



DEL-315-0.86

**INTERSECTION SAFETY
IMPROVEMENTS – ROUNDABOUT
DRAINAGE REPORT**

ODOT DISTRICT 6



PROJECT PID NO.: 110446

DATE: MAY 2026

WSP

WSP.COM

BEST MANAGEMENT PRACTICES



Post Construction - Project Summary

Project Data

		Units
Project EDA	4.71	acres
Is the Project Routine Maintenance per L&D Vol. 2, Sec. 1112.2	No	
BMPs Required?	BMPs Required	NA
Ain (New Impervious Area in New Permanent R/W	0.05	acres
Does Entire Site Drain to Large River (>100 sq. miles)?	No	
Water Quality Treatment Required	Yes	
Water Quantity Treatment Required	No	

Treatment Percent and Treatment Requirement

Aix (Project EDA that is inside the existing right-of-way)	4.03	acres
Ain (New Impervious Area in New Permanent R/W)	0.05	acres
T% (Treatment Percent)	20.98	%
Treatment Requirement	0.99	acres

BMPs Provided

BMP Name	BMP Type	Contributing Drainage Area (acres)	Contributing Drainage Area in ODOT R/W (acres)
VFS #1	Vegetated Filter Strip	0.30	0.30
VFS #2	Vegetated Filter Strip	0.25	0.25
VFS #3	Vegetated Filter Strip	0.11	0.11
VFS #4	Vegetated Filter Strip	0.23	0.23

Treatment Provided

Total Area with ODOT R/W Treated (acres)	0.89
Treatment Requirements (acres)	0.99
Treatment Check	Check Design

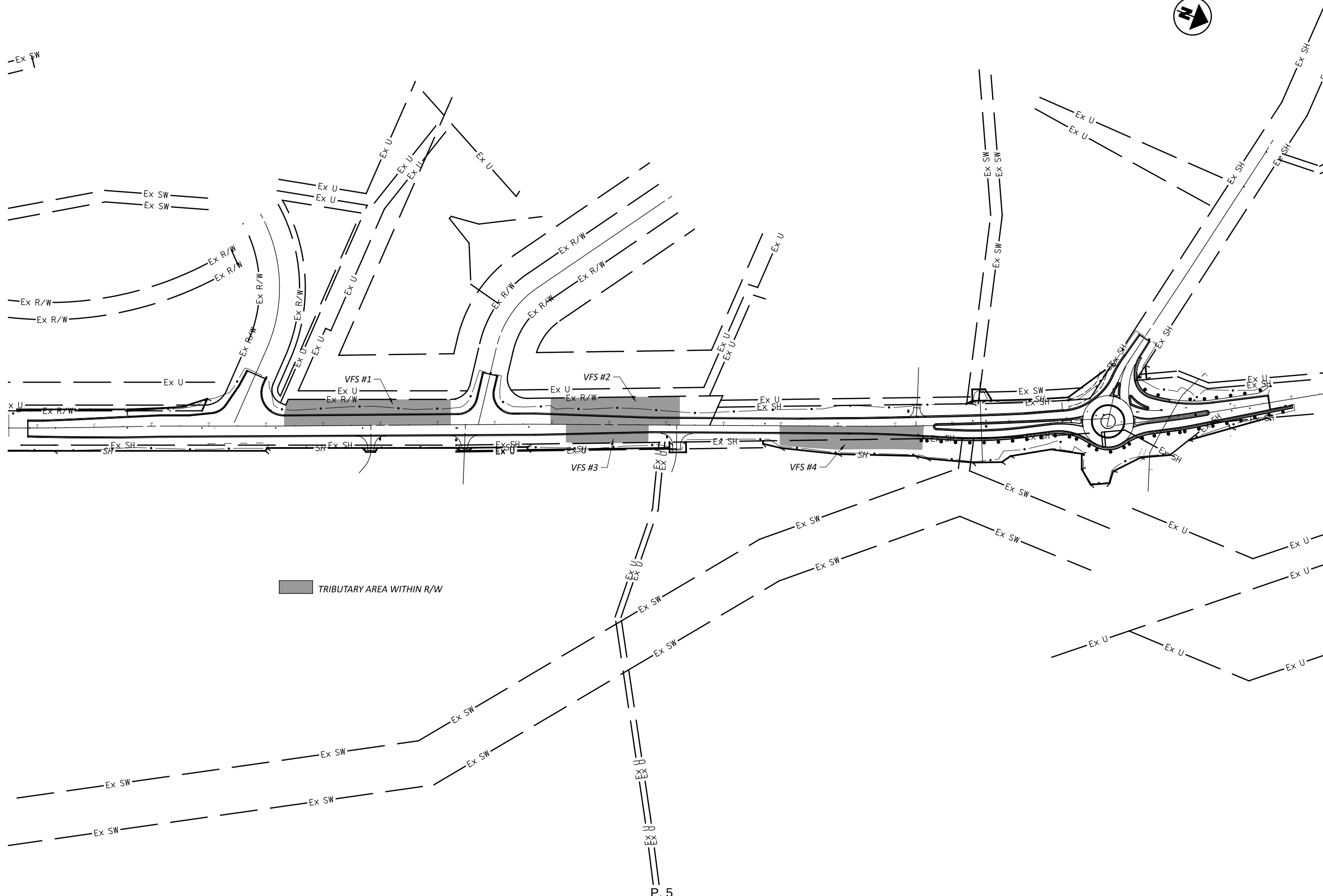
BMP Submittal Requirements (Per L&D, Vol. 2, Sec. 1116.2)

1. Estimated Project Earth Disturbed Area	Yes	Good
2. Treatment Percent Calculation	Yes	Good
3. BMP Selected for use	Yes	Good
4. Drainage area mapping for post-construction BMPs that show the total contributing drainage area and the amount of contributing area within ODOT right-of-way	Yes	Good
5. Plan sheets showing locations of post-construction BMP	Yes	Good
6. Calculations for each BMP	Yes	Good
7. Explanation for any area that is not treated	Yes	Good

Notes:

To minimize impacts to Archeological Resources, Historical Properties, Scenic Olentangy River, and Metropark property, It was decided that treatment would be achieved through credits from other projects in the area per ODOT District 6 coordination.

BMP DRAINAGE AREAS



HORIZONTAL
SCALE IN FEET

0 40 80 160

BMP SCHEMATIC EXHIBIT
DEL-315-0.86

DESIGN AGENCY

wsp

WSP USA, Inc.
2 Miranova Pl,
Suite 450
Columbus, OH 43215

DESIGNER

ATM

REVIEWER

ABS 01-29-26

PROJECT ID

110446

SHEET	TOTAL
P.1	1

VEGETATED FILTER STRIPS



Ohio Department of Transportation - Office of Hydraulic Engineering

Post-Construction BMP Calculation Spreadsheet

Vegetated Filter Strip

Filter Strip	Route	Begin Station	End Station	Side	Pavement Width (FT)	Filter Strip Width (FT)	Filter Strip Slope (z:1)	Filter Strip Length (FT)	Drainage Area (acres)	Filter Strip Area (SF)	Item 659 Topsoil Volume (CY)	Item 670 Erosion Protection Area (SY)
Filter Strip #1	S.R. 315	30+32	33+23	LT	20	24	4	292	0.30	7,365	90.9	818.3
Filter Strip #2	S.R. 315	34+97	37+23	LT	20	25	4	226	0.25	7,251	89.5	805.7
Filter Strip #3	S.R. 315	35+25	36+69	RT	20	15	4	144	0.11	2,319	28.6	257.7
Filter Strip #4	S.R. 315	38+99	41+49	RT	22	22	4	250	0.23	6,154	76.0	683.7
Filter Strip #5								0			0.0	0.0
Filter Strip #6								0			0.0	0.0
Filter Strip #7								0			0.0	0.0
Filter Strip #8								0			0.0	0.0
Filter Strip #9								0			0.0	0.0
Filter Strip #10								0			0.0	0.0

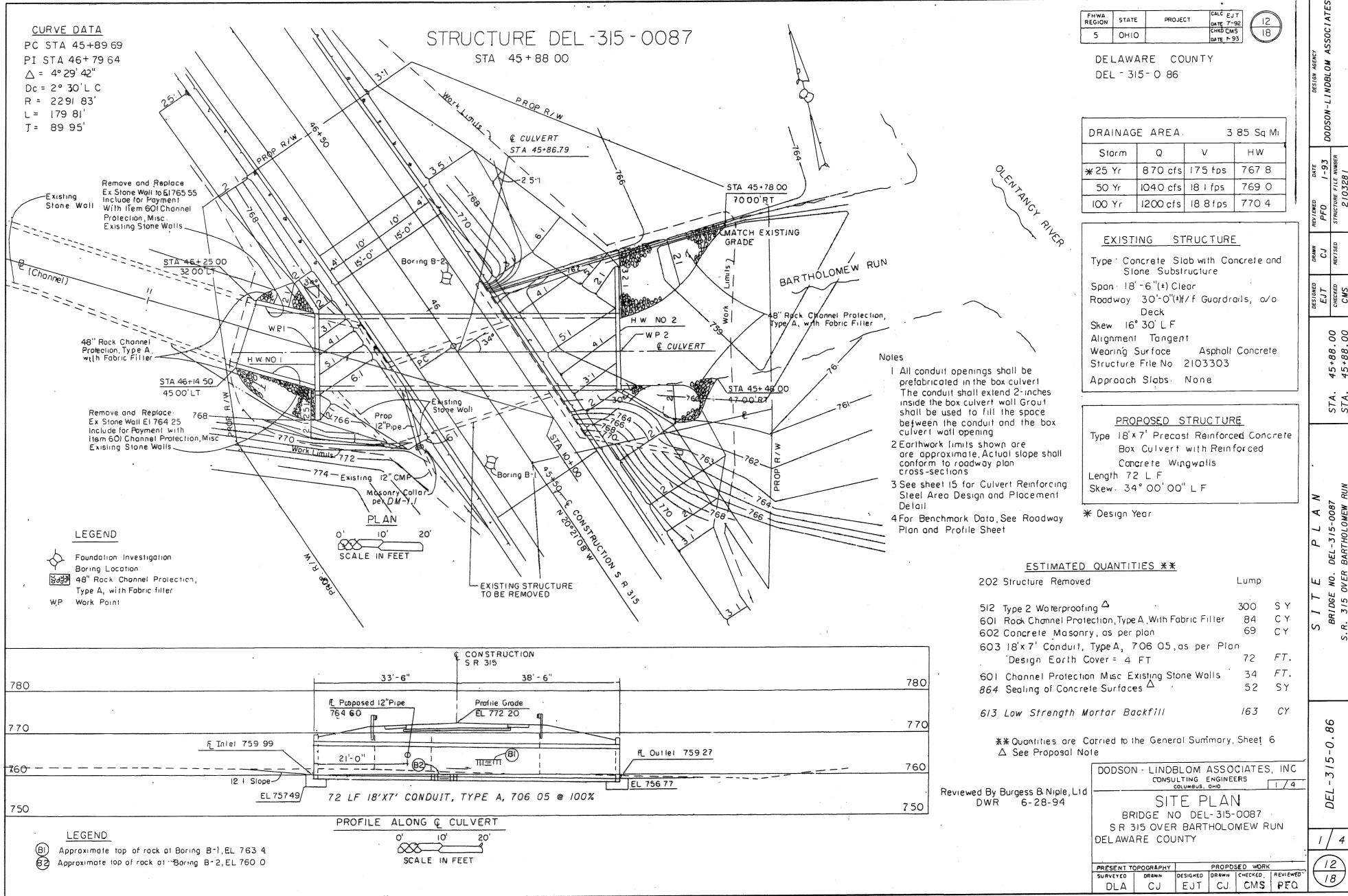
Total Treatment Credit Earned from Vegetated Filter Strips **0.888** acres
(Treatment is for quality only, not quantity)

BMP Design Considerations

		Answer	Design Check
1	Is the min. filter strip width 15-25 ft wide depending on L&D Table 1113-3?	Yes	Good
2	Is the slope 3:1 or flatter for 34 ft or narrower pavement drainage width	Yes	Good
3	Is the slope 6:1 or flatter for 35 - 48 ft pavement drainage width	NA	Good
4	Is the only contributing drainage to the filter strip from the road and shoulder?	Yes	Good
5	Does any concentrated flow or any outlets discharge to the filter strip?	No	Good
6	Is 4" of Item 659, Topsoil, included for the filter strip?	Yes	Good
7	Is Item 670, Slope Erosion Protection, included for the filter strip?	Yes	Good

CULVERTS

BARTHOLOMEW RUN CULVERT



EXISTING SITE PLAN

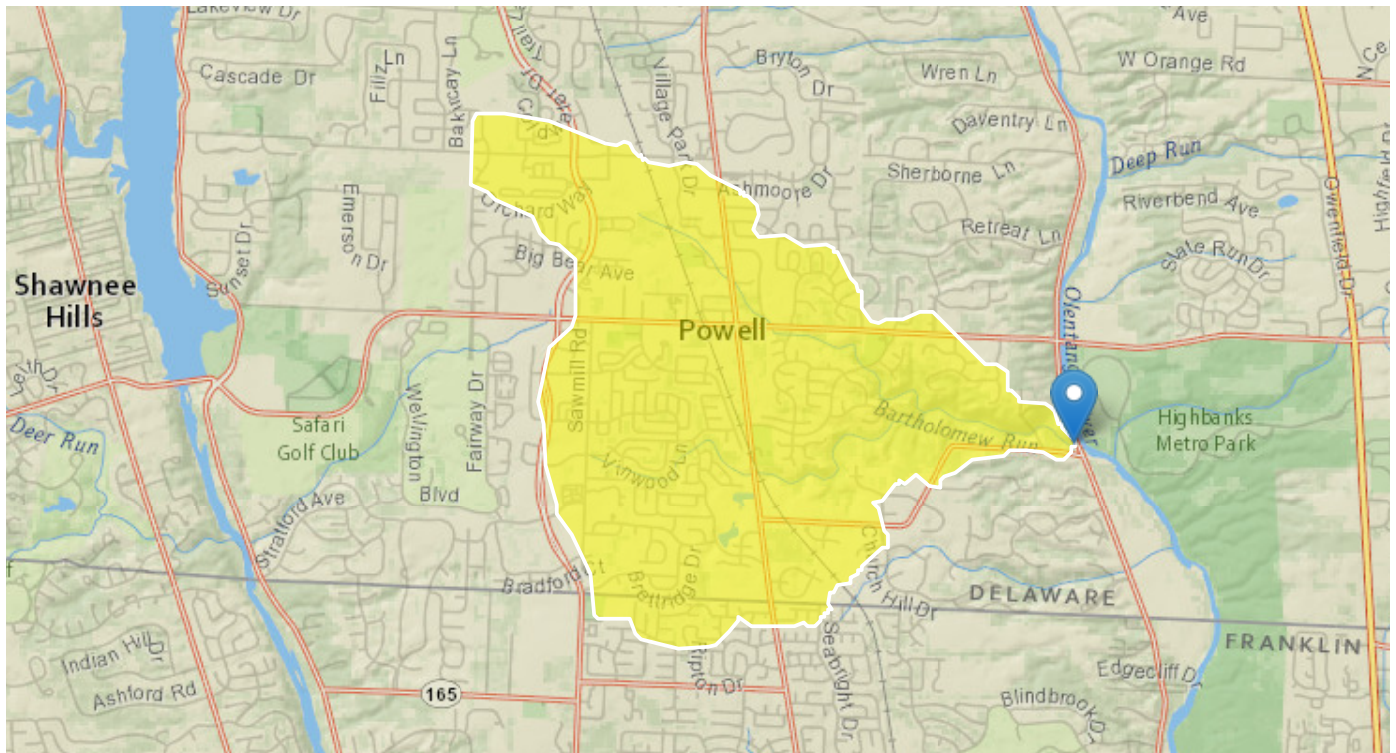
StreamStats Report

Region ID: OH

Workspace ID: OH20230907132109753000

Clicked Point (Latitude, Longitude): 40.14952, -83.04424

Time: 2023-09-07 09:21:36 -0400



 Collapse All

➤ Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	41.5	feet per mi
DRNAREA	Area that drains to a point on a stream	3.84	square miles
FOREST	Percentage of area covered by forest	31.4	percent
LAT_CENT	Latitude of Basin Centroid	40.1532	decimal degrees
LC92STOR	Percentage of water bodies and wetlands determined from the NLCD	0.54	percent

Parameter Code	Parameter Description	Value	Unit
OHREGA	Ohio Region A Indicator	1	dimensionless
OHREGC	Ohio Region C Indicator	0	dimensionless
PRECIPCENT	Mean Annual Precip at Basin Centroid	36.9	inches
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.8	dimensionless

➤ Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Full Model Reg A SIR2019 5018]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.04	5989
OHREGC	Ohio Region C Indicator 1 if in C else 0	0	dimensionless	0	1
OHREGA	Ohio Region A Indicator 1 if in A else 0	1	dimensionless	0	1
CSL1085LFP	Stream Slope 10 and 85 Longest Flow Path	41.5	feet per mi	1.53	516
LC92STOR	Percent Storage from NLCD1992	0.54	percent	0	25.35

Peak-Flow Statistics Flow Report [Peak Flow Full Model Reg A SIR2019 5018]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	ASEp
50-percent AEP flood	309	ft ³ /s	164	584	40.1
20-percent AEP flood	540	ft ³ /s	299	976	37.2
10-percent AEP flood	727	ft ³ /s	400	1320	37.6
4-percent AEP flood	997	ft ³ /s	544	1830	38.1
2-percent AEP flood	1220	ft ³ /s	659	2260	37.8
1-percent AEP flood	1460	ft ³ /s	780	2730	39.6
0.2-percent AEP flood	2090	ft ³ /s	1110	3950	40.3

Peak-Flow Statistics Citations

➤ Monthly Flow Statistics

Monthly Flow Statistics Parameters [Low Flow LatLE 41.2 wri02 4068]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.12	7422
LC92STOR	Percent Storage from NLCD1992	0.54	percent	0	19
PRECIPCENT	Mean Annual Precip at Basin Centroid	36.9	inches	34	43.2
FOREST	Percent Forest	31.4	percent	0	99.1
LAT_CENT	Latitude of Basin Centroid	40.1532	decimal degrees	38.68	41.2
STREAM_VARG	Streamflow Variability Index from Grid	0.8	dimensionless	0.25	1.13

Monthly Flow Statistics Flow Report [Low Flow LatLE 41.2 wri02 4068]

PIl: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
January Mean Flow	5.16	ft ³ /s	16.6	16.6
February Mean Flow	6.62	ft ³ /s	11.9	11.9
March Mean Flow	7.54	ft ³ /s	14	14
April Mean Flow	6.87	ft ³ /s	11.2	11.2
May Mean Flow	4.69	ft ³ /s	19.5	19.5
June Mean Flow	2.49	ft ³ /s	27	27
July Mean Flow	1.4	ft ³ /s	28.2	28.2
August Mean Flow	0.815	ft ³ /s	36.8	36.8
September Mean Flow	0.535	ft ³ /s	43.6	43.6
October Mean Flow	0.585	ft ³ /s	50.8	50.8
November Mean Flow	1.8	ft ³ /s	37.5	37.5
December Mean Flow	3.87	ft ³ /s	21.8	21.8

Koltun, G. F., and Whitehead, M. T.,2002, Techniques for Estimating Selected Streamflow Characteristics of Rural, Unregulated Streams in Ohio: U. S. Geological Survey Water-Resources Investigations Report 02-4068, 50 p
(<https://pubs.er.usgs.gov/publication/wri024068>)

➤ General Flow Statistics

General Flow Statistics Parameters [Low Flow LatLE 41.2 wri02 4068]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.12	7422
LC92STOR	Percent Storage from NLCD1992	0.54	percent	0	19
STREAM_VARG	Streamflow Variability Index from Grid	0.8	dimensionless	0.25	1.13
LAT_CENT	Latitude of Basin Centroid	40.1532	decimal degrees	38.68	41.2

General Flow Statistics Flow Report [Low Flow LatLE 41.2 wri02 4068]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
Harmonic Mean Streamflow	0.156	ft ³ /s	65.9	65.9

General Flow Statistics Citations

Koltun, G. F., and Whitehead, M. T.,2002, Techniques for Estimating Selected Streamflow Characteristics of Rural, Unregulated Streams in Ohio: U. S. Geological Survey Water-Resources Investigations Report 02-4068, 50 p
(<https://pubs.er.usgs.gov/publication/wri024068>)

➤ Bankfull Statistics

Bankfull Statistics Parameters [Interior Plains D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.19305	59927.7393

Bankfull Statistics Parameters [Central Lowland P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.200772	59927.66594

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Interior Plains D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	18.8	ft
Bieger_D_channel_depth	1.93	ft
Bieger_D_channel_cross_sectional_area	40.7	ft^2

Bankfull Statistics Flow Report [Central Lowland P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	21.4	ft
Bieger_P_channel_depth	2.33	ft
Bieger_P_channel_cross_sectional_area	38.7	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	19.9	ft
Bieger_USA_channel_depth	1.61	ft
Bieger_USA_channel_cross_sectional_area	35.3	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	18.8	ft
Bieger_D_channel_depth	1.93	ft
Bieger_D_channel_cross_sectional_area	40.7	ft^2
Bieger_P_channel_width	21.4	ft
Bieger_P_channel_depth	2.33	ft

Statistic	Value	Unit
Bieger_P_channel_cross_sectional_area	38.7	ft^2
Bieger_USA_channel_width	19.9	ft
Bieger_USA_channel_depth	1.61	ft
Bieger_USA_channel_cross_sectional_area	35.3	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G., 2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p.
https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverSheet

➤ Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region A 2012 5138]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	3.84	square miles	1	1250
STREAM_VARG	Streamflow Variability Index from Grid	0.8	dimensionless	0.24	1.12

Low-Flow Statistics Flow Report [Low Flow Region A 2012 5138]

PlI: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE
1 Day 10 Year Low Flow	0.00125	ft^3/s	53.1
7 Day 10 Year Low Flow	0.00331	ft^3/s	40
30 Day 10 Year Low Flow	0.00872	ft^3/s	35.7
90 Day 10 Year Low Flow	0.0152	ft^3/s	29.8

Low-Flow Statistics Citations

Koltun, G.F., and Kula, S.P., 2013, Methods for estimating selected low-flow statistics and development of annual flow-duration statistics for Ohio: U.S. Geological Survey Scientific Investigations Report 2012-5138, 195 p. (<http://pubs.usgs.gov/sir/2012/5138/>)

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Application Version: 4.17.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

Culvert Crossing: Bartholomew Run Existing

Customized Table – Original

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
25 Year	870.00	870.00	767.04	7.05	4.63	5-S2n	2.50	4.17	3.23	4.05	14.96	8.24	0.00	72.34
50 Year	1040.00	1040.00	768.03	8.04	5.66	5-S2n	2.81	4.70	3.68	4.45	15.68	8.68	0.00	72.34
100 Year	1200.00	1200.00	769.02	9.03	6.68	5-S2n	3.09	5.17	4.09	4.81	16.28	9.04	0.00	72.34

Customized Table - StreamStats

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
25 Year	997.00	997.00	767.78	7.79	5.39	5-S2n	2.73	4.57	3.57	4.36	15.51	8.57	0.00	72.34
50 Year	1220.00	1220.00	769.15	9.16	6.82	5-S2n	3.12	5.23	4.14	4.85	16.35	9.08	0.00	72.34
100 Year	1460.00	1460.00	770.82	10.83	9.04	5-S2n	3.53	5.89	4.73	5.33	17.15	9.55	0.00	72.34

Culvert Crossing: Bartholomew Run Proposed

Customized Table – Original

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
25 Year	870.00	870.00	767.04	7.05	5.01	5-S2n	2.50	4.17	3.14	4.76	15.41	6.64	0.00	95.68
50 Year	1040.00	1040.00	768.03	8.04	5.99	5-S2n	2.81	4.70	3.58	5.23	16.14	6.98	0.00	95.68
100 Year	1200.00	1200.00	769.02	9.03	6.97	5-S2n	3.09	5.17	3.98	5.64	16.75	7.26	0.00	95.68

Customized Table - StreamStats

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
25 Year	997.00	997.00	767.78	7.79	5.74	5-S2n	2.73	4.57	3.47	5.12	15.96	6.90	0.00	95.68
50 Year	1220.00	1220.00	769.15	9.16	7.09	5-S2n	3.13	5.23	4.03	5.69	16.82	7.30	0.00	95.68
100 Year	1460.00	1460.00	770.82	10.83	8.66	5-S2n	3.53	5.89	4.60	6.24	17.62	7.67	0.00	95.68

TOB=764.2628' (lowest measured)

OHWM=764.1930'

The top of the bank on the North side of the stream, upstream of the culvert, is 764.26'. The left side is controlling because it is flatter, therefore it would create a larger spread past the top of the bank. The proposed culvert has a headwater elevation of 768.03' using the original calculated flow for a 2% design storm. Using the flow produced by StreamStats, the headwater elevation is 769.15'. Both are higher than the top of bank elevations, the original value being 3.77' higher and the StreamStats value being 4.89' higher. The existing culvert produced the same elevations. In the circumstance of a 50-year storm, using the flow generated in StreamStats, water would create a spread of about 40', as that is the distance to an elevation greater than 769.15'. Using the original calculated flow, a spread of 30' would be reached. The ordinary high-water mark is 764.19'. This is about 3.84' below the headwater elevation for the original flow and 4.96' below the headwater elevation for the StreamStats flow.

Culvert Crossing: Bartholomew Run with StreamStats Flow

Customized Table – Existing Box

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
4% Storm	997.00	997.00	767.78	7.79	5.39	5-S2n	2.73	4.57	3.57	4.36	15.51	8.57	0.00	72.34
2% Storm	1220.00	1220.00	769.15	9.16	6.82	5-S2n	3.12	5.23	4.14	4.85	16.35	9.08	0.00	72.34
1% Storm	1460.00	1460.00	770.82	10.83	9.04	5-S2n	3.53	5.89	4.73	5.33	17.15	9.55	0.00	72.34

Customized Table – Proposed Box

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)	Length Full (ft)	Length Free (ft)
4% Storm	997.00	997.00	767.78	7.79	5.74	5-S2n	2.73	4.57	3.47	5.12	15.96	6.90	0.00	95.68
2% Storm	1220.00	1220.00	769.15	9.16	7.09	5-S2n	3.13	5.23	4.03	5.69	16.82	7.30	0.00	95.68
1% Storm	1460.00	1460.00	770.82	10.83	8.66	5-S2n	3.53	5.89	4.60	6.24	17.62	7.67	0.00	95.68

Using the flow produced by StreamStats, the headwater elevation for the proposed culvert is 769.15', 4.89' higher than the top of bank elevation of 764.26'. The existing culvert produced the same headwater elevations. In the circumstance of a 2% storm, water would create a spread of about 40' (on the north side of the stream). The ordinary high-water mark is 764.19', 4.96' below the 2% headwater elevation. The lowest corner of the nearest structure is at 770.00', 0.85' above the 2% storm and 0.82' below the 1% storm. The crest of the roadway is at 771.45', which is 2.30' above the 2% storm.

HW Control Elevation 1 (Roadway Crest) = 771.45

HW Control Elevation 2 (house corner just west of culvert) = 770.00

PROPOSED 36" CULVERT - STA. 42+50

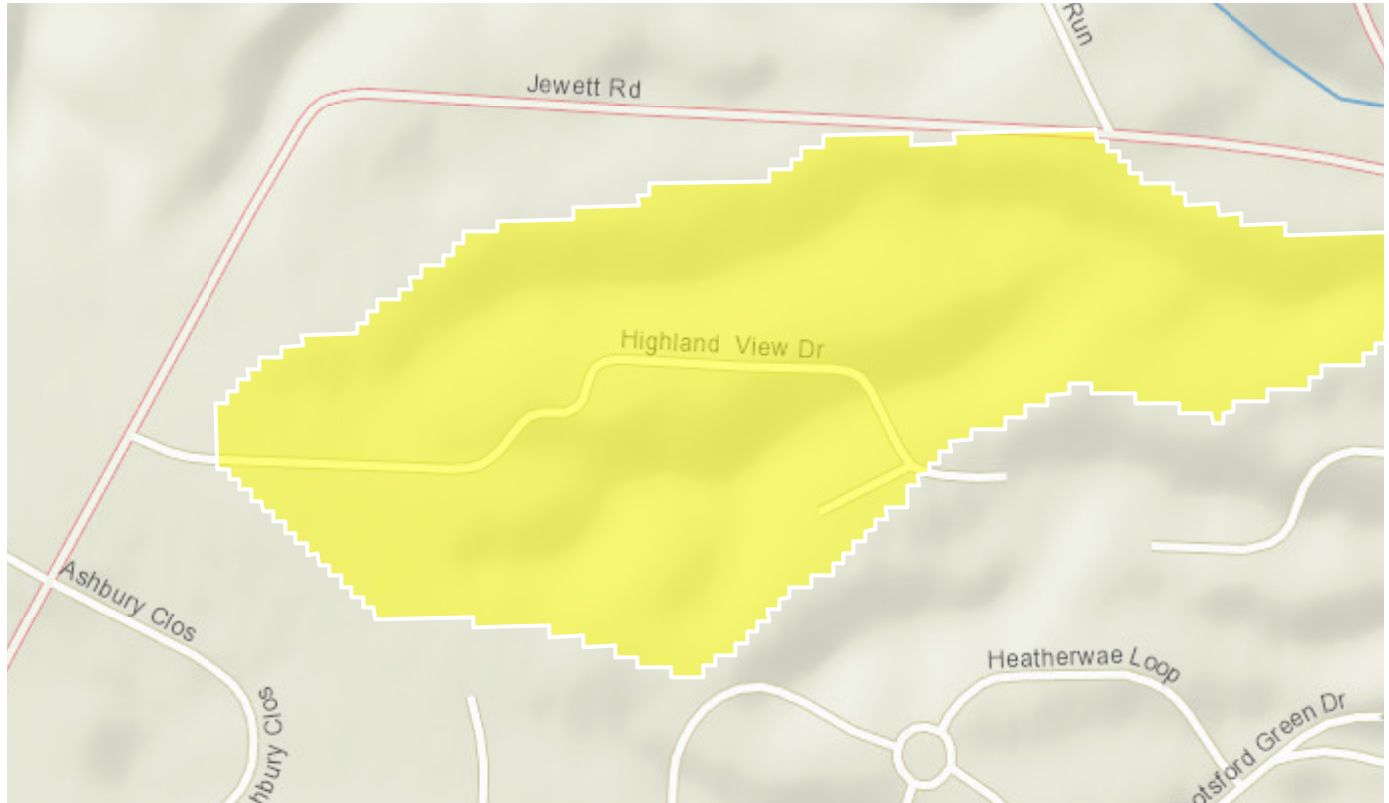
StreamStats Report

Region ID: OH

Workspace ID: OH20230907132711564000

Clicked Point (Latitude, Longitude): 40.14831, -83.04347

Time: 2023-09-07 09:27:36 -0400

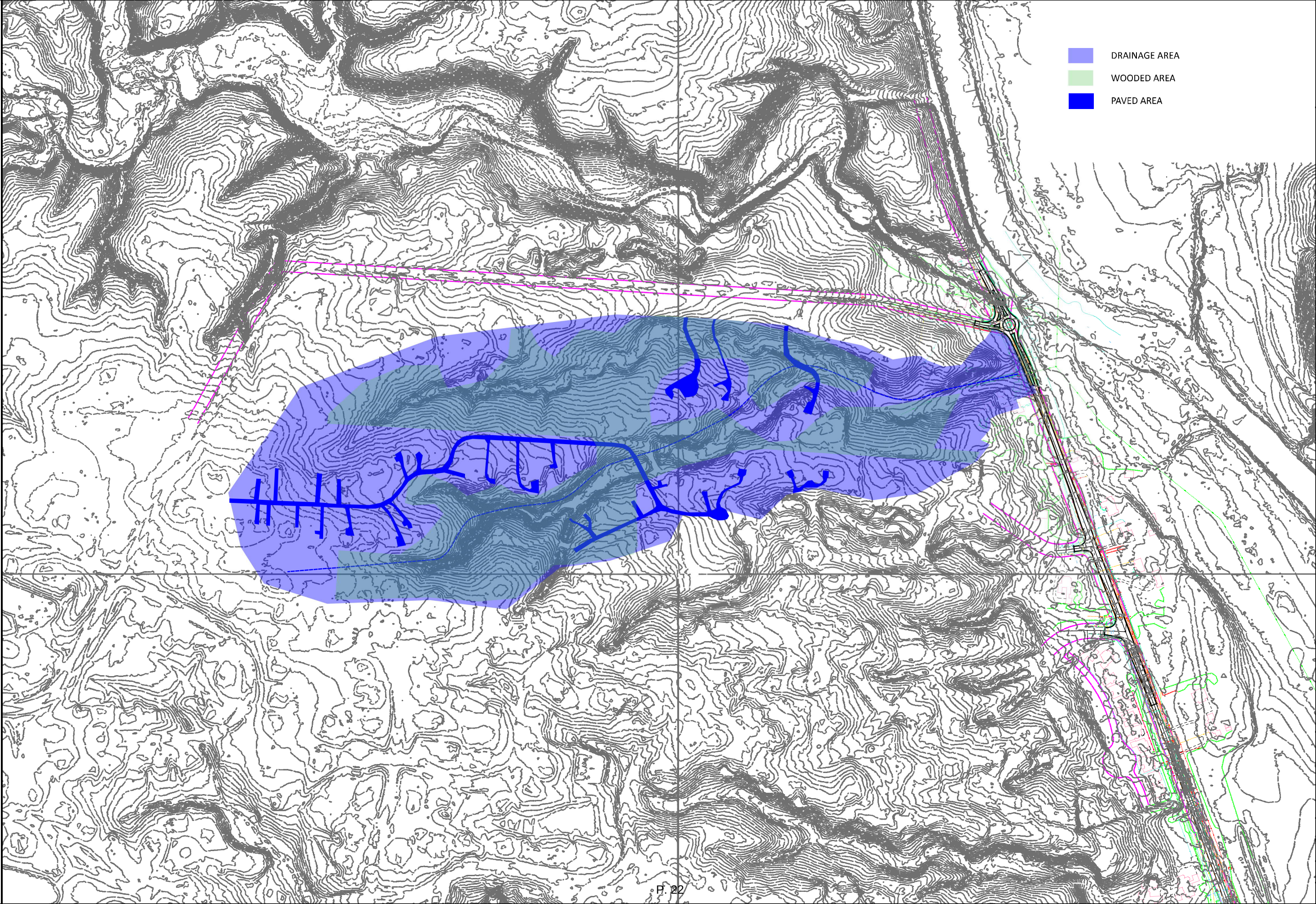


[+ Collapse All](#)

➤ Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CSL1085LFP	Change in elevation divided by length between points 10 and 85 percent of distance along the longest flow path to the basin divide, LFP from 2D grid	182	feet per mi
DRNAREA	Area that drains to a point on a stream	0.12	square miles
LAT_CENT	Latitude of Basin Centroid	40.1473	decimal degrees

Parameter Code	Parameter Description	Value	Unit
LC92STOR	Percentage of water bodies and wetlands determined from the NLCD	0.3	percent
OHREGA	Ohio Region A Indicator	1	dimensionless
OHREGC	Ohio Region C Indicator	0	dimensionless
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.8	dimensionless



County	DELAWARE	Route	SR315	Section	0.86	PID	110446	Shape	Circular
Station	42+50	Station	42+50		Invert Submerged From Tailwater?	No		Span x Rise	36
					AOP Design?	No			

User Input	
pH _w	Abrasion Level
8.2	4.0

Constants and Calculated Values			
pHs	Sediment/Rise	End of Service Life GA	Service Life Required
7.6	0	4	75

Zinc or Aluminum Coated Corrugated Steel Pipe Conduit Durability Results										
<i>Material</i>		707.01 , or 707.02 Metallic Coated (galvanized)	707.01 or 707.02 Metallic Coated (galvanized) with Concrete Field Paving	707.01 or 707.02 Metallic coated (Aluminized)	***707.01 or 707.02 Metallic coated (aluminized) with Concrete Field Paving	707.04 Polymeric Precoated Galvanized Steel	***707.04 Polymeric Precoated with Concrete Field Paving	**707.11 Polymer Precoated Spiral Rib Steel	**707.12 or 707.17 Aluminum Coated Spiral Rib Steel	**707.18 Polymer Precoated, Galvanized Steel Conduits with Polymer Precoated Galvanized Smooth Steel Interior Liner
<i>Conduit Use and Shape</i>		Culvert or Liner Pipe - Round or Pipe Arch	Culvert-Round, Pipe Arch, and Arch	Culvert or Liner Pipe - Round or Pipe Arch	Culvert -Round or Pipe Arch	Culvert or Liner Pipe -Round or Pipe Arch	Culvert-Round or Pipe Arch	Storm Sewer or Liner Pipe- Round	Liner Pipe- Round or Pipe Arch	Culvert, Storm Sewer, or Liner Pipe -Round
min gauge or thickness	Corr. Depth (inches)									
	1/4 or 1/2	16	N/A	16	N/A	16	N/A	N/A	N/A	16
	1	16	N/A	16	N/A	16	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	16	16	N/A
max gauge or thickness	1/4 or 1/2	10	N/A	10	N/A	10	N/A	N/A	N/A	12
	1	10	N/A	10	N/A	10	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	12	12	N/A
<i>Gauge</i>	<i>Thickness (inches)</i>									
16	0.064									
14	0.079									
12	0.109									
10	0.138									
8	0.168									

Corrugated Aluminum Pipe Durability Results				
<i>Material</i>		707.21 or 707.22 Aluminum	707.21 or 707.22 Aluminum Alloy with Concrete Invert Paving	707.24 Aluminum Spiral Rib
<i>Conduit Use and Shape</i>		Culvert or Liner Pipe- Round or Pipe Arch	Culvert - Round or Pipe Arch	Storm Sewer or Liner Pipe -Round
min gauge or thickness	Corr. Depth (inches)			
	1/4 or 1/2	N/A	N/A	N/A
	1	N/A	N/A	N/A
	3/4	N/A	N/A	14
max gauge or thickness	1/4 or 1/2	N/A	N/A	N/A
	1	N/A	N/A	N/A
	3/4	N/A	N/A	12
<i>Gauge</i>	<i>Thickness (inches)</i>			
16	0.06			
14	0.075			
12	0.105			
10	0.135			
8	0.164			

Steel Casing Pipe
**748.06 Steel Casing Pipe non-galvanized
Culvert or Liner Pipe-Round, Pipe Arch, or Box
0.5
0.5

Corrugated Aluminum Structural Plate Conduit Durability Results			
<i>Material</i>	707.23 Aluminum Structural Plate	707.23 Aluminum Alloy Structural Plate with Concrete Invert Paving	707.25 Aluminum Box
<i>Conduit Use and Shape</i>	Culvert or Liner Pipe - Round or Pipe Arch	Culvert - Round or Pipe Arch	Culvert or Liner Pipe - Box Shape

Corrugated Steel Structural Plate Conduit Durability Results			
<i>Material</i>	707.03 Metallic coated (galvanized)	707.03 Metallic coated (galvanized) with Concrete Field Paving	707.15 Galvanized steel box
<i>Conduit Use and Shape</i>	Culvert or Liner Pipe -Round or Pipe Arch	Culvert-Round, Pipe Arch, and Arch	Culvert or Liner Pipe -Box Shape

	Corr. Depth (inches)			
min gauge or thickness	3	N/A	N/A	N/A
max gauge or thickness	3	N/A	N/A	N/A
Gauge	Thickness (inches)			
12	0.1			
10	0.125			
8	0.15			
7	0.175			
5	0.2			
3	0.225			
1	0.25			

	Corr. Depth (inches)			
min gauge or thickness	2	N/A	N/A	N/A
max gauge or thickness	2	N/A	N/A	N/A
Gauge	Thickness (inches)			
12	0.109			
10	0.138			
8	0.168			
7	0.188			
5	0.218			
3	0.249			
1	0.28			

Concrete Conduit Durability Results						
Material	**706.01 Non-reinforced Concrete Pipe	**706.02 Reinforced Concrete Circular Pipe	**706.03 Reinforced Concrete Pipe, Epoxy Coated	**706.04 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	**706.05 Precast Reinforced Concrete Box Sections	706.08 Clay Drain Tile
Conduit Use and Shape	Culvert or Storm Sewer - Round	Culvert or Storm Sewer -Round	Culvert or Storm Sewer -Round or Elliptical	Culvert or Storm Sewer - Elliptical	Culvert or Storm Sewer -Box	Culvert or Storm Sewer - Round

Plastic Conduit Durability Results													
Material	707.33 Corrugated Polyethylene Smooth Lined Pipe	707.34 Polyethylene Plastic Pipe Based on Outside Diameter (OD)	707.35 Polyethylene Profile Wall Pipe	707.42 Polyvinyl Chloride Corrugated Smooth Interior Pipe	707.43 Polyvinyl Chloride Profile Wall Pipe	707.45 Polyvinyl Chloride Solid Wall Pipe	707.46 Polyvinyl Chloride Drain Waste and Vent Pipe	707.47 ABS and Polyvinyl Chloride Composite Pipe	707.48 Polyvinyl Chloride Large-Diameter Solid Wall Pipe	707.65 Corrugated Polypropylene Smooth Lined Pipe	707.75 Glass-Fiber-Reinforced Polymer Mortar Pipe	707.85 Steel Reinforced Thermoplastic Ribbed Pipe	748.02 Polyvinyl Chloride (PVC) Pipe, Joints, and Fittings
Conduit Use and Shape	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Storm Sewer or Liner Pipe - Round	Storm Sewer or Liner Pipe - Round	Storm Sewer - Round	Storm Sewer - Round	Storm Sewer - Round	Storm Sewer - Round	Culvert or Storm Sewer - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Storm Sewer - Round



Project: 110446
Intensity Zone: C
Culvert Number:

Original Creator: ABS Creation Date: 9/7/23
Updated By: JHH Updated On: 12/29/23
Checked By: Checked On:
Corrected By: Corrected On:
Verified By: Verified On:

Classification: Highways >= 3,000 ADT

Reference Road: S.R. 315

Inlet Station: 42+50.00 LT

Drainage Area Information

	Total	Impervious	WOODS	< 4:1 Grass	>4:1 Grass
Area (acres)	76.43	3.70	36.76	33.50	2.47
C Value	0.37	0.80	0.30	0.40	0.40
C*A =	28.38	2.96	11.03	13.40	0.99

Overland Flows (1)	
Length (ft)	300.00
Runoff Coefficient	0.30
Overland Slope (%)	0.75%
Overland Flows (2)	
Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	1.00%
Overland Flows (3)	
Length (ft)	0.00
Runoff Coefficient	0.70
Overland Slope (%)	1.00%
t _c (mins) =	27.45

Ts (Shallow Concentrated)		Td (Ditch)			
Length (ft)	3720	Length	0	Cover	Slope
Surface Type:	Forest w/ heavy ground litter	Sideslope	2	Heavy Grass	0.55%
Intercept Coeff.	0.076	Bottom	2.00	n	Q
Avg. slope (%)	3.60%	depth	0.91	0.035	7.50
t _c (mins) =	131.05	t _c (mins) =	0.00		

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.013
Pipe Slope (ft/ft)	1.11%
Hydraulic Radius	0.34
Velocity (ft/s)	5.90
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	27.45	mins
Shallow Concentrated Total:	131.05	mins
Ditch Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	158.50	mins
Tc (Used):	158.50	mins

Design Storm Controls (1006.2)	
A. 1' below low EOP = 772.50'	
B(1). 2' above inlet crown = 775.12'	
Check Storm Controls (1006.2.2)	
B. 2x diameter = 776.12'	
C. Overtopping = 773.48'	

HW25: 772.5 HW100: 773.48

Notes

Shallow Upper elev = 905', Lower Elev = 771.0'

<- Typically 100-year. Verify in 1006.2.2

	"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	25	95.736	14.000	0.871	1.08
Check Year:	100	80.436	11.500	0.794	1.36



UNIVERSAL CULVERT DESIGN

PID : 110446 **Date :** 07/29/2025 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Culvert Design - Sta. 42+50

Designer : ABS

HEADWATER CONTROL CODES: INLET - Inlet Control.
 OUTLET - Outlet Control.
 OUTLET* - Outlet Control with backwater curve used to compute headwater. See Figure III - 7E in HDS 5 for type flow.
 OUTLET** - Outlet Control - See Figure III - 7D in HDS 5 for type flow.
 N/A - Flow is supercritical with low headwater and low tailwater. Control Section is at the inlet.

Inlet Invert Elevation (ft.) : 769.87 **Outlet Invert Elevation (ft.) :** 768.58 **Tailwater Elevation (ft.) :** 769.37 **Overflow Elevation (ft.) :** 773.69
Allowable Headwater Elevation (ft.) : 772.50 or Diameter + 2 ft. (whichever is less)
Pipe Length (ft.) : 83.40 **Culvert Slope (ft./ft.) :** 0.0155 **Design Manning 'n' :** 0.0120
Design Discharge (cfs) : 30.60 @ 25 yrs. **Flood Discharge (cfs) :** 38.68 @ 100 yrs.

	FLOW (cfs.)	PIPE #	CULVERT SIZE	HWI (ft.)	HWO (ft.)	FLOW TYPE	VELOCITY (fps.)	DN (ft.)	DC (ft.)	MANNING N	HEADWATER CONTROL	OVER FLOW (cfs.)	DESIGN CODE	BURIAL DEPTH (ft.)
CULVERT TYPE : CIRCULAR SMOOTH				Entrance Type : Half Headwall						Entrance Loss (Ke) : 0.20				
	30.60	1	36 in.	772.48	N/A	1 - C	11.51	1.21	1.79	0.0120	INLET	0.00	D	0.00
	30.60	1	30 in.	772.83	N/A	1 - C	11.54	1.33	1.89	0.0120	INLET	0.00	D - 2	0.00
	30.60	1	42 in.	772.32	N/A	1 - C	11.38	1.13	1.71	0.0120	INLET	0.00	D + 1	0.00
	38.68	1	36 in.	772.89	N/A	1 - C	12.24	1.37	2.02	0.0120	INLET	0.00	F	0.00
	38.68	1	30 in.	773.54	772.66	2 - E	12.18	1.54	2.10	0.0120	INLET	0.00	F - 2	0.00
	38.68	1	42 in.	772.66	N/A	1 - C	12.15	1.28	1.93	0.0120	INLET	0.00	F + 1	0.00
CULVERT TYPE : CIRCULAR CORRUGATED				Entrance Type : Half Headwall						Entrance Loss (Ke) : 0.90				
Corrugated Metal Pipe (2 2/3 x 1/2 in. corrugations)														
Diameter exceeds 1.25 HWA	30.60	1	42 in.	772.39	N/A	1 - C	6.92	1.64	1.71	0.0237	INLET	0.00	D	0.00
	30.60	1	36 in.	772.63	773.06	1 - A	6.95	1.82	1.79	0.0241	OUTLET*	0.00	D - 1	0.00
	30.60	1	48 in.	772.26	N/A	1 - C	6.93	1.53	1.64	0.0235	INLET	0.00	D + 1	0.00



UNIVERSAL CULVERT DESIGN

	FLOW (cfs.)	PIPE #	CULVERT SIZE	HWI (ft.)	HWO (ft.)	FLOW TYPE	VELOCITY (fps.)	DN (ft.)	DC (ft.)	MANNING N	HEADWATER CONTROL	OVER FLOW (cfs.)	DESIGN CODE	BURIAL DEPTH (ft.)
	38.68	1	42 in.	772.77	N/A	1 - C	7.34	1.88	1.93	0.0237	INLET	0.00	F	0.00
	38.68	1	36 in.	773.20	773.51	2 - F	7.62	2.15	2.02	0.0241	OUTLET*	0.00	F - 1	0.00
	38.68	1	48 in.	772.59	N/A	1 - C	7.39	1.74	1.85	0.0235	INLET	0.00	F + 1	0.00
	15.30	2	24 in.	772.28	772.40	2 - F	6.47	1.71	1.41	0.0247	OUTLET*	0.00	D	0.00
	14.30	2	21 in.	772.99	774.19	2 - F	6.91	1.75	1.40	0.0248	OUTLET**	1.00	D - 1	0.00
	10.00	2	18 in.	774.48	778.70	2 - F	6.50	1.50	1.22	0.0249	OUTLET**	5.30	D - 2	0.00
	15.30	2	27 in.	771.98	772.25	1 - A	6.07	1.45	1.36	0.0245	OUTLET*	0.00	D + 1	0.00
	19.34	2	24 in.	773.01	773.68	2 - F	7.26	2.00	1.58	0.0247	OUTLET**	0.00	F	0.00
	14.34	2	21 in.	774.19	776.65	2 - F	6.93	1.75	1.41	0.0248	OUTLET**	5.00	F - 1	0.00
	10.04	2	18 in.	776.42	783.91	2 - F	6.52	1.50	1.22	0.0249	OUTLET**	9.30	F - 2	0.00
	19.34	2	27 in.	772.43	772.61	2 - F	6.68	1.74	1.54	0.0245	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (3 x 1 in. corrugations)														
Diameter exceeds 1.25 HWA	30.60	1	54 in.	772.14	N/A	1 - C	6.17	1.57	1.58	0.0273	INLET	0.00	D	0.00
	30.60	1	48 in.	772.26	772.66	1 - A	6.30	1.67	1.64	0.0275	OUTLET*	0.00	D - 1	0.00
	30.60	1	42 in.	772.39	772.78	1 - A	6.55	1.80	1.71	0.0278	OUTLET*	0.00	D - 2	0.00
	30.60	1	60 in.	772.03	N/A	1 - C	6.15	1.50	1.54	0.0271	INLET	0.00	D + 1	0.00
	38.68	1	54 in.	772.46	N/A	1 - C	6.58	1.79	1.79	0.0273	INLET	0.00	F	0.00
	38.68	1	48 in.	772.59	773.04	1 - A	6.78	1.90	1.85	0.0275	OUTLET*	0.00	F - 1	0.00
	38.68	1	42 in.	772.77	773.18	1 - A	7.10	2.08	1.93	0.0278	OUTLET*	0.00	F - 2	0.00
	38.68	1	60 in.	772.35	N/A	1 - C	6.57	1.70	1.73	0.0271	INLET	0.00	F + 1	0.00
	15.30	2	36 in.	771.69	771.96	1 - A	5.50	1.32	1.25	0.0281	OUTLET*	0.00	D	0.00
	15.30	2	42 in.	771.57	771.86	1 - A	5.29	1.22	1.19	0.0278	OUTLET*	0.00	D + 1	0.00
	19.34	2	36 in.	771.94	772.24	1 - A	5.92	1.51	1.41	0.0281	OUTLET*	0.00	F	0.00



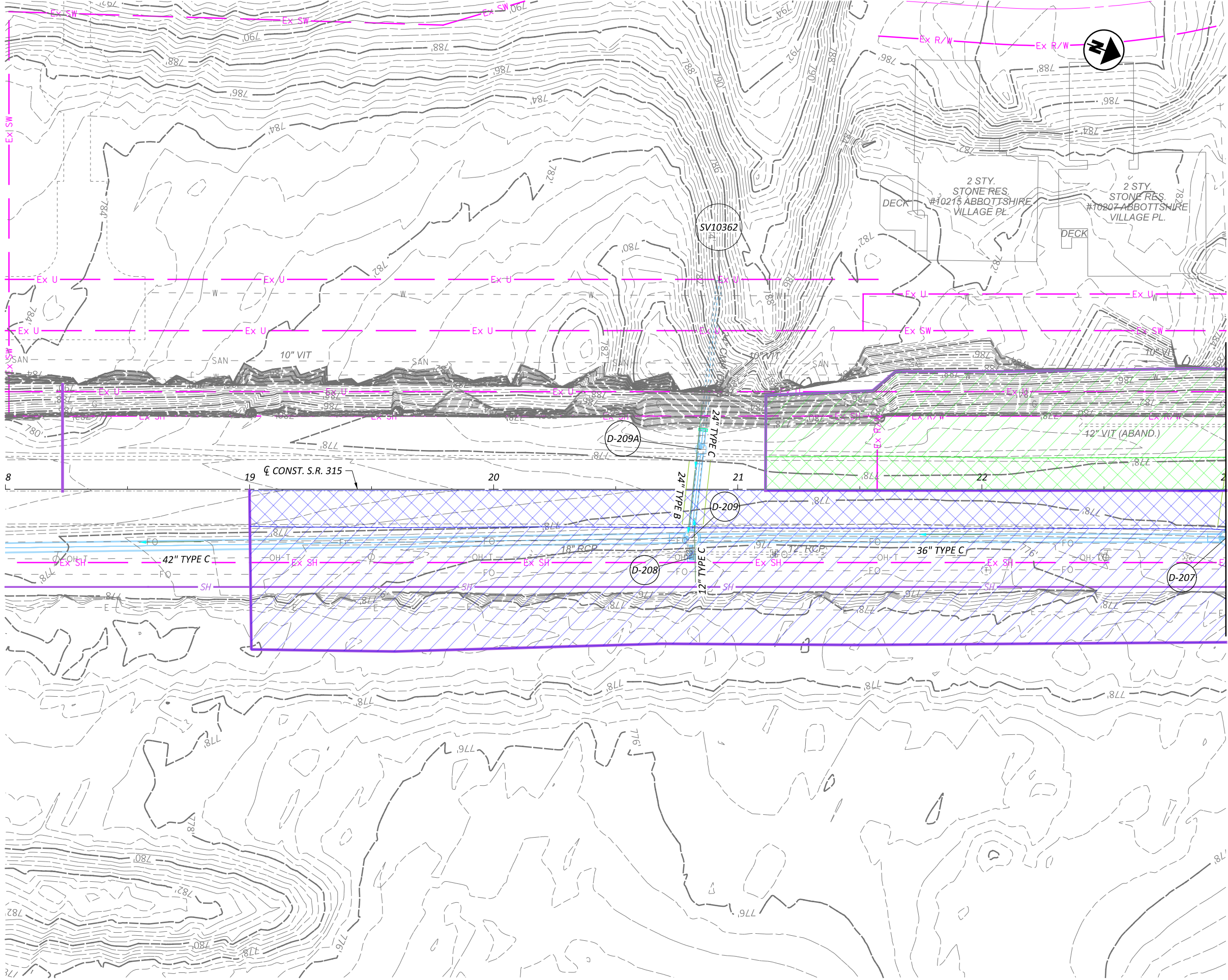
UNIVERSAL CULVERT DESIGN

	FLOW (cfs.)	PIPE #	CULVERT SIZE	HWI (ft.)	HWO (ft.)	FLOW TYPE	VELOCITY (fps.)	DN (ft.)	DC (ft.)	MANNING N	HEADWATER CONTROL	OVER FLOW (cfs.)	DESIGN CODE	BURIAL DEPTH (ft.)
	19.34	2	42 in.	771.81	772.13	1 - A	5.67	1.39	1.35	0.0278	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations)														
Diameter exceeds 1.25 HWA	30.60	1	60 in.	772.03	772.37	1 - A	5.98	1.67	1.54	0.0332	OUTLET*	0.00	D	0.00
	30.60	1	66 in.	771.94	772.30	1 - A	5.86	1.61	1.49	0.0330	OUTLET*	0.00	D + 1	0.00
	38.68	1	60 in.	772.35	772.71	1 - A	6.40	1.89	1.73	0.0332	OUTLET*	0.00	F	0.00
	38.68	1	66 in.	772.24	772.62	1 - A	6.26	1.81	1.69	0.0330	OUTLET*	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	15.30	2	60 in.	771.32	771.59	1 - A	4.93	1.17	1.08	0.0332	OUTLET*	0.00	D	0.00
	15.30	2	66 in.	771.27	771.55	1 - A	4.85	1.13	1.05	0.0330	OUTLET*	0.00	D + 1	0.00
	19.34	2	60 in.	771.52	771.83	1 - A	5.26	1.32	1.21	0.0332	OUTLET*	0.00	F	0.00
	19.34	2	66 in.	771.46	771.77	1 - A	5.17	1.27	1.18	0.0330	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations, Field Paved Invert)														
Diameter exceeds 1.25 HWA	30.60	1	60 in.	772.03	N/A	1 - C	6.34	1.47	1.54	0.0260	INLET	0.00	D	0.00
	30.60	1	66 in.	771.94	N/A	1 - C	5.86	1.42	1.49	0.0260	INLET	0.00	D + 1	0.00
	38.68	1	60 in.	772.35	N/A	1 - C	6.77	1.66	1.73	0.0260	INLET	0.00	F	0.00
	38.68	1	66 in.	772.24	N/A	1 - C	6.26	1.60	1.69	0.0260	INLET	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	15.30	2	60 in.	771.32	N/A	1 - C	4.93	1.04	1.08	0.0260	INLET	0.00	D	0.00
	15.30	2	66 in.	771.27	N/A	1 - C	4.85	1.01	1.05	0.0260	INLET	0.00	D + 1	0.00
	19.34	2	60 in.	771.52	N/A	1 - C	5.26	1.17	1.21	0.0260	INLET	0.00	F	0.00
	19.34	2	66 in.	771.46	N/A	1 - C	5.17	1.13	1.18	0.0260	INLET	0.00	F + 1	0.00

DRAINAGE AREAS

PERVIOUS AREA

IMPERVIOUS AREA



HORIZONTAL SCALE IN FEET

0

10

20

40

DESIGN AGENCY



WSP USA, Inc.
2 Miranova Pl.
Suite 450
Columbus, OH 43215

DESIGNER

JHH

REVIEWER

ABS 12-27-23

PROJECT ID

110446

SHEET

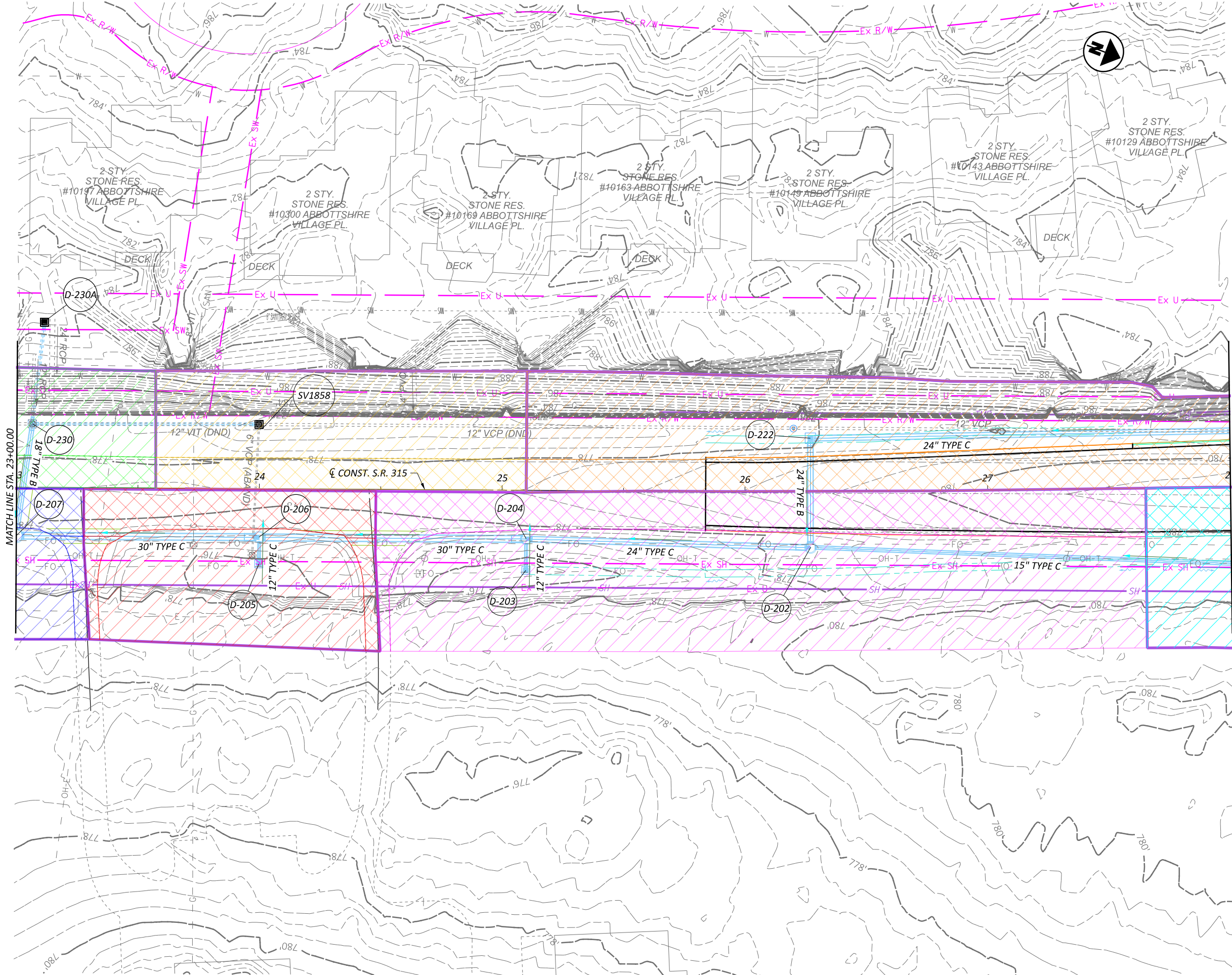
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TOTAL

9

PERVIOUS AREA

IMPERVIOUS AREA



HORIZONTAL
SCALE IN FEET

0

10

20

40

DESIGN AGENCY



WSP USA, Inc.
2 Miranova Pl.,
Suite 450
Columbus, OH 43215

DESIGNER

JHH

REVIEWER

ABS

PROJECT ID

110446

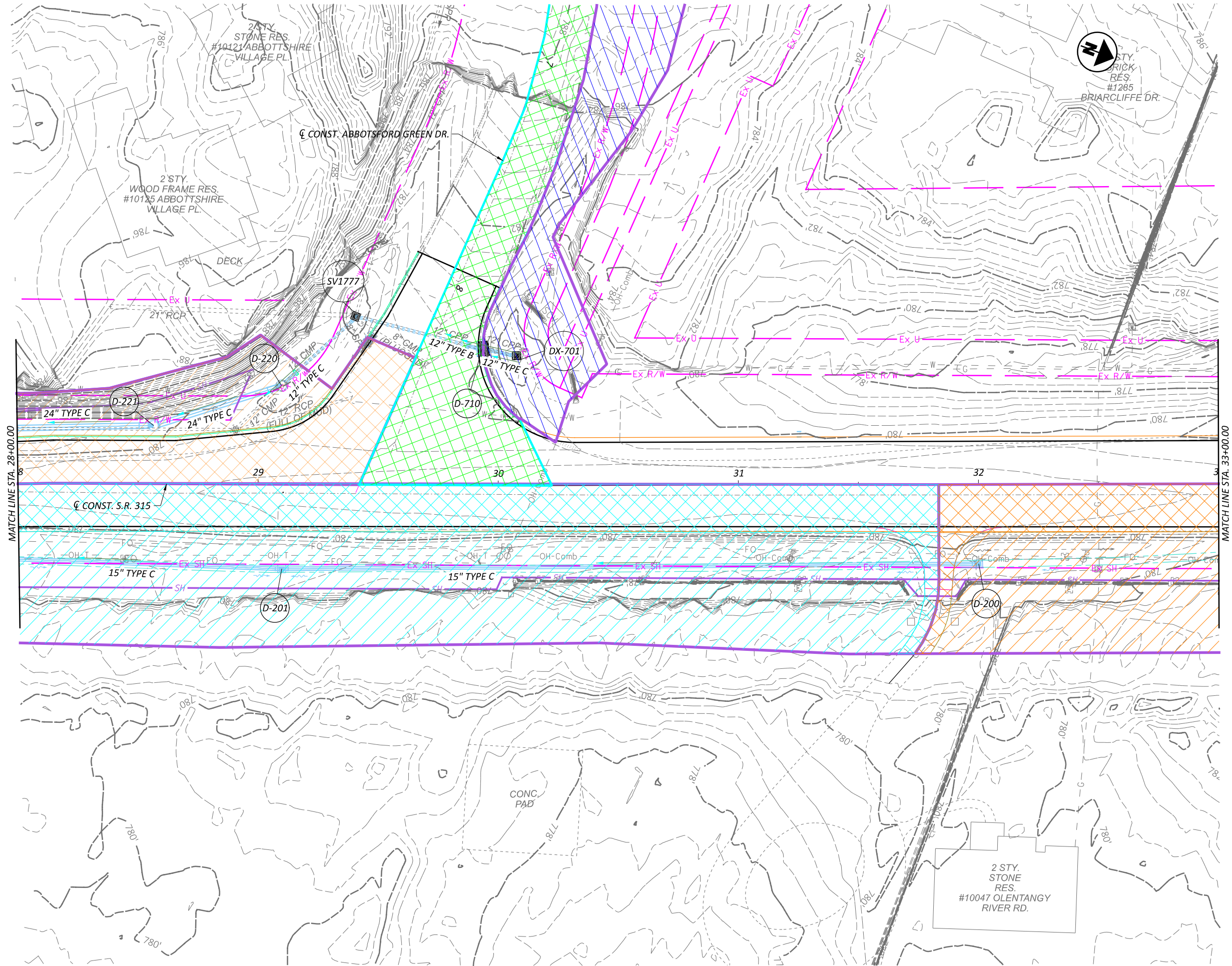
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A horizontal scale bar with markings at 0, 10, 20, and 40 feet. The scale is divided into alternating black and white segments.

DRAINAGE AREAS SCHEMATIC

DESIGN AGENCY



WSP USA, Inc.
2 Miranova Pl,
Suite 450
Columbus, OH 43215

DESIGNER

JHH

REVIEWER

ABS 12-27-23

PROJECT ID

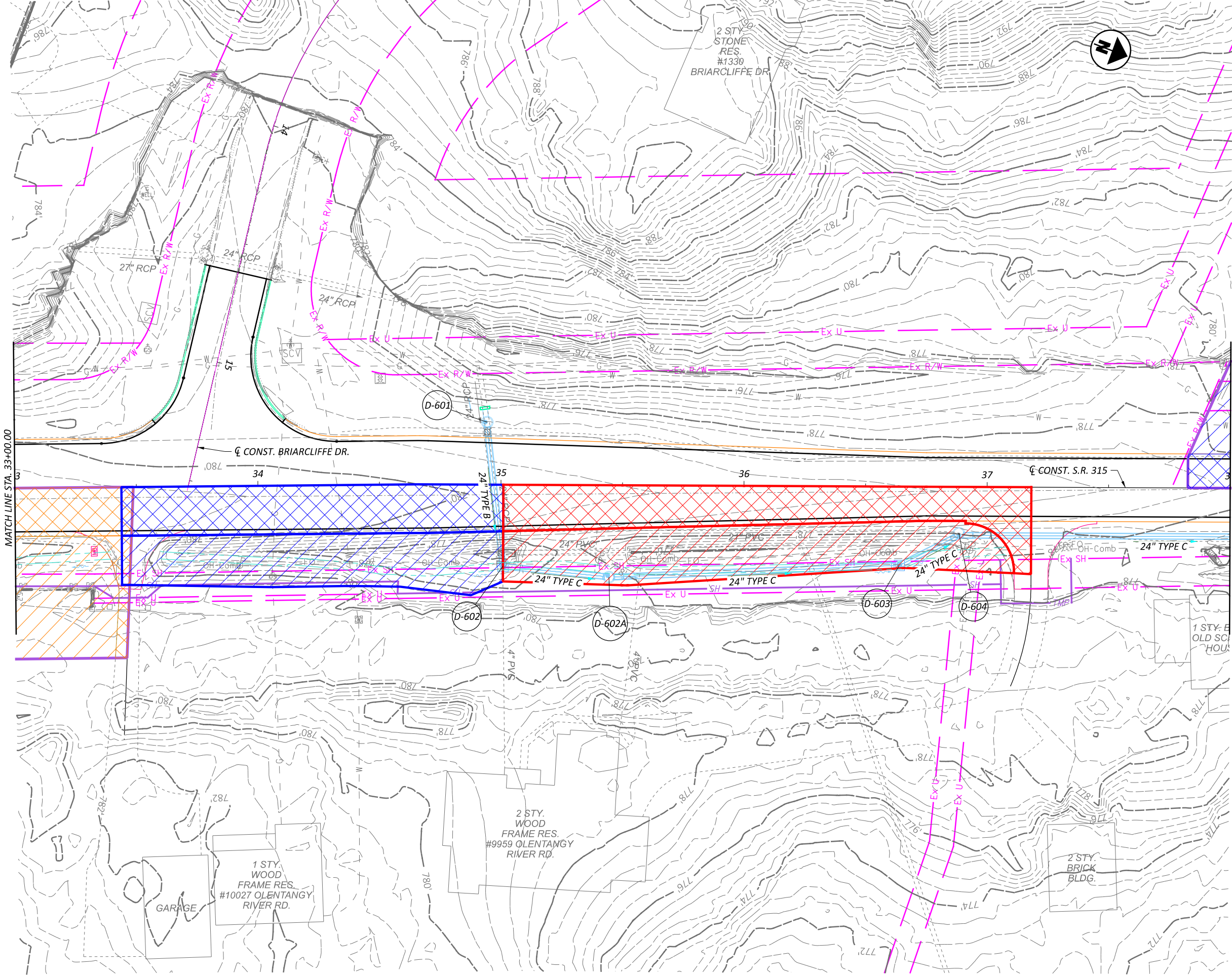
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p.3 | 9

PERVIOUS AREA

IMPERVIOUS AREA



HORIZONTAL
SCALE IN FEET

0

10

20

40

DRAINAGE AREAS
SCHEMATIC

DESIGN AGENCY

wsp

WSP USA, Inc.

2 Miranova Pl.

Suite 450

Columbus, OH 43215

DESIGNER

JHH

REVIEWER

ABS

PROJECT ID

110446

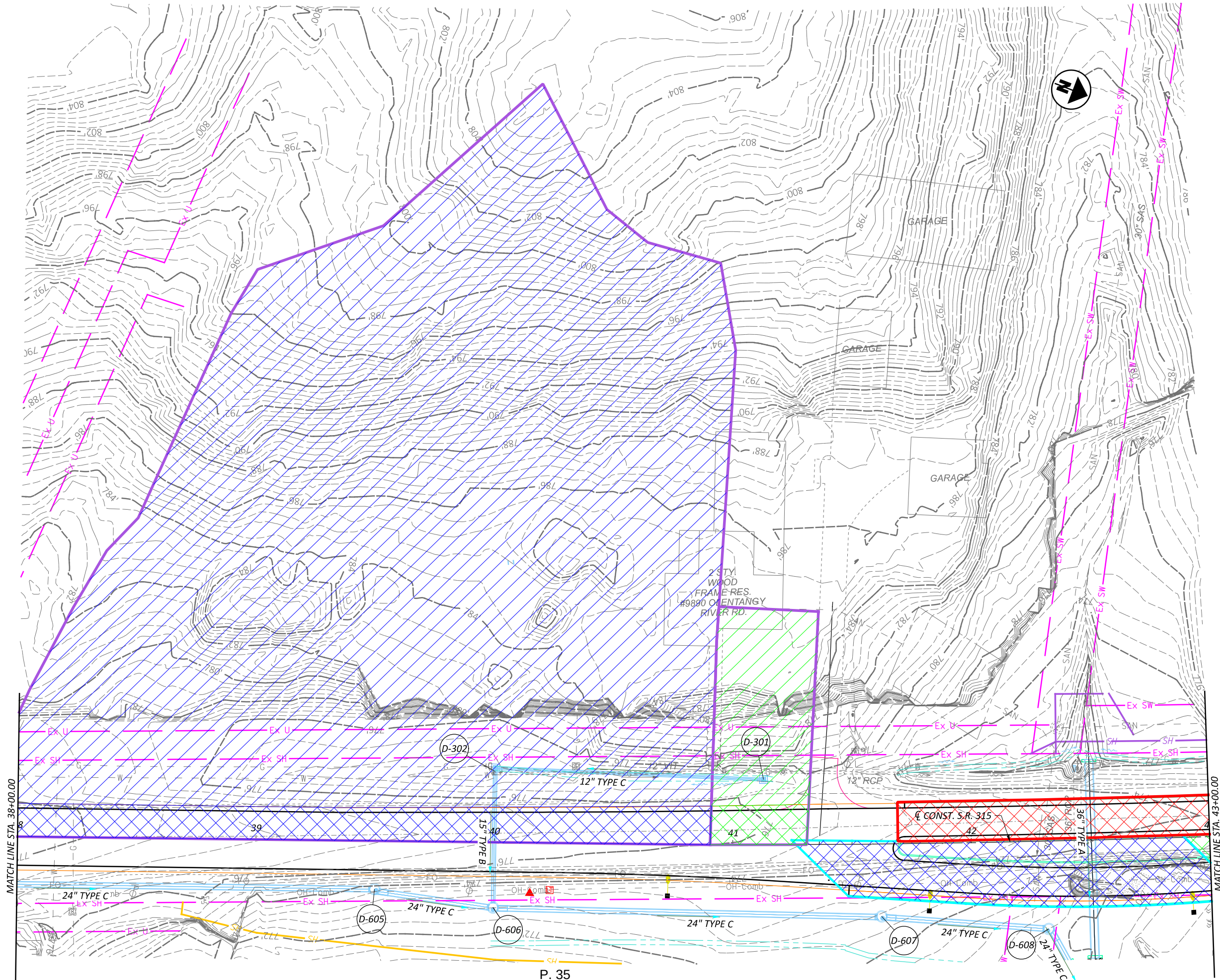
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P.4

TOTAL

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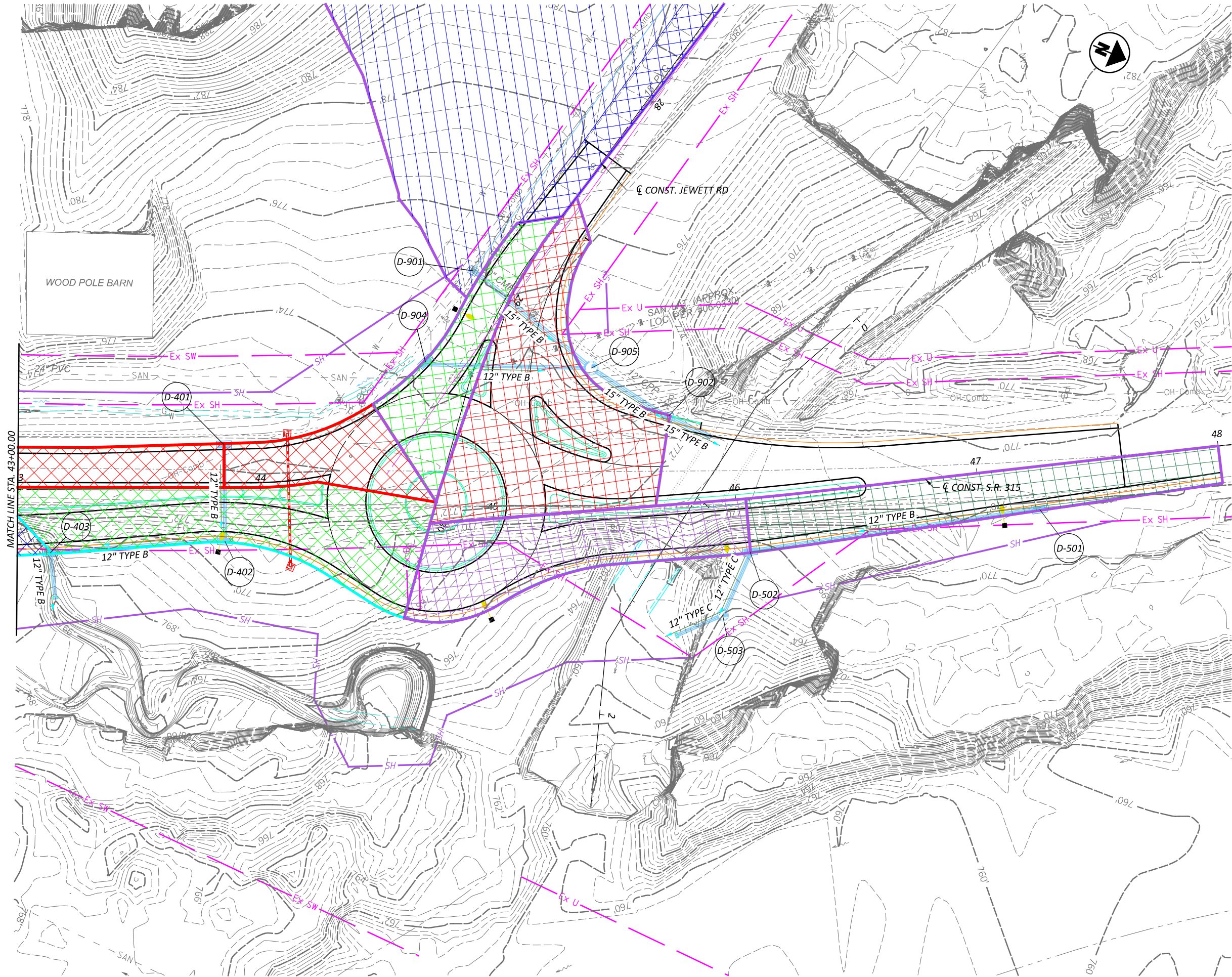


MATCH LINE STA. 43+00.00

DRAINAGE AREAS SCHEMATIC

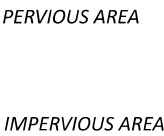
DESIGN AGENCY	
 WSP USA, Inc. 2 Miranova Pl, Suite 450 Columbus, OH 43215	
DESIGNER	
JHH	
REVIEWER	
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PROJECT ID	
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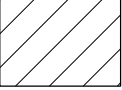
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DRAINAGE AREAS SCHEMATIC

DESIGNER	
JHH	
REVIEWER	
ABS	12-27-23
PROJECT ID	
110446	
SHEET	TOTAL
P:6	9

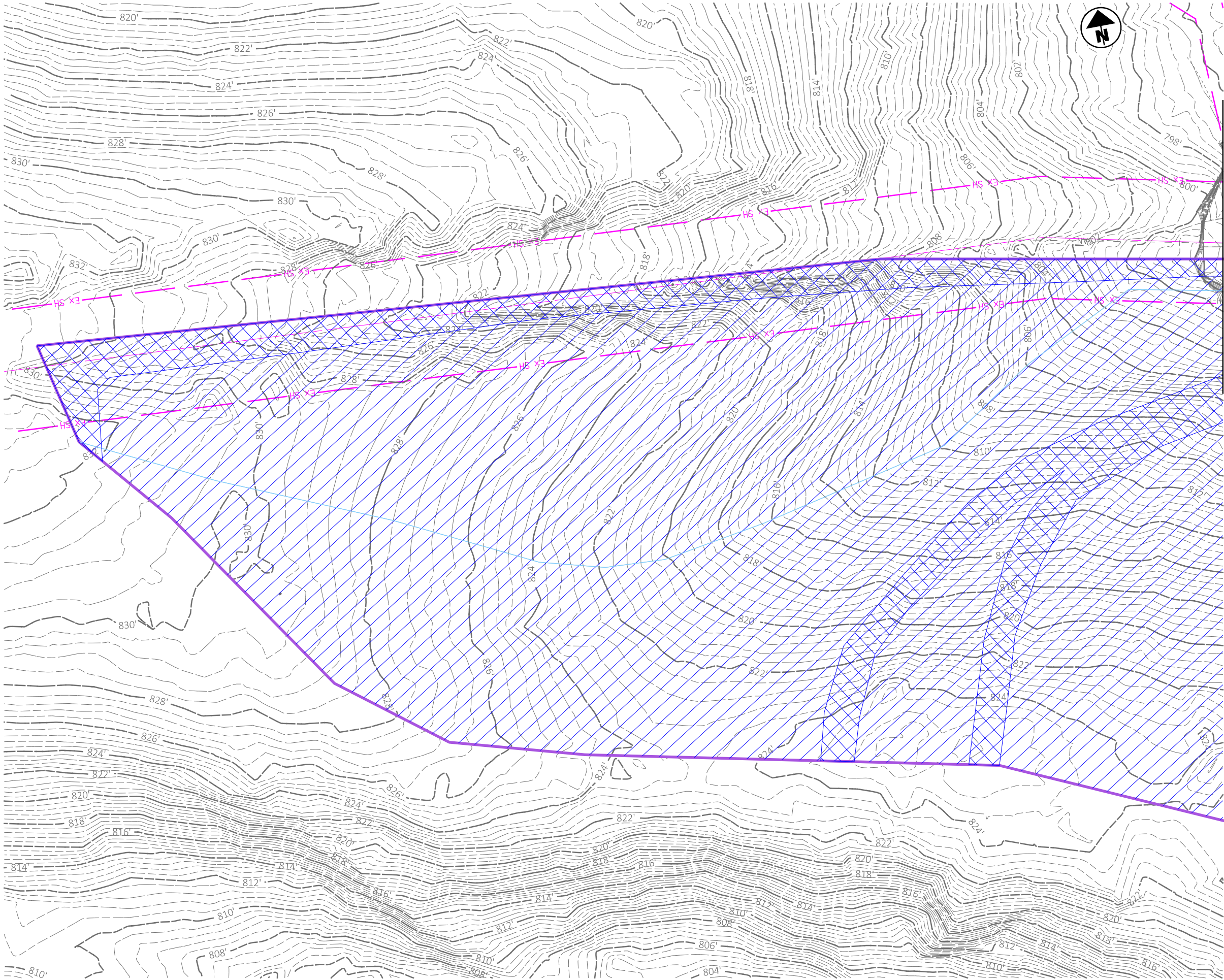




PERVIOUS AREA



IMPERVIOUS AREA



HORIZONTAL
SCALE IN FEET

0

10

20

40

DESIGN AGENCY



WSP USA, Inc.
2 Miranova Pl.,
Suite 450
Columbus, OH 43215

DESIGNER

JHH

REVIEWER

ABS

PROJECT ID

110446

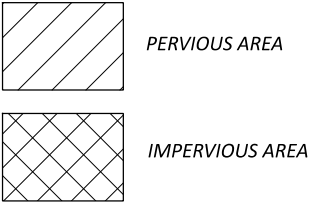
SHEET

P:8

TOTAL

9

MODEL: CLD_EWETT - Jewett Drainage Area Plan-1 [Sheet] PAPER SIZE: 34x22 (in.) DATE: 7/19/2026 TIME: 9:21:54 PM USER: USAM688684
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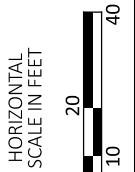


DESIGN AGENCY

WSP

WSP USA, Inc.
2 Milanova Pl,
Suite 450
Columbus, OH 43215

DESIGNER	
JHH	
REVIEWER	
ABS	12-27-23
PROJECT ID	
110446	
SHEET	TOTAL
P.9	9





Project: 110446
Intensity Zone: C
Inlet Number: D-201

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 28+73.00 RT

Drainage Area Information

Area (acres)	Total	Impervious	Wooded	Grassy
	0.91	0.27	0.00	0.64
C Value	0.63	0.90	0.30	0.52
C*A =	0.58	0.24	0.00	0.33

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	2.58
HGL Year:	25	95.736	14.000	0.871	5.10	2.93



Project: 110446
Intensity Zone: C
Inlet Number: D-203

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 25+10.00 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.48	0.13	0.00	0.35
C Value	0.63	0.90	0.30	0.53
C*A =	0.30	0.12	0.00	0.19

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

	"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	1.35
HGL Year:	25	95.736	14.000	0.871	1.54



Project: 110446
Intensity Zone: C
Inlet Number: D-205

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 24+00.00 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.18	0.05	0.00	0.13
C Value	0.64	0.90	0.30	0.54
C*A =	0.12	0.05	0.00	0.07

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.52
HGL Year:	25	95.736	14.000	0.871	5.10	0.59



Project: 110446
Intensity Zone: C
Inlet Number: D-208

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 20+81.00 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.63	0.15	0.00	0.48
C Value	0.60	0.90	0.30	0.50
C*A =	0.38	0.14	0.00	0.24

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	1.68
HGL Year:	25	95.736	14.000	0.871	5.10	1.92



Project: 110446
Intensity Zone: C
Inlet Number: D-222

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 26+27.00 LT

Drainage Area Information

Area (acres)	Total	Impervious	Wooded	Grassy
	0.47	0.20	0.00	0.27
C Value	0.67	0.90	0.30	0.50
C*A =	0.32	0.18	0.00	0.14

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	1.41
HGL Year:	25	95.736	14.000	0.871	5.10	1.61



Project: 110446
Intensity Zone: C
Inlet Number: D-301

Original Creator: JHH Creation Date: 12/28/23

Updated By: Updated On:
Checked By: ABS Checked On: 8/7/25
Corrected By: Corrected On:
Verified By: Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 41+12.94 LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.09	0.02	0.00	0.07
C Value	0.51	0.90	0.30	0.40
C*A =	0.05	0.02	0.00	0.03

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t _c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t _c (mins) =	1.91

Prior System Outlet: 0.00 mins

Overland Total: 15.00 mins

Shallow Concentrated Total: 1.91 mins

Ditch Total: 0.75 mins

Tc (Calculated): 17.67 mins

Tc (Used): 15.00 mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.21
HGL Year:	25	95.736	14.000	0.871	5.10	0.23



Project: 110446
Intensity Zone: C
Inlet Number: D-302

Original Creator: JHH
Updated By:
Checked By: ABS
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On: 8/7/25
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 40+00.00 LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	1.55	0.10	0.00	1.45
C Value	0.40	0.90	0.30	0.37
C*A =	0.63	0.09	0.00	0.54

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t _c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t _c (mins) =	1.91

Prior System Outlet: 0.00 mins

Overland Total: 15.00 mins

Shallow Concentrated Total: 1.91 mins

Ditch Total: 0.75 mins

Tc (Calculated): 17.67 mins

Tc (Used): 15.00 mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	2.80
HGL Year:	25	95.736	14.000	0.871	5.10	3.19



Project: 110446
Intensity Zone: C
Inlet Number: A-D401

Original Creator: JHH Creation Date: 12/28/23
Updated By: Updated On:
Checked By: Checked On:
Corrected By: Corrected On:
Verified By: Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 43+85.00 LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.12	0.12	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.11	0.11	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.48
HGL Year:	25	95.736	14.000	0.871	5.10	0.55



Project: 110446
Intensity Zone: C
Inlet Number: DA-402

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 43+85.34

RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.12	0.12	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.11	0.11	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.48
HGL Year:	25	95.736	14.000	0.871	5.10	0.55



Project: 110446
Intensity Zone: C
Inlet Number: DA-403

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 43+13.61 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.10	0.10	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.09	0.09	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.40
HGL Year:	25	95.736	14.000	0.871	5.10	0.46



Project: 110446
Intensity Zone: C
Inlet Number: D-501

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 46+04.00 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.09	0.09	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.08	0.08	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.36
HGL Year:	25	95.736	14.000	0.871	5.10	0.41



Project: 110446
Intensity Zone: C
Inlet Number: D-502

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 46+04.00 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.09	0.09	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.08	0.08	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.36
HGL Year:	25	95.736	14.000	0.871	5.10	0.41



Project: 110446
Intensity Zone: C
Inlet Number: DA-602

Original Creator:	JHH	Creation Date:	12/28/23
Updated By:	MMA	Updated On:	7/30/25
Checked By:	ABS	Checked On:	8/6/25
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Inlet Location: Grass

Reference Road: S.R. 315

Inlet Station: 35+00.99 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.15	0.07	0.00	0.08
C Value	0.69	0.90	0.30	0.50
C*A =	0.10	0.06	0.00	0.04

Overland Flows (1)

Length (ft)	31.00
Runoff Coefficient	0.90
Overland Slope (%)	1.60

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.00
Overland Slope (%)	0.00

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.00
Overland Slope (%)	0.00
t _c (mins) =	1.71

Ts (Shallow)

Length (ft)	227
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	1.47
t _c (mins) =	4.47

Prior System Outlet:

Prior System Outlet:	0.00	mins
Overland Total:	1.71	mins
Shallow Concentrated Total:	4.47	mins
Ditch Total:	0.00	mins
Tc (Calculated):	6.18	mins
Tc (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	0.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.00

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.47
HGL Year:	25	95.736	14.000	0.871	5.10	0.53



Project: 110446
Intensity Zone: C
Inlet Number: DA-603

Original Creator:	JHH	Creation Date:	12/28/23
Updated By:	MMA	Updated On:	7/31/25
Checked By:	ABS	Checked On:	8/6/25
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 35+57.54 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.19	0.08	0.00	0.11
C Value	0.65	0.90	0.30	0.47
C*A =	0.12	0.07	0.00	0.05

Overland Flows (1)	
Length (ft)	19.00
Runoff Coefficient	0.90
Overland Slope (%)	1.60
Overland Flows (2)	
Length (ft)	14.50
Runoff Coefficient	0.50
Overland Slope (%)	15.00
Overland Flows (3)	
Length (ft)	0.00
Runoff Coefficient	0.00
Overland Slope (%)	0.00
t _c (mins) =	3.01

Ts (Shallow)	
Length (ft)	163
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	0.37
t _c (mins) =	6.39

Prior System Outlet:	0.00	mins
Overland Total:	3.01	mins
Shallow Concentrated Total:	6.39	mins
Ditch Total:	0.00	mins
Tc (Calculated):	9.40	mins
Tc (Used):	15.00	mins

Td (Ditch)	
Ditch Length (ft)	0.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.00

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.54
HGL Year:	25	95.736	14.000	0.871	5.10	0.61



Project: 110446
Intensity Zone: C
Inlet Number: dx-701-a

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: Abbottsford

Inlet Station: 8+19.33

LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.22	0.00	0.00	0.22
C Value	0.50	0.90	0.30	0.50
C*A =	0.11	0.00	0.00	0.11

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.49
HGL Year:	25	95.736	14.000	0.871	5.10	0.56



Project: 110446
Intensity Zone: C
Inlet Number: DA-710

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: Abbottsford

Inlet Station: 8+19.33

LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.18	0.18	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.16	0.16	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.72
HGL Year:	25	95.736	14.000	0.871	5.10	0.83



Project: 110446
Intensity Zone: C
Inlet Number: D-901A

Original Creator: ATM
Creation Date: 7/15/26
Updated By:
Checked By:
Corrected By:
Verified By:

Inlet Location: Grass

Reference Road: Jewett

Inlet Station: 28+44.79 RT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	3.31	0.46	0.00	2.85
C Value	0.41	0.90	0.30	0.33
C*A =	1.36	0.42	0.00	0.94

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t _c (mins) =	13.21

Ts (Shallow)

Length (ft)	172
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t _c (mins) =	1.45

Prior System Outlet: 0.00 mins

Overland Total: 13.21 mins

Shallow Concentrated Total: 1.45 mins

Ditch Total: 0.66 mins

Tc (Calculated): 15.32 mins

Tc (Used): 15.32 mins

Td (Ditch)

Ditch Length (ft)	402.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.66

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.43	6.01
HGL Year:	25	95.736	14.000	0.871	5.05	6.85



Project: 110446
Intensity Zone: C
Inlet Number: D-901

Original Creator: JHH
Updated By: ATM
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On: 7/15/26
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: Jewett

Inlet Station: 28+98.92 RT

Drainage Area Information

	Total	Impervious	Aggregate	Wooded	Grassy
Area (acres)	0.72	0.01	0.00	0.00	0.71
C Value	0.34	0.90	0.60	0.30	0.33
C*A =	0.24	0.01	0.00	0.00	0.23

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t _c (mins) =	13.21

Ts (Shallow)

Length (ft)	227
Surface Type:	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	11.75
t _c (mins) =	1.58

Prior System Outlet:

Prior System Outlet:	0.00	mins
Overland Total:	13.21	mins
Shallow Concentrated Total:	1.58	mins
Ditch Total:	0.75	mins
Tc (Calculated):	15.54	mins
Tc (Used):	15.54	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t _c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.40	1.08
HGL Year:	25	95.736	14.000	0.871	5.02	1.23



Project: 110446
Intensity Zone: C
Inlet Number: D-902

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass Reference Road: S.R. 315 Inlet Station: 45+75.08 LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.14	0.14	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.13	0.13	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.56
HGL Year:	25	95.736	14.000	0.871	5.10	0.64



Project: 110446
Intensity Zone: C
Inlet Number: DA-904

Original Creator: JHH
Updated By:
Checked By:
Corrected By:
Verified By:
Creation Date: 12/28/23
Updated On:
Checked On:
Corrected On:
Verified On:

Inlet Location: Grass

Reference Road: Jewett

Inlet Station: 29+37.36

LT

Drainage Area Information

	Total	Impervious	Wooded	Grassy
Area (acres)	0.06	0.06	0.00	0.00
C Value	0.90	0.90	0.30	0.50
C*A =	0.05	0.05	0.00	0.00

Overland Flows (1)

Length (ft)	300.00
Runoff Coefficient	0.33
Overland Slope (%)	6.00

Overland Flows (2)

Length (ft)	0.00
Runoff Coefficient	0.40
Overland Slope (%)	2.82

Overland Flows (3)

Length (ft)	0.00
Runoff Coefficient	0.50
Overland Slope (%)	8.33
t_c (mins) =	15.00

Ts (Shallow)

Length (ft)	227
Surface Type	Short grass pasture
Intercept Coeff.	0.213
Avg. slope (%)	8.00
t_c (mins) =	1.91

Prior System Outlet:	0.00	mins
Overland Total:	15.00	mins
Shallow Concentrated Total:	1.91	mins
Ditch Total:	0.75	mins
T_c (Calculated):	17.67	mins
T_c (Used):	15.00	mins

Td (Ditch)

Ditch Length (ft)	457.00
Manning's "n"	0.030
Ditch Slope (ft/ft)	0.0385
Ditch Width (ft)	1.50
Ditch Depth (ft)	2.00
Foreslope (H:V)	3
Backslope (H:V)	2
X-Sectional Area (ft ²)	13.00
Wetted Perimeter (ft)	12.30
Hydraulic Radius (ft)	1.06
Velocity (ft/s)	10.11
t_c (mins) =	0.75

		"a"	"b"	"c"	i (in/hr)	Q (CFS)
Design Year:	10	84.550	13.000	0.882	4.47	0.24
HGL Year:	25	95.736	14.000	0.871	5.10	0.28

INLET SPACING



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : Abbotsford Green Dr Ex CB Adj to Grade Check Sta 8+35 RT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
5+89	Begin																		
8+35	CB-3A	246.00	0.90	0.09	1.00	15.82	16.82	0.0002	0.0830	0.0160	1.50	0.0000	3.78	*****	*****	0.29	0.256	9.73	Sag
8+76	Begin																		
8+35	CB-3A	41.00	0.90	0.03	1.00	3.00	10.00	0.0002	0.0830	0.0160	1.50	0.0000	4.82	*****	*****	0.13	0.209	6.78	End

SUMP DATA

Total Flow (cfs) : 0.42

Ponded Depth (ft.) : 0.037

Spread on Pavement (ft.) : 3.27



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : Abbotsford Green Dr Proposed Sta 8+20 LT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
5+87	Begin																		
8+20	CB-3A	233.00	0.90	0.11	1.00	13.98	14.98	0.0002	0.0830	0.0160	1.50	0.0000	4.01	*****	*****	0.41	0.281	11.30	Sag
8+40	Begin																		
8+20	CB-3A	20.00	0.90	0.07	1.00	1.28	10.00	0.0002	0.0830	0.0160	1.50	0.0000	4.82	*****	*****	0.30	0.258	9.84	End

SUMP DATA

Total Flow (cfs) : 0.70

Ponded Depth (ft.) : 0.075

Spread on Pavement (ft.) : 5.67



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : Briarcliffe Ex CB Sta 14+60 LT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
13+09	Begin																		
14+60	I-2-6	151.00	0.90	0.05	1.00	10.32	11.32	0.0002	0.0830	0.0160	1.50	0.0000	4.57	*****	*****	0.21	0.234	8.37	Sag
15+18	Begin																		
14+60	I-2-6	58.00	0.90	0.06	1.00	3.84	10.00	0.0002	0.0830	0.0160	1.50	0.0000	4.82	*****	*****	0.25	0.246	9.09	End

SUMP DATA

Total Flow (cfs) : 0.46

Ponded Depth (ft.) : 0.085

Spread on Pavement (ft.) : 1.02



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : Briarcliffe Ex CB Sta 14+60 RT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
13+06	Begin																		
14+60	I-2-6	154.00	0.90	0.05	1.00	10.75	11.75	0.0002	0.0830	0.0160	1.50	0.0000	4.50	*****	*****	0.19	0.227	7.92	Sag
15+40	Begin																		
14+60	I-2-6	80.00	0.90	0.06	1.00	5.33	10.10	0.0002	0.0830	0.0160	1.50	0.0000	4.80	*****	*****	0.24	0.243	8.93	End

SUMP DATA

Total Flow (cfs) : 0.42

Ponded Depth (ft.) : 0.081

Spread on Pavement (ft.) : 0.97



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : Jewett Proposed Sta 29+44 RT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
28+74	Begin																		
29+44	CB-3A	70.00	0.90	0.03	1.00	6.49	10.00	0.0002	0.0830	0.0028	2.00	0.0000	4.82	*****	*****	0.13	0.208	16.92	Sag
29+66	Begin																		
29+44	CB-3A	31.00	0.90	0.04	1.00	2.91	10.00	0.0002	0.0830	0.0028	2.00	0.0000	4.82	*****	*****	0.19	0.220	21.18	End

SUMP DATA

Total Flow (cfs) : 0.32

Ponded Depth (ft.) : 0.020

Spread on Pavement (ft.) : 1.64



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : SR 315 No Structure Check Sta 27+60 LT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
29+18	Begin																	
27+60	CB-3	158.00	0.90	0.08	1.00	1.98	10.00	0.0058	0.0830	0.0160	2.00	0.0000	4.82	0.35	0.00	0.35	0.179	2.83



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : SR 315 Proposed Sta 43+85 RT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
41+48	Begin																	
43+14	CB-3	166.00	0.90	0.10	1.00	1.51	10.00	0.0112	0.0830	0.0200	2.00	0.0000	4.82	0.45	0.00	0.45	0.174	2.38
43+85	CB-3	71.00	0.90	0.05	1.00	3.90	10.00	0.0002	0.0830	0.0340	2.00	0.0000	4.82	*****	*****	0.22	0.271	5.07 Sag
44+60	Begin																	
43+85	CB-3	75.00	0.90	0.07	1.00	4.22	10.00	0.0002	0.0830	0.0340	0.00	0.0000	4.82	*****	*****	0.30	0.229	6.73 End

SUMP DATA

Total Flow (cfs) : 0.52

Ponded Depth (ft.) : 0.042

Spread on Pavement (ft.) : 4.65



INLET SPACING DESIGN

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : SR 315 Proposed Sta 43+85 LT

Designer : JHH

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.42

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
41+69	Begin																		
43+85	CB-3	216.00	0.90	0.08	1.00	3.72	10.00	0.0030	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.34	0.198	3.97	Sag
44+72	Begin																		
43+85	CB-3	87.00	0.90	0.04	1.00	1.52	10.00	0.0030	0.0830	0.0160	2.00	0.0000	4.50	*****	*****	0.17	0.155	1.86	End

SUMP DATA

Total Flow (cfs) : 0.51

Ponded Depth (ft.) : 0.040

Spread on Pavement (ft.) : 1.88



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : SR 315 Proposed Sta 45+78 LT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
45+48	Begin																	
45+78	CB-3A	101.00	0.90	0.13	1.00	0.59	10.00	0.0229	0.0830	0.0188	2.00	0.0000	4.82	*****	*****	0.56	0.166	2.00 End



INLET SPACING DESIGN

PID : 110446 **Date :** 09/14/2023 **Project :** DEL-315-0.86

Location : Delaware County

Description : SR 315 Proposed Sta 47+24 RT

Designer : REM

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 6.00

Allowable Depth (ft.) 0.50

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
44+65	Begin																	
46+04	CB-3	139.00	0.90	0.09	1.00	0.94	10.00	0.0200	0.0830	0.0160	2.00	0.0000	4.82	0.39	0.00	0.39	0.148	1.78
47+24	CB-3	120.00	0.90	0.06	1.00	7.43	10.00	0.0002	0.0830	0.0160	2.00	0.0000	4.82	*****	*****	0.24	0.266	8.24 Sag
48+00	Begin																	
47+24	CB-3	76.00	0.90	0.03	1.00	4.99	10.00	0.0002	0.0830	0.0160	2.00	0.0000	4.82	*****	*****	0.13	0.224	5.60 End

SUMP DATA

Total Flow (cfs) : 0.37

Ponded Depth (ft.) : 0.024

Spread on Pavement (ft.) : 1.69

STORM SEWERS

Storm Sewer Design Report - 10 Year

Label	-Node- Upstream Downstream	Start Station	Stop Station	Upstream Inlet Area (acres)	System Drainage Area (acres)	Upstream Inlet C	System CA (acres)	Upstream Inlet Tc (min)	System Flow Time (min)	System Intensity (in/h)	Flow (cfs)	Diameter (in)	Rise (in)	Span (in)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	-Invert (Conduit)- Upstream Downstream (ft)	Manning's n	Design Velocity (ft/s)	Just Full Velocity (ft/s)	Capacity (Design) (cfs)	-Ground- Upstream Downstream (ft)	Cover (Start) (ft)	Notes
P-D200	D-200	32+00.00	29+10.00	0.27	0.27	0.60	0.16	15.00	15.00	4.47	0.72	15	0.00	0.00	290.28	0.0036	776.39 775.35	0.015	2.18	3.02	3.35	778.56 777.94	0.73	TYPE C
P-D201	D-201	29+10.00	26+27.00	0.65	0.91	0.59	0.54	15.00	17.22	4.18	2.29	15	0.00	0.00	282.93	0.0044	775.35 774.12	0.015	3.17	3.34	3.69	777.94 778.57	1.15	TYPE C
P-D202	D-202	26+27.00	25+10.00	(N/A)	1.39	(N/A)	0.86	0.00	18.71	4.01	16.31	24	0.00	0.00	117.21	0.0074	774.12 773.26	0.015	6.10		16.82	778.57 776.90	2.20	TYPE C
P-D203	D-203	25+10.00	25+10.00	0.48	0.48	0.61	0.29	15.00	15.00	4.47	1.31	12	0.00	0.00	13.00	0.0233	773.85 773.55	0.015	4.78		4.72	775.35 776.90	0.33	TYPE C
P-D204	D-204	25+10.00	24+00.00	(N/A)	1.86	(N/A)	1.15	0.00	19.03	3.97	17.45	30	0.00	0.00	110.00	0.0036	773.26 772.86	0.015	4.85		21.33	776.90 777.08	0.85	TYPE C
P-D205	D-205	24+00.00	24+00.00	0.18	0.18	0.64	0.11	15.00	15.00	4.47	0.51	12	0.00	0.00	11.00	0.0145	774.41 774.25	0.015	3.32		3.72	775.91 777.08	0.33	TYPE C
P-D206	D-206	24+00.00	23+00.00	(N/A)	2.04	(N/A)	1.26	0.00	19.41	3.93	17.85	30	0.00	0.00	100.00	0.0036	772.86 772.50	0.015	4.88		21.41	777.08 777.11	1.42	TYPE C
P-D207	D-207	23+00.00	20+81.00	(N/A)	2.48	(N/A)	1.53	0.00	19.75	3.90	32.79	36	0.00	0.00	219.00	0.0024	772.00 771.47	0.015	4.64		28.44	777.11 776.75	1.78	TYPE C
P-D208	D-208	20+81.00	20+81.00	0.63	0.63	0.60	0.38	15.00	15.00	4.47	1.70	12	0.00	0.00	8.00	0.0137	773.58 773.47	0.015	4.54		3.62	775.41 776.75	0.67	TYPE C
P-D209	D-209	20+81.00	16+59.00	(N/A)	3.11	(N/A)	1.91	0.00	20.54	3.82	42.12	42	0.00	0.00	422.04	0.0025	771.47 770.41	0.013	5.87		54.24	776.75 778.34	1.41	TYPE C
P-D209A	D-209A	20+84.97	20+81.00	(N/A)	0.00	(N/A)	0.00	0.00	15.14	4.46	8.00	24	0.00	0.00	36.64	0.0205	772.22 771.47	0.015	7.70	9.87	28.05	777.19 776.75	2.72	TYPE B
P-D209B	D-209B	20+85.80	20+84.97	(N/A)	0.00	(N/A)	0.00	0.00	15.12	4.46	8.00	24	0.00	0.00	8.00	0.0262	772.43 772.22	0.015	8.42		31.76	772.43 777.19	-2.25	TYPE C
P-D210	D-210	16+59.00	13+60.00	(N/A)	3.11	(N/A)	1.91	0.00	21.74	3.70	103.73	33	43.00	68.00	299.00	0.0026	770.41 769.62	0.013	7.26		105.09	778.34 776.29	3.85	TYPE C
P-D210A	D-210A	16+60.18	16+59.00	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	36	0.00	0.00	8.82	0.0072	773.67 773.61	0.013	(N/A)		56.58	773.67 778.34	-3.33	TYPE C
P-D211	D-211	13+60.00	13+07.40	(N/A)	3.11	(N/A)	1.91	0.00	22.42	3.64	103.61	33	43.00	68.00	53.42	0.0022	769.62 769.50	0.013	6.50		96.90	776.29 770.80	2.58	TYPE C
P-D220	D-220	29+09.58	28+56.37	(N/A)	0.00	(N/A)	0.00	0.00	15.08	4.46	12.84	24	0.00	0.00	55.84	0.0050	776.08 775.80	0.015	5.02		13.88	780.02 780.88	1.69	TYPE C
P-D220A	D-220A	29+15.45	29+09.58	(N/A)	0.00	(N/A)	0.00	0.00	15.07	4.46	6.54	12	0.00	0.00	8.00	0.0389	776.39 776.08	0.015	8.33		6.09	776.39 780.02	-1.17	TYPE C
P-D221	D-221	28+56.37	26+27.00	(N/A)	0.00	(N/A)	0.00	0.00	15.27	4.44	12.84	24	0.00	0.00	229.57	0.0057	775.80 774.49	0.015	5.31		14.81	780.88 778.03	2.83	TYPE C
P-D222	D-222	26+27.00	26+27.00	0.47	0.47	0.67	0.32	15.00	15.99	4.34	14.22	24	0.00	0.00	45.00	0.0082	774.49 774.12	0.015	6.28		17.77	778.03 778.57	1.29	TYPE B
P-D230	D-230	23+06.30	23+00.00	0.27	0.44	0.61	0.27	15.00	17.59	4.14	15.06	18	0.00	0.00	46.51	0.0168	772.78 772.00	0.015	8.52		11.79	777.79 777.11	3.30	TYPE B
P-D230A	D-230A	23+11.05	23+06.30	(N/A)	0.00	(N/A)	0.00	0.00	15.00	4.47	7.94	12	0.00	0.00	42.16	0.0237	775.41 774.41	0.015	10.11		4.76	778.50 777.79	1.92	EX. STORM
P-EX-D210A	SV2987 EX HEADWALL D-210A	16+65.59	16+60.18	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	36	0.00	0.00	40.14	0.0147	774.26 773.67	0.013	(N/A)	2.49	80.86	774.26 773.67	-3.33	EX. STORM
P-SV1777	SV1777	8+28.26	29+15.45	(N/A)	0.00	(N/A)	0.00	0.00	15.00	4.47	6.54	12	0.00	0.00	34.24	0.0388	777.72 776.39	0.015	8.58		6.08	779.26 776.39	0.37	EX. STORM
P-SV1858	SV1858	23+99.69	23+06.30	0.17	0.17	0.60	0.10	15.00	15.00	4.47	0.47	12	0.00	0.00	93.39	0.0033	773.09 772.78	0.015	0.60		1.79	776.64 777.79	2.38	EX. STORM
P-SV10362	D-230 SV10362 D-209B	20+92.50	20+85.80	(N/A)	0.00	(N/A)	0.00	0.00	15.00	4.47	8.00	24	0.00	0.00	61.50	0.0270	774.09 772.43	0.015	8.51		32.22	774.09 772.43	-2.25	EX. STORM

Storm Sewer Design Report - 10 Year

Label	-Node- Upstream Downstream	Start Station	Stop Station	Upstream Inlet Area (acres)	System Drainage Area (acres)	Upstream Inlet C	System CA (acres)	Upstream Inlet Tc (min)	System Flow Time (min)	System Intensity (in/h)	Flow (cfs)	Diameter (in)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	-Invert (Conduit)- Upstream Downstream (ft)	Manning's n	Design Velocity (ft/s)	Just Full Velocity (ft/s)	Capacity (Design) (cfs)	-Ground- Upstream Downstream (ft)	Cover (Start) (ft)	Notes
P-D401	D-401	43+85.00	43+85.34	0.12	0.12	0.90	0.11	10.00	10.00	5.32	0.60	12	39.21	0.0725	769.26	0.015	6.16		8.32	773.26	2.83	TYPE B
	D-402	43+85.00	43+85.34												766.42					773.00		
P-D402	D-402	43+85.34	43+13.61	0.12	0.24	0.90	0.22	15.00	15.00	4.47	0.98	12	72.08	0.0110	766.42	0.015	3.61		3.23	773.00	5.58	TYPE B
	D-403	43+85.34	43+13.61												765.63					773.56		
P-D403	D-403	43+13.61	43+31.64	0.1	0.34	0.9	0.31	15.00	15.59	4.39	1.37	12	19.38	0.0067	766.25	0.015	3.28		2.53	773.56	6.15	TYPE B
	D-404	43+13.61	43+31.64												766.12					766.12		
P-D501	D-501	47+24.00	46+04.00	0.09	0.09	0.90	0.08	10.00	10.00	5.32	0.41	12	121.00	0.0120	765.00	0.013	3.23		3.90	769.73	3.57	TYPE B
	D-502	47+24.00	46+04.00												763.55					770.80		
P-D502	D-502	46+04.00	45+91.00	0.09	0.17	0.90	0.16	10.00	10.62	5.20	0.82	12	29.00	0.1011	763.55	0.013	8.39		11.33	770.80	6.08	TYPE C
	D-503	46+04.00	45+91.00												760.65					763.95		
P-D503	D-503	45+91.00	45+71.00	(N/A)	0.17	(N/A)	0.16	0.00	10.68	5.19	0.82	12	21.00	0.0068	760.65	0.013	3.20		2.94	763.95	2.14	TYPE C
	D-504	45+91.00	45+71.00												760.50					760.50		
P-D601	D-601	34+94.24	35+00.94	(N/A)	0.00	(N/A)	0.00	0.00	15.00	4.47	6.06	24	59.65	0.001	772.53	0.015	2.20		6.06	779.10	4.32	TYPE B
	D-602	34+94.24	35+00.94												772.47					777.48		
P-D602	D-602	35+00.94	35+44.75	0.15	0.15	0.69	0.10	15.00	15.45	4.41	6.52	24	43.89	0.0048	772.47	0.015	4.28		13.59	777.48	2.75	TYPE C
	D-602A	35+00.94	35+44.75												772.26					778.10		
P-D602A	D-602A	35+44.75	36+64.01	(N/A)	0.15	(N/A)	0.10	0.00	15.62	4.39	6.52	24	119.51	0.006	772.26	0.015	4.66		15.25	778.10	3.58	TYPE C
	D-603	35+44.75	36+64.01												771.54					776.88		
P-D603	D-603	36+64.01	36+88.46	0.19	0.34	0.65	0.23	15.00	16.05	4.33	7.04	24	27.89	0.0467	771.54	0.015	9.99		42.36	776.88	3.09	TYPE C
	D-604	36+64.01	36+88.46												770.24					778.60		
P-D604	D-604	36+88.46	39+50.00	(N/A)	0.34	(N/A)	0.23	0.00	16.1	4.33	7.04	24	261.54	0.0025	770.24	0.015	3.38		9.73	778.60	6.11	TYPE C
	D-605	36+88.46	39+50.00												769.59					776.53		
P-D605	D-605	39+50.00	39+99.79	(N/A)	0.34	(N/A)	0.23	0.00	17.39	4.16	7.01	24	50.28	0.0023	769.59	0.015	3.29		9.42	776.53	4.68	TYPE C
	D-606	39+50.00	39+99.79												769.48					774.66		
P-D606	D-606	39+99.79	41+62.07	(N/A)	1.98	(N/A)	0.89	0.00	17.64	4.13	9.78	24	163.03	0.0025	769.48	0.015	3.58		9.87	774.66	2.93	TYPE C
	D-607	39+99.79	41+62.07												769.06					774.49		
P-D302	D-302	40+00.00	39+99.79	1.55	1.64	0.40	0.67	15.00	15.64	4.39	2.95	15	58.56	0.003	770.12	0.015	2.86		3.08	774.60	3.04	TYPE B
	D-606	40+00.00	39+99.79												769.94					774.66		
P-D301	D-301	41+12.94	40+00.00	0.09	0.09	0.51	0.05	15.00	15.00	4.47	0.22	12	112.53	0.021	772.48	0.015	2.94		4.47	774.66	1.01	TYPE C
	D-302	41+12.94	40+00.00												770.12					774.60		
P-D607	D-607	41+62.07	42+31.67	(N/A)	1.98	(N/A)	0.89	0.00	18.40	4.04	9.7	24	70.29	0.0025	769.06	0.015	3.52		9.71	774.49	3.17	TYPE C
	D-608	41+62.07	42+31.67												768.89					773.30		
P-D608	D-608	42+31.67	42+40.07	(N/A)	1.98	(N/A)	0.89	0	18.73	4.01	9.66	24	16.76	0.0027	768.89	0.015	3.68		10.15	773.3	2.16	TYPE C
	D-609	42+31.67	42+40.07												768.85					769.37		
P-D710	D-710	8+19.33	8+20.33	0.18	0.40	0.90	0.27	10.00	15.05	4.47	1.22	12	5.69	0.0123	776.69	0.015	4.00		3.43	780.55	2.86	TYPE B - CONNECTED TO MASONRY COLLAR
	D-711	8+19.33	8+20.33												776.62					777.54		
P-DX701	DX-701	8+16.12	8+19.33	0.22	0.22	0.50	0.11	15.00	15.00	4.47	0.50	12	14.93	0.0382	777.26	0.015	4.64		6.03	779.24	0.98	TYPE C - start at ex cb
	D-710	8+16.12	8+19.33												776.69					780.55		
P-DX702	D-711	8+20.33	8+28.26	(N/A)	0.40	(N/A)	0.27	0.00	15.08	4.46	1.22	12	48.40	0.0138	776.62	0.015	4.17		3.63	777.54	-0.25	X STORM
	DX-703	8+20.33	8+28.26												775.95					779.26		
D-901A	D-901A	28+45.79	28+98.01	3.39	3.39	0.9	0.95	15.32	15.32	4.43	4.24	15	55.92	0.0364	768.24	0.015	8.2		11.49	777.21	7.53	TYPE B
	D-901	28+45.79	28+98.01												766.21					774.56		
P-D901	D-901	28+98.92	29+12.19	0.72	4.12	0.9	1.6	15.54	15.54	4.4	7.09	15	63.04	0.0316	766.21	0.013	9.84		12.35	774.56	6.91	TYPE B
	D-905	28+98.92	29+12.19												764.22					773.6		
P-D902	D-902	45+75.08	45+91.72	0.14	4.31	0.90	1.83	15.00	16.09	4.33	7.96	15	19.29	0.0082	763.91	0.015	6.49		5.06	771.13	5.97	TYPE B
	D-903	45+75.08	45+91.72												763.75					763.75		
P-D904	D-904	29+37.36	29+12.19	0.06	0.06	0.90	0.05	10.00	10.00	5.32	0.27	12	68.14	0.0123	765.06	0.015	2.60	4.82	3.43	773.37	7.31	TYPE B
	D-905	29+37.36	29+12.19												764.22					773.60		
P-D905	D-905	29+12.19	45+75.08	(N/A)	4.17	(N/A)	1.70	0.00	15.99	4.34	7.42	15	37.61	0.0082	764.22	0.015	6.05		5.08	773.60	8.13	TYPE B
	D-902	29+12.19	45+75.08												763.91					771.13		

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Label	-Node- Upstream Downstream	Start Station	Stop Station	Upstream Inlet Area (acres)	System Drainage Area (acres)	Upstream Inlet C	System CA (acres)	Upstream Inlet Tc (min)	System Flow Time (min)	System Intensity (in/h)	Flow (cfs)	Diameter (in)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	-Invert (Conduit)- Upstream Downstream (ft)	Manning's n	Friction Slope (ft/ft)	-HGL- Upstream Downstream (ft)	-Ground- Upstream Downstream (ft)	Ground Minus HGL (Start) (ft)	Cover (Start) (ft)	Notes
P-D401	D-401	43+85.00	43+85.34	0.12	0.12	0.9	0.11	10	10	6.01	0.68	12	39.21	0.0725	769.26	0.015	0.068	769.61	773.26	3.65	2.83	TYPE B
	D-402	43+85.00	43+85.34												766.42			767.04	773.00			
P-D402	D-402	43+85.34	43+13.61	0.12	0.24	0.9	0.22	15	15	5.1	1.11	12	72.08	0.0024	766.42	0.015	0.0029	767.04	773.00	5.96	5.41	TYPE B
	D-403	43+85.34	43+13.61												766.25			766.82	773.56			
P-D403	D-403	43+13.61	43+31.64	0.1	0.34	0.9	0.31	15	15.57	5.01	1.56	12	19.38	0.0067	766.25	0.015	0.007	766.82	773.56	6.75	6.15	TYPE B
	D-404	43+13.61	43+31.64												766.12			766.65	766.12			
P-D501	D-501	47+24.00	46+04.00	0.09	0.09	0.90	0.08	10.00	10.00	6.01	0.46	12	121.00	0.012	765.00	0.013	0.0115	765.28	768.98	3.70	2.82	TYPE B
	D-502	47+24.00	46+04.00												763.55			763.96	770.80			
P-D502	D-502	46+04.00	45+91.00	0.09	0.17	0.90	0.16	10.00	10.60	5.88	0.93	12	29.00	0.1011	763.55	0.013	0.0728	763.96	770.80	6.84	6.08	TYPE C
	D-503	46+04.00	45+91.00												760.65			760.84	763.95			
P-D503	D-503	45+91.00	45+71.00	(N/A)	0.17	(N/A)	0.16	0.00	10.66	5.87	0.93	12	21.00	0.0068	760.65	0.013	0.0067	761.05	763.95	2.90	2.14	TYPE C
	D-504	45+91.00	45+71.00												760.50			760.89	760.50			
P-D601	D-601	34+94.24	35+00.94	(N/A)	0.00	(N/A)	0.00	0.00	15.00	5.10	6.06	24	59.65	0.001	772.53	0.015	0.003	773.71	779.10	5.39	4.32	TYPE B
	D-602	34+94.24	35+00.94												772.47			773.41	777.48			
P-D602	D-602	35+00.94	36+64.01	0.15	0.15	0.69	0.10	15.00	15.45	5.03	6.59	24	163.08	0.0057	772.47	0.015	0.0057	773.41	777.48	4.07	2.75	TYPE C
	D-603	35+00.94	36+64.01												771.54			772.48	776.88			
P-D603	D-603	36+64.01	36+88.46	0.19	0.34	0.65	0.19	15.00	16.05	4.94	7.01	24	27.89	0.0467	771.54	0.015	0.0404	772.48	776.88	4.40	3.09	TYPE C
	D-604	36+64.01	36+88.46												770.24			771.56	778.60			
P-D604	D-604	36+88.46	39+50.00	(N/A)	0.34	(N/A)	0.19	0.00	16.09	4.94	7.01	24	261.54	0.0025	770.24	0.015	0.0018	771.56	778.60	7.04	6.11	TYPE C
	D-605	36+88.46	39+50.00												769.59			771.13	776.53			
P-D605	D-605	39+50.00	39+99.79	(N/A)	0.34	(N/A)	0.19	0.00	17.38	4.76	6.98	24	50.28	0.0023	769.59	0.015	0.0014	771.13	776.53	5.39	4.68	TYPE C
	D-606	39+50.00	39+99.79												769.48			771.07	774.66			
P-D606	D-606	39+99.79	41+62.07	(N/A)	1.98	(N/A)	0.86	0.00	17.64	4.72	10.15	24	163.03	0.0025	769.48	0.015	0.003	771.07	774.66	3.59	2.93	TYPE C
	D-607	39+99.79	41+62.07												769.06			770.54	774.49			
P-D302	D-302	40+00.00	39+99.79	1.55	1.64	0.40	0.67	15.00	15.61	5.00	3.37	15	58.56	0.003	770.12	0.015	0.0032	771.26	774.60	3.34	3.04	TYPE B
	D-606	40+00.00	39+99.79												769.94			771.07	774.66			
P-D301	D-301	41+12.94	40+00.00	0.09	0.09	0.51	0.05	15.00	15.00	5.10	0.25	12	112.53	0.021	772.48	0.015	0.0133	772.69	774.66	1.97	1.01	TYPE C
	D-302	41+12.94	40+00.00												770.12			771.26	774.60			
P-D607	D-607	41+62.07	42+31.67	(N/A)	1.98	(N/A)	0.86	0.00	18.40	4.63	10.06	24	70.29	0.0025	769.06	0.015	0.0037	770.54	774.49	3.95	3.17	TYPE C
	D-608	41+62.07	42+31.67												768.89			770.20	773.30			
P-D608	D-608	42+31.67	42+40.07	(N/A)	1.98	(N/A)	0.86	0.00	18.73	4.59	10.03	24	16.76	0.0027	768.89	0.015	0.0052	770.20	773.30	3.10	2.16	TYPE C
	D-609	42+31.67	42+40.07												768.85			769.98	769.37			
P-D710	D-710	8+19.33	8+20.33	0.18	0.40	0.90	0.27	10.00	15.05	5.09	1.39	12	5.69	0.0123	776.69	0.015	0.0106	777.19	780.55	3.36	2.69	TYPE B - CONNECTED TO MASONRY COLLAR
	D-711	8+19.33	8+20.33												776.62			777.07	777.54			
P-DX701	DX-701	8+16.12	8+19.33	0.22	0.22	0.50	0.11	15.00	15.00	5.10	0.57	12	14.93	0.0382	777.26	0.015	0.0311	777.57	779.24	1.67	0.81	TYPE C - start at ex cb
	D-710	8+16.12	8+19.33												776.69			777.19	780.55			
P-DX702	D-711	8+20.33	8+28.26	(N/A)	0.40	(N/A)	0.27	0.00	15.07	5.09	1.39	12	48.40	0.0138	776.62	0.015	0.0133	777.12	777.54	0.42	-0.25	X STORM
	DX-703	8+20.33	8+28.26												775.95			776.38	779.26			
P-D901A	D-901A	28+45.79	28+98.01	3.39	3.39	0.9	0.86	15.32	15.32	5.05	4.39	15	55.92	0.0364	768.24	0.015	0.0346	769.09	777.21	8.12	7.53	TYPE B
	D-901	28+45.79	28+98.01												766.21			767.31	774.56			
P-D901	D-901	28+98.92	29+12.19	0.72	4.12	0.9	1.51	15.54	15.54	5.02	7.64	15	63.04	0.0316	766.21	0.013	0.02	767.31	774.56	7.26	6.91	TYPE B
	D-905	28+98.92	29+12.19												764.22			766.14	773.6			
P-D902	D-902	45+75.08	45+91.72	0.14	4.31	0.90	1.83	15.00	16.07	4.94	9.09	15	19.29	0.0082	763.91	0.015	0.0261	765.47	771.13	5.66	5.78	TYPE B
	D-903	45+75.08	45+91.72												763.75			764.91	763.75			
P-D904	D-904	29+37.36	29+12.19	0.06	0.06	0.90	0.05	10.00	10.00	6.01	0.30	12	68.14	0.0123	765.06	0.015	0.0001	766.34	773.37	7.03	7.14	TYPE B
	D-905	29+37.36	29+12.19												764.22			766.33	773.60			
P-D905	D-905	29+12.19	45+75.08	(N/A)	4.17	(N/A)	1.70	0.00	15.98	4.95	8.47	15	37.61	0.0082	764.22	0.015	0.0229	766.33	773.60	7.27	7.94	TYPE B
	D-902	29+12.19	45+75.08												763.91			765.47	771.13			

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Label	-Node- Upstream Downstream	Start Station	Stop Station	Upstream Inlet Area (acres)	System Drainage Area (acres)	Upstream Inlet C	System CA (acres)	Upstream Inlet Tc (min)	System Flow Time (min)	System Intensity (in/h)	Flow (cfs)	Diameter (in)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	-Invert (Conduit)- Upstream Downstream (ft)	Manning's n	Friction Slope (ft/ft)	-HGL- Upstream Downstream (ft)	-Ground- Upstream Downstream (ft)	Ground Minus HGL (Start) (ft)	Cover (Start) (ft)	Notes
P-D401	D-401	43+85.00	43+85.34	0.12	0.12	0.9	0.11	10	10	6.01	0.68	12	39.21	0.0725	769.26	0.015	0.068	769.61	773.26	3.65	2.83	TYPE B
	D-402	43+85.00	43+85.34												766.42			767.04	773.00			
P-D402	D-402	43+85.34	43+13.61	0.12	0.24	0.9	0.22	15	15	5.1	1.11	12	72.08	0.0024	766.42	0.015	0.0029	767.04	773.00	5.96	5.41	TYPE B
	D-403	43+85.34	43+13.61												766.25			766.82	773.56			
P-D403	D-403	43+13.61	43+31.64	0.1	0.34	0.9	0.31	15	15.57	5.01	1.56	12	19.38	0.0067	766.25	0.015	0.007	766.82	773.56	6.75	6.15	TYPE B
	D-404	43+13.61	43+31.64												766.12			766.65	766.12			
P-D501	D-501	47+24.00	46+04.00	0.09	0.09	0.90	0.08	10.00	10.00	6.01	0.46	12	121.00	0.012	765.00	0.013	0.0115	765.28	768.98	3.70	2.82	TYPE B
	D-502	47+24.00	46+04.00												763.55			763.96	770.80			
P-D502	D-502	46+04.00	45+91.00	0.09	0.17	0.90	0.16	10.00	10.60	5.88	0.93	12	29.00	0.1011	763.55	0.013	0.0728	763.96	770.80	6.84	6.08	TYPE C
	D-503	46+04.00	45+91.00												760.65			760.84	763.95			
P-D503	D-503	45+91.00	45+71.00	(N/A)	0.17	(N/A)	0.16	0.00	10.66	5.87	0.93	12	21.00	0.0068	760.65	0.013	0.0067	761.05	763.95	2.90	2.14	TYPE C
	D-504	45+91.00	45+71.00												760.50			760.89	760.50			
P-D601	D-601	34+94.24	35+00.94	(N/A)	0.00	(N/A)	0.00	0.00	15.00	5.10	6.06	24	59.65	0.001	772.53	0.015	0.0029	773.72	779.10	5.38	4.32	TYPE B
	D-602	34+94.24	35+00.94												772.47			773.46	777.48			
P-D602	D-602	35+00.94	35+44.75	0.15	0.15	0.69	0.10	15.00	15.45	5.03	6.59	24	43.89	0.0048	772.47	0.015	0.005	773.46	777.48	4.02	2.75	TYPE C
	D-602A	35+00.94	35+44.75												772.26			773.18	778.10			
P-D602A	D-602A	35+44.75	36+64.01	(N/A)	0.15	(N/A)	0.10	0.00	15.62	5	6.59	24	119.51	0.006	772.26	0.015	0.006	773.18	778.10	4.91	3.58	TYPE C
	D-603	35+44.75	36+64.01												771.54			772.49	776.88			
P-D603	D-603	36+64.01	36+88.46	0.19	0.34	0.65	0.23	15.00	16.05	4.94	7.18	24	27.89	0.0467	771.54	0.015	0.0401	772.49	776.88	4.39	3.09	TYPE C
	D-604	36+64.01	36+88.46												770.24			771.59	778.60			
P-D604	D-604	36+88.46	39+50.00	(N/A)	0.34	(N/A)	0.23	0.00	16.09	4.94	7.18	24	261.54	0.0025	770.24	0.015	0.0018	771.59	778.60	7.02	6.11	TYPE C
	D-605	36+88.46	39+50.00												769.59			771.16	776.53			
P-D605	D-605	39+50.00	39+99.79	(N/A)	0.34	(N/A)	0.23	0.00	17.38	4.76	7.14	24	50.28	0.0023	769.59	0.015	0.0014	771.16	776.53	5.37	4.68	TYPE C
	D-606	39+50.00	39+99.79												769.48			771.09	774.66			
P-D606	D-606	39+99.79	41+62.07	(N/A)	1.98	(N/A)	0.89	0.00	17.64	4.73	10.31	24	163.03	0.0025	769.48	0.015	0.003	771.09	774.66	3.57	2.93	TYPE C
	D-607	39+99.79	41+62.07												769.06			770.56	774.49			
P-D302	D-302	40+00.00	39+99.79	1.55	1.64	0.4	0.67	15.00	15.61	5.00	3.37	15	58.56	0.003	770.12	0.015	0.0031	771.28	774.60	3.33	3.04	TYPE B
	D-606	40+00.00	39+99.79												769.94			771.09	774.66			
P-D301	D-301	41+12.94	40+00.00	0.09	0.09	0.51	0.05	15.00	15.00	5.1	0.25	12	112.53	0.021	772.48	0.015	0.0131	772.69	774.66	1.97	1.01	TYPE C
	D-302	41+12.94	40+00.00												770.12			771.28	774.60			
P-D607	D-607	41+62.07	42+31.67	(N/A)	1.98	(N/A)	0.89	0.00	18.4	4.63	10.22	24	70.29	0.0025	769.06	0.015	0.0038	770.56	774.49	3.93	3.17	TYPE C
	D-608	41+62.07	42+31.67												768.89			770.21	773.30			
P-D608	D-608	42+31.67	42+40.07	(N/A)	1.98	(N/A)	0.89	0.00	18.73	4.59	10.19	24	16.76	0.0027	768.89	0.015	0.0052	770.21	773.3	3.09	2.16	TYPE C
	D-609	42+31.67	42+40.07												768.85			769.99	769.37			
P-D710	D-710	8+19.33	8+20.33	0.18	0.40	0.90	0.27	10.00	15.05	5.09	1.39	12	5.69	0.0123	776.69	0.015	0.0106	777.19	780.55	3.36	2.69	TYPE B - CONNECTED TO MASONRY COLLAR
	D-711	8+19.33	8+20.33												776.62			777.07	777.54			
P-DX701	DX-701	8+16.12	8+19.33	0.22	0.22	0.50	0.11	15.00	15.00	5.10	0.57	12	14.93	0.0382	777.26	0.015	0.0311	777.57	779.24	1.67	0.81	TYPE C - start at ex cb
	D-710	8+16.12	8+19.33												776.69			777.19	780.55			
P-DX702	D-711	8+20.33	8+28.26	(N/A)	0.40	(N/A)	0.27	0.00	15.07	5.09	1.39	12	48.40	0.0138	776.62	0.015	0.0133	777.12	777.54	0.42	-0.25	X STORM
	DX-703	8+20.33	8+28.26												775.95			776.38	779.26			
D-901A	D-901A	28+45.79	28+98.01	3.39	3.39	0.9	0.86	15.32	15.32	5.05	4.39	15	55.92	0.0364	768.24	0.015	0.0346	769.09	777.21	8.12	7.53	TYPE B
	D-901	28+45.79	28+98.01												766.21			767.31	774.56			
P-D901	D-901	28+98.92	29+12.19	0.72	4.12	0.9	1.51	15.54	15.54	5.02	7.64	15	63.04	0.0316	766.21	0.013	0.02	767.31	774.56	7.26	6.91	TYPE B
	D-905	28+98.92	29+12.19												764.22			766.14	773.6			
P-D902	D-902	45+75.08	45+91.72	0.14	4.31	0.90	1.83	15.00	16.07	4.94	9.09	15	19.29	0.0082	763.91	0.015	0.0261	765.47	771.13	5.66	5.78	TYPE B
	D-903	45+75.08	45+91.72												763.75			764.91	763.75			
P-D904	D-904	29+37.36	29+12.19	0.06	0.06	0.90	0.05	10.00	10.00	6.01	0.30	12	68.14	0.0123	765.06	0.015	0.0001	766.34	773.37	7.03	7.14	TYPE B
	D-905	29+37.36	29+12.19												764.22			766.33	773.60			
P-D905	D-905	29+12.19	45+75.08	(N/A)	4.17	(N/A)	1.70	0.00	15.98	4.95	8.47	15	37.61	0.0082	764.22	0.015	0.0229	766.33	773.60	7.27	7.94	TYPE B
	D-902	29+12.19	45+75.08												763.91			765.47	771.13			

P-D200 Just Full Velocity Check

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0036 ft/ft
Normal Depth	14.07 in
Diameter	15.0 in
Results	
Discharge	3.61 cfs
Flow Area	1.2 ft ²
Wetted Perimeter	3.3 ft
Hydraulic Radius	4.35 in
Top Width	0.60 ft
Critical Depth	9.21 in
Percent Full	93.8 %
Critical Slope	0.0086 ft/ft
Velocity	3.02 ft/s
Velocity Head	0.14 ft
Specific Energy	1.31 ft
Froude Number	0.378
Maximum Discharge	3.61 cfs
Discharge Full	3.36 cfs
Slope Full	0.0042 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	14.07 in
Critical Depth	9.21 in
Channel Slope	0.0036 ft/ft
Critical Slope	0.0086 ft/ft

P-D201 Just Full Velocity Check

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0044 ft/ft
Normal Depth	14.07 in
Diameter	15.0 in
Results	
Discharge	3.99 cfs
Flow Area	1.2 ft ²
Wetted Perimeter	3.3 ft
Hydraulic Radius	4.35 in
Top Width	0.60 ft
Critical Depth	9.70 in
Percent Full	93.8 %
Critical Slope	0.0090 ft/ft
Velocity	3.34 ft/s
Velocity Head	0.17 ft
Specific Energy	1.35 ft
Froude Number	0.418
Maximum Discharge	3.99 cfs
Discharge Full	3.71 cfs
Slope Full	0.0051 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	14.07 in
Critical Depth	9.70 in
Channel Slope	0.0044 ft/ft
Critical Slope	0.0090 ft/ft

P-D209A Just Full Velocity Check

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0205 ft/ft
Normal Depth	22.51 in
Diameter	24.0 in
Results	
Discharge	30.20 cfs
Flow Area	3.1 ft ²
Wetted Perimeter	5.3 ft
Hydraulic Radius	6.96 in
Top Width	0.97 ft
Critical Depth	22.39 in
Percent Full	93.8 %
Critical Slope	0.0205 ft/ft
Velocity	9.87 ft/s
Velocity Head	1.51 ft
Specific Energy	3.39 ft
Froude Number	0.977
Maximum Discharge	30.20 cfs
Discharge Full	28.07 cfs
Slope Full	0.0237 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	22.51 in
Critical Depth	22.39 in
Channel Slope	0.0205 ft/ft
Critical Slope	0.0205 ft/ft

Prop 24" P-D601 Flowing Full Calc

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.001 ft/ft
Normal Depth	24.0 in
Diameter	24.0 in
Discharge	6.20 cfs
Results	
Discharge	6.20 cfs
Normal Depth	24.0 in
Flow Area	3.1 ft ²
Wetted Perimeter	6.3 ft
Hydraulic Radius	6.0 in
Top Width	0.00 ft
Critical Depth	10.6 in
Percent Full	100.0 %
Critical Slope	0.006 ft/ft
Velocity	1.97 ft/s
Velocity Head	0.06 ft
Specific Energy	2.06 ft
Froude Number	(N/A)
Maximum Discharge	6.67 cfs
Discharge Full	6.20 cfs
Slope Full	0.001 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	24.0 in
Critical Depth	10.6 in
Channel Slope	0.001 ft/ft
Critical Slope	0.006 ft/ft

P-SV1858 Just Full Velocity Check

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0033 ft/ft
Normal Depth	11.26 in
Diameter	12.0 in
Results	
Discharge	1.91 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	2.6 ft
Hydraulic Radius	3.48 in
Top Width	0.48 ft
Critical Depth	7.07 in
Percent Full	93.8 %
Critical Slope	0.0090 ft/ft
Velocity	2.49 ft/s
Velocity Head	0.10 ft
Specific Energy	1.03 ft
Froude Number	0.348
Maximum Discharge	1.91 cfs
Discharge Full	1.77 cfs
Slope Full	0.0038 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	58.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.26 in
Critical Depth	7.07 in
Channel Slope	0.0033 ft/ft
Critical Slope	0.0090 ft/ft

P-D904 Just Full Velocity Check

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0123 ft/ft
Normal Depth	11.25 in
Diameter	12.0 in
Results	
Discharge	3.68 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	2.6 ft
Hydraulic Radius	3.48 in
Top Width	0.48 ft
Critical Depth	9.82 in
Percent Full	93.8 %
Critical Slope	0.0143 ft/ft
Velocity	4.82 ft/s
Velocity Head	0.36 ft
Specific Energy	1.30 ft
Froude Number	0.675
Maximum Discharge	3.68 cfs
Discharge Full	3.42 cfs
Slope Full	0.0142 ft/ft
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	11.25 in
Critical Depth	9.82 in
Channel Slope	0.0123 ft/ft
Critical Slope	0.0143 ft/ft

Ex 12in P-D1 Flowing Full Calc

Project Description	
Friction Method	Manning
Solve For	Formula
	Discharge
Input Data	
Roughness Coefficient	0.015
Channel Slope	0.0572 ft/ft
Normal Depth	11.25 in
Diameter	12.0 in
Results	
Discharge	7.94 cfs
Flow Area	0.8 ft ²
Wetted Perimeter	2.6 ft
Hydraulic Radius	3.48 in
Top Width	0.48 ft
Critical Depth	11.82 in
Percent Full	93.8 %
Critical Slope	0.0600 ft/ft
Velocity	10.38 ft/s
Velocity Head	1.68 ft
Specific Energy	2.61 ft
Froude Number	1.456
Maximum Discharge	7.94 cfs
Discharge Full	7.38 cfs
Slope Full	0.0662 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.00 in
Length	0.0 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.00 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	93.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	11.25 in
Critical Depth	11.82 in
Channel Slope	0.0572 ft/ft
Critical Slope	0.0600 ft/ft

Ditches



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D222

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.34	0.16	0.18
C Value	0.66	0.90	0.45
C*A =	0.23	0.14	0.08

Reference Road:	S.R 315	
Ditch Begin Station:	27+60.00	LT
Ditch End Station:	26+27.00	LT
Ditch Length (ft):	133	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated, woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-25+84 LT

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.05	0.01	0.04
C Value	0.54	0.90	0.45
C*A =	0.03	0.01	0.02

Reference Road:	S.R 315	
Ditch Begin Station:	26+27.00	LT
Ditch End Station:	25+84.00	LT
Ditch Length (ft):	43	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-25+84 RT

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.27	0.07	0.20
C Value	0.57	0.90	0.45
C*A =	0.15	0.06	0.09

Reference Road:	S.R 315	
Ditch Begin Station:	27+60.00	RT
Ditch End Station:	25+84.00	RT
Ditch Length (ft):	176	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t_c (mins) =	3.54

T_s (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t_c (mins) =	0.00

T_d (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t_c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
T_c (Calculated):	3.54	mins
T_c (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D201-S

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.23	0.07	0.16
C Value	0.59	0.90	0.45
C*A =	0.14	0.06	0.07

Reference Road:	S.R 315	
Ditch Begin Station:	27+60.00	RT
Ditch End Station:	29+10.00	RT
Ditch Length (ft):	150	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t_c (mins) =	3.54

T_s (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t_c (mins) =	0.00

T_d (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t_c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
T_c (Calculated):	3.54	mins
T_c (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D201-N

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.42	0.13	0.29
C Value	0.59	0.90	0.45
C*A =	0.25	0.12	0.13

Reference Road:	S.R 315	
Ditch Begin Station:	31+75.00	RT
Ditch End Station:	29+10.00	RT
Ditch Length (ft):	265	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D200

Original Creator:	JHH	Creation Date:	1/2/24
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.27	0.09	0.18
C Value	0.60	0.90	0.45
C*A =	0.16	0.08	0.08

Reference Road:	S.R 315	
Ditch Begin Station:	33+39.00	RT
Ditch End Station:	31+93.00	RT
Ditch Length (ft):	146	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D601

Original Creator:	JHH	Creation Date:	1/2/24
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.15	0.07	0.08
C Value	0.66	0.90	0.45
C*A =	0.10	0.06	0.04

Reference Road:	S.R 315	
Ditch Begin Station:	33+60.00	RT
Ditch End Station:	35+01.00	RT
Ditch Length (ft):	141	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D602

Original Creator:	JHH	Creation Date:	1/2/24
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.05	0.02	0.03
C Value	0.63	0.90	0.45
C*A =	0.03	0.02	0.01

Reference Road:	S.R 315	
Ditch Begin Station:	35+01.00	RT
Ditch End Station:	35+58.00	RT
Ditch Length (ft):	57	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
 Intensity Zone: C
 Ditch Name: DIT-D603-S

Original Creator:	JHH	Creation Date:	1/2/24
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.12	0.04	0.08
C Value	0.60	0.90	0.45
C*A =	0.07	0.04	0.04

Reference Road:	S.R 315	
Ditch Begin Station:	35+58.00	RT
Ditch End Station:	36+64.00	RT
Ditch Length (ft):	106	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D603-N

Original Creator:	JHH	Creation Date:	1/2/24
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.03	0.01	0.02
C Value	0.63	0.90	0.50
C*A =	0.02	0.01	0.01

Reference Road:	S.R 315	
Ditch Begin Station:	37+07.00	RT
Ditch End Station:	36+64.00	RT
Ditch Length (ft):	43	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D302-N

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.24	0.02	0.22
C Value	0.44	0.90	0.40
C*A =	0.11	0.02	0.09

Reference Road:	S.R 315	
Ditch Begin Station:	40+50.00	LT
Ditch End Station:	40+00.00	LT
Ditch Length (ft):	50	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated, woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-D302-S

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.30	0.02	0.28
C Value	0.43	0.90	0.40
C*A =	0.13	0.02	0.11

Reference Road:	S.R 315	
Ditch Begin Station:	40+50.00	LT
Ditch End Station:	41+13.00	LT
Ditch Length (ft):	63	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated, woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-36in-S

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.15	0.04	0.11
C Value	0.53	0.90	0.40
C*A =	0.08	0.04	0.04

Reference Road:	S.R 315	
Ditch Begin Station:	41+69.00	LT
Ditch End Station:	42+47.00	LT
Ditch Length (ft):	78	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated, woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-36in-N

Original Creator:	JHH	Creation Date:	12/29/23
Updated By:		Updated On:	
Checked By:		Checked On:	
Corrected By:		Corrected On:	
Verified By:		Verified On:	

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.69	0.00	0.69
C Value	0.40	0.90	0.40
C*A =	0.28	0.00	0.28

Reference Road:	S.R 315	
Ditch Begin Station:	44+47.00	LT
Ditch End Station:	42+47.00	LT
Ditch Length (ft):	200	

Overland Flows (1)	
Length (ft)	47.50
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	4.00
Runoff Coefficient	0.90
Overland Slope (%)	4.00
Overland Flows (3)	
Length (ft)	7.00
Runoff Coefficient	0.50
Overland Slope (%)	16.67
t _c (mins) =	3.54

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated, woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	3.54	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	3.54	mins
Tc (Used):	15.00	mins

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Notes



Project: 110446
Intensity Zone: C
Ditch Name: DIT-40+00 RT

Original Creator: ATM Creation Date: 8/1/25

Updated By:
Checked By:
Corrected By:
Verified By:

Updated On:
Checked On:
Corrected On:
Verified On:

Drainage Area Information

	Total	Impervious	Grassy
Area (acres)	0.47	0.14	0.33
C Value	0.55	0.90	0.40
C*A =	0.26	0.13	0.13

Reference Road:	S.R 315	
Ditch Begin Station:	40+00.00	LT
Ditch End Station:	42+76.20	LT
Ditch Length (ft):	276	

Overland Flows (1)	
Length (ft)	14.00
Runoff Coefficient	0.90
Overland Slope (%)	2.00
Overland Flows (2)	
Length (ft)	19.59
Runoff Coefficient	0.40
Overland Slope (%)	25.00
Overland Flows (3)	
Length (ft)	7.50
Runoff Coefficient	0.40
Overland Slope (%)	8.00
t _c (mins) =	4.70

Ts (Ditch or Gutter)	
Length (ft)	0
Surface Type:	Min. tillage cultivated; woodland
Intercept Coeff.	0.152
Avg. slope (%)	2.46
t _c (mins) =	0.00

Td (Pipe)	
Pipe Length (ft)	0.00
Manning's "n"	0.015
Pipe Slope (ft/ft)	0.0075
Hydraulic Radius	0.70
Velocity (ft/s)	6.78
t _c (mins) =	0.00

Prior System Outlet:	0.00	mins
Overland Total:	4.70	mins
Ditch or Gutter Total:	0.00	mins
Pipe Total:	0.00	mins
Tc (Calculated):	4.70	mins
Tc (Used):	15.00	mins

Notes



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 26+27 LT to 25+84 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
26+27	25+84	L	43.00	3.00	4.00	10.00	0.0074	0.05	0.05	0.54	0.03	Seed	3.71	5	0.030	16.25	0.55	0.02	0.10	0.05	3.75
												Seed	4.23	10	0.040	16.46	0.51	0.03	0.11	0.06	3.90



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 27+60 RT to 25+84 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
27+60	25+84	R	176.00	3.00	6.00	4.00	0.0074	0.05	0.05	0.54	0.03	Seed	3.36	5	0.030	19.96	0.58	0.02	0.09	0.05	3.48
												Seed	3.75	10	0.040	20.73	0.47	0.03	0.10	0.06	3.64



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 27+60 LT to 26+27 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
27+60	26+27	L	133.00	3.00	4.00	10.00	0.0085	0.34	0.34	0.66	0.22	Seed	3.65	5	0.030	16.86	1.18	0.09	0.82	0.17	5.33
												Seed	4.14	10	0.040	17.19	0.99	0.11	0.93	0.21	5.93



DITCH ANALYSIS

PID : 110446 Date : 01/03/2024 Project : DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 27+60 RT to 29+10 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH	RADIUS	IN SLOPE	BACK SLOPE	GRADE	AREA	AREA	RUNOFF	CA	PROTECT TYPE	RAIN	STORM	MANN.	TIME	VEL.	SHEAR	DESIGN	DEPTH	WIDTH
			(ft.)	WIDTH (ft.)			(ft./ft.)	(acres)	SUM (acres)	COEFF.	(Sum)		INT. (in./hr.)	FREQ. (yrs.)	COEFF.	FLOW (min.)	FLOW (fps.)	(lbs./ sq.ft.)	FLOW (cfs.)	FLOW (ft.)	FLOW (ft.)
27+60	29+10	R	150.00	3.00	6.00	4.00	0.0043	0.23	0.23	0.59	0.14	Seed	3.54	5	0.030	17.94	0.82	0.04	0.48	0.16	4.56
												Seed	4.00	10	0.040	18.41	0.71	0.05	0.54	0.19	4.93



DITCH ANALYSIS

PID : 110446 **Date :** 01/04/2024 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 31+75 RT to 29+10 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
31+75	29+10	R	265.00	3.00	6.00	4.00	0.0022	0.42	0.42	0.59	0.25	Seed	3.31	5	0.030	20.48	0.77	0.03	0.82	0.25	5.50
												Seed	3.68	10	0.040	21.45	0.65	0.04	0.91	0.31	6.09



DITCH ANALYSIS

PID : 110446 **Date :** 01/03/2024 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 33+39 RT to 32+00 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH	RADIUS	IN	BACK	GRADE	AREA	AREA	RUNOFF	CA	PROTECT TYPE	RAIN	STORM	MANN.	TIME	VEL.	SHEAR	DESIGN	DEPTH	WIDTH
			(ft.)	WIDTH (ft.)	SLOPE (ft./ft.)	SLOPE (ft./ft.)	(ft./ft.)	(acres)	SUM (acres)	COEFF.	(Sum)		INT. (in./hr.)	FREQ. (yrs.)	COEFF.	FLOW (min.)	FLOW (fps.)	(lbs./ sq.ft.)	FLOW (cfs.)	FLOW (ft.)	FLOW (ft.)
33+39	32+00	R	139.00	3.00	4.00	4.00	0.0058	0.27	0.27	0.60	0.16	Seed	3.61	5	0.030	17.27	0.99	0.06	0.58	0.16	4.29
												Seed	4.08	10	0.040	17.67	0.85	0.07	0.66	0.20	4.63



DITCH ANALYSIS

PID : 110446 **Date :** 01/02/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 33+60 RT to 35+01 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
33+60	35+01	R	141.00	3.00	4.00	16.00	0.0148	0.15	0.15	0.66	0.10	Seed	3.61	5	0.030	17.21	1.04	0.08	0.36	0.09	4.77
												Seed	4.10	10	0.040	17.57	0.90	0.10	0.41	0.11	5.20



DITCH ANALYSIS

PID : 110446 **Date :** 01/02/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 35+01 RT to 35+58 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
35+01	35+58	R	57.00	3.00	6.00	4.00	0.0023	0.05	0.05	0.63	0.03	Seed	3.60	5	0.030	17.31	0.41	0.01	0.11	0.08	3.81
												Seed	4.09	10	0.040	17.58	0.34	0.02	0.13	0.11	4.07



DITCH ANALYSIS

PID : 110446 **Date :** 01/02/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 35+58 RT to 36+64 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
35+58	36+64	R	106.00	3.00	6.00	4.00	0.0044	0.12	0.12	0.60	0.07	Seed	3.58	5	0.030	17.56	0.68	0.03	0.26	0.11	4.07
												Seed	4.05	10	0.040	17.99	0.59	0.04	0.29	0.13	4.34



DITCH ANALYSIS

PID : 110446 **Date :** 01/02/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 37+07 RT to 36+64 RT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
37+07	36+64	R	43.00	3.00	6.00	4.00	0.0074	0.03	0.03	0.63	0.02	Seed	3.70	5	0.030	16.36	0.51	0.02	0.07	0.04	3.43
												Seed	4.23	10	0.040	16.50	0.46	0.02	0.08	0.05	3.54



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 40+50 LT to 40+00 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
40+50	40+00	L	50.00	2.00	6.00	4.00	0.0080	0.24	0.24	0.44	0.11	Seed	3.76	5	0.030	15.81	1.03	0.07	0.40	0.14	3.42
												Seed	4.30	10	0.040	15.95	0.89	0.09	0.45	0.18	3.77



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 40+50 LT to 41+13 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
40+50	41+13	L	63.00	2.00	6.00	3.00	0.0056	0.30	0.30	0.43	0.13	Seed	3.73	5	0.030	16.07	0.97	0.06	0.48	0.18	3.60
												Seed	4.26	10	0.040	16.25	0.83	0.08	0.55	0.22	3.98



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 41+69 LT to 42+47 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
41+69	42+47	L	78.00	2.00	3.00	4.00	0.0423	0.15	0.15	0.53	0.08	Seed	3.76	5	0.030	15.75	1.69	0.21	0.30	0.08	2.55
												Seed	4.31	10	0.040	15.86	1.47	0.26	0.34	0.10	2.70



DITCH ANALYSIS

PID : 110446 **Date :** 12/29/2023 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 44+47 LT to 42+47 LT

Designer : JHH

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
44+47	42+47	L	200.00	2.00	3.00	4.00	0.0156	0.69	0.69	0.40	0.28	Seed	3.65	5	0.030	16.80	1.82	0.20	1.01	0.20	3.43
												Seed	4.15	10	0.040	17.12	1.55	0.25	1.15	0.26	3.79



DITCH ANALYSIS

PID : 0.130 **Date :** 08/01/2025 **Project :** DEL-315-0.86

Location : S.R. 315 and Jewett Rd.

Description : Proposed Ditch from 40+00 RT to 42+76.20

Designer : ATM

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	2.00	Type 2:	3.00	Type 3:	5.00
RCP	Type B:	6.00				

(*) Warning: Grade is steeper than allowable.

If value is parantheses, design parameters have been exceeded. - See user manual.

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS WIDTH (ft.)	IN SLOPE (ft./ft.)	BACK SLOPE (ft./ft.)	GRADE (ft./ft.)	AREA (acres)	AREA SUM (acres)	RUNOFF COEFF.	CA (Sum)	PROTECT TYPE	RAIN INT. (in./hr.)	STORM FREQ. (yrs.)	MANN. COEFF.	TIME FLOW (min.)	VEL. FLOW (fps.)	SHEAR (lbs./ sq.ft.)	DESIGN FLOW (cfs.)	DEPTH FLOW (ft.)	WIDTH FLOW (ft.)
40+00	42+76	R	276.00	2.50	0.25	0.25	0.0109	0.47	0.47	0.26	0.12	Seed	3.59	5	0.030	18.46	1.29	0.09	0.44	0.13	2.57
												Seed	3.98	10	0.040	18.97	1.11	0.12	0.49	0.17	2.59

Post Construction Storm Water Management

BMP Summary