dp-Grate
71	P-80	9.14	1.95	0.87	7.49	0.30	15	Cir	103	30.07	32.14	2.00	30.46	32.70	n/a	32.70	68	Comb.
72	P-42	12.87	2.87	0.90	7.49	0.43	18	Cir	143	29.41	31.56	1.50	29.89	32.20	n/a	32.20	1	Comb.
73	P-76	9.66	3.93	0.81	7.49	0.13	18	Cir	28	27.53	27.77	0.85	28.20	28.53	0.15	28.53	1	Dp-Grate
74	P-75 (1)	10.44	3.30	0.81	7.49	0.03	18	Cir	69	27.85	28.53	0.99	28.53	29.22	n/a	29.22	73	Comb.
75	P-75	9.70	2.93	0.81	7.49	0.22	18	Cir	75	28.63	29.27	0.85	29.22	29.92	n/a	29.92	74	Dp-Grate
76	P-74	9.97	1.85	0.81	7.49	0.31	18	Cir	139	29.35	30.60	0.90	29.92	31.11 j	n/a	31.11	75	Dp-Grate
77	P-218	4.20	0.32	0.85	7.49	0.05	12	Cir	17	28.63	28.83	1.19	29.22	29.06	n/a	29.06	74	Comb.

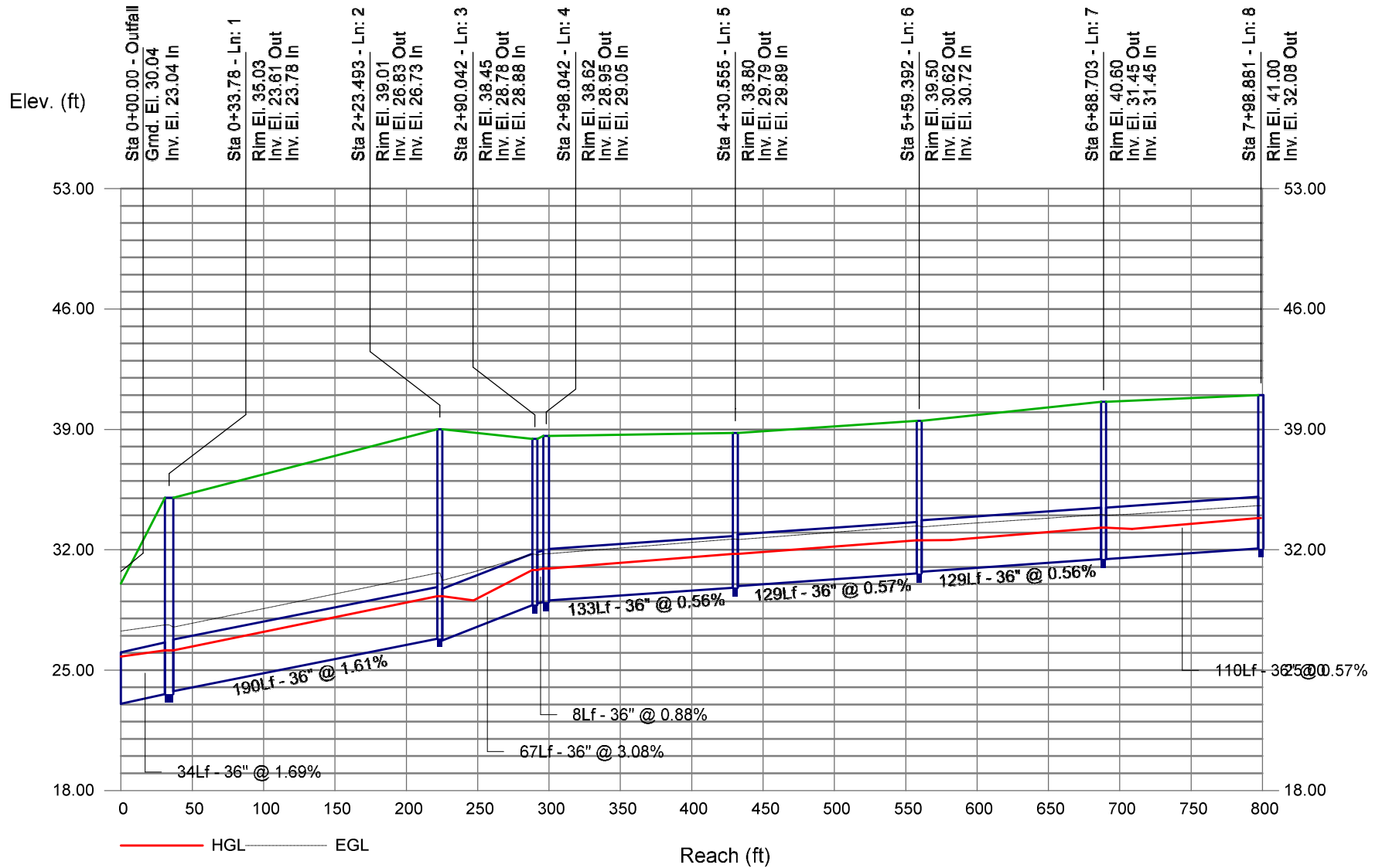
Project File: 191108_PipeSizing.stm

Number of lines: 77

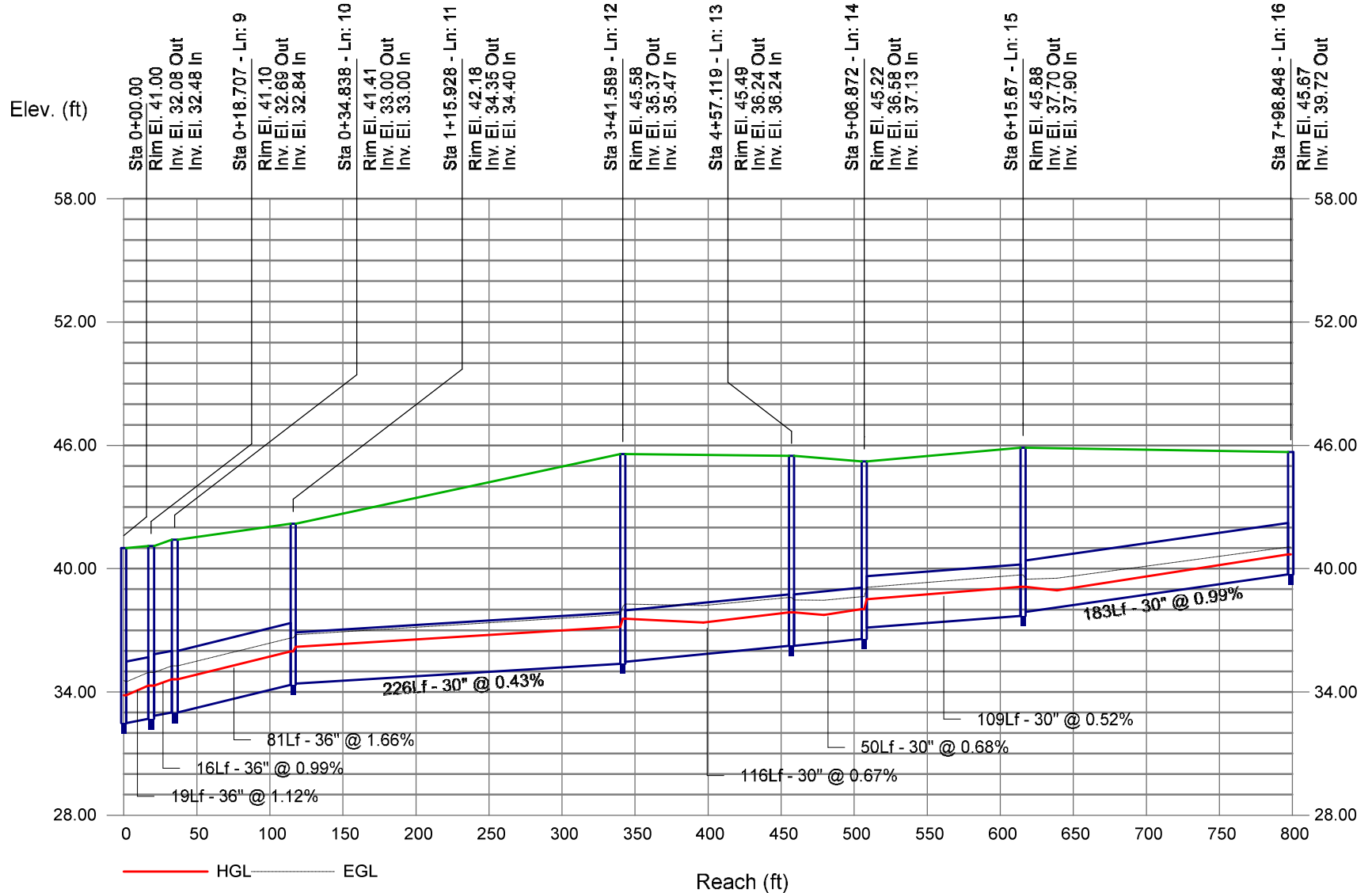
Date: 11/8/2019

NOTES: Intensity = 182.59 / (Inlet time + 19.10) ^ 0.99 -- Return period = 25 Yrs. ; ** Critical depth

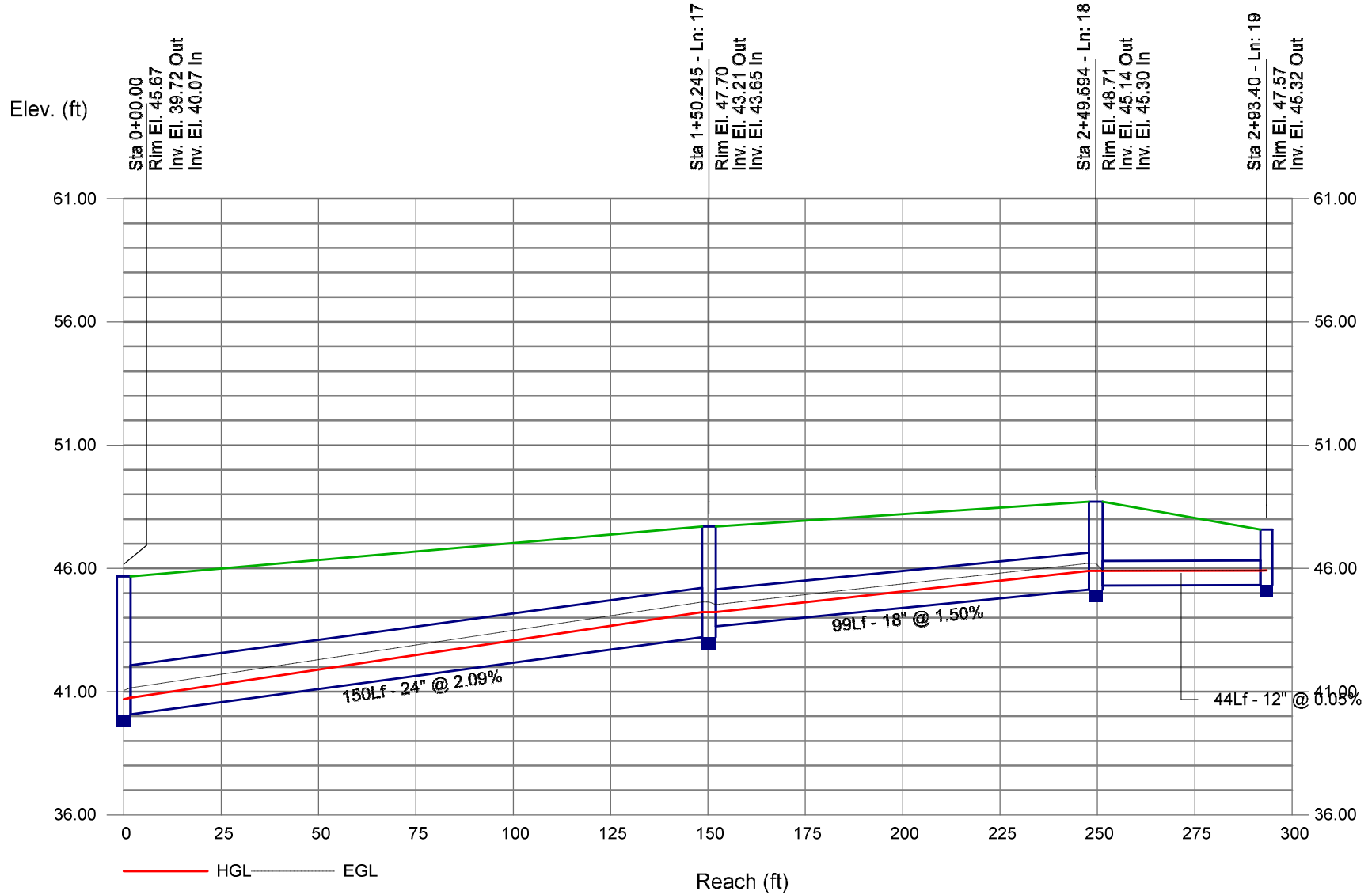
Storm Sewer Profile



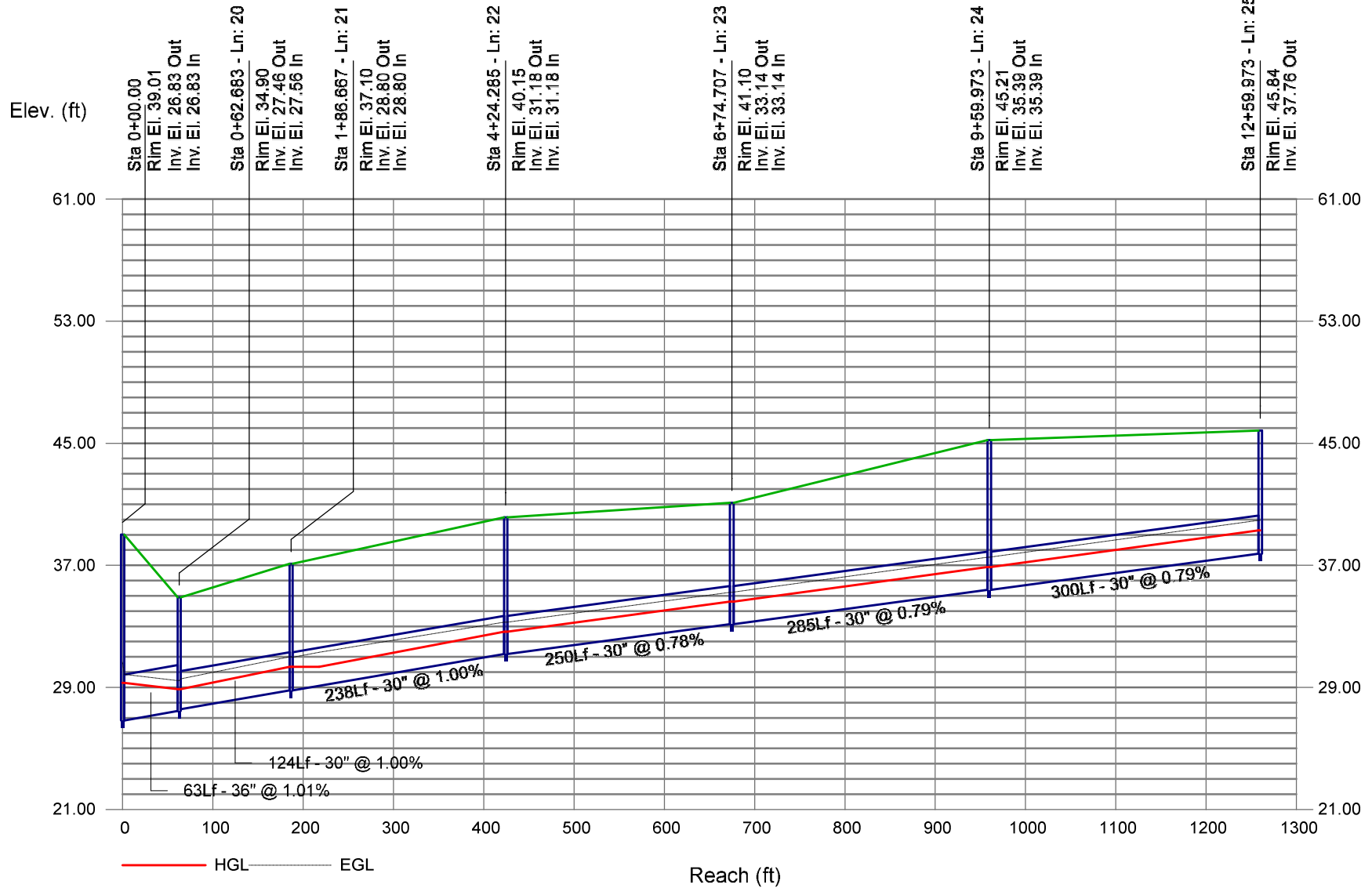
Storm Sewer Profile



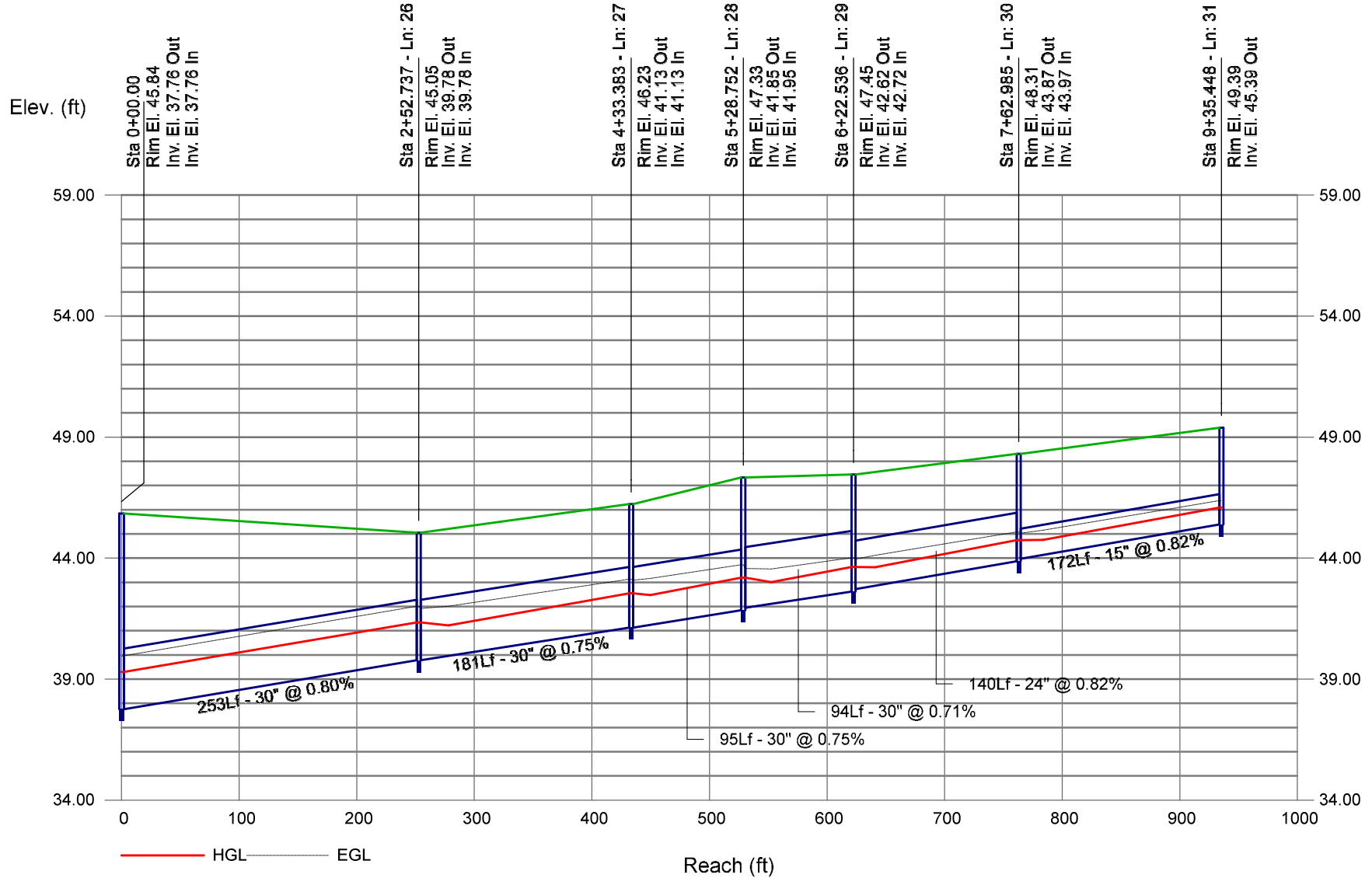
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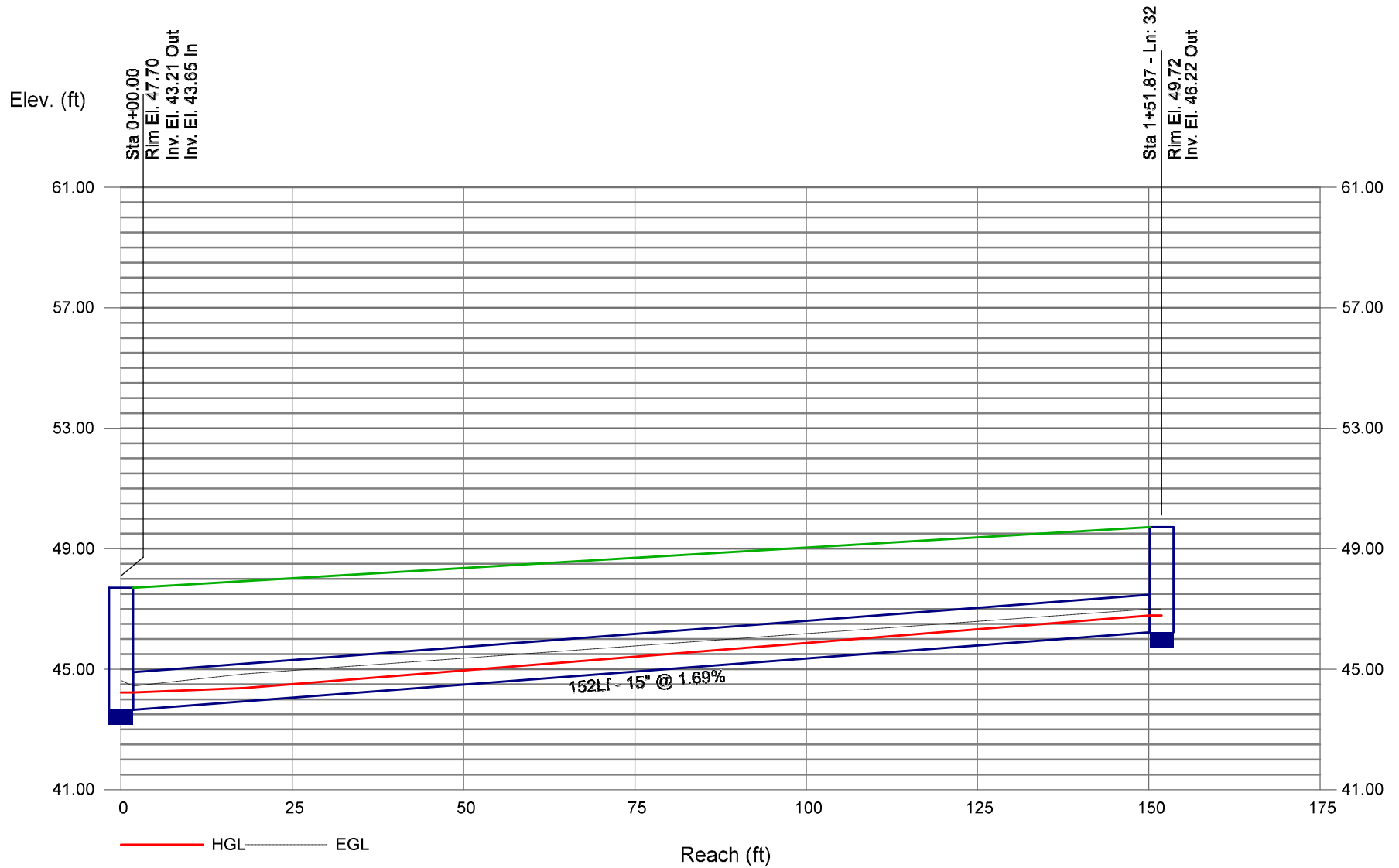
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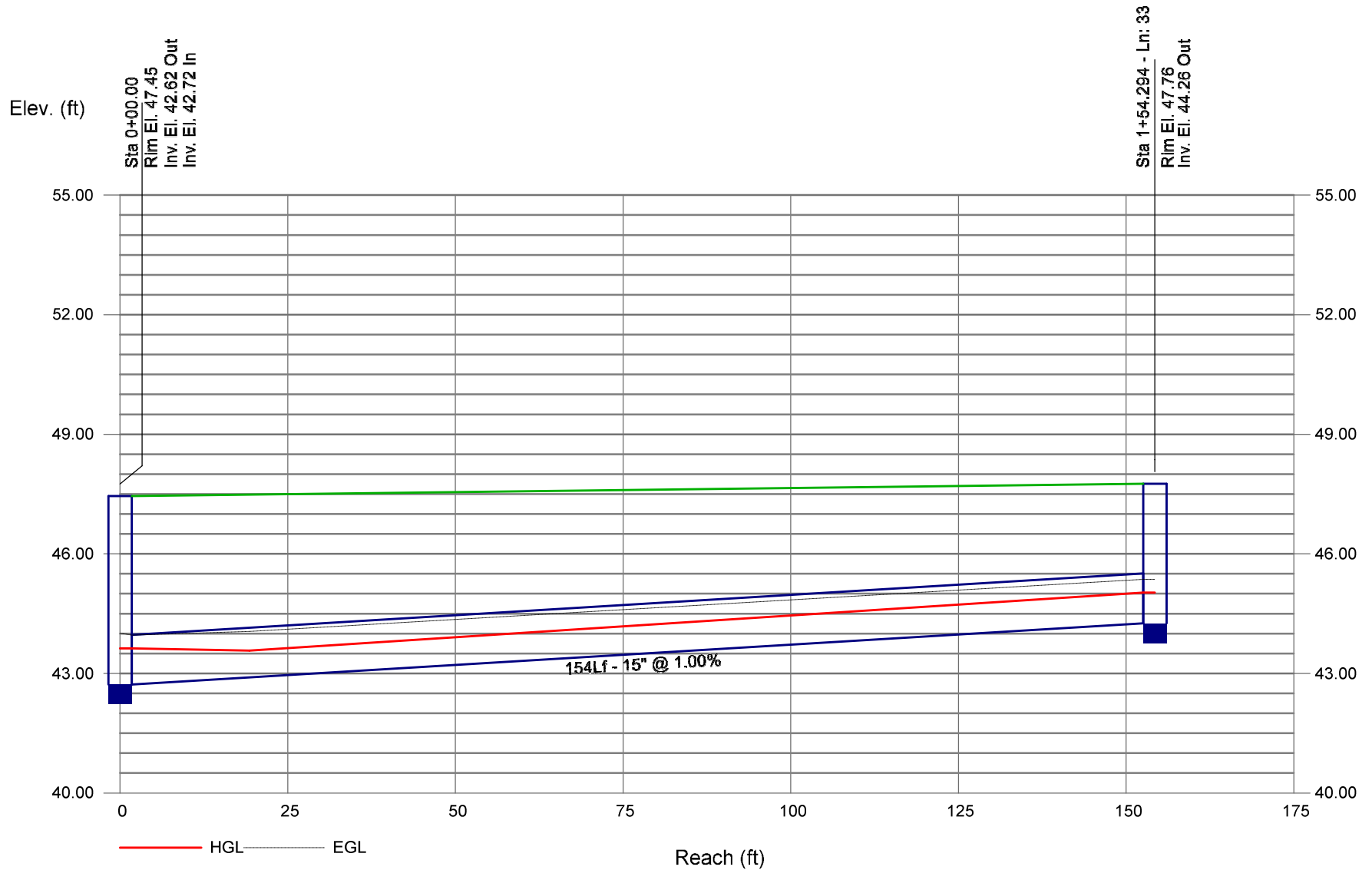
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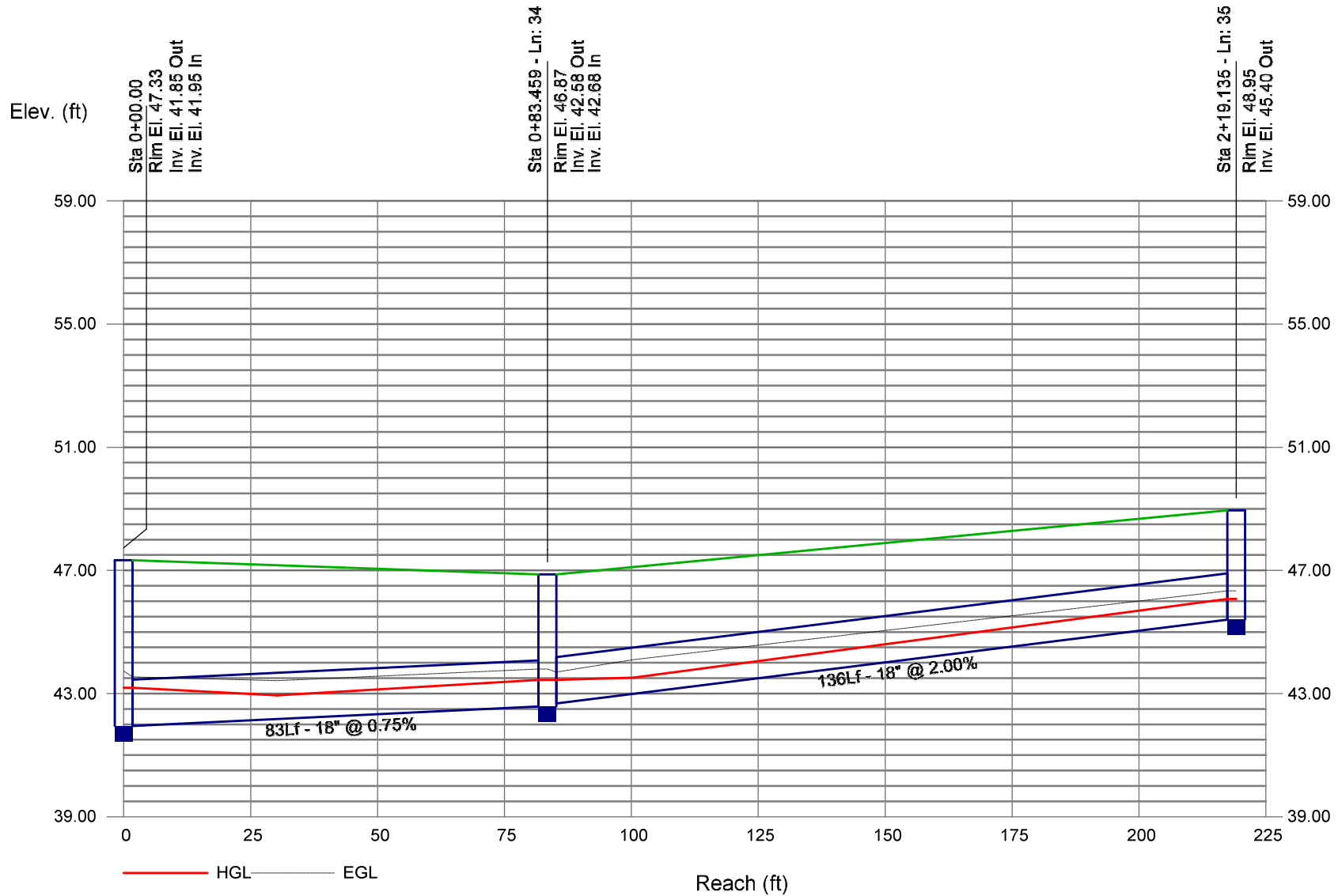
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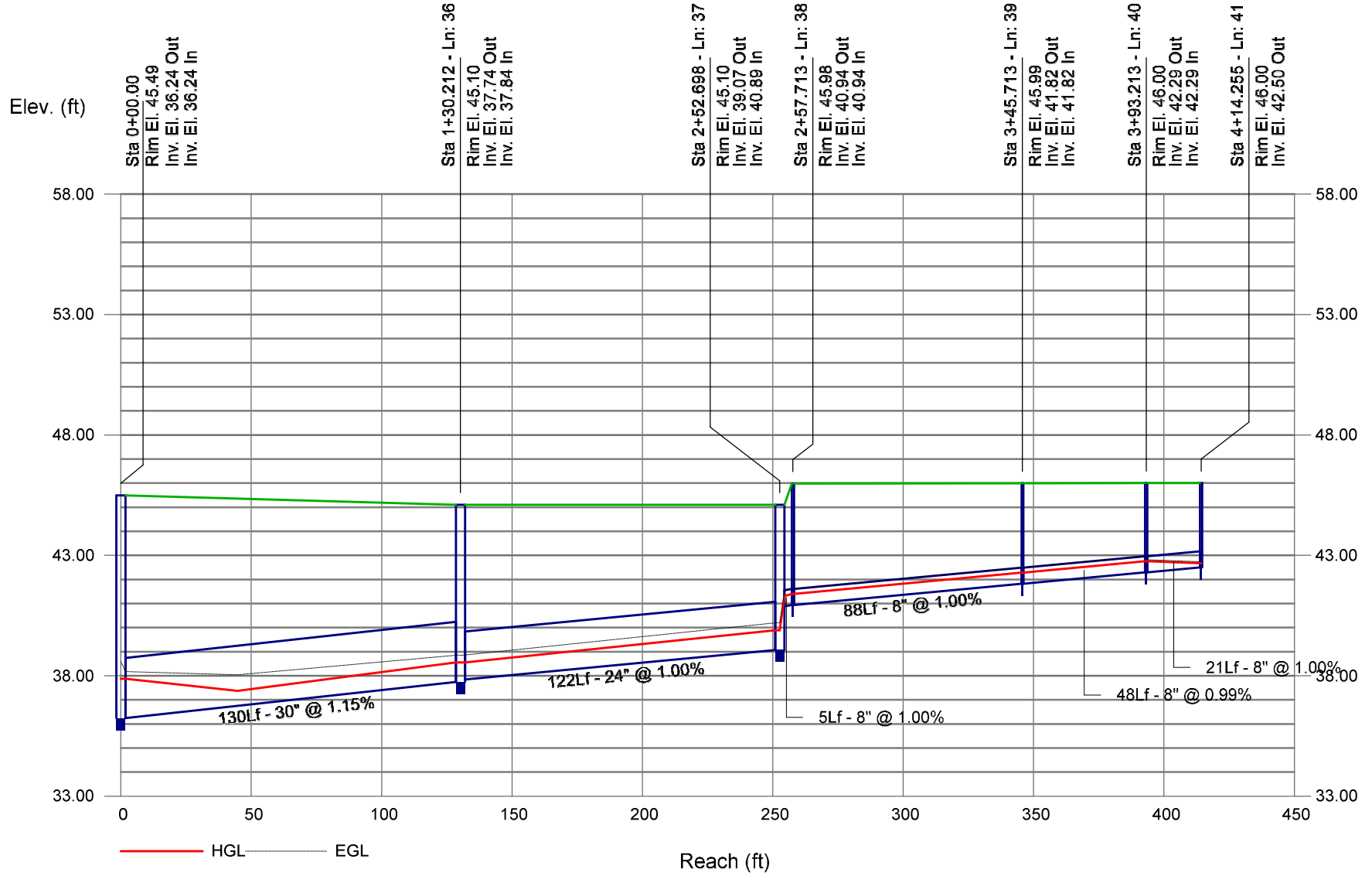
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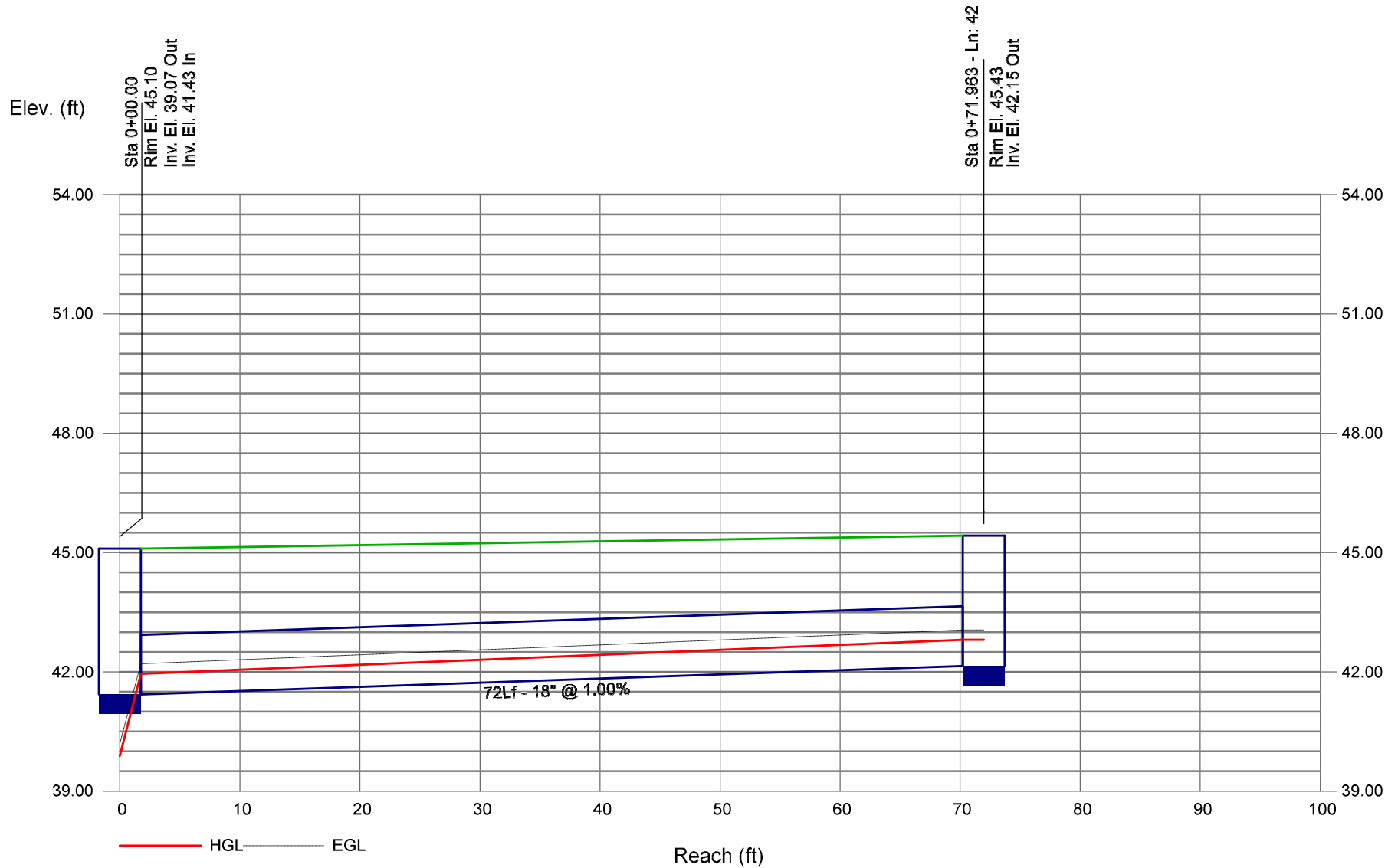
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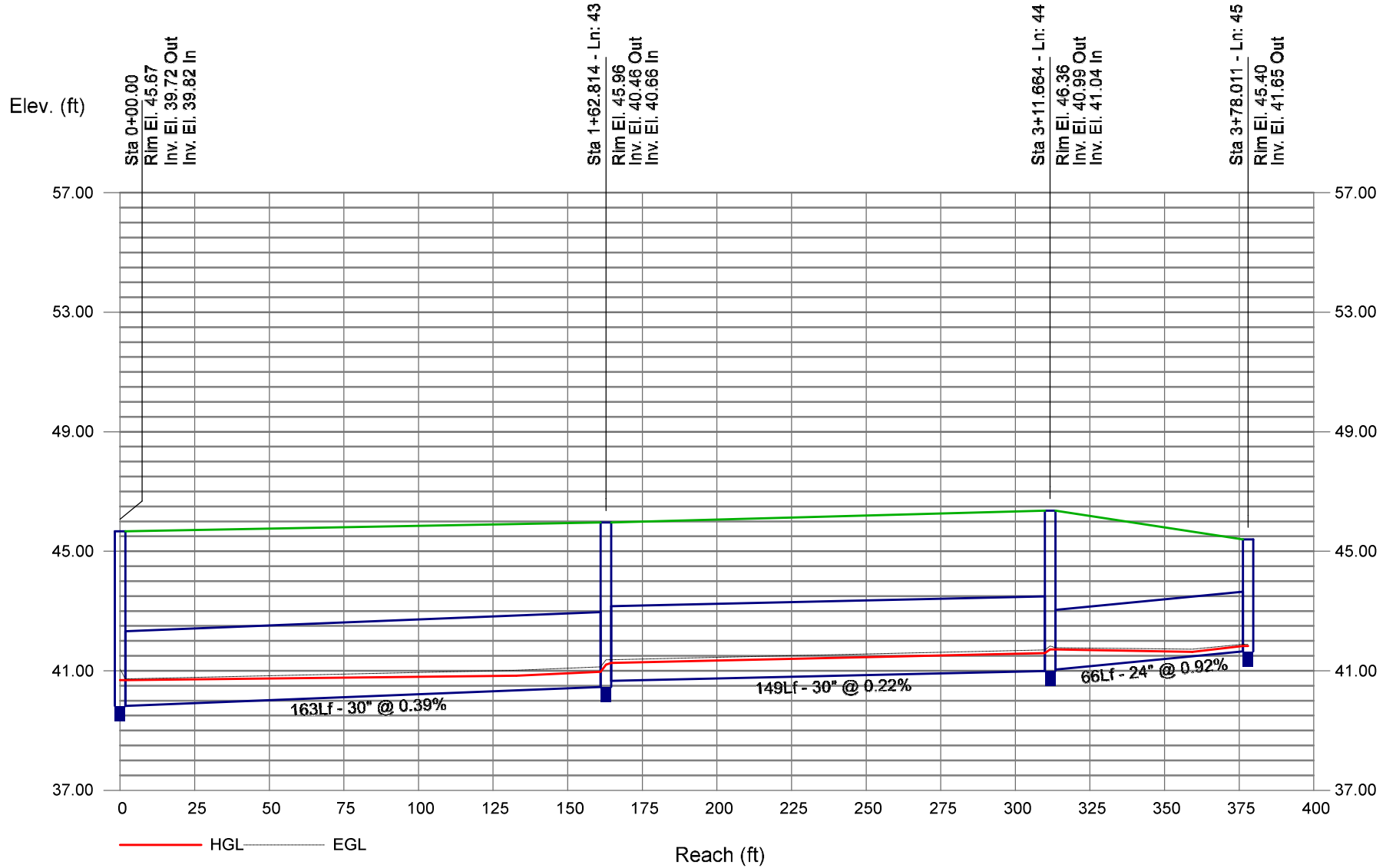
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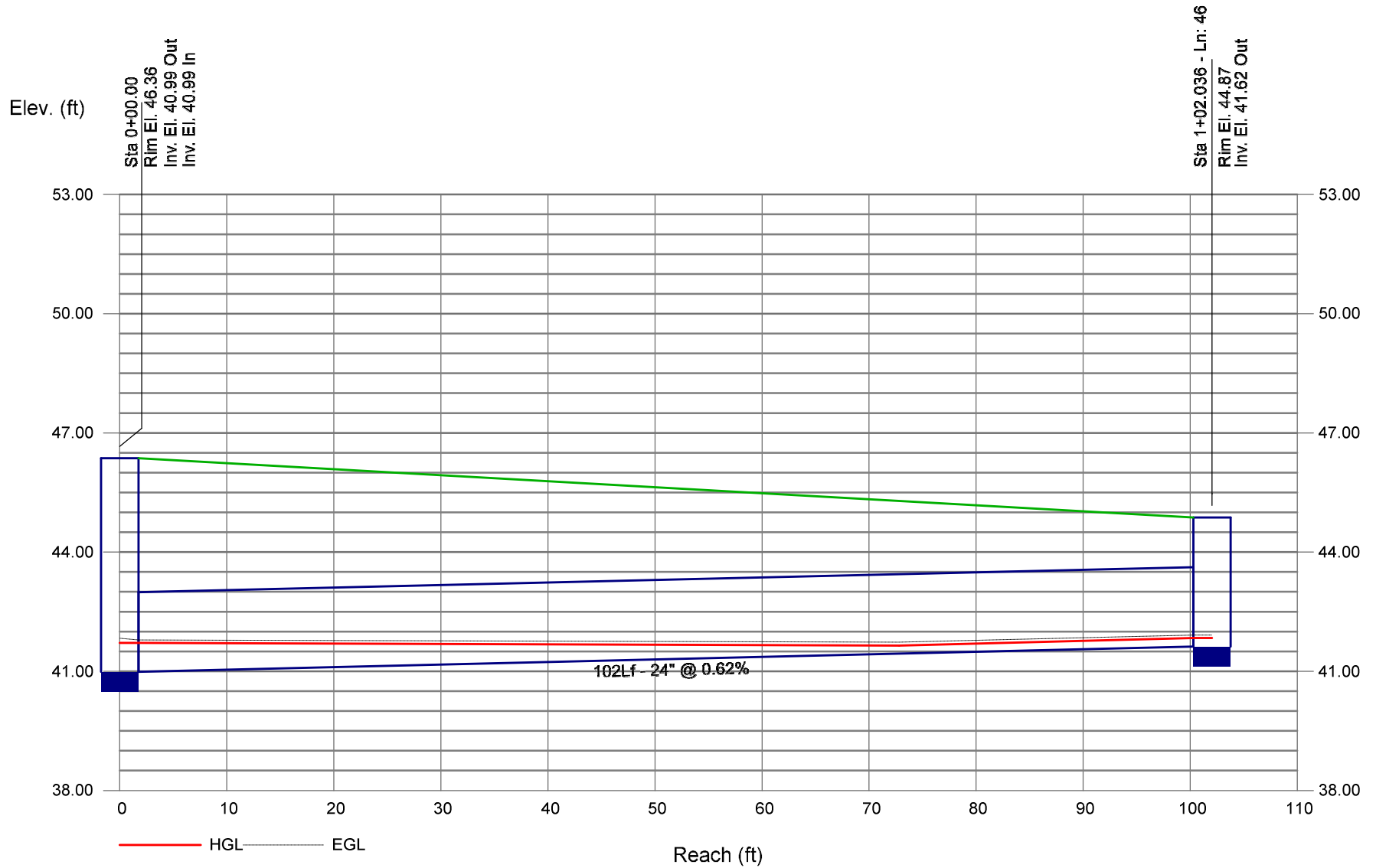
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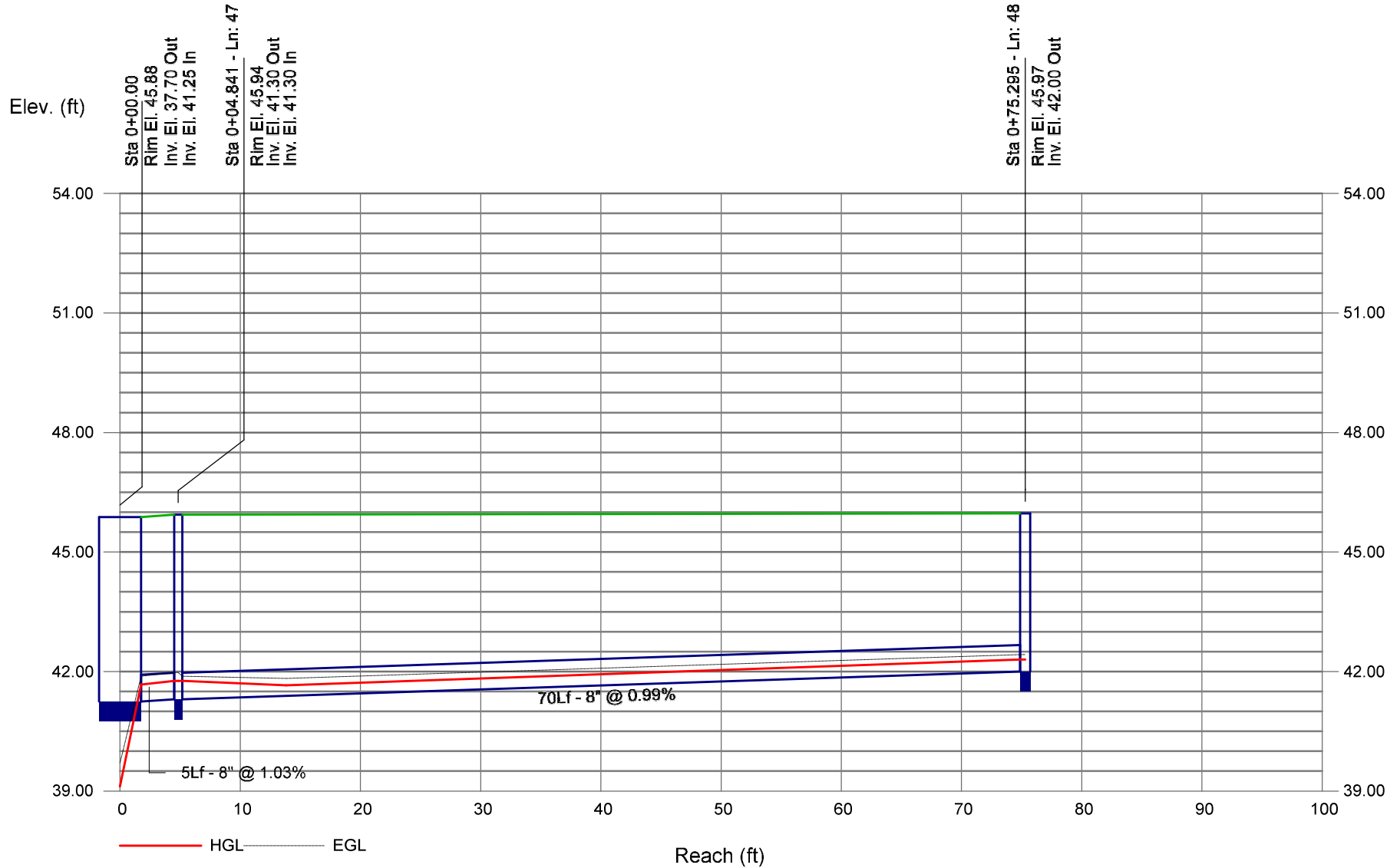
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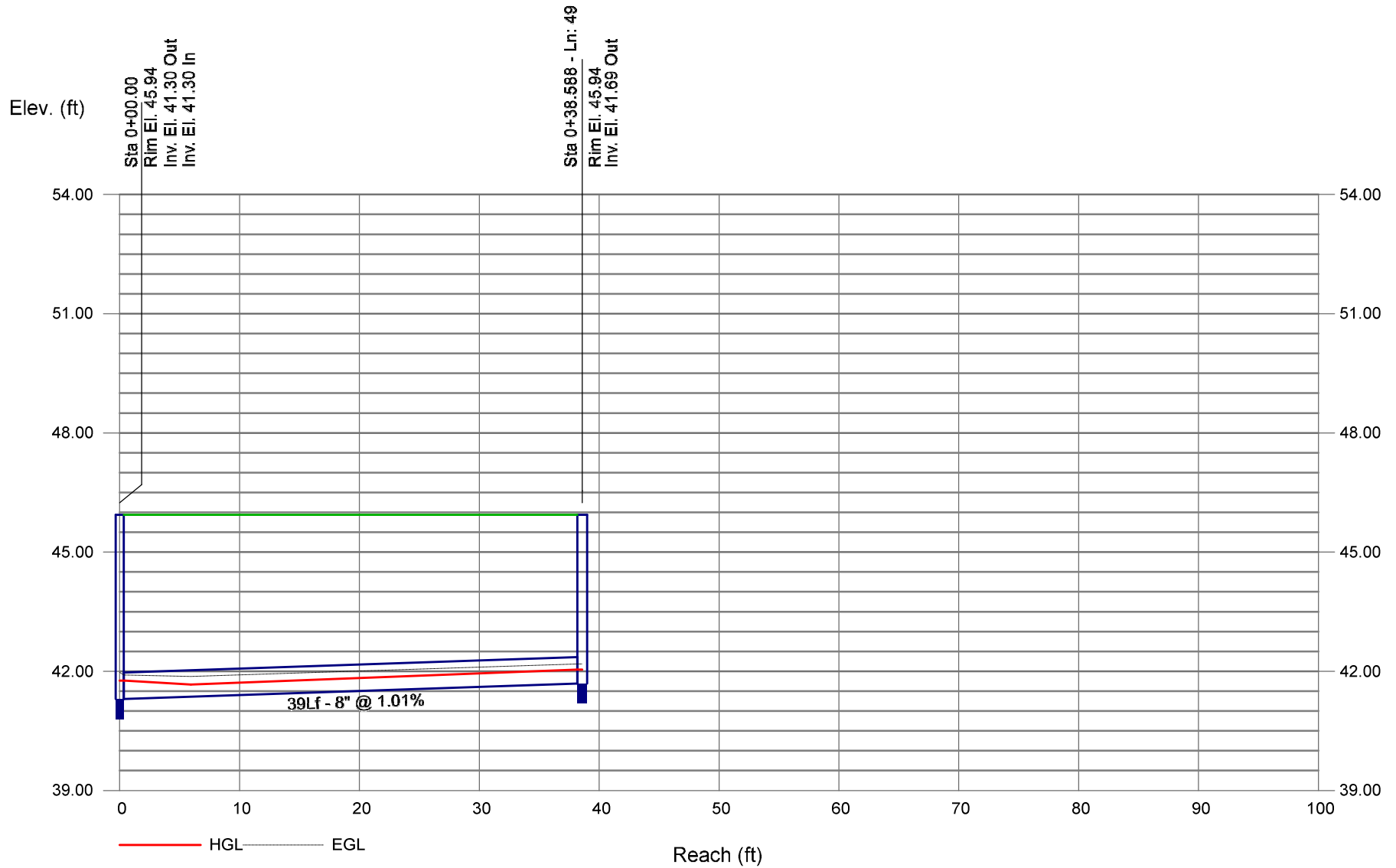
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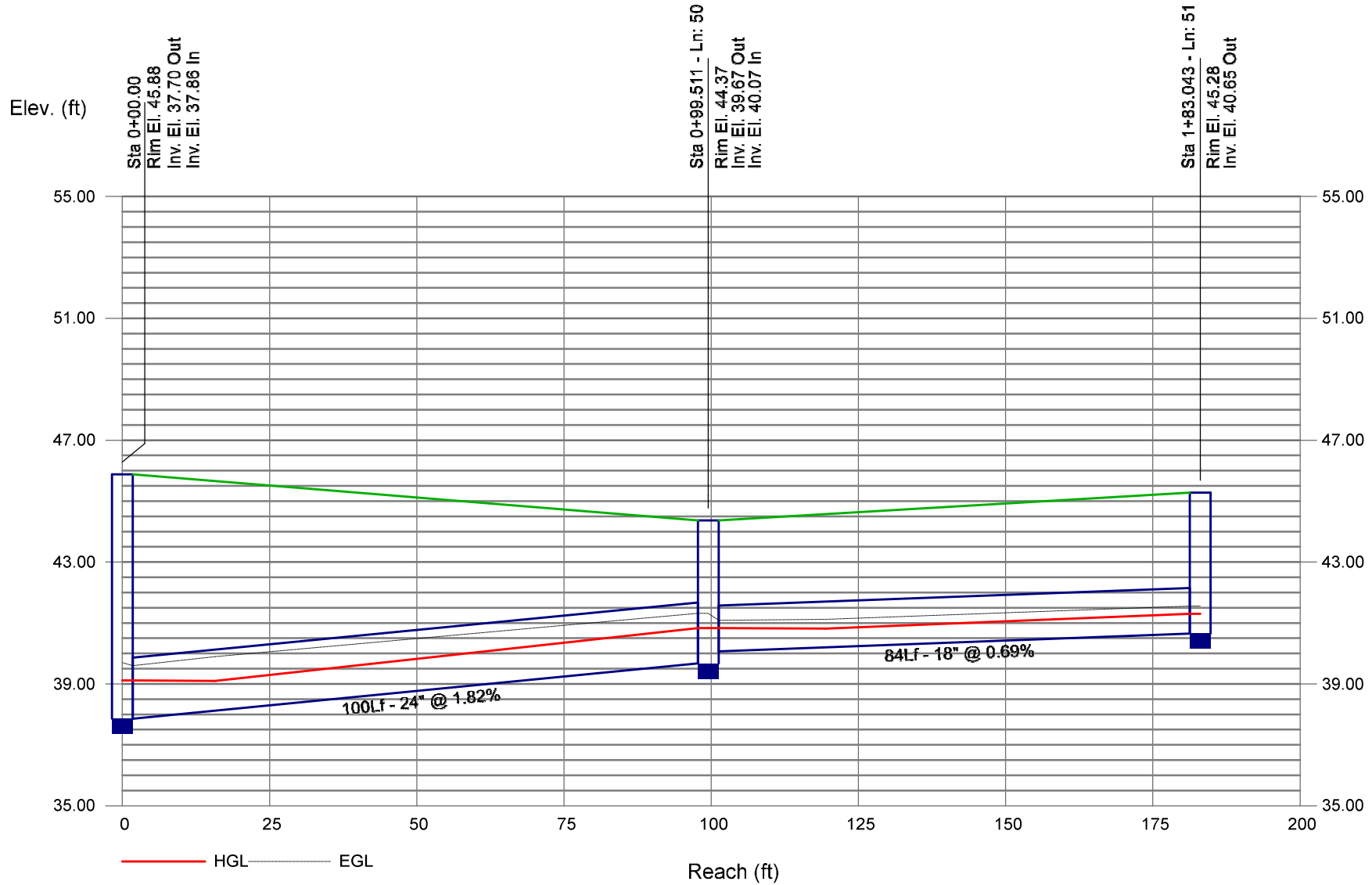
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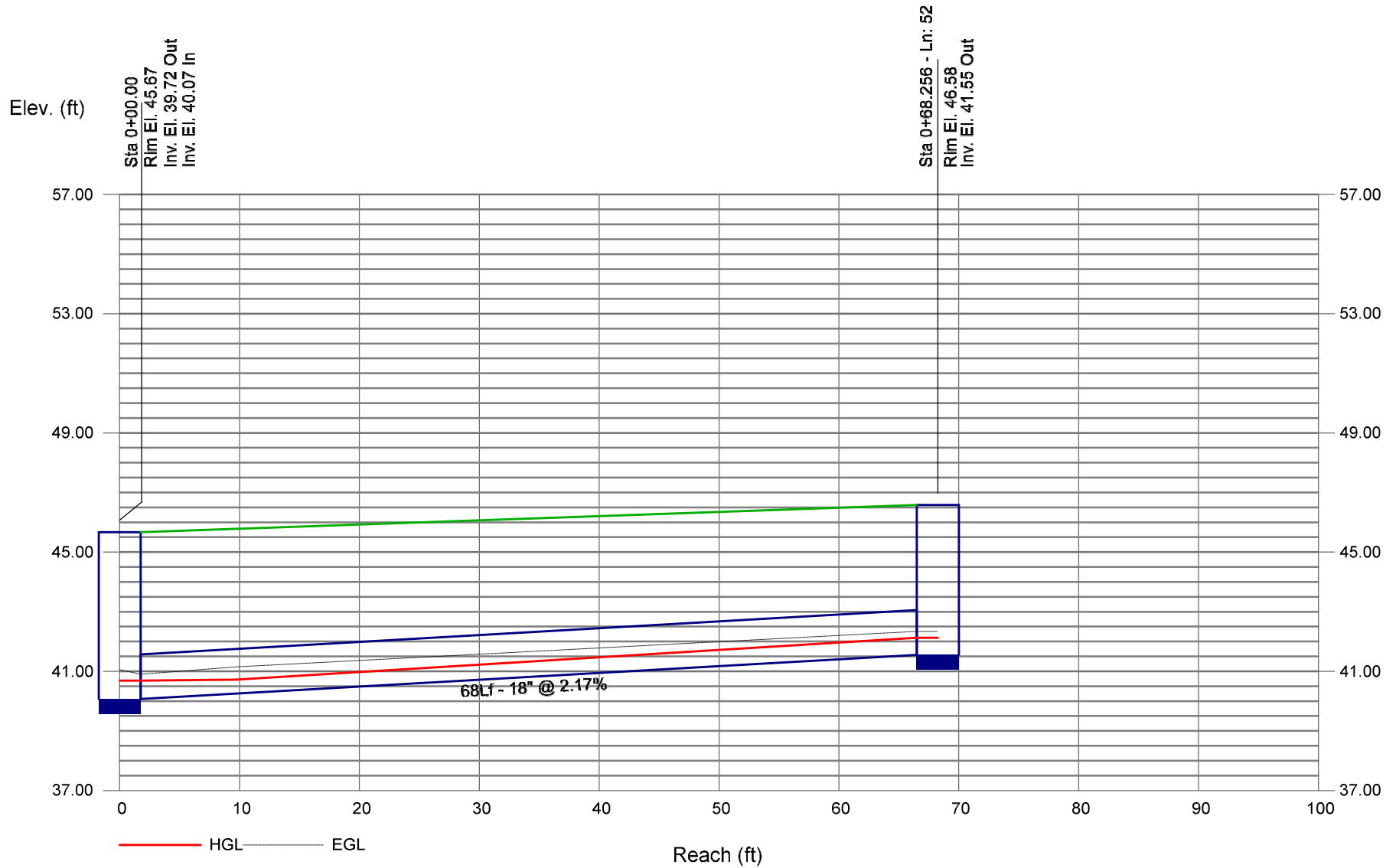
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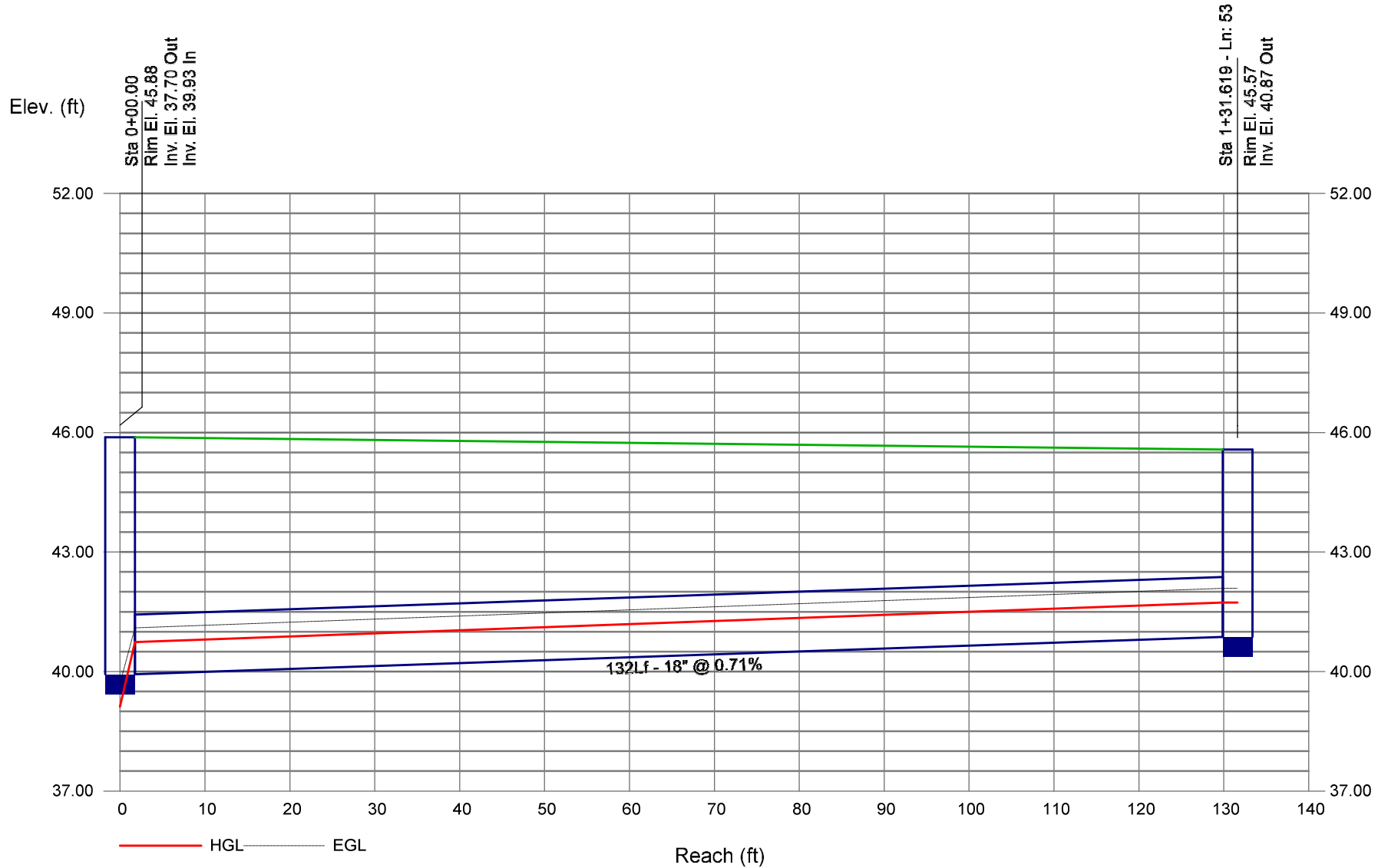
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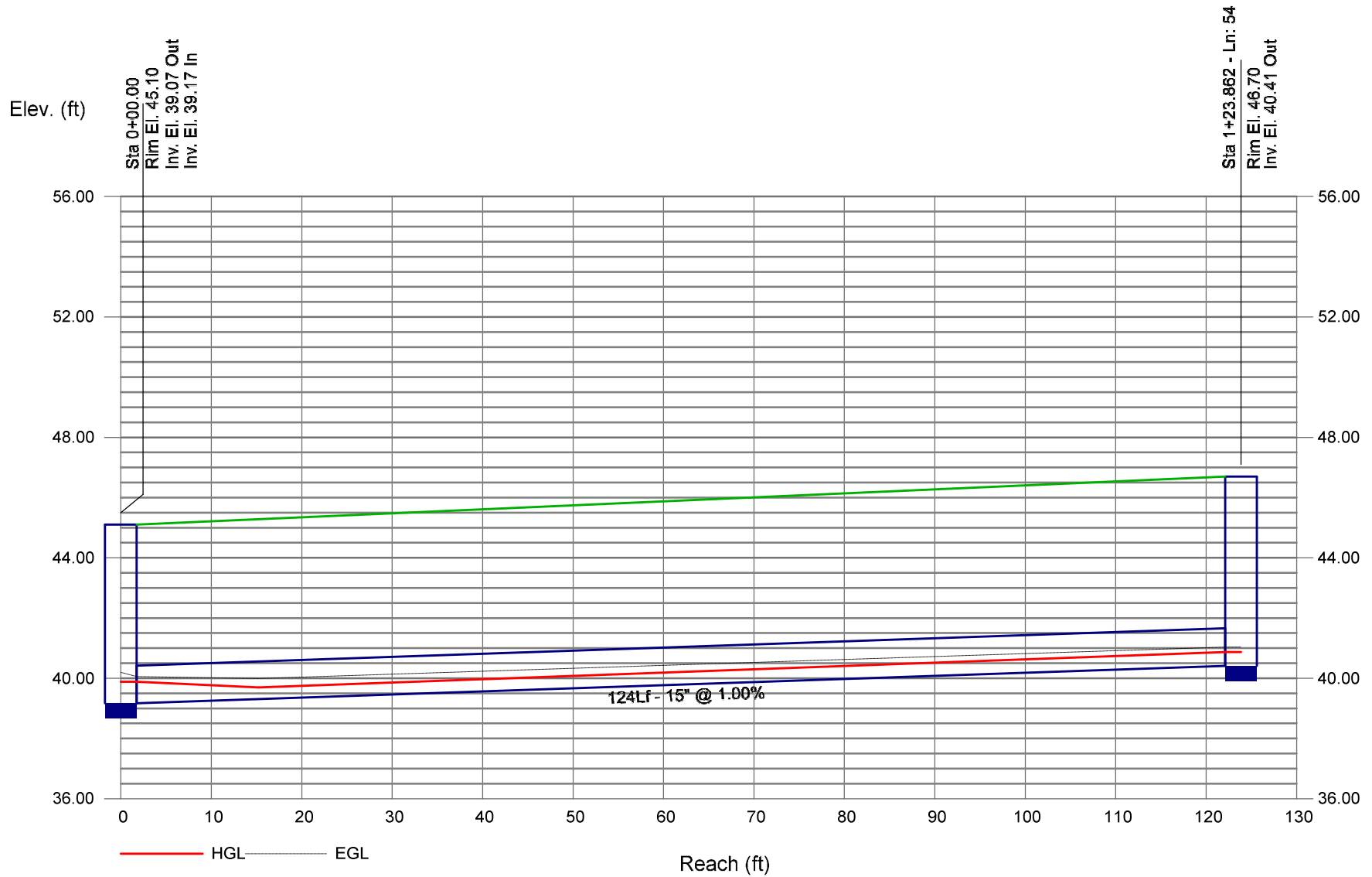
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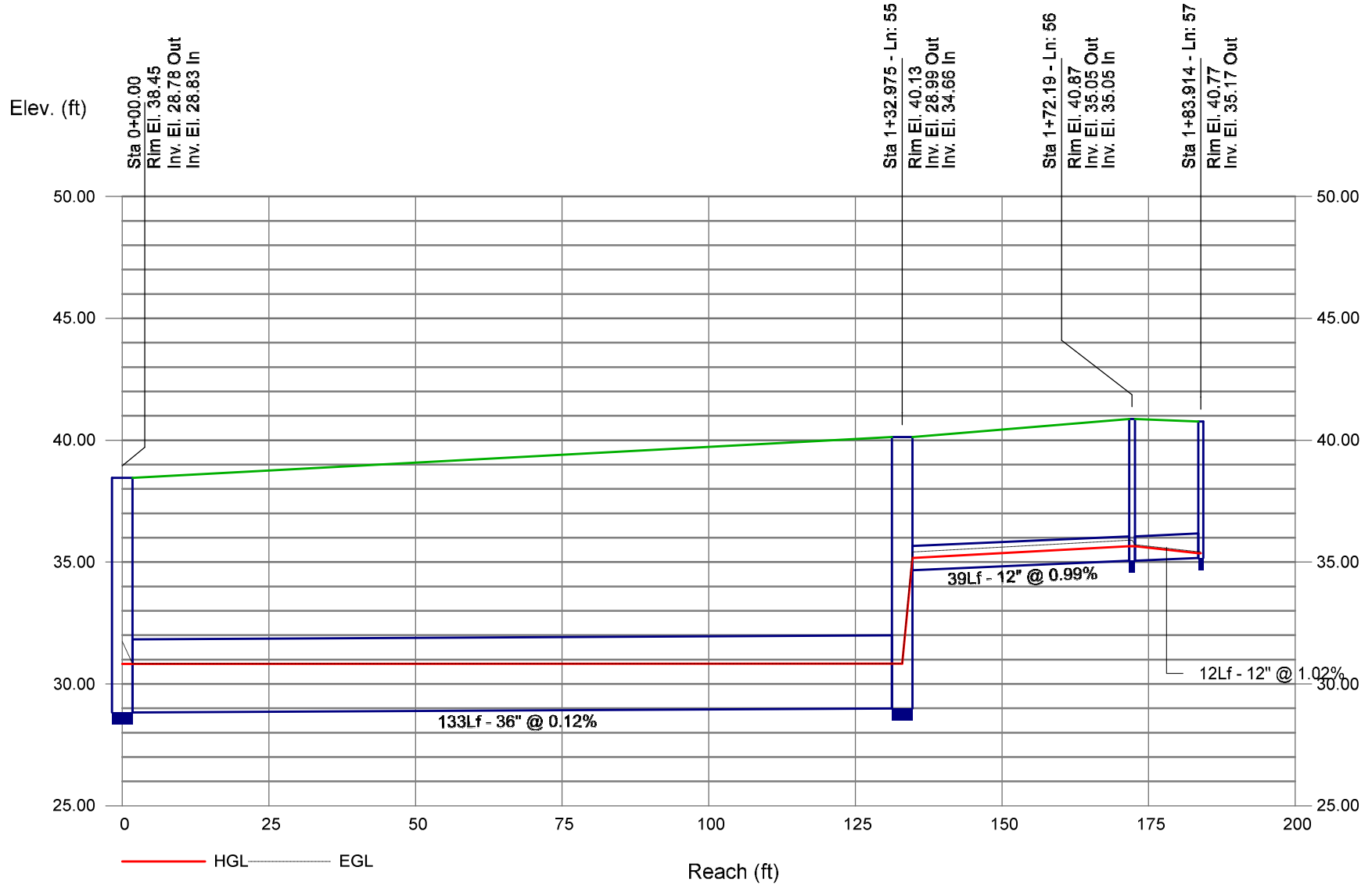
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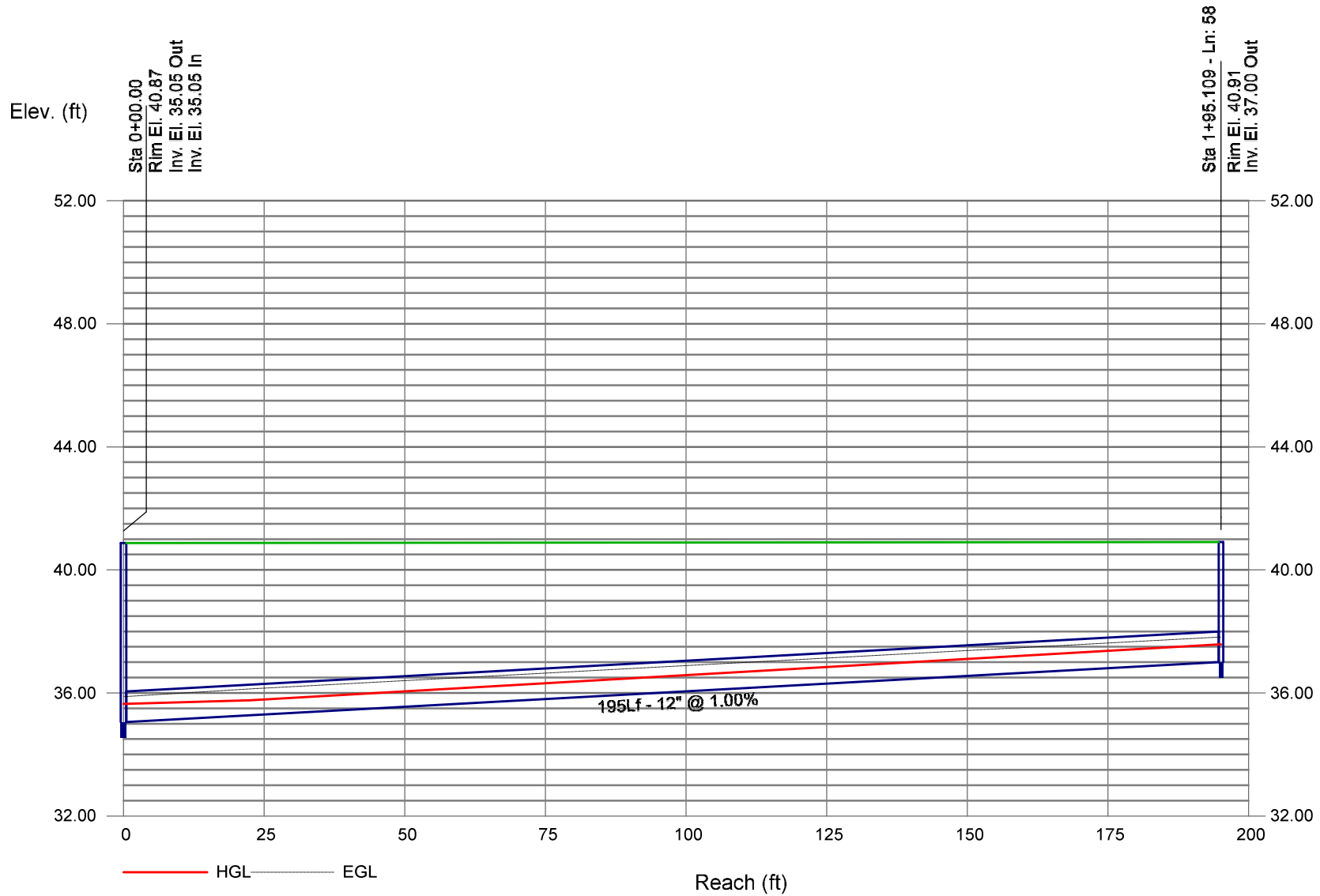
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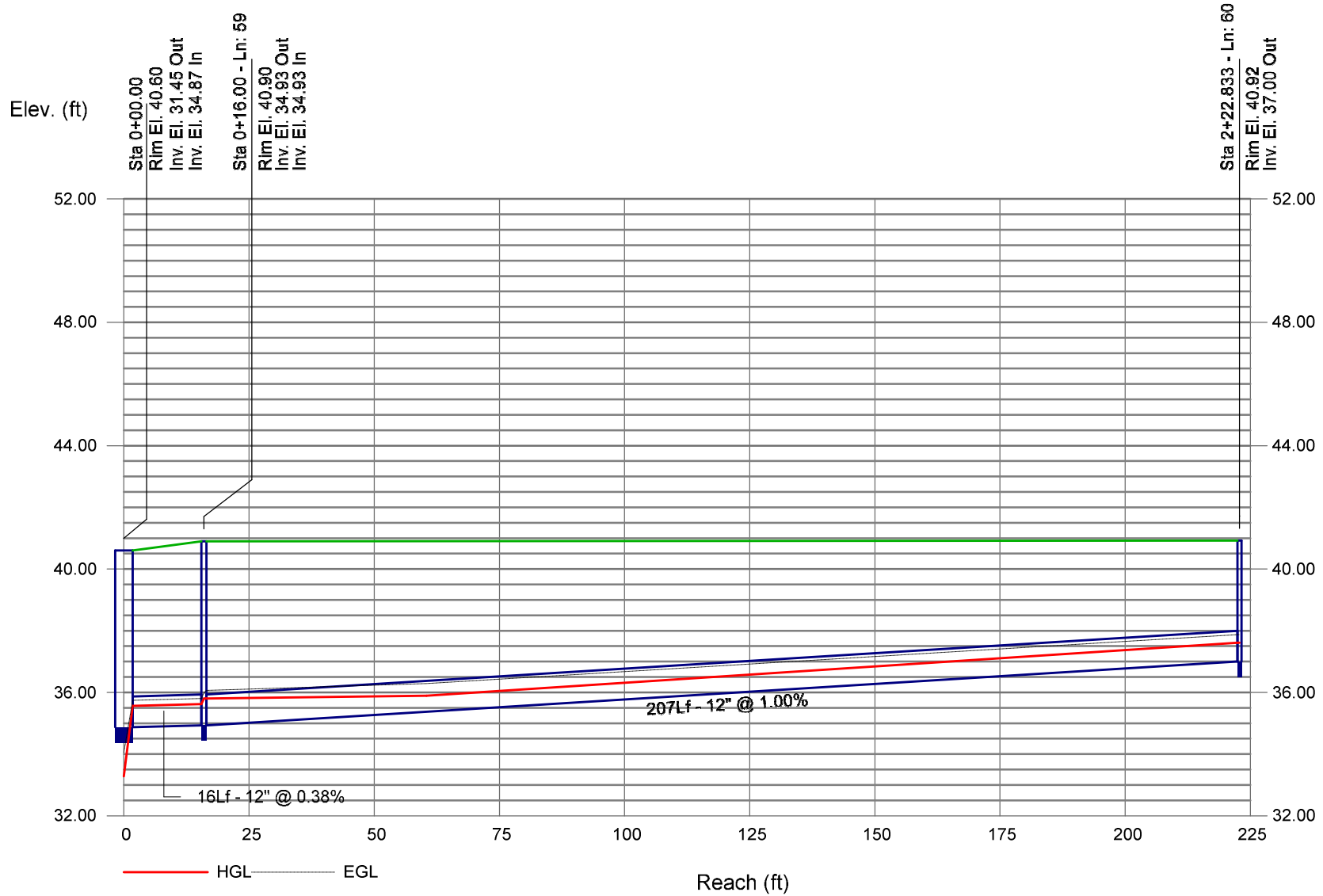
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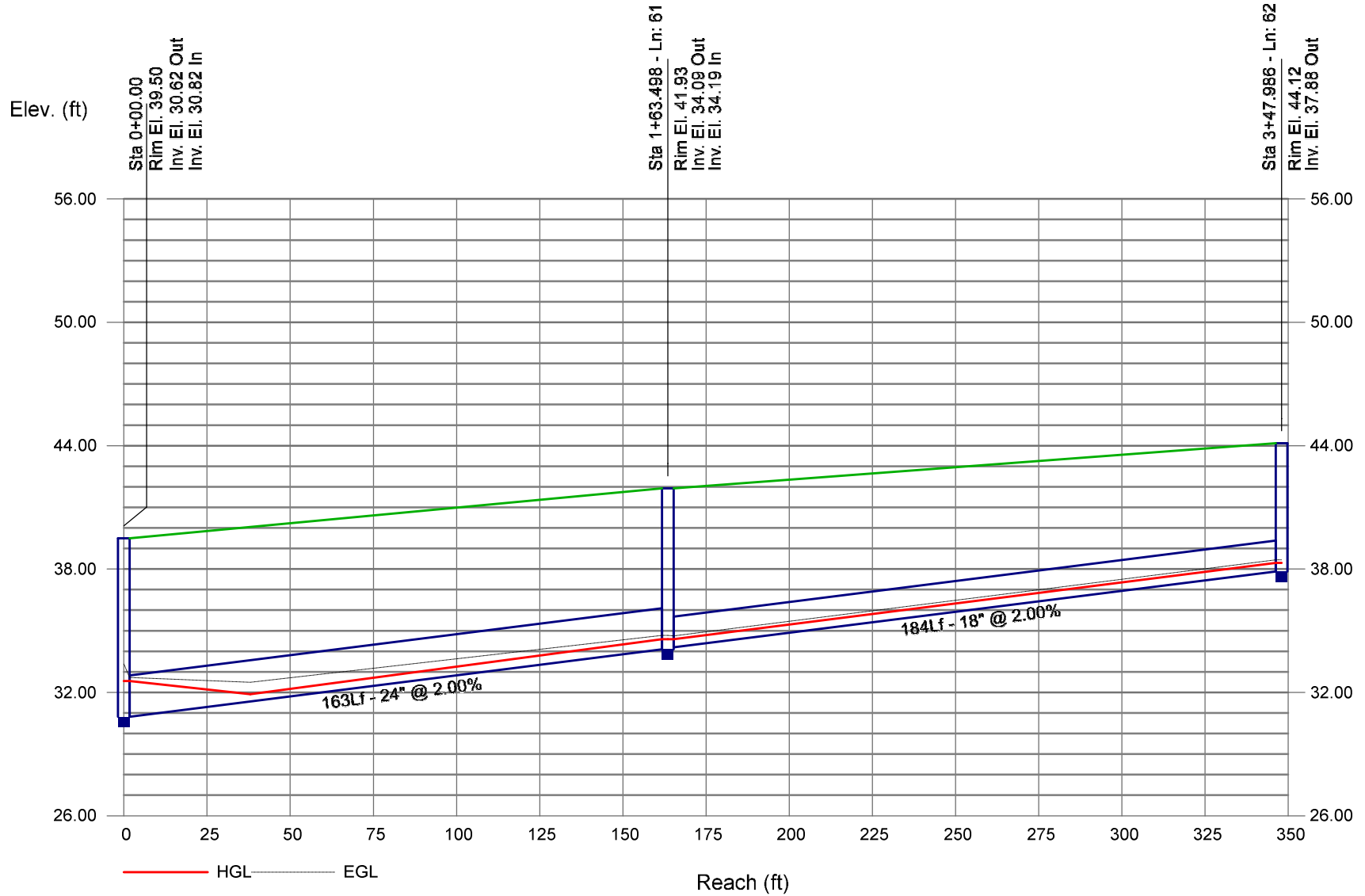
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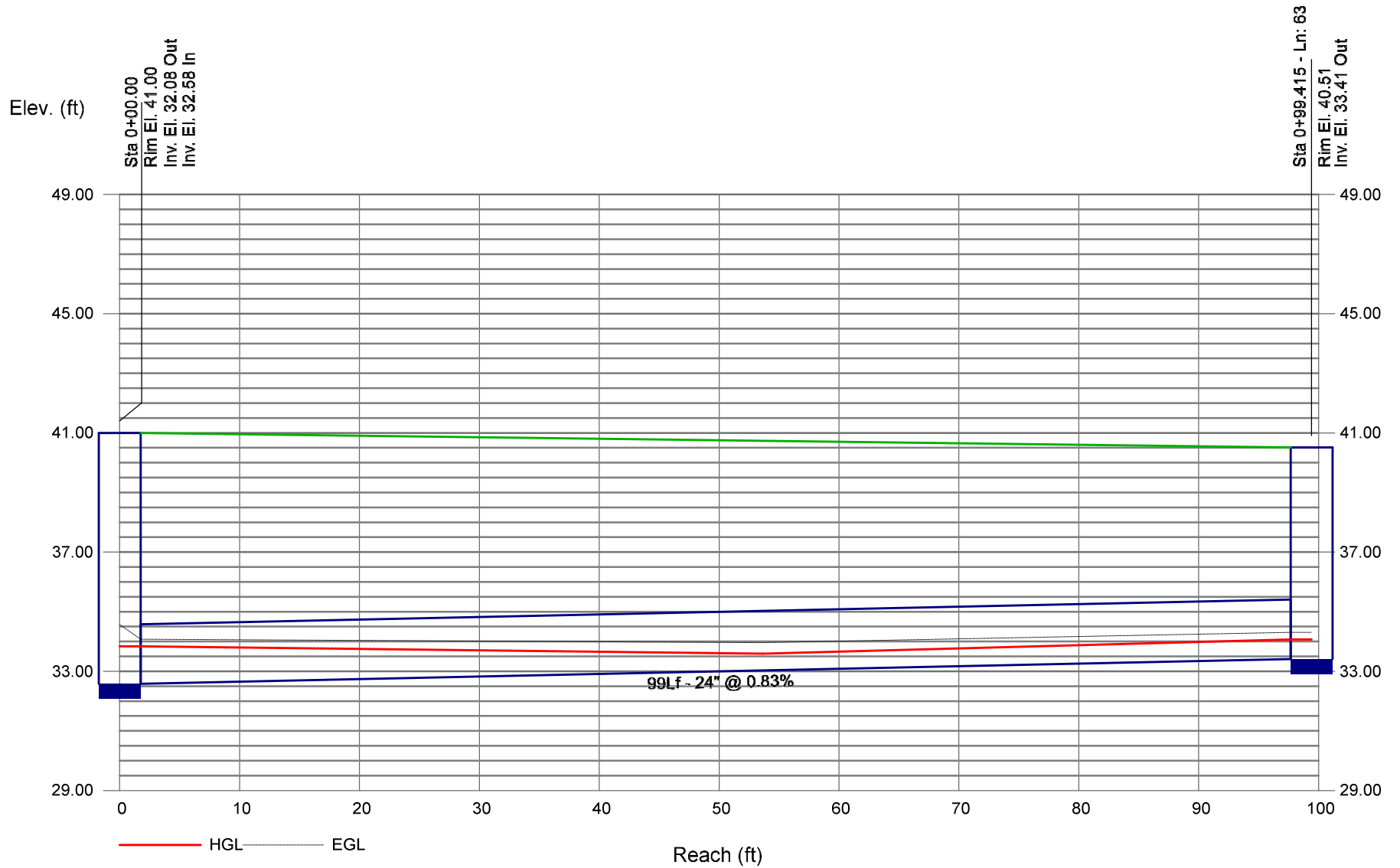
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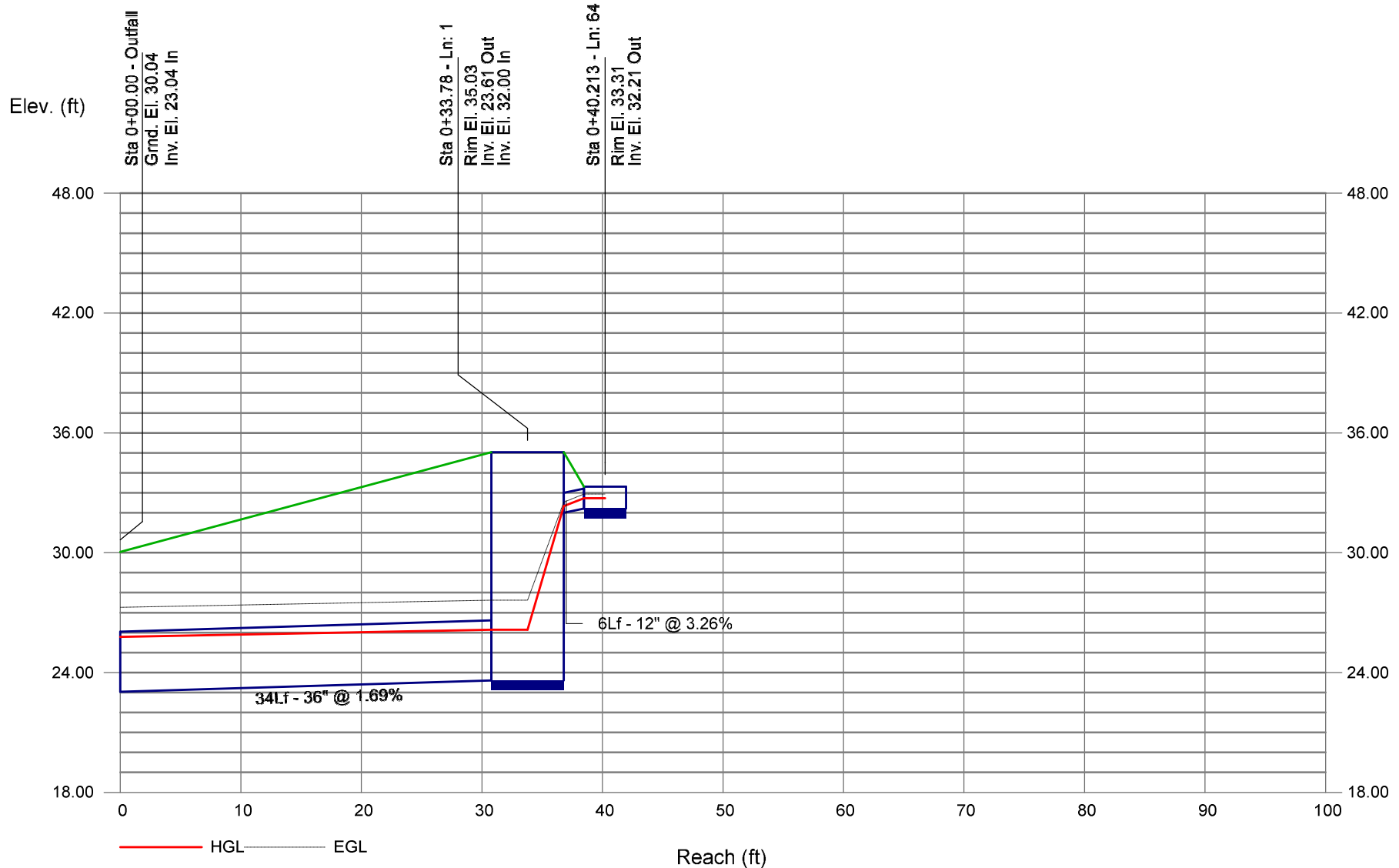
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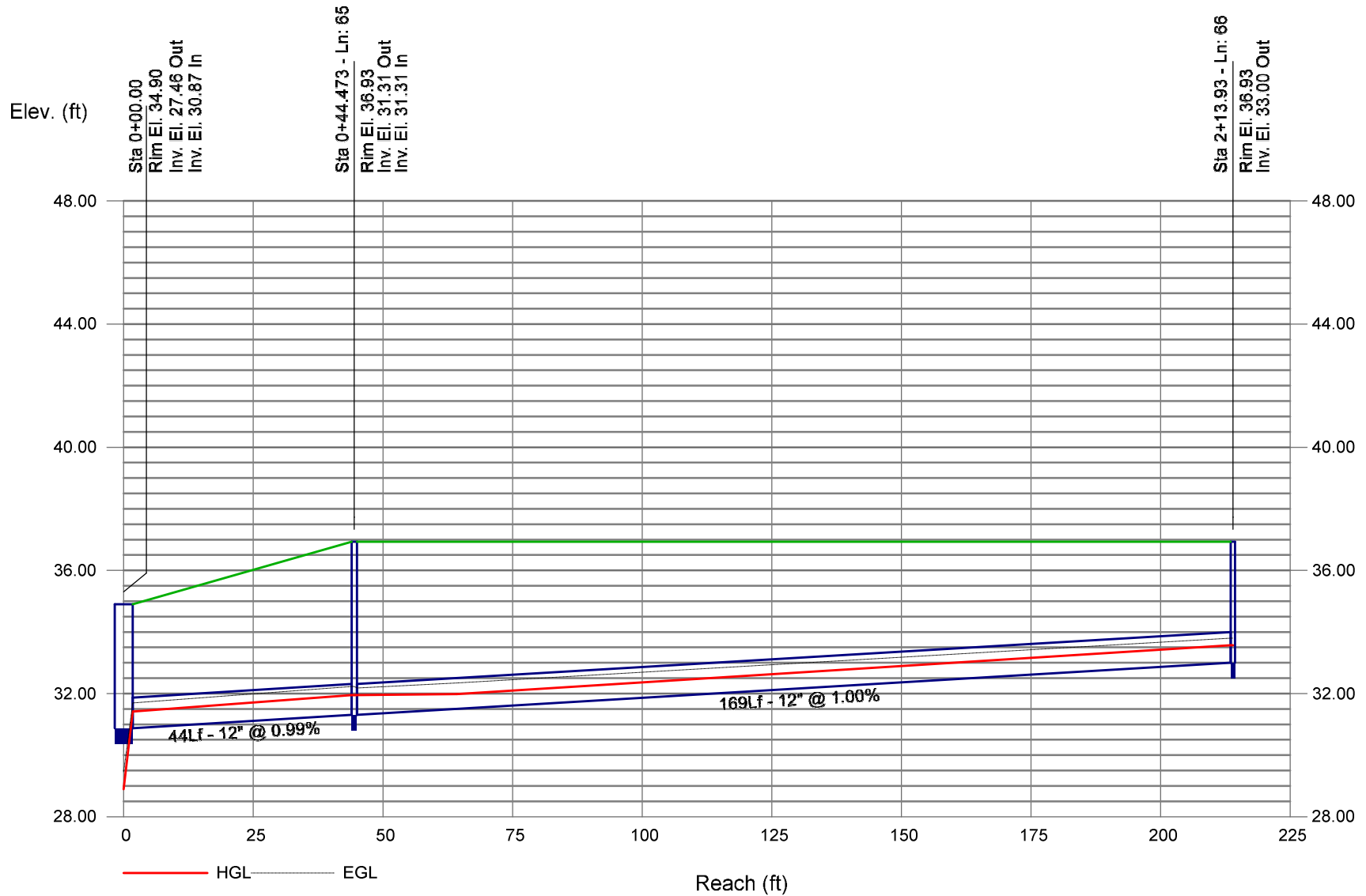
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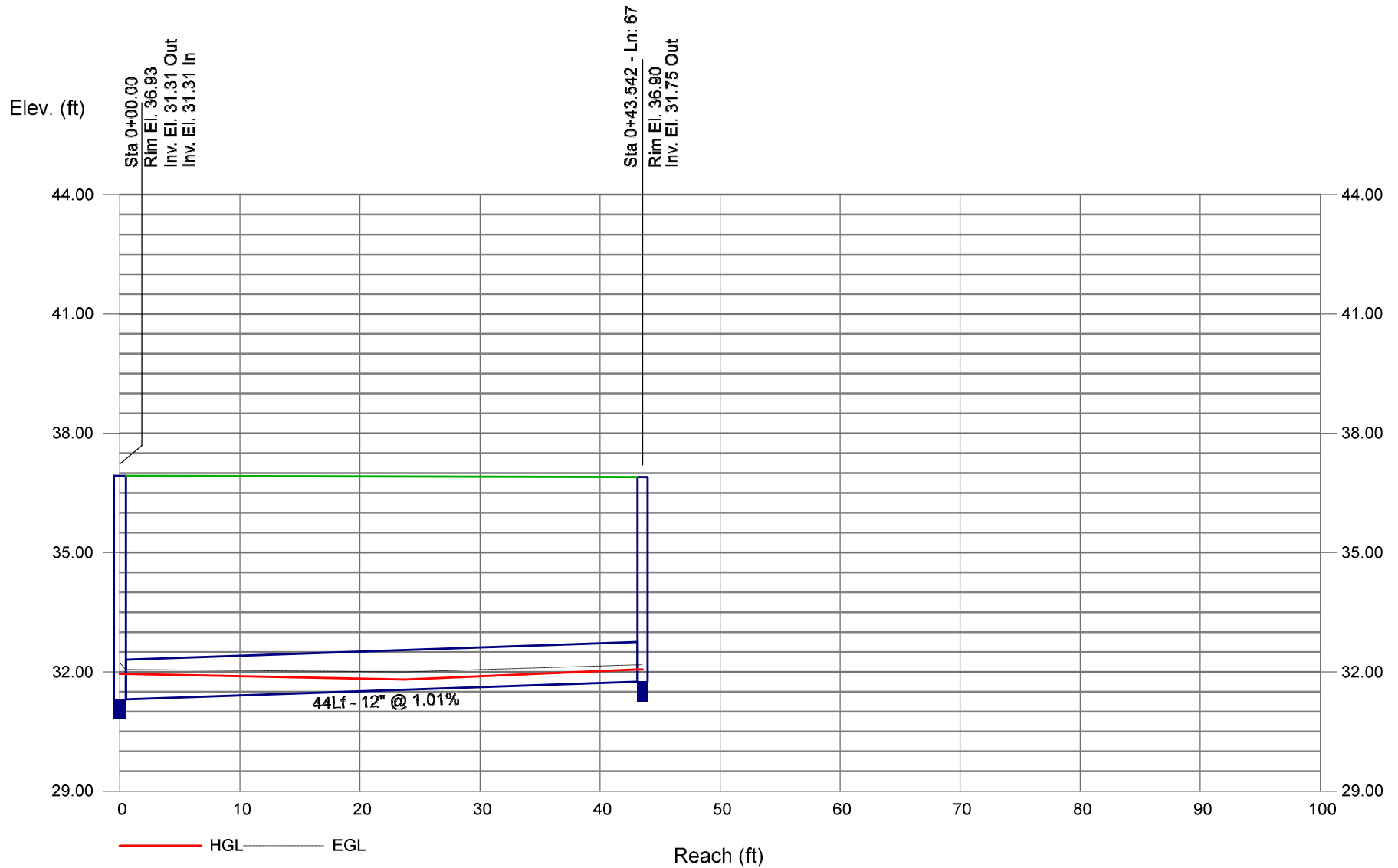
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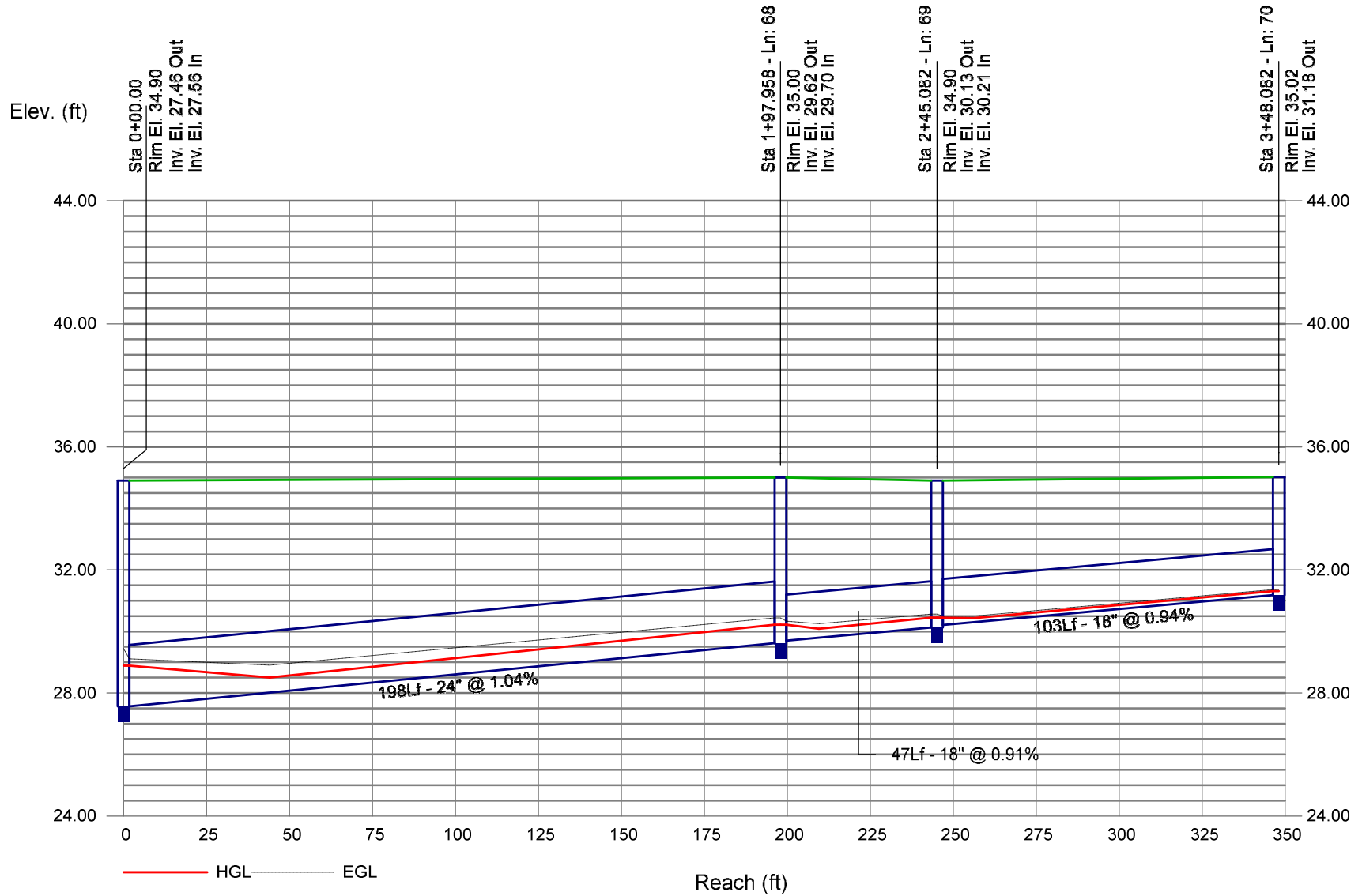
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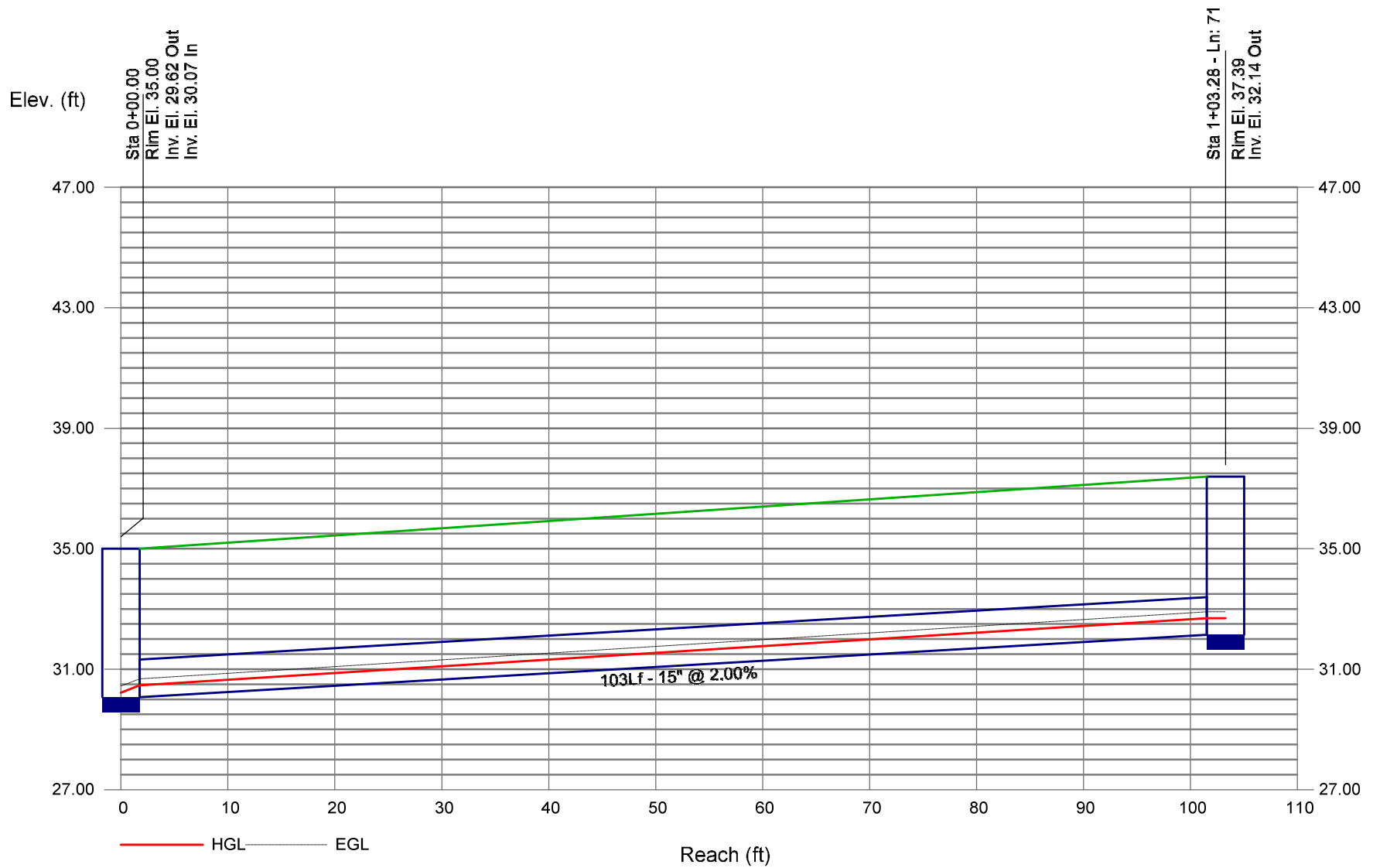
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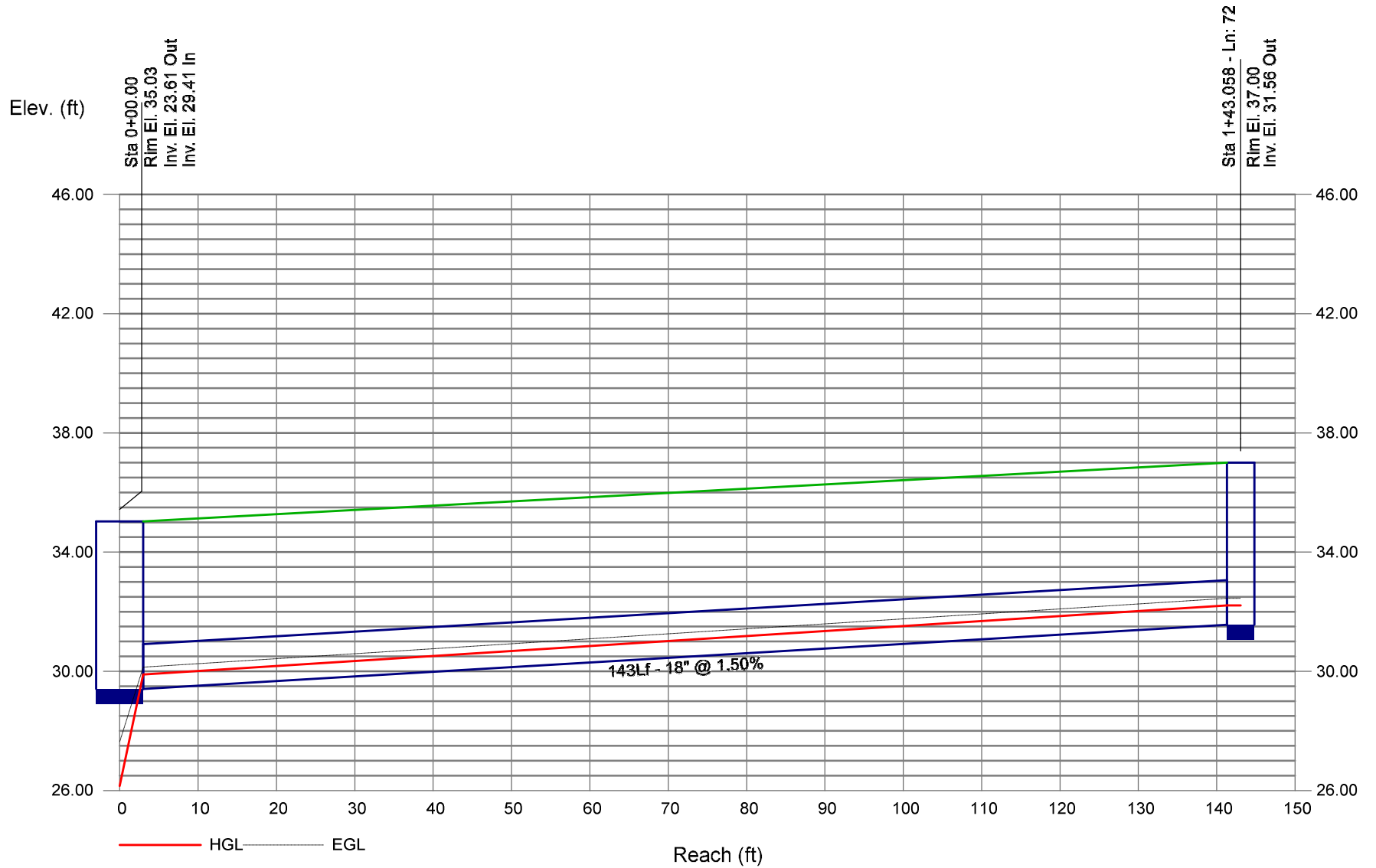
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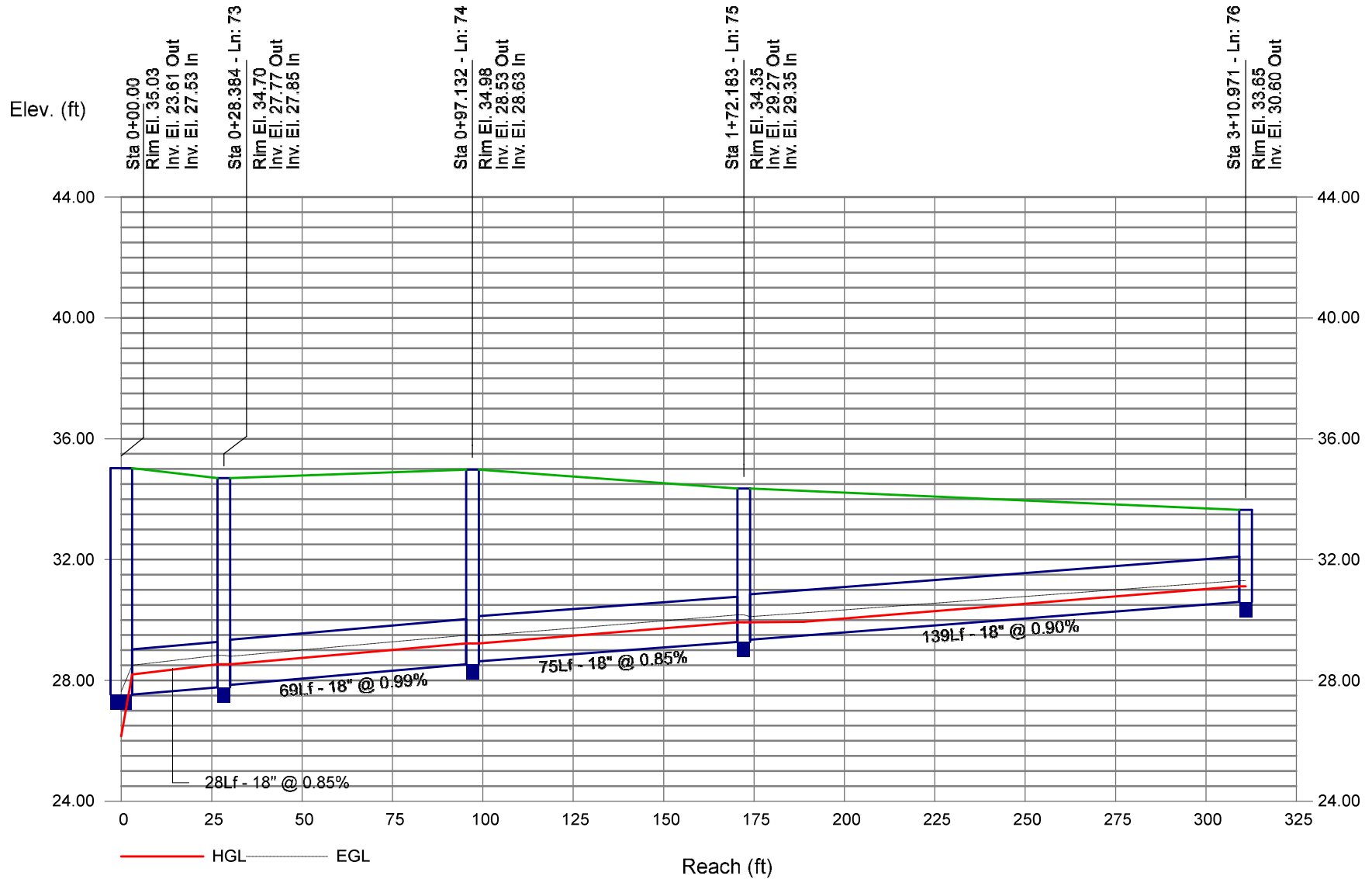
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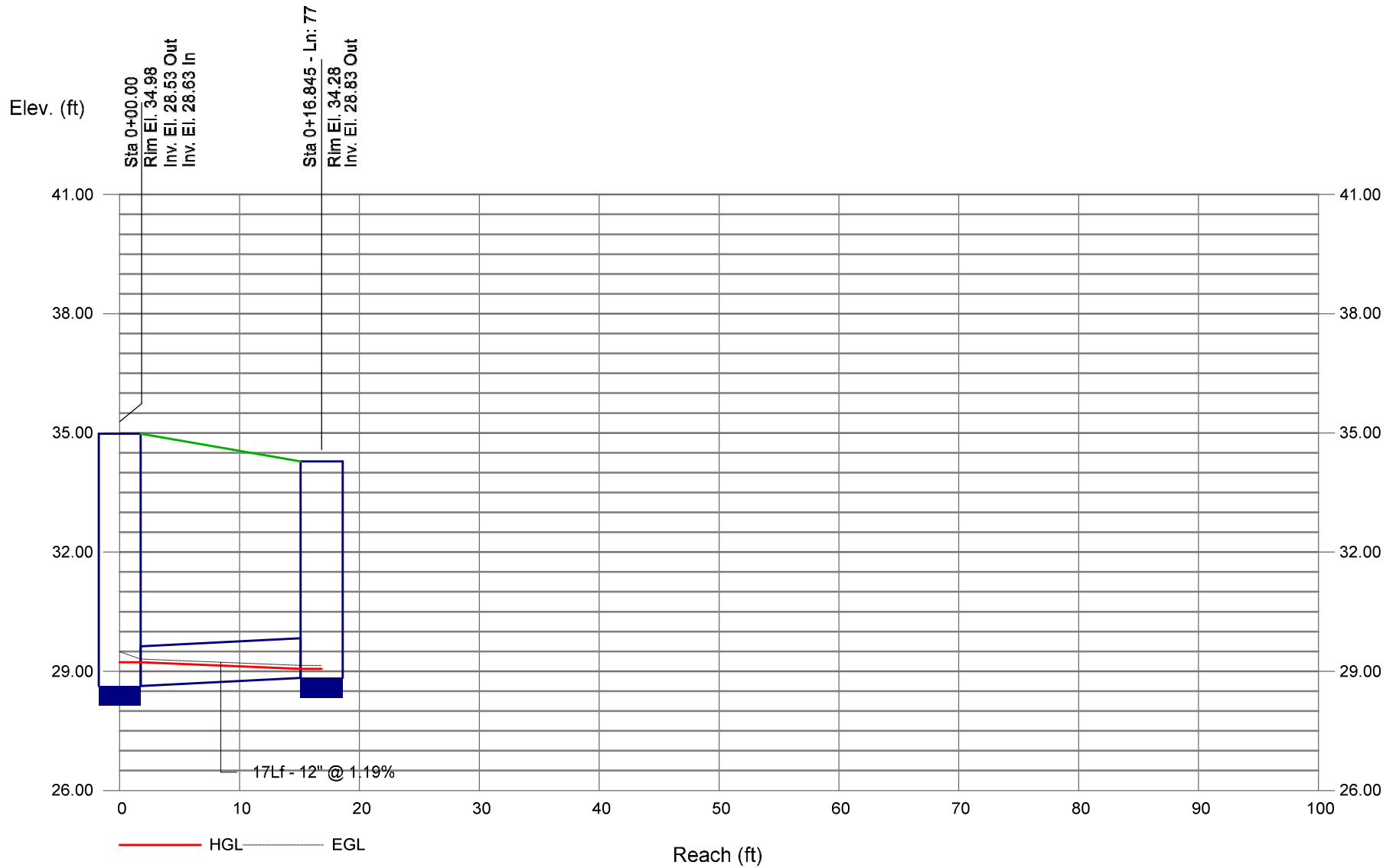
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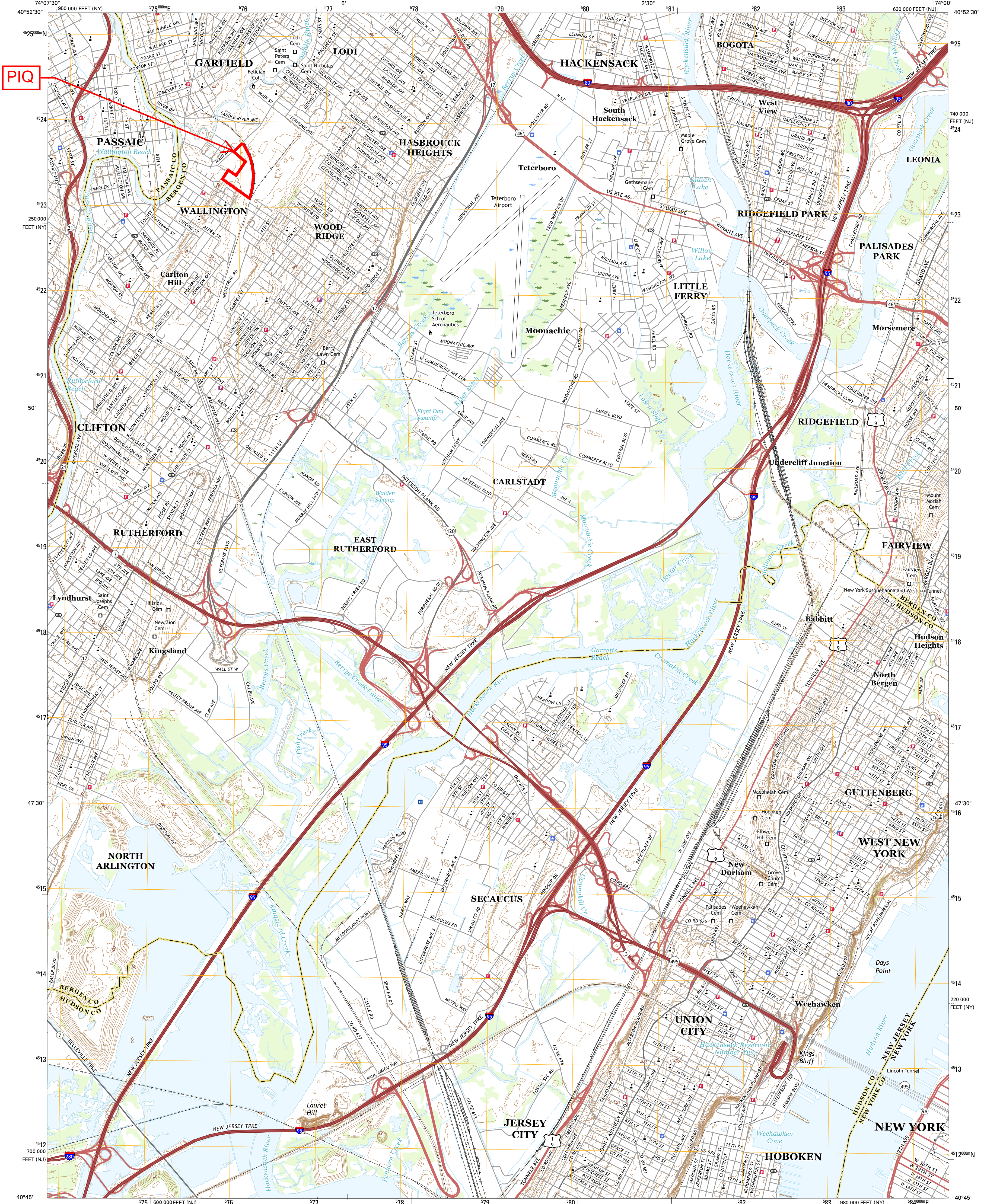


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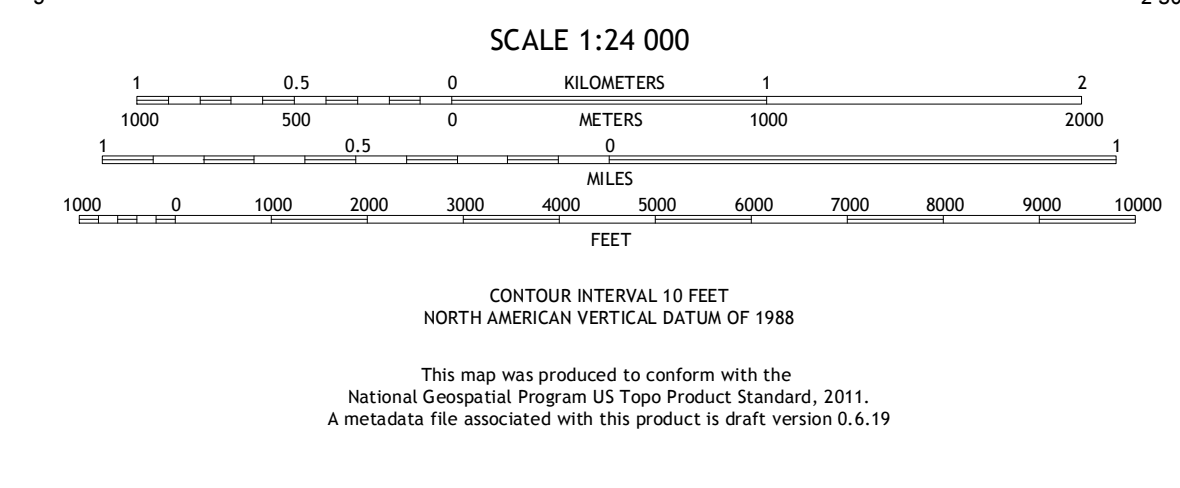
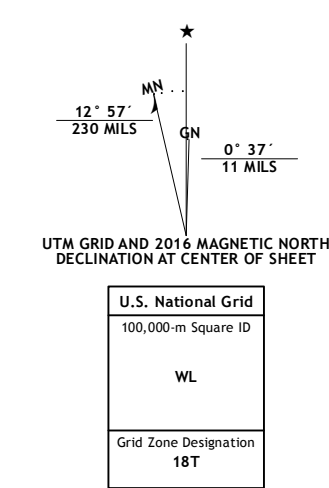
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PIQ

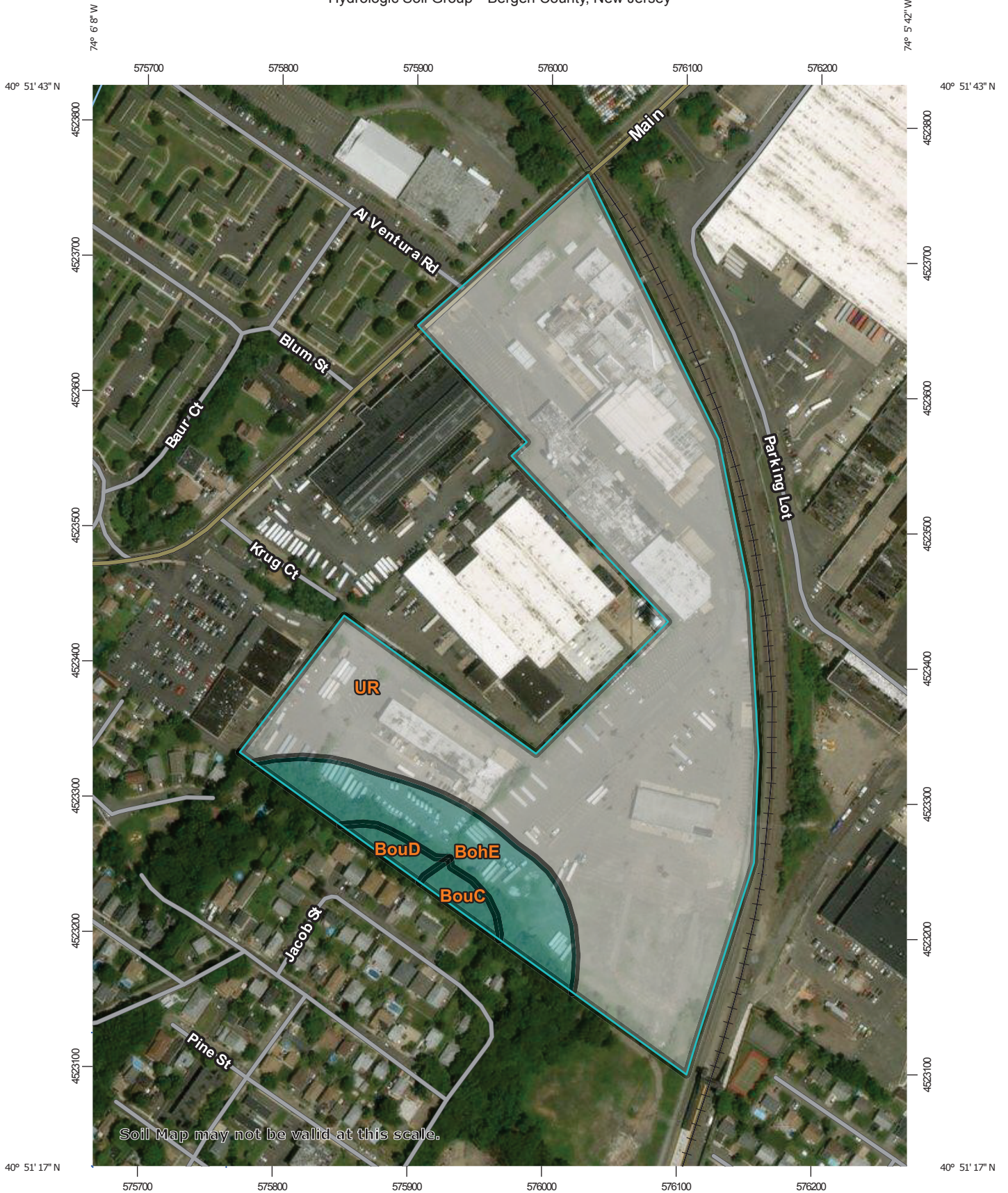
Produced by the United States Geological Survey North American Datum of 1983 (NAD83)...



ROAD CLASSIFICATION legend with symbols for Expressway, Secondary Hwy, Ramp, Interstate Route, US Route, State Route, Local Connector, Local Road, and 4WD.



Hydrologic Soil Group—Bergen County, New Jersey



Map Scale: 1:3,900 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

8/15/2017
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MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils





Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bergen County, New Jersey
 Survey Area Data: Version 13, Sep 26, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Feb 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Bergen County, New Jersey (NJ003)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BohE	Boonton moderately well drained gravelly loam, 25 to 45 percent slopes	C	2.8	10.5%
BouC	Boonton-Urban land complex, 8 to 15 percent slopes	C	0.3	1.2%
BouD	Boonton-Urban land complex, 15 to 25 percent slopes	C	0.3	1.1%
UR	Urban land		23.5	87.1%
Totals for Area of Interest			27.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

