

FAR EAST FREEWAY FAI/LIC-70-0.00/0.00

OHIO DEPARTMENT OF TRANSPORTATION
- DISTRICT 5

FAIRFIELD COUNTY and LICKING COUNTY

DRAINAGE REPORT

06/28/2024 - Stage 1 Submission

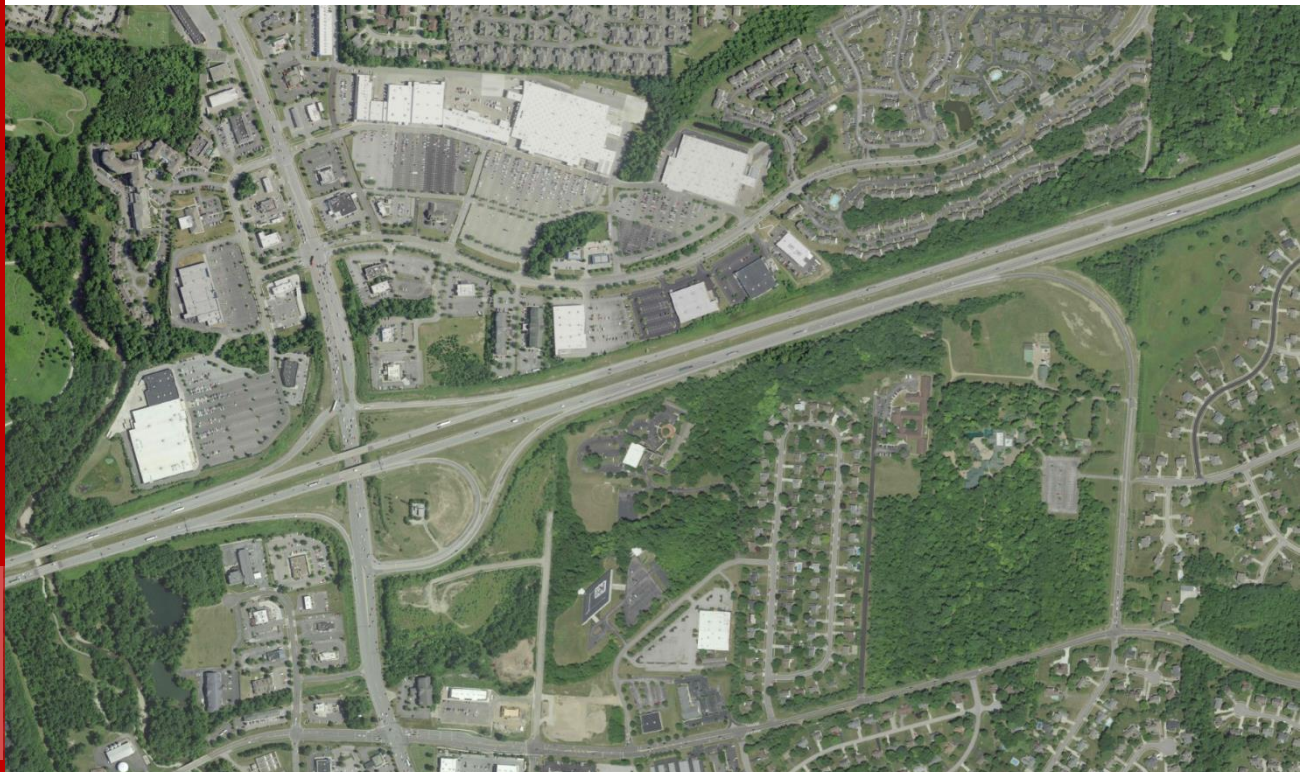


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I. Project Narrative

A. Project Description

This project consists of improvements along Interstate 70 and Taylor Road in Licking and Fairfield Counties. The improvements include pavement widening, the addition of collector roads with concrete barriers in both directions between State Route 256 and Taylor Road, mill-and-overlay of existing pavement, mechanically stabilized earth (MSE) walls, bridge replacements, Taylor Road extension and new bridge construction, curb and gutter, new sidewalks along Taylor Road, as well as a new closed storm sewer system, extension or replacement of existing culverts, and a detention basin. Additional items, including pavement markings, signing, lighting, grading, and other miscellaneous items, are also included in the improvement design.

B. Existing Conditions

The existing conditions of IR 70 include six lanes with paved shoulders, median and roadside ditches, culverts, and minimal closed storm sewer used to outlet water from the ditches. The existing conditions of Taylor Road include two sections: one north and one south of IR 70. The section north of IR 70 has two lanes with graded shoulders and a culvert. The section south of IR 70 has two lanes with a concrete median that turns into a left turn lane. The southern portion of Taylor Road has curbs and existing inlets. Currently, only eastbound IR 70 can exit onto Taylor Road, and there are no entrance ramps to IR 70 from Taylor Road. The majority of storm runoff drains to Blacklick Creek through the tributaries within the project area.

C. Proposed Design

IR 70 will be widened to the outside with the addition of collector roads between SR 256 and Taylor Road. Taylor Road will be extended over IR 70 with a new bridge, re-alignment, and re-grading of the existing road. The proposed stormwater management system includes closed storm sewer systems, curb inlets, concrete barrier inlets, median and roadside ditches, extension or replacement of existing culverts, and a detention basin. There are numerous runs of proposed storm sewer that outlet to different locations that will ultimately drain to Blacklick Creek.

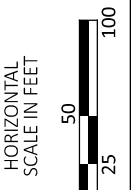
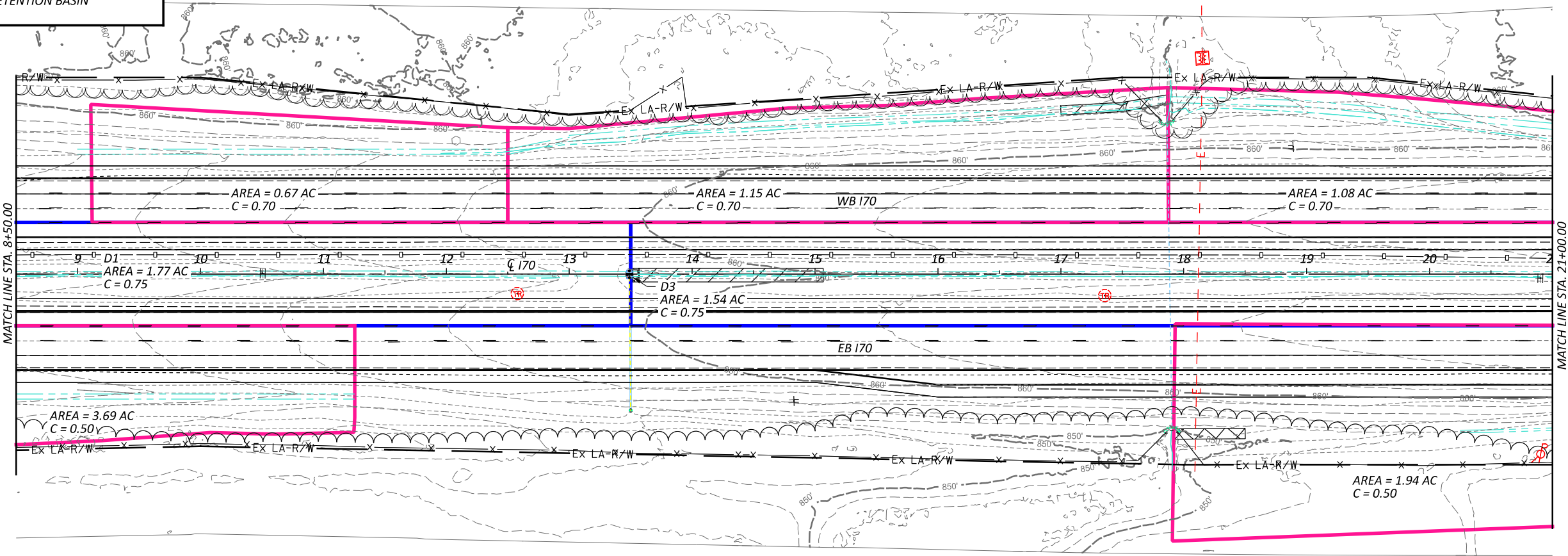
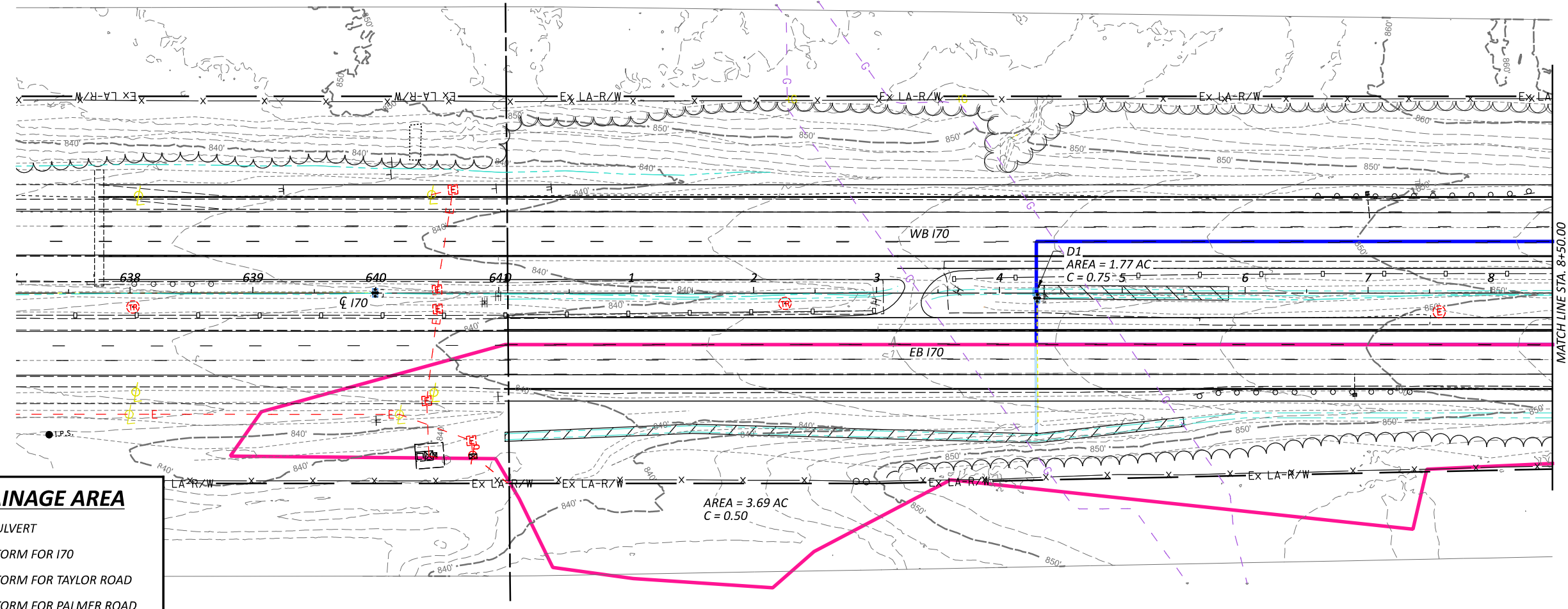
The project will require 28.10 acres of water quality and quantity treatment. A proposed detention basin will provide the required water quality and quantity treatment for the project. It will be in the infield of the exit ramp to Taylor Road from eastbound IR 70. The detention basin will treat a total of 40.98 acres, 29.09 acres of that is within permanent ODOT right-of-way.

II. Drainage Map

The drainage maps show the existing drainage system including existing culverts and storm sewers, as well as the proposed storm sewer system, detention basin, culverts, and the ditch erosion protection. The drainage areas were delineated from a combination of proposed work and existing terrain. Each drainage area has a label with total acreage, runoff coefficient, and drainage structure the area drains to in the proposed system. The drainage areas were used in all the drainage calculations including median ditch analysis, inlet spacing, storm sewer design, existing culvert analysis, and BMP considerations.

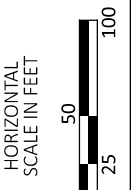
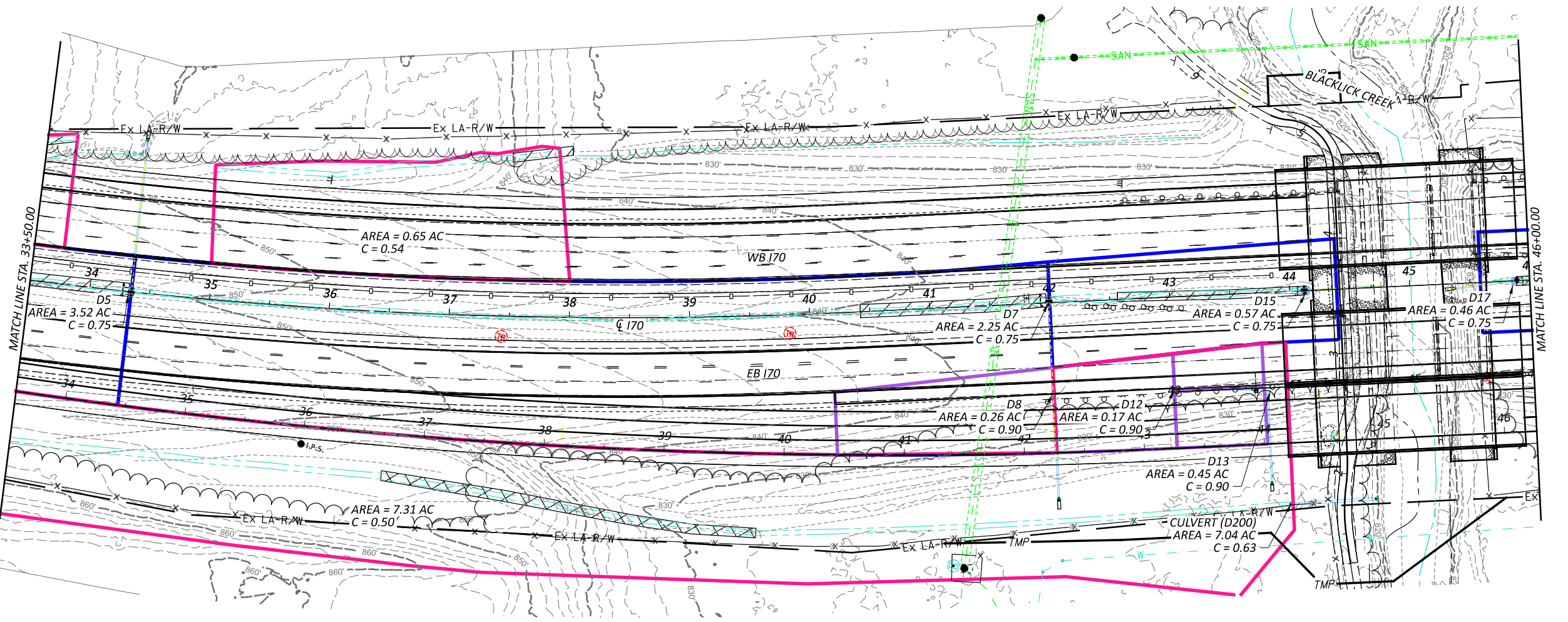
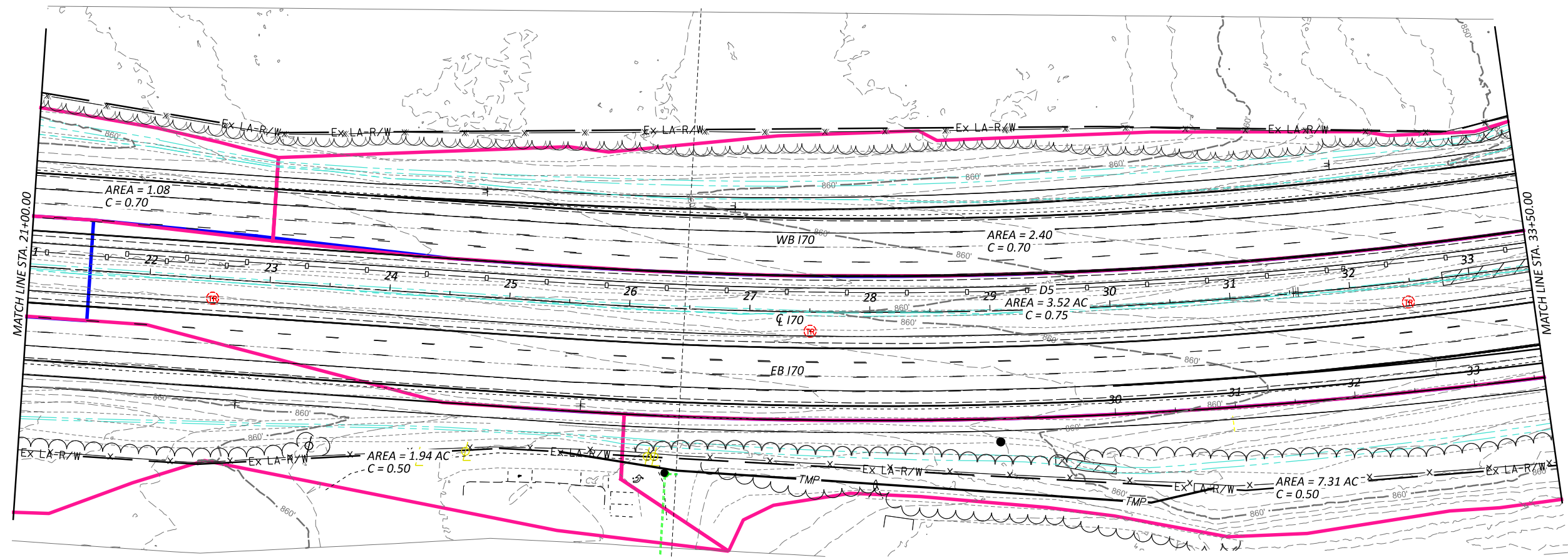
LEGEND - DRAINAGE AREA

- PROPOSED CULVERT
- PROPOSED STORM FOR I70
- PROPOSED STORM FOR TAYLOR ROAD
- PROPOSED STORM FOR PALMER ROAD
- PROPOSED MEDIAN DITCH
- PROPOSED OUTSIDE DITCH
- PROPOSED DETENTION BASIN



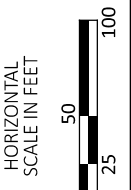
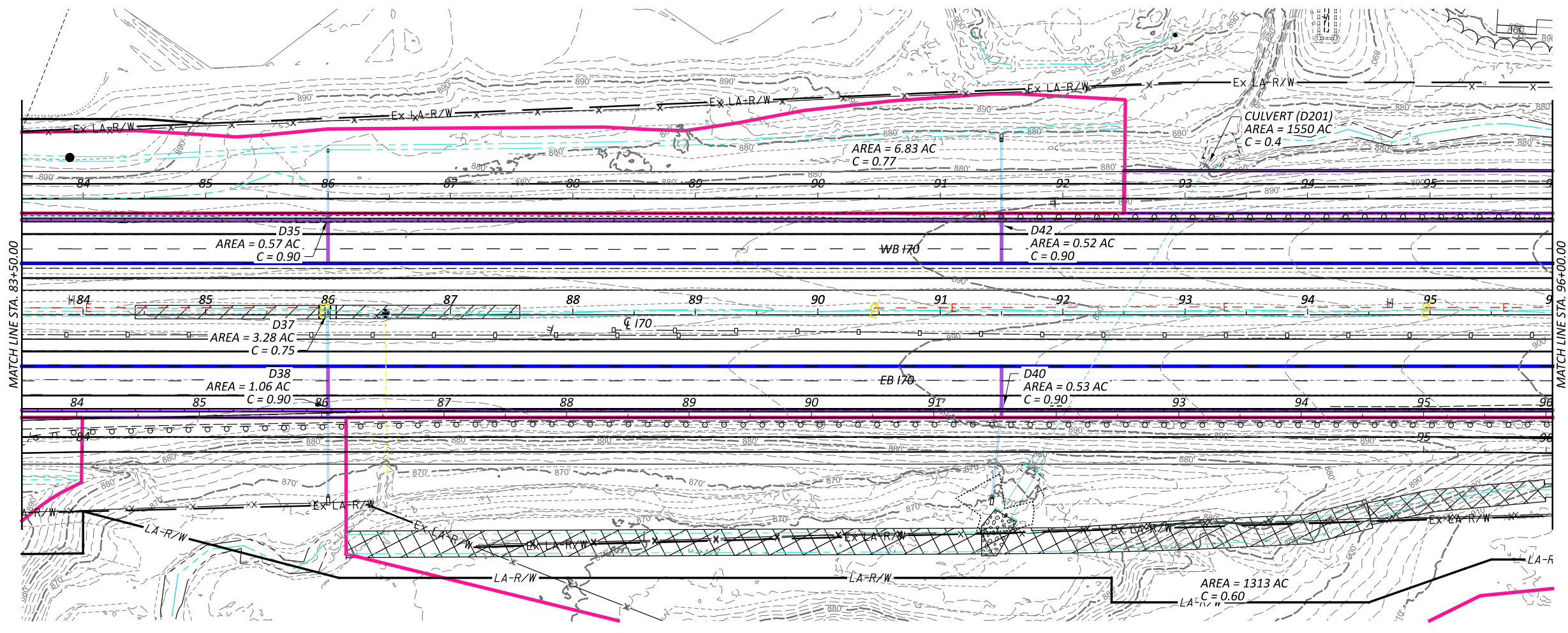
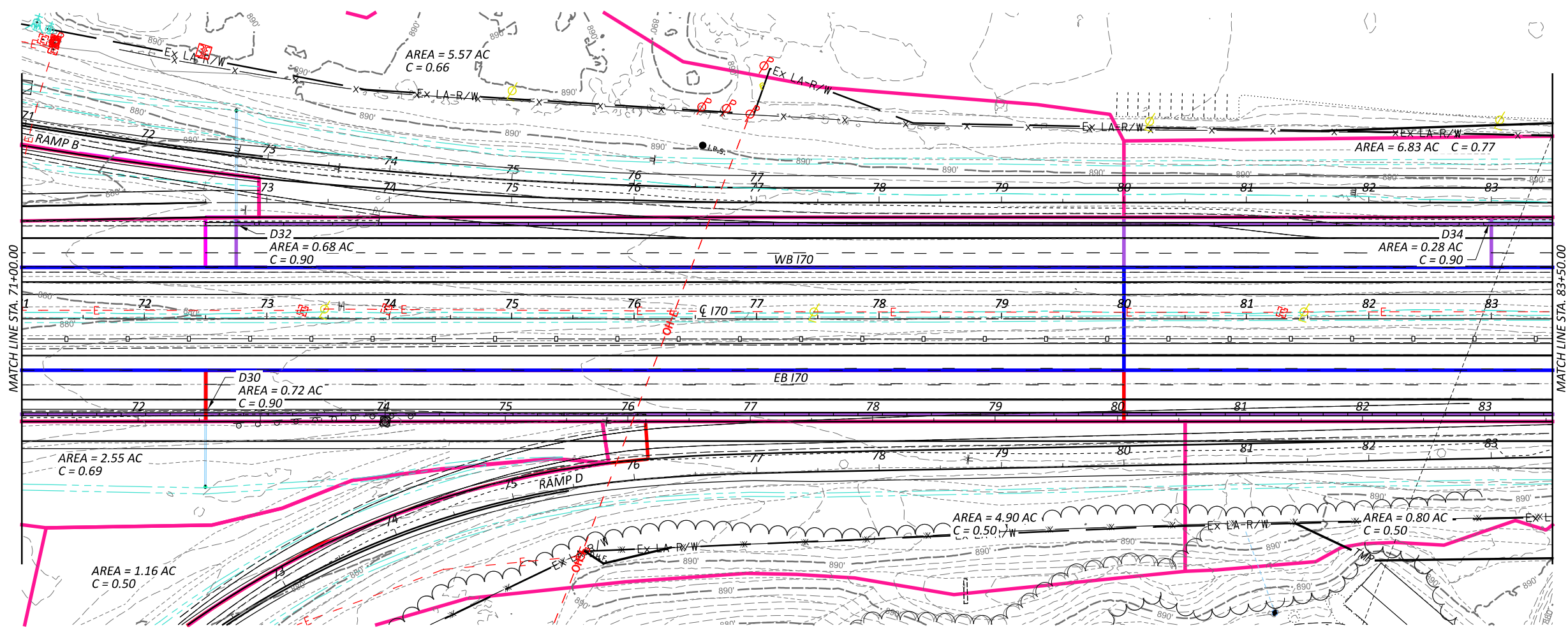
DRAINAGE MAP
 IR 70 - STA. 637+00.00 TO STA. A 21+00.00

DESIGN AGENCY	
DESIGNER	CEF
REVIEWER	DWG 06/28/24
PROJECT ID	96808
SHEET	TOTAL
1	12



DRAINAGE MAP
 IR 70 - STA. 21+00.00 TO STA. 46+00.00

DESIGN AGENCY	
DESIGNER	CEF
REVIEWER	DMG 06/28/24
PROJECT ID	96808
SHEET	TOTAL
2	12



DRAINAGE MAP
IR 70 - STA. 71+00.00 TO STA. 96+00.00

DESIGN AGENCY



DESIGNER

CEP

REVIEWER

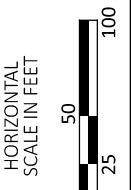
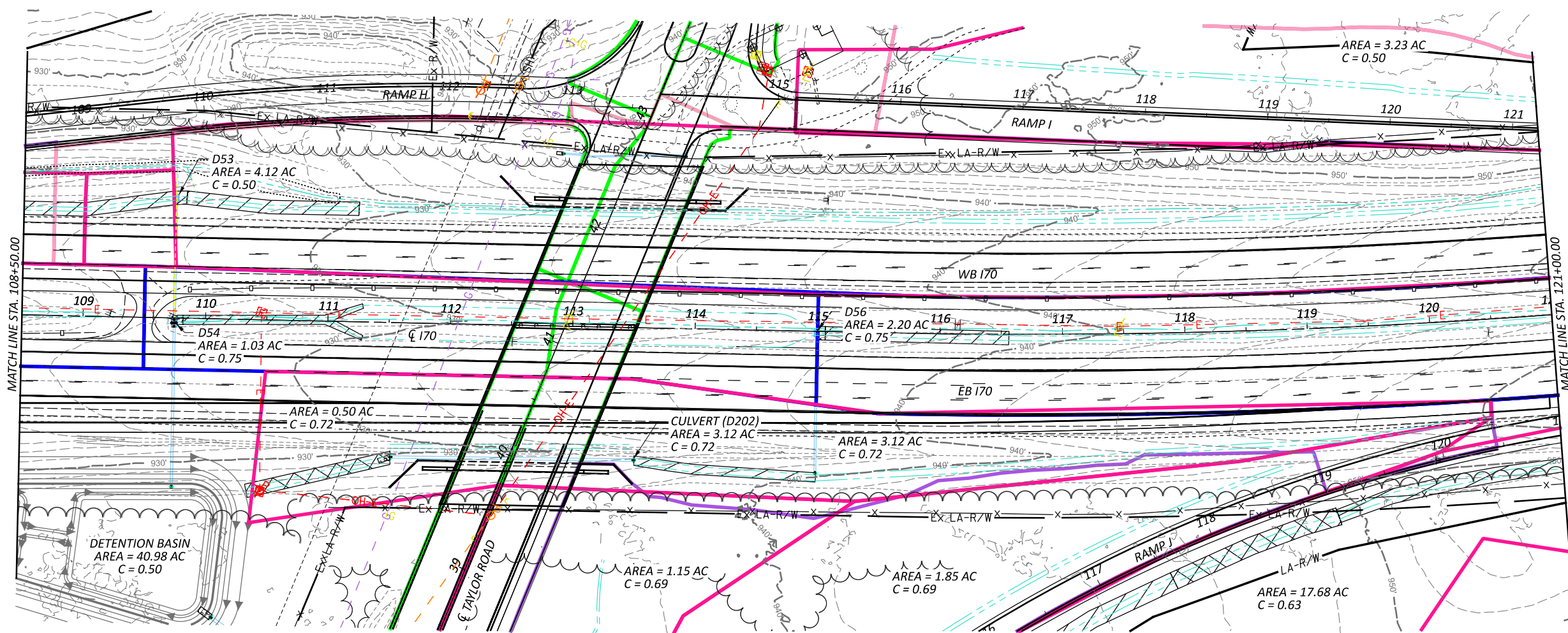
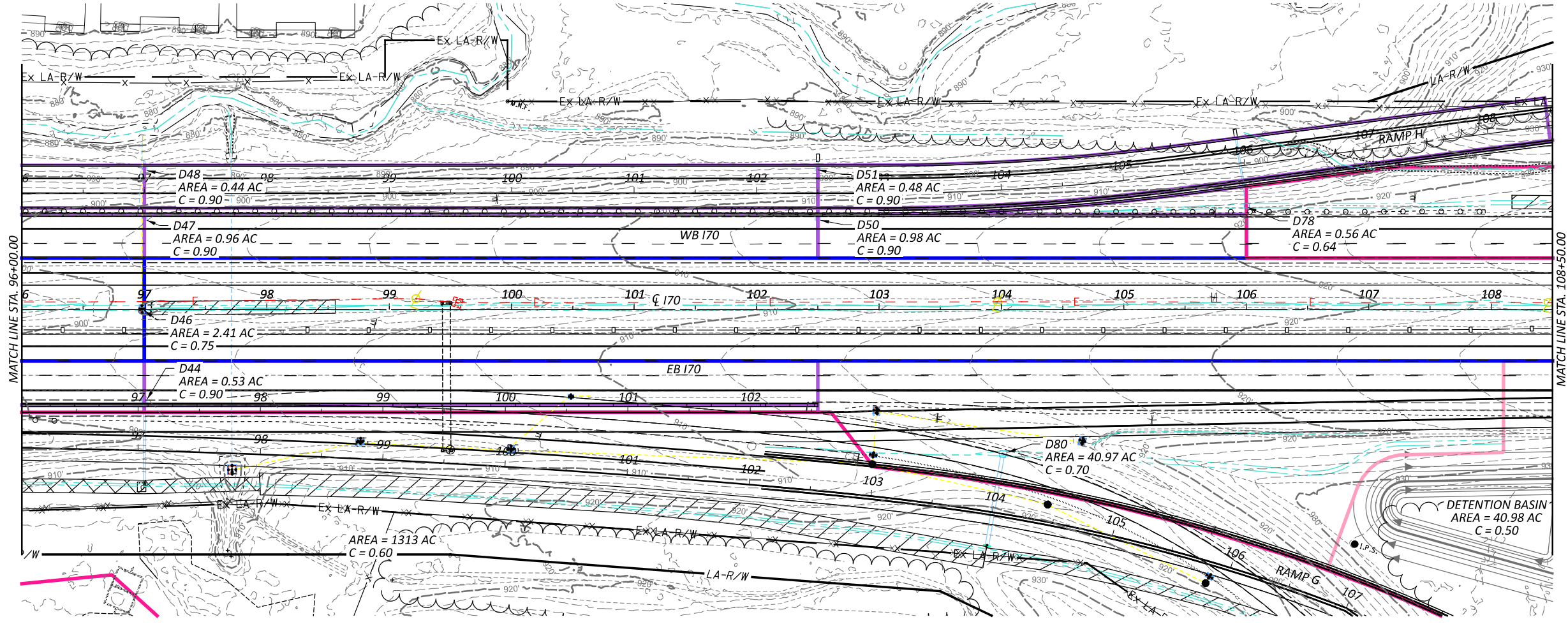
DMG 06/28/24

PROJECT ID

96808

SHEET TOTAL

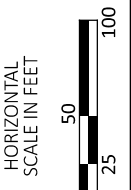
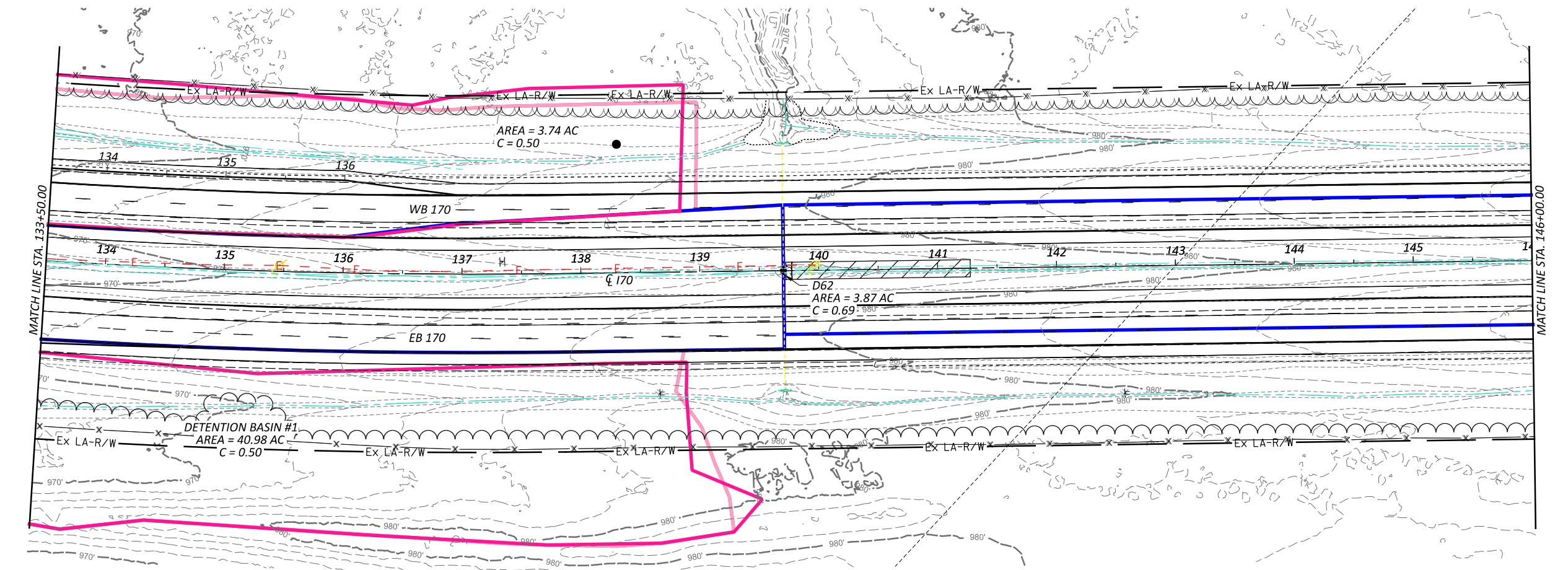
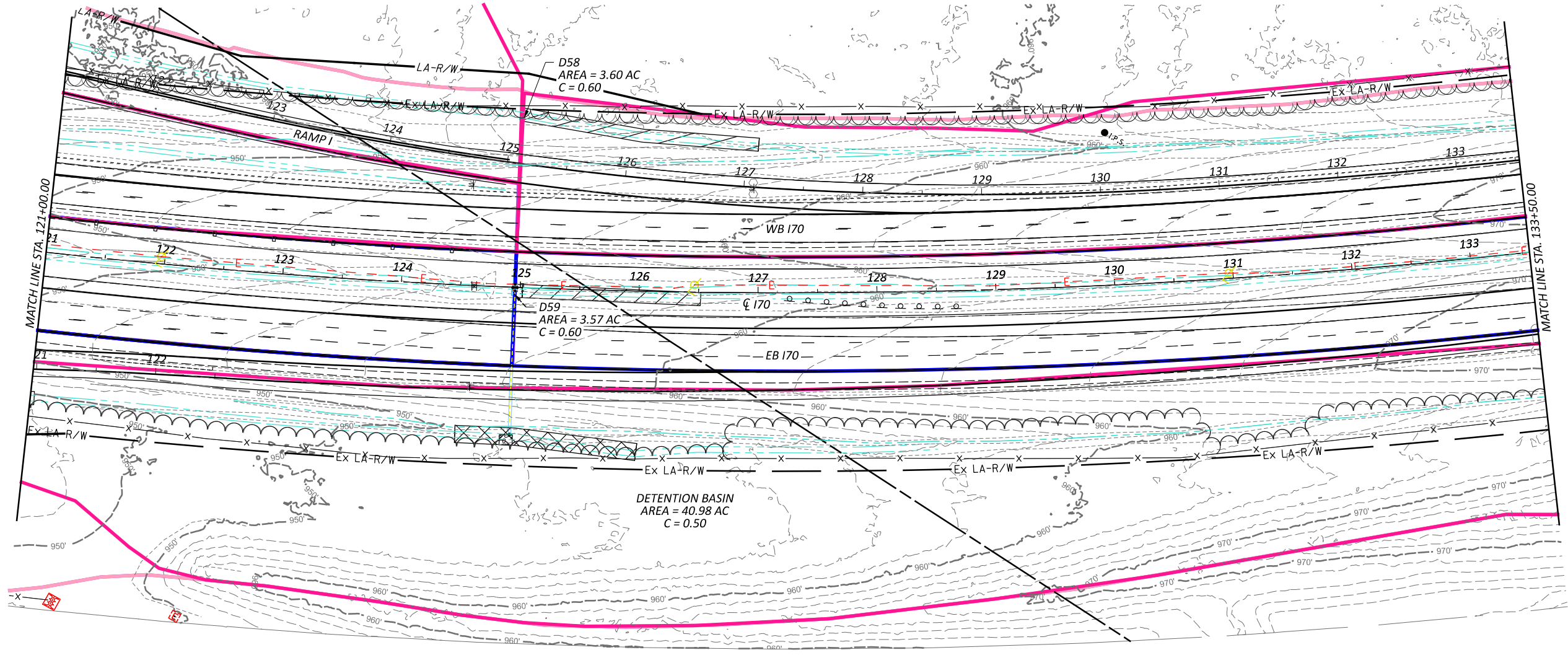
4 12



DRAINAGE MAP
 IR 70 - STA. A 96+00.00 TO STA. A 121+00.00



DESIGN AGENCY	
DESIGNER	CEF
REVIEWER	DMG 06/28/23
PROJECT ID	96808
SHEET	TOTAL
5	12



DRAINAGE MAP
IR 70 - STA. 121+00.00 TO STA. 146+00.00

DESIGN AGENCY



DESIGNER

CEF

REVIEWER

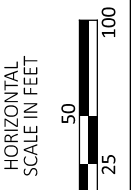
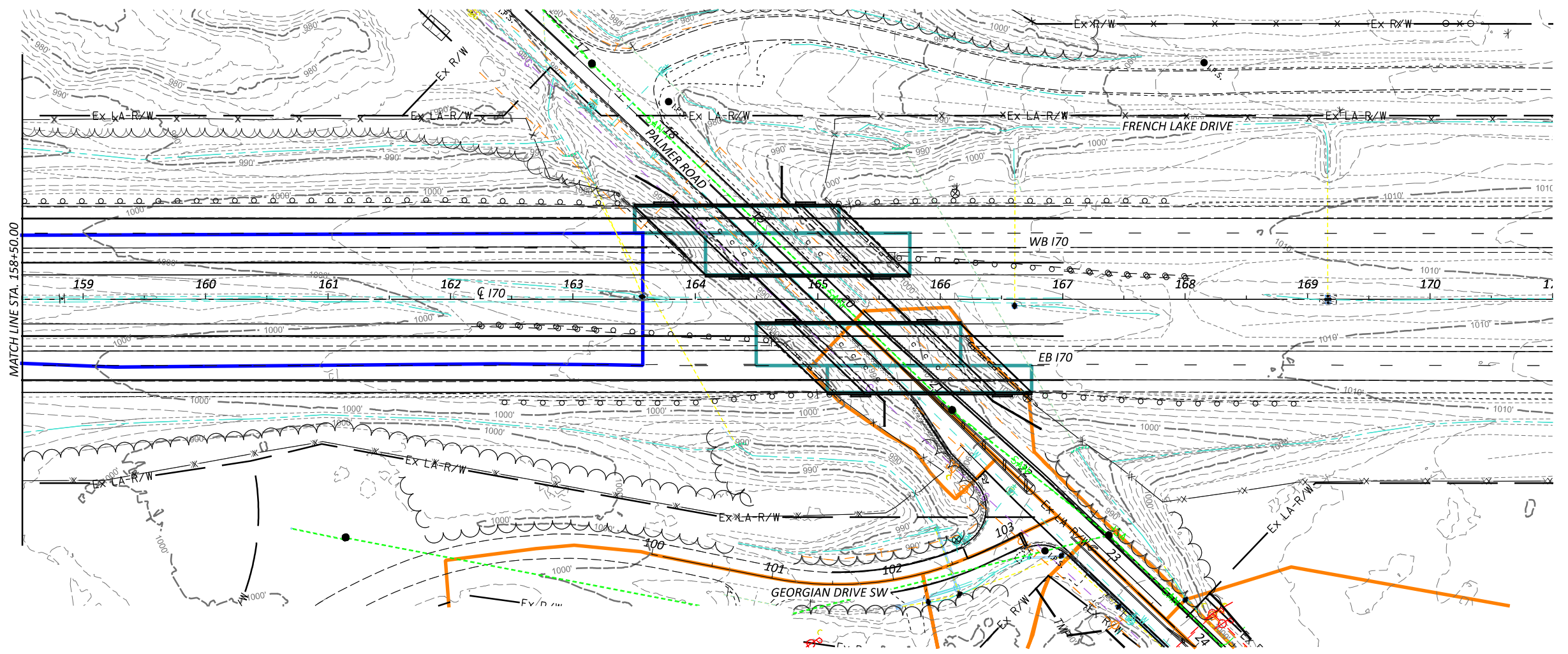
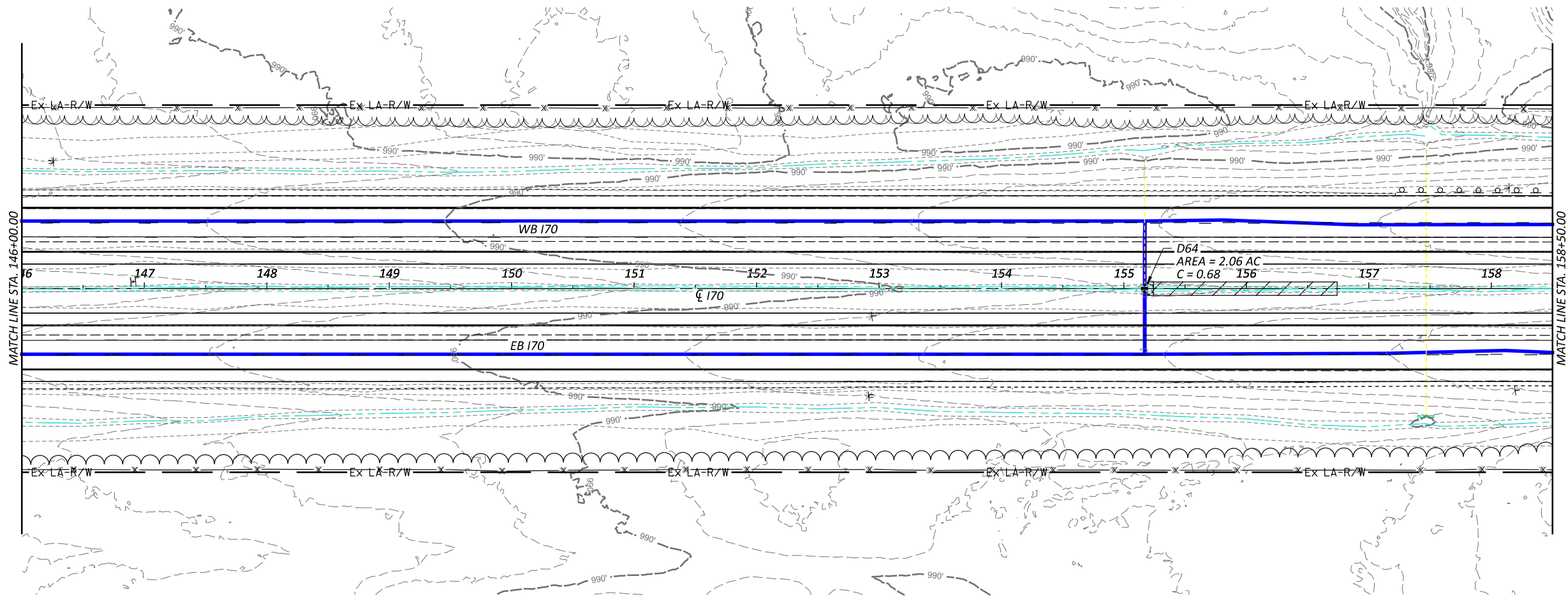
DMG 06/28/23

PROJECT ID

96808

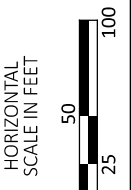
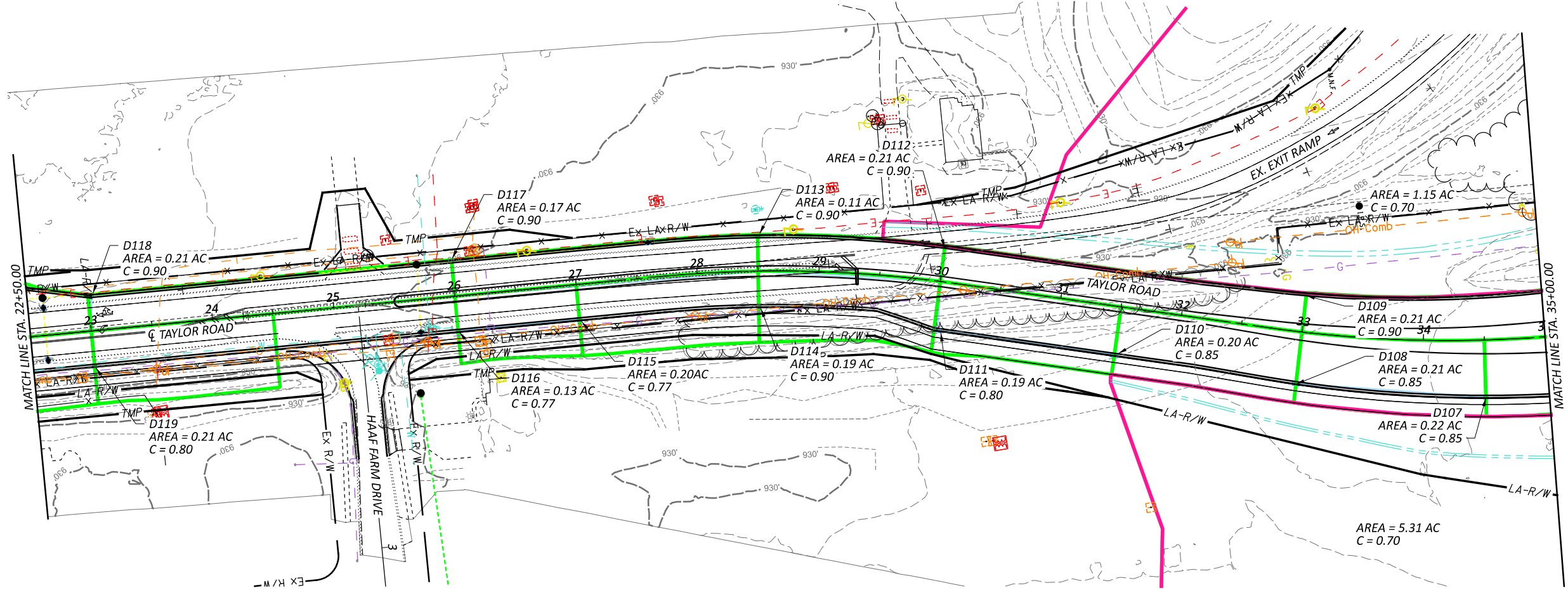
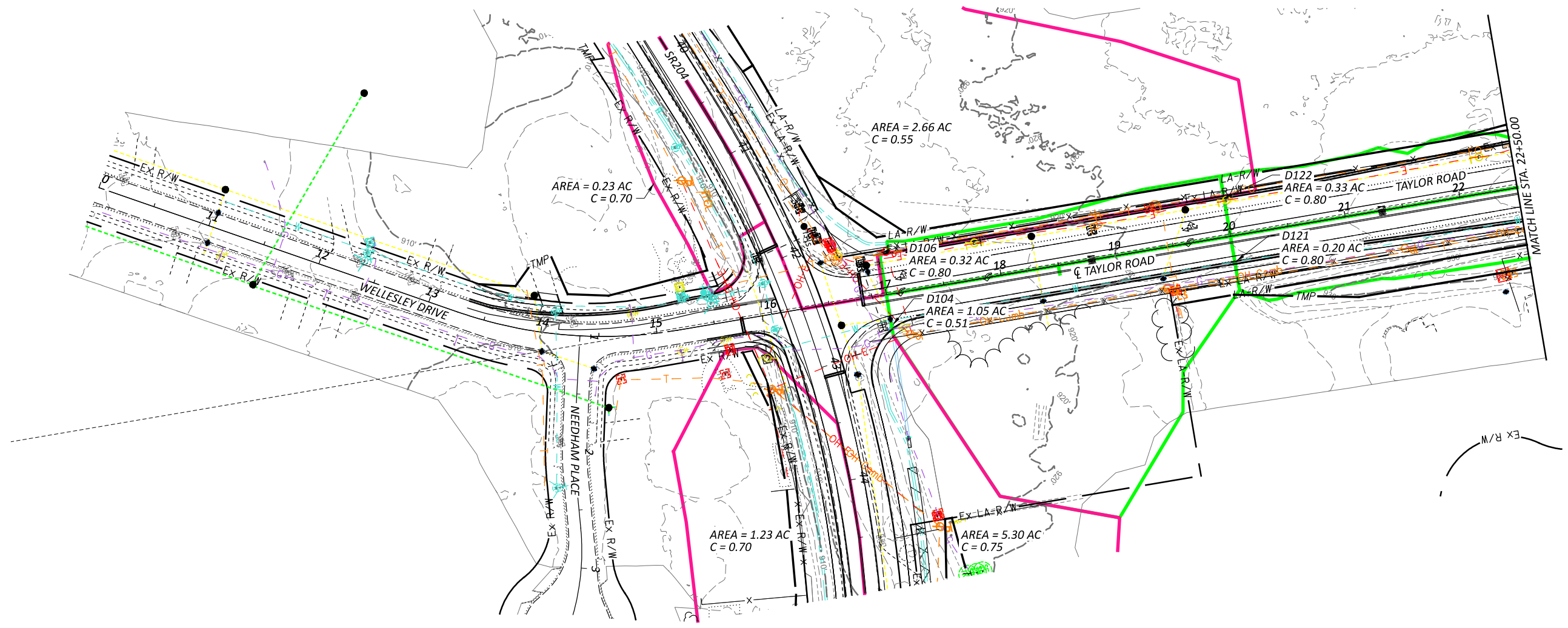
SHEET TOTAL

6 12



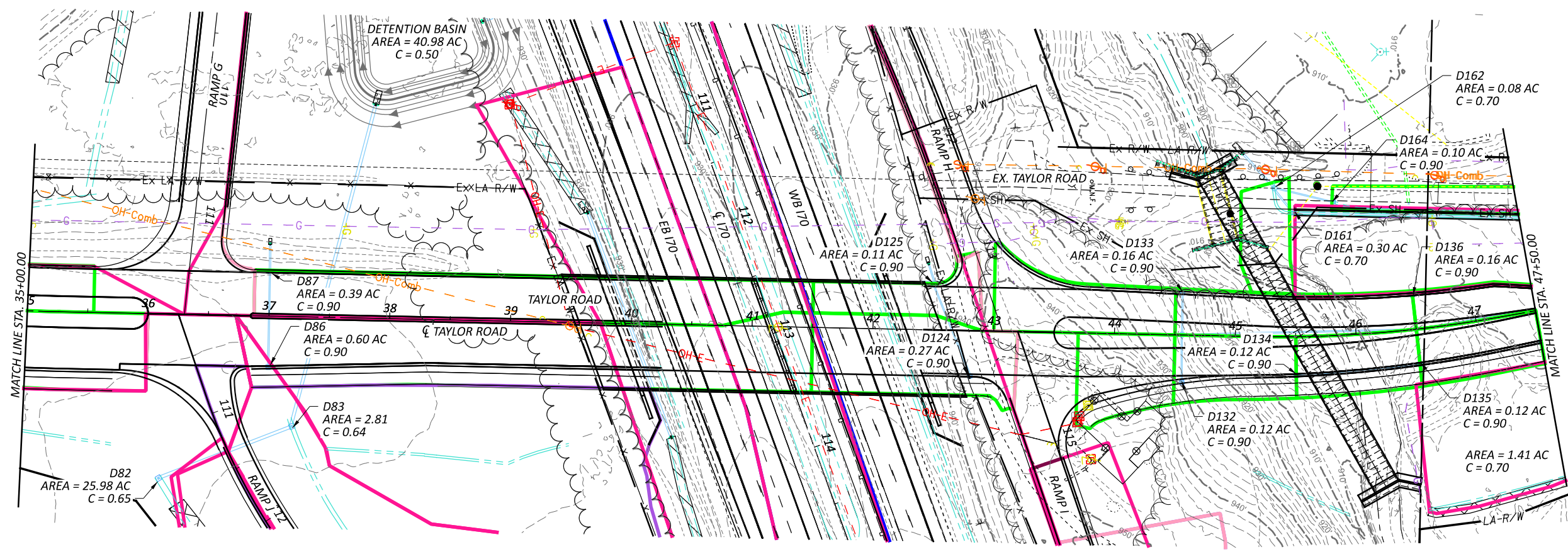
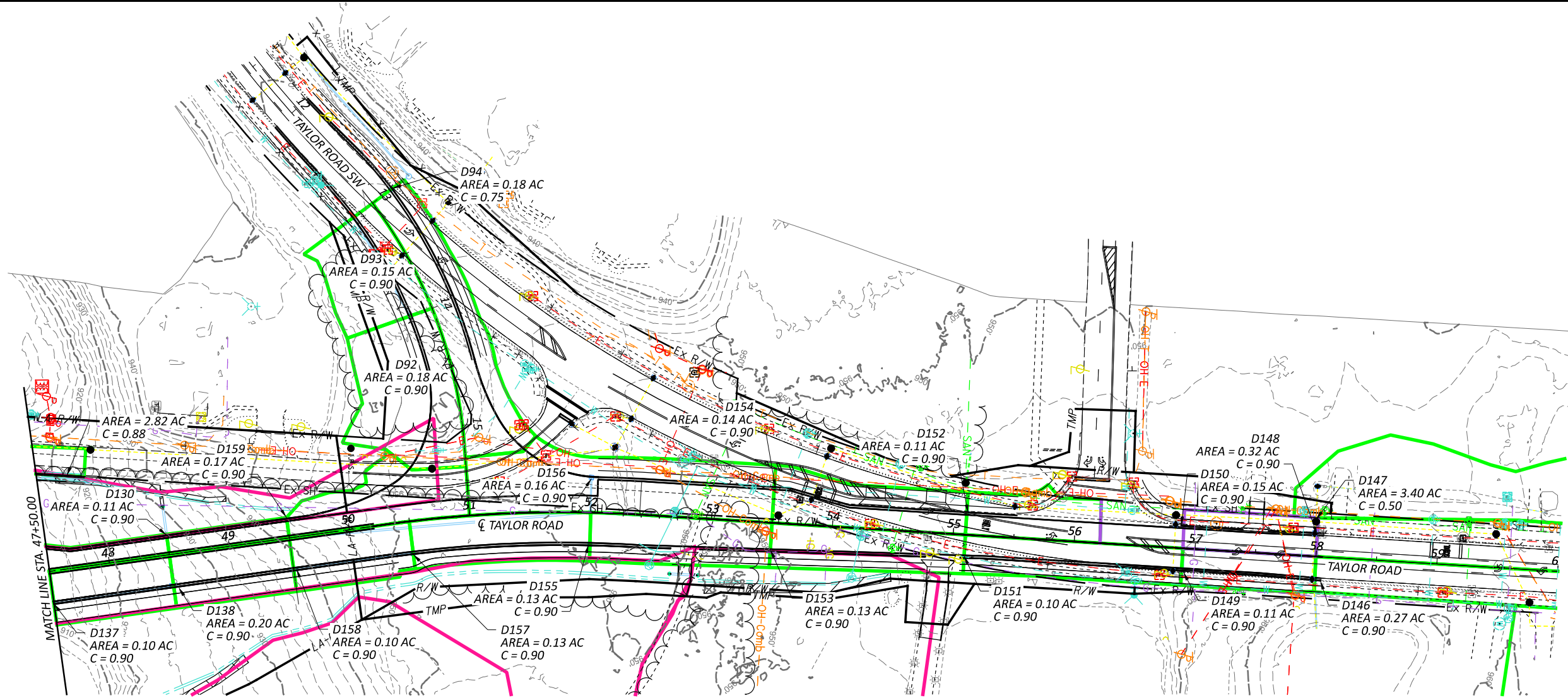
DRAINAGE MAP
 IR 70 - STA. 146+00.00 TO STA. 171+00.00

DESIGN AGENCY	
DESIGNER	CEF
REVIEWER	DMG 06/28/24
PROJECT ID	96808
SHEET	TOTAL
7	12



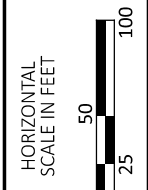
DRAINAGE MAP
TAYLOR ROAD - STA. 10+00.00 TO STA. 35+00.00

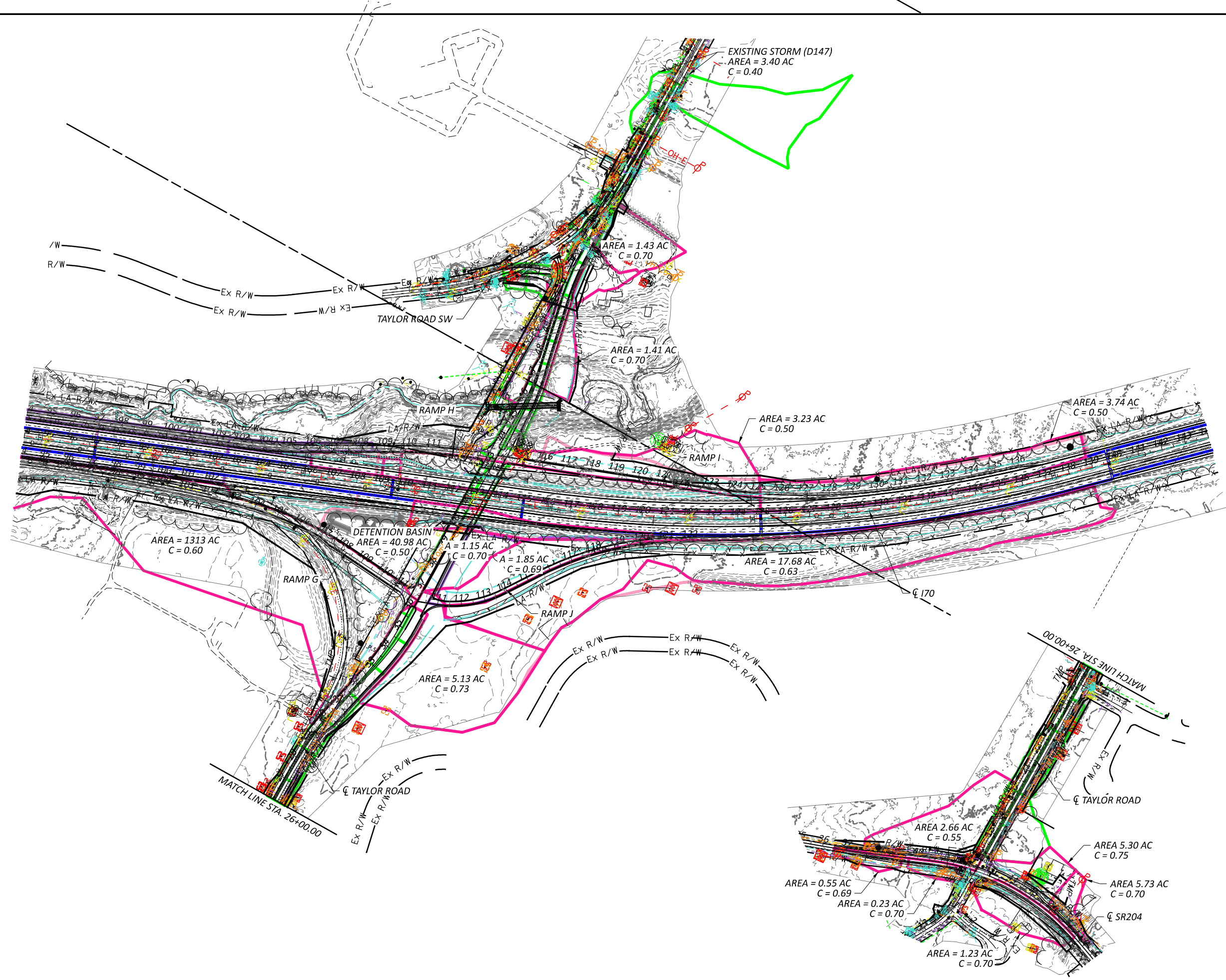
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DESIGNER	CEF
REVIEWER	DMG 06/28/24
PROJECT ID	96808
SHEET	8
TOTAL	12



DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DWG 06/28/24
PROJECT ID	96808
SHEET	9
TOTAL	12

DRAINAGE MAP
TAYLOR ROAD - STA. 35+00.00 TO STA. 60+00.00





DRAINAGE MAP
INTERCHANGE - I70 AND TAYLOR ROAD

DESIGN AGENCY

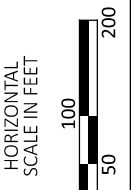
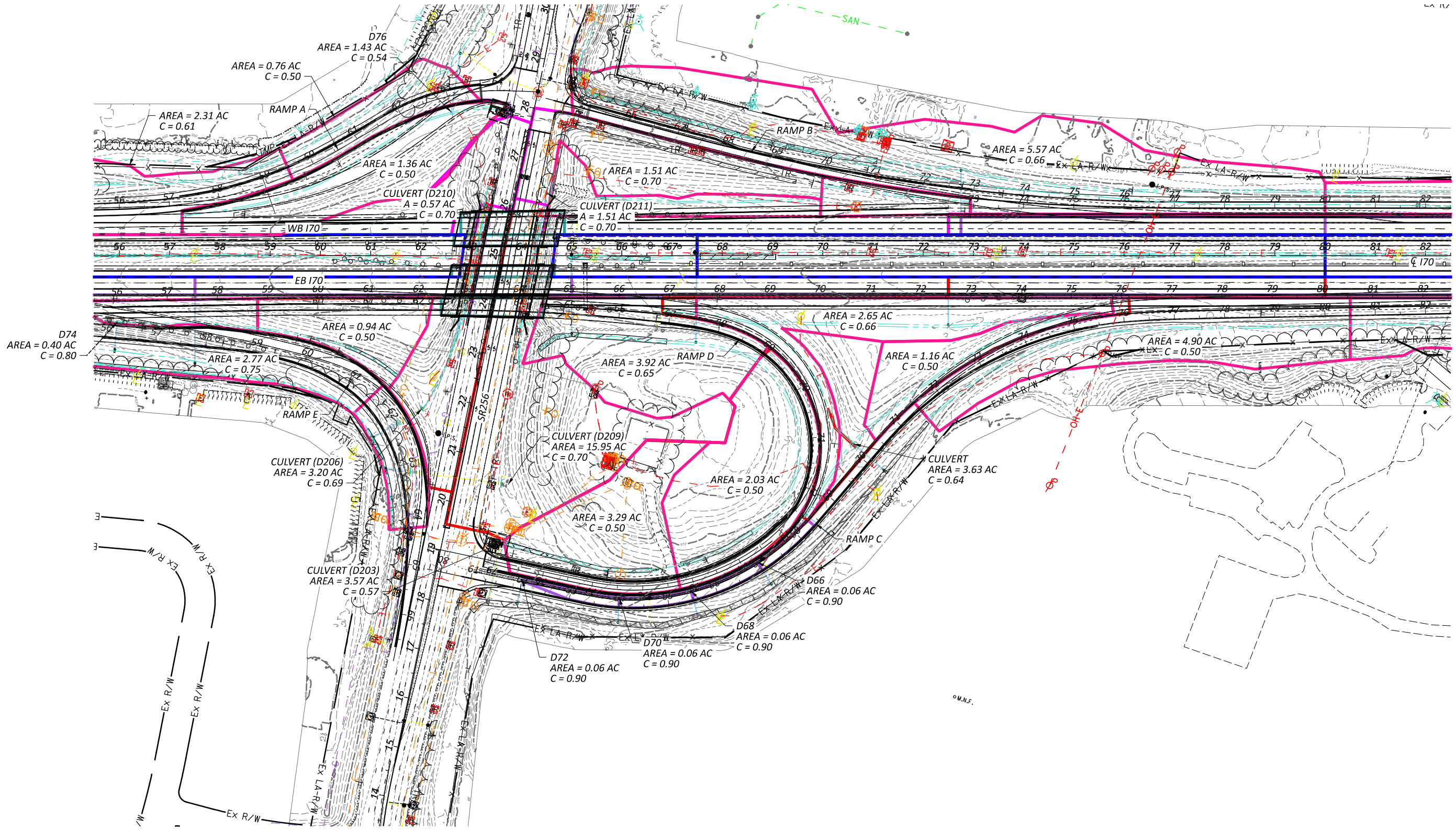


DESIGNER
CEF

REVIEWER
DMG 06/28/24

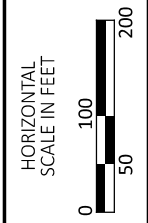
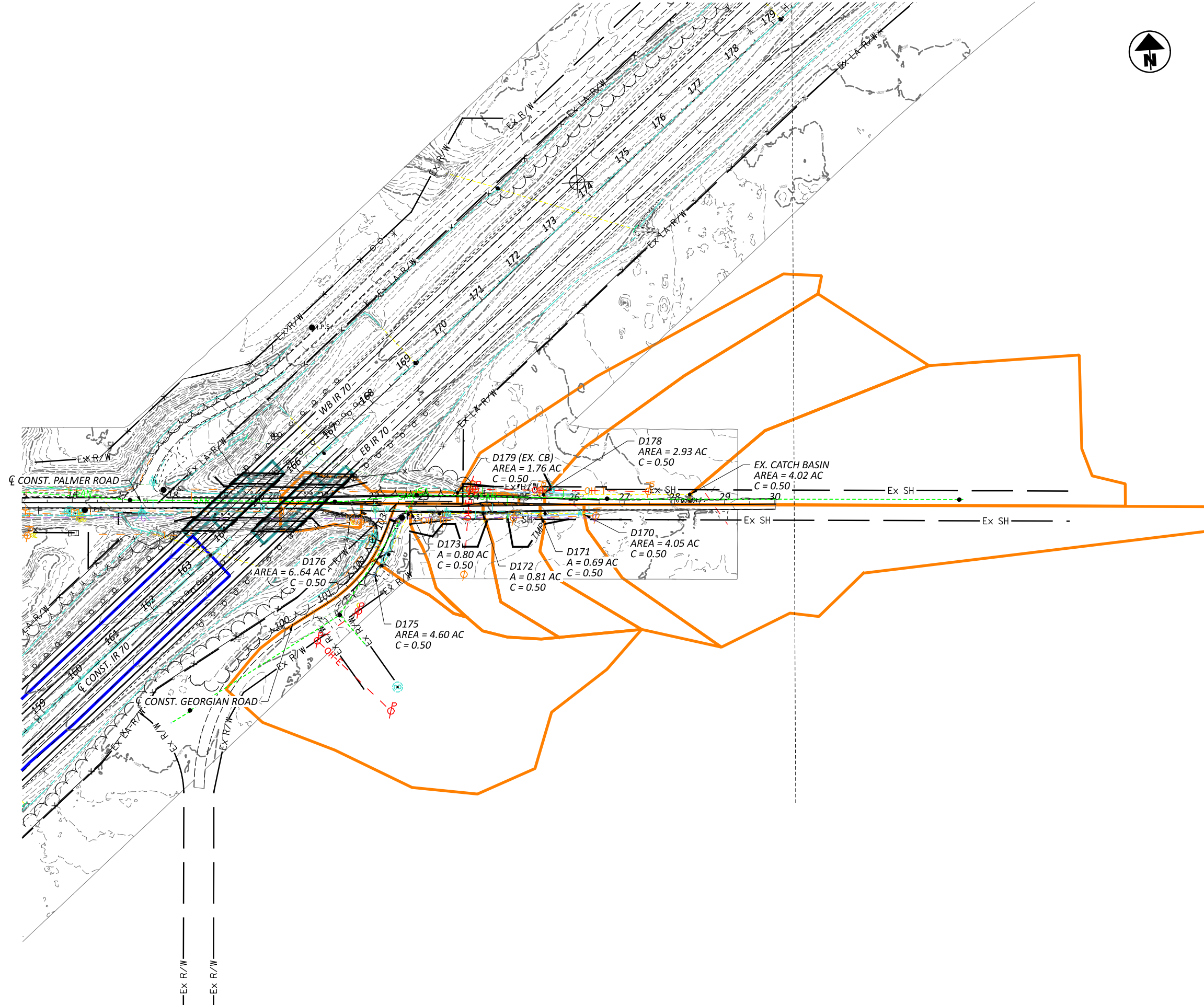
PROJECT ID
96808

SHEET	TOTAL
10	12



DRAINAGE MAP
INTERCHANGE - I70 AND SR256

DESIGN AGENCY	
CARPENTER MARTY	
DESIGNER	
CEF	
REVIEWER	
DMG 06/28/24	
PROJECT ID	
96808	
SHEET	TOTAL
11	12



DRAINAGE MAP
PALMER ROAD

DESIGN AGENCY



DESIGNER

CEP

REVIEWER

DMG 06/28/24

PROJECT ID

96808

SHEET TOTAL

12 12

III. Median Ditch Analysis

In the existing median of IR 70, there are ditches and catch basins which outlet the water to the roadside ditches. Preliminary ditch analysis was performed to check that the catch basins were appropriately spaced to avoid flooding on the roadway which might be caused by the additional proposed pavement. From the analysis, the existing median catch basins are adequately spaced to avoid flooding but will need to be replaced to ensure enough cover under the proposed pavement and median ditches. Some areas in the median will require additional ditch protection.



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 13+50.00 (D3) to Sta. 4+30.00 (D1) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
13+50	13+00	C	50.00	4.00	6.00	6.00	0.0125	0.10	0.10	0.71	0.07	Seed	3.24	2	0.030	16.03	0.82	0.05	0.22	0.06	4.74
												Seed	3.86	5	0.040	16.14	0.73	0.06	0.26	0.08	4.97
13+00	12+50	C	50.00	4.00	6.00	6.00	0.0133	0.10	0.19	0.71	0.14	Seed	3.16	2	0.030	16.81	1.07	0.07	0.43	0.09	5.06
												Seed	3.75	5	0.040	17.03	0.93	0.10	0.51	0.12	5.40
12+50	12+00	C	50.00	4.00	6.00	6.00	0.0130	0.10	0.29	0.71	0.20	Seed	3.09	2	0.030	17.50	1.20	0.09	0.63	0.11	5.35
												Seed	3.66	5	0.040	17.81	1.05	0.12	0.75	0.15	5.76
12+00	11+50	C	50.00	4.00	6.00	6.00	0.0138	0.10	0.38	0.71	0.27	Seed	3.03	2	0.030	18.12	1.34	0.11	0.83	0.13	5.55
												Seed	3.59	5	0.040	18.52	1.17	0.14	0.98	0.17	6.00
11+50	11+00	C	50.00	4.00	6.00	6.00	0.0146	0.10	0.48	0.71	0.34	Seed	2.98	2	0.030	18.69	1.47	0.13	1.01	0.14	5.71
												Seed	3.52	5	0.040	19.17	1.27	0.17	1.20	0.19	6.22
11+00	10+50	C	50.00	4.00	6.00	6.00	0.0159	0.10	0.58	0.71	0.41	Seed	2.93	2	0.030	19.21	1.59	0.15	1.20	0.15	5.84
												Seed	3.46	5	0.040	19.77	1.38	0.20	1.41	0.20	6.37
10+50	10+00	C	50.00	4.00	6.00	6.00	0.0161	0.10	0.67	0.71	0.48	Seed	2.89	2	0.030	19.71	1.67	0.17	1.38	0.17	5.98



DITCH ANALYSIS

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.)
												Seed	3.40	5	0.040	20.34	1.45	0.21	1.62	0.21	6.55
10+00	9+50	C	50.00	4.00	6.00	6.00	0.0162	0.10	0.77	0.71	0.55	Seed	2.85	2	0.030	20.18	1.75	0.18	1.55	0.18	6.11
												Seed	3.35	5	0.040	20.89	1.50	0.23	1.83	0.23	6.72
9+50	9+00	C	50.00	4.00	6.00	6.00	0.0165	0.10	0.86	0.71	0.61	Seed	2.81	2	0.030	20.64	1.82	0.19	1.72	0.19	6.22
												Seed	3.30	5	0.040	21.42	1.56	0.25	2.03	0.24	6.87
9+00	8+50	C	50.00	4.00	6.00	6.00	0.0155	0.10	0.96	0.71	0.68	Seed	2.77	2	0.030	21.09	1.83	0.19	1.89	0.20	6.38
												Seed	3.26	5	0.040	21.95	1.57	0.25	2.22	0.26	7.06
8+50	8+00	C	50.00	4.00	6.00	6.00	0.0162	0.10	1.06	0.71	0.75	Seed	2.74	2	0.030	21.53	1.90	0.21	2.05	0.21	6.47
												Seed	3.22	5	0.040	22.45	1.64	0.27	2.41	0.26	7.16
8+00	7+50	C	50.00	4.00	6.00	6.00	0.0159	0.10	1.15	0.71	0.82	Seed	2.71	2	0.030	21.96	1.93	0.22	2.21	0.22	6.59
												Seed	3.17	5	0.040	22.95	1.67	0.27	2.60	0.28	7.30
7+50	7+00	C	50.00	4.00	6.00	6.00	0.0159	0.10	1.25	0.71	0.89	Seed	2.68	2	0.030	22.38	1.98	0.22	2.37	0.22	6.69
												Seed	3.14	5	0.040	23.44	1.70	0.28	2.78	0.29	7.43
7+00	6+50	C	50.00	4.00	6.00	6.00	0.0164	0.10	1.34	0.71	0.95	Seed	2.65	2	0.030	22.79	2.04	0.24	2.53	0.23	6.76
												Seed	3.10	5	0.040	23.92	1.75	0.30	2.96	0.29	7.51
6+50	6+00	C	50.00	4.00	6.00	6.00	0.0164	0.10	1.44	0.71	1.02	Seed	2.62	2	0.030	23.19	2.08	0.24	2.68	0.24	6.85
												Seed	3.06	5	0.040	24.38	1.78	0.31	3.13	0.30	7.63
6+00	5+50	C	50.00	4.00	6.00	6.00	0.0121	0.10	1.54	0.71	1.09	Seed	2.59	2	0.030	23.62	1.90	0.20	2.82	0.27	7.19
												Seed	3.03	5	0.040	24.89	1.63	0.25	3.30	0.34	8.04
5+50	5+00	C	50.00	4.00	6.00	6.00	0.0144	0.10	1.63	0.71	1.16	Seed	2.56	2	0.030	24.03	2.05	0.23	2.97	0.26	7.13



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE C	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.)
												Seed	2.99	5	0.040	25.37	1.75	0.30	3.47	0.33	7.96
5+00	4+50	C	50.00	4.00	6.00	6.00	0.0153	0.10	1.73	0.71	1.23	Seed	2.54	2	0.030	24.42	2.12	0.25	3.11	0.26	7.16
												Seed	2.96	5	0.040	25.83	1.82	0.32	3.63	0.33	8.00
4+50	4+30	C	20.00	4.00	6.00	6.00	0.0168	0.04	1.77	0.71	1.25	Seed	2.53	2	0.030	24.57	2.20	0.27	3.17	0.26	7.11
												Seed	2.95	5	0.040	26.00	1.88	0.34	3.69	0.33	7.94



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 21+50.00 (high point) to Sta. 13+50.00 (D3) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
21+50	21+00	C	50.00	4.00	6.00	6.00	0.0004	0.10	0.10	0.71	0.07	Seed	3.04	2	0.030	18.03	0.26	0.00	0.21	0.16	5.93
												Seed	3.59	5	0.040	18.47	0.23	0.01	0.24	0.20	6.45
21+00	20+50	C	50.00	4.00	6.00	6.00	0.0013	0.10	0.19	0.71	0.14	Seed	2.88	2	0.030	19.77	0.47	0.01	0.39	0.17	6.00
												Seed	3.39	5	0.040	20.46	0.42	0.02	0.46	0.21	6.51
20+50	20+00	C	50.00	4.00	6.00	6.00	0.0017	0.10	0.29	0.71	0.20	Seed	2.77	2	0.030	21.18	0.59	0.02	0.57	0.19	6.26
												Seed	3.25	5	0.040	22.09	0.50	0.03	0.66	0.24	6.90
20+00	19+50	C	50.00	4.00	6.00	6.00	0.0021	0.10	0.38	0.71	0.27	Seed	2.67	2	0.030	22.40	0.68	0.03	0.73	0.20	6.45
												Seed	3.13	5	0.040	23.49	0.59	0.03	0.85	0.26	7.13
19+50	19+00	C	50.00	4.00	6.00	6.00	0.0037	0.10	0.48	0.71	0.34	Seed	2.61	2	0.030	23.33	0.89	0.05	0.89	0.19	6.32
												Seed	3.05	5	0.040	24.58	0.77	0.06	1.04	0.25	6.96
19+00	18+50	C	50.00	4.00	6.00	6.00	0.0050	0.10	0.58	0.71	0.41	Seed	2.56	2	0.030	24.14	1.03	0.06	1.04	0.20	6.35
												Seed	2.98	5	0.040	25.52	0.89	0.08	1.22	0.25	7.00
18+50	18+00	C	50.00	4.00	6.00	6.00	0.0052	0.10	0.67	0.71	0.48	Seed	2.51	2	0.030	24.90	1.09	0.07	1.20	0.21	6.51



DITCH ANALYSIS

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.)
												Seed	2.92	5	0.040	26.41	0.94	0.09	1.39	0.27	7.19
18+00	17+50	C	50.00	4.00	6.00	6.00	0.0051	0.10	0.77	0.71	0.55	Seed	2.46	2	0.030	25.64	1.12	0.07	1.34	0.22	6.69
												Seed	2.86	5	0.040	27.27	0.96	0.09	1.56	0.28	7.42
17+50	17+00	C	50.00	4.00	6.00	6.00	0.0058	0.10	0.86	0.71	0.61	Seed	2.42	2	0.030	26.32	1.20	0.08	1.48	0.23	6.76
												Seed	2.81	5	0.040	28.07	1.04	0.10	1.72	0.29	7.48
17+00	16+50	C	50.00	4.00	6.00	6.00	0.0073	0.10	0.96	0.71	0.68	Seed	2.38	2	0.030	26.94	1.35	0.10	1.63	0.23	6.71
												Seed	2.77	5	0.040	28.79	1.15	0.13	1.89	0.29	7.43
16+50	16+00	C	50.00	4.00	6.00	6.00	0.0080	0.10	1.06	0.71	0.75	Seed	2.35	2	0.030	27.52	1.42	0.11	1.76	0.23	6.77
												Seed	2.73	5	0.040	29.47	1.21	0.15	2.04	0.29	7.51
16+00	15+50	C	50.00	4.00	6.00	6.00	0.0083	0.10	1.15	0.71	0.82	Seed	2.32	2	0.030	28.08	1.47	0.12	1.90	0.24	6.85
												Seed	2.69	5	0.040	30.13	1.26	0.16	2.20	0.30	7.61
15+50	15+00	C	50.00	4.00	6.00	6.00	0.0094	0.10	1.25	0.71	0.89	Seed	2.29	2	0.030	28.61	1.58	0.14	2.03	0.24	6.85
												Seed	2.65	5	0.040	30.75	1.35	0.18	2.35	0.30	7.61
15+00	14+50	C	50.00	4.00	6.00	6.00	0.0102	0.10	1.34	0.71	0.95	Seed	2.27	2	0.030	29.11	1.65	0.15	2.16	0.24	6.88
												Seed	2.62	5	0.040	31.33	1.41	0.19	2.50	0.30	7.66
14+50	14+00	C	50.00	4.00	6.00	6.00	0.0109	0.10	1.44	0.71	1.02	Seed	2.24	2	0.030	29.60	1.72	0.17	2.29	0.24	6.93
												Seed	2.59	5	0.040	31.90	1.47	0.21	2.65	0.31	7.70
14+00	13+50	C	50.00	4.00	6.00	6.00	0.0121	0.10	1.54	0.71	1.09	Seed	2.22	2	0.030	30.05	1.81	0.18	2.42	0.24	6.93
												Seed	2.56	5	0.040	32.44	1.55	0.23	2.80	0.31	7.71



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 21+50.00 (high point) to Sta. 34+35.00 (D5) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
21+50	22+00	C	50.00	4.00	6.00	6.00	0.0005	0.10	0.10	0.72	0.07	Seed	3.04	2	0.030	17.96	0.28	0.00	0.21	0.16	5.87
												Seed	3.60	5	0.040	18.39	0.24	0.01	0.25	0.20	6.45
22+00	22+50	C	50.00	4.00	6.00	6.00	0.0002	0.10	0.20	0.72	0.14	Seed	2.78	2	0.030	21.00	0.26	0.00	0.40	0.27	7.22
												Seed	3.26	5	0.040	21.91	0.23	0.01	0.47	0.34	8.06
22+50	23+00	C	50.00	4.00	6.00	6.00	0.0011	0.11	0.31	0.74	0.22	Seed	2.66	2	0.030	22.63	0.51	0.02	0.59	0.22	6.64
												Seed	3.11	5	0.040	23.77	0.44	0.02	0.69	0.28	7.35
23+00	23+50	C	50.00	4.00	6.00	6.00	0.0026	0.12	0.42	0.75	0.31	Seed	2.58	2	0.030	23.72	0.75	0.03	0.80	0.20	6.45
												Seed	3.01	5	0.040	25.06	0.65	0.04	0.94	0.26	7.13
23+50	24+00	C	50.00	4.00	6.00	6.00	0.0034	0.13	0.55	0.76	0.41	Seed	2.52	2	0.030	24.65	0.89	0.05	1.02	0.22	6.59
												Seed	2.94	5	0.040	26.13	0.77	0.06	1.19	0.27	7.29
24+00	24+50	C	50.00	4.00	6.00	6.00	0.0035	0.13	0.68	0.77	0.51	Seed	2.47	2	0.030	25.50	0.97	0.05	1.26	0.24	6.87
												Seed	2.87	5	0.040	27.14	0.83	0.07	1.46	0.30	7.64
24+50	25+00	C	50.00	4.00	6.00	6.00	0.0048	0.14	0.82	0.77	0.62	Seed	2.42	2	0.030	26.24	1.13	0.07	1.49	0.24	6.90



DITCH ANALYSIS

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.)
												Seed	2.82	5	0.040	27.99	0.97	0.09	1.73	0.31	7.67
25+00	25+50	C	50.00	4.00	6.00	6.00	0.0049	0.14	0.96	0.77	0.72	Seed	2.38	2	0.030	26.93	1.20	0.08	1.72	0.26	7.11
												Seed	2.77	5	0.040	28.80	1.02	0.10	2.00	0.33	7.93
25+50	26+00	C	50.00	4.00	6.00	6.00	0.0053	0.14	1.10	0.77	0.83	Seed	2.35	2	0.030	27.58	1.27	0.09	1.95	0.27	7.27
												Seed	2.72	5	0.040	29.57	1.08	0.11	2.25	0.34	8.13
26+00	26+50	C	50.00	4.00	6.00	6.00	0.0058	0.14	1.24	0.77	0.94	Seed	2.32	2	0.030	28.20	1.36	0.10	2.17	0.28	7.37
												Seed	2.68	5	0.040	30.29	1.15	0.13	2.51	0.35	8.25
26+50	27+00	C	50.00	4.00	6.00	6.00	0.0075	0.14	1.38	0.77	1.04	Seed	2.29	2	0.030	28.74	1.52	0.13	2.38	0.28	7.32
												Seed	2.64	5	0.040	30.93	1.30	0.16	2.76	0.35	8.17
27+00	27+50	C	50.00	4.00	6.00	6.00	0.0078	0.14	1.52	0.77	1.15	Seed	2.26	2	0.030	29.26	1.59	0.14	2.60	0.29	7.43
												Seed	2.61	5	0.040	31.54	1.35	0.18	3.00	0.36	8.32
27+50	28+00	C	50.00	4.00	6.00	6.00	0.0098	0.14	1.65	0.77	1.26	Seed	2.24	2	0.030	29.73	1.76	0.17	2.81	0.28	7.37
												Seed	2.58	5	0.040	32.10	1.50	0.22	3.24	0.35	8.24
28+00	28+50	C	50.00	4.00	6.00	6.00	0.0091	0.14	1.79	0.77	1.36	Seed	2.21	2	0.030	30.21	1.75	0.17	3.02	0.30	7.58
												Seed	2.55	5	0.040	32.65	1.49	0.21	3.48	0.37	8.50
28+50	29+00	C	50.00	4.00	6.00	6.00	0.0102	0.14	1.93	0.77	1.47	Seed	2.19	2	0.030	30.65	1.86	0.19	3.22	0.30	7.59
												Seed	2.53	5	0.040	33.18	1.58	0.24	3.72	0.38	8.50
29+00	29+50	C	50.00	4.00	6.00	6.00	0.0113	0.14	2.07	0.77	1.58	Seed	2.17	2	0.030	31.08	1.96	0.21	3.43	0.30	7.61
												Seed	2.50	5	0.040	33.67	1.67	0.27	3.95	0.38	8.53
29+50	30+00	C	50.00	4.00	6.00	6.00	0.0111	0.14	2.21	0.77	1.68	Seed	2.15	2	0.030	31.50	1.98	0.21	3.63	0.31	7.74



DITCH ANALYSIS

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.)
												Seed	2.48	5	0.040	34.17	1.68	0.27	4.17	0.39	8.69
30+00	30+50	C	50.00	4.00	6.00	6.00	0.0129	0.14	2.35	0.77	1.79	Seed	2.14	2	0.030	31.89	2.13	0.25	3.83	0.31	7.69
												Seed	2.46	5	0.040	34.63	1.81	0.31	4.40	0.39	8.62
30+50	31+00	C	50.00	4.00	6.00	6.00	0.0131	0.14	2.49	0.77	1.90	Seed	2.12	2	0.030	32.27	2.17	0.26	4.02	0.31	7.78
												Seed	2.44	5	0.040	35.08	1.84	0.32	4.62	0.39	8.73
31+00	31+50	C	50.00	4.00	6.00	6.00	0.0136	0.14	2.63	0.77	2.01	Seed	2.10	2	0.030	32.64	2.23	0.27	4.22	0.32	7.83
												Seed	2.42	5	0.040	35.52	1.90	0.34	4.84	0.40	8.79
31+50	32+00	C	50.00	4.00	6.00	6.00	0.0148	0.14	2.77	0.77	2.11	Seed	2.09	2	0.030	33.00	2.33	0.30	4.41	0.32	7.84
												Seed	2.40	5	0.040	35.94	1.98	0.37	5.07	0.40	8.80
32+00	32+50	C	50.00	4.00	6.00	6.00	0.0155	0.14	2.91	0.77	2.22	Seed	2.07	2	0.030	33.35	2.39	0.31	4.60	0.32	7.88
												Seed	2.38	5	0.040	36.35	2.03	0.39	5.28	0.40	8.85
32+50	33+00	C	50.00	4.00	6.00	6.00	0.0159	0.14	3.05	0.77	2.33	Seed	2.06	2	0.030	33.69	2.45	0.33	4.80	0.33	7.94
												Seed	2.36	5	0.040	36.75	2.07	0.41	5.50	0.41	8.92
33+00	33+50	C	50.00	4.00	6.00	6.00	0.0157	0.14	3.19	0.78	2.44	Seed	2.04	2	0.030	34.02	2.46	0.33	4.99	0.34	8.04
												Seed	2.34	5	0.040	37.15	2.09	0.41	5.72	0.42	9.04
33+50	34+00	C	50.00	4.00	6.00	6.00	0.0181	0.14	3.33	0.78	2.55	Seed	2.03	2	0.030	34.34	2.62	0.37	5.18	0.33	7.97
												Seed	2.33	5	0.040	37.52	2.22	0.47	5.94	0.41	8.95
34+00	34+35	C	35.00	4.00	6.00	6.00	0.0177	0.10	3.43	0.78	2.63	Seed	2.02	2	0.030	34.56	2.62	0.37	5.32	0.34	8.04
												Seed	2.32	5	0.040	37.78	2.22	0.47	6.09	0.42	9.04



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 34+35.00 (D5) to Sta. 42+00.00 (D7) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (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.)
34+35	34+50	C	15.00	4.00	6.00	6.00	0.0175	0.05	0.05	0.78	0.04	Seed	3.32	2	0.030	15.33	0.75	0.04	0.12	0.04	4.45
												Seed	3.95	5	0.040	15.38	0.65	0.06	0.14	0.05	4.61
34+50	35+00	C	50.00	4.00	6.00	6.00	0.0198	0.15	0.19	0.77	0.15	Seed	3.24	2	0.030	15.99	1.24	0.11	0.48	0.09	5.03
												Seed	3.86	5	0.040	16.13	1.11	0.14	0.57	0.11	5.32
35+00	35+50	C	50.00	4.00	6.00	6.00	0.0199	0.15	0.34	0.78	0.26	Seed	3.19	2	0.030	16.53	1.51	0.15	0.84	0.12	5.42
												Seed	3.78	5	0.040	16.76	1.33	0.19	1.00	0.15	5.84
35+50	36+00	C	50.00	4.00	6.00	6.00	0.0201	0.15	0.49	0.78	0.38	Seed	3.14	2	0.030	17.01	1.73	0.18	1.19	0.14	5.71
												Seed	3.72	5	0.040	17.31	1.49	0.23	1.41	0.19	6.22
36+00	36+50	C	50.00	4.00	6.00	6.00	0.0193	0.15	0.64	0.78	0.50	Seed	3.09	2	0.030	17.46	1.85	0.20	1.54	0.17	6.00
												Seed	3.66	5	0.040	17.83	1.60	0.26	1.82	0.21	6.58
36+50	37+00	C	50.00	4.00	6.00	6.00	0.0202	0.15	0.79	0.78	0.62	Seed	3.05	2	0.030	17.87	2.00	0.23	1.88	0.18	6.22
												Seed	3.61	5	0.040	18.31	1.73	0.30	2.23	0.24	6.85
37+00	37+50	C	50.00	4.00	6.00	6.00	0.0204	0.16	0.95	0.79	0.74	Seed	3.01	2	0.030	18.27	2.11	0.26	2.23	0.20	6.43



DITCH ANALYSIS

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.)
												Seed	3.56	5	0.040	18.76	1.83	0.33	2.64	0.26	7.11
37+50	38+00	C	50.00	4.00	6.00	6.00	0.0198	0.16	1.11	0.79	0.87	Seed	2.98	2	0.030	18.65	2.19	0.27	2.58	0.22	6.65
												Seed	3.51	5	0.040	19.20	1.88	0.35	3.04	0.28	7.40
38+00	38+50	C	50.00	4.00	6.00	6.00	0.0188	0.16	1.27	0.79	0.99	Seed	2.95	2	0.030	19.02	2.23	0.28	2.92	0.24	6.88
												Seed	3.47	5	0.040	19.63	1.92	0.36	3.45	0.31	7.69
38+50	39+00	C	50.00	4.00	6.00	6.00	0.0199	0.16	1.43	0.79	1.12	Seed	2.91	2	0.030	19.37	2.36	0.31	3.27	0.25	7.01
												Seed	3.43	5	0.040	20.04	2.02	0.40	3.85	0.32	7.85
39+00	39+50	C	50.00	4.00	6.00	6.00	0.0210	0.17	1.60	0.79	1.25	Seed	2.89	2	0.030	19.70	2.48	0.34	3.61	0.26	7.14
												Seed	3.39	5	0.040	20.43	2.13	0.44	4.25	0.33	8.00
39+50	40+00	C	50.00	4.00	6.00	6.00	0.0200	0.17	1.77	0.80	1.39	Seed	2.86	2	0.030	20.04	2.50	0.35	3.97	0.28	7.35
												Seed	3.36	5	0.040	20.82	2.15	0.44	4.66	0.35	8.25
40+00	40+50	C	50.00	4.00	6.00	6.00	0.0208	0.17	1.94	0.80	1.53	Seed	2.83	2	0.030	20.35	2.61	0.38	4.32	0.29	7.46
												Seed	3.33	5	0.040	21.19	2.23	0.48	5.07	0.37	8.40
40+50	41+00	C	50.00	4.00	6.00	6.00	0.0204	0.17	2.11	0.80	1.66	Seed	2.81	2	0.030	20.67	2.65	0.39	4.67	0.30	7.63
												Seed	3.29	5	0.040	21.56	2.26	0.49	5.48	0.38	8.61
41+00	41+50	C	50.00	4.00	6.00	6.00	0.0149	0.11	2.22	0.74	1.74	Seed	2.78	2	0.030	21.01	2.40	0.31	4.85	0.34	8.04
												Seed	3.26	5	0.040	21.97	2.05	0.39	5.68	0.42	9.09
41+50	42+00	C	50.00	4.00	6.00	6.00	0.0109	0.11	2.33	0.73	1.82	Seed	2.75	2	0.030	21.40	2.17	0.25	5.01	0.37	8.45
												Seed	3.22	5	0.040	22.42	1.84	0.32	5.86	0.47	9.61



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 42+00.00 (D7) to Sta. 44+15.00 (D15) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
42+00	42+50	C	50.00	4.00	6.00	6.00	0.0127	0.10	0.10	0.71	0.07	Seed	3.25	2	0.030	15.98	0.82	0.05	0.22	0.06	4.74
												Seed	3.86	5	0.040	16.10	0.73	0.06	0.26	0.08	4.97
42+50	43+00	C	50.00	4.00	6.00	6.00	0.0138	0.10	0.19	0.72	0.14	Seed	3.16	2	0.030	16.76	1.09	0.08	0.44	0.09	5.06
												Seed	3.76	5	0.040	16.97	0.96	0.10	0.52	0.12	5.39
43+00	43+50	C	50.00	4.00	6.00	6.00	0.0110	0.10	0.29	0.72	0.21	Seed	3.09	2	0.030	17.48	1.15	0.08	0.64	0.12	5.42
												Seed	3.66	5	0.040	17.80	0.99	0.11	0.76	0.16	5.87
43+50	44+00	C	50.00	4.00	6.00	6.00	0.0036	0.10	0.39	0.71	0.28	Seed	3.00	2	0.030	18.44	0.86	0.04	0.83	0.19	6.26
												Seed	3.54	5	0.040	18.92	0.74	0.05	0.98	0.24	6.90
44+00	44+15	C	15.00	4.00	6.00	6.00	0.0131	0.03	0.41	0.71	0.30	Seed	2.98	2	0.030	18.63	1.35	0.11	0.88	0.14	5.63
												Seed	3.52	5	0.040	19.14	1.17	0.14	1.04	0.18	6.11



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 48+00.00 (D19) to Sta. 45+87.00 (D17) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
48+00	47+50	C	50.00	4.00	6.00	6.00	0.0117	0.10	0.10	0.71	0.07	Seed	3.24	2	0.030	16.03	0.78	0.05	0.22	0.06	4.77
												Seed	3.85	5	0.040	16.19	0.73	0.06	0.26	0.08	4.97
47+50	47+00	C	50.00	4.00	6.00	6.00	0.0136	0.10	0.19	0.71	0.14	Seed	3.16	2	0.030	16.81	1.07	0.08	0.43	0.09	5.06
												Seed	3.75	5	0.040	17.07	0.94	0.10	0.51	0.12	5.39
47+00	46+50	C	50.00	4.00	6.00	6.00	0.0105	0.10	0.29	0.71	0.20	Seed	3.08	2	0.030	17.55	1.12	0.08	0.63	0.12	5.43
												Seed	3.65	5	0.040	17.91	0.97	0.10	0.75	0.16	5.87
46+50	46+00	C	50.00	4.00	6.00	6.00	0.0097	0.10	0.38	0.71	0.27	Seed	3.02	2	0.030	18.25	1.19	0.09	0.82	0.14	5.71
												Seed	3.57	5	0.040	18.71	1.04	0.11	0.97	0.18	6.21
46+00	45+87	C	13.00	4.00	6.00	6.00	0.0099	0.03	0.41	0.71	0.29	Seed	3.00	2	0.030	18.43	1.22	0.09	0.87	0.15	5.76
												Seed	3.54	5	0.040	18.92	1.07	0.12	1.03	0.19	6.26



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : I-70 Median Ditch- Sta. 62+65.00 (SR256 Bridge) to Sta. 48+00.00 (D19) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
62+65	62+50	C	15.00	4.00	6.00	6.00	0.0182	0.06	0.06	0.71	0.04	Seed	3.32	2	0.030	15.30	0.81	0.05	0.15	0.04	4.52
												Seed	3.96	5	0.040	15.36	0.69	0.07	0.18	0.06	4.71
62+50	62+00	C	50.00	4.00	6.00	6.00	0.0195	0.10	0.16	0.72	0.11	Seed	3.24	2	0.030	16.04	1.15	0.09	0.37	0.07	4.87
												Seed	3.85	5	0.040	16.17	1.00	0.12	0.44	0.10	5.16
62+00	61+50	C	50.00	4.00	6.00	6.00	0.0175	0.10	0.26	0.72	0.18	Seed	3.17	2	0.030	16.67	1.28	0.11	0.58	0.10	5.19
												Seed	3.77	5	0.040	16.90	1.13	0.14	0.69	0.13	5.55
61+50	61+00	C	50.00	4.00	6.00	6.00	0.0196	0.10	0.35	0.72	0.25	Seed	3.11	2	0.030	17.23	1.48	0.14	0.79	0.11	5.37
												Seed	3.69	5	0.040	17.55	1.30	0.18	0.94	0.15	5.77
61+00	60+50	C	50.00	4.00	6.00	6.00	0.0254	0.10	0.45	0.72	0.32	Seed	3.07	2	0.030	17.71	1.74	0.19	0.99	0.12	5.45
												Seed	3.63	5	0.040	18.09	1.53	0.25	1.18	0.16	5.87
60+50	60+00	C	50.00	4.00	6.00	6.00	0.0289	0.10	0.55	0.72	0.39	Seed	3.03	2	0.030	18.14	1.94	0.23	1.19	0.13	5.55
												Seed	3.58	5	0.040	18.58	1.69	0.30	1.41	0.17	6.00
60+00	59+50	C	50.00	4.00	6.00	6.00	0.0223	0.10	0.65	0.72	0.46	Seed	2.98	2	0.030	18.58	1.87	0.21	1.38	0.15	5.81



DITCH ANALYSIS

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.)
												Seed	3.53	5	0.040	19.09	1.63	0.27	1.64	0.19	6.34
59+50	59+00	C	50.00	4.00	6.00	6.00	0.0212	0.10	0.74	0.72	0.53	Seed	2.95	2	0.030	19.02	1.92	0.22	1.57	0.16	5.97
												Seed	3.48	5	0.040	19.59	1.66	0.28	1.85	0.21	6.55
59+00	58+50	C	50.00	4.00	6.00	6.00	0.0210	0.10	0.84	0.72	0.60	Seed	2.91	2	0.030	19.44	1.97	0.23	1.76	0.18	6.11
												Seed	3.43	5	0.040	20.07	1.71	0.30	2.07	0.23	6.71
58+50	58+00	C	50.00	4.00	6.00	6.00	0.0208	0.10	0.94	0.72	0.67	Seed	2.87	2	0.030	19.85	2.03	0.24	1.94	0.19	6.23
												Seed	3.38	5	0.040	20.55	1.75	0.31	2.28	0.24	6.87
58+00	57+50	C	50.00	4.00	6.00	6.00	0.0202	0.10	1.03	0.72	0.74	Seed	2.84	2	0.030	20.25	2.06	0.25	2.11	0.20	6.37
												Seed	3.34	5	0.040	21.01	1.78	0.32	2.48	0.25	7.03
57+50	57+00	C	50.00	4.00	6.00	6.00	0.0229	0.10	1.13	0.72	0.81	Seed	2.81	2	0.030	20.62	2.21	0.28	2.28	0.20	6.38
												Seed	3.30	5	0.040	21.45	1.91	0.36	2.69	0.25	7.05
57+00	56+50	C	50.00	4.00	6.00	6.00	0.0192	0.10	1.23	0.72	0.88	Seed	2.78	2	0.030	21.01	2.13	0.26	2.45	0.22	6.60
												Seed	3.26	5	0.040	21.90	1.84	0.33	2.88	0.28	7.32
56+50	56+00	C	50.00	4.00	6.00	6.00	0.0198	0.10	1.32	0.72	0.95	Seed	2.75	2	0.030	21.39	2.20	0.28	2.62	0.22	6.67
												Seed	3.23	5	0.040	22.34	1.89	0.35	3.07	0.28	7.42
56+00	55+50	C	50.00	4.00	6.00	6.00	0.0195	0.10	1.42	0.72	1.02	Seed	2.72	2	0.030	21.76	2.23	0.28	2.78	0.23	6.78
												Seed	3.19	5	0.040	22.77	1.91	0.36	3.26	0.30	7.54
55+50	55+00	C	50.00	4.00	6.00	6.00	0.0201	0.10	1.52	0.72	1.09	Seed	2.69	2	0.030	22.12	2.29	0.30	2.94	0.24	6.84
												Seed	3.16	5	0.040	23.19	1.97	0.38	3.45	0.30	7.62
55+00	54+50	C	50.00	4.00	6.00	6.00	0.0200	0.10	1.62	0.72	1.16	Seed	2.67	2	0.030	22.48	2.32	0.30	3.10	0.24	6.93



DITCH ANALYSIS

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.)
												Seed	3.12	5	0.040	23.61	2.00	0.39	3.63	0.31	7.72
54+50	54+00	C	50.00	4.00	6.00	6.00	0.0201	0.10	1.71	0.72	1.23	Seed	2.64	2	0.030	22.83	2.36	0.31	3.26	0.25	7.01
												Seed	3.09	5	0.040	24.02	2.02	0.40	3.81	0.32	7.82
54+00	53+50	C	50.00	4.00	6.00	6.00	0.0199	0.10	1.81	0.72	1.30	Seed	2.62	2	0.030	23.18	2.39	0.32	3.41	0.26	7.09
												Seed	3.06	5	0.040	24.42	2.05	0.41	3.98	0.33	7.92
53+50	53+00	C	50.00	4.00	6.00	6.00	0.0195	0.10	1.91	0.72	1.37	Seed	2.60	2	0.030	23.53	2.41	0.32	3.56	0.26	7.17
												Seed	3.03	5	0.040	24.83	2.06	0.41	4.16	0.34	8.03
53+00	52+50	C	50.00	4.00	6.00	6.00	0.0199	0.10	2.00	0.72	1.44	Seed	2.57	2	0.030	23.86	2.45	0.33	3.71	0.27	7.23
												Seed	3.00	5	0.040	25.22	2.10	0.42	4.33	0.34	8.09
52+50	52+00	C	50.00	4.00	6.00	6.00	0.0203	0.10	2.10	0.72	1.51	Seed	2.55	2	0.030	24.20	2.49	0.35	3.86	0.27	7.29
												Seed	2.97	5	0.040	25.61	2.13	0.44	4.49	0.35	8.16
52+00	51+50	C	50.00	4.00	6.00	6.00	0.0202	0.10	2.20	0.72	1.58	Seed	2.53	2	0.030	24.53	2.52	0.35	4.00	0.28	7.35
												Seed	2.95	5	0.040	26.00	2.15	0.45	4.66	0.35	8.25
51+50	51+00	C	50.00	4.00	6.00	6.00	0.0201	0.10	2.29	0.72	1.65	Seed	2.51	2	0.030	24.85	2.54	0.36	4.14	0.29	7.42
												Seed	2.92	5	0.040	26.38	2.17	0.45	4.82	0.36	8.33
51+00	50+50	C	50.00	4.00	6.00	6.00	0.0205	0.10	2.39	0.72	1.72	Seed	2.49	2	0.030	25.17	2.59	0.37	4.28	0.29	7.46
												Seed	2.90	5	0.040	26.76	2.21	0.47	4.98	0.36	8.37
50+50	50+00	C	50.00	4.00	6.00	6.00	0.0201	0.10	2.49	0.72	1.79	Seed	2.47	2	0.030	25.50	2.59	0.37	4.42	0.30	7.54
												Seed	2.87	5	0.040	27.13	2.21	0.47	5.14	0.37	8.47
50+00	49+50	C	50.00	4.00	6.00	6.00	0.0202	0.10	2.59	0.72	1.86	Seed	2.45	2	0.030	25.81	2.62	0.38	4.56	0.30	7.60



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE C	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.)
												Seed	2.85	5	0.040	27.51	2.24	0.48	5.30	0.38	8.54
49+50	49+00	C	50.00	4.00	6.00	6.00	0.0193	0.10	2.68	0.72	1.93	Seed	2.43	2	0.030	26.13	2.60	0.37	4.69	0.31	7.70
												Seed	2.82	5	0.040	27.88	2.22	0.47	5.45	0.39	8.66
49+00	48+50	C	50.00	4.00	6.00	6.00	0.0154	0.10	2.78	0.72	2.00	Seed	2.41	2	0.030	26.47	2.42	0.32	4.82	0.33	7.99
												Seed	2.80	5	0.040	28.29	2.06	0.40	5.59	0.42	9.01
48+50	48+00	C	50.00	4.00	6.00	6.00	0.0126	0.10	2.88	0.72	2.07	Seed	2.39	2	0.030	26.84	2.28	0.28	4.95	0.35	8.25
												Seed	2.77	5	0.040	28.72	1.94	0.35	5.74	0.44	9.33



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 67+50 (D28) to Sta. 65+00.00 (D25/SR256) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (ft.)	IN WIDTH (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.)
67+50	67+00	C	50.00	4.00	6.00	6.00	0.0140	0.10	0.10	0.72	0.07	Seed	3.25	2	0.030	15.96	0.88	0.05	0.23	0.06	4.71
												Seed	3.87	5	0.040	16.08	0.75	0.07	0.27	0.08	4.97
67+00	66+50	C	50.00	4.00	6.00	6.00	0.0145	0.10	0.19	0.72	0.14	Seed	3.17	2	0.030	16.71	1.10	0.08	0.44	0.09	5.06
												Seed	3.76	5	0.040	16.94	0.97	0.10	0.53	0.12	5.39
66+50	66+00	C	50.00	4.00	6.00	6.00	0.0175	0.10	0.29	0.72	0.21	Seed	3.10	2	0.030	17.33	1.34	0.11	0.65	0.10	5.26
												Seed	3.68	5	0.040	17.64	1.17	0.15	0.77	0.14	5.64
66+00	65+50	C	50.00	4.00	6.00	6.00	0.0223	0.10	0.39	0.72	0.28	Seed	3.05	2	0.030	17.85	1.60	0.16	0.85	0.11	5.37
												Seed	3.62	5	0.040	18.24	1.38	0.21	1.01	0.15	5.79
65+50	65+00	C	50.00	4.00	6.00	6.00	0.0211	0.10	0.49	0.72	0.35	Seed	3.01	2	0.030	18.34	1.67	0.17	1.05	0.13	5.58
												Seed	3.56	5	0.040	18.81	1.46	0.22	1.24	0.17	6.03



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch- Sta. 80+00.00 (High Point) to Sta. 67+50.00 (D28) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (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.)
80+00	79+50	C	50.00	4.00	6.00	6.00	0.0015	0.10	0.10	0.72	0.07	Seed	3.14	2	0.030	16.98	0.42	0.01	0.22	0.11	5.35
												Seed	3.73	5	0.040	17.20	0.37	0.01	0.26	0.15	5.74
79+50	79+00	C	50.00	4.00	6.00	6.00	0.0024	0.10	0.19	0.72	0.14	Seed	3.01	2	0.030	18.35	0.59	0.02	0.42	0.15	5.74
												Seed	3.56	5	0.040	18.79	0.52	0.03	0.50	0.19	6.26
79+00	78+50	C	50.00	4.00	6.00	6.00	0.0028	0.10	0.29	0.72	0.21	Seed	2.90	2	0.030	19.51	0.70	0.03	0.61	0.17	6.06
												Seed	3.42	5	0.040	20.14	0.61	0.04	0.72	0.22	6.64
78+50	78+00	C	50.00	4.00	6.00	6.00	0.0022	0.10	0.39	0.72	0.28	Seed	2.81	2	0.030	20.68	0.70	0.03	0.78	0.21	6.55
												Seed	3.30	5	0.040	21.51	0.61	0.04	0.92	0.27	7.22
78+00	77+50	C	50.00	4.00	6.00	6.00	0.0029	0.10	0.49	0.72	0.35	Seed	2.73	2	0.030	21.68	0.83	0.04	0.95	0.22	6.61
												Seed	3.20	5	0.040	22.67	0.71	0.05	1.12	0.28	7.32
77+50	77+00	C	50.00	4.00	6.00	6.00	0.0035	0.10	0.58	0.72	0.42	Seed	2.66	2	0.030	22.57	0.94	0.05	1.12	0.22	6.67
												Seed	3.12	5	0.040	23.70	0.80	0.06	1.31	0.28	7.42
77+00	76+50	C	50.00	4.00	6.00	6.00	0.0040	0.10	0.68	0.72	0.49	Seed	2.61	2	0.030	23.39	1.02	0.06	1.27	0.23	6.79



DITCH ANALYSIS

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.)
												Seed	3.04	5	0.040	24.65	0.87	0.07	1.49	0.30	7.54
76+50	76+00	C	50.00	4.00	6.00	6.00	0.0052	0.10	0.78	0.72	0.56	Seed	2.56	2	0.030	24.10	1.15	0.08	1.43	0.23	6.77
												Seed	2.98	5	0.040	25.49	0.99	0.10	1.67	0.29	7.51
76+00	75+50	C	50.00	4.00	6.00	6.00	0.0064	0.10	0.87	0.72	0.63	Seed	2.52	2	0.030	24.75	1.27	0.09	1.58	0.23	6.77
												Seed	2.93	5	0.040	26.25	1.09	0.12	1.84	0.29	7.51
75+50	75+00	C	50.00	4.00	6.00	6.00	0.0063	0.10	0.97	0.72	0.70	Seed	2.48	2	0.030	25.39	1.30	0.09	1.73	0.24	6.92
												Seed	2.88	5	0.040	26.99	1.11	0.12	2.01	0.31	7.71
75+00	74+50	C	50.00	4.00	6.00	6.00	0.0068	0.10	1.07	0.72	0.77	Seed	2.44	2	0.030	26.00	1.36	0.11	1.87	0.25	7.00
												Seed	2.83	5	0.040	27.70	1.17	0.13	2.18	0.32	7.79
74+50	74+00	C	50.00	4.00	6.00	6.00	0.0084	0.10	1.16	0.72	0.84	Seed	2.41	2	0.030	26.55	1.51	0.13	2.02	0.24	6.93
												Seed	2.79	5	0.040	28.35	1.29	0.16	2.34	0.31	7.72
74+00	73+50	C	50.00	4.00	6.00	6.00	0.0084	0.10	1.26	0.72	0.91	Seed	2.38	2	0.030	27.09	1.54	0.13	2.16	0.25	7.05
												Seed	2.75	5	0.040	28.98	1.32	0.17	2.50	0.32	7.85
73+50	73+00	C	50.00	4.00	6.00	6.00	0.0086	0.10	1.36	0.72	0.98	Seed	2.35	2	0.030	27.61	1.58	0.14	2.29	0.26	7.13
												Seed	2.72	5	0.040	29.59	1.35	0.18	2.66	0.33	7.95
73+00	72+50	C	50.00	4.00	6.00	6.00	0.0093	0.10	1.46	0.72	1.05	Seed	2.32	2	0.030	28.11	1.66	0.15	2.43	0.26	7.16
												Seed	2.68	5	0.040	30.18	1.42	0.19	2.81	0.33	7.98
72+50	72+00	C	50.00	4.00	6.00	6.00	0.0098	0.10	1.55	0.72	1.12	Seed	2.29	2	0.030	28.60	1.71	0.16	2.56	0.27	7.21
												Seed	2.65	5	0.040	30.75	1.46	0.21	2.96	0.34	8.04
72+00	71+50	C	50.00	4.00	6.00	6.00	0.0113	0.10	1.65	0.72	1.19	Seed	2.27	2	0.030	29.05	1.82	0.19	2.70	0.26	7.17



DITCH ANALYSIS

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.)
												Seed	2.62	5	0.040	31.28	1.56	0.23	3.12	0.33	8.00
71+50	71+00	C	50.00	4.00	6.00	6.00	0.0115	0.10	1.75	0.72	1.26	Seed	2.25	2	0.030	29.50	1.86	0.19	2.83	0.27	7.24
												Seed	2.60	5	0.040	31.80	1.59	0.24	3.26	0.34	8.08
71+00	70+50	C	50.00	4.00	6.00	6.00	0.0119	0.10	1.84	0.72	1.33	Seed	2.23	2	0.030	29.93	1.91	0.20	2.96	0.27	7.29
												Seed	2.57	5	0.040	32.31	1.63	0.26	3.41	0.35	8.14
70+50	70+00	C	50.00	4.00	6.00	6.00	0.0124	0.10	1.94	0.72	1.40	Seed	2.21	2	0.030	30.35	1.97	0.21	3.08	0.28	7.32
												Seed	2.54	5	0.040	32.81	1.68	0.27	3.55	0.35	8.17
70+00	69+50	C	50.00	4.00	6.00	6.00	0.0139	0.10	2.04	0.72	1.47	Seed	2.19	2	0.030	30.75	2.07	0.24	3.21	0.27	7.30
												Seed	2.52	5	0.040	33.28	1.76	0.30	3.70	0.35	8.14
69+50	69+00	C	50.00	4.00	6.00	6.00	0.0148	0.10	2.13	0.72	1.54	Seed	2.17	2	0.030	31.14	2.14	0.25	3.33	0.28	7.30
												Seed	2.50	5	0.040	33.73	1.82	0.32	3.84	0.35	8.16
69+00	68+50	C	50.00	4.00	6.00	6.00	0.0152	0.10	2.23	0.72	1.61	Seed	2.15	2	0.030	31.52	2.18	0.26	3.46	0.28	7.35
												Seed	2.48	5	0.040	34.18	1.86	0.33	3.98	0.35	8.21
68+50	68+00	C	50.00	4.00	6.00	6.00	0.0156	0.10	2.33	0.72	1.68	Seed	2.14	2	0.030	31.90	2.23	0.27	3.58	0.28	7.38
												Seed	2.46	5	0.040	34.62	1.90	0.35	4.12	0.35	8.25
68+00	67+50	C	50.00	4.00	6.00	6.00	0.0159	0.10	2.43	0.72	1.75	Seed	2.12	2	0.030	32.26	2.26	0.28	3.70	0.29	7.43
												Seed	2.44	5	0.040	35.05	1.93	0.36	4.25	0.36	8.30



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch- Sta. 80+00.00 (High Point) to Sta. 86+00.00 (D37) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
80+00	80+50	C	50.00	4.00	6.00	6.00	0.0000	0.10	0.10	0.72	0.07	Seed	2.72	2	0.030	21.80	0.11	0.00	0.19	0.29	7.48
												Seed	3.18	5	0.040	22.85	0.10	0.00	0.22	0.37	8.38
80+50	81+00	C	50.00	4.00	6.00	6.00	0.0004	0.10	0.19	0.72	0.14	Seed	2.53	2	0.030	24.45	0.31	0.01	0.35	0.21	6.58
												Seed	2.95	5	0.040	25.97	0.26	0.01	0.41	0.28	7.35
81+00	81+50	C	50.00	4.00	6.00	6.00	0.0015	0.10	0.29	0.72	0.21	Seed	2.44	2	0.030	25.96	0.54	0.02	0.51	0.19	6.22
												Seed	2.83	5	0.040	27.74	0.46	0.02	0.59	0.24	6.84
81+50	82+00	C	50.00	4.00	6.00	6.00	0.0016	0.10	0.39	0.72	0.28	Seed	2.36	2	0.030	27.31	0.61	0.02	0.66	0.21	6.48
												Seed	2.73	5	0.040	29.33	0.52	0.03	0.76	0.26	7.16
82+00	82+50	C	50.00	4.00	6.00	6.00	0.0028	0.10	0.49	0.72	0.35	Seed	2.31	2	0.030	28.36	0.78	0.03	0.81	0.20	6.38
												Seed	2.66	5	0.040	30.56	0.67	0.04	0.93	0.25	7.03
82+50	83+00	C	50.00	4.00	6.00	6.00	0.0033	0.10	0.58	0.72	0.42	Seed	2.26	2	0.030	29.31	0.87	0.04	0.95	0.21	6.48
												Seed	2.60	5	0.040	31.67	0.74	0.05	1.09	0.26	7.16
83+00	83+50	C	50.00	4.00	6.00	6.00	0.0041	0.10	0.68	0.72	0.49	Seed	2.22	2	0.030	30.17	0.97	0.05	1.08	0.21	6.55



DITCH ANALYSIS

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.)
												Seed	2.55	5	0.040	32.67	0.83	0.07	1.25	0.27	7.22
83+50	84+00	C	50.00	4.00	6.00	6.00	0.0044	0.10	0.78	0.72	0.56	Seed	2.18	2	0.030	30.97	1.03	0.06	1.22	0.22	6.66
												Seed	2.50	5	0.040	33.61	0.88	0.08	1.40	0.28	7.35
84+00	84+50	C	50.00	4.00	6.00	6.00	0.0013	0.10	0.87	0.72	0.63	Seed	2.12	2	0.030	32.18	0.69	0.03	1.33	0.32	7.90
												Seed	2.44	5	0.040	35.02	0.59	0.03	1.53	0.41	8.87
84+50	85+00	C	50.00	4.00	6.00	6.00	0.0038	0.10	0.97	0.72	0.70	Seed	2.09	2	0.030	32.97	1.04	0.06	1.46	0.25	7.05
												Seed	2.40	5	0.040	35.95	0.88	0.08	1.67	0.32	7.83
85+00	85+50	C	50.00	4.00	6.00	6.00	0.0037	0.10	1.07	0.72	0.77	Seed	2.06	2	0.030	33.76	1.05	0.06	1.58	0.27	7.21
												Seed	2.36	5	0.040	36.88	0.90	0.08	1.81	0.34	8.03
85+50	86+00	C	50.00	4.00	6.00	6.00	0.0021	0.10	1.16	0.72	0.84	Seed	2.02	2	0.030	34.71	0.88	0.04	1.69	0.32	7.88
												Seed	2.31	5	0.040	37.99	0.75	0.05	1.93	0.40	8.85



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch- Sta. 97+00.00 (D46) to Sta. 86+00.00 (D37) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (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.)
97+00	96+50	C	50.00	4.00	6.00	6.00	0.0194	0.10	0.10	0.72	0.07	Seed	3.26	2	0.030	15.87	0.93	0.07	0.23	0.06	4.68
												Seed	3.87	5	0.040	16.00	0.84	0.09	0.27	0.07	4.87
96+50	96+00	C	50.00	4.00	6.00	6.00	0.0194	0.10	0.19	0.72	0.14	Seed	3.18	2	0.030	16.56	1.21	0.10	0.44	0.08	4.98
												Seed	3.78	5	0.040	16.77	1.06	0.13	0.53	0.11	5.29
96+00	95+50	C	50.00	4.00	6.00	6.00	0.0204	0.10	0.29	0.72	0.21	Seed	3.12	2	0.030	17.14	1.41	0.13	0.65	0.10	5.21
												Seed	3.70	5	0.040	17.44	1.23	0.17	0.78	0.13	5.58
95+50	95+00	C	50.00	4.00	6.00	6.00	0.0212	0.10	0.39	0.72	0.28	Seed	3.07	2	0.030	17.68	1.56	0.15	0.86	0.12	5.40
												Seed	3.64	5	0.040	18.04	1.36	0.20	1.02	0.15	5.82
95+00	94+50	C	50.00	4.00	6.00	6.00	0.0215	0.10	0.49	0.72	0.35	Seed	3.02	2	0.030	18.17	1.70	0.17	1.06	0.13	5.56
												Seed	3.58	5	0.040	18.60	1.47	0.23	1.25	0.17	6.03
94+50	94+00	C	50.00	4.00	6.00	6.00	0.0200	0.10	0.58	0.72	0.42	Seed	2.98	2	0.030	18.64	1.75	0.18	1.25	0.15	5.76
												Seed	3.52	5	0.040	19.16	1.52	0.24	1.47	0.19	6.27
94+00	93+50	C	50.00	4.00	6.00	6.00	0.0195	0.10	0.68	0.72	0.49	Seed	2.94	2	0.030	19.10	1.81	0.19	1.44	0.16	5.92



DITCH ANALYSIS

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.)
												Seed	3.47	5	0.040	19.68	1.56	0.25	1.69	0.21	6.48
93+50	93+00	C	50.00	4.00	6.00	6.00	0.0194	0.10	0.78	0.72	0.56	Seed	2.90	2	0.030	19.54	1.87	0.21	1.62	0.17	6.06
												Seed	3.42	5	0.040	20.20	1.63	0.27	1.91	0.22	6.64
93+00	92+50	C	50.00	4.00	6.00	6.00	0.0199	0.10	0.87	0.72	0.63	Seed	2.86	2	0.030	19.96	1.95	0.23	1.80	0.18	6.18
												Seed	3.37	5	0.040	20.69	1.69	0.29	2.12	0.23	6.79
92+50	92+00	C	50.00	4.00	6.00	6.00	0.0198	0.10	0.97	0.72	0.70	Seed	2.83	2	0.030	20.38	2.02	0.24	1.98	0.19	6.29
												Seed	3.33	5	0.040	21.16	1.74	0.30	2.32	0.24	6.93
92+00	91+50	C	50.00	4.00	6.00	6.00	0.0192	0.10	1.07	0.72	0.77	Seed	2.80	2	0.030	20.78	2.05	0.24	2.15	0.20	6.42
												Seed	3.29	5	0.040	21.63	1.77	0.31	2.52	0.26	7.09
91+50	91+00	C	50.00	4.00	6.00	6.00	0.0189	0.10	1.16	0.72	0.84	Seed	2.77	2	0.030	21.18	2.09	0.25	2.32	0.21	6.53
												Seed	3.25	5	0.040	22.09	1.79	0.32	2.72	0.27	7.24
91+00	90+50	C	50.00	4.00	6.00	6.00	0.0161	0.10	1.26	0.72	0.91	Seed	2.73	2	0.030	21.59	2.01	0.23	2.48	0.23	6.76
												Seed	3.21	5	0.040	22.57	1.73	0.29	2.91	0.29	7.51
90+50	90+00	C	50.00	4.00	6.00	6.00	0.0159	0.10	1.36	0.72	0.98	Seed	2.70	2	0.030	22.00	2.04	0.24	2.64	0.24	6.86
												Seed	3.17	5	0.040	23.05	1.75	0.30	3.10	0.30	7.64
90+00	89+50	C	50.00	4.00	6.00	6.00	0.0125	0.10	1.46	0.72	1.05	Seed	2.67	2	0.030	22.43	1.92	0.20	2.80	0.26	7.14
												Seed	3.13	5	0.040	23.55	1.64	0.26	3.28	0.33	8.00
89+50	89+00	C	50.00	4.00	6.00	6.00	0.0108	0.10	1.55	0.72	1.12	Seed	2.64	2	0.030	22.88	1.85	0.19	2.95	0.28	7.37
												Seed	3.09	5	0.040	24.08	1.58	0.24	3.45	0.36	8.27
89+00	88+50	C	50.00	4.00	6.00	6.00	0.0094	0.10	1.65	0.72	1.19	Seed	2.61	2	0.030	23.34	1.79	0.18	3.10	0.30	7.59



DITCH ANALYSIS

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.)
												Seed	3.05	5	0.040	24.62	1.53	0.22	3.62	0.38	8.53
88+50	88+00	C	50.00	4.00	6.00	6.00	0.0084	0.10	1.75	0.72	1.26	Seed	2.58	2	0.030	23.82	1.74	0.17	3.24	0.32	7.79
												Seed	3.00	5	0.040	25.18	1.48	0.21	3.78	0.40	8.78
88+00	87+50	C	50.00	4.00	6.00	6.00	0.0060	0.10	1.84	0.72	1.33	Seed	2.54	2	0.030	24.35	1.57	0.13	3.37	0.35	8.22
												Seed	2.96	5	0.040	25.80	1.33	0.17	3.93	0.44	9.32
87+50	87+00	C	50.00	4.00	6.00	6.00	0.0025	0.10	1.94	0.72	1.40	Seed	2.50	2	0.030	25.06	1.16	0.07	3.49	0.45	9.38
												Seed	2.90	5	0.040	26.64	0.98	0.09	4.05	0.56	10.72
87+00	86+50	C	50.00	4.00	6.00	6.00	0.0007	0.10	2.04	0.72	1.47	Seed	2.43	2	0.030	26.19	0.73	0.03	3.56	0.63	11.51
												Seed	2.82	5	0.040	27.98	0.62	0.03	4.13	0.77	13.28
86+50	86+00	C	50.00	4.00	6.00	6.00	0.0002	0.10	2.13	0.72	1.54	Seed	2.33	2	0.030	27.86	0.50	0.01	3.59	0.81	13.76
												Seed	2.70	5	0.040	29.96	0.42	0.01	4.14	1.00	15.96



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 109+00.00 to Sta. 97+50.00 (D46) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (ft.)	IN WIDTH (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.)
109+00	108+50	C	50.00	4.00	6.00	6.00	0.0200	0.10	0.10	0.72	0.07	Seed	3.26	2	0.030	15.87	0.98	0.07	0.23	0.05	4.64
												Seed	3.88	5	0.040	15.96	0.84	0.09	0.27	0.07	4.87
108+50	108+00	C	50.00	4.00	6.00	6.00	0.0197	0.10	0.19	0.72	0.14	Seed	3.18	2	0.030	16.56	1.23	0.10	0.44	0.08	4.97
												Seed	3.79	5	0.040	16.73	1.06	0.13	0.53	0.11	5.29
108+00	107+50	C	50.00	4.00	6.00	6.00	0.0200	0.10	0.29	0.72	0.21	Seed	3.12	2	0.030	17.14	1.39	0.13	0.65	0.10	5.22
												Seed	3.71	5	0.040	17.40	1.23	0.16	0.78	0.13	5.58
107+50	107+00	C	50.00	4.00	6.00	6.00	0.0197	0.10	0.39	0.72	0.28	Seed	3.07	2	0.030	17.69	1.52	0.15	0.86	0.12	5.43
												Seed	3.64	5	0.040	18.02	1.34	0.19	1.02	0.15	5.85
107+00	106+50	C	50.00	4.00	6.00	6.00	0.0198	0.10	0.49	0.72	0.35	Seed	3.02	2	0.030	18.20	1.63	0.17	1.05	0.13	5.61
												Seed	3.58	5	0.040	18.60	1.43	0.21	1.25	0.17	6.08
106+50	106+00	C	50.00	4.00	6.00	6.00	0.0200	0.10	0.58	0.72	0.42	Seed	2.98	2	0.030	18.67	1.75	0.18	1.25	0.15	5.76
												Seed	3.52	5	0.040	19.14	1.52	0.24	1.48	0.19	6.27
106+00	105+50	C	50.00	4.00	6.00	6.00	0.0191	0.10	0.68	0.72	0.49	Seed	2.94	2	0.030	19.13	1.79	0.19	1.44	0.16	5.93



DITCH ANALYSIS

STATION BEGIN	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.)
												Seed	3.47	5	0.040	19.68	1.55	0.25	1.70	0.21	6.50
105+50	105+00	C	50.00	4.00	6.00	6.00	0.0200	0.10	0.78	0.72	0.56	Seed	2.90	2	0.030	19.57	1.89	0.21	1.62	0.17	6.05
												Seed	3.42	5	0.040	20.18	1.64	0.27	1.91	0.22	6.63
105+00	104+50	C	50.00	4.00	6.00	6.00	0.0204	0.10	0.87	0.72	0.63	Seed	2.86	2	0.030	19.99	1.97	0.23	1.80	0.18	6.16
												Seed	3.37	5	0.040	20.67	1.70	0.29	2.12	0.23	6.77
104+50	104+00	C	50.00	4.00	6.00	6.00	0.0223	0.10	0.97	0.72	0.70	Seed	2.83	2	0.030	20.39	2.10	0.26	1.98	0.18	6.21
												Seed	3.33	5	0.040	21.13	1.82	0.33	2.33	0.24	6.84
104+00	103+50	C	50.00	4.00	6.00	6.00	0.0209	0.10	1.07	0.72	0.77	Seed	2.80	2	0.030	20.78	2.10	0.26	2.15	0.20	6.37
												Seed	3.29	5	0.040	21.58	1.82	0.33	2.53	0.25	7.03
103+50	103+00	C	50.00	4.00	6.00	6.00	0.0197	0.10	1.16	0.72	0.84	Seed	2.77	2	0.030	21.18	2.11	0.26	2.32	0.21	6.51
												Seed	3.25	5	0.040	22.04	1.82	0.33	2.72	0.27	7.21
103+00	102+50	C	50.00	4.00	6.00	6.00	0.0199	0.10	1.26	0.72	0.91	Seed	2.74	2	0.030	21.56	2.17	0.27	2.48	0.22	6.59
												Seed	3.21	5	0.040	22.48	1.86	0.34	2.92	0.28	7.32
102+50	102+00	C	50.00	4.00	6.00	6.00	0.0207	0.10	1.36	0.72	0.98	Seed	2.71	2	0.030	21.93	2.24	0.29	2.65	0.22	6.66
												Seed	3.18	5	0.040	22.91	1.93	0.37	3.11	0.28	7.39
102+00	101+50	C	50.00	4.00	6.00	6.00	0.0196	0.10	1.46	0.72	1.05	Seed	2.68	2	0.030	22.30	2.24	0.28	2.81	0.23	6.79
												Seed	3.14	5	0.040	23.34	1.92	0.36	3.29	0.30	7.56
101+50	101+00	C	50.00	4.00	6.00	6.00	0.0197	0.10	1.55	0.72	1.12	Seed	2.66	2	0.030	22.66	2.28	0.29	2.97	0.24	6.87
												Seed	3.11	5	0.040	23.77	1.96	0.37	3.48	0.30	7.65
101+00	100+50	C	50.00	4.00	6.00	6.00	0.0201	0.10	1.65	0.72	1.19	Seed	2.63	2	0.030	23.02	2.34	0.31	3.12	0.24	6.93



DITCH ANALYSIS

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.)
												Seed	3.08	5	0.040	24.18	2.00	0.39	3.65	0.31	7.73
100+50	100+00	C	50.00	4.00	6.00	6.00	0.0192	0.10	1.75	0.72	1.26	Seed	2.61	2	0.030	23.38	2.33	0.30	3.28	0.25	7.05
												Seed	3.05	5	0.040	24.60	2.00	0.39	3.83	0.32	7.88
100+00	99+50	C	50.00	4.00	6.00	6.00	0.0200	0.10	1.84	0.72	1.33	Seed	2.58	2	0.030	23.72	2.40	0.32	3.43	0.26	7.09
												Seed	3.02	5	0.040	25.01	2.05	0.41	4.00	0.33	7.92
99+50	99+00	C	50.00	4.00	6.00	6.00	0.0202	0.10	1.94	0.72	1.40	Seed	2.56	2	0.030	24.06	2.44	0.33	3.58	0.26	7.16
												Seed	2.99	5	0.040	25.40	2.08	0.42	4.17	0.33	8.00
99+00	98+50	C	50.00	4.00	6.00	6.00	0.0197	0.10	2.04	0.72	1.47	Seed	2.54	2	0.030	24.40	2.45	0.33	3.72	0.27	7.25
												Seed	2.96	5	0.040	25.80	2.09	0.42	4.34	0.34	8.11
98+50	98+00	C	50.00	4.00	6.00	6.00	0.0213	0.10	2.13	0.72	1.54	Seed	2.52	2	0.030	24.73	2.54	0.36	3.87	0.27	7.25
												Seed	2.93	5	0.040	26.18	2.17	0.46	4.51	0.34	8.11
98+00	97+50	C	50.00	4.00	6.00	6.00	0.0185	0.10	2.23	0.72	1.61	Seed	2.50	2	0.030	25.07	2.45	0.33	4.01	0.29	7.43
												Seed	2.91	5	0.040	26.58	2.09	0.42	4.67	0.36	8.34



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 115+00.00 (D56) to Sta. 109+75.00 (D54) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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 (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.)
115+00	114+50	C	50.00	0.00	6.00	6.00	0.0022	0.07	0.07	0.74	0.05	Seed	3.18	2	0.030	16.58	0.55	0.03	0.15	0.21	2.58
												Seed	3.77	5	0.040	16.87	0.45	0.04	0.18	0.26	3.09
114+50	114+00	C	50.00	0.00	6.00	6.00	0.0192	0.05	0.12	0.73	0.09	Seed	3.12	2	0.030	17.18	1.35	0.22	0.27	0.18	2.19
												Seed	3.69	5	0.040	17.58	1.16	0.26	0.32	0.21	2.58
114+00	113+50	C	50.00	0.00	6.00	6.00	0.0210	0.05	0.17	0.72	0.12	Seed	3.07	2	0.030	17.72	1.55	0.26	0.38	0.20	2.42
												Seed	3.62	5	0.040	18.22	1.30	0.31	0.44	0.24	2.87
113+50	113+00	C	50.00	0.00	6.00	6.00	0.0188	0.01	0.17	0.72	0.13	Seed	3.01	2	0.030	18.29	1.48	0.24	0.38	0.21	2.48
												Seed	3.55	5	0.040	18.89	1.25	0.29	0.45	0.24	2.93
113+00	112+50	C	50.00	0.00	6.00	6.00	0.0200	0.01	0.18	0.72	0.13	Seed	2.96	2	0.030	18.84	1.54	0.25	0.39	0.20	2.45
												Seed	3.48	5	0.040	19.54	1.29	0.30	0.45	0.24	2.90
112+50	112+00	C	50.00	0.00	6.00	6.00	0.0200	0.01	0.18	0.72	0.13	Seed	2.91	2	0.030	19.38	1.52	0.26	0.39	0.21	2.48
												Seed	3.42	5	0.040	20.19	1.27	0.30	0.46	0.24	2.93
112+00	111+50	C	50.00	0.00	6.00	6.00	0.0168	0.01	0.19	0.72	0.14	Seed	2.87	2	0.030	19.95	1.42	0.23	0.39	0.21	2.58



DITCH ANALYSIS

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.)
												Seed	3.35	5	0.040	20.87	1.20	0.26	0.46	0.25	3.03
111+50	111+00	C	50.00	4.00	6.00	6.00	0.0656	0.01	0.19	0.72	0.14	Seed	2.83	2	0.030	20.43	1.71	0.22	0.40	0.05	4.64
												Seed	3.31	5	0.040	21.42	1.51	0.29	0.47	0.07	4.84
111+00	Concent							0.41		0.74	0.44					21.50					
111+00	110+50	C	50.00	4.00	6.00	6.00	0.0197	0.10	0.70	0.72	0.51	Seed	2.71	2	0.030	21.96	1.79	0.19	1.39	0.16	5.89
												Seed	3.25	5	0.040	22.03	1.57	0.25	1.67	0.20	6.45
110+50	110+00	C	50.00	4.00	6.00	6.00	0.0367	0.10	0.80	0.72	0.58	Seed	2.68	2	0.030	22.32	2.29	0.32	1.56	0.14	5.69
												Seed	3.22	5	0.040	22.44	2.01	0.42	1.88	0.18	6.20
110+00	109+75	C	25.00	4.00	6.00	6.00	0.0128	0.10	0.89	0.72	0.65	Seed	2.66	2	0.030	22.57	1.67	0.16	1.74	0.20	6.40
												Seed	3.19	5	0.040	22.73	1.45	0.21	2.09	0.26	7.11



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 125+00.00 (D59) to Sta. 115+00 (D54) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
125+00	124+50	C	50.00	4.00	6.00	6.00	0.0165	0.11	0.11	0.75	0.08	Seed	3.26	2	0.030	15.87	0.93	0.07	0.26	0.06	4.77
												Seed	3.88	5	0.040	15.96	0.84	0.09	0.31	0.08	5.00
124+50	124+00	C	50.00	4.00	6.00	6.00	0.0158	0.12	0.23	0.76	0.18	Seed	3.19	2	0.030	16.53	1.22	0.10	0.56	0.10	5.19
												Seed	3.79	5	0.040	16.74	1.08	0.13	0.66	0.13	5.55
124+00	123+50	C	50.00	4.00	6.00	6.00	0.0159	0.12	0.36	0.76	0.27	Seed	3.13	2	0.030	17.12	1.42	0.12	0.84	0.12	5.50
												Seed	3.71	5	0.040	17.40	1.24	0.16	1.00	0.16	5.95
123+50	123+00	C	50.00	4.00	6.00	6.00	0.0173	0.12	0.48	0.76	0.36	Seed	3.07	2	0.030	17.63	1.60	0.16	1.12	0.14	5.72
												Seed	3.64	5	0.040	18.00	1.40	0.20	1.32	0.19	6.22
123+00	122+50	C	50.00	4.00	6.00	6.00	0.0190	0.12	0.60	0.76	0.46	Seed	3.03	2	0.030	18.10	1.77	0.19	1.39	0.16	5.90
												Seed	3.58	5	0.040	18.53	1.54	0.24	1.64	0.20	6.45
122+50	122+00	C	50.00	4.00	6.00	6.00	0.0175	0.12	0.73	0.76	0.55	Seed	2.99	2	0.030	18.56	1.82	0.20	1.65	0.18	6.14
												Seed	3.53	5	0.040	19.06	1.58	0.25	1.95	0.23	6.76
122+00	121+50	C	50.00	4.00	6.00	6.00	0.0189	0.12	0.85	0.76	0.65	Seed	2.95	2	0.030	18.98	1.96	0.22	1.91	0.19	6.27



DITCH ANALYSIS

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.)
												Seed	3.48	5	0.040	19.55	1.70	0.29	2.25	0.24	6.92
121+50	121+00	C	50.00	4.00	6.00	6.00	0.0189	0.12	0.98	0.76	0.74	Seed	2.91	2	0.030	19.39	2.04	0.24	2.16	0.20	6.43
												Seed	3.43	5	0.040	20.02	1.76	0.31	2.54	0.26	7.13
121+00	120+50	C	50.00	4.00	6.00	6.00	0.0195	0.12	1.10	0.76	0.83	Seed	2.88	2	0.030	19.78	2.13	0.26	2.40	0.21	6.56
												Seed	3.39	5	0.040	20.48	1.84	0.33	2.83	0.27	7.28
120+50	120+00	C	50.00	4.00	6.00	6.00	0.0192	0.12	1.22	0.76	0.93	Seed	2.85	2	0.030	20.16	2.18	0.27	2.65	0.23	6.72
												Seed	3.35	5	0.040	20.92	1.88	0.35	3.11	0.29	7.46
120+00	119+50	C	50.00	4.00	6.00	6.00	0.0193	0.12	1.35	0.76	1.02	Seed	2.82	2	0.030	20.53	2.25	0.28	2.88	0.24	6.84
												Seed	3.31	5	0.040	21.35	1.93	0.36	3.39	0.30	7.63
119+50	119+00	C	50.00	4.00	6.00	6.00	0.0207	0.12	1.47	0.76	1.12	Seed	2.79	2	0.030	20.88	2.36	0.31	3.12	0.24	6.91
												Seed	3.28	5	0.040	21.76	2.03	0.40	3.66	0.31	7.71
119+00	118+50	C	50.00	4.00	6.00	6.00	0.0196	0.12	1.60	0.76	1.21	Seed	2.76	2	0.030	21.23	2.36	0.31	3.35	0.26	7.07
												Seed	3.24	5	0.040	22.17	2.03	0.40	3.93	0.33	7.91
118+50	118+00	C	50.00	4.00	6.00	6.00	0.0203	0.12	1.72	0.76	1.31	Seed	2.74	2	0.030	21.57	2.44	0.33	3.57	0.26	7.15
												Seed	3.21	5	0.040	22.57	2.09	0.42	4.19	0.33	8.00
118+00	117+50	C	50.00	4.00	6.00	6.00	0.0201	0.12	1.84	0.76	1.40	Seed	2.71	2	0.030	21.91	2.48	0.34	3.80	0.27	7.26
												Seed	3.17	5	0.040	22.96	2.12	0.43	4.45	0.35	8.14
117+50	117+00	C	50.00	4.00	6.00	6.00	0.0200	0.12	1.97	0.76	1.49	Seed	2.69	2	0.030	22.24	2.52	0.35	4.02	0.28	7.37
												Seed	3.14	5	0.040	23.34	2.15	0.44	4.70	0.36	8.27
117+00	116+50	C	50.00	4.00	6.00	6.00	0.0214	0.12	2.09	0.76	1.59	Seed	2.66	2	0.030	22.55	2.62	0.38	4.23	0.28	7.40



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE C	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.)
												Seed	3.11	5	0.040	23.72	2.24	0.48	4.95	0.36	8.31
116+50	116+00	C	50.00	4.00	6.00	6.00	0.0210	0.12	2.22	0.76	1.68	Seed	2.64	2	0.030	22.87	2.64	0.38	4.45	0.29	7.51
												Seed	3.09	5	0.040	24.08	2.25	0.49	5.19	0.37	8.45
116+00	115+50	C	50.00	4.00	6.00	6.00	0.0188	0.12	2.34	0.76	1.78	Seed	2.62	2	0.030	23.19	2.57	0.36	4.65	0.31	7.71
												Seed	3.06	5	0.040	24.46	2.20	0.46	5.43	0.39	8.68
115+50	115+00	C	50.00	4.00	6.00	6.00	0.0208	0.12	2.46	0.75	1.87	Seed	2.60	2	0.030	23.50	2.70	0.40	4.85	0.31	7.69
												Seed	3.03	5	0.040	24.82	2.31	0.50	5.66	0.39	8.66



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 139+70.00 (D62) to Sta. 125+00.00 (D59) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
139+70	139+50	C	20.00	4.00	6.00	6.00	0.0097	0.05	0.05	0.69	0.04	Seed	3.29	2	0.030	15.55	0.59	0.03	0.12	0.05	4.55
												Seed	3.92	5	0.040	15.61	0.54	0.04	0.14	0.06	4.71
139+50	139+00	C	50.00	4.00	6.00	6.00	0.0128	0.13	0.18	0.69	0.12	Seed	3.21	2	0.030	16.35	1.01	0.07	0.39	0.09	5.03
												Seed	3.81	5	0.040	16.53	0.88	0.09	0.47	0.11	5.35
139+00	138+50	C	50.00	4.00	6.00	6.00	0.0128	0.12	0.30	0.69	0.21	Seed	3.13	2	0.030	17.03	1.20	0.09	0.65	0.12	5.39
												Seed	3.72	5	0.040	17.30	1.05	0.12	0.77	0.15	5.80
138+50	138+00	C	50.00	4.00	6.00	6.00	0.0136	0.13	0.43	0.69	0.29	Seed	3.07	2	0.030	17.64	1.37	0.12	0.91	0.14	5.64
												Seed	3.64	5	0.040	18.00	1.20	0.15	1.07	0.18	6.13
138+00	137+50	C	50.00	4.00	6.00	6.00	0.0146	0.13	0.55	0.69	0.38	Seed	3.02	2	0.030	18.18	1.53	0.14	1.15	0.15	5.84
												Seed	3.57	5	0.040	18.62	1.32	0.18	1.36	0.20	6.38
137+50	137+00	C	50.00	4.00	6.00	6.00	0.0062	0.13	0.68	0.69	0.47	Seed	2.96	2	0.030	18.87	1.21	0.08	1.39	0.22	6.59
												Seed	3.49	5	0.040	19.42	1.05	0.11	1.64	0.28	7.32
137+00	136+50	C	50.00	4.00	6.00	6.00	0.0127	0.12	0.80	0.75	0.56	Seed	2.91	2	0.030	19.38	1.62	0.15	1.63	0.19	6.34



DITCH ANALYSIS

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.)
												Seed	3.44	5	0.040	20.00	1.40	0.20	1.92	0.25	7.00
136+50	136+00	C	50.00	4.00	6.00	6.00	0.0139	0.12	0.92	0.74	0.65	Seed	2.87	2	0.030	19.85	1.75	0.18	1.85	0.20	6.43
												Seed	3.38	5	0.040	20.55	1.51	0.23	2.18	0.26	7.13
136+00	135+50	C	50.00	4.00	6.00	6.00	0.0141	0.12	1.03	0.74	0.73	Seed	2.84	2	0.030	20.31	1.82	0.19	2.07	0.21	6.58
												Seed	3.34	5	0.040	21.08	1.57	0.24	2.44	0.28	7.30
135+50	135+00	C	50.00	4.00	6.00	6.00	0.0155	0.11	1.14	0.74	0.81	Seed	2.80	2	0.030	20.73	1.93	0.21	2.28	0.22	6.65
												Seed	3.29	5	0.040	21.58	1.67	0.27	2.67	0.28	7.38
135+00	134+50	C	50.00	4.00	6.00	6.00	0.0168	0.11	1.25	0.74	0.89	Seed	2.77	2	0.030	21.14	2.04	0.24	2.48	0.23	6.72
												Seed	3.25	5	0.040	22.05	1.76	0.30	2.91	0.29	7.46
134+50	134+00	C	50.00	4.00	6.00	6.00	0.0157	0.11	1.36	0.74	0.98	Seed	2.74	2	0.030	21.55	2.04	0.24	2.67	0.24	6.88
												Seed	3.21	5	0.040	22.53	1.75	0.30	3.14	0.31	7.67
134+00	133+50	C	50.00	4.00	6.00	6.00	0.0168	0.11	1.48	0.74	1.06	Seed	2.71	2	0.030	21.94	2.13	0.26	2.87	0.25	6.95
												Seed	3.17	5	0.040	22.98	1.83	0.33	3.36	0.31	7.75
133+50	133+00	C	50.00	4.00	6.00	6.00	0.0167	0.11	1.59	0.74	1.14	Seed	2.68	2	0.030	22.32	2.17	0.27	3.06	0.25	7.05
												Seed	3.14	5	0.040	23.42	1.86	0.34	3.58	0.32	7.88
133+00	132+50	C	50.00	4.00	6.00	6.00	0.0161	0.11	1.70	0.74	1.22	Seed	2.65	2	0.030	22.70	2.19	0.27	3.25	0.27	7.18
												Seed	3.10	5	0.040	23.87	1.87	0.34	3.79	0.34	8.04
132+50	132+00	C	50.00	4.00	6.00	6.00	0.0167	0.11	1.81	0.74	1.31	Seed	2.63	2	0.030	23.07	2.25	0.28	3.43	0.27	7.25
												Seed	3.07	5	0.040	24.30	1.93	0.36	4.01	0.34	8.12
132+00	131+50	C	50.00	4.00	6.00	6.00	0.0179	0.11	1.92	0.74	1.39	Seed	2.60	2	0.030	23.42	2.34	0.30	3.61	0.27	7.28



DITCH ANALYSIS

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.)
												Seed	3.04	5	0.040	24.71	2.00	0.39	4.22	0.35	8.16
131+50	131+00	C	50.00	4.00	6.00	6.00	0.0172	0.11	2.03	0.74	1.47	Seed	2.58	2	0.030	23.78	2.35	0.30	3.79	0.28	7.40
												Seed	3.01	5	0.040	25.13	2.00	0.39	4.42	0.36	8.30
131+00	130+50	C	50.00	4.00	6.00	6.00	0.0168	0.11	2.14	0.74	1.55	Seed	2.56	2	0.030	24.13	2.35	0.31	3.97	0.29	7.51
												Seed	2.98	5	0.040	25.54	2.01	0.39	4.62	0.37	8.43
130+50	130+00	C	50.00	4.00	6.00	6.00	0.0159	0.11	2.25	0.74	1.63	Seed	2.53	2	0.030	24.48	2.34	0.30	4.14	0.30	7.64
												Seed	2.95	5	0.040	25.96	2.00	0.38	4.82	0.38	8.60
130+00	129+50	C	50.00	4.00	6.00	6.00	0.0154	0.11	2.36	0.74	1.72	Seed	2.51	2	0.030	24.84	2.34	0.30	4.31	0.31	7.75
												Seed	2.92	5	0.040	26.37	2.00	0.38	5.01	0.39	8.73
129+50	129+00	C	50.00	4.00	6.00	6.00	0.0161	0.11	2.47	0.74	1.80	Seed	2.49	2	0.030	25.18	2.41	0.32	4.47	0.32	7.79
												Seed	2.89	5	0.040	26.78	2.05	0.40	5.20	0.40	8.77
129+00	128+50	C	50.00	4.00	6.00	6.00	0.0163	0.11	2.59	0.74	1.88	Seed	2.47	2	0.030	25.52	2.44	0.33	4.64	0.32	7.85
												Seed	2.87	5	0.040	27.18	2.08	0.41	5.39	0.40	8.84
128+50	128+00	C	50.00	4.00	6.00	6.00	0.0170	0.11	2.70	0.74	1.96	Seed	2.45	2	0.030	25.86	2.50	0.34	4.80	0.32	7.88
												Seed	2.84	5	0.040	27.57	2.13	0.43	5.58	0.41	8.87
128+00	127+50	C	50.00	4.00	6.00	6.00	0.0168	0.11	2.81	0.74	2.04	Seed	2.43	2	0.030	26.19	2.52	0.34	4.96	0.33	7.96
												Seed	2.82	5	0.040	27.95	2.14	0.43	5.76	0.41	8.97
127+50	127+00	C	50.00	4.00	6.00	6.00	0.0161	0.11	2.92	0.74	2.13	Seed	2.41	2	0.030	26.52	2.50	0.34	5.12	0.34	8.07
												Seed	2.79	5	0.040	28.34	2.13	0.43	5.94	0.43	9.11
127+00	126+50	C	50.00	4.00	6.00	6.00	0.0162	0.11	3.03	0.74	2.21	Seed	2.39	2	0.030	26.85	2.53	0.35	5.28	0.34	8.13



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE C	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.)
												Seed	2.77	5	0.040	28.73	2.16	0.44	6.12	0.43	9.17
126+50	126+00	C	50.00	4.00	6.00	6.00	0.0170	0.11	3.14	0.74	2.29	Seed	2.37	2	0.030	27.17	2.60	0.37	5.43	0.34	8.13
												Seed	2.75	5	0.040	29.11	2.21	0.46	6.29	0.43	9.18
126+00	125+50	C	50.00	4.00	6.00	6.00	0.0162	0.11	3.25	0.74	2.37	Seed	2.35	2	0.030	27.49	2.57	0.36	5.59	0.35	8.25
												Seed	2.72	5	0.040	29.49	2.19	0.45	6.47	0.44	9.33
125+50	125+00	C	50.00	4.00	6.00	6.00	0.0167	0.11	3.36	0.74	2.46	Seed	2.34	2	0.030	27.81	2.62	0.37	5.74	0.36	8.28
												Seed	2.70	5	0.040	29.86	2.23	0.47	6.64	0.45	9.36



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 155+17.00 (D64) to Sta. 139+70.00 (D62) **Designer :** CEF

Rainfall Area : C

Allowable Shears

Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat Type 1:	3.00	Type 2:	4.00	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 (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.)
155+17	155+00	C	17.00	4.00	6.00	6.00	0.0104	0.04	0.04	0.70	0.03	Seed	3.30	2	0.030	15.49	0.57	0.03	0.10	0.04	4.48
												Seed	3.93	5	0.040	15.56	0.50	0.03	0.12	0.05	4.64
155+00	154+50	C	50.00	4.00	6.00	6.00	0.0187	0.13	0.17	0.69	0.12	Seed	3.22	2	0.030	16.22	1.11	0.09	0.37	0.08	4.90
												Seed	3.83	5	0.040	16.40	1.00	0.11	0.44	0.10	5.16
154+50	154+00	C	50.00	4.00	6.00	6.00	0.0082	0.13	0.29	0.69	0.20	Seed	3.13	2	0.030	17.03	1.03	0.07	0.63	0.13	5.55
												Seed	3.72	5	0.040	17.31	0.90	0.09	0.75	0.17	6.00
154+00	153+50	C	50.00	4.00	6.00	6.00	0.0109	0.13	0.42	0.69	0.29	Seed	3.07	2	0.030	17.68	1.27	0.10	0.88	0.14	5.72
												Seed	3.63	5	0.040	18.06	1.11	0.13	1.05	0.19	6.22
153+50	153+00	C	50.00	4.00	6.00	6.00	0.0088	0.13	0.54	0.69	0.37	Seed	3.01	2	0.030	18.33	1.28	0.10	1.13	0.17	6.09
												Seed	3.55	5	0.040	18.81	1.10	0.12	1.33	0.23	6.71
153+00	152+50	C	50.00	4.00	6.00	6.00	0.0052	0.13	0.67	0.69	0.46	Seed	2.94	2	0.030	19.06	1.13	0.07	1.36	0.22	6.69
												Seed	3.47	5	0.040	19.66	0.97	0.09	1.60	0.29	7.45
152+50	152+00	C	50.00	4.00	6.00	6.00	0.0084	0.13	0.79	0.69	0.55	Seed	2.89	2	0.030	19.66	1.40	0.11	1.58	0.21	6.56



DITCH ANALYSIS

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.)
												Seed	3.40	5	0.040	20.35	1.20	0.14	1.86	0.27	7.29
152+00	151+50	C	50.00	4.00	6.00	6.00	0.0136	0.13	0.92	0.69	0.63	Seed	2.85	2	0.030	20.14	1.72	0.17	1.80	0.20	6.42
												Seed	3.35	5	0.040	20.91	1.48	0.22	2.12	0.26	7.09
151+50	151+00	C	50.00	4.00	6.00	6.00	0.0082	0.13	1.04	0.69	0.72	Seed	2.80	2	0.030	20.69	1.50	0.13	2.02	0.25	6.95
												Seed	3.29	5	0.040	21.55	1.29	0.16	2.37	0.31	7.75
151+00	150+50	C	50.00	4.00	6.00	6.00	0.0156	0.13	1.17	0.69	0.81	Seed	2.77	2	0.030	21.12	1.93	0.21	2.23	0.22	6.61
												Seed	3.25	5	0.040	22.05	1.66	0.27	2.62	0.28	7.34
150+50	150+00	C	50.00	4.00	6.00	6.00	0.0155	0.13	1.29	0.69	0.89	Seed	2.74	2	0.030	21.54	1.98	0.22	2.44	0.23	6.76
												Seed	3.21	5	0.040	22.54	1.70	0.28	2.86	0.29	7.51
150+00	149+50	C	50.00	4.00	6.00	6.00	0.0113	0.13	1.42	0.69	0.98	Seed	2.70	2	0.030	22.00	1.81	0.18	2.64	0.26	7.14
												Seed	3.17	5	0.040	23.08	1.56	0.23	3.10	0.33	7.98
149+50	149+00	C	50.00	4.00	6.00	6.00	0.0104	0.13	1.54	0.69	1.06	Seed	2.67	2	0.030	22.46	1.80	0.18	2.84	0.28	7.34
												Seed	3.12	5	0.040	23.62	1.54	0.23	3.32	0.35	8.24
149+00	148+50	C	50.00	4.00	6.00	6.00	0.0124	0.13	1.67	0.69	1.15	Seed	2.64	2	0.030	22.89	1.96	0.21	3.04	0.27	7.30
												Seed	3.08	5	0.040	24.11	1.68	0.27	3.55	0.35	8.17
148+50	148+00	C	50.00	4.00	6.00	6.00	0.0109	0.13	1.79	0.69	1.24	Seed	2.61	2	0.030	23.32	1.90	0.20	3.23	0.29	7.53
												Seed	3.05	5	0.040	24.62	1.63	0.25	3.77	0.37	8.46
148+00	147+50	C	50.00	4.00	6.00	6.00	0.0122	0.13	1.92	0.69	1.32	Seed	2.58	2	0.030	23.73	2.02	0.22	3.42	0.29	7.53
												Seed	3.01	5	0.040	25.10	1.72	0.28	3.98	0.37	8.46
147+50	147+00	C	50.00	4.00	6.00	6.00	0.0206	0.13	2.04	0.69	1.41	Seed	2.56	2	0.030	24.07	2.46	0.34	3.61	0.26	7.15



DITCH ANALYSIS

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.)
												Seed	2.98	5	0.040	25.50	2.10	0.43	4.20	0.33	8.00
147+00	146+50	C	50.00	4.00	6.00	6.00	0.0100	0.13	2.17	0.69	1.50	Seed	2.53	2	0.030	24.50	1.94	0.20	3.79	0.33	7.93
												Seed	2.95	5	0.040	26.00	1.65	0.26	4.41	0.41	8.95
146+50	146+00	C	50.00	4.00	6.00	6.00	0.0104	0.13	2.29	0.69	1.58	Seed	2.50	2	0.030	24.92	1.99	0.22	3.96	0.33	7.99
												Seed	2.91	5	0.040	26.49	1.70	0.27	4.61	0.42	9.01
146+00	145+50	C	50.00	4.00	6.00	6.00	0.0133	0.13	2.42	0.69	1.67	Seed	2.48	2	0.030	25.30	2.20	0.26	4.14	0.32	7.82
												Seed	2.88	5	0.040	26.94	1.87	0.33	4.81	0.40	8.81
145+50	145+00	C	50.00	4.00	6.00	6.00	0.0116	0.13	2.54	0.69	1.75	Seed	2.46	2	0.030	25.69	2.12	0.24	4.31	0.34	8.04
												Seed	2.85	5	0.040	27.40	1.80	0.31	5.01	0.42	9.09
145+00	144+50	C	50.00	4.00	6.00	6.00	0.0105	0.13	2.67	0.69	1.84	Seed	2.43	2	0.030	26.09	2.07	0.23	4.48	0.35	8.24
												Seed	2.82	5	0.040	27.87	1.76	0.29	5.20	0.44	9.32
144+50	144+00	C	50.00	4.00	6.00	6.00	0.0087	0.13	2.79	0.69	1.93	Seed	2.41	2	0.030	26.51	1.95	0.21	4.64	0.38	8.54
												Seed	2.79	5	0.040	28.37	1.66	0.26	5.38	0.47	9.69
144+00	143+50	C	50.00	4.00	6.00	6.00	0.0100	0.13	2.92	0.69	2.01	Seed	2.39	2	0.030	26.91	2.08	0.23	4.80	0.37	8.45
												Seed	2.76	5	0.040	28.84	1.76	0.29	5.56	0.46	9.58
143+50	143+00	C	50.00	4.00	6.00	6.00	0.0113	0.13	3.04	0.69	2.10	Seed	2.36	2	0.030	27.29	2.19	0.26	4.96	0.37	8.39
												Seed	2.74	5	0.040	29.29	1.86	0.32	5.74	0.46	9.49
143+00	142+50	C	50.00	4.00	6.00	6.00	0.0144	0.13	3.17	0.69	2.19	Seed	2.35	2	0.030	27.64	2.41	0.31	5.13	0.35	8.19
												Seed	2.71	5	0.040	29.69	2.04	0.39	5.93	0.44	9.25
142+50	142+00	C	50.00	4.00	6.00	6.00	0.0150	0.13	3.29	0.69	2.27	Seed	2.33	2	0.030	27.98	2.47	0.33	5.29	0.35	8.21



DITCH ANALYSIS

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.)
												Seed	2.69	5	0.040	30.09	2.09	0.41	6.11	0.44	9.28
142+00	141+50	C	50.00	4.00	6.00	6.00	0.0064	0.13	3.42	0.69	2.36	Seed	2.30	2	0.030	28.43	1.83	0.18	5.43	0.44	9.33
												Seed	2.66	5	0.040	30.63	1.55	0.22	6.27	0.55	10.64
141+50	141+00	C	50.00	4.00	6.00	6.00	0.0087	0.13	3.54	0.69	2.44	Seed	2.28	2	0.030	28.83	2.06	0.23	5.58	0.42	9.00
												Seed	2.63	5	0.040	31.10	1.74	0.28	6.44	0.52	10.23
141+00	140+50	C	50.00	4.00	6.00	6.00	0.0106	0.13	3.67	0.69	2.53	Seed	2.26	2	0.030	29.20	2.23	0.26	5.73	0.40	8.81
												Seed	2.61	5	0.040	31.54	1.89	0.33	6.60	0.50	10.00
140+50	140+00	C	50.00	4.00	6.00	6.00	0.0090	0.13	3.79	0.69	2.62	Seed	2.24	2	0.030	29.60	2.12	0.24	5.87	0.42	9.08
												Seed	2.59	5	0.040	32.01	1.80	0.30	6.77	0.53	10.32
140+00	139+70	C	30.00	4.00	6.00	6.00	0.0040	0.07	3.87	0.69	2.67	Seed	2.23	2	0.030	29.91	1.58	0.13	5.94	0.53	10.30
												Seed	2.57	5	0.040	32.38	1.34	0.16	6.84	0.65	11.79



DITCH ANALYSIS

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 Median Ditch - Sta. 163+60 (Palmer) to Station A 155+25 (D77) **Designer :** CEF

Rainfall Area : C

Allowable Shears

	Seed:	0.40	Jute Mat:	0.45	Temporary Mat:	1.00
Permanent Mat	Type 1:	3.00	Type 2:	4.00	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.)
163+60	163+00	C	60.00	4.00	6.00	6.00	0.0090	0.14	0.14	0.69	0.10	Seed	3.22	2	0.030	16.19	0.84	0.05	0.31	0.08	5.00
												Seed	3.83	5	0.040	16.35	0.75	0.06	0.37	0.11	5.29
163+00	162+50	C	50.00	4.00	6.00	6.00	0.0096	0.12	0.26	0.69	0.18	Seed	3.14	2	0.030	16.98	1.06	0.07	0.57	0.12	5.39
												Seed	3.72	5	0.040	17.25	0.92	0.09	0.68	0.15	5.80
162+50	162+00	C	50.00	4.00	6.00	6.00	0.0110	0.12	0.39	0.69	0.27	Seed	3.07	2	0.030	17.65	1.24	0.09	0.82	0.14	5.64
												Seed	3.64	5	0.040	18.02	1.08	0.12	0.97	0.18	6.13
162+00	161+50	C	50.00	4.00	6.00	6.00	0.0106	0.12	0.51	0.69	0.35	Seed	3.01	2	0.030	18.27	1.33	0.11	1.06	0.16	5.93
												Seed	3.56	5	0.040	18.74	1.16	0.14	1.25	0.21	6.48
161+50	161+00	C	50.00	4.00	6.00	6.00	0.0104	0.12	0.63	0.69	0.44	Seed	2.96	2	0.030	18.86	1.41	0.12	1.29	0.18	6.16
												Seed	3.49	5	0.040	19.41	1.23	0.15	1.53	0.23	6.77
161+00	160+50	C	50.00	4.00	6.00	6.00	0.0098	0.12	0.76	0.69	0.52	Seed	2.91	2	0.030	19.43	1.46	0.12	1.52	0.20	6.40
												Seed	3.43	5	0.040	20.07	1.26	0.16	1.79	0.26	7.08
160+50	160+00	C	50.00	4.00	6.00	6.00	0.0108	0.12	0.88	0.69	0.61	Seed	2.86	2	0.030	19.96	1.57	0.14	1.74	0.21	6.53



DITCH ANALYSIS

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.)
												Seed	3.37	5	0.040	20.68	1.36	0.18	2.05	0.27	7.22
160+00	159+50	C	50.00	4.00	6.00	6.00	0.0104	0.12	1.00	0.69	0.69	Seed	2.82	2	0.030	20.47	1.61	0.15	1.96	0.23	6.72
												Seed	3.32	5	0.040	21.28	1.38	0.19	2.30	0.29	7.48
159+50	159+00	C	50.00	4.00	6.00	6.00	0.0108	0.12	1.13	0.69	0.78	Seed	2.78	2	0.030	20.97	1.68	0.16	2.17	0.24	6.85
												Seed	3.27	5	0.040	21.85	1.45	0.20	2.54	0.30	7.63
159+00	158+50	C	50.00	4.00	6.00	6.00	0.0114	0.12	1.25	0.69	0.86	Seed	2.75	2	0.030	21.44	1.76	0.17	2.37	0.25	6.95
												Seed	3.22	5	0.040	22.40	1.51	0.22	2.78	0.31	7.75
158+50	158+00	C	50.00	4.00	6.00	6.00	0.0096	0.12	1.37	0.68	0.94	Seed	2.71	2	0.030	21.93	1.70	0.16	2.56	0.27	7.22
												Seed	3.17	5	0.040	22.97	1.45	0.20	2.99	0.34	8.09
158+00	157+50	C	50.00	4.00	6.00	6.00	0.0110	0.12	1.49	0.68	1.02	Seed	2.68	2	0.030	22.38	1.82	0.18	2.74	0.27	7.22
												Seed	3.13	5	0.040	23.51	1.56	0.23	3.21	0.34	8.09
157+50	157+00	C	50.00	4.00	6.00	6.00	0.0098	0.12	1.61	0.68	1.11	Seed	2.64	2	0.030	22.85	1.78	0.18	2.92	0.29	7.45
												Seed	3.09	5	0.040	24.05	1.52	0.22	3.42	0.36	8.36
157+00	156+50	C	50.00	4.00	6.00	6.00	0.0102	0.12	1.73	0.68	1.19	Seed	2.61	2	0.030	23.30	1.84	0.19	3.10	0.29	7.51
												Seed	3.05	5	0.040	24.58	1.57	0.24	3.62	0.37	8.45
156+50	156+00	C	50.00	4.00	6.00	6.00	0.0220	0.12	1.85	0.68	1.27	Seed	2.59	2	0.030	23.64	2.45	0.34	3.29	0.25	6.95
												Seed	3.02	5	0.040	24.97	2.10	0.43	3.84	0.31	7.74
156+00	155+50	C	50.00	4.00	6.00	6.00	0.0108	0.13	1.98	0.69	1.36	Seed	2.56	2	0.030	24.07	1.95	0.21	3.48	0.31	7.67
												Seed	2.98	5	0.040	25.48	1.66	0.26	4.05	0.39	8.64
155+50	155+25	C	25.00	4.00	6.00	6.00	0.0136	0.08	2.06	0.69	1.41	Seed	2.55	2	0.030	24.26	2.13	0.25	3.60	0.29	7.53



DITCH ANALYSIS

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.)
											Seed	2.97	5	0.040	25.71	1.82	0.32	4.20	0.37	8.46

IV. Roadside Ditch Analysis

IR 70 has roadside ditches on both sides of the road. The water runoff from the road drains to these ditches which outlet into tributaries of Blacklick Creek. The flow velocities in the ditches were checked, and ditch protection was added where necessary. The ditch protection ranges from seeding to both temporary and permanent matting. The depth of flow was also checked to ensure no water was overtopping the roadway.



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I70 EB_ Sta. 11+25.00 to 0+00.00

Designer : WCS

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 (ft.)	IN WIDTH (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.)
11+25	11+00	R	50.00	5.00	4.00	4.00	0.0072	0.05	0.05	0.50	0.03	Seed	3.78	5	0.030	16.81	0.50	0.02	0.10	0.04	5.30
												Seed	4.20	10	0.040	17.05	0.43	0.02	0.11	0.05	5.39
11+00	10+50	R	50.00	5.00	4.00	4.00	0.0166	0.10	0.15	0.50	0.08	Seed	3.67	5	0.030	17.72	0.94	0.06	0.28	0.06	5.45
												Seed	4.08	10	0.040	18.09	0.80	0.08	0.31	0.07	5.58
10+50	10+00	R	50.00	5.00	4.00	4.00	0.0170	0.10	0.25	0.50	0.13	Seed	3.59	5	0.030	18.47	1.13	0.08	0.45	0.08	5.60
												Seed	3.98	10	0.040	18.94	0.96	0.10	0.50	0.10	5.77
10+00	9+50	R	50.00	5.00	4.00	4.00	0.0160	0.10	0.35	0.50	0.18	Seed	3.52	5	0.030	19.13	1.22	0.09	0.62	0.09	5.75
												Seed	3.90	10	0.040	19.71	1.06	0.12	0.68	0.12	5.95
9+50	9+00	R	50.00	5.00	4.00	4.00	0.0158	0.10	0.45	0.50	0.23	Seed	3.46	5	0.030	19.75	1.34	0.11	0.78	0.11	5.86
												Seed	3.83	10	0.040	20.43	1.15	0.13	0.86	0.14	6.08
9+00	8+50	R	50.00	5.00	4.00	4.00	0.0154	0.11	0.56	0.50	0.28	Seed	3.40	5	0.030	20.34	1.42	0.12	0.95	0.12	5.98
												Seed	3.76	10	0.040	21.10	1.23	0.15	1.05	0.15	6.22
8+50	8+00	R	50.00	5.00	4.00	4.00	0.0160	0.12	0.68	0.50	0.34	Seed	3.35	5	0.030	20.88	1.54	0.13	1.14	0.13	6.07



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Seed	3.70	10	0.040	21.73	1.32	0.17	1.26	0.17	6.34
8+00	7+50	R	50.00	5.00	4.00	4.00	0.0152	0.16	0.84	0.50	0.42	Seed	3.31	5	0.030	21.39	1.62	0.15	1.39	0.15	6.22
												Seed	3.64	10	0.040	22.33	1.39	0.18	1.53	0.19	6.53
7+50	7+00	R	50.00	5.00	4.00	4.00	0.0156	0.16	1.00	0.50	0.50	Seed	3.27	5	0.030	21.87	1.73	0.16	1.63	0.17	6.33
												Seed	3.59	10	0.040	22.89	1.48	0.20	1.80	0.21	6.67
7+00	6+50	R	50.00	5.00	4.00	4.00	0.0164	0.16	1.16	0.50	0.58	Seed	3.23	5	0.030	22.32	1.85	0.18	1.87	0.18	6.42
												Seed	3.55	10	0.040	23.41	1.58	0.23	2.06	0.22	6.77
6+50	6+00	R	50.00	2.00	4.00	4.00	0.0124	0.15	1.31	0.50	0.66	Seed	3.19	5	0.030	22.73	2.03	0.24	2.09	0.32	4.52
												Seed	3.51	10	0.040	23.90	1.69	0.30	2.30	0.38	5.07
6+00	5+50	R	50.00	2.00	4.00	4.00	0.0222	0.15	1.46	0.50	0.73	Seed	3.17	5	0.030	23.05	2.57	0.40	2.31	0.29	4.29
												Seed	3.48	10	0.040	24.28	2.15	0.48	2.54	0.35	4.78
5+50	5+00	R	50.00	2.00	4.00	4.00	0.0222	0.15	1.61	0.50	0.81	Seed	3.14	5	0.030	23.36	2.64	0.41	2.53	0.30	4.40
												Jute Mat	3.14	5	0.040	23.44	2.15	0.48	2.53	0.35	4.77
												Temp. Mat	3.14	5	0.040	23.44	2.15	0.48	2.53	0.35	4.77
												Temp. Mat	3.44	10	0.040	24.66	2.21	0.50	2.77	0.36	4.91
5+00	4+50	R	50.00	2.00	3.00	2.00	0.0222	0.14	1.75	0.50	0.88	Seed	3.11	5	0.030	23.72	2.91	0.46	2.73	0.33	3.66
												Jute Mat	3.11	5	0.040	23.79	2.37	0.54	2.72	0.39	3.93
												Temp. Mat	3.11	5	0.040	23.79	2.37	0.54	2.72	0.39	3.93
												Temp. Mat	3.42	10	0.040	25.00	2.44	0.56	2.99	0.41	4.03
4+50	4+00	R	50.00	2.00	3.00	2.00	0.0222	0.13	1.88	0.50	0.94	Seed	3.09	5	0.030	24.07	2.97	0.47	2.90	0.34	3.71



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (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.)
													Jute Mat	3.08	5	0.040	24.13	2.41	0.55	2.90	0.40	4.00
													Temp. Mat	3.08	5	0.040	24.13	2.41	0.55	2.90	0.40	4.00
													Temp. Mat	3.39	10	0.040	25.34	2.49	0.58	3.19	0.42	4.10
4+00	3+50	R	50.00	2.00	3.00	2.00	0.0222	0.12	2.00	0.50	1.00	Seed	3.06	5	0.030	24.41	3.01	0.49	3.07	0.35	3.77	
													Jute Mat	3.06	5	0.040	24.47	2.45	0.57	3.06	0.41	4.06
													Temp. Mat	3.06	5	0.040	24.47	2.45	0.57	3.06	0.41	4.06
													Temp. Mat	3.37	10	0.040	25.67	2.52	0.60	3.37	0.43	4.17
3+50	3+00	R	50.00	2.00	3.00	2.00	0.0222	0.12	2.12	0.50	1.06	Seed	3.04	5	0.030	24.74	3.06	0.50	3.22	0.36	3.81	
													Jute Mat	3.03	5	0.040	24.80	2.49	0.59	3.22	0.42	4.11
													Temp. Mat	3.03	5	0.040	24.80	2.49	0.59	3.22	0.42	4.11
													Temp. Mat	3.34	10	0.040	25.99	2.56	0.62	3.55	0.44	4.22
3+00	2+50	R	50.00	2.00	3.00	2.00	0.0222	0.12	2.24	0.50	1.12	Seed	3.01	5	0.030	25.07	3.10	0.52	3.38	0.37	3.86	
													Jute Mat	3.01	5	0.040	25.13	2.52	0.60	3.37	0.43	4.17
													Temp. Mat	3.01	5	0.040	25.13	2.52	0.60	3.37	0.43	4.17
													Temp. Mat	3.32	10	0.040	26.31	2.59	0.63	3.72	0.46	4.28
2+50	2+00	R	50.00	2.00	3.00	2.00	0.0226	0.10	2.34	0.50	1.17	Seed	2.99	5	0.030	25.40	3.15	0.53	3.50	0.38	3.89	
													Jute Mat	2.98	5	0.040	25.46	2.57	0.62	3.50	0.44	4.20
													Temp. Mat	2.98	5	0.040	25.46	2.57	0.62	3.50	0.44	4.20
													Temp. Mat	3.29	10	0.040	26.63	2.64	0.65	3.86	0.46	4.32
2+00	1+50	R	50.00	2.00	3.00	2.00	0.0184	0.13	2.47	0.50	1.24	Seed	2.96	5	0.030	25.74	2.97	0.47	3.67	0.41	4.04	



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Jute Mat	2.96	5	0.040	25.80	2.42	0.55	3.66	0.48	4.38
												Temp. Mat	2.96	5	0.040	25.80	2.42	0.55	3.66	0.48	4.38
												Temp. Mat	3.27	10	0.040	26.96	2.48	0.58	4.04	0.50	4.50
1+50	1+00	R	50.00	2.00	3.00	2.00	0.0204	0.14	2.61	0.50	1.31	Seed	2.94	5	0.030	26.07	3.12	0.52	3.84	0.41	4.04
												Jute Mat	2.94	5	0.040	26.13	2.54	0.60	3.84	0.47	4.37
												Temp. Mat	2.94	5	0.040	26.13	2.54	0.60	3.84	0.47	4.37
												Temp. Mat	3.25	10	0.040	27.28	2.61	0.64	4.24	0.50	4.50
1+00	0+50	R	50.00	2.00	3.00	2.00	0.0192	0.15	2.76	0.50	1.38	Seed	2.92	5	0.030	26.40	3.09	0.51	4.03	0.43	4.13
												Jute Mat	2.92	5	0.040	26.46	2.52	0.59	4.03	0.49	4.47
												Temp. Mat	2.92	5	0.040	26.46	2.52	0.59	4.03	0.49	4.47
												Temp. Mat	3.22	10	0.040	27.60	2.59	0.62	4.45	0.52	4.60
0+50	0+00	R	50.00	2.00	3.00	2.00	0.0182	0.93	3.69	0.50	1.85	Seed	2.90	5	0.030	26.71	3.29	0.57	5.35	0.50	4.50
												Jute Mat	2.89	5	0.040	26.77	2.67	0.66	5.34	0.58	4.90
												Temp. Mat	2.89	5	0.040	26.77	2.67	0.66	5.34	0.58	4.90
												Temp. Mat	3.20	10	0.040	27.90	2.75	0.69	5.91	0.61	5.05



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I70 EB_ Sta. 26+00.00 to Sta. 17+90.00

Designer : WCS

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+00	25+50	R	50.00	2.00	2.00	2.00	0.0564	0.17	0.17	0.50	0.09	Seed	3.95	5	0.030	15.40	2.04	0.27	0.34	0.08	2.31
												Seed	4.41	10	0.040	15.47	1.75	0.35	0.38	0.10	2.40
25+50	25+00	R	50.00	2.00	2.00	2.00	0.0102	0.11	0.29	0.50	0.14	Seed	3.87	5	0.030	16.00	1.37	0.11	0.55	0.17	2.69
												Seed	4.32	10	0.040	16.17	1.18	0.14	0.61	0.21	2.86
25+00	24+50	R	50.00	2.00	2.00	2.00	0.0112	0.10	0.39	0.50	0.19	Seed	3.81	5	0.030	16.53	1.58	0.14	0.74	0.20	2.78
												Seed	4.24	10	0.040	16.79	1.33	0.17	0.82	0.25	2.99
24+50	24+00	R	50.00	2.00	2.00	2.00	0.0234	0.10	0.49	0.50	0.24	Seed	3.76	5	0.030	16.91	2.17	0.26	0.92	0.18	2.72
												Seed	4.18	10	0.040	17.25	1.85	0.33	1.02	0.23	2.90
24+00	23+50	R	50.00	2.00	2.00	2.00	0.0288	0.11	0.59	0.50	0.30	Seed	3.72	5	0.030	17.25	2.46	0.34	1.11	0.19	2.76
												Seed	4.13	10	0.040	17.64	2.10	0.42	1.23	0.24	2.95
23+50	23+00	R	50.00	2.00	2.00	2.00	0.0308	0.11	0.70	0.50	0.35	Seed	3.69	5	0.030	17.57	2.63	0.39	1.29	0.20	2.82
												Seed	4.09	10	0.040	18.01	2.26	0.49	1.44	0.25	3.02
23+00	22+50	R	50.00	2.00	2.00	2.00	0.0218	0.11	0.81	0.50	0.41	Seed	3.65	5	0.030	17.91	2.47	0.33	1.48	0.24	2.97



DITCH ANALYSIS

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.)
												Seed	4.04	10	0.040	18.41	2.09	0.41	1.64	0.30	3.21
22+50	22+00	R	50.00	2.00	2.00	2.00	0.0246	0.13	0.95	0.50	0.47	Seed	3.62	5	0.030	18.21	2.69	0.39	1.71	0.25	3.02
												Seed	4.00	10	0.040	18.77	2.27	0.49	1.89	0.32	3.27
22+00	21+50	R	50.00	2.00	2.00	2.00	0.0216	0.16	1.11	0.50	0.55	Seed	3.59	5	0.030	18.52	2.69	0.39	1.99	0.29	3.15
												Seed	3.96	10	0.040	19.14	2.28	0.48	2.20	0.36	3.42
21+50	21+00	R	50.00	2.00	2.00	2.00	0.0160	0.18	1.29	0.50	0.65	Seed	3.55	5	0.030	18.85	2.53	0.34	2.29	0.34	3.35
												Seed	3.92	10	0.040	19.53	2.14	0.42	2.53	0.42	3.67
21+00	20+50	R	50.00	2.00	2.00	2.00	0.0184	0.17	1.46	0.50	0.73	Seed	3.52	5	0.030	19.15	2.75	0.40	2.56	0.35	3.39
												Seed	3.88	10	0.040	19.89	2.32	0.49	2.83	0.43	3.71
20+50	20+00	R	50.00	2.00	2.00	6.00	0.0050	0.08	1.54	0.50	0.77	Seed	3.47	5	0.030	19.68	1.56	0.14	2.66	0.45	5.60
												Seed	3.82	10	0.040	20.53	1.30	0.17	2.93	0.54	6.34
20+00	19+50	R	50.00	2.00	2.00	6.00	0.0194	0.10	1.64	0.50	0.82	Seed	3.44	5	0.030	20.00	2.59	0.40	2.81	0.33	4.62
												Seed	3.78	10	0.040	20.91	2.16	0.48	3.09	0.40	5.19
19+50	19+00	R	50.00	2.00	2.00	6.00	0.0186	0.10	1.74	0.50	0.87	Seed	3.41	5	0.030	20.33	2.59	0.39	2.96	0.34	4.72
												Seed	3.74	10	0.040	21.30	2.16	0.48	3.25	0.41	5.30
19+00	18+50	R	50.00	2.00	2.00	6.00	0.0133	0.10	1.84	0.50	0.92	Seed	3.37	5	0.030	20.69	2.32	0.32	3.10	0.38	5.04
												Seed	3.70	10	0.040	21.73	1.93	0.38	3.40	0.46	5.67
18+50	17+90	R	60.00	2.00	2.00	6.00	0.0522	0.10	1.94	0.50	0.97	Seed	3.35	5	0.030	20.94	3.84	0.89	3.24	0.27	4.19
												Jute Mat	3.34	5	0.040	21.00	3.13	1.03	3.24	0.32	4.54
												Temp. Mat	3.34	5	0.040	21.00	3.13	1.03	3.24	0.32	4.54



DITCH ANALYSIS

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.)
											Perm, Type 1	3.34	5	0.040	21.00	3.13	1.03	3.24	0.32	4.54
											Perm, Type 1	3.67	10	0.040	22.04	3.20	1.08	3.56	0.33	4.66



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 EB_Sta. 26+00.00 to Sta. 43+93.00

Designer : WCS

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+00	26+50	R	50.00	5.00	6.00	3.00	0.0092	0.08	0.08	0.50	0.04	Seed	3.84	5	0.030	16.28	0.62	0.03	0.16	0.05	5.44
												Seed	4.27	10	0.040	16.55	0.54	0.04	0.17	0.06	5.56
26+50	27+00	R	50.00	5.00	6.00	3.00	0.0048	0.12	0.20	0.50	0.10	Seed	3.70	5	0.030	17.47	0.70	0.03	0.37	0.10	5.87
												Seed	4.10	10	0.040	17.94	0.59	0.04	0.41	0.12	6.11
27+00	27+50	R	50.00	5.00	6.00	3.00	0.0136	0.09	0.28	0.50	0.14	Seed	3.62	5	0.030	18.23	1.07	0.08	0.51	0.09	5.80
												Seed	4.00	10	0.040	18.83	0.94	0.09	0.57	0.11	5.99
27+50	28+00	R	50.00	5.00	6.00	3.00	0.0286	0.07	0.36	0.50	0.18	Seed	3.56	5	0.030	18.78	1.47	0.14	0.64	0.08	5.73
												Seed	3.93	10	0.040	19.47	1.28	0.18	0.70	0.10	5.91
28+00	28+50	R	50.00	5.00	6.00	3.00	0.0146	0.07	0.43	0.50	0.22	Seed	3.49	5	0.030	19.43	1.28	0.10	0.75	0.11	5.97
												Seed	3.85	10	0.040	20.23	1.10	0.12	0.83	0.13	6.21
28+50	29+00	R	50.00	5.00	6.00	6.00	0.0150	0.08	0.51	0.50	0.26	Seed	3.43	5	0.030	20.05	1.33	0.11	0.88	0.12	6.39
												Seed	3.77	10	0.040	20.96	1.13	0.14	0.96	0.15	6.74
29+00	29+50	R	50.00	5.00	3.00	4.00	0.0400	0.09	0.60	0.50	0.30	Seed	3.39	5	0.030	20.47	1.99	0.24	1.01	0.10	5.67



DITCH ANALYSIS

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.)
												Seed	3.73	10	0.040	21.44	1.72	0.30	1.11	0.12	5.84
29+50	30+00	R	50.00	5.00	3.00	3.00	0.0752	0.10	0.69	0.50	0.35	Seed	3.36	5	0.030	20.80	2.56	0.41	1.16	0.09	5.52
												Jute Mat	3.36	5	0.040	20.86	2.15	0.48	1.16	0.10	5.61
												Temp. Mat	3.36	5	0.040	20.86	2.15	0.48	1.16	0.10	5.61
												Temp. Mat	3.69	10	0.040	21.82	2.21	0.51	1.28	0.11	5.65
30+00	30+50	R	50.00	4.00	3.00	4.00	0.0340	0.11	0.80	0.50	0.40	Seed	3.32	5	0.030	21.23	2.22	0.28	1.33	0.13	4.94
												Seed	3.65	10	0.040	22.25	1.90	0.36	1.46	0.17	5.17
30+50	31+00	R	50.00	4.00	3.00	3.00	0.0108	0.12	0.93	0.50	0.46	Seed	3.28	5	0.030	21.74	1.62	0.14	1.52	0.20	5.22
												Seed	3.60	10	0.040	22.85	1.39	0.17	1.67	0.25	5.51
31+00	31+50	R	50.00	4.00	3.00	4.00	0.0124	0.13	1.06	0.50	0.53	Seed	3.24	5	0.030	22.22	1.75	0.16	1.71	0.21	5.45
												Seed	3.55	10	0.040	23.41	1.48	0.20	1.87	0.26	5.80
31+50	32+00	R	50.00	4.00	3.00	4.00	0.0068	0.13	1.18	0.50	0.59	Seed	3.19	5	0.030	22.78	1.47	0.11	1.89	0.26	5.82
												Seed	3.49	10	0.040	24.07	1.25	0.14	2.07	0.32	6.26
32+00	32+50	R	50.00	4.00	3.00	4.00	0.0070	0.12	1.31	0.50	0.65	Seed	3.15	5	0.030	23.32	1.53	0.12	2.06	0.27	5.90
												Seed	3.44	10	0.040	24.71	1.29	0.15	2.25	0.34	6.35
32+50	33+00	R	50.00	4.00	3.00	4.00	0.0070	0.12	1.43	0.50	0.71	Seed	3.10	5	0.030	23.85	1.57	0.12	2.22	0.28	5.98
												Seed	3.39	10	0.040	25.34	1.33	0.15	2.42	0.35	6.44
33+00	33+50	R	50.00	4.00	3.00	4.00	0.0070	0.12	1.55	0.50	0.78	Seed	3.06	5	0.030	24.37	1.61	0.13	2.38	0.29	6.06
												Seed	3.34	10	0.040	25.95	1.36	0.16	2.60	0.36	6.54
33+50	34+00	R	50.00	4.00	3.00	4.00	0.0070	0.12	1.67	0.50	0.84	Seed	3.03	5	0.030	24.88	1.64	0.13	2.53	0.30	6.13



DITCH ANALYSIS

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.)
												Seed	3.30	10	0.040	26.55	1.38	0.16	2.76	0.38	6.63
34+00	34+50	R	50.00	4.00	3.00	4.00	0.0068	0.12	1.80	0.50	0.90	Seed	2.99	5	0.030	25.38	1.65	0.14	2.69	0.32	6.23
												Seed	3.26	10	0.040	27.14	1.39	0.17	2.92	0.39	6.74
34+50	35+00	R	50.00	4.00	3.00	4.00	0.0070	0.12	1.92	0.50	0.96	Seed	2.96	5	0.030	25.87	1.70	0.14	2.83	0.32	6.27
												Seed	3.22	10	0.040	27.72	1.43	0.17	3.08	0.40	6.80
35+00	35+50	R	50.00	5.00	3.00	4.00	0.0126	0.12	2.04	0.50	1.02	Seed	2.93	5	0.030	26.28	2.01	0.20	2.99	0.25	6.77
												Seed	3.18	10	0.040	28.21	1.70	0.25	3.25	0.31	7.19
35+50	36+00	R	50.00	4.00	3.00	4.00	0.0184	0.13	2.17	0.50	1.08	Seed	2.90	5	0.030	26.62	2.44	0.30	3.15	0.26	5.84
												Seed	3.15	10	0.040	28.61	2.06	0.37	3.42	0.32	6.27
36+00	36+50	R	50.00	4.00	3.00	4.00	0.0184	0.13	2.29	0.50	1.15	Seed	2.88	5	0.030	26.96	2.48	0.31	3.31	0.27	5.89
												Seed	3.13	10	0.040	29.01	2.09	0.38	3.59	0.33	6.33
36+50	37+00	R	50.00	4.00	3.00	4.00	0.0760	0.13	2.42	0.50	1.21	Seed	2.87	5	0.030	27.16	4.03	0.88	3.48	0.19	5.30
												Jute Mat	2.87	5	0.040	27.21	3.34	1.03	3.47	0.22	5.53
												Temp. Mat	2.87	5	0.040	27.21	3.34	1.03	3.47	0.22	5.53
												Perm, Type 1	2.87	5	0.040	27.21	3.34	1.03	3.47	0.22	5.53
												Perm, Type 1	3.11	10	0.040	29.25	3.43	1.09	3.77	0.23	5.60
37+00	37+50	R	50.00	4.00	3.00	2.00	0.0760	0.13	2.55	0.50	1.28	Seed	2.85	5	0.030	27.40	4.22	0.91	3.64	0.19	4.96
												Jute Mat	2.85	5	0.040	27.44	3.49	1.08	3.64	0.23	5.14
												Temp. Mat	2.85	5	0.040	27.44	3.49	1.08	3.64	0.23	5.14
												Perm, Type 1	2.85	5	0.040	27.44	3.49	1.08	3.64	0.23	5.14



DITCH ANALYSIS

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.)
												Perm, Type 1	3.10	10	0.040	29.49	3.60	1.13	3.95	0.24	5.20
37+50	38+00	R	50.00	4.00	2.00	2.00	0.0760	0.13	2.68	0.50	1.34	Seed	2.84	5	0.030	27.64	4.34	0.95	3.81	0.20	4.80
												Jute Mat	2.84	5	0.040	27.67	3.61	1.12	3.80	0.24	4.94
												Temp. Mat	2.84	5	0.040	27.67	3.61	1.12	3.80	0.24	4.94
												Perm, Type 1	2.84	5	0.040	27.67	3.61	1.12	3.80	0.24	4.94
												Perm, Type 1	3.08	10	0.040	29.71	3.71	1.17	4.13	0.25	4.99
38+00	38+50	R	50.00	4.00	2.00	2.00	0.0908	0.13	2.81	0.50	1.41	Seed	2.82	5	0.030	27.85	4.66	1.10	3.97	0.19	4.78
												Jute Mat	2.82	5	0.040	27.89	3.87	1.30	3.96	0.23	4.92
												Temp. Mat	2.82	5	0.040	27.89	3.87	1.30	3.96	0.23	4.92
												Perm, Type 1	2.82	5	0.040	27.89	3.87	1.30	3.96	0.23	4.92
												Perm, Type 1	3.07	10	0.040	29.92	3.99	1.37	4.31	0.24	4.96
38+50	39+00	R	50.00	4.00	2.00	2.00	0.0700	0.13	2.94	0.50	1.47	Seed	2.81	5	0.030	28.08	4.35	0.94	4.13	0.21	4.86
												Jute Mat	2.81	5	0.040	28.12	3.60	1.11	4.12	0.25	5.02
												Temp. Mat	2.81	5	0.040	28.12	3.60	1.11	4.12	0.25	5.02
												Perm, Type 1	2.81	5	0.040	28.12	3.60	1.11	4.12	0.25	5.02
												Perm, Type 1	3.06	10	0.040	30.14	3.72	1.16	4.49	0.27	5.07
39+00	39+50	R	50.00	4.00	2.00	2.00	0.0670	0.13	3.07	0.50	1.53	Seed	2.80	5	0.030	28.31	4.35	0.93	4.29	0.22	4.89
												Jute Mat	2.79	5	0.040	28.35	3.60	1.10	4.28	0.26	5.05
												Temp. Mat	2.79	5	0.040	28.35	3.60	1.10	4.28	0.26	5.05
												Perm, Type 1	2.79	5	0.040	28.35	3.60	1.10	4.28	0.26	5.05



DITCH ANALYSIS

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.)
												Perm, Type 1	3.04	10	0.040	30.37	3.71	1.15	4.66	0.28	5.10
39+50	40+00	R	50.00	4.00	2.00	2.00	0.0078	0.13	3.20	0.50	1.60	Seed	2.77	5	0.030	28.74	2.16	0.21	4.42	0.42	5.69
												Seed	3.01	10	0.040	30.82	1.83	0.25	4.82	0.52	6.09
40+00	40+50	R	50.00	4.00	2.00	2.00	0.0066	0.13	3.32	0.50	1.66	Seed	2.75	5	0.030	29.14	2.06	0.19	4.56	0.45	5.80
												Seed	2.99	10	0.040	31.30	1.74	0.23	4.96	0.56	6.22
40+50	41+00	R	50.00	4.00	2.00	2.00	0.0046	0.12	3.44	0.50	1.72	Seed	2.72	5	0.030	29.59	1.84	0.15	4.68	0.51	6.03
												Seed	2.95	10	0.040	31.83	1.55	0.18	5.08	0.62	6.50
41+00	41+50	R	50.00	4.00	2.00	2.00	0.0034	0.12	3.56	0.50	1.78	Seed	2.69	5	0.030	30.09	1.67	0.12	4.79	0.56	6.24
												Seed	2.92	10	0.040	32.43	1.41	0.15	5.20	0.69	6.75
41+50	42+00	R	50.00	4.00	2.00	2.00	0.0094	0.12	3.68	0.50	1.84	Seed	2.67	5	0.030	30.44	2.38	0.25	4.91	0.42	5.70
												Seed	2.90	10	0.040	32.84	2.01	0.31	5.33	0.53	6.10
42+00	Concent							2.25		0.75	3.53					22.66					
42+00	42+50	R	50.00	4.00	2.00	2.00	0.0062	0.21	6.14	0.50	3.63	Seed	2.65	5	0.030	30.76	2.55	0.27	9.63	0.70	6.80
												Seed	2.88	10	0.040	33.23	2.14	0.33	10.44	0.86	7.42
42+50	43+00	R	50.00	4.00	2.00	2.00	0.0024	0.22	6.35	0.50	3.74	Seed	2.63	5	0.030	31.21	1.84	0.14	9.83	0.92	7.66
												Seed	2.85	10	0.040	33.77	1.53	0.17	10.64	1.11	8.46
43+00	43+50		50.00	4.00	2.00	2.00	0.0064	0.22	6.57	0.50	3.85	Seed	2.61	5	0.030	31.53	2.62	0.28	10.05	0.71	6.84
												Seed	2.83	10	0.040	34.15	2.19	0.35	10.88	0.87	7.47
43+50	Concent							0.57		0.80	4.31					19.14					
43+50	43+93	R	43.00	4.00	2.00	2.00	0.0033	0.16	7.31	0.50	4.39	Seed	2.59	5	0.030	31.87	2.14	0.19	11.37	0.91	7.65



DITCH ANALYSIS

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.)
											Seed	2.80	10	0.040	34.55	1.78	0.23	12.30	1.11	8.44



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I70 EB (Ramp D) Sta. 75+40.00 (I70) to 71+00.00. (Ramp D) **Designer :** WCS

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 (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.)
75+40	75+00	R	40.00	6.00	8.00	8.00	0.0155	0.06	0.06	0.50	0.03	Seed	3.86	5	0.030	16.10	0.59	0.03	0.11	0.03	6.47
												Seed	4.30	10	0.040	16.26	0.51	0.04	0.12	0.04	6.60
75+00	74+50	R	50.00	4.00	8.00	8.00	0.0166	0.04	0.10	0.50	0.05	Seed	3.74	5	0.030	17.12	0.83	0.05	0.19	0.05	4.82
												Seed	4.16	10	0.040	17.39	0.72	0.07	0.21	0.06	5.03
74+50	74+00	R	50.00	3.00	6.00	6.00	0.0386	0.44	0.54	0.50	0.27	Seed	3.70	5	0.030	17.51	2.13	0.30	1.00	0.12	4.50
												Seed	4.11	10	0.040	17.84	1.83	0.37	1.11	0.15	4.85
74+00	73+50	R	50.00	3.00	6.00	6.00	0.0316	0.06	0.60	0.50	0.30	Seed	3.65	5	0.030	17.91	2.05	0.27	1.09	0.14	4.66
												Seed	4.05	10	0.040	18.32	1.74	0.34	1.21	0.17	5.06
73+50	73+00	R	50.00	3.00	6.00	6.00	0.0314	0.08	0.67	0.50	0.34	Seed	3.61	5	0.030	18.30	2.13	0.29	1.21	0.15	4.76
												Seed	4.00	10	0.040	18.78	1.79	0.36	1.34	0.18	5.19
73+00	72+50	R	50.00	5.00	3.00	3.00	0.0310	0.09	0.76	0.70	0.40	Seed	3.57	5	0.030	18.70	2.10	0.24	1.43	0.13	5.76
												Seed	3.95	10	0.040	19.24	1.80	0.31	1.58	0.16	5.96
72+50	Concent							0.72		0.90	1.05					10.00					



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
72+50	72+00	R	50.00	5.00	3.00	3.00	0.0048	0.10	1.58	0.70	1.12	Seed	3.51	5	0.030	19.21	1.62	0.12	3.92	0.39	7.35
												Seed	3.89	10	0.040	19.84	1.37	0.15	4.34	0.49	7.93
72+00	71+50	R	50.00	5.00	3.00	3.00	0.0052	0.10	1.68	0.70	1.19	Seed	3.46	5	0.030	19.71	1.69	0.13	4.11	0.39	7.36
												Seed	3.83	10	0.040	20.42	1.43	0.16	4.54	0.49	7.94
71+50	71+00	R	50.00	5.00	3.00	3.00	0.0060	0.10	1.78	0.70	1.26	Seed	3.42	5	0.030	20.17	1.79	0.15	4.29	0.39	7.33
												Seed	3.77	10	0.040	20.97	1.52	0.18	4.74	0.48	7.89
71+00	70+50	R	50.00	5.00	3.00	3.00	0.0066	0.09	1.87	0.70	1.32	Seed	3.38	5	0.030	20.61	1.88	0.16	4.46	0.39	7.31
												Seed	3.72	10	0.040	21.49	1.59	0.20	4.92	0.48	7.88
70+50	70+00	R	50.00	5.00	3.00	3.00	0.0074	0.09	1.96	0.70	1.38	Seed	3.34	5	0.030	21.03	1.98	0.18	4.61	0.38	7.28
												Seed	3.68	10	0.040	21.98	1.68	0.22	5.07	0.47	7.83
70+00	69+50	R	50.00	4.00	3.00	3.00	0.0080	0.13	2.09	0.70	1.47	Seed	3.31	5	0.030	21.42	2.15	0.21	4.86	0.43	6.57
												Seed	3.63	10	0.040	22.44	1.81	0.26	5.34	0.53	7.17
69+50	69+00	R	50.00	4.00	3.00	3.00	0.0088	0.10	2.19	0.70	1.54	Seed	3.27	5	0.030	21.79	2.24	0.23	5.04	0.43	6.55
												Seed	3.60	10	0.040	22.88	1.89	0.29	5.53	0.53	7.15
69+00	68+50	R	50.00	4.00	3.00	3.00	0.0070	0.13	2.32	0.70	1.63	Seed	3.24	5	0.030	22.18	2.10	0.20	5.28	0.47	6.79
												Seed	3.55	10	0.040	23.35	1.77	0.25	5.79	0.57	7.44
68+50	69+00	L	50.00	2.00	6.00	6.00	0.0064	0.05	2.37	0.70	1.67	Seed	3.20	5	0.030	22.62	1.89	0.22	5.33	0.54	8.46
												Seed	3.51	10	0.040	23.88	1.56	0.26	5.84	0.64	9.68
69+00	69+50	R	50.00	4.00	6.00	6.00	0.0054	0.06	2.43	0.50	1.70	Seed	3.16	5	0.030	23.10	1.72	0.16	5.36	0.46	9.53
												Seed	3.46	10	0.040	24.46	1.43	0.19	5.87	0.56	10.70



DITCH ANALYSIS

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.)
69+50	70+00	R	50.00	4.00	6.00	6.00	0.0042	0.06	2.49	0.50	1.73	Seed	3.12	5	0.030	23.63	1.57	0.13	5.38	0.49	9.91
												Seed	3.41	10	0.040	25.09	1.31	0.16	5.88	0.59	11.14
70+00	70+50	R	50.00	4.00	6.00	6.00	0.0114	0.06	2.55	0.50	1.76	Seed	3.09	5	0.030	24.00	2.25	0.27	5.43	0.38	8.59
												Seed	3.38	10	0.040	25.54	1.88	0.33	5.93	0.46	9.58
70+50	71+00	R	50.00	4.00	6.00	6.00	0.0178	0.06	2.61	0.50	1.79	Seed	3.07	5	0.030	24.31	2.65	0.38	5.48	0.34	8.10
												Seed	3.35	10	0.040	25.91	2.21	0.46	5.98	0.42	8.99



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 EB_Sta. 80+50.00 to Sta. 61+00.00 (Ramp C)

Designer : WCS

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 (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.)
80+50	80+00	R	50.00	4.00	6.00	6.00	0.0006	0.14	0.14	0.50	0.07	Seed	3.69	5	0.030	17.57	0.32	0.01	0.26	0.16	5.93
												Seed	4.09	10	0.040	18.02	0.27	0.01	0.29	0.20	6.45
80+00	79+50	R	50.00	4.00	6.00	6.00	0.0004	0.15	0.29	0.50	0.15	Seed	3.44	5	0.030	19.98	0.34	0.01	0.50	0.26	7.16
												Seed	3.79	10	0.040	20.83	0.29	0.01	0.55	0.32	7.87
79+50	79+00	R	50.00	4.00	6.00	6.00	0.0018	0.15	0.44	0.50	0.22	Seed	3.32	5	0.030	21.26	0.65	0.02	0.74	0.21	6.58
												Seed	3.64	10	0.040	22.33	0.55	0.03	0.81	0.26	7.16
79+00	78+50	R	50.00	4.00	6.00	6.00	0.0026	0.16	0.60	0.50	0.30	Seed	3.23	5	0.030	22.29	0.81	0.04	0.98	0.23	6.71
												Seed	3.54	10	0.040	23.54	0.67	0.05	1.07	0.28	7.35
78+50	78+00	R	50.00	4.00	6.00	6.00	0.0034	0.16	0.76	0.50	0.38	Seed	3.16	5	0.030	23.18	0.94	0.05	1.20	0.24	6.84
												Seed	3.45	10	0.040	24.59	0.79	0.06	1.31	0.29	7.48
78+00	77+50	R	50.00	4.00	6.00	6.00	0.0042	0.15	0.91	0.50	0.45	Seed	3.10	5	0.030	23.95	1.07	0.06	1.40	0.24	6.90
												Seed	3.38	10	0.040	25.51	0.89	0.08	1.53	0.30	7.56
77+50	77+00	R	50.00	4.00	6.00	6.00	0.0066	0.15	1.05	0.50	0.53	Seed	3.05	5	0.030	24.59	1.29	0.10	1.60	0.23	6.77



DITCH ANALYSIS

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.)
												Seed	3.32	10	0.040	26.28	1.09	0.12	1.75	0.28	7.38
77+00	76+50	R	50.00	4.00	6.00	6.00	0.0096	0.15	1.20	0.50	0.60	Seed	3.01	5	0.030	25.14	1.52	0.13	1.80	0.22	6.66
												Seed	3.27	10	0.040	26.93	1.28	0.16	1.96	0.27	7.25
76+50	76+00	R	50.00	4.00	6.00	6.00	0.0120	0.14	1.34	0.50	0.67	Seed	2.97	5	0.030	25.63	1.70	0.16	1.99	0.22	6.64
												Seed	3.23	10	0.040	27.51	1.42	0.20	2.16	0.27	7.24
76+00	75+50	R	50.00	4.00	6.00	6.00	0.0142	0.12	1.46	0.50	0.73	Seed	2.94	5	0.030	26.08	1.85	0.19	2.15	0.22	6.63
												Seed	3.19	10	0.040	28.04	1.55	0.24	2.33	0.27	7.22
75+50	75+00	R	50.00	4.00	6.00	6.00	0.0100	0.10	1.56	0.50	0.78	Seed	2.91	5	0.030	26.58	1.67	0.16	2.27	0.25	6.98
												Seed	3.15	10	0.040	28.64	1.40	0.19	2.47	0.30	7.64
75+00	74+50	R	50.00	4.00	6.00	6.00	0.0136	0.10	1.66	0.50	0.83	Seed	2.88	5	0.030	27.02	1.88	0.20	2.39	0.23	6.82
												Seed	3.12	10	0.040	29.17	1.58	0.24	2.59	0.29	7.45
74+50	74+00	R	50.00	4.00	6.00	6.00	0.0140	0.10	1.76	0.50	0.88	Seed	2.85	5	0.030	27.45	1.93	0.21	2.51	0.24	6.88
												Seed	3.09	10	0.040	29.68	1.61	0.26	2.72	0.29	7.51
74+00	73+50	R	50.00	4.00	6.00	6.00	0.0126	0.09	1.85	0.50	0.93	Seed	2.82	5	0.030	27.89	1.88	0.20	2.61	0.25	7.03
												Seed	3.05	10	0.040	30.21	1.57	0.24	2.83	0.31	7.69
73+50	73+00	R	50.00	4.00	6.00	6.00	0.0216	0.09	1.94	0.50	0.97	Seed	2.80	5	0.030	28.25	2.29	0.30	2.71	0.22	6.67
												Seed	3.03	10	0.040	30.64	1.92	0.37	2.93	0.27	7.25
73+00	72+50	R	50.00	4.00	6.00	6.00	0.0216	0.09	2.03	0.50	1.01	Seed	2.78	5	0.030	28.61	2.32	0.30	2.81	0.23	6.72
												Seed	3.00	10	0.040	31.07	1.94	0.37	3.04	0.28	7.32
72+50	72+00	R	50.00	4.00	6.00	6.00	0.0214	0.09	2.11	0.50	1.06	Seed	2.76	5	0.030	28.97	2.34	0.31	2.91	0.23	6.77



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Seed	2.97	10	0.040	31.49	1.96	0.38	3.14	0.28	7.38
72+00	71+50	R	50.00	4.00	6.00	6.00	0.0216	0.09	2.20	0.50	1.10	Seed	2.73	5	0.030	29.32	2.36	0.32	3.00	0.23	6.82
												Seed	2.95	10	0.040	31.91	1.98	0.39	3.24	0.29	7.43
71+50	71+00	R	50.00	4.00	6.00	6.00	0.0662	0.09	2.29	0.50	1.14	Seed	2.72	5	0.030	29.56	3.51	0.72	3.11	0.18	6.10
												Jute Mat	2.72	5	0.040	29.61	2.89	0.85	3.11	0.21	6.47
												Temp. Mat	2.72	5	0.040	29.61	2.89	0.85	3.11	0.21	6.47
												Temp. Mat	2.93	10	0.040	32.19	2.95	0.89	3.35	0.21	6.58
71+00	70+50	R	50.00	0.00	5.00	5.00	0.0252	0.90	3.19	0.50	1.59	Seed	2.70	5	0.030	29.87	3.17	0.82	4.30	0.52	5.21
												Jute Mat	2.70	5	0.040	29.93	2.56	0.91	4.30	0.58	5.80
												Temp. Mat	2.70	5	0.040	29.93	2.56	0.91	4.30	0.58	5.80
												Temp. Mat	2.91	10	0.040	32.51	2.60	0.94	4.64	0.60	5.98
70+50	70+00	R	50.00	0.00	5.00	5.00	0.0262	0.09	3.28	0.50	1.64	Seed	2.68	5	0.030	30.19	3.23	0.85	4.40	0.52	5.22
												Jute Mat	2.68	5	0.040	30.26	2.60	0.95	4.39	0.58	5.81
												Temp. Mat	2.68	5	0.040	30.26	2.60	0.95	4.39	0.58	5.81
												Temp. Mat	2.90	10	0.040	32.83	2.65	0.98	4.75	0.60	5.98
70+00	69+50	R	50.00	0.00	5.00	5.00	0.0226	0.09	3.37	0.50	1.68	Seed	2.67	5	0.030	30.53	3.07	0.76	4.49	0.54	5.40
												Jute Mat	2.66	5	0.040	30.59	2.48	0.85	4.48	0.60	6.02
												Temp. Mat	2.66	5	0.040	30.59	2.48	0.85	4.48	0.60	6.02
												Temp. Mat	2.88	10	0.040	33.16	2.52	0.87	4.85	0.62	6.20
69+50	69+00	R	50.00	0.00	4.00	5.00	0.0206	0.09	3.46	0.50	1.73	Seed	2.65	5	0.030	30.86	3.06	0.74	4.57	0.58	5.19



DITCH ANALYSIS

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.)
												Jute Mat	2.64	5	0.040	30.93	2.46	0.83	4.57	0.64	5.78
												Temp. Mat	2.64	5	0.040	30.93	2.46	0.83	4.57	0.64	5.78
												Temp. Mat	2.86	10	0.040	33.49	2.51	0.85	4.94	0.66	5.96
69+00	68+50	R	50.00	0.00	4.00	4.00	0.0274	0.09	3.55	0.50	1.77	Seed	2.63	5	0.030	31.17	3.51	0.99	4.66	0.58	4.61
												Jute Mat	2.63	5	0.040	31.22	2.83	1.10	4.66	0.64	5.13
												Temp. Mat	2.63	5	0.040	31.22	2.83	1.10	4.66	0.64	5.13
												Perm, Type 1	2.63	5	0.040	31.22	2.83	1.10	4.66	0.64	5.13
												Perm, Type 1	2.85	10	0.040	33.78	2.88	1.13	5.04	0.66	5.30
68+50	68+00	R	50.00	0.00	4.00	4.00	0.0154	0.09	3.64	0.50	1.82	Seed	2.61	5	0.030	31.52	2.84	0.62	4.75	0.65	5.17
												Jute Mat	2.61	5	0.040	31.59	2.29	0.69	4.74	0.72	5.76
												Temp. Mat	2.61	5	0.040	31.59	2.29	0.69	4.74	0.72	5.76
												Temp. Mat	2.83	10	0.040	34.13	2.33	0.71	5.14	0.74	5.94
68+00	67+50	R	50.00	0.00	4.00	4.00	0.0204	0.09	3.73	0.50	1.86	Seed	2.59	5	0.030	31.85	3.17	0.79	4.83	0.62	4.94
												Jute Mat	2.59	5	0.040	31.91	2.55	0.88	4.83	0.69	5.50
												Temp. Mat	2.59	5	0.040	31.91	2.55	0.88	4.83	0.69	5.50
												Temp. Mat	2.81	10	0.040	34.45	2.60	0.90	5.23	0.71	5.67
67+50	67+00	R	50.00	5.00	4.00	4.00	0.0140	0.09	3.82	0.50	1.91	Seed	2.57	5	0.030	32.26	2.42	0.28	4.91	0.32	7.58
												Seed	2.79	10	0.040	34.86	2.04	0.35	5.32	0.40	8.17
67+00	66+50	R	50.00	5.00	6.00	6.00	0.0200	0.09	3.91	0.50	1.95	Seed	2.56	5	0.030	32.58	2.60	0.36	4.99	0.29	8.43
												Seed	2.77	10	0.040	35.24	2.18	0.44	5.41	0.35	9.19



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH WIDTH (ft.)	RADIUS SLOPE (ft./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.)
													Temp. Mat	2.49	5	0.040	33.92	3.59	1.32	5.42	0.41	5.31
													Perm, Type 1	2.49	5	0.040	33.92	3.59	1.32	5.42	0.41	5.31
													Perm, Type 1	2.70	10	0.040	36.56	3.67	1.37	5.89	0.43	5.45
64+00	63+50	R	50.00	2.00	4.00	4.00	0.0524	0.09	4.45	0.50	2.22		Seed	2.48	5	0.030	34.11	4.48	1.17	5.51	0.36	4.87
													Jute Mat	2.48	5	0.040	34.15	3.64	1.35	5.51	0.41	5.31
													Temp. Mat	2.48	5	0.040	34.15	3.64	1.35	5.51	0.41	5.31
													Perm, Type 1	2.48	5	0.040	34.15	3.64	1.35	5.51	0.41	5.31
													Perm, Type 1	2.69	10	0.040	36.79	3.72	1.41	5.99	0.43	5.45
63+50	63+00	R	50.00	2.00	2.00	4.00	0.0490	0.09	4.54	0.50	2.27		Seed	2.47	5	0.030	34.33	4.62	1.18	5.60	0.38	4.31
													Jute Mat	2.47	5	0.040	34.37	3.75	1.37	5.60	0.45	4.68
													Temp. Mat	2.47	5	0.040	34.37	3.75	1.37	5.60	0.45	4.68
													Perm, Type 1	2.47	5	0.040	34.37	3.75	1.37	5.60	0.45	4.68
													Perm, Type 1	2.68	10	0.040	37.00	3.84	1.42	6.08	0.47	4.80
63+00	62+50	R	50.00	2.00	4.00	6.00	0.0312	0.09	4.63	0.50	2.31		Seed	2.46	5	0.030	34.61	3.58	0.78	5.68	0.40	5.98
													Jute Mat	2.45	5	0.040	34.66	2.90	0.89	5.68	0.46	6.57
													Temp. Mat	2.45	5	0.040	34.66	2.90	0.89	5.68	0.46	6.57
													Temp. Mat	2.67	10	0.040	37.28	2.97	0.93	6.18	0.48	6.75
62+50	62+00	R	50.00	2.00	6.00	6.00	0.0428	0.09	4.72	0.50	2.36		Seed	2.44	5	0.030	34.88	3.88	0.96	5.76	0.36	6.29
													Jute Mat	2.44	5	0.040	34.93	3.15	1.10	5.76	0.41	6.92
													Temp. Mat	2.44	5	0.040	34.93	3.15	1.10	5.76	0.41	6.92



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Perm, Type 1	2.44	5	0.040	34.93	3.15	1.10	5.76	0.41	6.92
												Perm, Type 1	2.66	10	0.040	37.54	3.22	1.14	6.27	0.43	7.12
62+00	61+50	R	50.00	2.00	6.00	6.00	0.0394	0.09	4.81	0.50	2.40	Seed	2.43	5	0.030	35.15	3.79	0.90	5.84	0.37	6.41
												Jute Mat	2.43	5	0.040	35.20	3.06	1.03	5.84	0.42	7.05
												Temp. Mat	2.43	5	0.040	35.20	3.06	1.03	5.84	0.42	7.05
												Perm, Type 1	2.43	5	0.040	35.20	3.06	1.03	5.84	0.42	7.05
												Perm, Type 1	2.65	10	0.040	37.81	3.13	1.08	6.36	0.44	7.26
61+50	61+00	R	50.00	2.00	6.00	6.00	0.0228	0.09	4.90	0.50	2.45	Seed	2.42	5	0.030	35.47	3.11	0.60	5.92	0.42	7.05
												Jute Mat	2.41	5	0.040	35.53	2.51	0.68	5.91	0.48	7.78
												Temp. Mat	2.41	5	0.040	35.53	2.51	0.68	5.91	0.48	7.78
												Temp. Mat	2.63	10	0.040	38.13	2.57	0.71	6.44	0.50	8.01



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 EB_Sta. 80+50.00 to Sta. 84+00.00

Designer : WCS

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 (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.)
80+50	81+00	R	50.00	4.00	6.00	6.00	0.0006	0.14	0.14	0.50	0.07	Seed	3.69	5	0.030	17.57	0.32	0.01	0.26	0.16	5.93
												Seed	4.09	10	0.040	18.02	0.27	0.01	0.29	0.20	6.45
81+00	81+50	R	50.00	4.00	6.00	6.00	0.0006	0.12	0.26	0.50	0.13	Seed	3.46	5	0.030	19.73	0.38	0.01	0.45	0.22	6.64
												Seed	3.81	10	0.040	20.57	0.32	0.01	0.50	0.27	7.29
81+50	82+00	R	50.00	4.00	6.00	6.00	0.0018	0.12	0.38	0.50	0.19	Seed	3.34	5	0.030	21.06	0.61	0.02	0.63	0.20	6.38
												Seed	3.66	10	0.040	22.15	0.53	0.03	0.70	0.24	6.90
82+00	82+50	R	50.00	4.00	6.00	6.00	0.0024	0.12	0.50	0.50	0.25	Seed	3.24	5	0.030	22.18	0.74	0.03	0.81	0.21	6.51
												Seed	3.54	10	0.040	23.47	0.62	0.04	0.89	0.26	7.09
82+50	83+00	R	50.00	4.00	6.00	6.00	0.0028	0.11	0.61	0.50	0.31	Seed	3.16	5	0.030	23.18	0.82	0.04	0.96	0.22	6.64
												Seed	3.44	10	0.040	24.66	0.69	0.05	1.05	0.27	7.25
83+00	83+50	R	50.00	4.00	6.00	6.00	0.0034	0.10	0.71	0.50	0.36	Seed	3.09	5	0.030	24.09	0.91	0.05	1.10	0.22	6.69
												Seed	3.36	10	0.040	25.74	0.77	0.06	1.19	0.27	7.29
83+50	84+00	R	50.00	4.00	6.00	6.00	0.0030	0.09	0.80	0.50	0.40	Seed	3.02	5	0.030	25.00	0.90	0.05	1.21	0.24	6.93



DITCH ANALYSIS

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.)
											Seed	3.28	10	0.040	26.84	0.76	0.06	1.31	0.30	7.58



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 EB_Sta. 29+50.00 (Taylor Rd) to Sta. 86+00.00

Designer : WCS

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 (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.)
29+50	30+00	R	50.00	5.00	6.00	6.00	0.0146	0.02	0.02	0.50	0.01	Seed	3.79	5	0.030	16.71	0.46	0.01	0.04	0.02	5.19
												Seed	4.20	10	0.040	17.05	0.38	0.02	0.04	0.02	5.26
30+00	30+50	R	50.00	5.00	6.00	6.00	0.0068	0.02	0.04	0.50	0.02	Seed	3.57	5	0.030	18.67	0.40	0.02	0.08	0.04	5.45
												Seed	3.94	10	0.040	19.36	0.38	0.02	0.09	0.04	5.52
30+50	31+00	R	50.00	5.00	3.00	6.00	0.0150	0.14	0.18	0.50	0.09	Seed	3.48	5	0.030	19.55	0.92	0.06	0.31	0.06	5.58
												Seed	3.83	10	0.040	20.37	0.80	0.08	0.35	0.08	5.73
31+00	31+50	R	50.00	5.00	6.00	3.00	0.0150	0.16	0.34	0.50	0.17	Seed	3.41	5	0.030	20.26	1.17	0.09	0.58	0.09	5.82
												Seed	3.75	10	0.040	21.18	1.00	0.11	0.64	0.12	6.04
31+50	32+00	R	50.00	5.00	6.00	3.00	0.0146	0.17	0.51	0.50	0.25	Seed	3.35	5	0.030	20.89	1.33	0.11	0.85	0.12	6.04
												Seed	3.68	10	0.040	21.91	1.15	0.13	0.93	0.14	6.29
32+00	32+50	R	50.00	5.00	3.00	6.00	0.0150	0.17	0.68	0.50	0.34	Seed	3.30	5	0.030	21.45	1.48	0.13	1.11	0.13	6.21
												Seed	3.62	10	0.040	22.56	1.27	0.16	1.22	0.17	6.51
32+50	33+00	R	50.00	5.00	3.00	4.00	0.0098	0.17	0.84	0.50	0.42	Seed	3.25	5	0.030	22.04	1.41	0.11	1.37	0.17	6.21



DITCH ANALYSIS

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.)
												Seed	3.56	10	0.040	23.24	1.21	0.13	1.50	0.21	6.50
33+00	33+50	R	50.00	5.00	3.00	4.00	0.0040	0.17	1.01	0.50	0.51	Seed	3.19	5	0.030	22.78	1.11	0.06	1.61	0.25	6.73
												Seed	3.49	10	0.040	24.11	0.95	0.08	1.76	0.31	7.14
33+50	34+00	R	50.00	5.00	3.00	4.00	0.0072	0.31	1.32	0.50	0.66	Seed	3.14	5	0.030	23.34	1.48	0.11	2.07	0.24	6.68
												Seed	3.44	10	0.040	24.77	1.26	0.13	2.27	0.30	7.09
34+00	34+50	R	50.00	5.00	3.00	3.00	0.0062	0.21	1.53	0.50	0.76	Seed	3.10	5	0.030	23.90	1.49	0.11	2.36	0.27	6.64
												Seed	3.38	10	0.040	25.42	1.27	0.13	2.58	0.34	7.03
34+50	35+00	R	50.00	5.00	3.00	3.00	0.0124	0.21	1.73	0.50	0.87	Seed	3.07	5	0.030	24.33	1.94	0.18	2.65	0.24	6.43
												Seed	3.35	10	0.040	25.93	1.66	0.23	2.89	0.30	6.78
35+00	35+50	R	50.00	5.00	3.00	3.00	0.0066	0.38	2.11	0.50	1.05	Seed	3.03	5	0.030	24.82	1.68	0.13	3.19	0.32	6.91
												Seed	3.30	10	0.040	26.51	1.43	0.16	3.48	0.39	7.36
35+50	111+00	R	30.00	5.00	3.00	3.00	0.0097	0.14	2.25	0.50	1.12	Seed	3.01	5	0.030	25.08	1.95	0.18	3.38	0.30	6.77
												Seed	3.28	10	0.040	26.81	1.66	0.22	3.69	0.37	7.19
111+00	110+50	R	50.00	5.00	3.00	4.00	0.0018	0.30	2.55	0.50	1.27	Seed	2.96	5	0.030	25.82	1.12	0.06	3.77	0.50	8.49
												Seed	3.22	10	0.040	27.69	0.94	0.07	4.10	0.61	9.27
110+50	110+00	R	50.00	5.00	3.00	4.00	0.0050	0.31	2.86	0.50	1.43	Seed	2.92	5	0.030	26.32	1.65	0.12	4.18	0.40	7.78
												Seed	3.18	10	0.040	28.29	1.38	0.15	4.54	0.49	8.42
110+00	109+50	R	50.00	5.00	3.00	4.00	0.0230	0.28	3.13	0.50	1.57	Seed	2.90	5	0.030	26.62	2.83	0.39	4.55	0.27	6.89
												Seed	3.15	10	0.040	28.63	2.39	0.48	4.94	0.33	7.34
109+50	109+00	R	50.00	5.00	3.00	4.00	0.0230	0.28	3.41	0.50	1.70	Seed	2.89	5	0.030	26.90	2.90	0.41	4.92	0.28	6.98



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH WIDTH (ft.)	RADIUS SLOPE (ft./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.)
													Jute Mat	2.88	5	0.040	26.96	2.39	0.48	4.91	0.33	7.33
													Temp. Mat	2.88	5	0.040	26.96	2.39	0.48	4.91	0.33	7.33
													Temp. Mat	3.13	10	0.040	28.97	2.46	0.50	5.33	0.35	7.44
109+00	108+50	R	50.00	5.00	3.00	4.00	0.0230	0.30	3.70	0.50	1.85		Seed	2.86	5	0.030	27.24	2.97	0.42	5.30	0.30	7.07
													Jute Mat	2.86	5	0.040	27.30	2.45	0.50	5.29	0.35	7.43
													Temp. Mat	2.86	5	0.040	27.30	2.45	0.50	5.29	0.35	7.43
													Temp. Mat	3.11	10	0.040	29.30	2.52	0.52	5.76	0.36	7.55
108+50	108+00	R	50.00	5.00	3.00	4.00	0.0230	0.27	3.98	0.50	1.99		Seed	2.84	5	0.030	27.58	3.04	0.44	5.65	0.31	7.14
													Jute Mat	2.84	5	0.040	27.63	2.50	0.52	5.64	0.36	7.52
													Temp. Mat	2.84	5	0.040	27.63	2.50	0.52	5.64	0.36	7.52
													Temp. Mat	3.09	10	0.040	29.63	2.57	0.54	6.14	0.38	7.65
108+00	107+50	R	50.00	5.00	3.00	4.00	0.0230	0.13	4.10	0.50	2.05		Seed	2.82	5	0.030	27.91	3.06	0.45	5.79	0.31	7.17
													Jute Mat	2.82	5	0.040	27.96	2.52	0.52	5.78	0.37	7.56
													Temp. Mat	2.82	5	0.040	27.96	2.52	0.52	5.78	0.37	7.56
													Temp. Mat	3.07	10	0.040	29.95	2.59	0.55	6.29	0.38	7.68
107+50	107+00	R	50.00	5.00	3.00	4.00	0.0170	0.20	4.30	0.50	2.15		Seed	2.80	5	0.030	28.26	2.80	0.37	6.02	0.35	7.42
													Seed	3.05	10	0.040	30.30	2.37	0.45	6.55	0.43	7.98
107+00	106+50	R	50.00	5.00	3.00	4.00	0.0376	0.19	4.49	0.50	2.25		Seed	2.78	5	0.030	28.49	3.70	0.66	6.25	0.28	6.97
													Jute Mat	2.78	5	0.040	28.53	3.05	0.78	6.25	0.33	7.33
													Temp. Mat	2.78	5	0.040	28.53	3.05	0.78	6.25	0.33	7.33



DITCH ANALYSIS

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.)
												Temp. Mat	3.03	10	0.040	30.56	3.14	0.82	6.80	0.35	7.44
106+50	106+00	R	50.00	5.00	3.00	3.00	0.0376	0.19	4.68	0.50	2.34	Seed	2.77	5	0.030	28.75	3.80	0.68	6.48	0.29	6.74
												Jute Mat	2.77	5	0.040	28.80	3.14	0.80	6.47	0.34	7.05
												Temp. Mat	2.77	5	0.040	28.80	3.14	0.80	6.47	0.34	7.05
												Temp. Mat	3.01	10	0.040	30.82	3.23	0.84	7.05	0.36	7.16
106+00	105+50	R	50.00	5.00	3.00	3.00	0.0374	0.21	4.89	0.50	2.45	Seed	2.75	5	0.030	29.01	3.85	0.69	6.73	0.30	6.78
												Jute Mat	2.75	5	0.040	29.06	3.17	0.82	6.73	0.35	7.10
												Temp. Mat	2.75	5	0.040	29.06	3.17	0.82	6.73	0.35	7.10
												Temp. Mat	3.00	10	0.040	31.08	3.27	0.86	7.33	0.37	7.21
105+50	105+00	R	50.00	5.00	3.00	3.00	0.0376	0.14	5.03	0.50	2.51	Seed	2.74	5	0.030	29.27	3.88	0.70	6.88	0.30	6.80
												Jute Mat	2.73	5	0.040	29.32	3.20	0.83	6.87	0.35	7.12
												Temp. Mat	2.73	5	0.040	29.32	3.20	0.83	6.87	0.35	7.12
												Temp. Mat	2.98	10	0.040	31.33	3.30	0.87	7.50	0.37	7.23
105+00	104+50	R	50.00	5.00	6.00	3.00	0.0376	0.12	5.15	0.50	2.57	Seed	2.72	5	0.030	29.54	3.74	0.69	7.01	0.30	7.66
												Jute Mat	2.72	5	0.040	29.59	3.06	0.82	7.00	0.35	8.13
												Temp. Mat	2.72	5	0.040	29.59	3.06	0.82	7.00	0.35	8.13
												Temp. Mat	2.97	10	0.040	31.59	3.15	0.86	7.64	0.36	8.28
104+50	104+00	R	50.00	5.00	6.00	3.00	0.0376	0.13	5.28	0.50	2.64	Seed	2.71	5	0.030	29.81	3.76	0.70	7.14	0.30	7.69
												Jute Mat	2.70	5	0.040	29.86	3.09	0.82	7.13	0.35	8.16
												Temp. Mat	2.70	5	0.040	29.86	3.09	0.82	7.13	0.35	8.16



DITCH ANALYSIS

STATION BEGIN	END		SIDE (ft.)	LENGTH WIDTH (ft.)	RADIUS SLOPE (ft./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.)
													Temp. Mat	2.95	10	0.040	31.86	3.17	0.86	7.79	0.37	8.32
104+00	Concent								40.97		0.70	31.32					65.00					
104+00	103+50	R	50.00	5.00	6.00	3.00	0.0150		1.37	47.62	0.50	32.00	Seed	1.57	5	0.030	65.17	4.80	1.00	50.35	1.07	14.62
													Jute Mat	1.57	5	0.040	65.21	3.89	1.15	50.32	1.23	16.06
													Temp. Mat	1.57	5	0.040	65.21	3.89	1.15	50.32	1.23	16.06
													Perm, Type 1	1.57	5	0.040	65.21	3.89	1.15	50.32	1.23	16.06
													Perm, Type 1	1.81	10	0.040	65.21	4.04	1.23	57.87	1.31	16.82
103+50	103+00	R	50.00	5.00	6.00	3.00	0.0150		1.35	48.97	0.50	32.68	Seed	1.57	5	0.030	65.39	4.83	1.01	51.28	1.08	14.70
													Jute Mat	1.57	5	0.040	65.43	3.91	1.16	51.26	1.24	16.15
													Temp. Mat	1.57	5	0.040	65.43	3.91	1.16	51.26	1.24	16.15
													Perm, Type 1	1.57	5	0.040	65.43	3.91	1.16	51.26	1.24	16.15
													Perm, Type 1	1.80	10	0.040	65.41	4.06	1.24	58.95	1.33	16.93
103+00	102+50	R	50.00	5.00	6.00	3.00	0.0152		0.13	49.10	0.50	32.74	Seed	1.57	5	0.030	65.60	4.85	1.02	51.26	1.07	14.67
													Jute Mat	1.56	5	0.040	65.64	3.93	1.17	51.24	1.24	16.12
													Temp. Mat	1.56	5	0.040	65.64	3.93	1.17	51.24	1.24	16.12
													Perm, Type 1	1.56	5	0.040	65.64	3.93	1.17	51.24	1.24	16.12
													Perm, Type 1	1.80	10	0.040	65.62	4.08	1.25	58.94	1.32	16.89
102+50	102+00	R	50.00	5.00	6.00	3.00	0.0160		0.14	49.23	0.50	32.81	Seed	1.56	5	0.030	65.81	4.94	1.06	51.25	1.06	14.55
													Jute Mat	1.56	5	0.040	65.85	4.00	1.22	51.23	1.22	15.98
													Temp. Mat	1.56	5	0.040	65.85	4.00	1.22	51.23	1.22	15.98



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH RADIUS (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.)
												Perm, Type 1	1.56	5	0.040	65.85	4.00	1.22	51.23	1.22	15.98
												Perm, Type 1	1.80	10	0.040	65.82	4.15	1.30	58.93	1.30	16.74
102+00	101+50	R	50.00	5.00	6.00	3.00	0.0148	0.21	49.44	0.50	32.91	Seed	1.56	5	0.030	66.02	4.80	1.00	51.29	1.08	14.74
												Jute Mat	1.56	5	0.040	66.06	3.89	1.15	51.26	1.24	16.19
												Temp. Mat	1.56	5	0.040	66.06	3.89	1.15	51.26	1.24	16.19
												Perm, Type 1	1.56	5	0.040	66.06	3.89	1.15	51.26	1.24	16.19
												Perm, Type 1	1.79	10	0.040	66.02	4.04	1.23	58.98	1.33	16.97
101+50	101+00	R	50.00	5.00	6.00	3.00	0.0150	0.15	49.59	0.50	32.99	Seed	1.55	5	0.030	66.23	4.83	1.01	51.28	1.08	14.70
												Jute Mat	1.55	5	0.040	66.27	3.91	1.16	51.25	1.24	16.15
												Temp. Mat	1.55	5	0.040	66.27	3.91	1.16	51.25	1.24	16.15
												Perm, Type 1	1.55	5	0.040	66.27	3.91	1.16	51.25	1.24	16.15
												Perm, Type 1	1.79	10	0.040	66.23	4.06	1.24	58.97	1.33	16.93
101+00	100+50	R	50.00	5.00	6.00	3.00	0.0150	0.15	49.73	0.50	33.06	Seed	1.55	5	0.030	66.45	4.83	1.01	51.27	1.08	14.70
												Jute Mat	1.55	5	0.040	66.49	3.91	1.16	51.24	1.24	16.15
												Temp. Mat	1.55	5	0.040	66.49	3.91	1.16	51.24	1.24	16.15
												Perm, Type 1	1.55	5	0.040	66.49	3.91	1.16	51.24	1.24	16.15
												Perm, Type 1	1.78	10	0.040	66.43	4.06	1.24	58.97	1.33	16.93
100+50	100+00	R	50.00	5.00	6.00	3.00	0.0150	0.16	49.89	0.50	33.14	Seed	1.55	5	0.030	66.66	4.83	1.01	51.27	1.08	14.70
												Jute Mat	1.55	5	0.040	66.70	3.91	1.16	51.24	1.24	16.15
												Temp. Mat	1.55	5	0.040	66.70	3.91	1.16	51.24	1.24	16.15



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH RADIUS (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.)
												Perm, Type 1	1.55	5	0.040	66.70	3.91	1.16	51.24	1.24	16.15
												Perm, Type 1	1.78	10	0.040	66.64	4.06	1.24	58.97	1.33	16.93
100+00	99+50	R	50.00	5.00	6.00	3.00	0.0150	0.19	50.08	0.50	33.23	Seed	1.54	5	0.030	66.87	4.83	1.01	51.29	1.08	14.71
												Jute Mat	1.54	5	0.040	66.91	3.91	1.16	51.26	1.24	16.16
												Temp. Mat	1.54	5	0.040	66.91	3.91	1.16	51.26	1.24	16.16
												Perm, Type 1	1.54	5	0.040	66.91	3.91	1.16	51.26	1.24	16.16
												Perm, Type 1	1.78	10	0.040	66.84	4.06	1.24	59.01	1.33	16.93
99+50	99+00	R	50.00	5.00	6.00	3.00	0.0150	0.19	50.26	0.50	33.33	Seed	1.54	5	0.030	67.09	4.83	1.01	51.31	1.08	14.71
												Jute Mat	1.54	5	0.040	67.13	3.91	1.16	51.29	1.24	16.16
												Temp. Mat	1.54	5	0.040	67.13	3.91	1.16	51.29	1.24	16.16
												Perm, Type 1	1.54	5	0.040	67.13	3.91	1.16	51.29	1.24	16.16
												Perm, Type 1	1.77	10	0.040	67.05	4.06	1.24	59.04	1.33	16.94
99+00	98+50	R	50.00	5.00	6.00	3.00	0.0150	0.16	50.42	0.50	33.40	Seed	1.54	5	0.030	67.30	4.83	1.01	51.31	1.08	14.71
												Jute Mat	1.54	5	0.040	67.34	3.91	1.16	51.29	1.24	16.16
												Temp. Mat	1.54	5	0.040	67.34	3.91	1.16	51.29	1.24	16.16
												Perm, Type 1	1.54	5	0.040	67.34	3.91	1.16	51.29	1.24	16.16
												Perm, Type 1	1.77	10	0.040	67.25	4.06	1.24	59.04	1.33	16.94
98+50	98+00	R	50.00	5.00	2.00	2.00	0.0134	0.86	51.28	0.50	33.83	Seed	1.53	5	0.030	67.49	5.36	1.07	51.86	1.28	10.12
												Jute Mat	1.53	5	0.040	67.53	4.36	1.25	51.84	1.49	10.96
												Temp. Mat	1.53	5	0.040	67.53	4.36	1.25	51.84	1.49	10.96



DITCH ANALYSIS

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.)
												Perm, Type 1	1.53	5	0.040	67.53	4.36	1.25	51.84	1.49	10.96
												Perm, Type 1	1.76	10	0.040	67.44	4.53	1.34	59.68	1.60	11.42
98+00	97+50	R	50.00	5.00	2.00	2.00	0.0324	1.03	52.31	0.50	34.35	Seed	1.53	5	0.030	67.64	7.35	2.06	52.56	1.02	9.07
												Jute Mat	1.53	5	0.040	67.67	6.00	2.40	52.55	1.19	9.75
												Temp. Mat	1.53	5	0.040	67.67	6.00	2.40	52.55	1.19	9.75
												Perm, Type 1	1.53	5	0.040	67.67	6.00	2.40	52.55	1.19	9.75
												Perm, Type 2	1.53	5	0.040	67.67	6.00	2.40	52.55	1.19	9.75
												Perm, Type 2	1.76	10	0.040	67.57	6.25	2.59	60.50	1.28	10.12
97+50	97+00	R	50.00	5.00	2.00	2.00	0.0348	0.83	53.14	0.50	34.77	Seed	1.53	5	0.030	67.78	7.56	2.18	53.12	1.00	9.01
												Jute Mat	1.53	5	0.040	67.80	6.17	2.54	53.10	1.17	9.69
												Temp. Mat	1.53	5	0.040	67.80	6.17	2.54	53.10	1.17	9.69
												Perm, Type 1	1.53	5	0.040	67.80	6.17	2.54	53.10	1.17	9.69
												Perm, Type 2	1.53	5	0.040	67.80	6.17	2.54	53.10	1.17	9.69
												Perm, Type 2	1.76	10	0.040	67.70	6.43	2.74	61.15	1.26	10.06
97+00	Concent							0.53		0.90	35.24					10.00					
97+00	96+50	R	50.00	5.00	2.00	2.00	0.0216	0.97	54.64	0.50	35.73	Seed	1.53	5	0.030	67.93	6.44	1.56	54.49	1.16	9.63
												Jute Mat	1.52	5	0.040	67.96	5.24	1.82	54.47	1.35	10.40
												Temp. Mat	1.52	5	0.040	67.96	5.24	1.82	54.47	1.35	10.40
												Perm, Type 1	1.52	5	0.040	67.96	5.24	1.82	54.47	1.35	10.40
												Perm, Type 1	1.76	10	0.040	67.85	5.46	1.96	62.73	1.45	10.81



DITCH ANALYSIS

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.)
96+50	96+00	R	50.00	5.00	2.00	2.00	0.0214	0.16	54.80	0.70	35.84	Seed	1.52	5	0.030	68.09	6.42	1.55	54.57	1.16	9.64
												Jute Mat	1.52	5	0.040	68.12	5.23	1.81	54.55	1.35	10.41
												Temp. Mat	1.52	5	0.040	68.12	5.23	1.81	54.55	1.35	10.41
												Perm, Type 1	1.52	5	0.040	68.12	5.23	1.81	54.55	1.35	10.41
												Perm, Type 1	1.75	10	0.040	68.01	5.44	1.95	62.82	1.46	10.83
96+00	95+50	R	50.00	12.00	2.00	2.00	0.0460	0.17	54.97	0.70	35.95	Seed	1.52	5	0.030	68.24	6.99	1.70	54.66	0.59	14.37
												Jute Mat	1.52	5	0.040	68.27	5.80	2.02	54.64	0.70	14.81
												Temp. Mat	1.52	5	0.040	68.27	5.80	2.02	54.64	0.70	14.81
												Perm, Type 1	1.52	5	0.040	68.27	5.80	2.02	54.64	0.70	14.81
												Perm, Type 2	1.52	5	0.040	68.27	5.80	2.02	54.64	0.70	14.81
												Perm, Type 2	1.75	10	0.040	68.14	6.10	2.19	62.94	0.76	15.05
95+50	95+00	R	50.00	12.00	2.00	2.00	0.0702	0.17	55.14	0.70	36.07	Seed	1.52	5	0.030	68.37	8.01	2.30	54.76	0.52	14.10
												Jute Mat	1.52	5	0.040	68.39	6.66	2.72	54.75	0.62	14.48
												Temp. Mat	1.52	5	0.040	68.39	6.66	2.72	54.75	0.62	14.48
												Perm, Type 1	1.52	5	0.040	68.39	6.66	2.72	54.75	0.62	14.48
												Perm, Type 2	1.52	5	0.040	68.39	6.66	2.72	54.75	0.62	14.48
												Perm, Type 2	1.75	10	0.040	68.26	7.00	2.96	63.06	0.67	14.70
95+00	94+50	R	50.00	12.00	2.00	2.00	0.0696	0.20	55.34	0.70	36.22	Seed	1.52	5	0.030	68.50	7.99	2.29	54.90	0.53	14.10
												Jute Mat	1.52	5	0.040	68.52	6.65	2.71	54.89	0.62	14.49
												Temp. Mat	1.52	5	0.040	68.52	6.65	2.71	54.89	0.62	14.49



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (ft./ft.)	IN SLOPE	BACK SLOPE	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.)
													Perm, Type 1	.52	5	0.040	68.52	6.65	2.71	54.89	0.62	14.49
													Perm, Type 2	1.52	5	0.040	68.52	6.65	2.71	54.89	0.62	14.49
													Perm, Type 2	1.75	10	0.040	68.38	6.99	2.94	63.23	0.68	14.71
94+50	94+00	R	50.00	16.00	2.00	2.00	0.0704	0.23	55.56	0.70	36.37		Seed	1.51	5	0.030	68.63	7.34	1.95	55.06	0.44	17.78
													Jute Mat	1.51	5	0.040	68.65	6.12	2.32	55.04	0.53	18.11
													Temp. Mat	1.51	5	0.040	68.65	6.12	2.32	55.04	0.53	18.11
													Perm, Type 1	.51	5	0.040	68.65	6.12	2.32	55.04	0.53	18.11
													Perm, Type 2	1.51	5	0.040	68.65	6.12	2.32	55.04	0.53	18.11
													Perm, Type 2	1.74	10	0.040	68.51	6.45	2.52	63.42	0.57	18.29
94+00	93+50	R	50.00	16.00	2.00	2.00	0.0416	0.26	55.83	0.70	36.56		Seed	1.51	5	0.030	68.79	6.23	1.35	55.24	0.52	18.08
													Jute Mat	1.51	5	0.040	68.81	5.19	1.60	55.23	0.62	18.47
													Temp. Mat	1.51	5	0.040	68.81	5.19	1.60	55.23	0.62	18.47
													Perm, Type 1	.51	5	0.040	68.81	5.19	1.60	55.23	0.62	18.47
													Perm, Type 2	1.74	10	0.040	68.66	5.47	1.74	63.63	0.67	18.69
93+50	93+00	R	50.00	16.00	2.00	2.00	0.0438	0.27	56.10	0.70	36.75		Seed	1.51	5	0.030	68.94	6.34	1.40	55.43	0.51	18.05
													Jute Mat	1.51	5	0.040	68.97	5.28	1.67	55.42	0.61	18.44
													Temp. Mat	1.51	5	0.040	68.97	5.28	1.67	55.42	0.61	18.44
													Perm, Type 1	.51	5	0.040	68.97	5.28	1.67	55.42	0.61	18.44
													Perm, Type 2	1.74	10	0.040	68.81	5.56	1.81	63.86	0.66	18.65
93+00	92+50	R	50.00	16.00	2.00	2.00	0.0440	0.27	56.36	0.70	36.93		Seed	1.51	5	0.030	69.10	6.35	1.41	55.62	0.51	18.06



DITCH ANALYSIS

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.)
												Jute Mat	1.51	5	0.040	69.13	5.30	1.67	55.60	0.61	18.44
												Temp. Mat	1.51	5	0.040	69.13	5.30	1.67	55.60	0.61	18.44
												Perm, Type 1	51	5	0.040	69.13	5.30	1.67	55.60	0.61	18.44
												Perm, Type 1	11.74	10	0.040	68.96	5.58	1.82	64.08	0.66	18.65
92+50	92+00	R	50.00	16.00	2.00	2.00	0.0438	0.26	56.62	0.70	37.11	Seed	1.50	5	0.030	69.26	6.35	1.41	55.80	0.52	18.06
												Jute Mat	1.50	5	0.040	69.28	5.30	1.67	55.78	0.61	18.45
												Temp. Mat	1.50	5	0.040	69.28	5.30	1.67	55.78	0.61	18.45
												Perm, Type 1	50	5	0.040	69.28	5.30	1.67	55.78	0.61	18.45
												Perm, Type 1	11.73	10	0.040	69.11	5.58	1.82	64.29	0.67	18.66
92+00	91+50	R	50.00	16.00	2.00	2.00	0.0230	0.25	56.87	0.70	37.29	Seed	1.50	5	0.030	69.45	5.19	0.90	55.95	0.63	18.50
												Jute Mat	1.50	5	0.040	69.48	4.32	1.06	55.93	0.74	18.96
												Temp. Mat	1.50	5	0.040	69.48	4.32	1.06	55.93	0.74	18.96
												Perm, Type 1	50	5	0.040	69.48	4.32	1.06	55.93	0.74	18.96
												Perm, Type 1	1.73	10	0.040	69.29	4.54	1.16	64.47	0.81	19.22
91+60	Concent							1254.		0.60	789.6					1773.					
91+50	Concent							0.52		0.90	790.1					10.00					
91+50	91+00	R	50.00	16.00	2.00	2.00	0.0208	0.24	1311.	0.70	790.3	Seed	0.10	5	0.030	1773.	5.72	1.03	80.24	0.80	19.19
												Jute Mat	0.10	5	0.040	1773.	4.75	1.23	80.24	0.94	19.78
												Temp. Mat	0.10	5	0.040	1773.	4.75	1.23	80.24	0.94	19.78
												Perm, Type 1	10	5	0.040	1773.	4.75	1.23	80.24	0.94	19.78



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Perm, Type 1	1.11	10	0.040	1773.	4.96	1.32	90.52	1.01	20.05
91+00	90+50	R	50.00	16.00	2.00	2.00	0.0204	0.24	1311.	0.70	790.4	Seed	0.10	5	0.030	1773.	5.69	1.02	80.25	0.80	19.21
												Jute Mat	0.10	5	0.040	1773.	4.72	1.21	80.25	0.95	19.80
												Temp. Mat	0.10	5	0.040	1773.	4.72	1.21	80.25	0.95	19.80
												Perm, Type 1	1.11	10	0.040	1773.	4.93	1.30	90.53	1.02	20.08
90+50	90+00	R	50.00	16.00	2.00	2.00	0.0194	0.23	1312.	0.70	790.6	Seed	0.10	5	0.030	1773.	5.60	0.99	80.26	0.81	19.25
												Jute Mat	0.10	5	0.040	1773.	4.65	1.17	80.26	0.96	19.86
												Temp. Mat	0.10	5	0.040	1773.	4.65	1.17	80.26	0.96	19.86
												Perm, Type 1	1.11	10	0.040	1773.	4.84	1.25	90.54	1.03	20.14
90+00	89+50		50.00	16.00			0.0170	0.22	1312.	0.70	790.8	Seed	0.10	5	0.030	1773.	6.30	1.52	80.27	1.43	13.35
												Jute Mat	0.10	5	0.040	1773.	5.17	1.73	80.27	1.64	14.24
												Temp. Mat	0.10	5	0.040	1773.	5.17	1.73	80.27	1.64	14.24
												Perm, Type 1	1.11	10	0.040	1773.	5.37	1.83	90.55	1.73	14.64
89+50	89+00	R	50.00	16.00	2.00	2.00	0.0150	0.21	1312.	0.70	790.9	Seed	0.10	5	0.030	1773.	5.15	0.82	80.28	0.88	19.51
												Jute Mat	0.10	5	0.040	1773.	4.27	0.97	80.28	1.04	20.16
												Temp. Mat	0.10	5	0.040	1773.	4.27	0.97	80.28	1.04	20.16
												Temp. Mat	0.11	10	0.040	1773.	4.45	1.04	90.56	1.12	20.46



DITCH ANALYSIS

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.)
89+00	88+50		50.00	16.00	2.00	2.00	0.0128	0.20	1312.	0.70	791.1	Seed	0.10	5	0.030	1774.	4.89	0.73	80.28	0.92	19.68
												Jute Mat	0.10	5	0.040	1774.	4.06	0.87	80.28	1.09	20.35
												Temp. Mat	0.10	5	0.040	1774.	4.06	0.87	80.28	1.09	20.35
												Temp. Mat	0.11	10	0.040	1774.	4.23	0.93	90.56	1.17	20.67
88+50	88+00	R	50.00	16.00	2.00	2.00	0.0106	0.19	1312.	0.70	791.2	Seed	0.10	5	0.030	1774.	4.60	0.64	80.29	0.97	19.89
												Jute Mat	0.10	5	0.040	1774.	3.81	0.76	80.29	1.15	20.60
												Temp. Mat	0.10	5	0.040	1774.	3.81	0.76	80.29	1.15	20.60
												Temp. Mat	0.11	10	0.040	1774.	3.97	0.82	90.57	1.23	20.94
88+00	87+50	R	50.00	16.00	2.00	2.00	0.0082	0.17	1313.	0.70	791.3	Seed	0.10	5	0.030	1774.	4.23	0.54	80.29	1.05	20.19
												Jute Mat	0.10	5	0.040	1774.	3.50	0.63	80.29	1.24	20.96
												Temp. Mat	0.10	5	0.040	1774.	3.50	0.63	80.29	1.24	20.96
												Temp. Mat	0.11	10	0.040	1774.	3.65	0.68	90.57	1.33	21.32
87+50	87+00	R	50.00	16.00	2.00	2.00	0.0062	0.16	1313.	0.70	791.4	Seed	0.10	5	0.030	1774.	3.86	0.44	80.29	1.14	20.55
												Jute Mat	0.10	5	0.040	1774.	3.20	0.52	80.29	1.34	21.38
												Temp. Mat	0.10	5	0.040	1774.	3.20	0.52	80.29	1.34	21.38
												Temp. Mat	0.11	10	0.040	1774.	3.33	0.56	90.58	1.44	21.77
87+00	86+50	R	50.00	16.00	2.00	2.00	0.0040	0.15	1313.	0.70	791.5	Seed	0.10	5	0.030	1775.	3.34	0.32	80.29	1.29	21.17
												Seed	0.11	10	0.040	1775.	2.87	0.41	90.57	1.64	22.54
86+50	86+00	R	50.00	16.00	2.00	2.00	0.0062	0.09	1313.	0.70	791.6	Seed	0.10	5	0.030	1775.	3.86	0.44	80.29	1.14	20.55
												Jute Mat	0.10	5	0.040	1775.	3.19	0.52	80.29	1.34	21.38



DITCH ANALYSIS

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.)	
												Temp. Mat	1.10	5	0.040	1775.	3.19	0.52	80.29	1.34	21.38
												Temp. Mat	0.11	10	0.040	1775.	3.33	0.56	90.57	1.44	21.77



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 EB_Sta. 120+00.00 to Sta. 113+50.00 (Culvert Inlet)

Designer : WCS

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.)
120+00	119+50	R	50.00	4.00	6.00	6.00	0.0424	0.04	0.04	0.70	0.03	Seed	3.89	5	0.030	15.85	0.95	0.08	0.12	0.03	4.35
												Seed	4.34	10	0.040	15.98	0.82	0.10	0.13	0.04	4.45
119+50	119+00	R	50.00	4.00	6.00	6.00	0.0290	0.03	0.08	0.70	0.05	Seed	3.80	5	0.030	16.64	1.04	0.08	0.20	0.05	4.55
												Seed	4.22	10	0.040	16.91	0.87	0.11	0.22	0.06	4.71
119+00	118+50	R	50.00	4.00	6.00	6.00	0.0214	0.04	0.12	0.70	0.08	Seed	3.71	5	0.030	17.39	1.08	0.09	0.31	0.06	4.77
												Seed	4.12	10	0.040	17.77	0.94	0.11	0.34	0.08	4.97
118+50	118+00	R	50.00	4.00	6.00	6.00	0.0224	0.05	0.17	0.70	0.12	Seed	3.63	5	0.030	18.06	1.26	0.11	0.42	0.08	4.90
												Seed	4.03	10	0.040	18.55	1.06	0.14	0.47	0.10	5.16
118+00	117+50	R	50.00	4.00	6.00	4.00	0.0326	0.05	0.22	0.70	0.15	Seed	3.58	5	0.030	18.59	1.55	0.16	0.55	0.08	4.81
												Seed	3.96	10	0.040	19.17	1.36	0.20	0.61	0.10	4.99
117+50	117+00	R	50.00	4.00	6.00	3.00	0.0386	0.06	0.28	0.70	0.19	Seed	3.53	5	0.030	19.05	1.79	0.21	0.69	0.09	4.79
												Seed	3.90	10	0.040	19.70	1.55	0.26	0.76	0.11	4.98
117+00	116+50	R	50.00	4.00	6.00	4.00	0.0418	0.07	0.34	0.70	0.24	Seed	3.49	5	0.030	19.47	1.96	0.25	0.84	0.10	4.95



DITCH ANALYSIS

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.)
												Seed	3.85	10	0.040	20.19	1.68	0.31	0.92	0.12	5.20
116+50	116+00	R	50.00	4.00	6.00	4.00	0.0446	0.07	0.41	0.70	0.29	Seed	3.45	5	0.030	19.86	2.14	0.29	1.00	0.10	5.03
												Seed	3.81	10	0.040	20.64	1.84	0.36	1.10	0.13	5.29
116+00	115+50	R	50.00	4.00	3.00	3.00	0.0414	0.08	0.49	0.70	0.34	Seed	3.41	5	0.030	20.22	2.29	0.31	1.18	0.12	4.71
												Seed	3.76	10	0.040	21.07	1.98	0.38	1.30	0.15	4.89
115+50	115+00	R	50.00	4.00	3.00	3.00	0.0348	0.09	0.58	0.70	0.40	Seed	3.38	5	0.030	20.59	2.28	0.29	1.37	0.14	4.81
												Seed	3.72	10	0.040	21.49	1.97	0.37	1.50	0.17	5.02
115+00	Concent							2.20		0.75	2.05					24.82					
115+00	114+50	R	50.00	4.00	3.00	3.00	0.0074	0.09	2.87	0.70	2.12	Seed	3.00	5	0.030	25.19	2.27	0.23	6.37	0.51	7.05
												Seed	3.40	10	0.040	25.25	1.93	0.29	7.20	0.63	7.80
114+50	114+00	R	50.00	4.00	3.00	3.00	0.0076	0.10	2.97	0.70	2.19	Seed	2.98	5	0.030	25.55	2.31	0.24	6.51	0.51	7.06
												Seed	3.36	10	0.040	25.68	1.96	0.30	7.36	0.64	7.82
114+00	113+50	R	50.00	4.00	3.00	3.00	0.0156	0.10	3.07	0.70	2.26	Seed	2.96	5	0.030	25.83	2.98	0.41	6.68	0.42	6.55
												Jute Mat	2.95	5	0.040	25.89	2.44	0.48	6.67	0.50	6.98
												Temp. Mat	2.95	5	0.040	25.89	2.44	0.48	6.67	0.50	6.98
												Temp. Mat	3.34	10	0.040	26.01	2.53	0.52	7.54	0.53	7.19



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : I-70 EB_Sta. 111+50.00 (Culvert Outlet) to Sta. 110+50.00 (Detention Basin) **Designer :** WCS

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.)
111+50	Concent							3.07		0.74	2.27					26.01					
111+50	111+00	R	50.00	4.00	4.00	4.00	0.0542	0.13	3.20	0.70	2.36	Seed	2.93	5	0.030	26.20	4.46	1.01	6.92	0.30	6.39
												Jute Mat	2.93	5	0.040	26.24	3.65	1.19	6.91	0.35	6.80
												Temp. Mat	2.93	5	0.040	26.24	3.65	1.19	6.91	0.35	6.80
												Perm, Type 1	2.93	5	0.040	26.24	3.65	1.19	6.91	0.35	6.80
												Perm, Type 1	3.32	10	0.040	26.23	3.80	1.27	7.84	0.38	7.00
111+00	110+50	R	50.00	4.00	6.00	4.00	0.0206	0.15	3.35	0.70	2.47	Seed	2.91	5	0.030	26.50	3.11	0.50	7.18	0.39	7.88
												Jute Mat	2.91	5	0.040	26.57	2.54	0.58	7.17	0.45	8.52
												Temp. Mat	2.91	5	0.040	26.57	2.54	0.58	7.17	0.45	8.52
												Temp. Mat	3.30	10	0.040	26.55	2.63	0.62	8.13	0.48	8.82



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 12+50.00 to Sta. 9+15.00

Designer : WCS

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.)
12+50	12+00	L	50.00	4.00	6.00	4.00	0.0142	0.09	0.09	0.70	0.06	Seed	3.88	5	0.030	15.92	0.88	0.06	0.24	0.06	4.64
												Seed	4.33	10	0.040	16.05	0.77	0.07	0.27	0.08	4.81
12+00	11+50	L	50.00	4.00	6.00	4.00	0.0148	0.09	0.18	0.70	0.13	Seed	3.80	5	0.030	16.64	1.14	0.09	0.48	0.09	4.94
												Seed	4.23	10	0.040	16.88	0.99	0.11	0.53	0.12	5.17
11+50	11+00	L	50.00	4.00	6.00	4.00	0.0158	0.10	0.28	0.70	0.19	Seed	3.73	5	0.030	17.24	1.36	0.11	0.72	0.12	5.15
												Seed	4.14	10	0.040	17.59	1.17	0.14	0.80	0.15	5.45
11+00	10+50	L	50.00	4.00	6.00	4.00	0.0160	0.10	0.38	0.70	0.26	Seed	3.66	5	0.030	17.79	1.50	0.14	0.96	0.14	5.37
												Seed	4.06	10	0.040	18.23	1.29	0.17	1.07	0.17	5.71
10+50	10+00	L	50.00	4.00	4.00	4.00	0.0156	0.10	0.48	0.70	0.34	Seed	3.61	5	0.030	18.29	1.65	0.15	1.21	0.16	5.27
												Seed	4.00	10	0.040	18.82	1.42	0.19	1.34	0.20	5.58
10+00	9+50	L	50.00	4.00	4.00	4.00	0.0160	0.11	0.59	0.70	0.41	Seed	3.56	5	0.030	18.76	1.78	0.17	1.46	0.17	5.40
												Seed	3.94	10	0.040	19.37	1.52	0.22	1.61	0.22	5.74
9+50	9+15	L	35.00	4.00	4.00	4.00	0.0157	0.08	0.67	0.70	0.47	Seed	3.53	5	0.030	19.08	1.84	0.18	1.64	0.19	5.50



DITCH ANALYSIS

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.)
											Seed	3.90	10	0.040	19.74	1.56	0.23	1.81	0.23	5.88



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 12+50.00 to Sta. 17+86.00

Designer : WCS

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.)
12+50	13+00	L	50.00	4.00	6.00	6.00	0.0208	0.09	0.09	0.70	0.06	Seed	3.90	5	0.030	15.81	1.00	0.07	0.25	0.06	4.68
												Seed	4.34	10	0.040	15.95	0.85	0.09	0.27	0.07	4.87
13+00	13+50	L	50.00	4.00	3.00	6.00	0.0152	0.09	0.18	0.70	0.13	Seed	3.81	5	0.030	16.51	1.17	0.09	0.48	0.09	4.83
												Seed	4.24	10	0.040	16.77	1.02	0.11	0.53	0.12	5.04
13+50	14+00	L	50.00	4.00	3.00	6.00	0.0222	0.09	0.27	0.70	0.19	Seed	3.75	5	0.030	17.06	1.51	0.15	0.71	0.10	4.94
												Seed	4.16	10	0.040	17.39	1.30	0.18	0.79	0.13	5.18
14+00	14+50	L	50.00	4.00	3.00	6.00	0.0108	0.10	0.37	0.70	0.26	Seed	3.68	5	0.030	17.68	1.33	0.10	0.95	0.15	5.38
												Seed	4.08	10	0.040	18.12	1.14	0.13	1.06	0.19	5.72
14+50	15+00	L	50.00	4.00	3.00	6.00	0.0058	0.11	0.48	0.70	0.33	Seed	3.60	5	0.030	18.38	1.18	0.07	1.20	0.21	5.86
												Seed	3.98	10	0.040	18.95	1.00	0.09	1.33	0.26	6.32
15+00	15+50	L	50.00	4.00	3.00	4.00	0.0021	0.11	0.58	0.70	0.41	Seed	3.51	5	0.030	19.29	0.91	0.04	1.43	0.31	6.16
												Seed	3.87	10	0.040	20.02	0.77	0.05	1.58	0.38	6.69
15+50	16+00	L	50.00	4.00	6.00	4.00	0.0310	0.12	0.70	0.70	0.49	Seed	3.47	5	0.030	19.65	2.29	0.30	1.70	0.16	5.56



DITCH ANALYSIS

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.)
												Seed	3.82	10	0.040	20.45	1.94	0.38	1.88	0.19	5.95
16+00	16+50	L	50.00	4.00	3.00	4.00	0.0122	0.12	0.82	0.70	0.57	Seed	3.43	5	0.030	20.11	1.81	0.17	1.96	0.23	5.58
												Seed	3.77	10	0.040	20.99	1.54	0.21	2.15	0.28	5.96
16+50	17+00	L	50.00	4.00	3.00	6.00	0.0114	0.12	0.94	0.70	0.66	Seed	3.38	5	0.030	20.57	1.80	0.17	2.22	0.24	6.19
												Seed	3.72	10	0.040	21.53	1.52	0.21	2.44	0.30	6.71
17+00	17+86	L	86.00	4.00	3.00	4.00	0.0335	0.22	1.15	0.70	0.81	Seed	3.34	5	0.030	21.08	2.82	0.42	2.69	0.20	5.42
												Jute Mat	3.33	5	0.040	21.18	2.33	0.50	2.69	0.24	5.67
												Temp. Mat	3.33	5	0.040	21.18	2.33	0.50	2.69	0.24	5.67
												Temp. Mat	3.66	10	0.040	22.12	2.41	0.53	2.96	0.25	5.76



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 23+00.00 to Sta. 17+86.00

Designer : WCS

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.)
23+00	22+50	L	50.00	4.00	6.00	6.00	0.0154	0.08	0.08	0.50	0.04	Seed	3.87	5	0.030	16.07	0.76	0.05	0.16	0.05	4.58
												Seed	4.31	10	0.040	16.24	0.68	0.06	0.17	0.06	4.71
22+50	22+00	L	50.00	4.00	6.00	6.00	0.0168	0.09	0.17	0.50	0.09	Seed	3.77	5	0.030	16.88	1.04	0.07	0.32	0.07	4.84
												Seed	4.19	10	0.040	17.18	0.89	0.09	0.36	0.09	5.06
22+00	21+50	L	50.00	4.00	3.00	4.00	0.0464	0.10	0.27	0.70	0.15	Seed	3.72	5	0.030	17.33	1.79	0.22	0.58	0.08	4.53
												Seed	4.12	10	0.040	17.70	1.57	0.27	0.64	0.09	4.66
21+50	21+00	L	50.00	4.00	3.00	6.00	0.0630	0.10	0.37	0.70	0.22	Seed	3.67	5	0.030	17.70	2.23	0.33	0.81	0.08	4.75
												Seed	4.07	10	0.040	18.13	1.93	0.41	0.90	0.10	4.94
21+00	20+50	L	50.00	4.00	3.00	4.00	0.0278	0.11	0.47	0.70	0.30	Seed	3.63	5	0.030	18.13	1.94	0.22	1.07	0.12	4.87
												Seed	4.02	10	0.040	18.63	1.67	0.27	1.19	0.16	5.10
20+50	20+00	L	50.00	4.00	3.00	4.00	0.0428	0.11	0.58	0.70	0.37	Seed	3.59	5	0.030	18.48	2.40	0.34	1.34	0.13	4.88
												Seed	3.97	10	0.040	19.03	2.06	0.42	1.49	0.16	5.11
20+00	19+50	L	50.00	4.00	6.00	4.00	0.0310	0.12	0.70	0.70	0.46	Seed	3.55	5	0.030	18.85	2.25	0.29	1.62	0.15	5.52



DITCH ANALYSIS

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.)
												Seed	3.93	10	0.040	19.46	1.91	0.37	1.79	0.19	5.89
19+50	19+00	L	50.00	4.00	3.00	6.00	0.0328	0.12	0.82	0.70	0.54	Seed	3.52	5	0.030	19.19	2.43	0.34	1.90	0.17	5.49
												Seed	3.88	10	0.040	19.86	2.08	0.42	2.10	0.21	5.85
19+00	18+50	L	50.00	4.00	3.00	6.00	0.0148	0.12	0.95	0.70	0.63	Seed	3.47	5	0.030	19.61	1.95	0.21	2.18	0.22	6.01
												Seed	3.83	10	0.040	20.37	1.66	0.26	2.40	0.28	6.49
18+50	17+86	L	64.00	4.00	3.00	4.00	0.0264	0.13	1.08	0.70	0.72	Seed	3.43	5	0.030	20.03	2.53	0.34	2.47	0.21	5.44
												Seed	3.78	10	0.040	20.86	2.16	0.42	2.72	0.26	5.80



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 23+00.00 to Sta. 33+75.00

Designer : WCS

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.)
23+00	23+50	L	50.00	4.00	6.00	6.00	0.0052	0.08	0.08	0.50	0.04	Seed	3.82	5	0.030	16.45	0.55	0.02	0.15	0.06	4.77
												Seed	4.24	10	0.040	16.78	0.48	0.03	0.17	0.08	4.97
23+50	24+00	L	50.00	4.00	6.00	6.00	0.0066	0.09	0.17	0.50	0.09	Seed	3.69	5	0.030	17.55	0.76	0.04	0.32	0.09	5.10
												Seed	4.08	10	0.040	18.06	0.64	0.05	0.35	0.12	5.39
24+00	24+50	L	50.00	4.00	6.00	6.00	0.0084	0.10	0.27	0.50	0.14	Seed	3.60	5	0.030	18.41	0.95	0.06	0.49	0.11	5.32
												Seed	3.97	10	0.040	19.09	0.81	0.07	0.54	0.14	5.64
24+50	25+00	L	50.00	4.00	6.00	6.00	0.0110	0.10	0.37	0.50	0.19	Seed	3.52	5	0.030	19.12	1.14	0.08	0.65	0.12	5.45
												Seed	3.88	10	0.040	19.93	0.97	0.10	0.72	0.15	5.80
25+00	25+50	L	50.00	4.00	6.00	6.00	0.0120	0.10	0.47	0.50	0.24	Seed	3.46	5	0.030	19.77	1.27	0.10	0.81	0.13	5.60
												Seed	3.80	10	0.040	20.69	1.08	0.12	0.89	0.17	5.98
25+50	26+00	L	50.00	4.00	6.00	4.00	0.0150	0.11	0.58	0.50	0.29	Seed	3.41	5	0.030	20.33	1.49	0.13	0.99	0.14	5.41
												Seed	3.74	10	0.040	21.35	1.27	0.16	1.08	0.17	5.75
26+00	26+50	L	50.00	4.00	6.00	4.00	0.0150	0.12	0.70	0.50	0.35	Seed	3.36	5	0.030	20.85	1.57	0.15	1.17	0.16	5.56



DITCH ANALYSIS

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.)
												Seed	3.68	10	0.040	21.97	1.35	0.18	1.28	0.19	5.92
26+50	27+00	L	50.00	4.00	4.00	4.00	0.0164	0.12	0.82	0.50	0.41	Seed	3.31	5	0.030	21.32	1.75	0.17	1.36	0.17	5.33
												Seed	3.63	10	0.040	22.53	1.49	0.21	1.49	0.21	5.65
27+00	27+50	L	50.00	4.00	2.00	2.00	0.0152	0.13	0.95	0.50	0.48	Seed	3.27	5	0.030	21.77	1.88	0.18	1.56	0.19	4.76
												Seed	3.58	10	0.040	23.04	1.61	0.22	1.70	0.24	4.95
27+50	28+00	L	50.00	4.00	6.00	4.00	0.0146	0.13	1.08	0.50	0.54	Seed	3.23	5	0.030	22.23	1.79	0.18	1.75	0.20	5.96
												Seed	3.53	10	0.040	23.59	1.51	0.22	1.91	0.24	6.43
28+00	28+50	L	50.00	4.00	6.00	3.00	0.0126	0.08	1.16	0.70	0.59	Seed	3.20	5	0.030	22.70	1.76	0.17	1.90	0.22	5.95
												Seed	3.49	10	0.040	24.15	1.50	0.21	2.07	0.27	6.39
28+50	29+00	L	50.00	4.00	6.00	4.00	0.0112	0.13	1.28	0.70	0.68	Seed	3.16	5	0.030	23.18	1.75	0.17	2.15	0.24	6.38
												Seed	3.44	10	0.040	24.71	1.47	0.20	2.35	0.29	6.93
29+00	29+50	L	50.00	4.00	6.00	4.00	0.0118	0.13	1.41	0.70	0.77	Seed	3.12	5	0.030	23.63	1.84	0.18	2.41	0.25	6.50
												Seed	3.40	10	0.040	25.25	1.55	0.23	2.62	0.31	7.06
29+50	30+00	L	50.00	4.00	6.00	3.00	0.0114	0.13	1.54	0.70	0.86	Seed	3.09	5	0.030	24.06	1.90	0.19	2.66	0.27	6.42
												Seed	3.36	10	0.040	25.76	1.60	0.23	2.89	0.33	6.96
30+00	30+50	L	50.00	4.00	6.00	4.00	0.0128	0.13	1.67	0.70	0.95	Seed	3.06	5	0.030	24.48	2.01	0.22	2.90	0.27	6.70
												Seed	3.32	10	0.040	26.26	1.68	0.26	3.15	0.33	7.31
30+50	31+00	L	50.00	4.00	6.00	3.00	0.0134	0.12	1.79	0.70	1.04	Seed	3.03	5	0.030	24.87	2.12	0.24	3.14	0.28	6.53
												Seed	3.29	10	0.040	26.72	1.78	0.29	3.41	0.35	7.11
31+00	31+50	L	50.00	4.00	6.00	3.00	0.0134	0.13	1.91	0.70	1.12	Seed	3.00	5	0.030	25.25	2.17	0.24	3.37	0.29	6.63



DITCH ANALYSIS

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.)
												Seed	3.25	10	0.040	27.18	1.82	0.30	3.66	0.36	7.23
31+50	32+00	L	50.00	4.00	6.00	3.00	0.0144	0.12	2.03	0.70	1.20	Seed	2.97	5	0.030	25.62	2.26	0.27	3.58	0.30	6.67
												Seed	3.22	10	0.040	27.62	1.90	0.33	3.88	0.36	7.26
32+00	32+50	L	50.00	4.00	6.00	3.00	0.0150	0.11	2.14	0.70	1.28	Seed	2.95	5	0.030	25.98	2.33	0.28	3.78	0.30	6.72
												Seed	3.19	10	0.040	28.04	1.96	0.35	4.09	0.37	7.32
32+50	33+00	L	50.00	4.00	6.00	3.00	0.0172	0.10	2.24	0.70	1.35	Seed	2.93	5	0.030	26.31	2.48	0.32	3.96	0.30	6.69
												Seed	3.17	10	0.040	28.44	2.08	0.39	4.28	0.37	7.29
33+00	33+75	L	75.00	4.00	6.00	6.00	0.0421	0.15	2.40	0.70	1.46	Seed	2.90	5	0.030	26.69	3.31	0.62	4.23	0.24	6.83
												Jute Mat	2.89	5	0.040	26.77	2.71	0.73	4.23	0.28	7.31
												Temp. Mat	2.89	5	0.040	26.77	2.71	0.73	4.23	0.28	7.31
												Temp. Mat	3.14	10	0.040	28.89	2.78	0.76	4.58	0.29	7.46



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 35+00.00 to Sta. 38+00.00

Designer : WCS

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+00	35+50	L	50.00	4.00	6.00	6.00	0.0190	0.10	0.10	0.50	0.05	Seed	3.89	5	0.030	15.90	0.90	0.06	0.20	0.05	4.61
												Seed	4.33	10	0.040	16.03	0.78	0.08	0.22	0.06	4.77
35+50	36+00	L	50.00	4.00	6.00	6.00	0.0196	0.10	0.20	0.50	0.10	Seed	3.80	5	0.030	16.61	1.15	0.09	0.38	0.08	4.90
												Seed	4.23	10	0.040	16.88	0.99	0.11	0.43	0.09	5.13
36+00	36+50	L	50.00	4.00	6.00	4.00	0.0544	0.11	0.31	0.50	0.15	Seed	3.75	5	0.030	17.05	1.86	0.24	0.58	0.07	4.71
												Seed	4.16	10	0.040	17.39	1.63	0.30	0.64	0.09	4.89
36+50	37+00	L	50.00	4.00	6.00	4.00	0.0544	0.11	0.42	0.50	0.21	Seed	3.70	5	0.030	17.45	2.06	0.29	0.77	0.08	4.85
												Seed	4.11	10	0.040	17.85	1.78	0.36	0.86	0.11	5.06
37+00	37+50	L	50.00	4.00	6.00	6.00	0.0544	0.12	0.54	0.50	0.27	Seed	3.66	5	0.030	17.82	2.24	0.33	0.98	0.10	5.15
												Seed	4.06	10	0.040	18.28	1.91	0.41	1.09	0.12	5.45
37+50	38+00	L	50.00	4.00	3.00	6.00	0.0768	0.12	0.65	0.70	0.35	Seed	3.63	5	0.030	18.11	2.79	0.49	1.27	0.10	4.92
												Jute Mat	3.62	5	0.040	18.18	2.31	0.58	1.27	0.12	5.09
												Temp. Mat	3.62	5	0.040	18.18	2.31	0.58	1.27	0.12	5.09



DITCH ANALYSIS

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.)
											Temp. Mat	4.02	10	0.040	18.63	2.41	0.61	1.41	0.13	5.15



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 69+75.00 to Sta. 65+50.00

Designer : WCS

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.)
69+75	69+50	L	25.00	4.00	6.00	6.00	0.0132	0.04	0.04	0.70	0.03	Seed	3.92	5	0.030	15.65	0.67	0.03	0.11	0.04	4.45
												Seed	4.38	10	0.040	15.71	0.58	0.04	0.12	0.05	4.58
69+50	69+00	L	50.00	4.00	6.00	6.00	0.0134	0.05	0.09	0.50	0.05	Seed	3.79	5	0.030	16.69	0.78	0.05	0.19	0.06	4.68
												Seed	4.23	10	0.040	16.88	0.69	0.06	0.21	0.07	4.84
69+00	68+50	L	50.00	4.00	4.00	4.00	0.0138	0.04	0.13	0.50	0.07	Seed	3.69	5	0.030	17.58	0.90	0.06	0.26	0.07	4.54
												Seed	4.10	10	0.040	17.92	0.80	0.07	0.29	0.08	4.67
68+50	68+00	L	50.00	4.00	4.00	4.00	0.0200	0.04	0.17	0.70	0.10	Seed	3.61	5	0.030	18.30	1.14	0.09	0.35	0.07	4.58
												Seed	4.01	10	0.040	18.75	0.99	0.11	0.39	0.09	4.73
68+00	67+50	L	50.00	4.00	4.00	6.00	0.0180	0.04	0.21	0.50	0.12	Seed	3.54	5	0.030	19.00	1.18	0.09	0.42	0.08	4.81
												Seed	3.92	10	0.040	19.56	1.01	0.11	0.46	0.10	5.02
67+50	67+00	L	50.00	4.00	4.00	4.00	0.0218	0.04	0.25	0.50	0.14	Seed	3.47	5	0.030	19.63	1.33	0.11	0.48	0.08	4.67
												Seed	3.84	10	0.040	20.28	1.15	0.14	0.53	0.10	4.84
67+00	66+50	L	50.00	4.00	4.00	4.00	0.0417	0.04	0.29	0.50	0.16	Seed	3.42	5	0.030	20.12	1.71	0.19	0.54	0.07	4.59



DITCH ANALYSIS

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.)
												Seed	3.79	10	0.040	20.84	1.46	0.24	0.60	0.09	4.75
66+50	66+00	L	50.00	4.00	4.00	6.00	0.0340	0.04	0.33	0.50	0.18	Seed	3.38	5	0.030	20.62	1.64	0.18	0.60	0.08	4.83
												Seed	3.73	10	0.040	21.43	1.40	0.22	0.66	0.10	5.05
66+00	65+50	L	50.00	4.00	3.00	6.00	0.0596	0.04	0.37	0.70	0.21	Seed	3.34	5	0.030	21.02	2.07	0.28	0.69	0.08	4.69
												Seed	3.68	10	0.040	21.89	1.77	0.36	0.76	0.10	4.87



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 80+00.00 to Sta. 64+80.00 (Ramp B)

Designer : WCS

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 (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.)
80+00	79+50	L	25.00	4.00	3.00	3.00	0.0012	0.10	0.10	0.70	0.07	Seed	3.88	5	0.030	15.97	0.42	0.01	0.26	0.14	4.84
												Seed	4.32	10	0.040	16.12	0.37	0.01	0.29	0.17	5.03
79+50	79+00	L	50.00	4.00	6.00	3.00	0.0052	0.11	0.21	0.70	0.14	Seed	3.76	5	0.030	16.91	0.87	0.04	0.54	0.13	5.21
												Seed	4.18	10	0.040	17.23	0.74	0.05	0.60	0.17	5.52
79+00	78+50	L	50.00	4.00	6.00	3.00	0.0020	0.11	0.32	0.70	0.22	Seed	3.63	5	0.030	18.06	0.72	0.03	0.80	0.22	6.01
												Seed	4.02	10	0.040	18.58	0.61	0.03	0.89	0.28	6.51
78+50	78+00	L	50.00	4.00	6.00	3.00	0.0028	0.12	0.43	0.70	0.30	Seed	3.54	5	0.030	19.00	0.88	0.04	1.07	0.24	6.15
												Seed	3.90	10	0.040	19.69	0.75	0.05	1.18	0.30	6.66
78+00	77+50	L	50.00	4.00	6.00	4.00	0.0236	0.09	0.52	0.50	0.35	Seed	3.49	5	0.030	19.44	1.85	0.21	1.22	0.14	5.40
												Seed	3.85	10	0.040	20.21	1.59	0.26	1.34	0.17	5.73
77+50	77+00	L	50.00	4.00	4.00	4.00	0.0076	0.13	0.65	0.70	0.44	Seed	3.43	5	0.030	20.03	1.40	0.10	1.50	0.22	5.76
												Seed	3.78	10	0.040	20.91	1.19	0.13	1.65	0.27	6.18
77+00	76+50	L	50.00	4.00	4.00	4.00	0.0200	0.11	0.76	0.50	0.49	Seed	3.39	5	0.030	20.45	2.00	0.22	1.67	0.18	5.42



DITCH ANALYSIS

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.)
												Seed	3.73	10	0.040	21.39	1.71	0.27	1.83	0.22	5.76
76+50	76+00	L	50.00	4.00	4.00	4.00	0.0062	0.15	0.91	0.70	0.60	Seed	3.34	5	0.030	21.03	1.43	0.11	2.00	0.27	6.19
												Seed	3.67	10	0.040	22.08	1.21	0.13	2.20	0.34	6.71
76+00	75+50	L	50.00	4.00	4.00	4.00	0.0074	0.19	1.10	0.70	0.73	Seed	3.29	5	0.030	21.54	1.61	0.13	2.40	0.29	6.31
												Seed	3.61	10	0.040	22.69	1.36	0.16	2.63	0.36	6.85
75+50	75+00	L	50.00	4.00	4.00	4.00	0.0088	0.21	1.31	0.70	0.87	Seed	3.25	5	0.030	22.00	1.81	0.17	2.84	0.30	6.42
												Seed	3.56	10	0.040	23.23	1.53	0.20	3.12	0.37	6.98
75+00	74+50	L	50.00	4.00	4.00	4.00	0.0174	0.22	1.52	0.70	1.02	Seed	3.22	5	0.030	22.35	2.40	0.29	3.30	0.27	6.17
												Seed	3.53	10	0.040	23.64	2.02	0.36	3.62	0.34	6.68
74+50	74+00	L	50.00	4.00	4.00	4.00	0.0188	0.22	1.74	0.70	1.18	Seed	3.20	5	0.030	22.68	2.56	0.34	3.77	0.29	6.29
												Seed	3.50	10	0.040	24.03	2.16	0.41	4.12	0.35	6.82
74+00	73+50	L	50.00	4.00	3.00	4.00	0.0198	0.19	1.93	0.70	1.31	Seed	3.17	5	0.030	22.98	2.74	0.37	4.17	0.30	6.11
												Seed	3.47	10	0.040	24.39	2.31	0.46	4.55	0.37	6.60
73+50	73+00	L	50.00	4.00	4.00	3.00	0.0210	0.20	2.13	0.70	1.45	Seed	3.15	5	0.030	23.27	2.88	0.41	4.57	0.31	6.19
												Jute Mat	3.14	5	0.040	23.33	2.36	0.48	4.57	0.37	6.57
												Temp. Mat	3.14	5	0.040	23.33	2.36	0.48	4.57	0.37	6.57
												Temp. Mat	3.44	10	0.040	24.73	2.42	0.50	4.99	0.39	6.70
73+00	72+50	L	50.00	4.00	3.00	2.00	0.0514	0.17	2.30	0.70	1.57	Seed	3.13	5	0.030	23.53	4.11	0.82	4.91	0.26	5.29
												Jute Mat	3.13	5	0.040	23.58	3.40	0.97	4.91	0.30	5.52
												Temp. Mat	3.13	5	0.040	23.58	3.40	0.97	4.91	0.30	5.52



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (ft./ft.)	IN SLOPE	BACK SLOPE	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.)
													Temp. Mat	3.42	10	0.040	24.97	3.50	1.03	5.37	0.32	5.60
72+75	Concent								0.90		0.68	2.18					10.00					
72+50	72+00	L	50.00	4.00	3.00	2.00	0.0060	0.16	3.36	0.70	2.30	Seed	3.10	5	0.030	23.95	2.24	0.22	7.11	0.58	6.91	
												Seed	3.39	10	0.040	25.41	1.88	0.27	7.78	0.72	7.58	
72+00	71+50	L	50.00	4.00	3.00	3.00	0.0126	0.16	3.52	0.70	2.41	Seed	3.07	5	0.030	24.24	2.86	0.37	7.40	0.48	6.86	
												Seed	3.36	10	0.040	25.75	2.40	0.46	8.09	0.58	7.51	
71+50	71+00	L	50.00	4.00	4.00	3.00	0.0185	0.14	3.67	0.70	2.51	Seed	3.05	5	0.030	24.50	3.23	0.50	7.66	0.43	7.01	
												Jute Mat	3.05	5	0.040	24.55	2.64	0.58	7.65	0.50	7.52	
												Temp. Mat	3.05	5	0.040	24.55	2.64	0.58	7.65	0.50	7.52	
												Temp. Mat	3.34	10	0.040	26.06	2.72	0.61	8.36	0.53	7.69	
71+00	70+50	L	50.00	4.00	4.00	3.00	0.0240	0.13	3.79	0.70	2.59	Seed	3.03	5	0.030	24.79	3.57	0.61	7.87	0.41	6.85	
												Jute Mat	3.03	5	0.040	24.84	2.92	0.71	7.86	0.48	7.33	
												Temp. Mat	3.03	5	0.040	24.84	2.92	0.71	7.86	0.48	7.33	
												Temp. Mat	3.32	10	0.040	26.34	3.00	0.75	8.60	0.50	7.50	
70+50	70+00	L	50.00	4.00	4.00	4.00	0.0278	0.12	3.91	0.70	2.68	Seed	3.01	5	0.030	25.06	3.71	0.68	8.07	0.39	7.13	
												Jute Mat	3.01	5	0.040	25.11	3.03	0.79	8.06	0.46	7.65	
												Temp. Mat	3.01	5	0.040	25.11	3.03	0.79	8.06	0.46	7.65	
												Temp. Mat	3.30	10	0.040	26.61	3.11	0.83	8.83	0.48	7.83	
70+00	69+50	L	50.00	4.00	4.00	2.00	0.0384	0.12	4.03	0.70	2.76	Seed	3.00	5	0.030	25.30	4.34	0.89	8.28	0.37	6.24	
												Jute Mat	2.99	5	0.040	25.35	3.56	1.05	8.27	0.44	6.62	



DITCH ANALYSIS

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.)
												Temp. Mat	2.99	5	0.040	25.35	3.56	1.05	8.27	0.44	6.62
												Perm, Type 1	2.99	5	0.040	25.35	3.56	1.05	8.27	0.44	6.62
												Perm, Type 1	3.28	10	0.040	26.83	3.66	1.10	9.06	0.46	6.76
69+50	69+00	L	50.00	4.00	6.00	4.00	0.0422	0.17	4.20	0.70	2.88	Seed	2.98	5	0.030	25.54	4.22	0.93	8.58	0.35	7.52
												Jute Mat	2.98	5	0.040	25.59	3.44	1.08	8.57	0.41	8.11
												Temp. Mat	2.98	5	0.040	25.59	3.44	1.08	8.57	0.41	8.11
												Perm, Type 1	2.98	5	0.040	25.59	3.44	1.08	8.57	0.41	8.11
												Perm, Type 1	3.26	10	0.040	27.07	3.54	1.14	9.39	0.43	8.31
69+00	68+50	L	50.00	4.00	4.00	3.00	0.0458	0.21	4.40	0.70	3.02	Seed	2.96	5	0.030	25.77	4.64	1.04	8.96	0.37	6.56
												Jute Mat	2.96	5	0.040	25.81	3.80	1.22	8.95	0.43	7.00
												Temp. Mat	2.96	5	0.040	25.81	3.80	1.22	8.95	0.43	7.00
												Perm, Type 1	2.96	5	0.040	25.81	3.80	1.22	8.95	0.43	7.00
												Perm, Type 1	3.25	10	0.040	27.28	3.91	1.29	9.82	0.45	7.15
68+50	68+00	L	50.00	4.00	6.00	3.00	0.0412	0.19	4.60	0.70	3.16	Seed	2.95	5	0.030	26.00	4.36	0.96	9.31	0.38	7.38
												Jute Mat	2.94	5	0.040	26.04	3.56	1.13	9.30	0.44	7.94
												Temp. Mat	2.94	5	0.040	26.04	3.56	1.13	9.30	0.44	7.94
												Perm, Type 1	2.94	5	0.040	26.04	3.56	1.13	9.30	0.44	7.94
												Perm, Type 1	3.23	10	0.040	27.51	3.66	1.18	10.21	0.46	8.14
68+00	67+50	L	50.00	4.00	6.00	6.00	0.0412	0.17	4.77	0.50	3.24	Seed	2.93	5	0.030	26.24	4.18	0.94	9.51	0.37	8.40
												Jute Mat	2.93	5	0.040	26.28	3.41	1.09	9.50	0.43	9.10



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (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.)
													Temp. Mat	2.93	5	0.040	26.28	3.41	1.09	9.50	0.43	9.10
													Perm, Type 1	2.93	5	0.040	26.28	3.41	1.09	9.50	0.43	9.10
													Perm, Type 1	3.21	10	0.040	27.75	3.50	1.15	10.43	0.45	9.36
67+50	67+00	L	50.00	4.00	6.00	2.00	0.0442	0.16	4.93	0.50	3.32		Seed	2.91	5	0.030	26.46	4.60	1.05	9.69	0.38	7.05
													Jute Mat	2.91	5	0.040	26.50	3.76	1.23	9.68	0.45	7.56
													Temp. Mat	2.91	5	0.040	26.50	3.76	1.23	9.68	0.45	7.56
													Perm, Type 1	2.91	5	0.040	26.50	3.76	1.23	9.68	0.45	7.56
													Perm, Type 1	3.20	10	0.040	27.96	3.87	1.29	10.64	0.47	7.75
67+00	66+50	L	50.00	4.00	6.00	6.00	0.0258	0.16	5.09	0.50	3.40		Seed	2.90	5	0.030	26.74	3.58	0.68	9.86	0.42	9.06
													Jute Mat	2.89	5	0.040	26.79	2.91	0.79	9.85	0.49	9.86
													Temp. Mat	2.89	5	0.040	26.79	2.91	0.79	9.85	0.49	9.86
													Temp. Mat	3.18	10	0.040	28.24	2.99	0.82	10.83	0.51	10.15
66+50	66+00	L	50.00	4.00	6.00	6.00	0.0316	0.15	5.24	0.50	3.48		Seed	2.88	5	0.030	27.01	3.87	0.80	10.02	0.40	8.84
													Jute Mat	2.88	5	0.040	27.06	3.14	0.92	10.00	0.47	9.61
													Temp. Mat	2.88	5	0.040	27.06	3.14	0.92	10.00	0.47	9.61
													Temp. Mat	3.16	10	0.040	28.50	3.23	0.97	11.00	0.49	9.89
66+00	65+50	L	50.00	4.00	6.00	2.00	0.0240	0.14	5.38	0.50	3.55		Seed	2.86	5	0.030	27.28	3.77	0.69	10.16	0.46	7.69
													Jute Mat	2.86	5	0.040	27.33	3.07	0.80	10.15	0.54	8.30
													Temp. Mat	2.86	5	0.040	27.33	3.07	0.80	10.15	0.54	8.30
													Temp. Mat	3.14	10	0.040	28.76	3.16	0.85	11.16	0.56	8.52



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE LENGTH	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.)	
65+50	64+80	L	70.00	4.00	6.00	6.00	0.0077	0.19	5.57	0.50	3.65	Seed	2.83	5	0.030	27.82	2.34	0.28	10.31	0.59	11.03
												Seed	3.11	10	0.040	29.36	1.95	0.34	11.33	0.71	12.47



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 80+00.00 to Sta. 92+00.00

Designer : WCS

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.)
80+00	80+50	L	50.00	4.00	6.00	2.00	0.0018	0.07	0.07	0.50	0.03	Seed	3.73	5	0.030	17.20	0.38	0.01	0.12	0.08	4.60
												Seed	4.14	10	0.040	17.54	0.32	0.01	0.14	0.10	4.77
80+50	81+00	L	50.00	4.00	6.00	6.00	0.0024	0.07	0.14	0.70	0.08	Seed	3.56	5	0.030	18.75	0.54	0.02	0.30	0.12	5.42
												Seed	3.94	10	0.040	19.34	0.45	0.02	0.33	0.15	5.80
81+00	81+50	L	50.00	4.00	2.00	2.00	0.0032	0.07	0.21	0.70	0.14	Seed	3.45	5	0.030	19.87	0.73	0.03	0.47	0.15	4.59
												Seed	3.81	10	0.040	20.63	0.65	0.04	0.51	0.18	4.73
81+50	82+00	L	50.00	4.00	2.00	2.00	0.0038	0.07	0.29	0.70	0.19	Seed	3.36	5	0.030	20.82	0.87	0.04	0.63	0.17	4.67
												Seed	3.70	10	0.040	21.72	0.75	0.05	0.69	0.21	4.84
82+00	82+50	L	50.00	4.00	2.00	2.00	0.0046	0.07	0.36	0.70	0.24	Seed	3.29	5	0.030	21.65	1.00	0.05	0.78	0.18	4.72
												Seed	3.61	10	0.040	22.68	0.86	0.06	0.86	0.23	4.90
82+50	83+00	L	50.00	4.00	2.00	2.00	0.0052	0.08	0.44	0.70	0.29	Seed	3.22	5	0.030	22.39	1.11	0.06	0.94	0.19	4.77
												Seed	3.54	10	0.040	23.55	0.95	0.08	1.03	0.24	4.97
83+00	83+50	L	50.00	4.00	2.00	2.00	0.0058	0.08	0.51	0.70	0.34	Seed	3.16	5	0.030	23.08	1.21	0.07	1.09	0.20	4.82



DITCH ANALYSIS

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.)
												Seed	3.47	10	0.040	24.35	1.04	0.09	1.20	0.26	5.02
83+50	84+00	L	50.00	4.00	2.00	2.00	0.0076	0.08	0.59	0.50	0.38	Seed	3.12	5	0.030	23.68	1.36	0.09	1.19	0.20	4.79
												Seed	3.41	10	0.040	25.05	1.18	0.12	1.31	0.25	4.99
84+00	84+50	L	50.00	4.00	2.00	2.00	0.0180	0.08	0.66	0.70	0.44	Seed	3.08	5	0.030	24.13	1.88	0.19	1.35	0.17	4.66
												Seed	3.37	10	0.040	25.57	1.61	0.23	1.47	0.21	4.83
84+50	85+00	L	50.00	4.00	2.00	2.00	0.0302	0.08	0.74	0.70	0.49	Seed	3.06	5	0.030	24.49	2.31	0.28	1.49	0.15	4.60
												Seed	3.34	10	0.040	25.99	1.99	0.35	1.63	0.19	4.75
85+00	85+50	L	50.00	4.00	2.00	3.00	0.0304	0.08	0.81	0.70	0.54	Seed	3.03	5	0.030	24.84	2.35	0.30	1.64	0.16	4.79
												Seed	3.31	10	0.040	26.40	2.02	0.37	1.79	0.20	4.99
85+50	86+00	L	50.00	4.00	2.00	3.00	0.0302	0.08	0.89	0.70	0.59	Seed	3.00	5	0.030	25.18	2.43	0.31	1.78	0.17	4.83
												Seed	3.28	10	0.040	26.80	2.09	0.39	1.95	0.21	5.03
86+00	Concent							4.34		0.79	4.02					11.71					
86+00	86+50	L	50.00	4.00	2.00	3.00	0.0026	0.08	5.30	0.70	4.08	Seed	2.97	5	0.030	25.61	1.94	0.16	12.12	0.97	8.85
												Seed	3.24	10	0.040	27.31	1.62	0.19	13.22	1.18	9.88
86+50	87+00	L	50.00	4.00	2.00	4.00	0.0024	0.08	5.38	0.70	4.13	Seed	2.94	5	0.030	26.06	1.83	0.14	12.15	0.96	9.78
												Seed	3.21	10	0.040	27.86	1.52	0.17	13.24	1.16	10.98
87+00	87+50	L	50.00	4.00	2.00	4.00	0.0026	0.08	5.46	0.70	4.19	Seed	2.91	5	0.030	26.50	1.89	0.15	12.19	0.95	9.67
												Seed	3.17	10	0.040	28.39	1.57	0.19	13.27	1.14	10.85
87+50	88+00	L	50.00	4.00	2.00	4.00	0.0024	0.08	5.54	0.70	4.24	Seed	2.88	5	0.030	26.95	1.83	0.14	12.23	0.97	9.80
												Seed	3.13	10	0.040	28.93	1.52	0.17	13.30	1.16	10.99



DITCH ANALYSIS

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.)
88+00	88+50	L	50.00	4.00	2.00	3.00	0.0024	0.08	5.62	0.70	4.30	Seed	2.85	5	0.030	27.39	1.90	0.15	12.27	1.00	8.99
												Seed	3.10	10	0.040	29.46	1.58	0.18	13.32	1.21	10.03
88+50	89+00	L	50.00	4.00	2.00	4.00	0.0026	0.08	5.70	0.70	4.36	Seed	2.83	5	0.030	27.83	1.89	0.15	12.30	0.95	9.70
												Seed	3.07	10	0.040	29.99	1.57	0.19	13.35	1.14	10.86
89+00	89+50	L	50.00	4.00	2.00	2.00	0.0025	0.08	5.78	0.50	4.40	Seed	2.80	5	0.030	28.25	1.99	0.16	12.30	1.02	8.09
												Seed	3.03	10	0.040	30.49	1.66	0.19	13.34	1.24	8.97
89+50	90+00	L	50.00	4.00	2.00	2.00	0.0026	0.09	5.87	0.70	4.46	Seed	2.77	5	0.030	28.66	2.02	0.16	12.37	1.01	8.06
												Seed	3.00	10	0.040	30.98	1.68	0.20	13.39	1.23	8.93
90+00	90+50	L	50.00	4.00	2.00	2.00	0.0024	0.10	5.98	0.70	4.53	Seed	2.75	5	0.030	29.08	1.97	0.16	12.45	1.04	8.16
												Seed	2.97	10	0.040	31.49	1.64	0.19	13.47	1.26	9.04
90+50	91+00	L	50.00	4.00	2.00	2.00	0.0026	0.11	6.08	0.70	4.60	Seed	2.72	5	0.030	29.49	2.03	0.17	12.54	1.02	8.09
												Seed	2.95	10	0.040	31.98	1.69	0.20	13.56	1.24	8.96
91+00	91+50	L	50.00	4.00	2.00	2.00	0.0024	0.11	6.19	0.70	4.68	Seed	2.70	5	0.030	29.91	1.98	0.16	12.64	1.05	8.19
												Seed	2.92	10	0.040	32.49	1.64	0.19	13.65	1.27	9.08
91+50	Concent							0.53		0.90	5.16					10.00					
91+50	92+00	L	50.00	4.00	2.00	2.00	0.0026	0.11	6.83	0.70	5.23	Seed	2.68	5	0.030	30.31	2.10	0.18	14.02	1.08	8.34
												Seed	2.89	10	0.040	32.97	1.74	0.21	15.13	1.31	9.25



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 109+00.00 to Sta. 106+00.00

Designer : WCS

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.)
109+00	108+50	L	50.00	4.00	6.00	6.00	0.0190	0.08	0.08	0.50	0.04	Seed	3.87	5	0.030	16.02	0.85	0.05	0.15	0.04	4.52
												Seed	4.32	10	0.040	16.14	0.71	0.07	0.17	0.06	4.68
108+50	108+00	L	50.00	4.00	4.00	6.00	0.0196	0.09	0.17	0.50	0.08	Seed	3.78	5	0.030	16.77	1.08	0.08	0.32	0.07	4.67
												Seed	4.21	10	0.040	17.02	0.96	0.10	0.35	0.08	4.83
108+00	107+50	L	50.00	4.00	2.00	2.00	0.0184	0.09	0.25	0.50	0.13	Seed	3.71	5	0.030	17.41	1.27	0.10	0.47	0.09	4.35
												Seed	4.12	10	0.040	17.76	1.13	0.13	0.52	0.11	4.44
107+50	107+00	L	50.00	4.00	2.00	2.00	0.0178	0.08	0.34	0.70	0.19	Seed	3.64	5	0.030	17.98	1.46	0.12	0.68	0.11	4.44
												Seed	4.04	10	0.040	18.41	1.26	0.16	0.75	0.14	4.56
107+00	106+50	L	50.00	4.00	2.00	2.00	0.0216	0.08	0.42	0.70	0.24	Seed	3.59	5	0.030	18.47	1.70	0.16	0.86	0.12	4.48
												Seed	3.98	10	0.040	18.98	1.47	0.20	0.95	0.15	4.60
106+50	106+00	L	50.00	4.00	2.00	2.00	0.0253	0.07	0.48	0.70	0.29	Seed	3.55	5	0.030	18.90	1.90	0.20	1.02	0.13	4.50
												Seed	3.92	10	0.040	19.49	1.64	0.25	1.13	0.16	4.64



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : I-70 WB_Sta. 109+00.00 to Sta. 109+75.00 **Designer :** WCS

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.)
109+00	109+75	L	75.00	4.00	6.00	6.00	0.0037	0.13	0.13	0.50	0.06	Seed	3.74	5	0.030	17.14	0.58	0.02	0.24	0.09	5.10
												Seed	4.15	10	0.040	17.47	0.48	0.03	0.27	0.12	5.42



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 124+75.00 to Sta. 109+75.00

Designer : WCS

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 (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.)
124+75	124+50	L	25.00	0.00	6.00	6.00	0.0240	0.06	0.06	0.50	0.03	Seed	3.96	5	0.030	15.35	1.19	0.19	0.12	0.13	1.55
												Seed	4.42	10	0.040	15.42	0.98	0.23	0.13	0.15	1.80
124+50	124+00	L	50.00	0.00	6.00	6.00	0.0242	0.07	0.13	0.50	0.07	Seed	3.89	5	0.030	15.91	1.45	0.26	0.26	0.17	2.06
												Seed	4.32	10	0.040	16.10	1.20	0.30	0.29	0.20	2.38
124+00	123+50	L	50.00	0.00	6.00	6.00	0.0188	0.08	0.21	0.50	0.11	Seed	3.82	5	0.030	16.47	1.50	0.25	0.40	0.21	2.55
												Seed	4.24	10	0.040	16.76	1.23	0.29	0.45	0.25	2.96
123+50	123+00	L	50.00	4.00	6.00	6.00	0.0182	0.08	0.30	0.50	0.15	Seed	3.74	5	0.030	17.12	1.29	0.11	0.55	0.09	5.13
												Seed	4.15	10	0.040	17.52	1.10	0.13	0.61	0.12	5.42
123+00	122+50	L	50.00	4.00	6.00	6.00	0.0236	0.09	0.39	0.50	0.19	Seed	3.68	5	0.030	17.66	1.52	0.15	0.72	0.10	5.22
												Seed	4.07	10	0.040	18.16	1.30	0.19	0.79	0.13	5.53
122+50	122+00	L	50.00	4.00	6.00	6.00	0.0240	0.10	0.49	0.50	0.25	Seed	3.62	5	0.030	18.17	1.64	0.17	0.89	0.12	5.39
												Seed	4.00	10	0.040	18.75	1.40	0.22	0.98	0.14	5.72
122+00	121+50	L	50.00	4.00	6.00	6.00	0.0200	0.11	0.60	0.50	0.30	Seed	3.57	5	0.030	18.67	1.65	0.17	1.07	0.13	5.61



DITCH ANALYSIS

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.)
												Seed	3.94	10	0.040	19.34	1.42	0.21	1.18	0.17	6.00
121+50	121+00	L	50.00	4.00	6.00	6.00	0.0188	0.12	0.71	0.50	0.36	Seed	3.52	5	0.030	19.16	1.70	0.18	1.25	0.15	5.80
												Seed	3.88	10	0.040	19.91	1.45	0.22	1.38	0.19	6.24
121+00	120+50	L	50.00	4.00	6.00	6.00	0.0154	0.12	0.83	0.50	0.42	Seed	3.47	5	0.030	19.65	1.67	0.17	1.45	0.17	6.06
												Seed	3.82	10	0.040	20.50	1.41	0.21	1.59	0.21	6.56
120+50	120+00	R	50.00	4.00	6.00	6.00	0.0180	0.12	0.96	0.50	0.48	Seed	3.43	5	0.030	20.10	1.84	0.20	1.64	0.18	6.11
												Seed	3.77	10	0.040	21.03	1.56	0.24	1.80	0.22	6.61
120+00	119+50	R	50.00	4.00	6.00	6.00	0.0196	0.13	1.08	0.50	0.54	Seed	3.39	5	0.030	20.53	1.95	0.22	1.84	0.18	6.21
												Seed	3.72	10	0.040	21.53	1.66	0.28	2.02	0.23	6.72
119+50	119+00	L	50.00	4.00	6.00	6.00	0.0202	0.13	1.22	0.50	0.61	Seed	3.35	5	0.030	20.93	2.04	0.24	2.04	0.19	6.32
												Seed	3.67	10	0.040	22.01	1.73	0.30	2.24	0.24	6.85
119+00	118+50	L	50.00	4.00	6.00	6.00	0.0202	0.13	1.35	0.50	0.68	Seed	3.31	5	0.030	21.33	2.11	0.26	2.24	0.20	6.44
												Seed	3.63	10	0.040	22.48	1.78	0.32	2.45	0.25	7.01
118+50	118+00	L	50.00	4.00	6.00	6.00	0.0198	0.14	1.49	0.50	0.74	Seed	3.28	5	0.030	21.71	2.15	0.27	2.44	0.21	6.58
												Seed	3.59	10	0.040	22.94	1.81	0.33	2.67	0.26	7.17
118+00	117+50	L	50.00	4.00	6.00	6.00	0.0188	0.14	1.63	0.50	0.81	Seed	3.25	5	0.030	22.10	2.17	0.27	2.64	0.23	6.72
												Seed	3.55	10	0.040	23.39	1.82	0.33	2.89	0.28	7.35
117+50	117+00	L	50.00	4.00	6.00	6.00	0.0198	0.14	1.77	0.50	0.88	Seed	3.22	5	0.030	22.46	2.25	0.29	2.84	0.23	6.80
												Seed	3.51	10	0.040	23.83	1.90	0.35	3.11	0.29	7.43
117+00	116+50	L	50.00	4.00	6.00	6.00	0.0172	0.15	1.91	0.50	0.96	Seed	3.18	5	0.030	22.84	2.20	0.27	3.05	0.25	7.02



DITCH ANALYSIS

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.)
												Seed	3.48	10	0.040	24.28	1.84	0.33	3.32	0.31	7.70
116+50	116+00	L	50.00	4.00	6.00	6.00	0.0184	0.15	2.06	0.50	1.03	Seed	3.15	5	0.030	23.20	2.29	0.29	3.25	0.26	7.07
												Seed	3.44	10	0.040	24.71	1.93	0.36	3.54	0.31	7.75
116+00	115+50	L	50.00	4.00	6.00	6.00	0.0156	0.15	2.21	0.50	1.10	Seed	3.12	5	0.030	23.58	2.20	0.27	3.45	0.28	7.32
												Seed	3.40	10	0.040	25.16	1.85	0.33	3.76	0.34	8.05
115+50	115+00	R	50.00	4.00	6.00	6.00	0.0168	0.15	2.35	0.50	1.18	Seed	3.10	5	0.030	23.94	2.30	0.29	3.64	0.28	7.35
												Seed	3.37	10	0.040	25.60	1.92	0.36	3.97	0.34	8.09
115+00	114+50	L	50.00	4.00	6.00	6.00	0.0176	0.15	2.51	0.50	1.25	Seed	3.07	5	0.030	24.29	2.37	0.31	3.85	0.28	7.41
												Seed	3.34	10	0.040	26.01	1.99	0.38	4.18	0.35	8.16
114+50	114+00	L	50.00	4.00	6.00	6.00	0.0198	0.13	2.64	0.50	1.32	Seed	3.05	5	0.030	24.62	2.51	0.35	4.02	0.28	7.38
												Seed	3.31	10	0.040	26.41	2.10	0.42	4.36	0.34	8.12
114+00	113+50	L	50.00	4.00	6.00	6.00	0.0182	0.15	2.79	0.50	1.39	Seed	3.02	5	0.030	24.96	2.47	0.34	4.21	0.30	7.54
												Seed	3.28	10	0.040	26.81	2.06	0.41	4.57	0.36	8.32
113+50	113+00	R	50.00	4.00	6.00	6.00	0.0184	0.15	2.94	0.50	1.47	Seed	3.00	5	0.030	25.29	2.51	0.35	4.40	0.30	7.62
												Seed	3.25	10	0.040	27.21	2.10	0.42	4.78	0.37	8.40
113+00	112+50	L	50.00	4.00	6.00	6.00	0.0204	0.16	3.10	0.50	1.55	Seed	2.97	5	0.030	25.61	2.64	0.38	4.61	0.30	7.61
												Seed	3.22	10	0.040	27.59	2.21	0.46	4.99	0.37	8.38
112+50	112+00	L	50.00	4.00	6.00	6.00	0.0200	0.16	3.26	0.50	1.63	Seed	2.95	5	0.030	25.92	2.65	0.39	4.81	0.31	7.71
												Seed	3.20	10	0.040	27.96	2.21	0.47	5.21	0.38	8.51
112+00	111+50	L	50.00	4.00	6.00	6.00	0.0202	0.16	3.42	0.50	1.71	Seed	2.93	5	0.030	26.23	2.69	0.40	5.01	0.32	7.79



DITCH ANALYSIS

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.)
												Seed	3.17	10	0.040	28.33	2.25	0.48	5.42	0.38	8.59
111+50	111+00	L	50.00	4.00	6.00	6.00	0.0198	0.16	3.58	0.50	1.79	Seed	2.91	5	0.030	26.54	2.71	0.40	5.20	0.32	7.88
												Seed	3.15	10	0.040	28.70	2.26	0.48	5.63	0.39	8.71
111+00	110+50	L	50.00	4.00	6.00	6.00	0.0206	0.16	3.74	0.50	1.87	Seed	2.89	5	0.030	26.84	2.78	0.42	5.40	0.33	7.92
												Jute Mat	2.89	5	0.040	26.90	2.26	0.49	5.39	0.38	8.55
												Temp. Mat	2.89	5	0.040	26.90	2.26	0.49	5.39	0.38	8.55
												Temp. Mat	3.13	10	0.040	29.06	2.32	0.51	5.84	0.40	8.75
110+50	109+75	L	75.00	4.00	6.00	6.00	0.0328	0.22	3.96	0.50	1.98	Seed	2.86	5	0.030	27.28	3.32	0.60	5.66	0.30	7.54
												Jute Mat	2.86	5	0.040	27.36	2.70	0.70	5.65	0.34	8.13
												Temp. Mat	2.86	5	0.040	27.36	2.70	0.70	5.65	0.34	8.13
												Temp. Mat	3.10	10	0.040	29.51	2.77	0.74	6.13	0.36	8.31



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : I-70 WB_Sta. 139+00.00 to Sta. 125+00.00

Designer : WCS

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 (ft.)	IN WIDTH (ft.)	BACK SLOPE (ft./ft.)	GRADE SLOPE (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.)
139+00	137+00	L	200.00	4.00	6.00	6.00	0.0160	0.46	0.46	0.50	0.23	Seed	3.72	5	0.030	17.28	1.43	0.13	0.86	0.13	5.51
												Seed	4.13	10	0.040	17.67	1.21	0.16	0.95	0.16	5.90
137+00	136+50	L	50.00	4.00	6.00	6.00	0.0198	0.12	0.58	0.50	0.29	Seed	3.66	5	0.030	17.79	1.64	0.17	1.06	0.13	5.61
												Seed	4.06	10	0.040	18.26	1.40	0.21	1.17	0.17	6.00
136+50	136+00	L	50.00	4.00	6.00	6.00	0.0188	0.12	0.69	0.50	0.35	Seed	3.61	5	0.030	18.27	1.71	0.17	1.25	0.15	5.79
												Seed	4.00	10	0.040	18.84	1.45	0.22	1.38	0.19	6.24
136+00	135+50	L	50.00	4.00	6.00	6.00	0.0156	0.11	0.80	0.50	0.40	Seed	3.56	5	0.030	18.77	1.67	0.17	1.43	0.17	6.05
												Seed	3.93	10	0.040	19.42	1.42	0.21	1.58	0.21	6.53
135+50	135+00	L	50.00	4.00	6.00	6.00	0.0256	0.15	0.95	0.50	0.48	Seed	3.52	5	0.030	19.17	2.08	0.26	1.68	0.16	5.95
												Seed	3.88	10	0.040	19.89	1.77	0.32	1.85	0.20	6.42
135+00	134+50	L	50.00	4.00	6.00	6.00	0.0170	0.13	1.08	0.50	0.54	Seed	3.47	5	0.030	19.61	1.88	0.21	1.88	0.19	6.32
												Seed	3.83	10	0.040	20.41	1.59	0.25	2.07	0.24	6.87
134+50	134+00	L	50.00	4.00	6.00	6.00	0.0274	0.16	1.24	0.50	0.62	Seed	3.44	5	0.030	19.97	2.31	0.31	2.14	0.18	6.18



DITCH ANALYSIS

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.)
												Seed	3.79	10	0.040	20.84	1.95	0.39	2.35	0.23	6.71
134+00	133+50	L	50.00	4.00	6.00	6.00	0.0278	0.16	1.40	0.50	0.70	Seed	3.41	5	0.030	20.31	2.40	0.34	2.39	0.19	6.32
												Seed	3.75	10	0.040	21.25	2.03	0.41	2.63	0.24	6.86
133+50	133+00	L	50.00	4.00	6.00	4.00	0.0256	0.16	1.56	0.50	0.78	Seed	3.37	5	0.030	20.65	2.47	0.34	2.64	0.21	6.11
												Seed	3.71	10	0.040	21.65	2.09	0.42	2.90	0.26	6.62
133+00	132+50	R	50.00	4.00	3.00	3.00	0.0238	0.13	1.70	0.50	0.85	Seed	3.35	5	0.030	20.97	2.61	0.34	2.84	0.23	5.39
												Seed	3.67	10	0.040	22.02	2.22	0.43	3.11	0.29	5.73
132+50	132+00	R	50.00	4.00	6.00	6.00	0.0206	0.16	1.86	0.50	0.93	Seed	3.31	5	0.030	21.32	2.34	0.31	3.07	0.24	6.89
												Seed	3.63	10	0.040	22.45	1.97	0.38	3.37	0.30	7.55
132+00	131+50	L	50.00	4.00	6.00	6.00	0.0176	0.15	2.01	0.50	1.00	Seed	3.28	5	0.030	21.69	2.26	0.29	3.29	0.26	7.13
												Seed	3.60	10	0.040	22.88	1.90	0.35	3.61	0.32	7.84
131+50	131+00	L	50.00	4.00	3.00	6.00	0.0170	0.15	2.15	0.50	1.08	Seed	3.25	5	0.030	22.04	2.38	0.30	3.50	0.28	6.52
												Seed	3.56	10	0.040	23.30	2.00	0.37	3.83	0.34	7.10
131+00	130+50	R	50.00	4.00	3.00	4.00	0.0174	0.14	2.29	0.50	1.15	Seed	3.22	5	0.030	22.37	2.52	0.32	3.70	0.29	6.04
												Seed	3.53	10	0.040	23.69	2.13	0.39	4.04	0.36	6.53
130+50	130+00	L	50.00	4.00	3.00	4.00	0.0164	0.14	2.43	0.50	1.22	Seed	3.20	5	0.030	22.70	2.51	0.31	3.88	0.31	6.14
												Seed	3.49	10	0.040	24.08	2.12	0.39	4.24	0.38	6.64
130+00	129+50	R	50.00	4.00	3.00	4.00	0.0166	0.14	2.57	0.50	1.28	Seed	3.17	5	0.030	23.03	2.56	0.32	4.06	0.31	6.19
												Seed	3.46	10	0.040	24.46	2.16	0.40	4.44	0.38	6.69
129+50	129+00	R	50.00	4.00	3.00	4.00	0.0176	0.12	2.68	0.50	1.34	Seed	3.14	5	0.030	23.34	2.64	0.34	4.21	0.31	6.19



DITCH ANALYSIS

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.)
												Seed	3.43	10	0.040	24.84	2.23	0.42	4.60	0.39	6.70
129+00	128+50	L	50.00	4.00	3.00	4.00	0.0182	0.12	2.80	0.50	1.40	Seed	3.12	5	0.030	23.65	2.69	0.36	4.36	0.32	6.22
												Seed	3.40	10	0.040	25.20	2.27	0.44	4.76	0.39	6.73
128+50	128+00	R	50.00	4.00	3.00	6.00	0.0190	0.12	2.92	0.50	1.46	Seed	3.10	5	0.030	23.96	2.67	0.37	4.52	0.31	6.82
												Seed	3.37	10	0.040	25.57	2.25	0.45	4.93	0.38	7.44
128+00	127+50	R	50.00	4.00	3.00	6.00	0.0186	0.12	3.04	0.50	1.52	Seed	3.07	5	0.030	24.27	2.68	0.37	4.68	0.32	6.88
												Seed	3.34	10	0.040	25.94	2.25	0.46	5.09	0.39	7.53
127+50	127+00	R	50.00	4.00	3.00	4.00	0.0192	0.13	3.17	0.50	1.59	Seed	3.05	5	0.030	24.56	2.84	0.40	4.84	0.33	6.31
												Seed	3.32	10	0.040	26.29	2.39	0.49	5.26	0.41	6.84
127+00	126+50	L	50.00	4.00	3.00	4.00	0.0198	0.13	3.30	0.50	1.65	Seed	3.03	5	0.030	24.85	2.90	0.41	5.00	0.33	6.34
												Jute Mat	3.02	5	0.040	24.91	2.38	0.48	4.99	0.39	6.74
												Temp. Mat	3.02	5	0.040	24.91	2.38	0.48	4.99	0.39	6.74
												Temp. Mat	3.29	10	0.040	26.63	2.44	0.51	5.44	0.41	6.87
126+50	126+00	L	50.00	4.00	3.00	4.00	0.0236	0.13	3.43	0.50	1.72	Seed	3.00	5	0.030	25.18	3.10	0.48	5.16	0.32	6.27
												Jute Mat	3.00	5	0.040	25.24	2.55	0.56	5.15	0.38	6.66
												Temp. Mat	3.00	5	0.040	25.24	2.55	0.56	5.15	0.38	6.66
												Temp. Mat	3.27	10	0.040	26.95	2.62	0.59	5.61	0.40	6.78
126+00	125+50	R	50.00	4.00	3.00	4.00	0.0384	0.14	3.58	0.50	1.79	Seed	2.98	5	0.030	25.46	3.71	0.69	5.34	0.29	6.01
												Jute Mat	2.98	5	0.040	25.51	3.05	0.81	5.33	0.34	6.36
												Temp. Mat	2.98	5	0.040	25.51	3.05	0.81	5.33	0.34	6.36



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE L	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.)
												Temp. Mat	3.25	10	0.040	27.21	3.13	0.85	5.81	0.35	6.48
125+50	125+00	L	50.00	4.00	3.00	3.00	0.0324	0.16	3.74	0.50	1.87	Seed	2.96	5	0.030	25.74	3.61	0.63	5.54	0.31	5.87
												Jute Mat	2.96	5	0.040	25.79	2.96	0.74	5.53	0.37	6.20
												Temp. Mat	2.96	5	0.040	25.79	2.96	0.74	5.53	0.37	6.20
												Temp. Mat	3.23	10	0.040	27.49	3.05	0.78	6.04	0.38	6.30



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp A_Roadside_Sta. 59+50.00 to Sta. 52+00.00

Designer : WCS

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.)
59+50	59+00	L	50.00	4.00	6.00	6.00	0.0024	0.08	0.08	0.50	0.04	Seed	3.75	5	0.030	17.00	0.42	0.01	0.14	0.08	4.90
												Seed	4.17	10	0.040	17.34	0.35	0.01	0.16	0.10	5.16
59+00	58+50	L	50.00	4.00	6.00	6.00	0.0024	0.07	0.15	0.50	0.07	Seed	3.58	5	0.030	18.59	0.50	0.02	0.26	0.11	5.35
												Seed	3.95	10	0.040	19.25	0.43	0.02	0.29	0.14	5.68
58+50	58+00	L	50.00	4.00	6.00	6.00	0.0050	0.08	0.22	0.50	0.11	Seed	3.47	5	0.030	19.69	0.73	0.04	0.39	0.11	5.35
												Seed	3.81	10	0.040	20.55	0.63	0.04	0.43	0.14	5.68
58+00	57+50	L	50.00	4.00	6.00	6.00	0.0326	0.08	0.30	0.50	0.15	Seed	3.41	5	0.030	20.24	1.52	0.15	0.51	0.08	4.90
												Seed	3.75	10	0.040	21.20	1.30	0.19	0.56	0.09	5.13
57+50	57+00	L	50.00	4.00	6.00	6.00	0.0316	0.12	0.42	0.50	0.21	Seed	3.37	5	0.030	20.74	1.67	0.18	0.71	0.09	5.11
												Seed	3.69	10	0.040	21.78	1.43	0.23	0.77	0.12	5.39
57+00	56+50	L	50.00	4.00	3.00	6.00	0.0272	0.14	0.55	0.50	0.28	Seed	3.32	5	0.030	21.21	1.79	0.19	0.92	0.11	5.03
												Seed	3.64	10	0.040	22.33	1.53	0.24	1.01	0.14	5.28
56+50	56+00	L	50.00	4.00	3.00	4.00	0.0358	0.15	0.71	0.50	0.35	Seed	3.29	5	0.030	21.59	2.15	0.27	1.16	0.12	4.86



DITCH ANALYSIS

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.)
												Seed	3.60	10	0.040	22.78	1.85	0.34	1.27	0.15	5.06
56+00	55+50	L	50.00	4.00	3.00	4.00	0.0018	0.16	0.87	0.50	0.43	Seed	3.21	5	0.030	22.56	0.85	0.04	1.39	0.32	6.24
												Seed	3.51	10	0.040	23.93	0.72	0.04	1.52	0.39	6.74
55+50	55+00	L	50.00	4.00	3.00	4.00	0.0446	0.18	1.04	0.50	0.52	Seed	3.18	5	0.030	22.88	2.62	0.39	1.66	0.14	4.99
												Seed	3.47	10	0.040	24.30	2.25	0.49	1.81	0.17	5.22
55+00	54+50	L	50.00	4.00	3.00	3.00	0.0908	0.13	1.17	0.70	0.61	Seed	3.16	5	0.030	23.11	3.53	0.71	1.93	0.12	4.75
												Jute Mat	3.16	5	0.040	23.16	2.93	0.84	1.92	0.15	4.89
												Temp. Mat	3.16	5	0.040	23.16	2.93	0.84	1.92	0.15	4.89
												Temp. Mat	3.45	10	0.040	24.58	3.02	0.88	2.10	0.16	4.93
54+50	54+00	L	50.00	4.00	3.00	3.00	0.0472	0.21	1.38	0.70	0.76	Seed	3.14	5	0.030	23.43	3.07	0.50	2.37	0.17	5.03
												Jute Mat	3.13	5	0.040	23.49	2.53	0.60	2.37	0.20	5.22
												Temp. Mat	3.13	5	0.040	23.49	2.53	0.60	2.37	0.20	5.22
												Temp. Mat	3.43	10	0.040	24.89	2.61	0.63	2.59	0.21	5.28
54+00	53+50	L	50.00	4.00	3.00	3.00	0.0200	0.22	1.59	0.70	0.91	Seed	3.11	5	0.030	23.83	2.45	0.30	2.82	0.24	5.46
												Seed	3.39	10	0.040	25.29	2.09	0.38	3.08	0.30	5.80
53+50	53+00	L	50.00	2.00	3.00	3.00	0.0200	0.23	1.82	0.70	1.07	Seed	3.08	5	0.030	24.12	2.88	0.46	3.29	0.37	4.21
												Jute Mat	3.08	5	0.040	24.18	2.35	0.53	3.29	0.43	4.56
												Temp. Mat	3.08	5	0.040	24.18	2.35	0.53	3.29	0.43	4.56
												Temp. Mat	3.37	10	0.040	25.64	2.41	0.56	3.60	0.45	4.68
53+00	52+50	L	50.00	2.00	3.00	3.00	0.0188	0.24	2.06	0.70	1.23	Seed	3.06	5	0.030	24.47	2.93	0.47	3.77	0.40	4.41



DITCH ANALYSIS

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.)
												Jute Mat	3.05	5	0.040	24.53	2.38	0.55	3.76	0.47	4.80
												Temp. Mat	3.05	5	0.040	24.53	2.38	0.55	3.76	0.47	4.80
												Temp. Mat	3.34	10	0.040	25.98	2.44	0.57	4.12	0.49	4.92
52+50	52+00	L	50.00	2.00	3.00	3.00	0.0366	0.25	2.31	0.70	1.41	Seed	3.04	5	0.030	24.75	3.85	0.82	4.27	0.36	4.16
												Jute Mat	3.03	5	0.040	24.80	3.14	0.95	4.26	0.42	4.51
												Temp. Mat	3.03	5	0.040	24.80	3.14	0.95	4.26	0.42	4.51
												Temp. Mat	3.32	10	0.040	26.24	3.22	1.00	4.67	0.44	4.63



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp A_Infield_Sta. 57+25.00 to 63+00.00

Designer : WCS

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.)
57+25	58+00	L	75.00	2.00	6.00	6.00	0.0080	0.11	0.11	0.50	0.06	Seed	3.81	5	0.030	16.51	0.84	0.05	0.21	0.10	3.16
												Seed	4.25	10	0.040	16.72	0.69	0.06	0.23	0.12	3.48
58+00	58+50	L	50.00	4.00	6.00	6.00	0.0078	0.09	0.20	0.50	0.10	Seed	3.70	5	0.030	17.48	0.84	0.05	0.37	0.10	5.16
												Seed	4.11	10	0.040	17.87	0.72	0.06	0.41	0.12	5.45
58+50	59+00	L	50.00	4.00	6.00	6.00	0.0078	0.11	0.31	0.50	0.16	Seed	3.61	5	0.030	18.33	0.98	0.06	0.56	0.12	5.45
												Seed	3.99	10	0.040	18.86	0.84	0.07	0.62	0.15	5.80
59+00	59+50	L	50.00	4.00	6.00	6.00	0.0078	0.12	0.43	0.50	0.21	Seed	3.53	5	0.030	19.10	1.07	0.07	0.75	0.14	5.72
												Seed	3.89	10	0.040	19.77	0.91	0.09	0.83	0.18	6.16
59+50	60+00	L	50.00	4.00	6.00	6.00	0.0078	0.12	0.55	0.50	0.27	Seed	3.45	5	0.030	19.82	1.16	0.08	0.94	0.16	5.97
												Seed	3.81	10	0.040	20.61	0.98	0.10	1.04	0.20	6.45
60+00	60+50	L	50.00	4.00	6.00	6.00	0.0078	0.13	0.68	0.50	0.34	Seed	3.39	5	0.030	20.49	1.23	0.09	1.15	0.18	6.19
												Seed	3.73	10	0.040	21.40	1.05	0.11	1.26	0.23	6.71
60+50	61+00	L	50.00	4.00	6.00	6.00	0.0080	0.14	0.81	0.50	0.41	Seed	3.33	5	0.030	21.13	1.31	0.10	1.36	0.20	6.38



DITCH ANALYSIS

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.)
												Seed	3.66	10	0.040	22.15	1.11	0.12	1.49	0.25	6.95
61+00	61+50	L	50.00	4.00	6.00	6.00	0.0080	0.16	0.97	0.50	0.49	Seed	3.28	5	0.030	21.73	1.38	0.11	1.60	0.22	6.61
												Seed	3.60	10	0.040	22.86	1.16	0.13	1.75	0.27	7.22
61+50	62+00	L	50.00	4.00	6.00	6.00	0.0112	0.15	1.12	0.50	0.56	Seed	3.23	5	0.030	22.25	1.61	0.15	1.81	0.21	6.56
												Seed	3.54	10	0.040	23.47	1.36	0.18	1.98	0.26	7.14
62+00	62+50	R	50.00	4.00	6.00	6.00	0.0086	0.13	1.25	0.50	0.62	Seed	3.19	5	0.030	22.79	1.52	0.13	1.98	0.24	6.88
												Seed	3.49	10	0.040	24.13	1.27	0.16	2.17	0.30	7.54
62+50	63+00	L	50.00	4.00	6.00	6.00	0.0032	0.11	1.36	0.50	0.68	Seed	3.13	5	0.030	23.55	1.10	0.06	2.12	0.32	7.90
												Seed	3.42	10	0.040	25.03	0.91	0.08	2.31	0.40	8.77



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp B_Infield_Sta. 73+00.00 to Sta. 65+00.00

Designer : WCS

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.)
73+00	72+50	L	50.00	4.00	2.00	2.00	0.0502	0.04	0.04	0.70	0.02	Seed	3.88	5	0.030	15.92	0.97	0.08	0.10	0.02	4.10
												Seed	4.34	10	0.040	16.00	0.81	0.10	0.11	0.03	4.13
72+50	72+00	L	50.00	4.00	2.00	2.00	0.0064	0.05	0.08	0.70	0.06	Seed	3.74	5	0.030	17.09	0.69	0.03	0.21	0.08	4.30
												Seed	4.17	10	0.040	17.35	0.59	0.04	0.24	0.10	4.39
72+00	71+50	L	50.00	4.00	4.00	4.00	0.0138	0.06	0.14	0.70	0.10	Seed	3.65	5	0.030	17.89	1.01	0.07	0.35	0.08	4.64
												Seed	4.06	10	0.040	18.28	0.90	0.09	0.39	0.10	4.79
71+50	71+00	L	50.00	4.00	4.00	4.00	0.0200	0.07	0.20	0.70	0.14	Seed	3.59	5	0.030	18.52	1.33	0.11	0.51	0.09	4.71
												Seed	3.98	10	0.040	19.01	1.13	0.14	0.57	0.11	4.90
71+00	70+50	L	50.00	4.00	4.00	2.00	0.0046	0.07	0.28	0.70	0.19	Seed	3.49	5	0.030	19.42	0.92	0.05	0.68	0.16	4.98
												Seed	3.87	10	0.040	20.03	0.80	0.06	0.75	0.20	5.22
70+50	70+00	L	50.00	4.00	4.00	4.00	0.0308	0.09	0.37	0.70	0.26	Seed	3.45	5	0.030	19.86	1.84	0.21	0.89	0.11	4.87
												Seed	3.81	10	0.040	20.56	1.59	0.26	0.98	0.14	5.08
70+00	69+50	R	50.00	2.00	4.00	4.00	0.0052	0.10	0.47	0.70	0.33	Seed	3.39	5	0.030	20.53	1.24	0.09	1.11	0.28	4.28



DITCH ANALYSIS

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.)
												Seed	3.74	10	0.040	21.36	1.04	0.11	1.22	0.35	4.77
69+50	69+00	R	50.00	2.00	4.00	4.00	0.0436	0.10	0.57	0.70	0.40	Seed	3.36	5	0.030	20.83	2.78	0.48	1.34	0.18	3.42
												Jute Mat	3.35	5	0.040	20.90	2.28	0.56	1.33	0.21	3.65
												Temp. Mat	3.35	5	0.040	20.90	2.28	0.56	1.33	0.21	3.65
												Temp. Mat	3.70	10	0.040	21.71	2.34	0.60	1.47	0.22	3.75
69+00	68+50	R	50.00	2.00	4.00	4.00	0.0408	0.10	0.67	0.70	0.47	Seed	3.33	5	0.030	21.19	2.85	0.50	1.56	0.20	3.57
												Jute Mat	3.32	5	0.040	21.26	2.32	0.58	1.55	0.23	3.84
												Temp. Mat	3.32	5	0.040	21.26	2.32	0.58	1.55	0.23	3.84
												Temp. Mat	3.67	10	0.040	22.06	2.39	0.62	1.72	0.24	3.93
68+50	68+00	R	50.00	2.00	4.00	4.00	0.0452	0.10	0.77	0.70	0.54	Seed	3.30	5	0.030	21.53	3.06	0.58	1.77	0.21	3.64
												Jute Mat	3.29	5	0.040	21.59	2.50	0.67	1.77	0.24	3.91
												Temp. Mat	3.29	5	0.040	21.59	2.50	0.67	1.77	0.24	3.91
												Temp. Mat	3.64	10	0.040	22.38	2.58	0.71	1.96	0.25	4.02
68+00	67+50	R	50.00	2.00	6.00	4.00	0.0442	0.12	0.89	0.70	0.62	Seed	3.27	5	0.030	21.86	3.05	0.60	2.03	0.22	4.16
												Jute Mat	3.26	5	0.040	21.92	2.48	0.69	2.03	0.25	4.51
												Temp. Mat	3.26	5	0.040	21.92	2.48	0.69	2.03	0.25	4.51
												Temp. Mat	3.61	10	0.040	22.71	2.55	0.73	2.24	0.26	4.65
67+50	67+00	R	50.00	6.00	6.00	4.00	0.0290	0.12	1.01	0.70	0.71	Seed	3.23	5	0.030	22.30	2.22	0.27	2.28	0.15	7.52
												Seed	3.57	10	0.040	23.14	1.92	0.34	2.52	0.19	7.89
67+00	66+50	R	50.00	2.00	6.00	4.00	0.0480	0.12	1.13	0.70	0.79	Seed	3.21	5	0.030	22.55	3.34	0.71	2.53	0.24	4.38



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (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.)
													Jute Mat	3.20	5	0.040	22.60	2.72	0.82	2.53	0.28	4.75
													Temp. Mat	3.20	5	0.040	22.60	2.72	0.82	2.53	0.28	4.75
													Temp. Mat	3.55	10	0.040	23.44	2.80	0.87	2.80	0.29	4.90
66+50	66+00	R	50.00	2.00	6.00	4.00	0.0454	0.12	1.25	0.70	0.87	Seed	3.18	5	0.030	22.85	3.36	0.72	2.78	0.25	4.53	
													Jute Mat	3.18	5	0.040	22.91	2.74	0.83	2.78	0.29	4.93
													Temp. Mat	3.18	5	0.040	22.91	2.74	0.83	2.78	0.29	4.93
													Temp. Mat	3.52	10	0.040	23.73	2.81	0.87	3.08	0.31	5.09
66+00	65+50	R	50.00	2.00	6.00	4.00	0.0390	0.13	1.38	0.70	0.96	Seed	3.16	5	0.030	23.16	3.28	0.67	3.05	0.28	4.75	
													Jute Mat	3.15	5	0.040	23.22	2.66	0.77	3.04	0.32	5.18
													Temp. Mat	3.15	5	0.040	23.22	2.66	0.77	3.04	0.32	5.18
													Temp. Mat	3.50	10	0.040	24.04	2.73	0.82	3.37	0.34	5.36
65+50	65+00	R	50.00	2.00	4.00	4.00	0.0350	0.13	1.51	0.70	1.06	Seed	3.13	5	0.030	23.47	3.35	0.67	3.31	0.31	4.45	
													Jute Mat	3.13	5	0.040	23.52	2.73	0.77	3.30	0.35	4.84
													Temp. Mat	3.13	5	0.040	23.52	2.73	0.77	3.30	0.35	4.84
													Temp. Mat	3.47	10	0.040	24.34	2.81	0.82	3.66	0.37	4.99



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp C_Infield_Sta. 75+50.00 to Sta. 70+50.00

Designer : WCS

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.)
75+50	75+00	R	50.00	4.00	6.00	6.00	0.0128	0.01	0.01	0.50	0.01	Seed	3.74	5	0.030	17.11	0.37	0.01	0.02	0.02	4.19
												Seed	4.14	10	0.040	17.54	0.30	0.02	0.03	0.02	4.26
75+00	74+50	R	50.00	4.00	6.00	6.00	0.0206	0.22	0.23	0.50	0.12	Seed	3.66	5	0.030	17.79	1.23	0.10	0.43	0.08	4.93
												Seed	4.05	10	0.040	18.33	1.03	0.13	0.47	0.10	5.19
74+50	74+00	R	50.00	4.00	6.00	6.00	0.0128	0.34	0.57	0.50	0.29	Seed	3.60	5	0.030	18.38	1.40	0.12	1.03	0.15	5.80
												Seed	3.97	10	0.040	19.02	1.20	0.15	1.14	0.19	6.22
74+00	73+50	R	50.00	4.00	6.00	6.00	0.0128	0.05	0.62	0.50	0.31	Seed	3.54	5	0.030	18.95	1.44	0.12	1.10	0.15	5.85
												Seed	3.90	10	0.040	19.70	1.22	0.15	1.21	0.19	6.30
73+50	73+00	R	50.00	4.00	6.00	6.00	0.0127	0.05	0.67	0.50	0.34	Seed	3.48	5	0.030	19.52	1.46	0.13	1.17	0.16	5.93
												Seed	3.83	10	0.040	20.37	1.25	0.16	1.29	0.20	6.38
73+00	72+50	R	50.00	4.00	6.00	6.00	0.0128	0.07	0.74	0.50	0.37	Seed	3.43	5	0.030	20.07	1.50	0.14	1.28	0.17	6.03
												Seed	3.77	10	0.040	21.01	1.27	0.17	1.40	0.21	6.51
72+50	72+00	R	50.00	4.00	6.00	6.00	0.0400	0.09	0.83	0.50	0.42	Seed	3.39	5	0.030	20.43	2.29	0.32	1.41	0.13	5.55



DITCH ANALYSIS

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.)
												Seed	3.73	10	0.040	21.44	1.94	0.40	1.55	0.16	5.93
72+00	71+50	R	50.00	4.00	6.00	6.00	0.0262	0.16	0.99	0.50	0.49	Seed	3.36	5	0.030	20.83	2.09	0.26	1.65	0.16	5.92
												Seed	3.68	10	0.040	21.91	1.77	0.32	1.81	0.20	6.37
71+50	71+00	R	50.00	4.00	6.00	6.00	0.0276	0.11	1.10	0.50	0.55	Seed	3.32	5	0.030	21.21	2.20	0.29	1.82	0.17	5.99
												Seed	3.64	10	0.040	22.36	1.85	0.35	1.99	0.21	6.47
71+00	70+50	R	50.00	5.00	6.00	6.00	0.0354	0.07	1.16	0.50	0.58	Seed	3.29	5	0.030	21.57	2.30	0.31	1.91	0.14	6.70
												Seed	3.60	10	0.040	22.78	1.96	0.39	2.09	0.18	7.11



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp D_Sta. 69+00.00 to Sta. 75+25.00

Designer : WCS

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.)
69+00	69+50	R	50.00	4.00	3.00	4.00	0.0050	0.12	0.12	0.50	0.06	Seed	3.84	5	0.030	16.28	0.62	0.03	0.23	0.09	4.60
												Seed	4.28	10	0.040	16.46	0.55	0.03	0.26	0.11	4.75
69+50	70+00	R	50.00	4.00	3.00	4.00	0.0050	0.13	0.25	0.50	0.13	Seed	3.72	5	0.030	17.27	0.82	0.04	0.47	0.13	4.90
												Seed	4.14	10	0.040	17.61	0.71	0.05	0.52	0.16	5.13
70+00	70+50	R	50.00	4.00	3.00	4.00	0.0100	0.14	0.39	0.50	0.20	Seed	3.65	5	0.030	17.95	1.20	0.08	0.71	0.13	4.93
												Seed	4.04	10	0.040	18.41	1.04	0.10	0.79	0.17	5.17
70+50	71+00	R	50.00	4.00	3.00	4.00	0.0200	0.13	0.53	0.50	0.26	Seed	3.59	5	0.030	18.45	1.66	0.16	0.94	0.13	4.89
												Seed	3.98	10	0.040	18.99	1.42	0.20	1.04	0.16	5.13
71+00	71+50	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.64	0.50	0.32	Seed	3.54	5	0.030	18.92	1.78	0.18	1.14	0.14	5.00
												Seed	3.92	10	0.040	19.53	1.52	0.22	1.26	0.18	5.25
71+50	72+00	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.76	0.50	0.38	Seed	3.50	5	0.030	19.36	1.88	0.19	1.33	0.16	5.09
												Seed	3.87	10	0.040	20.05	1.60	0.24	1.47	0.20	5.37
72+00	72+50	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.88	0.50	0.44	Seed	3.46	5	0.030	19.79	1.96	0.21	1.52	0.17	5.18



DITCH ANALYSIS

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.)
												Seed	3.82	10	0.040	20.54	1.68	0.26	1.68	0.21	5.48
72+50	73+00	R	50.00	3.00	3.00	4.00	0.0200	0.17	1.05	0.50	0.52	Seed	3.42	5	0.030	20.16	2.20	0.27	1.79	0.22	4.51
												Seed	3.77	10	0.040	20.99	1.88	0.33	1.97	0.27	4.87
73+00	73+50	R	50.00	3.50	3.00	4.00	0.0342	0.14	1.19	0.50	0.59	Seed	3.39	5	0.030	20.48	2.66	0.39	2.01	0.18	4.78
												Seed	3.74	10	0.040	21.35	2.27	0.48	2.22	0.23	5.09
73+50	74+00	R	50.00	3.50	3.00	4.00	0.0342	0.14	1.33	0.50	0.66	Seed	3.36	5	0.030	20.78	2.75	0.41	2.23	0.19	4.86
												Jute Mat	3.36	5	0.040	20.84	2.27	0.49	2.23	0.23	5.10
												Temp. Mat	3.36	5	0.040	20.84	2.27	0.49	2.23	0.23	5.10
												Temp. Mat	3.70	10	0.040	21.71	2.34	0.52	2.46	0.24	5.19
74+00	74+50	R	50.00	3.50	3.00	4.00	0.0342	0.18	1.51	0.50	0.75	Seed	3.33	5	0.030	21.13	2.86	0.44	2.51	0.21	4.95
												Jute Mat	3.33	5	0.040	21.19	2.35	0.52	2.51	0.24	5.21
												Temp. Mat	3.33	5	0.040	21.19	2.35	0.52	2.51	0.24	5.21
												Temp. Mat	3.67	10	0.040	22.05	2.44	0.55	2.77	0.26	5.30
74+50	75+00	R	50.00	5.00	3.00	4.00	0.0342	0.36	1.87	0.50	0.93	Seed	3.30	5	0.030	21.49	2.82	0.41	3.08	0.19	6.35
												Jute Mat	3.29	5	0.040	21.55	2.33	0.49	3.08	0.23	6.59
												Temp. Mat	3.29	5	0.040	21.55	2.33	0.49	3.08	0.23	6.59
												Temp. Mat	3.64	10	0.040	22.39	2.41	0.51	3.40	0.24	6.69
75+00	75+25	R	25.00	5.00	3.00	4.00	0.0336	0.17	2.03	0.50	1.02	Seed	3.28	5	0.030	21.69	2.88	0.43	3.34	0.20	6.42
												Jute Mat	3.28	5	0.040	21.72	2.38	0.50	3.33	0.24	6.68
												Temp. Mat	3.28	5	0.040	21.72	2.38	0.50	3.33	0.24	6.68



DITCH ANALYSIS

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.)
											Temp. Mat	3.62	10	0.040	22.56	2.47	0.53	3.69	0.25	6.78



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp D_Sta. 69+00.00 to Sta. 75+25.00

Designer : WCS

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 (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.)
69+00	69+50	R	50.00	4.00	3.00	4.00	0.0050	0.12	0.12	0.50	0.06	Seed	3.84	5	0.030	16.28	0.62	0.03	0.23	0.09	4.60
												Seed	4.28	10	0.040	16.46	0.55	0.03	0.26	0.11	4.75
69+50	70+00	R	50.00	4.00	3.00	4.00	0.0050	0.13	0.25	0.50	0.13	Seed	3.72	5	0.030	17.27	0.82	0.04	0.47	0.13	4.90
												Seed	4.14	10	0.040	17.61	0.71	0.05	0.52	0.16	5.13
70+00	70+50	R	50.00	4.00	3.00	4.00	0.0100	0.14	0.39	0.50	0.20	Seed	3.65	5	0.030	17.95	1.20	0.08	0.71	0.13	4.93
												Seed	4.04	10	0.040	18.41	1.04	0.10	0.79	0.17	5.17
70+50	71+00	R	50.00	4.00	3.00	4.00	0.0200	0.13	0.53	0.50	0.26	Seed	3.59	5	0.030	18.45	1.66	0.16	0.94	0.13	4.89
												Seed	3.98	10	0.040	18.99	1.42	0.20	1.04	0.16	5.13
71+00	71+50	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.64	0.50	0.32	Seed	3.54	5	0.030	18.92	1.78	0.18	1.14	0.14	5.00
												Seed	3.92	10	0.040	19.53	1.52	0.22	1.26	0.18	5.25
71+50	72+00	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.76	0.50	0.38	Seed	3.50	5	0.030	19.36	1.88	0.19	1.33	0.16	5.09
												Seed	3.87	10	0.040	20.05	1.60	0.24	1.47	0.20	5.37
72+00	72+50	R	50.00	4.00	3.00	4.00	0.0200	0.12	0.88	0.50	0.44	Seed	3.46	5	0.030	19.79	1.96	0.21	1.52	0.17	5.18



DITCH ANALYSIS

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.)
												Seed	3.82	10	0.040	20.54	1.68	0.26	1.68	0.21	5.48
72+50	73+00	R	50.00	3.00	3.00	4.00	0.0200	0.17	1.05	0.50	0.52	Seed	3.42	5	0.030	20.16	2.20	0.27	1.79	0.22	4.51
												Seed	3.77	10	0.040	20.99	1.88	0.33	1.97	0.27	4.87
73+00	73+50	R	50.00	3.50	3.00	4.00	0.0342	0.14	1.19	0.50	0.59	Seed	3.39	5	0.030	20.48	2.66	0.39	2.01	0.18	4.78
												Seed	3.74	10	0.040	21.35	2.27	0.48	2.22	0.23	5.09
73+50	74+00	R	50.00	3.50	3.00	4.00	0.0342	0.14	1.33	0.50	0.66	Seed	3.36	5	0.030	20.78	2.75	0.41	2.23	0.19	4.86
												Jute Mat	3.36	5	0.040	20.84	2.27	0.49	2.23	0.23	5.10
												Temp. Mat	3.36	5	0.040	20.84	2.27	0.49	2.23	0.23	5.10
												Temp. Mat	3.70	10	0.040	21.71	2.34	0.52	2.46	0.24	5.19
74+00	74+50	R	50.00	3.50	3.00	4.00	0.0342	0.18	1.51	0.50	0.75	Seed	3.33	5	0.030	21.13	2.86	0.44	2.51	0.21	4.95
												Jute Mat	3.33	5	0.040	21.19	2.35	0.52	2.51	0.24	5.21
												Temp. Mat	3.33	5	0.040	21.19	2.35	0.52	2.51	0.24	5.21
												Temp. Mat	3.67	10	0.040	22.05	2.44	0.55	2.77	0.26	5.30
74+50	75+00	R	50.00	5.00	3.00	4.00	0.0342	0.36	1.87	0.50	0.93	Seed	3.30	5	0.030	21.49	2.82	0.41	3.08	0.19	6.35
												Jute Mat	3.29	5	0.040	21.55	2.33	0.49	3.08	0.23	6.59
												Temp. Mat	3.29	5	0.040	21.55	2.33	0.49	3.08	0.23	6.59
												Temp. Mat	3.64	10	0.040	22.39	2.41	0.51	3.40	0.24	6.69
75+00	75+25	R	25.00	5.00	3.00	4.00	0.0336	0.17	2.03	0.50	1.02	Seed	3.28	5	0.030	21.69	2.88	0.43	3.34	0.20	6.42
												Jute Mat	3.28	5	0.040	21.72	2.38	0.50	3.33	0.24	6.68
												Temp. Mat	3.28	5	0.040	21.72	2.38	0.50	3.33	0.24	6.68



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp E_Roadside_Sta. 61+50.00 to Sta. 52+80.00

Designer : WCS

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.)
61+50	61+00	R	50.00	2.00	2.00	2.00	0.0222	0.10	0.10	0.70	0.07	Seed	3.92	5	0.030	15.60	1.40	0.12	0.27	0.09	2.35
												Seed	4.38	10	0.040	15.68	1.20	0.16	0.30	0.11	2.45
61+00	60+50	R	50.00	2.00	2.00	2.00	0.0350	0.10	0.20	0.70	0.14	Seed	3.87	5	0.030	16.01	2.07	0.26	0.55	0.12	2.47
												Seed	4.32	10	0.040	16.15	1.76	0.33	0.61	0.15	2.60
60+50	60+00	R	50.00	2.00	2.00	2.00	0.0328	0.11	0.31	0.70	0.22	Seed	3.83	5	0.030	16.37	2.35	0.31	0.83	0.15	2.61
												Seed	4.26	10	0.040	16.57	2.00	0.40	0.92	0.19	2.77
60+00	59+50	R	50.00	2.00	2.00	2.00	0.0258	0.11	0.42	0.70	0.29	Seed	3.79	5	0.030	16.72	2.36	0.32	1.11	0.20	2.78
												Seed	4.21	10	0.040	16.98	2.03	0.39	1.23	0.24	2.98
59+50	59+00	R	50.00	2.00	2.00	2.00	0.0274	0.11	0.53	0.70	0.37	Seed	3.75	5	0.030	17.04	2.61	0.37	1.39	0.22	2.88
												Seed	4.17	10	0.040	17.35	2.22	0.47	1.55	0.27	3.10
59+00	58+50	R	50.00	2.00	2.00	2.00	0.0220	0.11	0.64	0.70	0.45	Seed	3.71	5	0.030	17.36	2.56	0.36	1.67	0.26	3.04
												Seed	4.12	10	0.040	17.73	2.18	0.44	1.86	0.32	3.29
58+50	58+00	R	50.00	2.00	2.00	2.00	0.0270	0.12	0.76	0.70	0.53	Seed	3.68	5	0.030	17.65	2.89	0.45	1.96	0.27	3.07



DITCH ANALYSIS

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.)
												Jute Mat	3.67	5	0.040	17.71	2.36	0.53	1.95	0.31	3.26
												Temp. Mat	3.67	5	0.040	17.71	2.36	0.53	1.95	0.31	3.26
												Temp. Mat	4.08	10	0.040	18.07	2.44	0.56	2.17	0.33	3.33
58+00	57+50	R	50.00	2.00	2.00	2.00	0.0142	0.12	0.88	0.70	0.61	Seed	3.64	5	0.030	18.06	2.41	0.30	2.23	0.34	3.38
												Seed	4.03	10	0.040	18.48	2.03	0.38	2.47	0.43	3.71
57+50	Concent							0.73		0.90	1.27					10.00					
57+50	57+00	R	50.00	2.00	2.00	2.00	0.0140	0.11	1.72	0.70	1.35	Seed	3.61	5	0.030	18.33	3.02	0.46	4.86	0.53	4.11
												Jute Mat	3.60	5	0.040	18.40	2.46	0.53	4.85	0.61	4.45
												Temp. Mat	3.60	5	0.040	18.40	2.46	0.53	4.85	0.61	4.45
												Temp. Mat	4.00	10	0.040	18.81	2.53	0.57	5.39	0.65	4.59
57+00	56+50	R	50.00	2.00	2.00	2.00	0.0140	0.10	1.82	0.70	1.42	Seed	3.57	5	0.030	18.67	3.06	0.47	5.06	0.54	4.15
												Jute Mat	3.56	5	0.040	18.73	2.48	0.55	5.06	0.63	4.50
												Temp. Mat	3.56	5	0.040	18.73	2.48	0.55	5.06	0.63	4.50
												Temp. Mat	3.96	10	0.040	19.14	2.55	0.58	5.62	0.66	4.65
56+50	56+00	R	50.00	2.00	2.00	2.00	0.0142	0.10	1.92	0.70	1.49	Seed	3.54	5	0.030	19.00	3.11	0.49	5.27	0.55	4.19
												Jute Mat	3.53	5	0.040	19.06	2.52	0.56	5.26	0.64	4.55
												Temp. Mat	3.53	5	0.040	19.06	2.52	0.56	5.26	0.64	4.55
												Temp. Mat	3.93	10	0.040	19.46	2.60	0.60	5.85	0.67	4.69
56+00	55+50	R	50.00	2.00	2.00	2.00	0.0138	0.11	2.03	0.70	1.57	Seed	3.50	5	0.030	19.33	3.11	0.49	5.50	0.57	4.26
												Jute Mat	3.50	5	0.040	19.39	2.53	0.56	5.49	0.66	4.62



DITCH ANALYSIS

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.)
												Temp. Mat	3.50	5	0.040	19.39	2.53	0.56	5.49	0.66	4.62
												Temp. Mat	3.89	10	0.040	19.78	2.60	0.60	6.11	0.69	4.77
55+50	55+00	R	50.00	2.00	2.00	2.00	0.0138	0.14	2.18	0.70	1.67	Seed	3.47	5	0.030	19.65	3.16	0.50	5.79	0.58	4.32
												Jute Mat	3.46	5	0.040	19.71	2.56	0.58	5.78	0.67	4.70
												Temp. Mat	3.46	5	0.040	19.71	2.56	0.58	5.78	0.67	4.70
												Temp. Mat	3.86	10	0.040	20.09	2.64	0.61	6.44	0.71	4.85
55+00	54+50	R	50.00	2.00	2.00	2.00	0.0140	0.14	2.32	0.70	1.77	Seed	3.44	5	0.030	19.97	3.21	0.52	6.08	0.59	4.37
												Jute Mat	3.43	5	0.040	20.03	2.61	0.60	6.07	0.69	4.76
												Temp. Mat	3.43	5	0.040	20.03	2.61	0.60	6.07	0.69	4.76
												Temp. Mat	3.83	10	0.040	20.40	2.69	0.64	6.77	0.73	4.91
54+50	54+00	R	50.00	2.00	2.00	2.00	0.0144	0.14	2.45	0.70	1.86	Seed	3.41	5	0.030	20.29	3.29	0.54	6.35	0.60	4.41
												Jute Mat	3.40	5	0.040	20.34	2.67	0.63	6.34	0.70	4.80
												Temp. Mat	3.40	5	0.040	20.34	2.67	0.63	6.34	0.70	4.80
												Temp. Mat	3.80	10	0.040	20.70	2.75	0.66	7.08	0.74	4.96
54+00	53+50	R	50.00	2.00	2.00	2.00	0.0140	0.13	2.59	0.70	1.96	Seed	3.38	5	0.030	20.60	3.29	0.54	6.61	0.62	4.48
												Jute Mat	3.37	5	0.040	20.66	2.67	0.63	6.60	0.72	4.87
												Temp. Mat	3.37	5	0.040	20.66	2.67	0.63	6.60	0.72	4.87
												Temp. Mat	3.77	10	0.040	21.00	2.75	0.66	7.37	0.76	5.04
53+50	53+00	R	50.00	2.00	2.00	2.00	0.0130	0.13	2.71	0.70	2.05	Seed	3.35	5	0.030	20.91	3.24	0.52	6.85	0.64	4.58
												Jute Mat	3.35	5	0.040	20.97	2.62	0.61	6.84	0.75	4.99



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE RADIUS	LENGTH WIDTH	IN SLOPE	BACK SLOPE	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.)	
											Temp. Mat	3.35	5	0.040	20.97	2.62	0.61	6.84	0.75	4.99	
											Temp. Mat	3.74	10	0.040	21.31	2.71	0.64	7.65	0.79	5.16	
53+00	52+80	R	10.00	2.00	2.00	2.00	0.0310	0.06	2.77	0.70	2.09	Seed	3.34	5	0.030	21.01	4.45	1.00	6.97	0.52	4.07
											Jute Mat	3.34	5	0.040	21.02	3.62	1.16	6.97	0.60	4.41	
											Temp. Mat	3.34	5	0.040	21.02	3.62	1.16	6.97	0.60	4.41	
											Perm, Type 1	3.34	5	0.040	21.02	3.62	1.16	6.97	0.60	4.41	
											Perm, Type 1	3.74	10	0.040	21.36	3.73	1.23	7.79	0.64	4.55	



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp E_Roadside_Sta. 61+50.00 to Sta. 64+25.00

Designer : WCS

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.)
61+50	62+00	R	50.00	2.00	2.00	2.00	0.0572	0.10	0.10	0.70	0.07	Seed	3.95	5	0.030	15.44	1.87	0.24	0.27	0.07	2.27
												Seed	4.40	10	0.040	15.51	1.60	0.31	0.30	0.09	2.34
62+00	Concent							1.72		0.70	1.27					19.07					
62+00	62+50	R	50.00	2.00	2.00	2.00	0.0142	0.10	1.92	0.70	1.34	Seed	3.50	5	0.030	19.35	3.01	0.46	4.70	0.52	4.06
												Jute Mat	3.49	5	0.040	19.41	2.44	0.53	4.69	0.60	4.40
												Temp. Mat	3.49	5	0.040	19.41	2.44	0.53	4.69	0.60	4.40
												Temp. Mat	3.93	10	0.040	19.40	2.53	0.57	5.28	0.64	4.55
62+50	63+00	R	50.00	2.00	2.00	2.00	0.0376	0.10	2.02	0.70	1.41	Seed	3.47	5	0.030	19.60	4.30	0.95	4.91	0.41	3.62
												Jute Mat	3.47	5	0.040	19.65	3.51	1.11	4.90	0.47	3.90
												Temp. Mat	3.47	5	0.040	19.65	3.51	1.11	4.90	0.47	3.90
												Perm, Type 1	3.47	5	0.040	19.65	3.51	1.11	4.90	0.47	3.90
												Perm, Type 1	3.91	10	0.040	19.63	3.63	1.19	5.52	0.51	4.02
63+00	Concent							15.95		0.70	12.58					84.50					



DITCH ANALYSIS

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.)
63+00	63+50	R	50.00	2.00	2.00	2.00	0.0086	0.10	18.06	0.70	12.64	Seed	1.29	5	0.030	84.74	3.52	0.59	16.31	1.10	6.41
												Jute Mat	1.29	5	0.040	84.79	2.84	0.68	16.30	1.27	7.06
												Temp. Mat	1.29	5	0.040	84.79	2.84	0.68	16.30	1.27	7.06
												Temp. Mat	1.48	10	0.040	84.78	2.95	0.73	18.78	1.35	7.41
63+50	64+00	R	50.00	2.00	2.00	2.00	0.0084	0.09	18.16	0.70	12.71	Seed	1.29	5	0.030	85.03	3.49	0.58	16.35	1.11	6.44
												Jute Mat	1.29	5	0.040	85.09	2.82	0.67	16.34	1.27	7.10
												Temp. Mat	1.29	5	0.040	85.09	2.82	0.67	16.34	1.27	7.10
												Temp. Mat	1.48	10	0.040	85.07	2.92	0.71	18.82	1.36	7.45
64+00	64+25	R	25.00	2.00	2.00	2.00	0.0104	0.05	18.21	0.70	12.74	Seed	1.28	5	0.030	85.20	3.77	0.68	16.37	1.06	6.22
												Jute Mat	1.28	5	0.040	85.23	3.05	0.79	16.36	1.21	6.85
												Temp. Mat	1.28	5	0.040	85.23	3.05	0.79	16.36	1.21	6.85
												Temp. Mat	1.48	10	0.040	85.20	3.17	0.84	18.85	1.30	7.19



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp E_Infield_Sta. 58+75.00 to Sta. 55+75.00

Designer : WCS

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 (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.)
58+75	58+50	R	25.00	2.00	6.00	6.00	0.0008	0.04	0.04	0.50	0.02	Seed	3.80	5	0.030	16.64	0.24	0.01	0.07	0.11	3.29
												Seed	4.23	10	0.040	16.85	0.21	0.01	0.08	0.13	3.55
58+50	58+00	R	50.00	0.00	6.00	6.00	0.0058	0.07	0.10	0.50	0.05	Seed	3.67	5	0.030	17.70	0.81	0.07	0.19	0.20	2.38
												Seed	4.08	10	0.040	18.12	0.66	0.08	0.21	0.23	2.77
58+00	57+50	R	50.00	0.00	6.00	6.00	0.0136	0.06	0.17	0.50	0.08	Seed	3.60	5	0.030	18.38	1.25	0.17	0.30	0.20	2.38
												Seed	3.98	10	0.040	18.93	1.03	0.20	0.33	0.23	2.77
57+50	57+00	R	50.00	0.00	6.00	6.00	0.0214	0.06	0.22	0.50	0.11	Seed	3.55	5	0.030	18.91	1.57	0.27	0.39	0.20	2.45
												Seed	3.92	10	0.040	19.56	1.30	0.32	0.43	0.24	2.84
57+00	56+50	R	50.00	0.00	6.00	6.00	0.0184	0.06	0.28	0.50	0.14	Seed	3.49	5	0.030	19.44	1.58	0.26	0.49	0.23	2.74
												Seed	3.85	10	0.040	20.20	1.31	0.30	0.54	0.26	3.16
56+50	56+00	R	50.00	0.00	2.00	2.00	0.0054	0.06	0.34	0.50	0.17	Seed	3.43	5	0.030	20.08	1.30	0.16	0.58	0.47	1.89
												Seed	3.77	10	0.040	20.98	1.07	0.18	0.64	0.55	2.19
56+00	55+75	R	25.00	0.00	6.00	6.00	0.0104	0.09	0.43	0.50	0.21	Seed	3.40	5	0.030	20.38	1.38	0.19	0.72	0.30	3.54



DITCH ANALYSIS

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.)
											Seed	3.74	10	0.040	21.34	1.16	0.22	0.79	0.34	4.06



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp E_Infield_Sta. 58+75.00 to Sta. 62+20.00

Designer : WCS

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 (ft.)	IN WIDTH (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.)
58+75	59+00	R	25.00	2.00	6.00	6.00	0.0020	0.04	0.04	0.50	0.02	Seed	3.86	5	0.030	16.15	0.35	0.01	0.08	0.09	3.03
												Seed	4.29	10	0.040	16.36	0.29	0.01	0.08	0.11	3.29
59+00	59+50	R	50.00	2.00	6.00	6.00	0.0068	0.09	0.12	0.50	0.06	Seed	3.73	5	0.030	17.21	0.81	0.05	0.23	0.11	3.29
												Seed	4.14	10	0.040	17.60	0.68	0.06	0.26	0.13	3.61
59+50	60+00	R	50.00	2.00	6.00	6.00	0.0126	0.10	0.22	0.50	0.11	Seed	3.65	5	0.030	17.91	1.20	0.10	0.41	0.12	3.48
												Seed	4.04	10	0.040	18.43	0.98	0.12	0.45	0.16	3.87
60+00	60+50	R	50.00	2.00	6.00	6.00	0.0320	0.12	0.34	0.50	0.17	Seed	3.60	5	0.030	18.36	1.86	0.24	0.61	0.12	3.45
												Seed	3.98	10	0.040	18.96	1.55	0.30	0.68	0.15	3.80
60+50	61+00	R	50.00	2.00	6.00	6.00	0.0418	0.12	0.46	0.50	0.23	Seed	3.56	5	0.030	18.73	2.22	0.34	0.82	0.13	3.58
												Seed	3.93	10	0.040	19.40	1.86	0.42	0.90	0.16	3.95
61+00	61+50	R	50.00	2.00	6.00	6.00	0.0742	0.19	0.65	0.50	0.32	Seed	3.53	5	0.030	19.01	3.01	0.63	1.15	0.14	3.63
												Jute Mat	3.53	5	0.040	19.07	2.45	0.73	1.14	0.16	3.90
												Temp. Mat	3.53	5	0.040	19.07	2.45	0.73	1.14	0.16	3.90



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE RADIUS	LENGTH 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.)	
											Temp. Mat	3.90	10	0.040	19.73	2.53	0.77	1.27	0.17	4.00	
61+50	62+20	R	70.00	4.00	4.00	4.00	0.0833	0.19	0.84	0.70	0.46	Seed	3.49	5	0.030	19.44	3.14	0.59	1.60	0.11	4.91
												Jute Mat	3.48	5	0.040	19.52	2.60	0.70	1.59	0.13	5.08
												Temp. Mat	3.48	5	0.040	19.52	2.60	0.70	1.59	0.13	5.08
												Temp. Mat	3.85	10	0.040	20.16	2.70	0.74	1.76	0.14	5.14



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp I_Roadside_Sta. 115+20.00 to Sta. 125+00.00

Designer : WCS

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.)
115+20	116+30	L	110.00	4.00	6.00	6.00	0.0043	0.22	0.22	0.50	0.11	Seed	3.70	5	0.030	17.47	0.72	0.03	0.40	0.12	5.42
												Seed	4.10	10	0.040	17.90	0.60	0.04	0.45	0.15	5.80
116+50	117+00	L	50.00	4.00	6.00	6.00	0.0038	0.09	0.31	0.50	0.15	Seed	3.58	5	0.030	18.55	0.76	0.04	0.55	0.15	5.77
												Seed	3.96	10	0.040	19.18	0.65	0.04	0.61	0.18	6.19
117+00	117+50	L	50.00	4.00	6.00	6.00	0.0026	0.12	0.42	0.50	0.21	Seed	3.47	5	0.030	19.67	0.73	0.03	0.73	0.19	6.32
												Seed	3.82	10	0.040	20.51	0.62	0.04	0.81	0.24	6.87
117+50	118+00	L	50.00	4.00	6.00	6.00	0.0024	0.12	0.55	0.50	0.27	Seed	3.37	5	0.030	20.75	0.77	0.03	0.92	0.22	6.67
												Seed	3.70	10	0.040	21.78	0.64	0.04	1.01	0.28	7.32
118+00	118+50	L	50.00	4.00	6.00	6.00	0.0026	0.13	0.67	0.50	0.34	Seed	3.28	5	0.030	21.74	0.83	0.04	1.10	0.24	6.90
												Seed	3.59	10	0.040	22.95	0.70	0.05	1.20	0.30	7.58
118+50	119+00	L	50.00	4.00	6.00	6.00	0.0024	0.13	0.80	0.50	0.40	Seed	3.20	5	0.030	22.71	0.85	0.04	1.28	0.27	7.22
												Seed	3.49	10	0.040	24.11	0.72	0.05	1.40	0.33	7.93
119+00	119+50	L	50.00	4.00	6.00	6.00	0.0026	0.11	0.91	0.50	0.45	Seed	3.12	5	0.030	23.63	0.90	0.04	1.42	0.28	7.32



DITCH ANALYSIS

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.)
												Seed	3.40	10	0.040	25.21	0.76	0.05	1.54	0.34	8.06
119+50	120+00	L	50.00	4.00	6.00	6.00	0.0024	0.12	1.02	0.50	0.51	Seed	3.05	5	0.030	24.54	0.90	0.04	1.56	0.30	7.58
												Seed	3.32	10	0.040	26.31	0.76	0.05	1.70	0.36	8.35
120+00	120+50	L	50.00	4.00	6.00	4.00	0.0026	0.11	1.13	0.50	0.57	Seed	2.99	5	0.030	25.39	0.98	0.05	1.69	0.31	7.12
												Seed	3.24	10	0.040	27.31	0.82	0.06	1.84	0.38	7.80
120+50	121+00	R	50.00	4.00	6.00	6.00	0.0024	0.10	1.23	0.50	0.62	Seed	2.93	5	0.030	26.27	0.94	0.05	1.80	0.32	7.87
												Seed	3.17	10	0.040	28.37	0.78	0.06	1.95	0.39	8.71
121+00	121+50	L	50.00	4.00	6.00	6.00	0.0026	0.30	1.53	0.50	0.77	Seed	2.87	5	0.030	27.07	1.02	0.06	2.20	0.35	8.22
												Seed	3.11	10	0.040	29.34	0.86	0.07	2.38	0.42	9.09
121+50	122+00	L	50.00	4.00	6.00	6.00	0.0024	0.29	1.82	0.50	0.91	Seed	2.82	5	0.030	27.87	1.04	0.06	2.57	0.39	8.67
												Seed	3.05	10	0.040	30.29	0.87	0.07	2.78	0.47	9.64
122+00	122+50	L	50.00	4.00	6.00	6.00	0.0026	0.30	2.13	0.50	1.06	Seed	2.78	5	0.030	28.61	1.12	0.07	2.95	0.41	8.91
												Seed	2.99	10	0.040	31.19	0.93	0.08	3.18	0.49	9.91
122+50	123+00	L	50.00	4.00	6.00	6.00	0.0024	0.43	2.56	0.50	1.28	Seed	2.73	5	0.030	29.34	1.14	0.07	3.50	0.46	9.46
												Seed	2.94	10	0.040	32.06	0.95	0.08	3.76	0.55	10.56
123+00	123+50	L	50.00	4.00	6.00	6.00	0.0024	0.22	2.78	0.50	1.39	Seed	2.69	5	0.030	30.05	1.16	0.07	3.74	0.47	9.66
												Seed	2.89	10	0.040	32.93	0.96	0.08	4.01	0.57	10.78
123+50	124+00	L	50.00	4.00	3.00	3.00	0.0026	0.17	2.95	0.50	1.47	Seed	2.66	5	0.030	30.66	1.36	0.08	3.92	0.52	7.11
												Seed	2.85	10	0.040	33.66	1.14	0.10	4.21	0.63	7.77
124+00	124+50	L	50.00	4.00	3.00	4.00	0.0026	0.17	3.12	0.50	1.56	Seed	2.62	5	0.030	31.28	1.35	0.08	4.09	0.52	7.66



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE L	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.)
												Seed	2.81	10	0.040	34.40	1.12	0.10	4.39	0.63	8.42
124+50	125+00	L	50.00	4.00	3.00	4.00	0.0024	0.11	3.23	0.50	1.62	Seed	2.59	5	0.030	31.91	1.32	0.08	4.19	0.54	7.78
												Seed	2.77	10	0.040	35.15	1.10	0.10	4.48	0.65	8.56



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp J_Roadside_STA. 139+00.00 to Sta. 111+50.00

Designer : WCS

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 (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.)
139+00	128+00	R	1100.0	4.00	4.00	4.00	0.0062	3.79	3.79	0.70	2.65	Seed	3.19	5	0.030	22.75	2.22	0.23	8.46	0.60	8.77
												Seed	3.48	10	0.040	24.25	1.85	0.28	9.22	0.72	9.78
128+00	127+50	R	50.00	4.00	3.00	4.00	0.0116	0.22	4.00	0.50	2.76	Seed	3.17	5	0.030	23.04	2.86	0.38	8.74	0.52	7.67
												Seed	3.45	10	0.040	24.60	2.39	0.46	9.51	0.64	8.47
127+50	127+00	R	50.00	4.00	3.00	4.00	0.0082	0.22	4.22	0.50	2.87	Seed	3.14	5	0.030	23.36	2.55	0.30	9.01	0.58	8.09
												Seed	3.42	10	0.040	24.99	2.13	0.36	9.80	0.71	8.98
127+00	126+50	R	50.00	4.00	3.00	4.00	0.0092	0.21	4.43	0.50	2.97	Seed	3.12	5	0.030	23.67	2.67	0.33	9.27	0.58	8.03
												Seed	3.39	10	0.040	25.36	2.23	0.40	10.07	0.70	8.90
126+50	126+00	R	50.00	4.00	3.00	4.00	0.0108	0.23	4.66	0.50	3.09	Seed	3.09	5	0.030	23.97	2.86	0.38	9.56	0.56	7.92
												Seed	3.36	10	0.040	25.71	2.39	0.46	10.38	0.68	8.77
126+00	125+50	R	50.00	4.00	3.00	4.00	0.0460	0.21	4.87	0.50	3.19	Seed	3.08	5	0.030	24.14	4.78	1.10	9.84	0.38	6.69
												Jute Mat	3.08	5	0.040	24.18	3.92	1.29	9.83	0.45	7.15
												Temp. Mat	3.08	5	0.040	24.18	3.92	1.29	9.83	0.45	7.15



DITCH ANALYSIS

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.)
												Perm, Type 1	3.08	5	0.040	24.18	3.92	1.29	9.83	0.45	7.15
												Perm, Type 1	3.35	10	0.040	25.92	4.02	1.35	10.69	0.47	7.30
125+50	125+00	R	50.00	4.00	3.00	4.00	0.0462	0.21	5.09	0.50	3.30	Seed	3.07	5	0.030	24.35	4.83	1.12	10.12	0.39	6.73
												Jute Mat	3.06	5	0.040	24.39	3.95	1.32	10.11	0.46	7.20
												Temp. Mat	3.06	5	0.040	24.39	3.95	1.32	10.11	0.46	7.20
												Perm, Type 1	3.06	5	0.040	24.39	3.95	1.32	10.11	0.46	7.20
												Perm, Type 1	3.33	10	0.040	26.12	4.06	1.38	10.99	0.48	7.34
125+00	Concent							7.17		0.60	7.60					22.95					
125+00	124+50	R	50.00	4.00	3.00	4.00	0.0076	0.25	12.51	0.50	7.73	Seed	3.04	5	0.030	24.64	3.25	0.46	23.52	0.98	10.84
												Jute Mat	3.04	5	0.040	24.70	2.63	0.53	23.48	1.12	11.87
												Temp. Mat	3.04	5	0.040	24.70	2.63	0.53	23.48	1.12	11.87
												Temp. Mat	3.31	10	0.040	26.43	2.69	0.56	25.56	1.17	12.21
124+50	124+00	R	50.00	4.00	2.00	3.00	0.0050	0.26	12.77	0.70	7.91	Seed	3.02	5	0.030	24.98	2.97	0.36	23.88	1.16	9.81
												Seed	3.28	10	0.040	26.77	2.47	0.44	25.97	1.40	11.01
124+00	123+50	R	50.00	4.00	2.00	3.00	0.0050	0.27	13.04	0.70	8.10	Seed	3.00	5	0.030	25.26	2.99	0.37	24.29	1.17	9.87
												Seed	3.26	10	0.040	27.10	2.48	0.44	26.40	1.41	11.07
123+50	123+00	R	50.00	4.00	2.00	3.00	0.0050	0.24	13.28	0.50	8.22	Seed	2.98	5	0.030	25.54	2.99	0.37	24.49	1.18	9.89
												Seed	3.24	10	0.040	27.44	2.48	0.44	26.60	1.42	11.10
123+00	122+50	R	50.00	4.00	2.00	2.00	0.0052	0.22	13.50	0.70	8.38	Seed	2.96	5	0.030	25.80	3.16	0.40	24.80	1.22	8.88
												Seed	3.21	10	0.040	27.76	2.62	0.48	26.92	1.48	9.91



DITCH ANALYSIS

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.)
122+50	122+00	R	50.00	4.00	2.00	2.00	0.0050	0.45	13.95	0.70	8.69	Seed	2.94	5	0.030	26.07	3.14	0.39	25.57	1.25	9.01
												Seed	3.19	10	0.040	28.08	2.61	0.47	27.74	1.51	10.06
122+00	121+50	R	50.00	4.00	2.00	2.00	0.0050	0.09	14.04	0.70	8.76	Seed	2.92	5	0.030	26.33	3.14	0.39	25.60	1.25	9.01
												Seed	3.17	10	0.040	28.40	2.61	0.47	27.75	1.51	10.06
121+50	121+00	R	50.00	4.00	2.00	2.00	0.0052	0.09	14.13	0.70	8.82	Seed	2.91	5	0.030	26.60	3.19	0.40	25.62	1.24	8.96
												Jute Mat	2.90	5	0.040	26.66	2.59	0.47	25.59	1.44	9.76
												Temp. Mat	2.90	5	0.040	26.66	2.59	0.47	25.59	1.44	9.76
												Temp. Mat	3.15	10	0.040	28.71	2.64	0.49	27.76	1.50	10.00
121+00	120+50	R	50.00	4.00	2.00	2.00	0.0052	0.08	14.21	0.70	8.87	Seed	2.88	5	0.030	26.92	3.18	0.40	25.59	1.24	8.96
												Jute Mat	2.88	5	0.040	26.98	2.58	0.47	25.56	1.44	9.75
												Temp. Mat	2.88	5	0.040	26.98	2.58	0.47	25.56	1.44	9.75
												Temp. Mat	3.13	10	0.040	29.02	2.64	0.49	27.75	1.50	10.00
120+50	120+00	R	50.00	4.00	2.00	2.00	0.0072	0.04	14.25	0.70	8.90	Seed	2.87	5	0.030	27.21	3.58	0.51	25.50	1.14	8.55
												Jute Mat	2.86	5	0.040	27.26	2.91	0.59	25.47	1.32	9.28
												Temp. Mat	2.86	5	0.040	27.26	2.91	0.59	25.47	1.32	9.28
												Temp. Mat	3.11	10	0.040	29.30	2.97	0.62	27.67	1.38	9.51
120+00	119+50	R	50.00	4.00	2.00	2.00	0.0084	0.07	14.32	0.50	8.93	Seed	2.85	5	0.030	27.48	3.78	0.57	25.44	1.09	8.36
												Jute Mat	2.84	5	0.040	27.53	3.07	0.66	25.41	1.27	9.07
												Temp. Mat	2.84	5	0.040	27.53	3.07	0.66	25.41	1.27	9.07
												Temp. Mat	3.09	10	0.040	29.57	3.14	0.69	27.63	1.32	9.29



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH WIDTH (ft.)	RADIUS SLOPE (ft./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.)
													Jute Mat	2.77	5	0.040	28.72	2.82	0.62	25.81	0.97	13.77
													Temp. Mat	2.77	5	0.040	28.72	2.82	0.62	25.81	0.97	13.77
													Temp. Mat	3.02	10	0.040	30.72	2.89	0.65	28.13	1.02	14.15
117+00	116+50	R	50.00	5.00	6.00	3.00	0.0064	0.18	15.05	0.70	9.44		Seed	2.75	5	0.030	29.00	2.94	0.38	26.00	0.95	13.57
													Seed	3.00	10	0.040	31.06	2.44	0.46	28.32	1.14	15.29
116+50	116+00	R	50.00	5.00	6.00	3.00	0.0114	0.20	15.24	0.70	9.58		Seed	2.74	5	0.030	29.23	3.64	0.59	26.25	0.83	12.44
													Jute Mat	2.74	5	0.040	29.28	2.95	0.68	26.22	0.96	13.60
													Temp. Mat	2.74	5	0.040	29.28	2.95	0.68	26.22	0.96	13.60
													Temp. Mat	2.98	10	0.040	31.34	3.02	0.71	28.57	1.00	13.97
116+00	115+50	R	50.00	5.00	6.00	4.00	0.0114	0.22	15.46	0.70	9.73		Seed	2.72	5	0.030	29.51	3.58	0.58	26.50	0.82	13.16
													Jute Mat	2.72	5	0.040	29.57	2.90	0.67	26.47	0.94	14.41
													Temp. Mat	2.72	5	0.040	29.57	2.90	0.67	26.47	0.94	14.41
													Temp. Mat	2.97	10	0.040	31.62	2.97	0.70	28.86	0.98	14.82
115+50	115+00	R	50.00	5.00	6.00	4.00	0.0114	0.24	15.70	0.50	9.85		Seed	2.71	5	0.030	29.80	3.58	0.58	26.66	0.82	13.19
													Jute Mat	2.70	5	0.040	29.85	2.91	0.67	26.63	0.94	14.43
													Temp. Mat	2.70	5	0.040	29.85	2.91	0.67	26.63	0.94	14.43
													Temp. Mat	2.95	10	0.040	31.90	2.97	0.70	29.06	0.98	14.85
115+00	114+50	R	50.00	5.00	6.00	4.00	0.0114	0.25	15.94	0.50	9.97		Seed	2.69	5	0.030	30.09	3.59	0.58	26.83	0.82	13.21
													Jute Mat	2.69	5	0.040	30.14	2.91	0.67	26.80	0.95	14.46
													Temp. Mat	2.69	5	0.040	30.14	2.91	0.67	26.80	0.95	14.46



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Temp. Mat	2.93	10	0.040	32.18	2.98	0.70	29.26	0.99	14.88
114+50	114+00	R	50.00	5.00	3.00	4.00	0.0114	0.38	16.33	0.70	10.24	Seed	2.67	5	0.030	30.36	3.86	0.63	27.40	0.88	11.16
												Jute Mat	2.67	5	0.040	30.41	3.13	0.72	27.37	1.02	12.13
												Temp. Mat	2.67	5	0.040	30.41	3.13	0.72	27.37	1.02	12.13
												Temp. Mat	2.92	10	0.040	32.44	3.21	0.76	29.90	1.07	12.46
114+00	113+50	R	50.00	5.00	3.00	4.00	0.0116	0.30	16.62	0.70	10.45	Seed	2.66	5	0.030	30.62	3.90	0.64	27.79	0.88	11.17
												Jute Mat	2.66	5	0.040	30.67	3.17	0.74	27.77	1.02	12.15
												Temp. Mat	2.66	5	0.040	30.67	3.17	0.74	27.77	1.02	12.15
												Temp. Mat	2.90	10	0.040	32.69	3.25	0.77	30.35	1.07	12.48
113+50	113+00	R	50.00	5.00	3.00	4.00	0.0114	0.33	16.95	0.70	10.68	Seed	2.65	5	0.030	30.88	3.89	0.64	28.26	0.89	11.26
												Jute Mat	2.64	5	0.040	30.93	3.16	0.74	28.23	1.04	12.25
												Temp. Mat	2.64	5	0.040	30.93	3.16	0.74	28.23	1.04	12.25
												Temp. Mat	2.89	10	0.040	32.95	3.24	0.77	30.87	1.08	12.58
113+00	112+50	R	50.00	5.00	3.00	4.00	0.0352	0.33	17.28	0.70	10.91	Seed	2.64	5	0.030	31.07	5.84	1.47	28.75	0.67	9.69
												Jute Mat	2.63	5	0.040	31.11	4.76	1.71	28.73	0.78	10.46
												Temp. Mat	2.63	5	0.040	31.11	4.76	1.71	28.73	0.78	10.46
												Perm, Type 1	2.63	5	0.040	31.11	4.76	1.71	28.73	0.78	10.46
												Perm, Type 1	2.88	10	0.040	33.12	4.89	1.80	31.43	0.82	10.73
112+50	112+00	R	50.00	5.00	3.00	4.00	0.0354	0.30	17.58	0.70	11.12	Seed	2.63	5	0.030	31.25	5.88	1.49	29.20	0.67	9.72
												Jute Mat	2.62	5	0.040	31.28	4.79	1.74	29.18	0.79	10.50



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (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.)
													Temp. Mat	2.62	5	0.040	31.28	4.79	1.74	29.18	0.79	10.50
													Perm, Type 1	2.62	5	0.040	31.28	4.79	1.74	29.18	0.79	10.50
													Perm, Type 1	2.87	10	0.040	33.29	4.92	1.82	31.94	0.82	10.77
112+00	111+50	R	50.00	5.00	3.00	4.00	0.0352	0.09	17.68	0.70	11.19		Seed	2.62	5	0.030	31.42	5.87	1.49	29.27	0.68	9.74
													Jute Mat	2.61	5	0.040	31.45	4.79	1.73	29.25	0.79	10.52
													Temp. Mat	2.61	5	0.040	31.45	4.79	1.73	29.25	0.79	10.52
													Perm, Type 1	2.61	5	0.040	31.45	4.79	1.73	29.25	0.79	10.52
													Perm, Type 1	2.86	10	0.040	33.46	4.91	1.81	32.02	0.83	10.78



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Ramp J_Infield_Sta. 119+00.00 to Sta. 111+50.00

Designer : WCS

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.)
119+00	118+50	R	50.00	4.00	6.00	6.00	0.0244	0.05	0.05	0.70	0.04	Seed	3.88	5	0.030	15.94	0.86	0.06	0.14	0.04	4.45
												Seed	4.32	10	0.040	16.10	0.73	0.07	0.15	0.05	4.58
118+50	118+00	R	50.00	4.00	6.00	6.00	0.0208	0.06	0.11	0.70	0.08	Seed	3.79	5	0.030	16.71	1.07	0.08	0.30	0.06	4.77
												Seed	4.21	10	0.040	16.98	0.93	0.10	0.34	0.08	4.97
118+00	117+50	R	50.00	4.00	6.00	6.00	0.0164	0.07	0.18	0.50	0.11	Seed	3.70	5	0.030	17.43	1.12	0.09	0.42	0.08	5.00
												Seed	4.11	10	0.040	17.82	0.96	0.11	0.47	0.10	5.26
117+50	117+00	R	50.00	4.00	6.00	6.00	0.0124	0.09	0.27	0.70	0.17	Seed	3.63	5	0.030	18.14	1.19	0.09	0.63	0.11	5.35
												Seed	4.02	10	0.040	18.64	1.00	0.11	0.69	0.14	5.71
117+00	116+50	R	50.00	4.00	6.00	6.00	0.0082	0.09	0.36	0.70	0.24	Seed	3.55	5	0.030	18.87	1.13	0.08	0.84	0.15	5.82
												Seed	3.92	10	0.040	19.50	0.97	0.10	0.93	0.19	6.26
116+50	116+00	R	50.00	4.00	6.00	6.00	0.0066	0.11	0.47	0.70	0.31	Seed	3.48	5	0.030	19.59	1.14	0.08	1.09	0.19	6.24
												Seed	3.83	10	0.040	20.35	0.97	0.09	1.20	0.23	6.77
116+00	115+50	R	50.00	4.00	6.00	6.00	0.0052	0.12	0.58	0.70	0.40	Seed	3.41	5	0.030	20.32	1.13	0.07	1.35	0.22	6.67



DITCH ANALYSIS

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.)
												Seed	3.75	10	0.040	21.22	0.95	0.09	1.48	0.28	7.30
115+50	115+00	R	50.00	4.00	6.00	6.00	0.0136	0.14	0.72	0.70	0.49	Seed	3.36	5	0.030	20.82	1.67	0.16	1.65	0.19	6.30
												Seed	3.69	10	0.040	21.81	1.42	0.20	1.81	0.24	6.84
115+00	114+50	R	50.00	4.00	6.00	6.00	0.0106	0.18	0.90	0.70	0.62	Seed	3.31	5	0.030	21.32	1.64	0.15	2.04	0.23	6.77
												Seed	3.64	10	0.040	22.41	1.39	0.19	2.24	0.28	7.40
114+50	114+00	R	50.00	4.00	6.00	6.00	0.0196	0.25	1.15	0.70	0.79	Seed	3.28	5	0.030	21.70	2.19	0.27	2.59	0.22	6.67
												Seed	3.60	10	0.040	22.86	1.84	0.34	2.84	0.27	7.29
114+00	113+50	R	50.00	4.00	3.00	6.00	0.0260	0.10	1.24	0.70	0.86	Seed	3.25	5	0.030	22.03	2.56	0.36	2.79	0.22	5.97
												Seed	3.56	10	0.040	23.25	2.16	0.44	3.06	0.27	6.44
113+50	113+00	R	50.00	4.00	3.00	6.00	0.0238	0.09	1.33	0.70	0.92	Seed	3.22	5	0.030	22.36	2.53	0.34	2.97	0.23	6.09
												Seed	3.53	10	0.040	23.63	2.14	0.43	3.25	0.29	6.59
113+00	112+50	R	50.00	4.00	3.00	6.00	0.0098	0.28	1.61	0.70	1.12	Seed	3.19	5	0.030	22.78	1.97	0.20	3.56	0.33	6.96
												Seed	3.49	10	0.040	24.13	1.66	0.25	3.89	0.40	7.63
112+50	112+00	R	50.00	4.00	3.00	6.00	0.0060	0.12	1.74	0.70	1.20	Seed	3.15	5	0.030	23.26	1.70	0.15	3.79	0.39	7.49
												Seed	3.44	10	0.040	24.72	1.42	0.18	4.13	0.47	8.27
112+00	111+50	R	50.00	4.00	3.00	6.00	0.0112	0.11	1.85	0.70	1.28	Seed	3.12	5	0.030	23.65	2.15	0.24	3.99	0.34	7.03
												Seed	3.40	10	0.040	25.18	1.80	0.29	4.35	0.41	7.72



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : SR-204_Left_Sta. 42+50.00 to Sta. 37+70.00

Designer : WCS

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.)
42+50	42+00	L	50.00	2.00	4.00	4.00	0.0156	0.39	0.39	0.50	0.20	Seed	3.94	5	0.030	15.51	1.64	0.17	0.77	0.17	3.40
												Seed	4.39	10	0.040	15.59	1.38	0.21	0.86	0.22	3.74
42+00	41+50	L	50.00	2.00	4.00	4.00	0.0094	0.21	0.60	0.50	0.30	Seed	3.87	5	0.030	16.04	1.55	0.15	1.16	0.25	4.00
												Seed	4.31	10	0.040	16.23	1.31	0.18	1.29	0.31	4.45
41+50	41+00	L	50.00	2.00	3.00	3.00	0.0131	0.31	0.91	0.50	0.46	Seed	3.82	5	0.030	16.44	2.06	0.24	1.74	0.29	3.76
												Seed	4.25	10	0.040	16.71	1.73	0.30	1.93	0.36	4.18
41+00	40+50	L	50.00	2.00	3.00	3.00	0.0180	0.29	1.20	0.70	0.66	Seed	3.78	5	0.030	16.77	2.56	0.36	2.48	0.32	3.95
												Seed	4.20	10	0.040	17.09	2.15	0.45	2.75	0.40	4.40
40+50	40+00	L	50.00	2.00	3.00	3.00	0.0133	0.23	1.42	0.50	0.77	Seed	3.74	5	0.030	17.11	2.40	0.32	2.88	0.38	4.29
												Seed	4.15	10	0.040	17.51	2.01	0.39	3.19	0.47	4.80
40+00	39+50	L	50.00	2.00	3.00	3.00	0.0106	0.44	1.86	0.70	1.07	Seed	3.70	5	0.030	17.46	2.42	0.32	3.98	0.48	4.87
												Seed	4.10	10	0.040	17.92	2.02	0.38	4.40	0.58	5.49
39+50	39+00	L	50.00	2.00	3.00	3.00	0.0118	0.32	2.18	0.50	1.23	Seed	3.67	5	0.030	17.78	2.60	0.37	4.52	0.50	4.98



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE	LENGTH (ft.)	RADIUS (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.)
												Seed	4.06	10	0.040	18.30	2.18	0.44	5.00	0.60	5.62
39+00	38+50	L	50.00	2.00	3.00	3.00	0.0140	0.22	2.39	0.50	1.34	Seed	3.63	5	0.030	18.07	2.83	0.43	4.87	0.49	4.96
												Jute Mat	3.63	5	0.040	18.14	2.29	0.50	4.86	0.57	5.42
												Temp. Mat	3.63	5	0.040	18.14	2.29	0.50	4.86	0.57	5.42
												Temp. Mat	4.02	10	0.040	18.65	2.36	0.52	5.38	0.60	5.60
38+50	37+70	R	80.00	2.00	3.00	3.00	0.0146	0.27	2.66	0.50	1.47	Seed	3.58	5	0.030	18.59	2.94	0.46	5.27	0.51	5.05
												Jute Mat	3.57	5	0.040	18.69	2.38	0.54	5.25	0.59	5.52
												Temp. Mat	3.57	5	0.040	18.69	2.38	0.54	5.25	0.59	5.52
												Temp. Mat	3.96	10	0.040	19.20	2.45	0.56	5.83	0.62	5.71



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description :SR-204_Left_Sta. 43+50.00 to Sta. 45+57.00

Designer : WCS

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.)
43+50	44+00	L	50.00	2.00	3.00	2.00	0.0146	0.18	0.18	0.70	0.13	Seed	3.93	5	0.030	15.57	1.48	0.13	0.50	0.14	2.71
												Seed	4.38	10	0.040	15.66	1.25	0.16	0.55	0.18	2.90
44+00	Concent							4.57		0.76	3.60					60.27					
44+00	44+50	L	50.00	2.00	3.00	2.00	0.0118	0.09	4.84	0.70	3.66	Seed	1.66	5	0.030	60.56	2.91	0.44	6.08	0.60	4.99
												Jute Mat	1.66	5	0.040	60.62	2.36	0.51	6.08	0.69	5.45
												Temp. Mat	1.66	5	0.040	60.62	2.36	0.51	6.08	0.69	5.45
												Temp. Mat	1.91	10	0.040	60.61	2.46	0.54	6.99	0.74	5.70
44+50	45+00	L	50.00	2.00	3.00	2.00	0.0346	0.23	5.07	0.60	3.80	Seed	1.66	5	0.030	60.81	4.34	0.99	6.29	0.46	4.30
												Jute Mat	1.66	5	0.040	60.86	3.53	1.15	6.29	0.53	4.67
												Temp. Mat	1.66	5	0.040	60.86	3.53	1.15	6.29	0.53	4.67
												Perm, Type 1	1.66	5	0.040	60.86	3.53	1.15	6.29	0.53	4.67
												Perm, Type 1	1.90	10	0.040	60.84	3.67	1.24	7.23	0.57	4.87
45+00	45+57	L	57.00	2.00	3.00	2.00	0.0612	0.23	5.30	0.70	3.96	Seed	1.65	5	0.030	61.03	5.38	1.54	6.54	0.40	4.02



DITCH ANALYSIS

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.)
											Jute Mat	1.65	5	0.040	61.07	4.38	1.80	6.54	0.47	4.35
											Temp. Mat	1.65	5	0.040	61.07	4.38	1.80	6.54	0.47	4.35
											Perm, Type 1	1.65	5	0.040	61.07	4.38	1.80	6.54	0.47	4.35
											Perm, Type 1	1.90	10	0.040	61.04	4.56	1.93	7.52	0.51	4.53



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : SR-204_Left_Sta. 46+00.00 to Sta. 48+00.00

Designer : WCS

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.)
46+00	Concent							5.30		0.70	3.71					70.00					
46+00	46+50	L	50.00	2.00	3.00	2.00	0.0380	0.30	5.60	0.70	3.92	Seed	1.49	5	0.030	70.19	4.39	1.02	5.84	0.43	4.16
												Jute Mat	1.49	5	0.040	70.23	3.57	1.19	5.83	0.50	4.51
												Temp. Mat	1.49	5	0.040	70.23	3.57	1.19	5.83	0.50	4.51
												Perm, Type 1	1.49	5	0.040	70.23	3.57	1.19	5.83	0.50	4.51
												Perm, Type 1	1.71	10	0.040	70.22	3.72	1.28	6.71	0.54	4.70
46+50	47+00	L	50.00	2.00	3.00	2.00	0.0352	0.07	5.67	0.70	3.97	Seed	1.48	5	0.030	70.43	4.29	0.97	5.89	0.44	4.21
												Jute Mat	1.48	5	0.040	70.47	3.48	1.13	5.89	0.51	4.57
												Temp. Mat	1.48	5	0.040	70.47	3.48	1.13	5.89	0.51	4.57
												Perm, Type 1	1.48	5	0.040	70.47	3.48	1.13	5.89	0.51	4.57
												Perm, Type 1	1.71	10	0.040	70.45	3.63	1.21	6.78	0.55	4.76
47+00	47+50	L	50.00	2.00	3.00	2.00	0.0118	0.04	5.71	0.70	3.99	Seed	1.48	5	0.030	70.76	2.89	0.43	5.91	0.59	4.94
												Jute Mat	1.48	5	0.040	70.83	2.35	0.50	5.90	0.68	5.40



DITCH ANALYSIS

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.)	
											Temp. Mat	1.48	5	0.040	70.83	2.35	0.50	5.90	0.68	5.40	
											Temp. Mat	1.70	10	0.040	70.80	2.44	0.54	6.79	0.73	5.65	
47+50	48+00	L	50.00	2.00	3.00	2.00	0.0288	0.02	5.73	0.70	4.01	Seed	1.48	5	0.030	71.03	3.99	0.84	5.91	0.47	4.34
											Jute Mat	1.47	5	0.040	71.08	3.25	0.97	5.91	0.54	4.71	
											Temp. Mat	1.47	5	0.040	71.08	3.25	0.97	5.91	0.54	4.71	
											Temp. Mat	1.70	10	0.040	71.04	3.38	1.05	6.80	0.58	4.91	



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : SR-204_Right_Sta. 39+40.00 to Sta. 36+50.00 **Designer :** WCS

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.)
39+40	Concent							0.24		0.70	0.17					15.00					
39+32	39+00	R	32.00	2.00	4.00	4.00	0.0097	0.04	0.28	0.70	0.19	Seed	3.95	5	0.030	15.38	1.39	0.12	0.76	0.20	3.57
												Seed	4.41	10	0.040	15.46	1.17	0.15	0.85	0.24	3.96
39+00	38+50	R	50.00	2.00	4.00	4.00	0.0108	0.07	0.34	0.70	0.24	Seed	3.88	5	0.030	15.92	1.52	0.14	0.94	0.21	3.72
												Seed	4.33	10	0.040	16.10	1.30	0.18	1.04	0.26	4.11
38+50	38+00	R	50.00	2.00	4.00	4.00	0.0110	0.08	0.42	0.70	0.29	Seed	3.82	5	0.030	16.43	1.63	0.16	1.12	0.23	3.88
												Seed	4.25	10	0.040	16.70	1.36	0.20	1.25	0.29	4.32
38+00	37+50	R	50.00	2.00	4.00	4.00	0.0110	0.06	0.48	0.70	0.33	Seed	3.76	5	0.030	16.92	1.67	0.17	1.25	0.25	4.00
												Seed	4.17	10	0.040	17.29	1.41	0.21	1.39	0.31	4.45
37+50	37+00	R	50.00	2.00	4.00	4.00	0.0296	0.04	0.52	0.70	0.36	Seed	3.72	5	0.030	17.26	2.43	0.37	1.35	0.20	3.59
												Seed	4.13	10	0.040	17.70	2.05	0.45	1.49	0.24	3.96
37+00	36+50	R	50.00	2.00	4.00	4.00	0.0230	0.03	0.55	0.70	0.38	Seed	3.68	5	0.030	17.63	2.26	0.31	1.41	0.22	3.74
												Seed	4.07	10	0.040	18.14	1.89	0.39	1.56	0.27	4.15



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description :SR-204_Right_Sta. 41+50.00 to Sta. 39+67.00

Designer : WCS

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+50	41+00	R	50.00	2.00	3.00	3.00	0.0050	0.05	0.05	0.70	0.03	Seed	3.84	5	0.030	16.26	0.68	0.03	0.13	0.09	2.52
												Seed	4.27	10	0.040	16.51	0.56	0.04	0.15	0.11	2.68
41+00	40+50	L	50.00	2.00	4.00	4.00	0.0050	0.08	0.13	0.70	0.09	Seed	3.73	5	0.030	17.24	0.86	0.05	0.34	0.15	3.20
												Seed	4.13	10	0.040	17.63	0.72	0.06	0.37	0.19	3.50
40+50	40+00	L	50.00	2.00	3.00	3.00	0.0100	0.07	0.20	0.70	0.14	Seed	3.65	5	0.030	17.89	1.28	0.10	0.50	0.16	2.95
												Seed	4.05	10	0.040	18.39	1.08	0.12	0.56	0.20	3.19
40+00	39+67	L	33.00	2.00	3.00	3.00	0.0215	0.04	0.23	0.70	0.16	Seed	3.62	5	0.030	18.21	1.75	0.19	0.59	0.14	2.84
												Seed	4.00	10	0.040	18.76	1.49	0.23	0.66	0.17	3.05



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description :SR-204_Right_Sta. 43+00.00 to 47+50.00

Designer : WCS

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 (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.)
43+40	44+00	R	60.00	2.00	3.00	3.00	0.0108	0.32	0.32	0.70	0.22	Seed	3.92	5	0.030	15.63	1.58	0.14	0.88	0.21	3.27
												Seed	4.37	10	0.040	15.75	1.32	0.18	0.98	0.27	3.60
44+00	44+50	R	50.00	2.00	4.00	4.00	0.0170	0.16	0.48	0.70	0.34	Seed	3.87	5	0.030	16.05	1.99	0.24	1.30	0.23	3.80
												Seed	4.31	10	0.040	16.25	1.67	0.30	1.45	0.28	4.23
44+50	45+00	L	50.00	2.00	3.00	2.00	0.0212	0.15	0.64	0.70	0.44	Seed	3.83	5	0.030	16.39	2.48	0.34	1.70	0.26	3.30
												Seed	4.25	10	0.040	16.64	2.09	0.43	1.89	0.32	3.61
45+00	45+50	L	50.00	4.00	3.00	3.00	0.0286	0.15	0.79	0.70	0.55	Seed	3.79	5	0.030	16.72	2.49	0.33	2.09	0.18	5.10
												Seed	4.21	10	0.040	17.03	2.14	0.41	2.32	0.23	5.39
45+50	46+00	R	50.00	2.00	3.00	3.00	0.0334	0.15	0.93	0.70	0.65	Seed	3.76	5	0.030	16.98	3.18	0.57	2.46	0.27	3.64
												Jute Mat	3.75	5	0.040	17.04	2.59	0.67	2.45	0.32	3.92
												Temp. Mat	3.75	5	0.040	17.04	2.59	0.67	2.45	0.32	3.92
												Temp. Mat	4.17	10	0.040	17.34	2.67	0.71	2.73	0.34	4.03
46+00	46+50	R	50.00	2.00	3.00	2.00	0.0290	0.13	1.06	0.70	0.74	Seed	3.72	5	0.030	17.30	3.21	0.56	2.76	0.31	3.55



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (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.)
													Jute Mat	3.71	5	0.040	17.36	2.61	0.66	2.75	0.36	3.81
													Temp. Mat	3.71	5	0.040	17.36	2.61	0.66	2.75	0.36	3.81
													Temp. Mat	4.13	10	0.040	17.65	2.70	0.69	3.07	0.38	3.92
46+50	47+00	R	50.00	2.00	3.00	2.00	0.0249	0.09	1.15	0.70	0.81	Seed	3.68	5	0.030	17.63	3.11	0.52	2.96	0.34	3.68	
													Jute Mat	3.68	5	0.040	17.69	2.53	0.61	2.96	0.39	3.96
													Temp. Mat	3.68	5	0.040	17.69	2.53	0.61	2.96	0.39	3.96
													Temp. Mat	4.09	10	0.040	17.97	2.61	0.65	3.30	0.41	4.07
47+00	47+50	R	50.00	2.00	3.00	3.00	0.0395	0.08	1.23	0.70	0.86	Seed	3.65	5	0.030	17.92	3.62	0.74	3.14	0.30	3.80	
													Jute Mat	3.64	5	0.040	17.97	2.95	0.86	3.14	0.35	4.09
													Temp. Mat	3.64	5	0.040	17.97	2.95	0.86	3.14	0.35	4.09
													Temp. Mat	4.06	10	0.040	18.24	3.05	0.91	3.50	0.37	4.22



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road_Left_Sta. 47+50.00 to Sta. 45+50.00

Designer : WCS

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.)
47+50	47+00	L	50.00	2.50	2.00	2.00	0.0074	0.07	0.07	0.70	0.05	Seed	3.87	5	0.030	16.03	0.79	0.04	0.19	0.09	2.87
												Seed	4.32	10	0.040	16.15	0.70	0.05	0.21	0.11	2.95
47+00	46+50	L	50.00	2.50	2.00	2.00	0.0094	0.07	0.14	0.70	0.10	Seed	3.78	5	0.030	16.77	1.10	0.07	0.37	0.12	2.99
												Seed	4.21	10	0.040	17.01	0.95	0.09	0.42	0.16	3.12
46+50	46+00	L	50.00	2.50	2.00	2.00	0.0092	0.08	0.22	0.70	0.15	Seed	3.71	5	0.030	17.42	1.27	0.09	0.57	0.16	3.13
												Seed	4.12	10	0.040	17.76	1.10	0.11	0.63	0.20	3.29
46+00	45+50	L	50.00	2.50	2.00	2.00	0.0130	0.08	0.30	0.70	0.21	Seed	3.65	5	0.030	17.95	1.58	0.14	0.76	0.17	3.18
												Seed	4.05	10	0.040	18.37	1.36	0.17	0.84	0.21	3.35



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road_Left_Sta. 49+50.00 to Sta. 47+50.00

Designer : WCS

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.)
49+50	49+00	L	50.00	3.00	3.00	3.00	0.1124*	0.12	0.12	0.70	0.09	Seed	3.95	5	0.030	15.38	2.16	0.35	0.34	0.05	3.30
												Seed	4.41	10	0.040	15.44	1.92	0.43	0.38	0.06	3.37
49+00	48+50	L	50.00	3.00	2.00	3.00	0.1312*	0.03	0.15	0.70	0.11	Seed	3.91	5	0.030	15.71	2.47	0.44	0.42	0.05	3.27
												Jute Mat	3.90	5	0.040	15.78	2.04	0.53	0.42	0.06	3.32
												Temp. Mat	3.90	5	0.040	15.78	2.04	0.53	0.42	0.06	3.32
												Temp. Mat	4.36	10	0.040	15.82	2.18	0.55	0.46	0.07	3.34
48+50	Concent							2.52		0.90	2.37					12.73					
48+50	48+00	L	50.00	3.00	2.00	2.00	0.1560*	0.05	2.72	0.70	2.41	Seed	3.89	5	0.030	15.89	8.04	3.12	9.37	0.32	4.28
												Jute Mat	3.89	5	0.040	15.91	6.61	3.67	9.37	0.38	4.51
												Temp. Mat	3.89	5	0.040	15.91	6.61	3.67	9.37	0.38	4.51
												Perm, Type 1	3.89	5	0.040	15.91	6.61	3.67	9.37	0.38	4.51
												Perm, Type 2	3.89	5	0.040	15.91	6.61	3.67	9.37	0.38	4.51
												Perm, Type 3	3.89	5	0.040	15.91	6.61	3.67	9.37	0.38	4.51



DITCH ANALYSIS

STATION BEGIN	STATION END	SIDE L	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.)
												Perm, Type 3	4.35	10	0.040	15.95	6.84	3.91	10.47	0.40	4.61
48+00	47+50	L	50.00	3.00	2.00	2.00	0.1068*	0.10	2.82	0.70	2.48	Seed	3.87	5	0.030	16.03	7.12	2.41	9.60	0.36	4.45
												Jute Mat	3.87	5	0.040	16.05	5.85	2.84	9.59	0.43	4.70
												Temp. Mat	3.87	5	0.040	16.05	5.85	2.84	9.59	0.43	4.70
												Perm, Type 1	3.87	5	0.040	16.05	5.85	2.84	9.59	0.43	4.70
												Perm, Type 2	3.87	5	0.040	16.05	5.85	2.84	9.59	0.43	4.70
												Perm, Type 2	4.33	10	0.040	16.08	6.06	3.02	10.73	0.45	4.81



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road_Right_Sta. 31+50.00 to Sta. 36+00.00

Designer : WCS

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 (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+50	32+00	R	50.00	2.00	4.00	4.00	0.0170	0.08	0.08	0.70	0.05	Seed	3.91	5	0.030	15.75	1.13	0.09	0.21	0.08	2.64
												Seed	4.36	10	0.040	15.85	0.96	0.11	0.23	0.10	2.82
32+00	32+50	R	50.00	2.00	2.00	4.00	0.0174	0.29	0.37	0.70	0.26	Seed	3.85	5	0.030	16.19	1.91	0.22	0.99	0.20	3.19
												Seed	4.29	10	0.040	16.36	1.62	0.27	1.10	0.25	3.48
32+50	33+00	R	50.00	2.00	4.00	4.00	0.0108	0.42	0.78	0.70	0.55	Seed	3.80	5	0.030	16.62	1.93	0.22	2.08	0.33	4.61
												Seed	4.23	10	0.040	16.87	1.62	0.27	2.32	0.40	5.19
33+00	33+50	R	50.00	2.00	4.00	4.00	0.0126	0.47	1.25	0.70	0.88	Seed	3.76	5	0.030	16.97	2.32	0.31	3.29	0.40	5.17
												Seed	4.17	10	0.040	17.30	1.94	0.38	3.65	0.48	5.85
33+50	34+00	R	50.00	2.00	4.00	4.00	0.0030	0.31	1.56	0.70	1.09	Seed	3.69	5	0.030	17.55	1.45	0.12	4.03	0.62	6.96
												Seed	4.09	10	0.040	17.99	1.20	0.14	4.47	0.75	7.96
34+00	34+50	R	50.00	2.00	4.00	4.00	0.0078	0.53	2.09	0.70	1.46	Seed	3.65	5	0.030	17.92	2.22	0.28	5.35	0.57	6.52
												Seed	4.04	10	0.040	18.44	1.85	0.33	5.92	0.68	7.44
34+50	35+00	R	50.00	2.00	4.00	4.00	0.0064	2.76	4.85	0.70	3.40	Seed	3.61	5	0.030	18.25	2.56	0.35	12.28	0.87	8.98



DITCH ANALYSIS

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.)
												Seed	4.00	10	0.040	18.83	2.13	0.41	13.57	1.04	10.30
35+00	35+50	R	50.00	2.00	4.00	4.00	0.0052	0.29	5.14	0.70	3.60	Seed	3.58	5	0.030	18.59	2.40	0.30	12.87	0.93	9.47
												Seed	3.95	10	0.040	19.25	1.99	0.36	14.20	1.11	10.87
35+50	36+00	R	50.00	16.00	2.00	2.00	0.0058	0.17	5.31	0.70	3.72	Seed	3.53	5	0.030	19.01	1.96	0.14	13.14	0.40	17.59
												Seed	3.90	10	0.040	19.74	1.70	0.18	14.49	0.50	18.00



DITCH ANALYSIS

PID : 96808 **Date :** 04/09/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road Ditch - Sta. 39+50.00 to 37+50.00 (RT)

Designer : WCS

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.)
39+50	Concent							0.36		0.70	0.25					10.00					
39+50	39+00	R	50.00	2.00	2.00	2.00	0.0124	0.20	0.56	0.70	0.39	Seed	3.95	5	0.030	15.40	2.05	0.23	1.55	0.29	3.17
												Seed	4.41	10	0.040	15.48	1.74	0.28	1.73	0.37	3.46
39+00	38+50	R	50.00	2.00	2.00	2.00	0.0134	0.21	0.77	0.70	0.54	Seed	3.90	5	0.030	15.76	2.33	0.28	2.11	0.34	3.35
												Seed	4.35	10	0.040	15.90	1.96	0.35	2.35	0.42	3.69
38+50	38+00	R	50.00	2.00	4.00	2.00	0.0140	0.18	0.95	0.70	0.66	Seed	3.86	5	0.030	16.11	2.36	0.31	2.56	0.35	4.13
												Seed	4.30	10	0.040	16.32	1.98	0.38	2.85	0.44	4.61
38+00	37+50	R	50.00	2.00	2.00	2.00	0.0142	0.20	1.15	0.70	0.80	Seed	3.82	5	0.030	16.43	2.66	0.36	3.07	0.41	3.64
												Seed	4.25	10	0.040	16.69	2.23	0.45	3.41	0.51	4.03



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road_Right_Sta. 52+50.00 to Sta. 46+50.00

Designer : WCS

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.)
52+50	52+00	R	50.00	2.00	4.00	3.00	0.0330	0.33	0.33	0.70	0.23	Seed	3.96	5	0.030	15.37	2.27	0.32	0.91	0.16	3.10
												Seed	4.41	10	0.040	15.43	1.93	0.40	1.02	0.20	3.37
52+00	51+50	R	50.00	2.00	4.00	2.00	0.0130	0.21	0.54	0.70	0.38	Seed	3.90	5	0.030	15.79	1.94	0.22	1.46	0.27	3.61
												Seed	4.35	10	0.040	15.93	1.64	0.27	1.63	0.33	3.99
51+50	51+00	R	50.00	2.00	4.00	2.00	0.0120	0.16	0.69	0.70	0.48	Seed	3.85	5	0.030	16.20	2.04	0.23	1.86	0.31	3.87
												Seed	4.28	10	0.040	16.42	1.71	0.29	2.07	0.38	4.30
51+00	50+50	R	50.00	2.00	4.00	2.00	0.0034	0.06	0.76	0.70	0.53	Seed	3.77	5	0.030	16.82	1.32	0.10	1.99	0.45	4.71
												Seed	4.19	10	0.040	17.17	1.11	0.12	2.21	0.55	5.29
50+50	50+00	R	50.00	2.00	4.00	2.00	0.0186	0.03	0.78	0.70	0.55	Seed	3.73	5	0.030	17.16	2.44	0.34	2.04	0.29	3.75
												Seed	4.14	10	0.040	17.57	2.06	0.42	2.27	0.36	4.15
50+00	49+50	R	50.00	2.00	3.00	2.00	0.0078	0.03	0.82	0.70	0.57	Seed	3.68	5	0.030	17.61	1.87	0.19	2.10	0.38	3.91
												Seed	4.08	10	0.040	18.11	1.56	0.23	2.33	0.47	4.35
49+50	49+00	R	50.00	3.00	2.00	2.00	0.1576*	0.05	0.87	0.70	0.61	Seed	3.67	5	0.030	17.78	4.92	1.35	2.22	0.14	3.55



DITCH ANALYSIS

STATION BEGIN	STATION END		SIDE (ft.)	LENGTH (ft.)	RADIUS (ft./ft.)	IN SLOPE	BACK SLOPE	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.)
													Jute Mat	3.66	5	0.040	17.81	4.09	1.60	2.22	0.16	3.65
													Temp. Mat	3.66	5	0.040	17.81	4.09	1.60	2.22	0.16	3.65
													Perm, Type 1	3.66	5	0.040	17.81	4.09	1.60	2.22	0.16	3.65
													Perm, Type 1	4.06	10	0.040	18.30	4.24	1.70	2.46	0.17	3.69
49+00	48+50	R	50.00	3.00	2.00	2.00	0.1284*	0.07	0.94	0.70	0.66	Seed	3.64	5	0.030	17.99	4.73	1.23	2.39	0.15	3.61	
													Jute Mat	3.64	5	0.040	18.02	3.92	1.45	2.39	0.18	3.73
													Temp. Mat	3.64	5	0.040	18.02	3.92	1.45	2.39	0.18	3.73
													Perm, Type 1	3.64	5	0.040	18.02	3.92	1.45	2.39	0.18	3.73
													Perm, Type 1	4.03	10	0.040	18.51	4.06	1.54	2.65	0.19	3.77
48+50	48+00	R	50.00	3.00	2.00	2.00	0.1560*	0.10	1.04	0.70	0.72	Seed	3.62	5	0.030	18.18	5.21	1.48	2.62	0.15	3.61	
													Jute Mat	3.62	5	0.040	18.22	4.32	1.76	2.62	0.18	3.72
													Temp. Mat	3.62	5	0.040	18.22	4.32	1.76	2.62	0.18	3.72
													Perm, Type 1	3.62	5	0.040	18.22	4.32	1.76	2.62	0.18	3.72
													Perm, Type 1	4.01	10	0.040	18.69	4.47	1.87	2.91	0.19	3.77
48+00	47+50	R	50.00	3.00	2.00	2.00	0.1300*	0.11	1.14	0.70	0.80	Seed	3.60	5	0.030	18.38	5.08	1.38	2.88	0.17	3.68	
													Jute Mat	3.60	5	0.040	18.42	4.20	1.63	2.88	0.20	3.81
													Temp. Mat	3.60	5	0.040	18.42	4.20	1.63	2.88	0.20	3.81
													Perm, Type 1	3.60	5	0.040	18.42	4.20	1.63	2.88	0.20	3.81
													Perm, Type 1	3.99	10	0.040	18.88	4.35	1.74	3.19	0.21	3.86
47+50	47+00	R	50.00	3.00	2.00	2.00	0.0064	0.12	1.27	0.70	0.89	Seed	3.55	5	0.030	18.85	1.91	0.17	3.15	0.43	4.71	



DITCH ANALYSIS

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.)
												Seed	3.93	10	0.040	19.40	1.61	0.21	3.49	0.53	5.13
47+00	46+50	R	50.00	3.00	2.00	2.00	0.0014	0.15	1.41	0.70	0.99	Seed	3.48	5	0.030	19.57	1.15	0.06	3.44	0.68	5.73
												Seed	3.84	10	0.040	20.25	0.97	0.07	3.80	0.84	6.35



DITCH ANALYSIS

PID : 96808 Date : 04/09/2024 Project : FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Taylor Road_Right_Sta. 54+30.00 to Sta. 53+00.00

Designer : WCS

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.)
54+30	54+00	R	30.00	2.00	4.00	4.00	0.0693	0.35	0.35	0.70	0.24	Seed	3.98	5	0.030	15.17	2.94	0.56	0.97	0.13	3.04
												Jute Mat	3.98	5	0.040	15.21	2.42	0.66	0.97	0.15	3.22
												Temp. Mat	3.98	5	0.040	15.21	2.42	0.66	0.97	0.15	3.22
												Temp. Mat	4.45	10	0.040	15.20	2.51	0.70	1.08	0.16	3.30
54+00	53+50	R	50.00	2.00	2.00	4.00	0.0242	0.59	0.94	0.70	0.66	Seed	3.94	5	0.030	15.49	2.87	0.47	2.59	0.31	3.85
												Jute Mat	3.93	5	0.040	15.56	2.34	0.54	2.59	0.36	4.16
												Temp. Mat	3.93	5	0.040	15.56	2.34	0.54	2.59	0.36	4.16
												Temp. Mat	4.40	10	0.040	15.54	2.42	0.58	2.90	0.38	4.29
53+50	53+00	R	50.00	2.00	4.00	4.00	0.0240	0.49	1.43	0.70	1.00	Seed	3.90	5	0.030	15.83	3.06	0.55	3.89	0.37	4.93
												Jute Mat	3.89	5	0.040	15.89	2.49	0.63	3.88	0.42	5.38
												Temp. Mat	3.89	5	0.040	15.89	2.49	0.63	3.88	0.42	5.38
												Temp. Mat	4.36	10	0.040	15.87	2.57	0.67	4.35	0.45	5.58



DITCH ANALYSIS

PID : 96808 **Date :** 05/07/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5
Description : Georgian Road_Right_Sta. 103+00.00 to Sta. 102+47.00 **Designer :** CEF

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.)
103+00	Concent							6.35		0.40	2.54					85.54					
103+00	102+75	R	25.00	2.00	2.00	2.00	0.0072	0.09	6.44	0.43	2.58	Seed	1.28	5	0.030	85.74	2.13	0.23	3.30	0.51	4.05
												Seed	1.47	10	0.040	85.77	1.80	0.29	3.80	0.64	4.57
102+75	102+47	R	28.00	2.00	2.00	2.00	0.0054	0.07	6.51	0.40	2.61	Seed	1.28	5	0.030	85.98	1.92	0.19	3.32	0.56	4.22
												Seed	1.47	10	0.040	86.06	1.62	0.23	3.83	0.70	4.78

V. Inlet Spacing Calculations

The project is in rainfall area C. Per ODOT L&D Vol. 2 Sec. 1103.2, the storm frequency for IR 70 is 10-year and for Taylor Road is 5-year. The sag locations for IR 70 were checked with the 50-year. The total maximum spread for IR 70 was limited to the paved shoulder which varies throughout the project and a maximum of 6" depth. Taylor Road has an ADT greater than 6,000 with 11' lanes so the allowable spread is either 7' or 9' depending on the number of through lanes. The maximum allowable depth for Taylor Road is 5". The proposed storm sewer system has single-grated catch basins (type 3A), double-grated basins (type 3), manholes (type 3), single slope barrier inlets (I-3), ditch catch basins (type 2-2B, 3, 4, 6), and half-height headwalls.



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 1 - Eastbound I-70 concrete barrier (N) from sta. 80+00 to sta. 43+00

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 10

Total Allow. Spread (ft.) : 10.00

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.)
80+00	Begin																	
72+50	I-3C	750.00	0.90	0.62	10.00	6.78	16.78	0.0060	0.0400	0.0160	10.00	0.1667	4.24	2.13	0.23	2.36	0.277	6.93
65+00	I-3B	750.00	0.90	0.62	10.00	4.62	14.62	0.0150	0.0400	0.0160	10.00	0.1667	4.53	2.08	0.68	2.76	0.248	6.19
57+50	I-3B	750.00	0.90	0.62	10.00	3.98	13.98	0.0200	0.0400	0.0160	10.00	0.1667	4.62	2.20	1.06	3.26	0.250	6.24
48+00	I-3C	950.00	0.90	0.79	10.00	4.71	14.71	0.0200	0.0400	0.0160	10.00	0.1667	4.52	2.59	1.69	4.27	0.276	6.91
46+15	I-3C	185.00	0.90	0.15	10.00	1.33	11.33	0.0110	0.0400	0.0160	10.00	0.1667	5.06	1.97	0.40	2.37	0.248	6.20
45+00	CB-3A	115.00	0.90	0.10	10.00	2.64	12.64	0.0010	0.0400	0.0160	10.00	0.0000	4.84	*****	*****	0.83	0.263	6.56 End
45+00	CB-3A	122.00	0.90	0.13	10.00	4.42	14.42	0.0004	0.0400	0.0160	10.00	0.0000	4.56	*****	*****	0.53	0.264	6.59 Sag
43+78	I-3C	78.00	0.90	0.06	10.00	1.11	11.11	0.0070	0.0400	0.0160	10.00	0.1667	5.11	0.31	0.00	0.31	0.125	3.13
43+00	Begin																	



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 2 - Eastbound I-70 concrete barrier (S) from sta. 80+00 to sta. 43+00 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.):** 10 **Total Allow. Spread (ft.):** 10.00 **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.)
80+00	Begin																	
72+50	I-3C	750.00	0.90	0.11	10.00	10.73	20.73	0.0060	0.0400	0.0160	4.00	0.1667	3.80	0.38	0.00	0.38	0.139	3.48
65+00	I-3B	750.00	0.90	0.11	10.00	7.44	17.44	0.0150	0.0400	0.0160	4.00	0.1667	4.16	0.41	0.00	0.41	0.121	3.03
57+50	I-3B	750.00	0.90	0.11	10.00	6.64	16.64	0.0200	0.0400	0.0160	6.00	0.1667	4.26	0.42	0.00	0.42	0.116	2.90
48+00	I-3C	950.00	0.90	0.26	10.00	6.66	16.66	0.0210	0.0400	0.0160	10.00	0.1667	4.25	1.00	0.00	1.00	0.159	3.96
46+15	I-3C	185.00	0.90	0.12	10.00	1.87	11.87	0.0120	0.0400	0.0160	10.00	0.1667	4.97	0.54	0.00	0.54	0.140	3.49
45+00	CB-3A	115.00	0.90	0.07	10.00	3.48	13.48	0.0010	0.0400	0.0160	10.00	0.1667	4.70	*****	*****	0.27	0.173	4.33 Sag
45+00	CB-3A	122.00	0.90	0.07	10.00	1.67	11.67	0.0080	0.0400	0.0160	10.00	0.1667	5.00	*****	*****	0.29	0.120	3.00 End
43+78	I-3B	78.00	0.90	0.08	10.00	0.73	10.73	0.0180	0.0400	0.0160	10.00	0.1667	5.18	0.39	0.00	0.39	0.114	2.86
43+00	Begin																	

SUMP DATA

Total Flow (cfs) : 0.57

Ponded Depth (ft.) : 0.058

Spread on Pavement (ft.) : 1.94



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 3 - Eastbound I-70 concrete barrier (N) from sta. 80+00 to sta. 102+50 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
80+00	Begin																	
86+00	I-3B	600.00	0.90	0.50	10.00	8.76	18.76	0.0020	0.0400	0.0160	10.00	0.1667	4.00	*****	*****	1.80	0.308	7.69 Sag
86+00	I-3B	550.00	0.90	0.45	10.00	4.54	14.54	0.0090	0.0400	0.0160	10.00	0.1667	4.54	*****	*****	1.84	0.234	5.85 End
91+50	I-3C	550.00	0.90	0.45	10.00	3.34	13.34	0.0200	0.0400	0.0160	10.00	0.1667	4.72	1.58	0.33	1.91	0.204	5.11
97+00	I-3C	550.00	0.90	0.45	10.00	3.20	13.20	0.0200	0.0400	0.0160	10.00	0.1667	4.74	1.75	0.50	2.25	0.217	5.43
102+50	Begin																	

SUMP DATA

Total Flow (cfs) : 3.64

Ponded Depth (ft.) : 0.215

Spread on Pavement (ft.) : 5.08



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 4 - Eastbound I-70 concrete barrier (S) from sta. 80+00 to sta. 102+50 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 4.00 **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.)
80+00	Begin																	
86+00	I-3B	600.00	0.90	0.08	10.00	14.55	24.55	0.0020	0.0400	0.0160	4.00	0.1667	3.45	*****	*****	0.24	0.144	3.59 Sag
86+00	I-3B	550.00	0.90	0.08	10.00	6.68	16.68	0.0110	0.0400	0.0160	4.00	0.1667	4.25	*****	*****	0.29	0.113	2.82 End
91+50	I-3C	550.00	0.90	0.08	10.00	5.39	15.39	0.0190	0.0400	0.0160	4.00	0.1667	4.42	0.30	0.00	0.30	0.103	2.58
97+00	I-3C	550.00	0.90	0.08	10.00	5.39	15.39	0.0190	0.0400	0.0160	4.00	0.1667	4.42	0.30	0.00	0.30	0.103	2.58
102+50	Begin																	

SUMP DATA

Total Flow (cfs) : 0.53

Ponded Depth (ft.) : 0.000

Spread on Pavement (ft.) : 0.00



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 5 - Westbound I-70 concrete barrier (S) from sta. 80+00 to sta. 108+00 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
80+00	Begin																	
83+00	I-3C	300.00	0.90	0.24	10.00	5.12	15.12	0.0020	0.0400	0.0160	10.00	0.1667	4.46	0.96	0.00	0.96	0.243	6.08
86+00	I-3C	300.00	0.90	0.24	10.00	5.12	15.12	0.0020	0.0400	0.0160	10.00	0.1667	4.46	*****	*****	0.96	0.243	6.08 Sag
86+00	I-3C	550.00	0.90	0.45	10.00	4.54	14.54	0.0090	0.0400	0.0160	10.00	0.1667	4.54	*****	*****	1.84	0.234	5.85 End
91+50	I-3B	550.00	0.90	0.45	10.00	3.34	13.34	0.0200	0.0400	0.0160	10.00	0.1667	4.72	1.58	0.33	1.91	0.204	5.11
97+00	I-3B	550.00	0.90	0.45	10.00	3.20	13.20	0.0200	0.0400	0.0160	10.00	0.1667	4.74	1.75	0.50	2.25	0.217	5.43
102+50	I-3C	550.00	0.90	0.45	10.00	3.14	13.14	0.0200	0.0400	0.0160	10.00	0.1667	4.75	1.83	0.59	2.43	0.224	5.59
108+00	Begin																	

SUMP DATA

Total Flow (cfs) : 2.80

Ponded Depth (ft.) : 0.202

Spread on Pavement (ft.) : 3.56



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 6 - Westbound I-70 concrete barrier (N) from sta. 80+00 sta. 107+25 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.):** 10 **Total Allow. Spread (ft.):** 4.00 **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.)
80+00	Begin																	
83+00	I-3C	300.00	0.90	0.04	10.00	8.31	18.31	0.0020	0.0400	0.0160	4.00	0.1667	4.05	0.14	0.00	0.14	0.118	2.94
86+00	I-3C	300.00	0.90	0.04	10.00	5.39	15.39	0.0060	0.0400	0.0160	4.00	16666.00	4.42	*****	*****	0.15	0.099	2.47 Sag
86+00	I-3C	550.00	0.90	0.07	10.00	7.42	17.42	0.0090	0.0400	0.0160	4.00	0.1667	4.16	*****	*****	0.26	0.112	2.80 End
91+50	I-3C	550.00	0.90	0.07	10.00	5.42	15.42	0.0200	0.0400	0.0160	4.00	0.1667	4.42	0.27	0.00	0.27	0.099	2.47
97+00	I-3C	550.00	0.90	0.07	10.00	5.22	15.22	0.0220	0.0400	0.0160	4.00	0.1667	4.44	0.28	0.00	0.28	0.097	2.43
102+50	I-3C	475.00	0.90	0.06	10.00	3.60	13.60	0.0450	0.0400	0.0160	4.00	0.1667	4.68	0.23	0.00	0.23	0.080	1.99
107+25	Begin																	

SUMP DATA

Total Flow (cfs) : 0.41

Ponded Depth (ft.) : 0.056

Spread on Pavement (ft.) : 0.69



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 7 - Westbound I-70 concrete barrier (S) from sta. 80+00 to sta. 72+75 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
80+00	Begin																	
72+75	I-3C	725.00	0.90	0.59	10.00	7.12	17.12	0.0050	0.0400	0.0160	10.00	0.1667	4.20	2.08	0.14	2.23	0.281	7.02



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 8 - Westbound I-70 concrete barrier (N) from sta. 80+00 to sta. 72+75 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 4.00 **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.)
80+00	Begin																	
72+75	I-3C	725.00	0.90	0.09	10.00	10.85	20.85	0.0060	0.0400	0.0160	4.00	0.1667	3.78	0.31	0.00	0.31	0.130	3.25



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 9 -Westbound I-70 and Ramp H concrete barrier from sta. 108+50 to sta. 92+60

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 10

Total Allow. Spread (ft.) : 10.00

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.)
108+50	Begin																	
102+50	I-3D	600.00	0.90	0.48	10.00	2.60	12.60	0.0460	0.0400	0.0160	10.00	0.1667	4.84	1.47	0.62	2.09	0.181	4.52
97+00	I-3D	550.00	0.90	0.44	10.00	3.06	13.06	0.0210	0.0400	0.0160	10.00	0.1667	4.77	1.86	0.65	2.51	0.224	5.61
92+60	I-3D	440.00	0.90	0.36	10.00	2.57	12.57	0.0200	0.0400	0.0160	10.00	0.1667	4.85	1.74	0.49	2.22	0.216	5.41



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 10 - Ramp C concrete median from sta. 68+36.50 to sta. 62+00.00

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 10

Total Allow. Spread (ft.) : 3.00

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.)
68+37	Begin																	
67+00	I-2-8	136.50	0.90	0.06	10.00	1.22	11.22	0.0310	0.0313	0.0313	3.00	0.1666	5.09	0.27	0.00	0.27	0.082	2.64
65+50	I-2-8	150.00	0.90	0.06	10.00	1.25	11.25	0.0350	0.0313	0.0313	3.00	0.1667	5.08	0.29	0.00	0.29	0.083	2.66
64+00	I-2-8	150.00	0.90	0.06	10.00	1.17	11.17	0.0420	0.0313	0.0313	3.00	0.1667	5.09	0.29	0.00	0.29	0.080	2.57
62+00	I-2-8	200.00	0.90	0.07	10.00	1.53	11.53	0.0430	0.0313	0.0313	3.00	0.1667	5.03	0.31	0.00	0.31	0.081	2.60



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 1 - Eastbound I-70 concrete barrier (N) from sta. 80+00 to sta. 43+00 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 50 **Total Allow. Spread (ft.) :** 10.00 **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.)
80+00	Begin																	
72+50	I-3C	750.00	0.90	0.62	10.00	6.40	16.40	0.0060	0.0400	0.0160	10.00	0.1667	5.31	2.49	0.47	2.96	0.302	7.55
65+00	I-3B	750.00	0.90	0.62	10.00	4.32	14.32	0.0150	0.0400	0.0160	10.00	0.1667	5.64	2.46	1.16	3.62	0.274	6.85
57+50	I-3B	750.00	0.90	0.62	10.00	3.70	13.70	0.0200	0.0400	0.0160	10.00	0.1667	5.75	2.62	1.75	4.37	0.279	6.97
48+00	I-3C	950.00	0.90	0.79	10.00	4.37	14.37	0.0200	0.0400	0.0160	10.00	0.1667	5.63	3.08	2.67	5.76	0.309	7.72
46+15	I-3C	185.00	0.90	0.15	10.00	1.21	11.21	0.0110	0.0400	0.0160	10.00	0.1667	6.23	2.54	0.97	3.51	0.287	7.18
45+00	CB-3A	115.00	0.90	0.10	10.00	2.27	12.27	0.0010	0.0400	0.0160	10.00	0.0000	6.01	*****	*****	1.51	0.328	8.20 End
45+00	CB-3A	122.00	0.90	0.13	10.00	4.18	14.18	0.0004	0.0400	0.0160	10.00	0.0000	5.67	*****	*****	0.66	0.286	7.15 Sag
43+78	I-3C	78.00	0.90	0.06	10.00	1.04	11.04	0.0070	0.0400	0.0160	10.00	0.1667	6.27	0.40	0.00	0.40	0.138	3.45
43+00	Begin																	



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 2 - Eastbound I-70 concrete barrier (S) from sta. 80+00 to sta. 43+00 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.):** 50 **Total Allow. Spread (ft.):** 10.00 **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.)
80+00	Begin																	
72+50	I-3C	750.00	0.90	0.11	10.00	10.11	20.11	0.0060	0.0400	0.0160	4.00	0.1667	4.82	0.48	0.00	0.48	0.152	3.80
65+00	I-3B	750.00	0.90	0.11	10.00	7.03	17.03	0.0150	0.0400	0.0160	4.00	0.1667	5.22	0.52	0.00	0.52	0.132	3.30
57+50	I-3B	750.00	0.90	0.11	10.00	6.27	16.27	0.0200	0.0400	0.0160	6.00	0.1667	5.33	0.53	0.00	0.53	0.126	3.15
48+00	I-3C	950.00	0.90	0.26	10.00	6.30	16.30	0.0210	0.0400	0.0160	10.00	0.1667	5.33	1.19	0.06	1.25	0.172	4.31
46+15	I-3C	185.00	0.90	0.12	10.00	1.74	11.74	0.0120	0.0400	0.0160	10.00	0.1667	6.12	0.72	0.00	0.72	0.156	3.89
45+00	CB-3A	115.00	0.90	0.07	10.00	3.30	13.30	0.0010	0.0400	0.0160	10.00	0.1667	5.82	*****	*****	0.34	0.188	4.69 Sag
45+00	CB-3A	122.00	0.90	0.07	10.00	1.58	11.58	0.0080	0.0400	0.0160	10.00	0.1667	6.15	*****	*****	0.36	0.130	3.24 End
43+78	I-3B	78.00	0.90	0.08	10.00	0.70	10.70	0.0180	0.0400	0.0160	10.00	0.1667	6.34	0.47	0.00	0.47	0.123	3.09
43+00	Begin																	

SUMP DATA

Total Flow (cfs) : 0.70

Ponded Depth (ft.) : 0.075

Spread on Pavement (ft.) : 2.10



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 3 - Eastbound I-70 concrete barrier (N) from sta. 80+00 to sta. 102+50 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 50 **Total Allow. Spread (ft.) :** 10.00 **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.)	
80+00	Begin																		
86+00	I-3B	600.00	0.90	0.50	10.00	8.27	18.27	0.0020	0.0400	0.0160	10.00	0.1667	5.05	*****	*****	2.27	0.336	8.39	Sag
86+00	I-3B	550.00	0.90	0.45	10.00	4.30	14.30	0.0090	0.0400	0.0160	10.00	0.1667	5.65	*****	*****	2.29	0.254	6.35	End
91+50	I-3C	550.00	0.90	0.45	10.00	3.16	13.16	0.0200	0.0400	0.0160	10.00	0.1667	5.85	1.81	0.56	2.37	0.221	5.54	
97+00	I-3C	550.00	0.90	0.45	10.00	3.00	13.00	0.0200	0.0400	0.0160	10.00	0.1667	5.88	2.06	0.88	2.94	0.240	6.01	
102+50	Begin																		

SUMP DATA

Total Flow (cfs) : 4.56

Ponded Depth (ft.) : 0.262

Spread on Pavement (ft.) : 5.64



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 4 - Eastbound I-70 concrete barrier (S) from sta. 80+00 to sta. 102+50 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 50 **Total Allow. Spread (ft.) :** 4.00 **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.)
80+00	Begin																	
86+00	I-3B	600.00	0.90	0.08	10.00	13.68	23.68	0.0020	0.0400	0.0160	4.00	0.1667	4.43	*****	*****	0.30	0.158	3.94 Sag
86+00	I-3B	550.00	0.90	0.08	10.00	6.32	16.32	0.0110	0.0400	0.0160	4.00	0.1667	5.33	*****	*****	0.36	0.123	3.07 End
91+50	I-3C	550.00	0.90	0.08	10.00	5.10	15.10	0.0190	0.0400	0.0160	4.00	0.1667	5.51	0.38	0.00	0.38	0.112	2.81
97+00	I-3C	550.00	0.90	0.08	10.00	5.10	15.10	0.0190	0.0400	0.0160	4.00	0.1667	5.51	0.38	0.00	0.38	0.112	2.81
102+50	Begin																	

SUMP DATA

Total Flow (cfs) : 0.67

Ponded Depth (ft.) : 0.012

Spread on Pavement (ft.) : 2.64



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 5 - Westbound I-70 concrete barrier (S) from sta. 80+00 to sta. 108+00 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 50 **Total Allow. Spread (ft.) :** 10.00 **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.)
80+00	Begin																	
83+00	I-3C	300.00	0.90	0.24	10.00	4.85	14.85	0.0020	0.0400	0.0160	10.00	0.1667	5.56	1.20	0.00	1.20	0.264	6.61
86+00	I-3C	300.00	0.90	0.24	10.00	4.85	14.85	0.0020	0.0400	0.0160	10.00	0.1667	5.56	*****	*****	1.20	0.264	6.61 Sag
86+00	I-3C	550.00	0.90	0.45	10.00	4.30	14.30	0.0090	0.0400	0.0160	10.00	0.1667	5.65	*****	*****	2.29	0.254	6.35 End
91+50	I-3B	550.00	0.90	0.45	10.00	3.16	13.16	0.0200	0.0400	0.0160	10.00	0.1667	5.85	1.81	0.56	2.37	0.221	5.54
97+00	I-3B	550.00	0.90	0.45	10.00	3.00	13.00	0.0200	0.0400	0.0160	10.00	0.1667	5.88	2.06	0.88	2.94	0.240	6.01
102+50	I-3C	550.00	0.90	0.45	10.00	2.92	12.92	0.0200	0.0400	0.0160	10.00	0.1667	5.89	2.20	1.07	3.26	0.250	6.24
108+00	Begin																	

SUMP DATA

Total Flow (cfs) : 3.49

Ponded Depth (ft.) : 0.234

Spread on Pavement (ft.) : 4.12



INLET SPACING DESIGN

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 6 - Westbound I-70 concrete barrier (N) from sta. 80+00 sta. 107+25 **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 50 **Total Allow. Spread (ft.) :** 4.00 **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.)
80+00	Begin																	
83+00	I-3C	300.00	0.90	0.04	10.00	7.85	17.85	0.0020	0.0400	0.0160	4.00	0.1667	5.11	0.17	0.00	0.17	0.128	3.21
86+00	I-3C	300.00	0.90	0.04	10.00	5.10	15.10	0.0060	0.0400	0.0160	4.00	16666.00	5.51	*****	*****	0.19	0.107	2.69 Sag
86+00	I-3C	550.00	0.90	0.07	10.00	7.01	17.01	0.0090	0.0400	0.0160	4.00	0.1667	5.22	*****	*****	0.32	0.122	3.05 End
91+50	I-3C	550.00	0.90	0.07	10.00	5.13	15.13	0.0200	0.0400	0.0160	4.00	0.1667	5.51	0.34	0.00	0.34	0.107	2.68
97+00	I-3C	550.00	0.90	0.07	10.00	4.94	14.94	0.0220	0.0400	0.0160	4.00	0.1667	5.54	0.34	0.00	0.34	0.105	2.64
102+50	I-3C	475.00	0.90	0.06	10.00	3.41	13.41	0.0450	0.0400	0.0160	4.00	0.1667	5.80	0.29	0.00	0.29	0.086	2.15
107+25	Begin																	

SUMP DATA

Total Flow (cfs) : 0.51

Ponded Depth (ft.) : 0.065

Spread on Pavement (ft.) : 0.80



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 11 - Taylor Road (left) Sta. 41+50 to Sta. 42+50 (Ramp H) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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+50	Begin																	
42+50	CB-3A	100.00	0.90	0.10	10.00	1.51	11.51	0.0090	0.0160	0.0160	2.00	0.1667	4.54	0.34	0.07	0.41	0.094	5.90



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 12 - Taylor Road (left) Sta. 43+00 (Ramp H) to Sta. 50+75 (Taylor SW)

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 7.00

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.)
43+00	Begin																	
44+50	CB-3A	150.00	0.90	0.16	10.00	1.37	11.37	0.0250	0.0160	0.0160	2.00	0.1667	4.56	0.48	0.18	0.66	0.093	5.82
46+50	CB-3A	200.00	0.90	0.16	10.00	1.57	11.57	0.0320	0.0160	0.0160	2.00	0.1667	4.53	0.57	0.26	0.83	0.097	6.06
48+50	CB-3A	200.00	0.90	0.11	10.00	1.89	11.89	0.0220	0.0160	0.0160	2.00	0.1667	4.47	0.50	0.20	0.71	0.098	6.12
49+50	CB-3	100.00	0.90	0.04	10.00	1.94	11.94	0.0050	0.0160	0.0160	2.00	0.1667	4.46	*****	*****	0.36	0.101	6.31 Sag
49+50	CB-3	125.00	0.90	0.11	10.00	1.94	11.94	0.0080	0.0160	0.0160	2.00	0.1667	4.46	*****	*****	0.44	0.099	6.21 End
50+75	Begin																	

SUMP DATA

Total Flow (cfs) : 0.81

Ponded Depth (ft.) : 0.070

Spread on Pavement (ft.) : 2.06



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 13 - Taylor Road (left) Sta. 56+20 (school) to Sta. 52+00 (Taylor SW)

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 7.00

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.)
56+20	Begin																	
55+10	CB-3A	110.00	0.90	0.11	10.00	1.51	11.51	0.0110	0.0160	0.0160	2.00	0.1667	4.54	0.37	0.08	0.45	0.094	5.89
53+50	CB-3A	160.00	0.90	0.14	10.00	1.60	11.60	0.0200	0.0160	0.0160	2.00	0.1667	4.52	0.47	0.18	0.65	0.097	6.05
52+00	CB-3A	150.00	0.90	0.16	10.00	1.36	11.36	0.0220	0.0160	0.0160	2.00	0.1667	4.56	0.56	0.27	0.84	0.104	6.52



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 14 - Taylor Road (left) Sta. 60+50 (end project) to Sta. 56+90 (school)

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 7.00

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.)
60+50	Begin																	
58+00	CB-3A	250.00	0.90	0.21	10.00	3.29	13.29	0.0070	0.0400	0.0160	2.00	0.1667	4.25	0.64	0.16	0.80	0.165	7.31
56+90	CB-3A	110.00	0.90	0.08	10.00	1.67	11.67	0.0080	0.0160	0.0160	2.00	0.1667	4.51	0.39	0.10	0.48	0.103	6.43



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 15 - Taylor Road (right) Sta. 41+50 to Sta. 42+92 (Ramp I) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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+50	Begin																	
42+92	CB-3A	142.00	0.90	0.24	10.00	1.90	11.90	0.0070	0.0160	0.0160	2.00	0.1667	4.47	0.61	0.36	0.97	0.137	8.54



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 16 - Taylor Road (right) Sta. 43+70 (Ramp I) to Sta. 60+50 (end project) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 7.00 **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.)
43+70	Begin																	
44+50	CB-3A	80.00	0.90	0.12	10.00	0.74	10.74	0.0290	0.0160	0.0160	2.00	0.1667	4.68	0.41	0.11	0.52	0.083	5.18
45+50	CB-3A	100.00	0.90	0.12	10.00	0.86	10.86	0.0310	0.0160	0.0160	2.00	0.1667	4.66	0.47	0.16	0.62	0.088	5.48
46+50	CB-3A	100.00	0.90	0.12	10.00	0.84	10.84	0.0320	0.0160	0.0160	2.00	0.1667	4.66	0.48	0.17	0.64	0.088	5.52
47+50	CB-3A	100.00	0.90	0.11	10.00	0.89	10.89	0.0280	0.0160	0.0160	2.00	0.1667	4.65	0.46	0.16	0.62	0.089	5.56
48+50	CB-3	100.00	0.90	0.10	10.00	1.09	11.09	0.0170	0.0160	0.0160	2.00	0.1667	4.61	0.55	0.03	0.58	0.095	5.97
49+50	CB-3	100.00	0.90	0.10	10.00	1.85	11.85	0.0050	0.0160	0.0160	2.00	0.1667	4.48	*****	*****	0.44	0.108	6.78 Sag
49+50	CB-3	100.00	0.90	0.10	10.00	1.66	11.66	0.0070	0.0160	0.0160	2.00	0.1667	4.51	*****	*****	0.41	0.099	6.17 End
50+50	CB-3A	150.00	0.90	0.13	10.00	1.59	11.59	0.0200	0.0160	0.0160	2.00	0.1667	4.52	0.41	0.11	0.52	0.089	5.55
52+00	CB-3A	150.00	0.90	0.13	10.00	1.46	11.46	0.0220	0.0160	0.0160	2.00	0.1667	4.55	0.47	0.17	0.63	0.094	5.87
53+50	CB-3	160.00	0.90	0.13	10.00	1.58	11.58	0.0200	0.0160	0.0160	2.00	0.1667	4.53	0.61	0.07	0.68	0.099	6.16
55+10	CB-3A	180.00	0.90	0.13	10.00	2.50	12.50	0.0090	0.0160	0.0160	2.00	0.1667	4.37	0.43	0.14	0.57	0.107	6.68
56+90	CB-3A	110.00	0.90	0.08	10.00	1.70	11.70	0.0080	0.0160	0.0160	2.00	0.1667	4.51	0.37	0.08	0.45	0.100	6.27
58+00	CB-3A	250.00	0.90	0.17	10.00	2.77	12.77	0.0070	0.0833	0.0160	2.00	0.1667	4.33	0.75	0.00	0.75	0.222	5.46
60+50	Begin																	



INLET SPACING DESIGN

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF (ft.)	CONC. AREA (acres)	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.)
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SUMP DATA

Total Flow (cfs) : 0.85

Ponded Depth (ft.) : 0.074

Spread on Pavement (ft.) : 2.09



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 17 - Taylor Road (left) Sta. 41+50 to Sta. 37+00 (Ramp G) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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+50	Begin																	
37+00	CB-3A	450.00	0.90	0.39	10.00	3.06	13.06	0.0320	0.0160	0.0160	2.00	0.1667	4.28	0.84	0.66	1.50	0.121	7.58



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 18 - Taylor Road (left) Sta. 35+50 (Ramp G) to Sta. 17+00 (SR204)

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 9.00

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.)
35+50	Begin																	
33+00	CB-3	250.00	0.90	0.21	10.00	2.12	12.12	0.0260	0.0160	0.0160	2.00	0.1667	4.43	0.70	0.14	0.84	0.101	6.33
30+00	CB-3A	300.00	0.90	0.21	10.00	4.64	14.64	0.0050	0.0160	0.0160	2.00	0.1667	4.05	0.58	0.32	0.90	0.142	8.87
28+50	CB-3A	150.00	0.90	0.11	10.00	2.43	12.43	0.0050	0.0160	0.0160	2.00	0.1667	4.38	0.52	0.24	0.76	0.133	8.29
26+00	CB-3A	250.00	0.90	0.17	10.00	3.64	13.64	0.0060	0.0160	0.0160	2.00	0.1667	4.20	0.57	0.31	0.88	0.136	8.48
23+00	CB-3A	300.00	0.90	0.21	10.00	3.28	13.28	0.0110	0.0160	0.0160	2.00	0.1667	4.25	0.67	0.44	1.11	0.132	8.27
20+00	CB-3A	300.00	0.80	0.33	10.00	2.54	12.54	0.0170	0.0160	0.0160	2.00	0.1667	4.36	0.85	0.75	1.60	0.140	8.73
17+00	CB-3A	300.00	0.80	0.32	10.00	2.15	12.15	0.0240	0.0160	0.0160	2.00	0.1667	4.43	0.96	0.92	1.88	0.139	8.70



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 19 - Taylor Road (right) Sta. 41+50 to Sta. 37+00 (Ramp J) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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+50	Begin																	
37+00	CB-3A	450.00	0.90	0.61	10.00	2.72	12.72	0.0320	0.0160	0.0160	2.00	0.1667	4.34	1.14	1.24	2.38	0.144	9.00



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 20 - Taylor Road (right) Sta. 36+00 (Ramp J) to Sta. 26+00 (Haaf) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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.)
36+00	Begin																	
34+50	CB-3A	150.00	0.85	0.22	10.00	1.12	11.12	0.0360	0.0160	0.0160	2.00	0.1667	4.61	0.58	0.28	0.86	0.096	6.02
33+00	CB-3	150.00	0.85	0.21	10.00	1.32	11.32	0.0200	0.0160	0.0160	2.00	0.1667	4.57	0.84	0.25	1.09	0.118	7.35
31+50	CB-3	150.00	0.85	0.20	10.00	2.11	12.11	0.0060	0.0160	0.0160	2.00	0.1667	4.44	0.83	0.18	1.01	0.143	8.93
30+00	CB-3	150.00	0.80	0.19	10.00	2.36	12.36	0.0050	0.0160	0.0160	2.00	0.1667	4.39	0.74	0.10	0.85	0.139	8.66
28+50	CB-3A	150.00	0.77	0.19	10.00	2.65	12.65	0.0040	0.0160	0.0160	2.00	0.1667	4.35	0.51	0.23	0.74	0.137	8.59
27+00	CB-3A	150.00	0.77	0.20	10.00	2.32	12.32	0.0050	0.0160	0.0160	2.00	0.1667	4.40	0.58	0.32	0.90	0.142	8.87
26+00	CB-3A	100.00	0.77	0.13	10.00	1.42	11.42	0.0070	0.0160	0.0160	2.00	0.1667	4.55	0.53	0.25	0.78	0.126	7.87



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 21 - Taylor Road (right) Sta. 24+50 (Haaf) to Sta. 17+00 (SR204) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 9.00 **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.)
24+50	Begin																	
23+00	CB-3A	150.00	0.80	0.21	10.00	1.75	11.75	0.0120	0.0160	0.0160	2.00	0.1667	4.50	0.52	0.24	0.76	0.113	7.04
20+00	CB-3A	300.00	0.80	0.41	10.00	2.57	12.57	0.0160	0.0160	0.0160	2.00	0.1667	4.36	0.87	0.79	1.67	0.144	8.97
17+00	CB-3	300.00	0.51	1.05	60.27	2.25	62.52	0.0230	0.0160	0.0160	2.00	0.1667	1.62	1.10	0.56	1.66	0.134	8.37



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 22 - Taylor SW (right) Sta. 15+15 to Sta. 11+71 (end project) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 5 **Total Allow. Spread (ft.) :** 7.00 **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.)
15+15	Begin																	
14+00	CB-3A	115.00	0.70	0.22	10.00	1.41	11.41	0.0110	0.0160	0.0160	2.00	0.1667	4.56	0.49	0.21	0.70	0.111	6.96
13+00	CB-3A	100.00	0.70	0.15	10.00	1.16	11.16	0.0130	0.0160	0.0160	2.00	0.1667	4.60	0.49	0.20	0.69	0.107	6.71
11+71	CB-3A	129.00	0.70	0.20	10.00	1.28	11.28	0.0170	0.0160	0.0160	2.00	0.1667	4.58	0.56	0.28	0.84	0.110	6.87



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 23 - Taylor SW (left) Sta. 15+15 (Taylor) to Sta. 11+71 (end project)

Designer : CEF

Rainfall Area: C

Storm Frequency (yr.) : 5

Total Allow. Spread (ft.) : 7.00

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.)
15+15	Begin																	
13+00	CB-3A	215.00	0.85	0.18	10.00	2.21	12.21	0.0180	0.0160	0.0160	2.00	0.1667	4.42	0.49	0.19	0.68	0.100	6.26
11+71	CB-3A	129.00	0.85	0.10	10.00	1.38	11.38	0.0180	0.0160	0.0160	2.00	0.1667	4.56	0.44	0.14	0.58	0.094	5.90



INLET SPACING DESIGN

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 24 - Palmer Road (right) Sta. 24+85 to Sta. 22+75 (Georgian) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 2 **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.)
24+85	Begin																	
22+75	CB-3	210.00	0.40	1.33	10.00	0.89	10.89	0.0478	0.0833	0.0160	2.00	0.0000	3.93	1.85	0.24	2.09	0.226	5.74

VI. Storm Sewer Calculations

The just-full capacity frequency used was 10 years and the hydraulic grade frequency used was 25 years. The required minimum pipe diameter is 15" for IR 70 and 12" for Taylor Road. Pipe inverts were set based on a minimum cover of 2' for manholes and catch basins. For single-slope barrier inlets, the pipe inverts were controlled by a preferred cover of 5.33' with a required minimum cover of 4'. The storm sewers along IR 70 are concrete barrier inlets along both collector roads and catch basins to drain the water out of the median. The Taylor Road system north of IR 70 will connect to the existing storm system at sta. 58+00 and outlet to a tributary of Blacklick Creek. Taylor Road SW proposed storm sewer system will tie into the existing system at an existing manhole. The Taylor Road system south of IR 70 will outlet to a ditch that drains to a tributary of Blacklick Creek.

The proposed storm sewer system outlets the water as close as possible to the existing conditions with minor exceptions for the detention basin. The majority of the water in the system drains to Blacklick Creek through three well-defined tributaries. One storm system run will drain to an existing detention pond outside of the project limits located south of IR 70 at sta. 13+50.



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 1 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		To		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D1	D2	4+30		1.77	1.33	26.00	3.34	3.81	4.4	5.1	15	116.4	0.0065	838.64	4.20	4.87	0.0082	839.91	842.18	2.27	2.29	CB 4
	begin	4+30		1.77	1.33									837.88				838.96	838.51			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 2 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	INTENSITY (25 yrs.)	(cfs.) (10 yrs.)	(cfs.) (25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D3	D4	13+50	1.54	1.16	32.44	2.92	3.35	3.4	3.9	15	110.8	0.0050	852.54	3.61	4.24	0.0048	853.54	856.04	2.50	2.25	CB 4
	begin	13+50	1.54	1.16									851.99				853.01	852.62			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 3 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		To		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D5	D6	34+35		3.52	2.64	37.78	2.65	3.06	7.0	8.1	15	127.2	0.0150	844.09	6.37	7.38	0.0208	846.01	849.47	3.46	4.13	CB 4
	begin	34+35		3.52	2.64									842.18				843.36	842.93			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 4 - Median Ditch and Gore Ramp E

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D7	D8	42+00	2.25	1.69	22.42	3.64	4.16	6.1	7.0	18	78.1	0.0100	831.25	5.53	9.79	0.0059	832.24	834.75	2.51	2.00	CB 4
	begin	42+00	2.25	1.69									830.47				831.73	837.73			0.015
D8	D9	42+00	0.26	0.23	22.66	3.62	4.14	6.9	8.0	18	87.9	0.0500	830.47	10.43	21.90	0.0076	831.12	837.73	6.61	5.76	CB 6
	final	42+00	2.51	1.92									826.08				827.37	826.83			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/23/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 5 - Eastbound I-70 and ramp E gore

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MINUS	MANNING'S
		To		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D12	D13	42+97	0.17	0.15	10.00	5.32	5.96	0.8	0.9	15	79.7	0.0430	831.89	5.46	12.49	0.0003	832.13	836.00	3.87	2.86		CB 6
	begin	43+78	0.17	0.15									828.46				829.27	834.63				0.015
D13	D14	43+78	0.45	0.41	10.24	5.27	5.92	2.9	3.3	15	78.5	0.0415	828.46	7.80	12.27	0.0035	828.92	834.63	5.71	4.92		13C
	final	43+78	0.62	0.56									825.20				826.19	825.83				0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 6 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D15	D16	44+15	44+77	0.57	0.43	19.14	3.96	4.51	1.7	1.9	15	55.5	0.0100	819.48	3.99	6.02	0.0012	819.99	832.88	12.89	12.15	CB 4
	begin			0.57	0.43									818.93				819.83	819.56			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 7 - Median ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D17	D18	45+87	0.46	0.35	18.92	3.99	4.55	1.4	1.6	15	50.6	0.0750	826.82	7.72	16.50	0.0008	827.09	833.03	5.94	4.96	CB 4
	begin	45+30	0.46	0.35									823.02				823.90	823.65			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 8 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D19	D20	48+00	2.96	2.22	28.72	3.15	3.63	7.0	8.1	15	78.3	0.0300	831.46	8.61	10.43	0.0206	832.33	834.71	2.38	2.00	CB 4
	begin	48+00	2.96	2.22									829.11				830.29	835.96			0.015
D20	HW20	48+00	1.04	0.94	28.87	3.14	3.61	9.9	11.4	18	88.1	0.0250	828.86	8.77	15.48	0.0157	829.87	835.96	6.09	5.60	1 3C
	final	48+00	4.00	3.16									826.66				828.05	828.41			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 9 - Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D21	D22	46+15	0.20	0.18	10.00	5.32	5.94	1.0	1.1	15	75.2	0.0150	827.17	3.94	7.38	0.0004	827.50	833.75	6.25	5.33	13C
	begin	46+15	0.20	0.18									826.04				826.87	827.67			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 10 - Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D23	D24	57+50	0.73	0.66	10.00	5.32	5.95	3.5	3.9	15	137.9	0.0500	849.52	8.73	13.47	0.0049	850.00	856.10	6.10	5.33	13B
	begin	57+50	0.73	0.66									842.62				843.65	843.26			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/24/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 11 - Median ditch and Eastbound I-70 concrete carrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D25	D26	65+00	0.55	0.41	18.81	4.00	4.55	1.6	1.9	15	71.3	0.0150	865.75	4.60	7.38	0.0011	866.20	869.00	2.80	2.00	CB 4
	begin	65+00	0.55	0.41									864.68				865.58	871.37			0.015
D26	D27	65+00	0.72	0.65	19.07	3.97	4.51	4.2	4.8	15	80.0	0.0100	864.68	5.01	6.02	0.0073	865.57	871.37	5.80	5.44	13B
	final	65+00	1.27	1.06									863.88				864.95	864.51			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 12 - Median ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D28	D29	67+50	2.41	1.81	35.05	2.78	3.19	5.0	5.8	18	170.5	0.0050	869.72	4.02	6.91	0.0040	870.83	873.47	2.64	2.25	CB 4
	begin	67+50	2.41	1.81									868.87				870.08	869.62			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 13 - Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	INTENSITY (25 yrs.)	(cfs.) (10 yrs.)	(cfs.) (25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D30	D31	72+50	0.72	0.65	10.00	5.32	5.95	3.4	3.9	15	62.5	0.0050	876.14	3.62	4.24	0.0047	877.15	882.72	5.57	5.33	13C
	begin	72+50	0.72	0.65									875.83				876.85	876.46			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 14 - Westbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D32	D33	72+75		0.68	0.61	10.00	5.32	5.92	3.3	3.6	15	90.5	0.0050	876.48	3.60	4.25	0.0042	877.42	883.06	5.64	5.33	13C
	begin	72+75		0.68	0.61									876.03				877.04	876.66			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 15 - Westbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D34	D35	83+00	0.28	0.25	10.00	5.32	5.61	1.3	1.4	15	300.0	0.0050	879.72	2.92	4.26	0.0006	880.24	886.60	6.36	5.63	1 3C
	begin	86+00	0.28	0.25									878.22				879.47	885.47			0.015
D35	D36	86+00	0.57	0.51	11.71	5.00	5.61	3.8	4.3	15	54.5	0.0050	878.22	3.66	4.24	0.0059	879.47	885.47	6.00	6.00	1 3C
	final	86+00	0.85	0.77									877.95				878.99	878.58			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 16 - Median ditch and Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D37	D38	86+00	3.28	2.46	37.99	2.64	3.06	6.5	7.5	15	76.6	0.0250	879.39	7.87	9.52	0.0180	880.27	882.64	2.37	2.00	CB 4
	begin	86+00	3.28	2.46									877.48				878.65	885.60			0.015
D38	D39	86+00	1.06	0.95	38.15	2.63	3.05	9.0	10.4	15	73.3	0.0500	877.48	11.10	13.47	0.0346	878.35	885.60	7.25	6.87	13B
	final	86+00	4.34	3.41									873.81				875.04	874.44			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 17 - Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	INTENSITY (25 yrs.)	(cfs.) (10 yrs.)	(cfs.) (25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D40	D41	91+50	0.53	0.48	10.00	5.32	5.98	2.5	2.9	15	74.5	0.0500	882.80	8.01	13.47	0.0026	883.21	890.55	7.34	6.50	13C
	begin	91+43	0.53	0.48									879.08				880.04	879.70			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 18 - Westbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D42	D43	91+50		0.52	0.47	10.00	5.32	5.98	2.5	2.8	15	68.7	0.0450	881.96	7.66	12.77	0.0025	882.37	890.65	8.28	7.44	13B
	begin	91+50		0.52	0.47									878.87				879.83	879.50			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 20 - Eastbound I-70 concrete barrier

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D44	D45	97+00	0.53	0.48	10.00	5.32	5.94	2.5	2.8	15	67.2	0.0050	894.98	3.42	4.26	0.0026	895.78	901.56	5.78	5.33	13C
	begin	97+00	0.53	0.48									894.64				895.61	895.27			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 21 - Median Ditch and Westbound I-70 concrete barrier and MSE wall outlet **Designer :** CEF

Rainfall Area: C **Just Full Capacity Frequency (yrs.) :** 10 **Hydraulic Gradient Frequency (yrs.) :** 25

Minimum Pipe Size : 15.00 **Tailwater Elevation (ft.):** 0.00

JUNCTION From	STATION To	From To	ΔAREA Σ AREA (acres)	ΔCA Σ CA	BEGIN TIME (min.)	RAINFALL INTENSITY				DISCHARGE (cfs.)			PIPE			F/L PIPE IN / OUT (ft.)	MEAN VEL (fps.)	JUST FULL CAPACITY (cfs.)	FRICT SLOPE (ft./ft.)	HYGR EL. IN / OUT (ft.)	COVER IN / OUT (ft.)	COVER MINUS HY GR	COVER MINUS CROWN	INLET TYPE MANNING'S 'n'
						(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(ft.)	(ft.)									
D46	D47	97+00	2.41	1.81	26.58	3.30	3.79	6.0	6.9	15	73.8	0.0250	894.44	7.74	9.52	0.0150	895.27	898.69	3.42	3.00	CB 4			
	begin	97+00	2.41	1.81									892.60				893.75	901.67			0.015			
D47	D48	97+00	0.96	0.86	26.74	3.29	3.78	8.8	10.1	15	40.6	0.0243	889.60	8.10	9.38	0.0325	891.15	901.67	10.52	10.82	13B			
		97+00	3.37	2.67									888.61				889.83	901.05			0.015			
D48	D49	97+00	0.44	0.40	26.82	3.28	3.78	10.1	11.6	15	5.7	0.0300	885.61	8.98	10.43	0.0429	886.91	901.05	14.14	14.19	13D			
	final	97+00	3.81	3.07									885.44				886.67	885.96			0.015			



STORM SEWER SYSTEM

PID : 96808

Date : 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 22 - Westbound I-70 concrete barrier and MSE wall outlet

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'	
D50	D51	102+50		0.98	0.88	10.00	5.32	6.00	4.7	5.3	15	40.6	0.0749	899.81	10.99	16.48	0.0089	900.32	912.81	12.49	11.75	I 3C
	begin	102+50		0.98	0.88									896.77				897.86	912.86			0.015
D51	D52	102+50		0.48	0.43	10.06	5.31	5.99	7.0	7.9	15	5.6	0.0200	893.77	7.28	8.52	0.0198	894.95	912.86	17.91	17.84	I 3D
	final	102+50		1.46	1.31									893.66				894.84	894.33			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 23 - Median Ditch (Detention Basin Inlet)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D53	D54	109+75		4.12	2.06	23.35	3.55	4.01	7.3	8.3	21	99.4	0.0050	919.98	4.43	10.45	0.0036	921.59	923.73	2.14	2.00	CB 4
	begin	109+75		4.12	2.06									919.48				921.23	924.54			0.015
D54	D55	109+75		1.03	0.52	23.72	3.52	4.01	9.1	10.3	21	136.8	0.0050	919.48	4.58	10.41	0.0056	921.23	924.54	3.31	3.31	CB 4
	final	109+75		5.15	2.58									918.80				920.27	919.68			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 24 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D56	D57	115+00	2.20	1.65	24.82	3.43	3.91	5.7	6.5	18	115.0	0.0050	931.15	4.11	6.92	0.0050	932.39	934.65	2.26	2.00	CB 4
	begin	115+00	2.20	1.65									930.58				931.82	931.33			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 25 - Median Ditch

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		To		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'	
D58	D59	124+95		3.60	2.16	22.42	3.64	4.13	7.9	8.9	24	145.7	0.0050	947.23	4.55	14.93	0.0021	948.40	949.23	0.83	0.00	HW Half He
	begin	124+95		3.60	2.16									946.50				948.03	953.60			0.015
D59	D60	124+95		3.57	2.14	22.95	3.59	4.09	15.4	17.6	27	120.8	0.0050	946.25	5.30	20.35	0.0043	948.03	953.60	5.57	5.10	CB 4
	final	124+95		7.17	4.30									945.65				947.51	946.78			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 28 - Ramp C Concrete Median (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D66	D67	67+00	0.06	0.05	10.00	5.32	5.95	0.3	0.3	15	53.3	0.0250	865.10	3.29	9.51	0.0000	865.26	868.35	3.09	2.00	1.2
	begin	67+00	0.06	0.05									863.77				864.50	864.40			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 29 - Ramp C Concrete Median (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'	
D68	D69	65+50		0.06	0.06	10.00	5.32	5.93	0.3	0.3	15	51.7	0.0100	859.87	2.45	6.02	0.0000	860.09	863.12	3.03	2.00	1 2
	begin	65+50		0.06	0.06									859.35				860.09	859.98			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 30 - Ramp C Concrete Median (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		To		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D70	D71	64+00		0.06	0.06	10.00	5.32	5.94	0.3	0.3	15	50.9	0.0100	853.59	2.45	6.03	0.0000	853.82	856.84	3.02	2.00	1 2
	begin	64+00		0.06	0.06									853.08				853.82	853.71			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 31 - Ramp C Concrete Median (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D72	D73	62+00	0.07	0.06	10.00	5.32	5.95	0.3	0.4	15	49.7	0.0200	845.05	3.18	8.52	0.0000	845.23	848.30	3.07	2.00	1.2
	begin	62+00	0.07	0.06									844.06				844.80	844.68			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 32 - Ramp E Infield Outlet (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	INTENSITY (10 yrs.)	INTENSITY (25 yrs.)	(cfs.) (10 yrs.)	(cfs.) (25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D74	D75	56+20	0.40	0.32	10.00	5.32	5.97	1.7	1.9	15	54.6	0.0200	847.20	5.14	8.51	0.0012	847.62	851.45	3.83	3.00	CB 2-3
	begin	56+20	0.40	0.32									846.11				847.01	846.74			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 33 - Ramp A Infield Outlet (SR 256 Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL			DISCHARGE			PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'	
D76	D77	63+00	1.43	0.77	75.00	1.63	1.91	1.3	1.5	15	119.6	0.0050	847.40	2.87	4.27	0.0007	847.93	850.65	2.72	2.00	CB 2-3		
	begin	63+36	1.43	0.77									846.80				847.67	847.43				0.015	



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 34 - Ramp H Infield outlet (Taylor Road Interchange)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 15.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D78	D79	105+95	0.56	0.36	10.00	5.32	5.99	1.9	2.2	15	56.5	0.0900	902.67	9.14	18.07	0.0015	902.97	919.40	16.43	15.48	CB 2-3
	begin	105+95	0.56	0.36									897.59				898.50	898.21			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 35 - Ramp G Infield Outlet from Detention Basin (Taylor Road Interchange) **Designer :** CEF

Rainfall Area: C **Just Full Capacity Frequency (yrs.) :** 10 **Hydraulic Gradient Frequency (yrs.) :** 25

Minimum Pipe Size : 15.00 **Tailwater Elevation (ft.):** 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL	DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)		DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D80	D81	104+00	40.97	28.68	65.00	1.81	2.13	52.0	36	76.7	0.0100	908.07	9.26	62.18	0.0111	910.91	913.58	2.67	2.51	CB 2-4
	begin	104+00	40.97	28.68								907.30				910.06	908.80			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 36 - Ramp J Infield Outlet to Detention Basin (Taylor Road Interchange) **Designer :** CEF

Rainfall Area: C **Just Full Capacity Frequency (yrs.) :** 10 **Hydraulic Gradient Frequency (yrs.) :** 25

Minimum Pipe Size : 15.00 **Tailwater Elevation (ft.):** 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D82	D83	111+30	111+50	25.98	16.89	55.00	2.05	2.37	34.5	40.0	30	117.2	0.0100	924.29	8.26	38.30	0.0127	928.47	928.78	0.31	1.99	CB 2-3
	begin	111+50		25.98	16.89									923.11				926.99	934.00			0.015
D83	D84	111+50	111+22	2.81	1.80	55.24	2.04	2.37	38.1	44.3	30	275.9	0.0100	923.11	7.76	38.27	0.0155	926.99	934.00	7.01	8.39	CB 2-3
	final	111+22		28.79	18.69									920.35				922.71	921.60			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/29/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 37- Taylor Road bridge to Ramp G and Ramp J to Detention Basin **Designer :** CEF

Rainfall Area: C **Just Full Capacity Frequency (yrs.) :** 10 **Hydraulic Gradient Frequency (yrs.) :** 25
Minimum Pipe Size : 12.00 **Tailwater Elevation (ft.):** 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D86	D87	37+00		0.60	0.54	10.00	5.32	5.96	2.9	3.2	12	79.5	0.0200	943.15	5.93	4.70	0.0109	943.79	946.15	2.36	2.00	CB 3A
	begin	37+00		0.60	0.54									941.56				942.44	946.23			0.015
D87	D85	37+00		0.39	0.35	10.22	5.28	5.95	4.7	5.3	15	23.6	0.0200	941.31	6.72	8.52	0.0090	942.14	946.23	4.09	3.67	CB 3A
	final	111+22		0.99	0.89									940.84				941.93	941.46			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/29/2024 **Project :** FAI-LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 38 - Taylor Road SW from Taylor Road to existing system

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D92	D93	14+00	0.18	0.14	10.00	5.32	5.93	0.7	0.8	12	93.9	0.0245	939.54	4.41	5.20	0.0007	939.82	943.04	3.22	2.50	CB 3A
	begin	13+00	0.18	0.14									937.24				937.93	941.73			0.015
D93	D94	13+00	0.15	0.11	10.35	5.25	5.91	1.3	1.5	12	39.0	0.0250	937.24	5.25	5.25	0.0022	937.61	941.73	4.12	3.50	CB 3A
		13+00	0.33	0.25									936.26				937.02	941.73			0.015
D94	D95	13+00	0.18	0.14	10.48	5.23	5.90	2.0	2.3	12	17.8	0.0250	936.26	5.90	5.25	0.0053	936.74	941.73	4.99	4.47	CB 3A
		13+00	0.51	0.38									935.82				936.64	942.80			0.015
D95	D96	13+00	0.00	0.00	10.53	5.22	5.82	2.0	2.2	12	130.9	0.0250	935.82	5.92	5.25	0.0052	936.29	942.80	6.51	5.98	MH 3
	final	11+71	0.51	0.38									932.55				933.37	941.07			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/29/2024 **Project :** FAI-LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 39 - Taylor Road from I70 Ramp G and Ramp J to SR204

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION From	STATION To	From To	ΔAREA Σ AREA (acres)	ΔCA Σ CA	BEGIN TIME (min.)	RAINFALL INTENSITY		DISCHARGE (cfs.)		PIPE			F/L PIPE IN / OUT (ft.)	MEAN VEL (fps.)	JUST FULL CAPACITY (cfs.)	FRICT SLOPE (ft./ft.)	HYGR EL. IN / OUT (ft.)	COVER IN / OUT (ft.)	COVER MINUS HY GR	COVER MINUS CROWN	INLET TYPE MANNING'S 'n'
						(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)									
D107	D108	34+50	0.22	0.19	10.00	5.32	5.49	1.0	1.0	12	156.4	0.0175	933.22	4.28	4.40	0.0011	933.56	936.43	2.87	2.21	CB 3A
	begin	33+00	0.22	0.19									930.48				931.89	933.50			0.015
D108	D97	33+00	0.21	0.18	10.61	5.20	5.49	1.9	2.0	12	42.6	0.0100	930.48	4.13	3.32	0.0042	931.89	933.50	1.61	2.02	CB 3
		33+00	0.43	0.37									930.05				931.71	934.84			0.015
D109	D97	33+00	0.21	0.19	10.00	5.32	5.49	1.0	1.0	12	31.6	0.0100	930.37	3.50	3.32	0.0011	931.75	933.67	1.92	2.30	CB 3
	begin	33+00	0.64	0.55									930.05				931.71	934.84			0.015
D97	D98	33+00	0.00	0.00	10.78	5.17	5.49	2.9	3.0	12	300.0	0.0075	930.05	3.65	2.88	0.0097	931.71	934.84	3.13	3.79	MH 3
		30+00	0.64	0.55									927.80				928.80	933.13			0.015
D110	D111	31+50	0.20	0.17	10.00	5.32	5.49	0.9	0.9	12	146.8	0.0095	929.60	3.35	3.24	0.0009	929.98	932.64	2.66	2.04	CB 3
	begin	30+00	0.84	0.72									928.20				928.93	931.91			0.015
D111	D98	30+00	0.19	0.15	10.73	5.18	5.49	1.7	1.8	12	40.1	0.0100	928.20	4.00	3.32	0.0033	928.93	931.91	2.98	2.71	CB 3
		30+00	1.03	0.88									927.80				928.80	933.13			0.015
D112	D98	30+00	0.21	0.19	10.00	5.32	5.49	1.0	1.0	12	29.0	0.0250	928.53	4.90	5.26	0.0011	928.84	932.07	3.23	2.54	CB 3A
	begin	30+00	1.24	1.07									927.80				928.80	933.13			0.015
D98	D99	30+00	0.00	0.00	12.15	4.92	5.49	5.2	5.8	15	149.9	0.0100	927.55	5.19	6.02	0.0109	928.80	933.13	4.33	4.33	MH 3
		28+50	1.24	1.07									926.05				927.16	932.38			0.015



STORM SEWER SYSTEM

JUNCTION	STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE			
					From	To	From	To	Σ AREA	Σ CA	TIME										INTENSITY	(cfs.)	(cfs.)
		(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	(ft.)	'n'
D113	D99	0.11	0.10	10.00	5.32	5.99	0.5	0.6	12	29.0	0.0500	927.75	5.21	7.43	0.0004	927.95	931.32	3.37	2.57	CB 3A			
	begin	1.35	1.16									926.30				926.96	932.38			0.015			
D114	D99	0.19	0.15	10.00	5.32	5.99	0.8	0.9	12	29.0	0.0500	927.75	5.79	7.43	0.0008	927.99	931.32	3.33	2.57	CB 3A			
	begin	1.54	1.31									926.30				927.00	932.38			0.015			
D99	D100	0.00	0.00	12.63	4.84	5.01	6.3	6.6	18	249.9	0.0100	925.80	5.56	9.79	0.0052	926.74	932.38	5.64	5.08	MH 3			
		1.54	1.31									923.30				925.01	930.95			0.015			
D115	D116	0.20	0.15	10.00	5.32	5.93	0.8	0.9	12	100.0	0.0225	927.51	4.46	4.98	0.0009	927.81	930.57	2.76	2.06	CB 3A			
	begin	1.74	1.46									925.26				925.96	929.89			0.015			
D116	D100	0.13	0.10	10.37	5.25	5.01	1.3	1.3	12	29.1	0.0500	925.26	6.80	7.43	0.0017	925.55	929.89	4.34	3.63	CB 3A			
		1.87	1.56									923.80				925.01	930.95			0.015			
D117	D100	0.17	0.15	10.00	5.32	5.01	0.8	0.8	12	29.0	0.0500	925.25	5.91	7.43	0.0006	925.48	929.89	4.41	3.64	CB 3A			
	begin	2.04	1.72									923.80				925.01	930.95			0.015			
D100	D101	0.00	0.00	13.38	4.72	5.01	8.1	8.6	18	300.0	0.0100	923.30	5.82	9.79	0.0089	925.01	930.95	5.94	6.15	MH 3			
		2.04	1.72									920.30				922.33	926.94			0.015			
D118	D101	0.21	0.19	10.00	5.32	5.01	1.0	0.9	12	29.1	0.0500	922.25	6.24	7.42	0.0009	922.51	926.47	3.96	3.22	CB 3A			
	begin	2.25	1.91									920.80				922.33	926.94			0.015			
D119	D101	0.21	0.17	10.00	5.32	5.01	0.9	0.8	12	29.1	0.0500	922.26	6.06	7.43	0.0007	922.49	926.47	3.98	3.22	CB 3A			
	begin	2.46	2.07									920.80				922.33	926.94			0.015			
D101	D102	0.00	0.00	14.24	4.58	5.01	9.5	10.4	18	300.0	0.0150	920.30	7.08	11.99	0.0130	922.33	926.94	4.61	5.14	MH 3			
		2.46	2.07									915.80				918.43	921.93			0.015			
D121	D102	0.41	0.33	10.00	5.32	5.01	1.7	1.6	12	23.5	0.0500	917.48	7.33	7.43	0.0028	918.50	921.54	3.04	3.06	CB 3A			
	begin	2.87	2.40									916.30				918.43	921.93			0.015			



STORM SEWER SYSTEM

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D122	D102	20+00 begin	0.33 3.20	0.26 2.67	10.00	5.32	5.01	1.4	1.3	12	34.4	0.0500	918.02 916.30	6.91	7.43	0.0018	918.49 918.43	921.37 921.93	2.88	2.35	CB 3A 0.015
D102	D103	20+00 17+00	0.00 3.20	0.00 2.67	14.95	4.48	5.01	12.0	13.4	18	300.0	0.0175	915.80 910.55	7.77	12.95	0.0215	918.43 911.98	921.93 914.80	3.50	4.63	MH 3 0.015
D106	D103	17+00 begin	0.32 3.52	0.26 2.92	10.00	5.32	4.99	1.4	1.3	12	34.5	0.0050	911.22 911.05	2.94	2.35	0.0017	911.87 911.81	914.24 914.80	2.37	2.02	CB 3A 0.015
D103	D104	17+00 17+00	0.00 3.52	0.00 2.92	15.59	4.39	4.99	12.8	14.6	24	29.6	0.0050	910.05 909.90	5.01	14.91	0.0055	911.81 911.59	914.80 914.65	2.99	2.75	MH 3 0.015
D104	D105	17+00 final	1.05 4.57	0.54 3.46	60.27	1.92	2.24	6.6	7.7	24	100.7	0.0050	909.90 909.40	4.35	14.86	0.0016	911.05 910.89	914.65 910.40	3.60	2.75	CB 3 0.015



STORM SEWER SYSTEM

PID : 96808

Date : 04/29/2024 **Project :** FAI-LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 40 - Taylor Road from bridge to I-70 Ramp H and Ramp I

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D124	D125	42+80		0.27	0.24	10.00	5.32	5.95	1.3	1.4	12	80.9	0.0200	955.79	4.86	4.70	0.0022	956.19	959.79	3.60	3.00	CB 3A
	begin	42+50		0.27	0.24									954.17				954.92	960.05			0.015
D125	D126	42+50		0.11	0.10	10.28	5.27	5.94	1.8	2.0	12	18.9	0.0195	954.17	5.25	4.63	0.0043	954.69	960.05	5.36	4.88	1 3D
	final	42+30		0.38	0.34									953.80				954.61	954.30			0.015

Job Name: FAI/LIC-70 Job No.: 96808
 Location: Fairfield and Licking Counties Sheet: 1 of 1
 Task: Taylor Road - Existing Drainage
 Calculated By: CEF Date: 4/26/2024
 Checked By: DMG Date: 4/29/2024

Weighted Runoff Coefficient

Drainage Area = 3.40 ac
 Paved Area: 0.00
 Unpaved Area: 3.40

Paved Area "C" Value: 0.90
 Unpaved Area "C" Value: 0.40

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.40

Shallow Concentrated Flow

$$V = 3.3ks^{1/2} = (3.3) * (0.457) * (1\%)^{1/2} = 0.151 \text{ fps}$$

k = 0.457
 s = 0.01

$$t_s = \frac{L}{60V} = \frac{784}{(60) * (0.15)} = 86.64 \text{ min}$$

L = 784 ft

Time of Concentration

$$T = t_0 + t_s = 0 + 86.64 = 86.64 \text{ min}$$

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

Q = CiA

i ₂ = 1.03	in/hr	Q ₂ = 1.41	cfs
i ₅ = 1.27	in/hr	Q ₅ = 1.73	cfs
i ₁₀ = 1.47	in/hr	Q ₁₀ = 2.00	cfs
i ₂₅ = 1.73	in/hr	Q ₂₅ = 2.36	cfs
i ₅₀ = 1.93	in/hr	Q ₅₀ = 2.63	cfs
i ₁₀₀ = 2.11	in/hr	Q ₁₀₀ = 2.87	cfs



STORM SEWER SYSTEM

PID : 96808

Date : 04/30/2024 **Project :** FAI-LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 41 - Taylor Road from I70 Ramp H and I to end of project

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION	STATION	ΔAREA	ΔCA	BEGIN	RAINFALL	DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE	
From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
		(acres)		(min.)	(10 yrs.) (25 yrs.)	(10 yrs.) (25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'	
D132	D127	0.12	0.11	10.00	5.32	5.98	0.6	0.6	12	39.5	0.0250	951.82	4.17	5.25	0.0004	952.06	954.86	2.80	2.04	CB 3A
	begin	0.12	0.11									950.83				951.49	956.43			0.015
D133	D127	0.16	0.14	10.00	5.32	5.98	0.8	0.9	12	35.0	0.0250	951.71	4.51	5.25	0.0008	951.99	954.97	2.98	2.26	CB 3A
	begin	0.28	0.25									950.83				951.52	956.43			0.015
D127	D128	0.00	0.00	10.16	5.29	5.86	1.3	1.5	12	193.9	0.0310	950.83	5.73	5.85	0.0023	951.19	956.43	5.24	4.60	MH 3
		0.28	0.25									944.83				945.58	949.89			0.015
D134	D135	0.12	0.11	10.00	5.32	5.93	0.6	0.6	12	103.1	0.0300	948.80	4.44	5.76	0.0004	949.03	951.96	2.93	2.16	CB 3A
	begin	0.40	0.36									945.70				946.37	948.88			0.015
D135	D128	0.12	0.11	10.39	5.24	5.91	1.1	1.3	12	29.1	0.0300	945.70	5.43	5.76	0.0017	946.04	948.88	2.84	2.18	CB 3A
		0.52	0.47									944.83				945.57	949.89			0.015
D136	D128	0.16	0.14	10.00	5.32	5.99	0.8	0.9	12	28.7	0.0300	945.69	4.86	5.75	0.0008	945.97	948.81	2.84	2.12	CB 3A
	begin	0.68	0.61									944.83				945.53	949.89			0.015
D128	D129	0.00	0.00	10.72	5.18	1.68	3.2	1.0	12	200.0	0.0425	944.83	8.09	6.85	0.0011	945.11	949.89	4.78	4.06	MH 3
		0.68	0.61									936.33				937.14	945.27			0.015
D137	D138	0.10	0.09	10.00	5.32	5.94	0.5	0.5	12	100.0	0.0500	942.62	5.03	7.43	0.0003	942.81	945.99	3.18	2.37	CB 3A
	begin	0.78	0.70									937.62				938.27	944.26			0.015



STORM SEWER SYSTEM

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D138	D129	48+50 48+50	0.20 0.98	0.18 0.88	10.33	5.26	1.68	1.4	0.5	12	25.7	0.0500	937.62 936.33	6.92	7.43	0.0002	937.79 937.14	944.26 945.27	6.47	5.64	CB 3 0.015
D145	D146	58+00 begin	3.39 4.37	2.54 3.42	60.00	1.92	2.25	4.9	5.7	12	40.5	0.0450	952.73 950.90	9.14	7.05	0.0343	953.45 951.88	953.73 956.50	0.28	0.00	HW Half He 0.015
D146	D139	58+00 58+00	0.27 4.64	0.24 3.67	60.07	1.92	2.25	5.3	6.3	12	19.0	0.0500	950.90 949.95	9.71	7.43	0.0412	951.72 950.93	956.50 956.82	4.78	4.60	CB 3A 0.015
D147	D148	58+00 begin	3.40 8.04	1.36 5.03	87.00	1.46	1.72	2.0	2.3	12	10.0	0.0250	950.67 950.42	5.91	5.25	0.0057	951.30 951.25	957.09 956.51	5.79	5.42	MH 3 0.015
D148	D139	58+00 58+00	0.32 8.36	0.29 5.32	87.03	1.46	1.72	2.4	2.8	12	18.8	0.0250	950.42 949.95	6.18	5.25	0.0084	950.97 950.81	956.51 956.82	5.54	5.09	CB 3A 0.015
D139	D140	58+00 56+90	0.00 8.36	0.00 5.32	87.08	1.45	1.71	6.4	7.6	18	110.0	0.0125	949.45 948.08	6.10	10.95	0.0070	950.42 949.36	956.82 955.96	6.40	5.87	MH 3 0.015
D149	D140	56+90 begin	0.11 8.47	0.10 5.41	10.00	5.32	6.00	0.5	0.6	12	17.8	0.0500	949.47 948.58	5.21	7.43	0.0004	949.67 949.24	955.66 955.96	5.99	5.19	CB 3A 0.015
D150	D140	56+90 begin	0.15 8.62	0.14 5.55	10.00	5.32	6.00	0.7	0.8	12	18.3	0.0500	949.49 948.58	5.69	7.43	0.0007	949.72 949.26	955.67 955.96	5.95	5.18	CB 3A 0.015
D140	D141	56+90 55+10	0.00 8.62	0.00 5.55	87.38	1.45	1.71	6.8	8.0	18	180.0	0.0125	948.08 945.83	6.16	10.95	0.0076	949.08 947.12	955.96 954.27	6.88	6.38	MH 3 0.015
D151	D141	55+10 begin	0.10 8.72	0.09 5.64	10.00	5.32	6.00	0.5	0.5	12	18.5	0.0500	947.26 946.33	5.03	7.43	0.0003	947.44 946.98	953.97 954.27	6.53	5.72	CB 3A 0.015
D152	D141	55+10 begin	0.11 8.83	0.10 5.74	10.00	5.32	6.00	0.5	0.6	12	18.1	0.0500	947.23 946.33	5.21	7.43	0.0004	947.43 946.99	953.98 954.27	6.55	5.75	CB 3A 0.015



STORM SEWER SYSTEM

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From To	Σ AREA (acres)	Σ CA	TIME (min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	DIAM. (in.)	LENGTH (ft.)	SLOPE (ft./ft.)	IN / OUT (ft.)	VEL (fps.)	CAPACITY (cfs.)	SLOPE (ft./ft.)	IN / OUT (ft.)	IN / OUT (ft.)	MINUS HY GR	MINUS CROWN	MANNING'S 'n'
D141	D142	55+10 53+50	0.00 8.83	0.00 5.74	87.87	1.44	1.70	7.0	8.3	18	160.0	0.0125	945.83 943.83	6.22	10.95	0.0082	946.85 945.13	954.27 951.19	7.42	6.94	MH 3 0.015
D153	D142	53+50 begin 53+50	0.13 8.96	0.12 5.86	10.00	5.32	6.00	0.6	0.7	12	23.3	0.0500	945.50 944.33	5.48	7.43	0.0005	945.71 945.00	950.81 951.19	5.10	4.31	CB 3 0.015
D154	D142	53+50 begin 53+50	0.14 9.10	0.13 5.98	10.00	5.32	5.99	0.7	0.8	12	29.0	0.0500	945.78 944.33	5.59	7.43	0.0006	946.00 945.01	950.72 951.19	4.72	3.94	CB 3A 0.015
D142	D143	53+50 52+00	0.00 9.10	0.00 5.98	88.30	1.44	1.69	7.3	8.6	18	150.0	0.0150	943.83 941.58	6.73	11.99	0.0090	944.82 942.90	951.19 947.89	6.37	5.86	MH 3 0.015
D155	D143	52+00 begin 52+00	0.13 9.23	0.12 6.10	10.00	5.32	5.99	0.6	0.7	12	26.5	0.0500	943.41 942.08	5.48	7.43	0.0005	943.62 942.75	947.46 947.89	3.84	3.06	CB 3A 0.015
D156	D143	52+00 begin 52+00	0.16 9.39	0.14 6.24	10.00	5.32	5.99	0.8	0.9	12	29.0	0.0500	943.53 942.08	5.77	7.43	0.0008	943.77 942.77	947.45 947.89	3.68	2.92	CB 3A 0.015
D143	D144	52+00 49+50	0.00 9.39	0.00 6.24	88.67	1.43	1.69	7.7	9.0	18	249.6	0.0150	941.58 937.83	6.80	11.99	0.0098	942.60 939.16	947.89 944.77	5.29	4.81	MH 3 0.015
D157	D158	50+50 begin 49+50	0.13 9.52	0.12 6.36	10.00	5.32	5.92	0.6	0.7	12	99.5	0.0200	941.11 939.12	3.95	4.70	0.0005	941.38 939.79	944.49 943.79	3.11	2.38	CB 3A 0.015
D158	D144	49+50 49+50	0.10 9.62	0.09 6.45	10.42	5.24	5.90	1.1	1.2	12	26.2	0.0300	939.12 938.33	5.33	5.75	0.0016	939.44 939.07	943.79 944.77	4.35	3.67	CB 3 0.015
D159	D144	49+50 begin 49+50	0.17 9.79	0.15 6.60	10.00	5.32	6.00	0.8	0.9	12	15.3	0.0300	938.79 938.33	4.89	5.75	0.0009	939.07 939.03	943.97 944.77	4.90	4.18	CB 3 0.015
D144	D129	49+50 48+50	0.00 9.79	0.00 6.60	89.28	1.43	1.68	8.2	9.6	18	100.0	0.0200	937.83 935.83	7.72	13.85	0.0112	938.80 937.18	944.77 945.27	5.97	5.44	MH 3 0.015



STORM SEWER SYSTEM

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S	
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D129	D130	48+50		0.00	0.00	89.49	1.42	1.68	9.4	11.1	18	15.4	0.0200	935.83	7.96	13.85	0.0149	937.14	945.27	8.13	7.94	MH 3
		48+50		9.79	6.60									935.52				936.91	944.47			0.015
D130	D131	48+50		0.11	0.10	89.53	1.42	1.68	9.5	11.3	18	25.0	0.0200	935.52	7.97	13.85	0.0153	936.80	944.47	7.67	7.45	CB 3
	final	48+50		9.90	6.70									935.02				936.41	935.66			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/30/2024 **Project :** FAI-LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : Run 42 - Taylor Road Concrete Channel from Sta. 47+50 to Sta. 45+50 **Designer :** CEF

Rainfall Area: C **Just Full Capacity Frequency (yrs.) :** 10 **Hydraulic Gradient Frequency (yrs.) :** 25
Minimum Pipe Size : 12.00 **Tailwater Elevation (ft.):** 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MINUS	MANNING'S
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D160	D161	47+91	45+49	2.82	1.97	16.08	4.33	4.85	8.5	9.6	18	229.5	0.0100	918.21	5.86	9.79	0.0110	919.80	922.47	2.67	2.76	CB 2-2B
	begin			2.82	1.97									915.92				917.27	921.10			0.015
D161	D162	45+50	45+03	0.30	0.21	18.37	4.05	4.63	8.8	10.1	18	25.4	0.0500	912.92	11.12	21.90	0.0123	913.67	921.10	7.43	6.68	CB 2-2B
				3.12	2.18									911.65				913.01	914.85			0.015
D164	D162	1+00	1+00	0.10	0.09	10.00	5.32	5.95	0.5	0.5	12	50.1	0.0115	908.19	3.00	3.56	0.0003	908.46	911.30	2.84	2.11	CB 2-2B
	begin			3.22	2.27									907.61				908.26	914.85			0.015
D162	D163	1+00	1+00	0.08	0.06	18.41	4.04	4.62	9.4	10.8	18	39.4	0.0250	907.11	8.68	15.48	0.0140	908.08	914.85	6.77	6.24	MH 3
	final			3.30	2.33									906.13				907.50	907.63			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 04/18/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 43 - SR 204 Sta. 37+75 to 35+00 To Existing CB

Designer : WCS

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	Δ AREA	Δ CA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D90	D91	37+74	2.66	1.33	19.14	3.96	4.51	5.3	6.0	12	125.0	0.0532	906.53	9.93	7.66	0.0377	907.23	907.53	0.30	0.00	HW Half He
	begin	36+50	2.66	1.33									899.88				900.86	904.30			0.015



STORM SEWER SYSTEM

PID : 96808

Date : 05/06/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 44 - Palmer Road (left)

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MINUS	MANNING'S
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D178	D179	28+30		4.02	2.01	145.0	0.97	1.16	2.0	2.3	12	68.3	0.0371	1001.49	6.76	6.40	0.0057	1001.93	1009.37	7.44	6.88	CB 7
	begin	25+42		4.02	2.01									998.96				999.79	1001.98			0.015
D179	EXCB	102+47		2.93	1.47	145.1	0.97	1.15	3.4	4.0	12	173.0	0.0375	998.96	7.84	6.43	0.0169	999.56	1001.98	2.42	2.02	CB 2-2B
	final	102+47		6.95	3.47									992.47				993.39	996.10			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 05/06/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 45 - Palmer Road (right) to Georgian

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION		ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	To	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MINUS	MANNING'S
				(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D170	D171	26+25	25+30	4.05	2.03	85.00	1.48	1.75	3.0	3.5	12	87.6	0.0400	1002.10	7.82	6.64	0.0131	1002.64	1005.10	2.46	2.00	CB 2-3
	begin			4.05	2.02									998.60				999.50	1002.30			0.015
D171	D172	25+00	24+25	0.69	0.35	85.19	1.48	1.74	3.5	4.1	12	113.8	0.0420	998.60	8.25	6.81	0.0179	999.19	1002.30	3.11	2.70	CB 2-3
				4.74	2.37									993.82				994.75	997.13			0.015
D172	D173	24+25	22+75	0.81	0.41	85.42	1.48	1.74	4.1	4.8	12	144.0	0.0440	993.82	8.73	6.97	0.0244	994.46	997.13	2.67	2.31	CB 3A
				5.55	2.78									987.48				988.43	989.35			0.015
D173	D174	22+75	22+50	0.80	0.40	85.69	1.47	1.74	4.7	5.5	15	34.0	0.0100	987.23	5.11	6.02	0.0097	988.32	989.35	1.03	0.87	CB 2-3
	final			6.35	3.18									986.89				987.99	987.52			0.015



STORM SEWER SYSTEM

PID : 96808 **Date :** 05/06/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT District 5

Description : Run 46 - Georgian Road

Designer : CEF

Rainfall Area: C

Just Full Capacity Frequency (yrs.) : 10

Hydraulic Gradient Frequency (yrs.) : 25

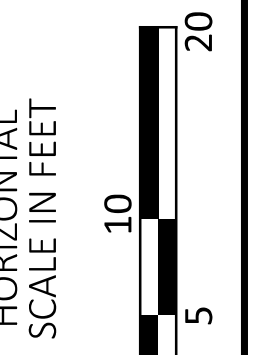
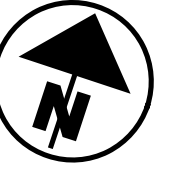
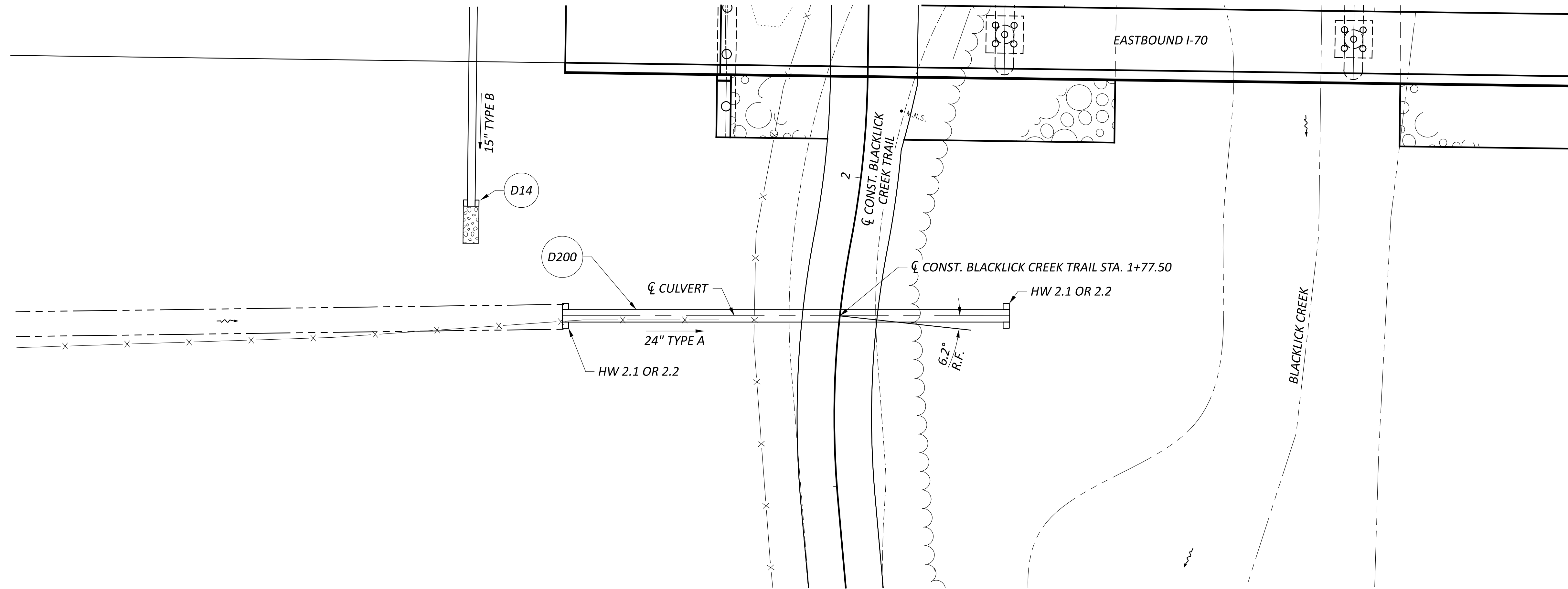
Minimum Pipe Size : 12.00

Tailwater Elevation (ft.): 0.00

JUNCTION		STATION	ΔAREA	ΔCA	BEGIN	RAINFALL		DISCHARGE		PIPE			F/L PIPE	MEAN	JUST FULL	FRICT	HYGR EL.	COVER	COVER	COVER	INLET TYPE
From	To	From	Σ AREA	Σ CA	TIME	INTENSITY	(cfs.)	(cfs.)	(cfs.)	DIAM.	LENGTH	SLOPE	IN / OUT	VEL	CAPACITY	SLOPE	IN / OUT	IN / OUT	MINUS	MINUS	MANNING'S
		To	(acres)		(min.)	(10 yrs.)	(25 yrs.)	(10 yrs.)	(25 yrs.)	(in.)	(ft.)	(ft./ft.)	(ft.)	(fps.)	(cfs.)	(ft./ft.)	(ft.)	(ft.)	HY GR	CROWN	'n'
D175	D176	102+00	4.60	2.30	120.0	1.13	1.34	2.6	3.1	15	50.5	0.0050	987.42	3.43	4.24	0.0030	988.57	990.94	2.37	2.27	CB 2-2A
	begin	102+47	4.60	2.30									987.17				988.42	989.35			0.015
D176	D177	102+47	6.64	3.32	120.2	1.13	1.34	6.4	7.5	18	51.7	0.0050	986.92	4.17	6.94	0.0068	988.42	989.35	0.93	0.93	CB 2-3
	final	102+47	11.24	5.62									986.66				987.94	987.29			0.015

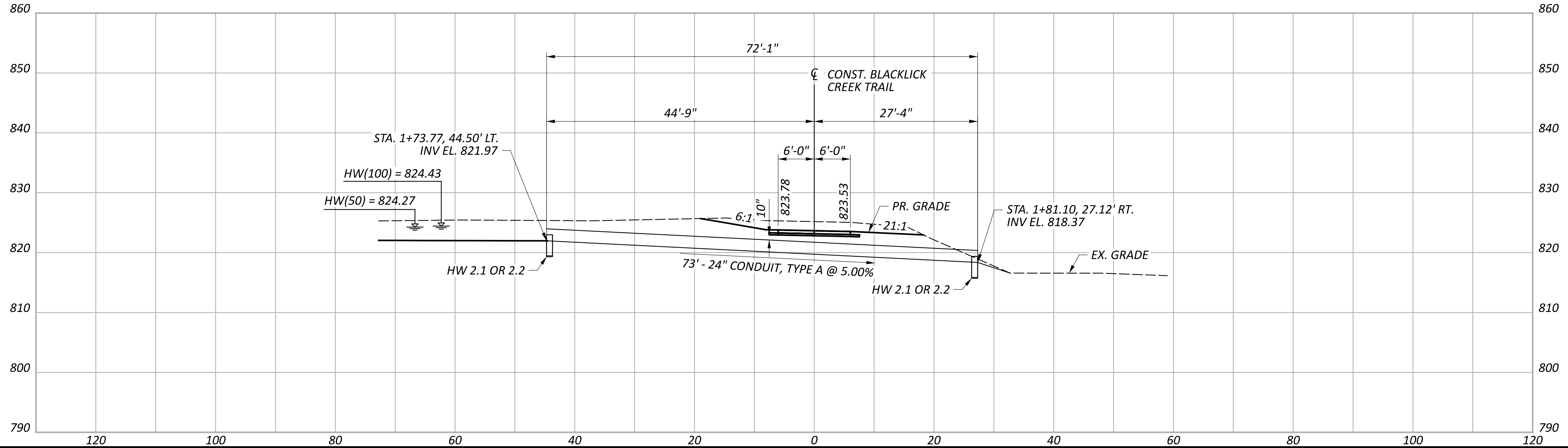
VII. Culvert Design Calculations

There are three culverts under ramps and two culverts along SR 256 that are being removed and replaced, one culvert under IR 70 and one culvert under SR 256 that are both being extended on the outlet ends, and one proposed culvert under Blacklick Creek Trail. The existing culverts' parameters were provided by American Structurepoint. The drainage areas were delineated from a combination of proposed ground, existing terrain, storm system calculations, ditch analysis, Streamstats, and existing plans. The 50-year storm was used for the design year with a maximum of 100-year and minimum of 10-year.



PROPOSED STRUCTURE	
TYPE:	24" CIRCULAR CONDUIT 706.01, 706.02 707.33, 707.35, OR 707.42
SKEW:	6.2° R.F.
ALIGNMENT:	CURVE
CFN:	

HYDRAULIC DATA	
DRAINAGE AREA =	7.04 ACRES
Q (50) =	15.78 CFS
V (50) =	13.86 FT/S
HW (50) =	824.27 FT
Q (100) =	17.02 CFS
V (100) =	13.93 FT/S
HW (100) =	824.43 FT
ORDINARY HIGH WATER MARK:	N/A
DESIGN SERVICE LIFE:	75 YEARS
ABRASION LEVEL:	4.0
pH:	7.6



CULVERT DETAIL
 BLACKLICK CREEK TRAIL - STA. 1+77.50

DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DMG 06/28/24
PROJECT ID	96808
SHEET TOTAL	P.0864 P.0986



Job Name: FAI/LIC-70-0.00/0.00 Job No.: 96808
 Location: ODOT District 5 Sheet: 1 of 1
 Task: Culvert Discharge - Blacklick Creek Trail (Sta. 1+77)
 Calculated By: CEF Date: 4/22/2024
 Checked By: DMG Date: 4/24/2024

Weighted Runoff Coefficient

Drainage Area = 7.04 ac	Paved Area "C" Value: 0.90
Paved Area: 2.28	Unpaved Area "C" Value: 0.50
Unpaved Area: 4.76	

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.63

Time of Concentration

Time of Concentration from Storm System Calculations

Run 4: Median and Ramp Gore = 22.66 minutes

Time of Concentration from Ditch Calculations

EB I70 from high point (sta. 26+00) to trail (sta. 44+00) = 34.71 minutes *

*Includes storm system time of concentration

Culvert Time of Concentration = 34.71 minutes

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

$$Q = CiA$$

i ₂ = 2.02 in/hr	Q ₂ = 8.96 cfs
i ₅ = 2.46 in/hr	Q ₅ = 10.91 cfs
i ₁₀ = 2.8 in/hr	Q ₁₀ = 12.41 cfs
i ₂₅ = 3.25 in/hr	Q ₂₅ = 14.41 cfs
i ₅₀ = 3.56 in/hr	Q ₅₀ = 15.78 cfs
i ₁₀₀ = 3.84 in/hr	Q ₁₀₀ = 17.02 cfs

HY-8 Culvert Analysis Report

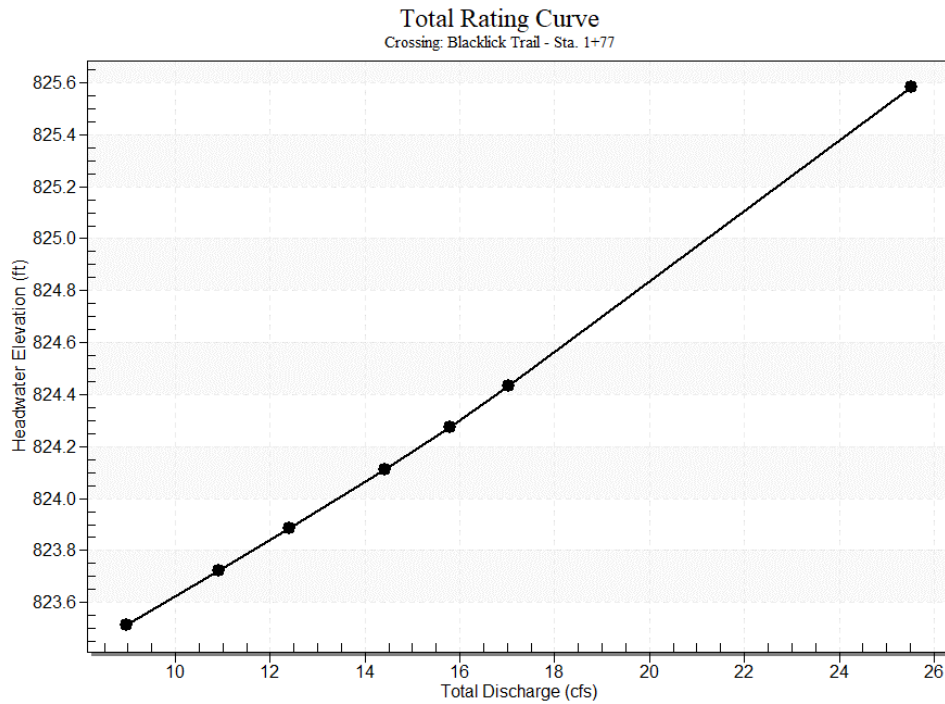
Crossing Discharge Data

Discharge Selection Method: User Defined

Table 1 - Summary of Culvert Flows at Crossing: Blacklick Trail - Sta. 1+77

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Pr. 24" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
823.51	2 year	8.96	8.96	0.00	1
823.72	5 year	10.91	10.91	0.00	1
823.88	10 year	12.41	12.41	0.00	1
824.11	25 year	14.41	14.41	0.00	1
824.27	50 year	15.78	15.78	0.00	1
824.43	100 year	17.02	17.02	0.00	1
825.53	Overtopping	23.84	23.84	0.00	Overtopping

Rating Curve Plot for Crossing: Blacklick Trail - Sta. 1+77



Culvert Data: Pr. 24" Circular Culvert

Table 1 - Culvert Summary Table: Pr. 24" Circular Culvert

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)
2 year	8.96 cfs	8.96 cfs	823.51	1.54	0.0*	1-S2n	0.55	1.07	0.55	0.27	12.89	0.66
5 year	10.91 cfs	10.91 cfs	823.72	1.75	0.0*	1-S2n	0.60	1.18	0.63	0.30	12.75	0.72
10 year	12.41 cfs	12.41 cfs	823.88	1.91	0.0*	1-S2n	0.65	1.27	0.69	0.32	13.03	0.76
25 year	14.41 cfs	14.41 cfs	824.11	2.14	0.0*	5-S2n	0.70	1.37	0.75	0.35	13.42	0.80
50 year	15.78 cfs	15.78 cfs	824.27	2.30	0.0*	5-S2n	0.73	1.43	0.78	0.37	13.86	0.83
100 year	17.02 cfs	17.02 cfs	824.43	2.46	0.0*	5-S2n	0.76	1.49	0.82	0.39	13.93	0.85

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

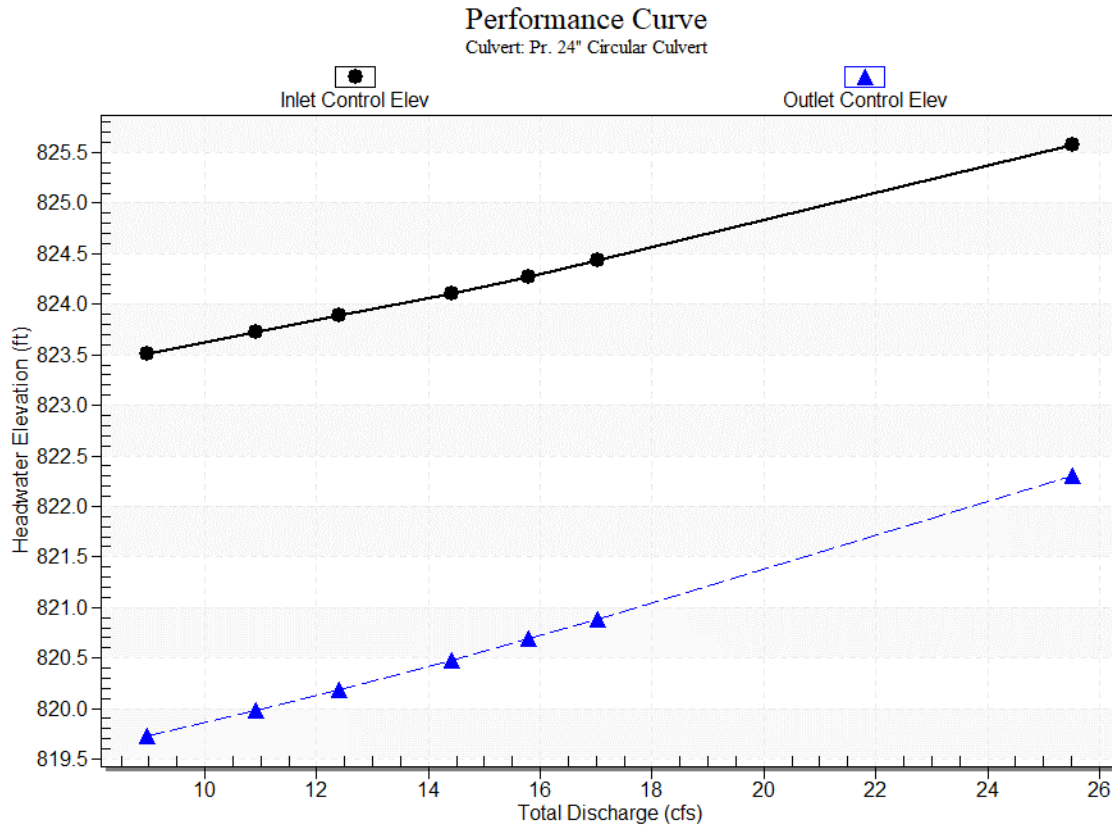
Inlet Elevation (invert): 821.97 ft,

Outlet Elevation (invert): 818.37 ft

Culvert Length: 72.09 ft,

Culvert Slope: 0.0500

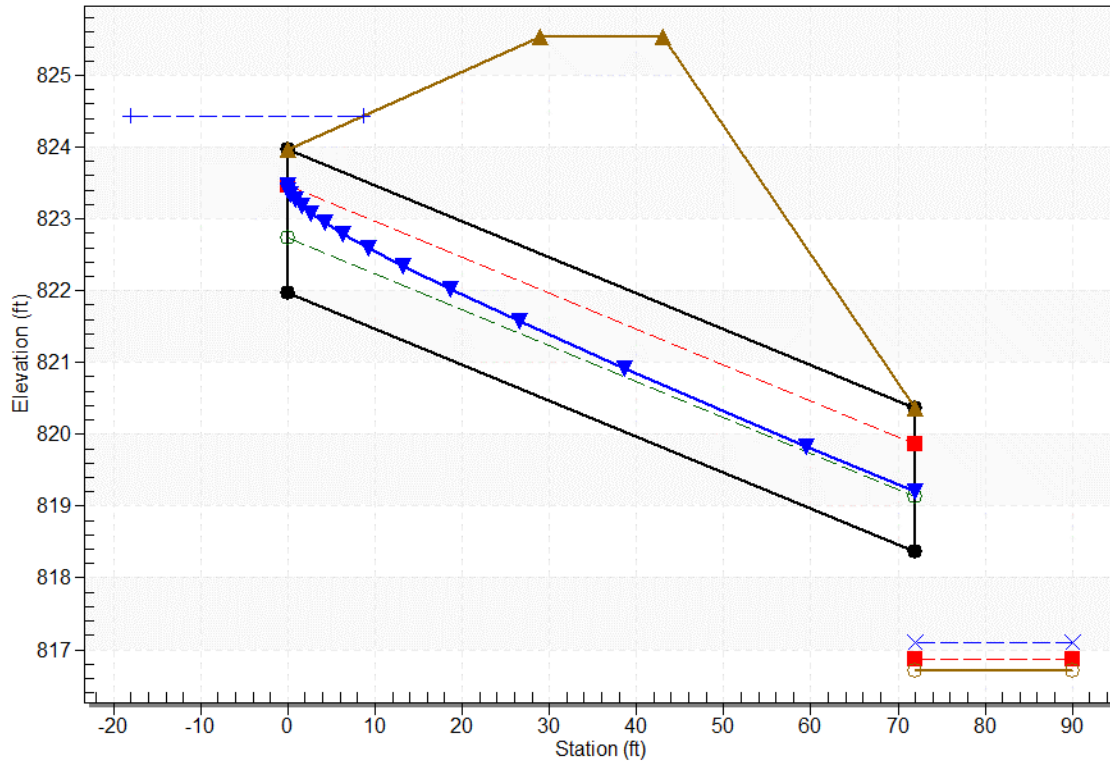
Culvert Performance Curve Plot: Pr. 24" Circular Culvert



Water Surface Profile Plot for Culvert: Pr. 24" Circular Culvert

Crossing - Blacklick Trail - Sta. 1+77, Design Discharge - 17.0 cfs

Culvert - Pr. 24" Circular Culvert, Culvert Discharge - 17.0 cfs



Site Data - Pr. 24" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 821.97 ft

Outlet Station: 72.00 ft

Outlet Elevation: 818.37 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 24" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: Blacklick Trail - Sta. 1+77

Table 2 - Downstream Channel Rating Curve (Crossing: Blacklick Trail - Sta. 1+77)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
8.96	816.98	0.27	0.66	0.08	0.23
10.91	817.01	0.30	0.72	0.09	0.23
12.41	817.03	0.32	0.76	0.10	0.24
14.41	817.06	0.35	0.80	0.11	0.24
15.78	817.08	0.37	0.83	0.12	0.24
17.02	817.10	0.39	0.85	0.12	0.24

Tailwater Channel Data - Blacklick Trail - Sta. 1+77

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 50.00 ft

Side Slope (H:V): 2.00 (:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0650

Channel Invert Elevation: 816.71 ft

Roadway Data for Crossing: Blacklick Trail - Sta. 1+77

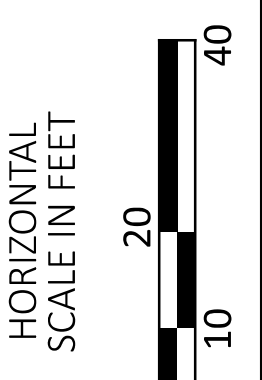
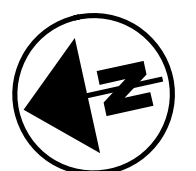
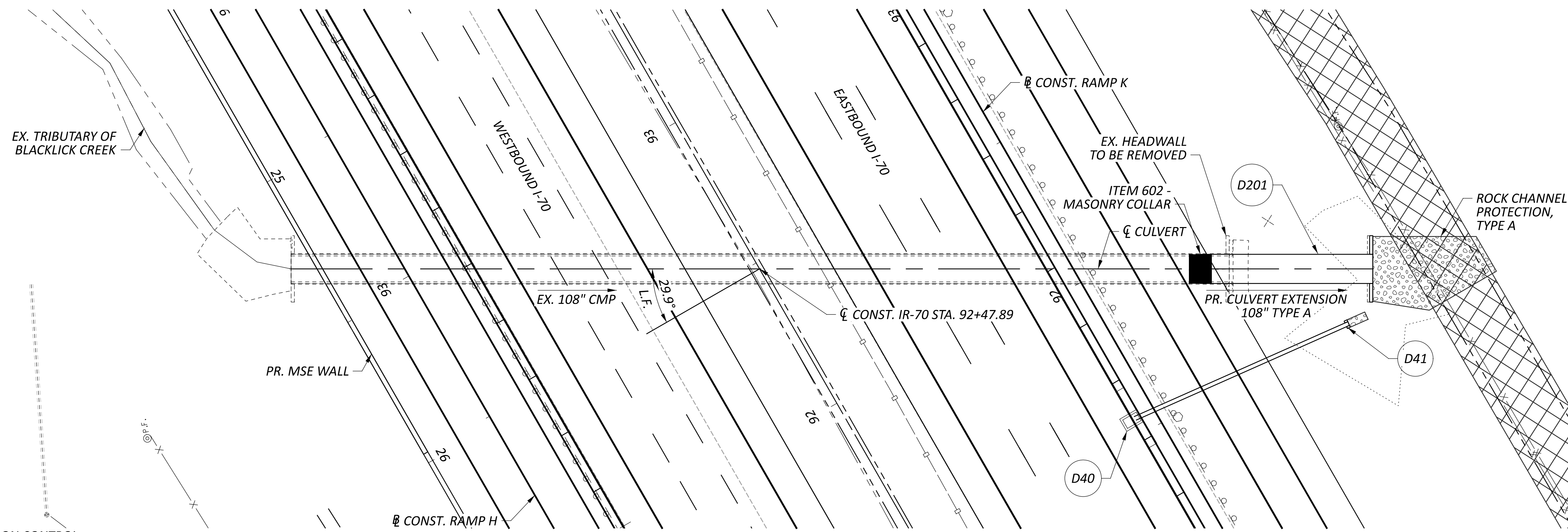
Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 40.00 ft

Crest Elevation: 825.53 ft

Roadway Surface: Paved

Roadway Top Width: 14.00 ft



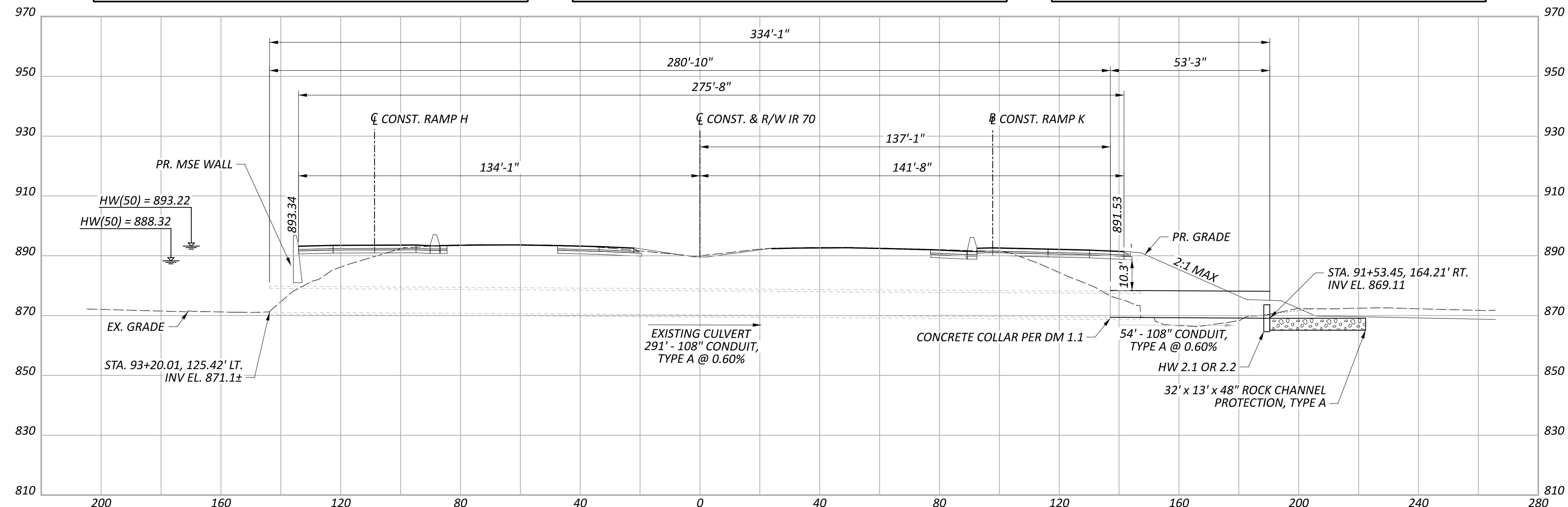
LEGEND

ITEM 836 - EROSION CONTROL WITH TURF REINFORCING MAT

EXISTING STRUCTURE
TYPE: CORRUGATED METAL
SIZE: 108"
SKEW: 29.9° L.F.
ALIGNMENT: TANGENT
DATE BUILT: 1/2/1999
CONDITION: SATISFACTORY
CFN: 1886368

PROPOSED STRUCTURE
TYPE: 108" TYPE A 707.02 (0.064) ALUMINIZED, 707.04 (0.064), 707.07 (0.064) ALUMINIZED, 707.22
SKEW: 29.9° L.F.
ALIGNMENT: TANGENT
CFN:

HYDRAULIC DATA
DRAINAGE AREA = 1550 ACRES
Q (50) = 940 CFS V (50) = 16.55 FT/S HW (50) = 888.32 FT
Q (100) = 1124 CFS V (100) = 18.72 FT/S HW (100) = 893.22 FT
ORDINARY HIGH WATER MARK: 874.88 FT
DESIGN SERVICE LIFE: 75 YEARS
ABRASION LEVEL: 2.0
pH: 7.5



CULVERT DETAIL
 IR 70 - STA. 92+47.89

DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DIMG 06/28/24
PROJECT ID	96808
SHEET TOTAL	P.0865 P.0986

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 562.00 cfs

Design Flow: 940.00 cfs

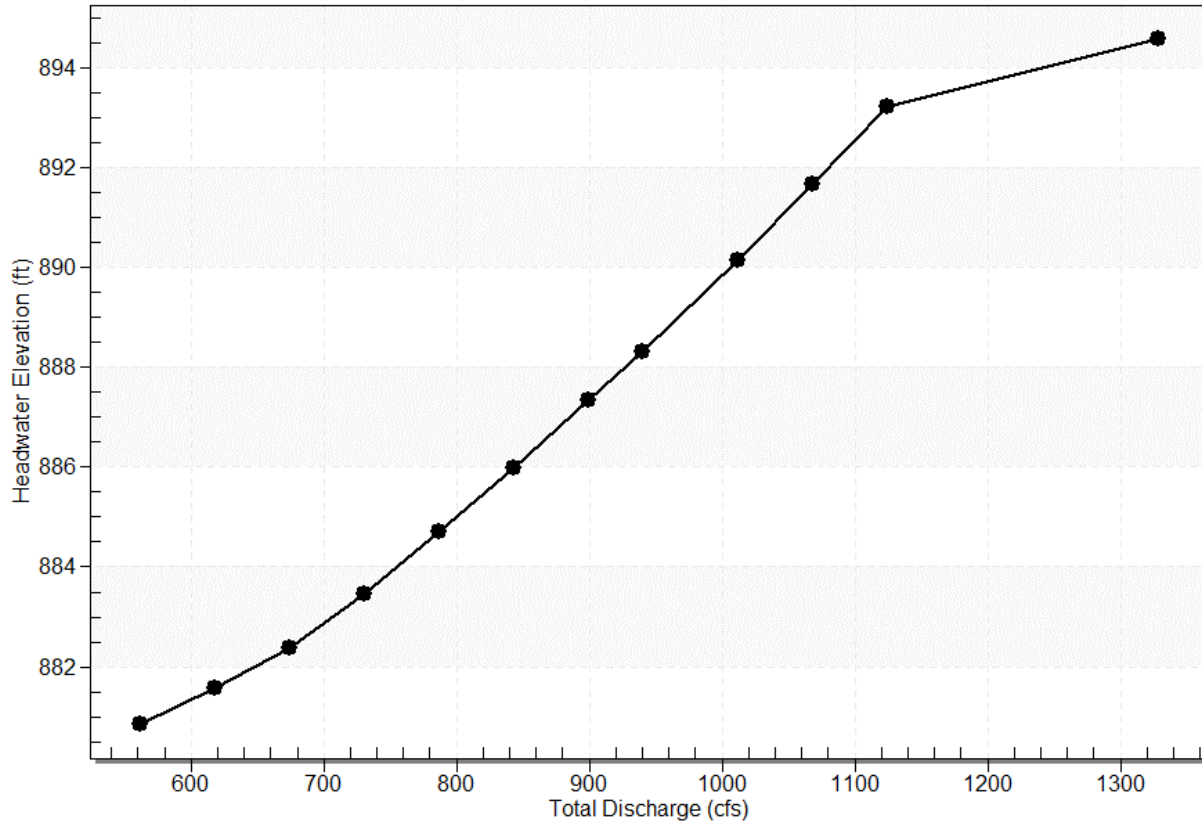
Maximum Flow: 1124.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: I70 - Sta. 92+50

Headwater Elevation (ft)	Total Discharge (cfs)	Existing 108" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
880.86	562.00	562.00	0.00	1
881.58	618.20	618.20	0.00	1
882.38	674.40	674.40	0.00	1
883.45	730.60	730.60	0.00	1
884.70	786.80	786.80	0.00	1
885.97	843.00	843.00	0.00	1
887.33	899.20	899.20	0.00	1
888.32	940.00	940.00	0.00	1
890.15	1011.60	1011.60	0.00	1
891.65	1067.80	1067.80	0.00	1
893.22	1124.00	1124.00	0.00	1
893.77	1143.14	1143.14	0.00	Overtopping

Rating Curve Plot for Crossing: I70 - Sta. 92+50

Total Rating Curve
Crossing: I70 - Sta. 92+50



Culvert Data: Existing 108" Circular Culvert

Table 1 - Culvert Summary Table: Existing 108" Circular Culvert

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)
562.00 cfs	562.00 cfs	880.86	9.04	9.728	7-M2c	9.00	5.86	5.86	3.68	12.82	8.81
618.20 cfs	618.20 cfs	881.58	9.73	10.451	7-M2c	9.00	6.15	6.15	3.86	13.35	9.04
674.40 cfs	674.40 cfs	882.38	10.45	11.254	7-M2c	9.00	6.43	6.43	4.03	13.87	9.26
730.60 cfs	730.60 cfs	883.45	11.21	12.316	7-M2c	9.00	6.69	6.69	4.20	14.41	9.46
786.80 cfs	786.80 cfs	884.70	12.01	13.569	7-M2c	9.00	6.93	6.93	4.36	14.96	9.65
843.00 cfs	843.00 cfs	885.97	12.87	14.843	7-M2c	9.00	7.16	7.16	4.51	15.53	9.83
899.20 cfs	899.20 cfs	887.33	13.78	16.204	7-M2c	9.00	7.38	7.38	4.66	16.11	10.00
940.00 cfs	940.00 cfs	888.32	14.48	17.186	7-M2c	9.00	7.52	7.52	4.76	16.55	10.12
1011.60 cfs	1011.60 cfs	890.15	15.79	19.020	7-M2c	9.00	7.75	7.75	4.93	17.36	10.32
1067.80 cfs	1067.80 cfs	891.65	16.89	20.525	7-M2c	9.00	7.91	7.91	5.07	18.03	10.47
1124.00 cfs	1124.00 cfs	893.22	18.05	22.091	7-M2c	9.00	8.05	8.05	5.20	18.72	10.61

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

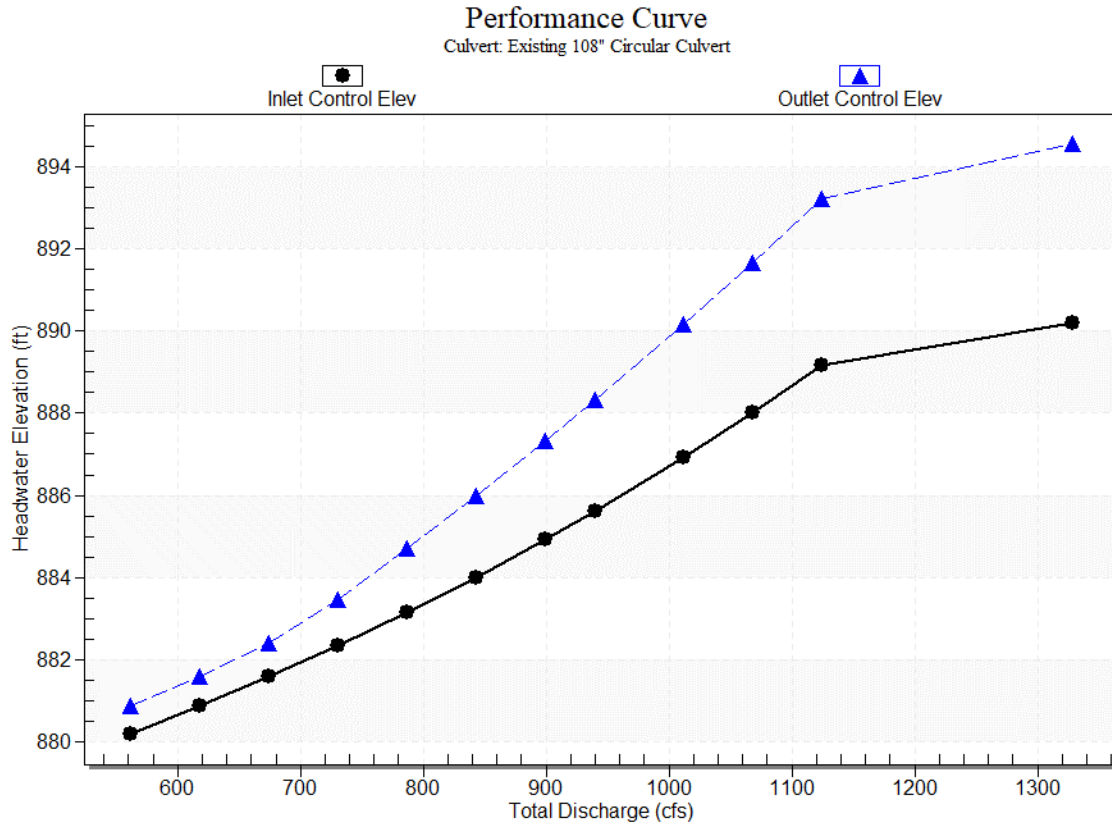
Inlet Elevation (invert): 871.13 ft,

Outlet Elevation (invert): 869.37 ft

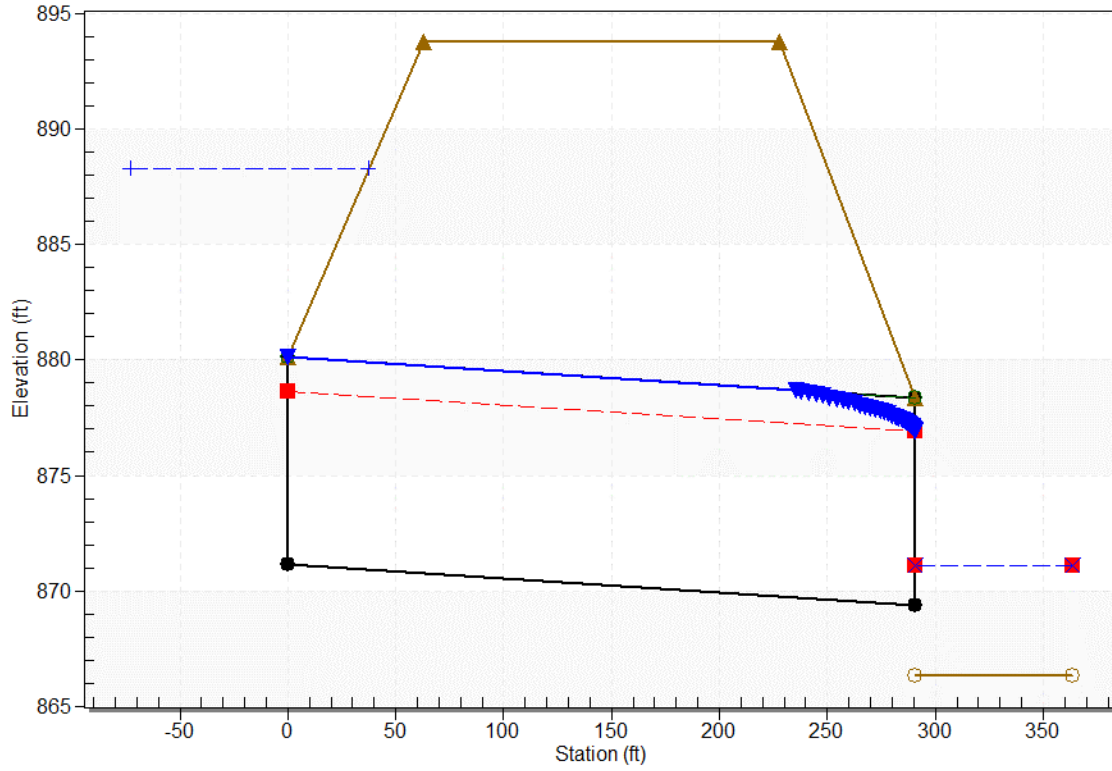
Culvert Length: 290.81 ft,

Culvert Slope: 0.0061

Culvert Performance Curve Plot: Existing 108" Circular Culvert



Water Surface Profile Plot for Culvert: Existing 108" Circular Culvert
 Crossing - I70 - Sta. 92+50, Design Discharge - 940.0 cfs
 Culvert - Existing 108" Circular Culvert, Culvert Discharge - 940.0 cfs



Site Data - Existing 108" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 871.13 ft

Outlet Station: 290.80 ft

Outlet Elevation: 869.37 ft

Number of Barrels: 1

Culvert Data Summary - Existing 108" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 9.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: I70 - Sta. 92+50

Table 2 - Downstream Channel Rating Curve (Crossing: I70 - Sta. 92+50)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
562.00	870.01	3.68	8.81	5.05	0.97
618.20	870.19	3.86	9.04	5.30	0.97
674.40	870.36	4.03	9.26	5.54	0.98
730.60	870.53	4.20	9.46	5.76	0.98
786.80	870.69	4.36	9.65	5.98	0.99
843.00	870.84	4.51	9.83	6.19	0.99
899.20	870.99	4.66	10.00	6.39	0.99
940.00	871.09	4.76	10.12	6.53	1.00
1011.60	871.26	4.93	10.32	6.77	1.00
1067.80	871.40	5.07	10.47	6.96	1.00
1124.00	871.53	5.20	10.61	7.13	1.01

Tailwater Channel Data - I70 - Sta. 92+50

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 10.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0220

Channel Manning's n: 0.0450

Channel Invert Elevation: 866.33 ft

Roadway Data for Crossing: I70 - Sta. 92+50

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 72.00 ft

Crest Elevation: 893.77 ft

Roadway Surface: Paved

Roadway Top Width: 165.00 ft



Surveying	Engineering	Project Management
Job Name: FAI/LIC-70-0.00/0.00		Job No.: 96808
Location: ODOT District 5		Sheet: 1 of 1
Task: Culvert Discharge - I70 (sta. 92+50)		
Calculated By: CEF		Date: 4/22/2024
Checked By: DMG		Date: 4/24/2024

Design Parameters from FAI-70-0.00 and LIC-70-0.00 from 1965 plan set

Drainage Area = 1550 acres
 $Q_{50} = 940$ cfs

Drainage Flows from Stream Stats

$Q_2 = 178$ cfs
 $Q_5 = 311$ cfs
 $Q_{10} = 417$ cfs
 $Q_{25} = 571$ cfs
 $Q_{50} = 698$ cfs
 $Q_{100} = 835$ cfs

Drainage Flows for Calculations

$Q_2 = 240$ cfs
 $Q_5 = 419$ cfs
 $Q_{10} = 562$ cfs
 $Q_{25} = 769$ cfs
 $Q_{50} = 940$ cfs
 $Q_{100} = 1124$ cfs

The drainage flows used for calculations were delineated from a combination of the drainage design parameters from the original culvert design and from the Stream Stats.

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 562.00 cfs

Design Flow: 940.00 cfs

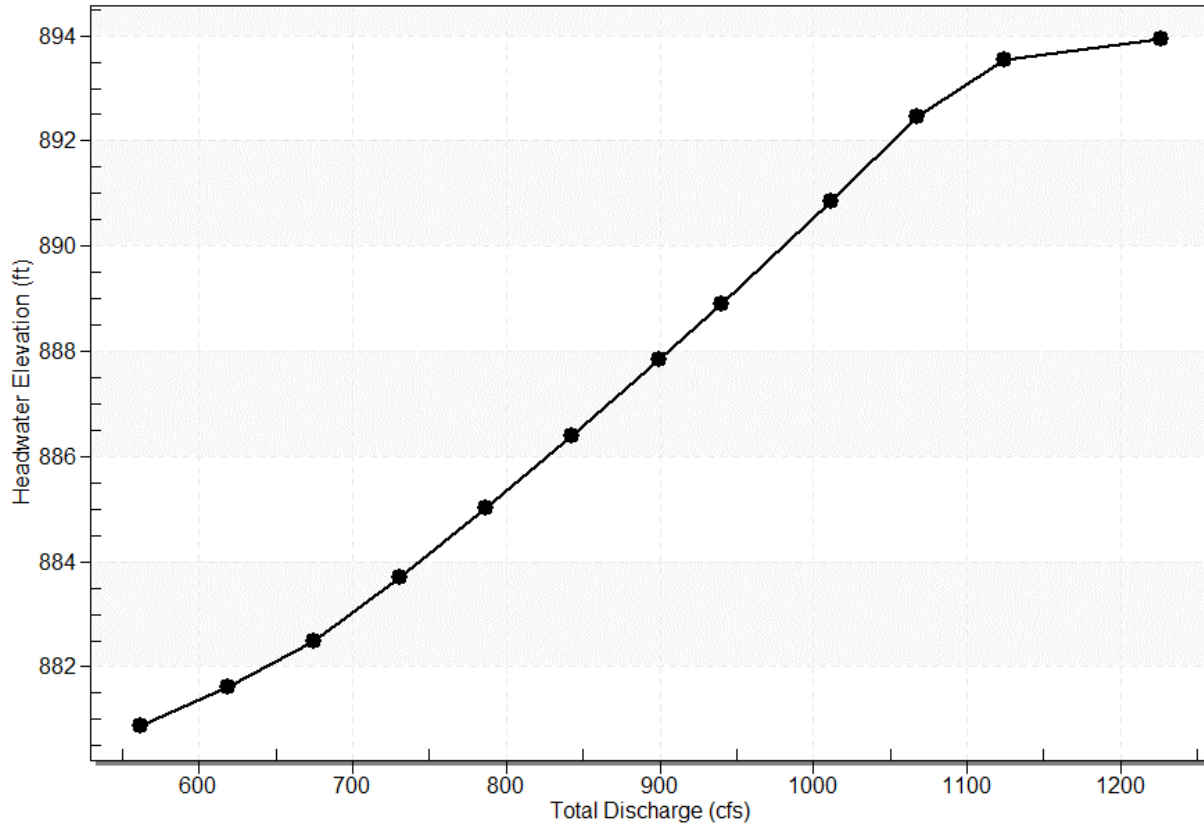
Maximum Flow: 1124.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: I70 - Sta. 92+50

Headwater Elevation (ft)	Total Discharge (cfs)	Extension Ex. 108" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
880.88	562.00	562.00	0.00	1
881.63	618.20	618.20	0.00	1
882.48	674.40	674.40	0.00	1
883.69	730.60	730.60	0.00	1
885.02	786.80	786.80	0.00	1
886.38	843.00	843.00	0.00	1
887.83	899.20	899.20	0.00	1
888.89	940.00	940.00	0.00	1
890.85	1011.60	1011.60	0.00	1
892.47	1067.80	1067.80	0.00	1
893.53	1124.00	1103.67	20.26	8
893.34	1096.83	1096.83	0.00	Overtopping

Rating Curve Plot for Crossing: I70 - Sta. 92+50

Total Rating Curve
Crossing: I70 - Sta. 92+50



Culvert Data: Extension Ex. 108" Circular Culvert

Table 1 - Culvert Summary Table: Extension Ex. 108" Circular Culvert

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)
562.00 cfs	562.00 cfs	880.88	9.04	9.754	7-M2c	9.00	5.86	5.86	3.02	12.82	8.43
618.20 cfs	618.20 cfs	881.63	9.73	10.499	7-M2c	9.00	6.15	6.15	3.19	13.35	8.67
674.40 cfs	674.40 cfs	882.48	10.45	11.352	7-M2c	9.00	6.43	6.43	3.34	13.87	8.90
730.60 cfs	730.60 cfs	883.69	11.21	12.559	7-M2c	9.00	6.69	6.69	3.49	14.41	9.11
786.80 cfs	786.80 cfs	885.02	12.01	13.892	7-M2c	9.00	6.93	6.93	3.63	14.96	9.31
843.00 cfs	843.00 cfs	886.38	12.87	15.252	7-M2c	9.00	7.16	7.16	3.77	15.53	9.50
899.20 cfs	899.20 cfs	887.83	13.78	16.705	7-M2c	9.00	7.38	7.38	3.90	16.11	9.68
940.00 cfs	940.00 cfs	888.89	14.48	17.757	7-M2c	9.00	7.52	7.52	4.00	16.55	9.80
1011.60 cfs	1011.60 cfs	890.85	15.79	19.723	7-M2c	9.00	7.75	7.75	4.16	17.36	10.01
1067.80 cfs	1067.80 cfs	892.47	16.89	21.338	7-M2c	9.00	7.91	7.91	4.28	18.03	10.17
1124.00 cfs	1103.67 cfs	893.53	17.62	22.404	7-M2c	9.00	8.00	8.00	4.40	18.46	10.31

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

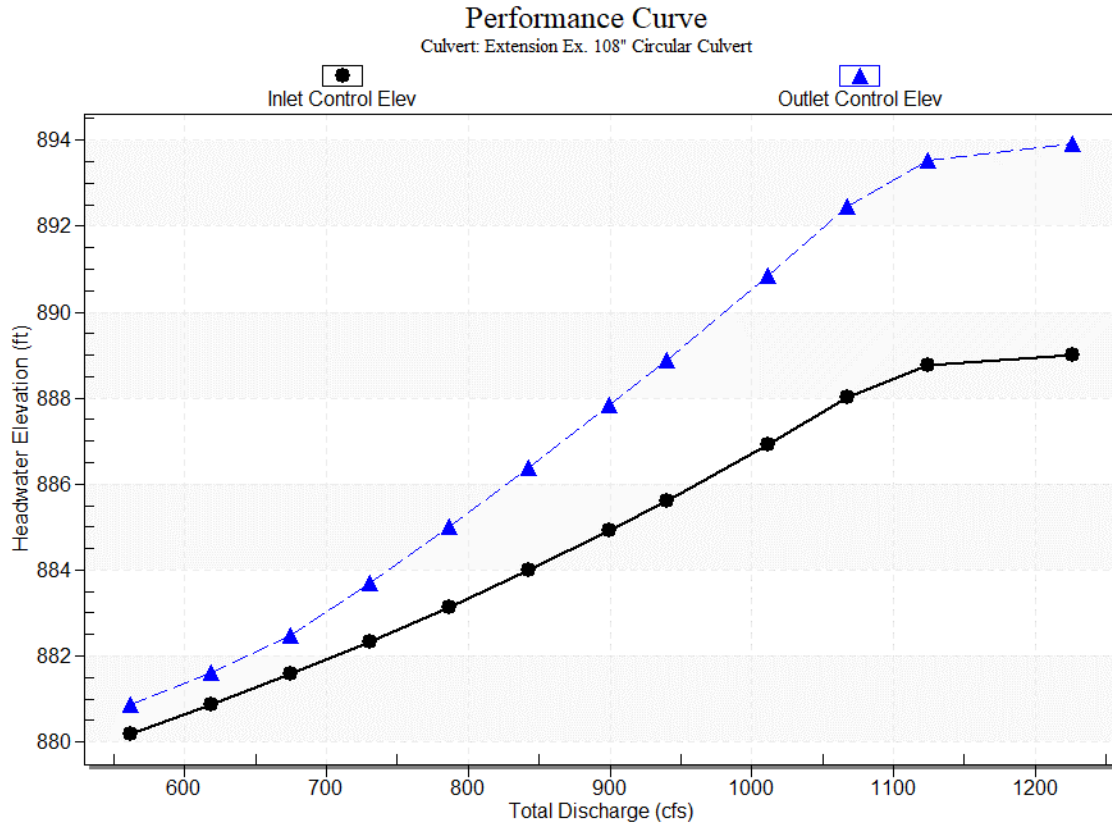
Inlet Elevation (invert): 871.13 ft,

Outlet Elevation (invert): 869.11 ft

Culvert Length: 334.11 ft,

Culvert Slope: 0.0060

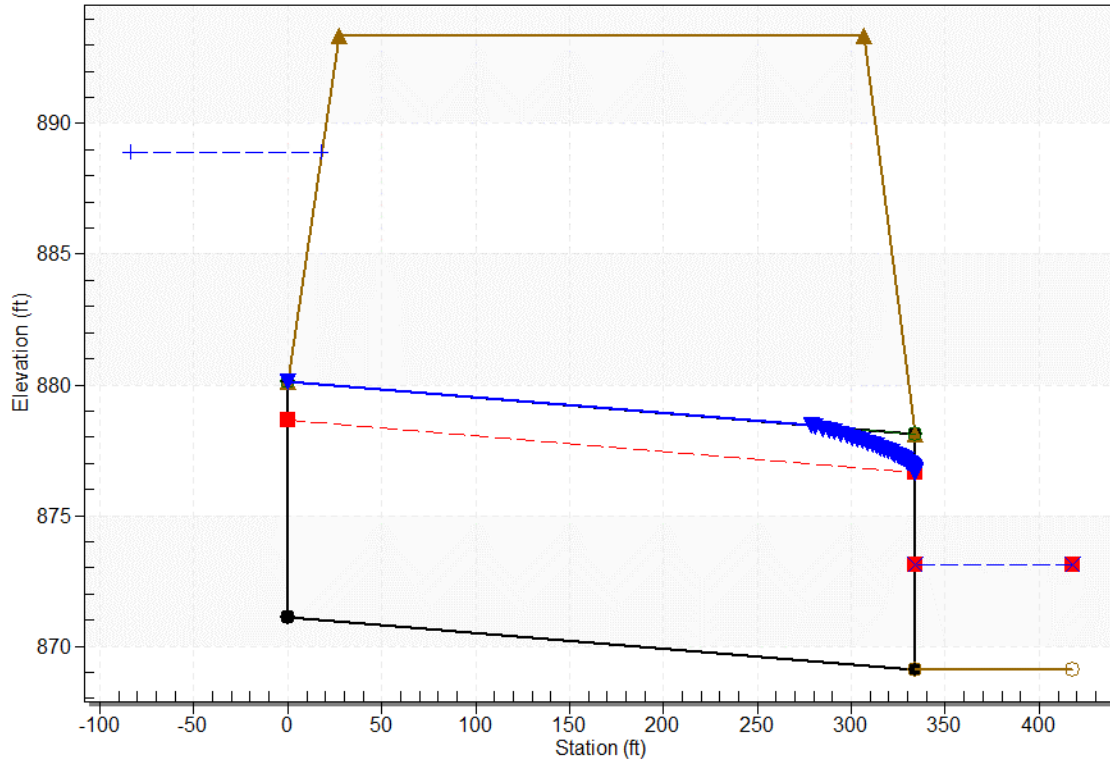
Culvert Performance Curve Plot: Extension Ex. 108" Circular Culvert



Water Surface Profile Plot for Culvert: Extension Ex. 108" Circular Culvert

Crossing - I70 - Sta. 92+50, Design Discharge - 940.0 cfs

Culvert - Extension Ex. 108" Circular Culvert, Culvert Discharge - 940.0 cfs



Site Data - Extension Ex. 108" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 871.13 ft

Outlet Station: 334.10 ft

Outlet Elevation: 869.11 ft

Number of Barrels: 1

Culvert Data Summary - Extension Ex. 108" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 9.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0240

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: I70 - Sta. 92+50

Table 2 - Downstream Channel Rating Curve (Crossing: I70 - Sta. 92+50)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
562.00	872.13	3.02	8.43	4.15	0.96
618.20	872.30	3.19	8.67	4.37	0.97
674.40	872.45	3.34	8.90	4.59	0.98
730.60	872.60	3.49	9.11	4.79	0.98
786.80	872.74	3.63	9.31	4.99	0.99
843.00	872.88	3.77	9.50	5.18	0.99
899.20	873.01	3.90	9.68	5.36	0.99
940.00	873.11	4.00	9.80	5.49	1.00
1011.60	873.27	4.16	10.01	5.71	1.00
1067.80	873.39	4.28	10.17	5.87	1.01
1124.00	873.51	4.40	10.31	6.03	1.01

Tailwater Channel Data - I70 - Sta. 92+50

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 16.00 ft

Side Slope (H:V): 2.00 (2:1)

Channel Slope: 0.0220

Channel Manning's n: 0.0450

Channel Invert Elevation: 869.11 ft

Roadway Data for Crossing: I70 - Sta. 92+50

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 80.00 ft

Crest Elevation: 893.34 ft

Roadway Surface: Paved

Roadway Top Width: 280.00 ft

County Station	FAJ/LIC 92+50	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 108
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User Input	
pH _w	Abrasion Level
7.5	2.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	**707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Invert	**707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Bituminous paved Invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized Culvert or Liner Pipe-Round, Pipe Arch, or Box	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate Culvert or Liner Pipe-Round, Pipe Arch, and Arch	707.24 Aluminum Spiral Rib Storm Sewer or Liner Pipe-Round	707.25 Aluminum Box Culvert -Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe-Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe-Round, Pipe Arch, or Box	Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe -Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
min gauge or thickness	1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1	8	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
	2	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Gauge	Thickness (inches)	16	0.064	14	0.079	12	0.109	10	0.138	8	0.168	7	0.188	5	0.219	3	0.249	1	0.28	Casing	0.5	

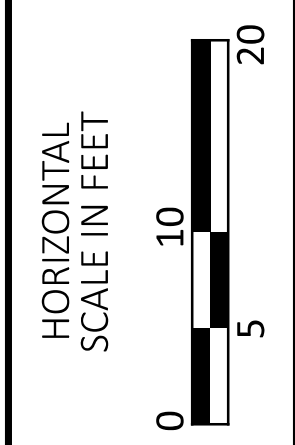
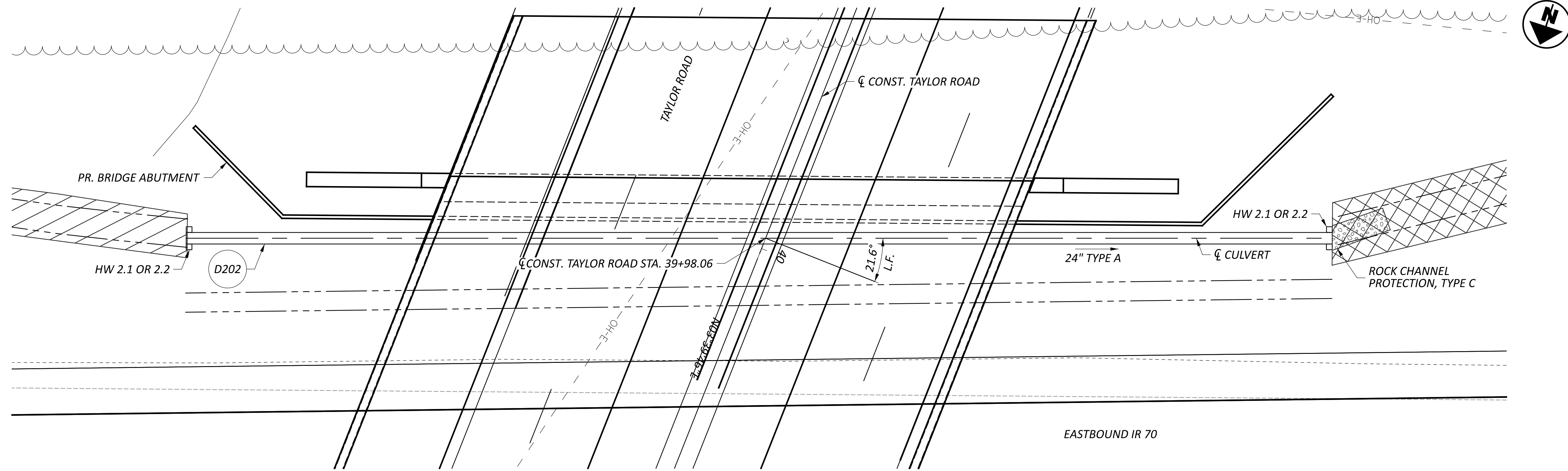
Concrete Conduit Durability Results						
Material	**706.01 Non-reinforced Concrete Pipe	**706.02 Reinforced Concrete Circular Pipe	**706.03 Reinforced Concrete Pipe, Epoxy Coated	**706.04 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	**706.05 Precast Reinforced Concrete Box Sections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

Notes:

- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.
- Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.1
- Options were eliminated when the NCSRA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limiter
- Epoxy is required on all concrete surfaces when pH<4
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Dat.
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved Invert=	10
Bituminous lined =	25
Galvanized=	0



CULVERT DETAIL
 TAYLOR ROAD BRIDGE ABUTMENT

LEGEND

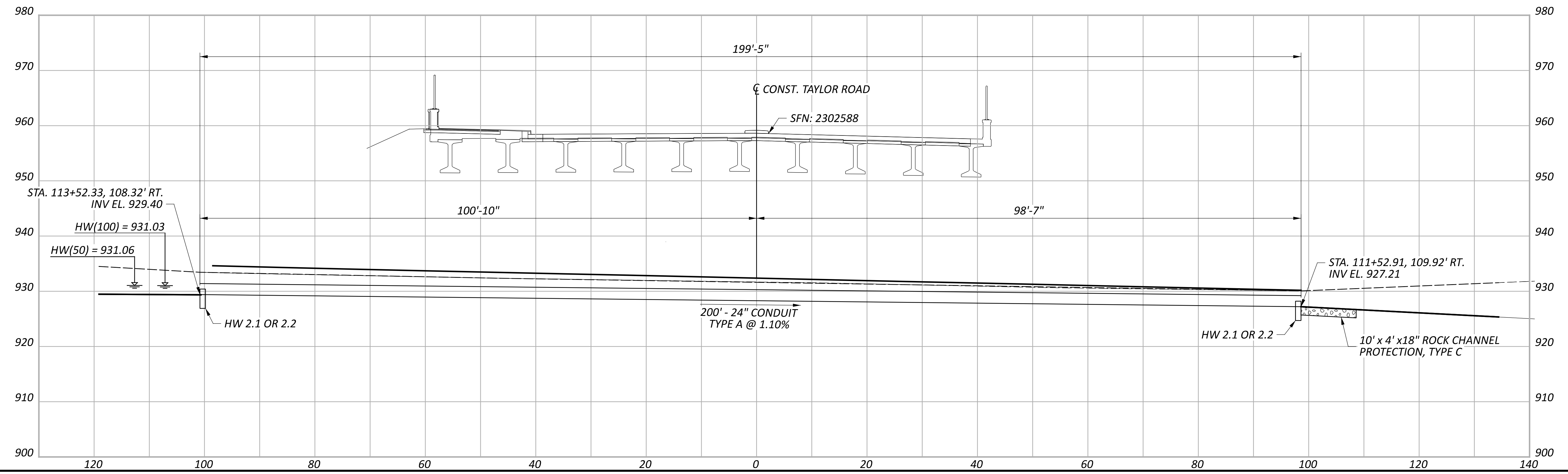
	ITEM 670 - SLOPE EROSION PROTECTION MAT
	ITEM 836 - EROSION CONTROL WITH TURF REINFORCING MAT

PROPOSED STRUCTURE

TYPE:	24" CIRCULAR CONDUIT, TYPE A, 706.01, 706.02, 707.01 (0.218) GALVANIZED, 707.01 (0.064) ALUMINIZED, 707.04 (0.064) POLYMERIC COATED, 706.33, 707.35, OR 707.42
SKEW:	21.6° L.F.
ALIGNMENT:	TANGENT
CFN:	TBD

HYDRAULIC DATA

DRAINAGE AREA =	3.12 ACRES				
Q (50) =	9.42 CFS	V (50) =	7.82 FT/S	HW (50) =	931.03 FT
Q (100) =	9.68 CFS	V (100) =	7.87 FT/S	HW (100) =	931.09 FT
ORDINARY HIGH WATER MARK:	N/A				
DESIGN SERVICE LIFE:	75 YEARS				
ABRASION LEVEL:	2.0				
pH:	7.6				



DESIGN AGENCY

 DESIGNER
 CEF
 REVIEWER
 DMG 06/28/24
 PROJECT ID
 96808
 SHEET TOTAL
 P.0866 | P.0986

Job Name: FAI/LIC-70 Job No.: 96808
 Location: Fairfield and Licking Counties Sheet: 1 of 1
 Task: Taylor Road - Drive Pipe (Sta. 53+00)
 Calculated By: CEF Date: 5/7/2024
 Checked By: DMG Date: 5/7/2024

Time of Concentration Palmer Road Closed Storm and Ditch

Drainage Area = 3.12 ac
 C = 0.7

Time of Concentration = 25.81 mins

*from ditch calcs for Eastbound I-70 (Sta. 120+00 to Sta. 113+50)

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

Q = CiA

i ₂ =	2.46	in/hr	Q ₂ =	5.38	cfs
i ₅ =	2.96	in/hr	Q ₅ =	6.47	cfs
i ₁₀ =	3.36	in/hr	Q ₁₀ =	7.34	cfs
i ₂₅ =	3.87	in/hr	Q ₂₅ =	8.46	cfs
i ₅₀ =	4.23	in/hr	Q ₅₀ =	9.24	cfs
i ₁₀₀ =	4.55	in/hr	Q ₁₀₀ =	9.94	cfs

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 7.34 cfs

Design Flow: 9.24 cfs

Maximum Flow: 9.94 cfs

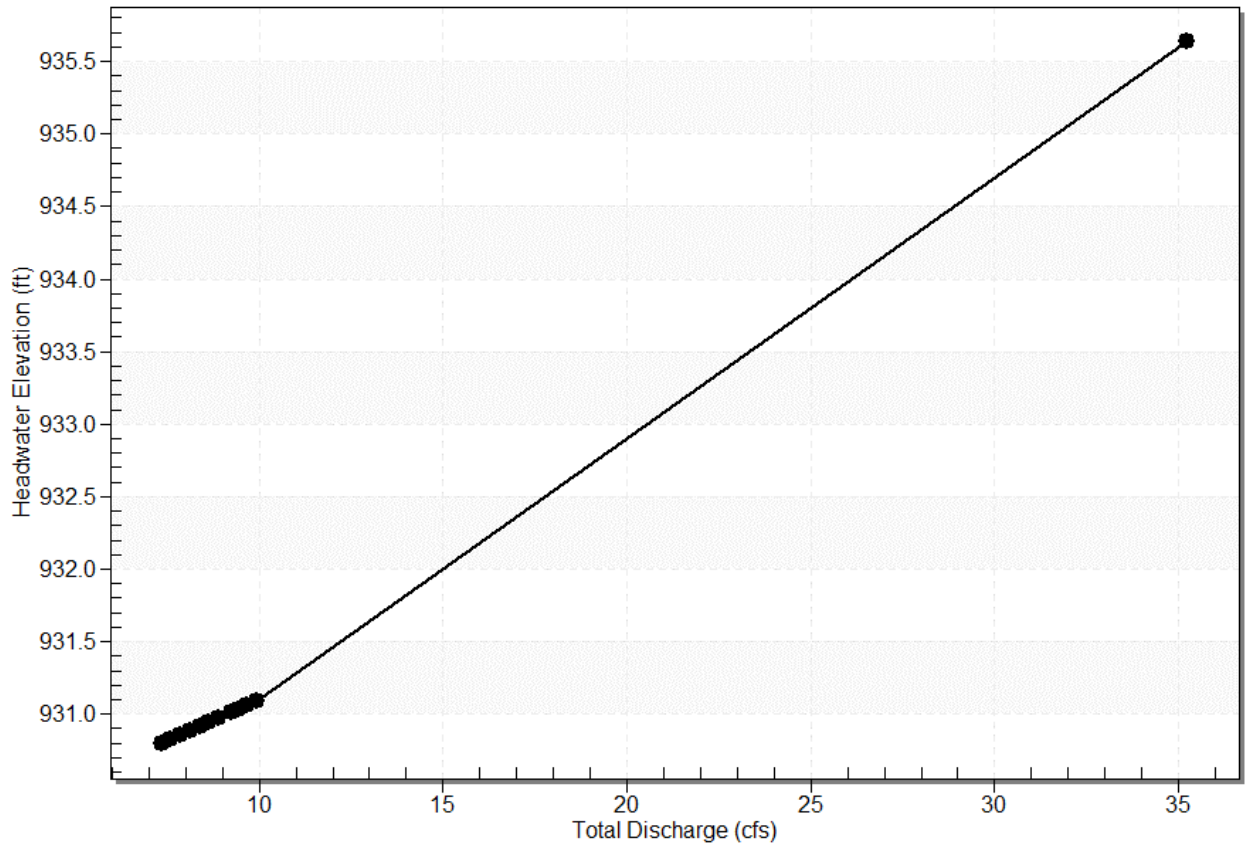
Table 1 - Summary of Culvert Flows at Crossing: Taylor Road - Bridge Abutment

Headwater Elevation (ft)	Total Discharge (cfs)	Pr. 24" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
930.80	7.34	7.34	0.00	1
930.83	7.60	7.60	0.00	1
930.86	7.86	7.86	0.00	1
930.89	8.12	8.12	0.00	1
930.92	8.38	8.38	0.00	1
930.95	8.64	8.64	0.00	1
930.98	8.90	8.90	0.00	1
931.01	9.24	9.24	0.00	1
931.03	9.42	9.42	0.00	1
931.06	9.68	9.68	0.00	1
931.09	9.94	9.94	0.00	1
935.56	33.72	33.72	0.00	Overtopping

Rating Curve Plot for Crossing: Taylor Road - Bridge Abutment

Total Rating Curve

Crossing: Taylor Road - Bridge Abutment



Culvert Data: Pr. 24" Circular Culvert

Table 1 - Culvert Summary Table: Pr. 24" Circular Culvert

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)
7.34 cfs	7.34 cfs	930.80	1.40	0.0*	1-S2n	0.71	0.96	0.71	0.70	7.31	5.23
7.60 cfs	7.60 cfs	930.83	1.43	0.0*	1-S2n	0.73	0.98	0.73	0.72	7.38	5.28
7.86 cfs	7.86 cfs	930.86	1.46	0.0*	1-S2n	0.74	1.00	0.74	0.74	7.45	5.33
8.12 cfs	8.12 cfs	930.89	1.49	0.0*	1-S2n	0.75	1.01	0.75	0.75	7.52	5.38
8.38 cfs	8.38 cfs	930.92	1.52	0.0*	1-S2n	0.77	1.03	0.77	0.77	7.58	5.42
8.64 cfs	8.64 cfs	930.95	1.55	0.0*	1-S2n	0.78	1.05	0.78	0.79	7.64	5.47
8.90 cfs	8.90 cfs	930.98	1.58	0.0*	1-S2n	0.79	1.06	0.79	0.81	7.71	5.51
9.24 cfs	9.24 cfs	931.01	1.61	0.0*	1-S2n	0.81	1.09	0.81	0.83	7.70	5.57
9.42 cfs	9.42 cfs	931.03	1.63	0.0*	1-S2n	0.82	1.10	0.82	0.84	7.82	5.60
9.68 cfs	9.68 cfs	931.06	1.66	0.0*	1-S2n	0.83	1.11	0.83	0.86	7.88	5.64
9.94 cfs	9.94 cfs	931.09	1.69	0.0*	1-S2n	0.84	1.13	0.85	0.88	7.87	5.68

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 929.40 ft,

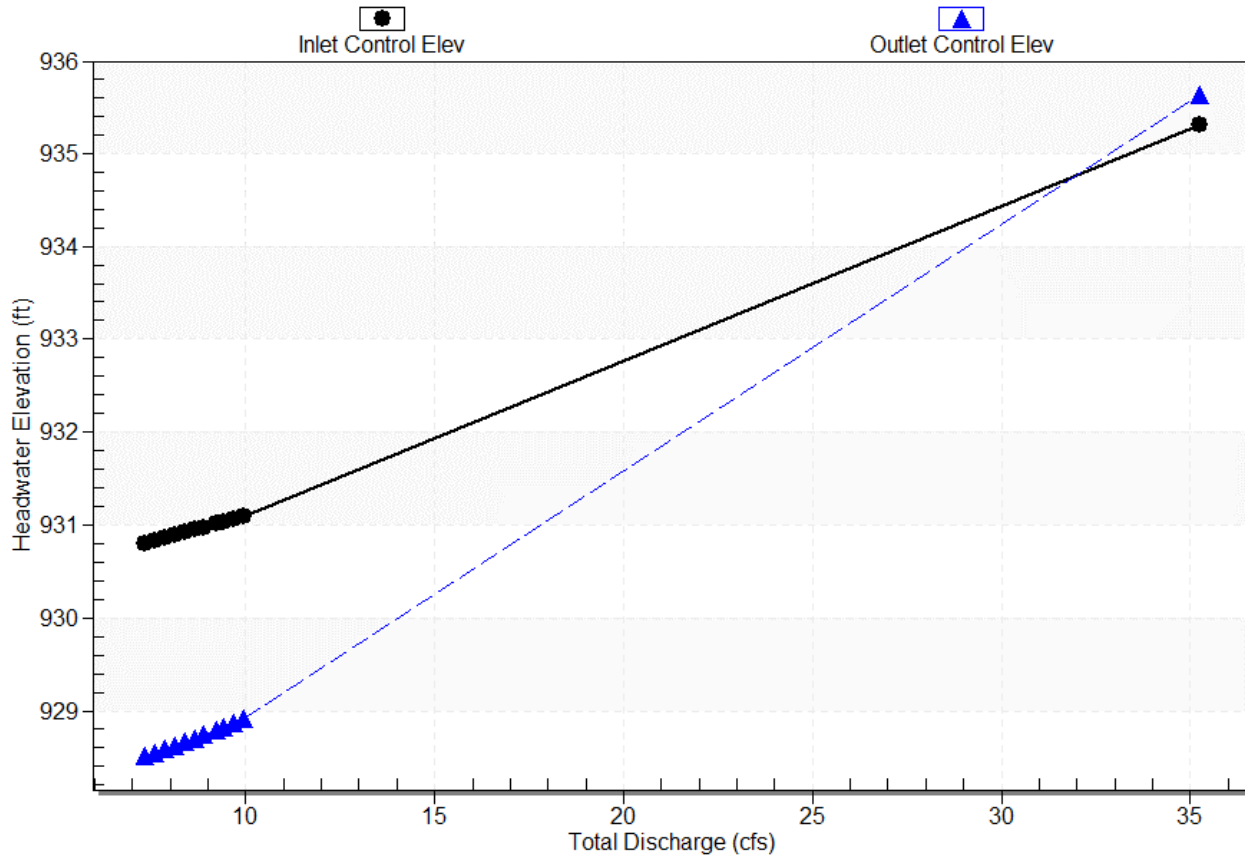
Outlet Elevation (invert): 927.26 ft

Culvert Length: 177.31 ft,

Culvert Slope: 0.0121

Culvert Performance Curve Plot: Pr. 24" Circular Culvert

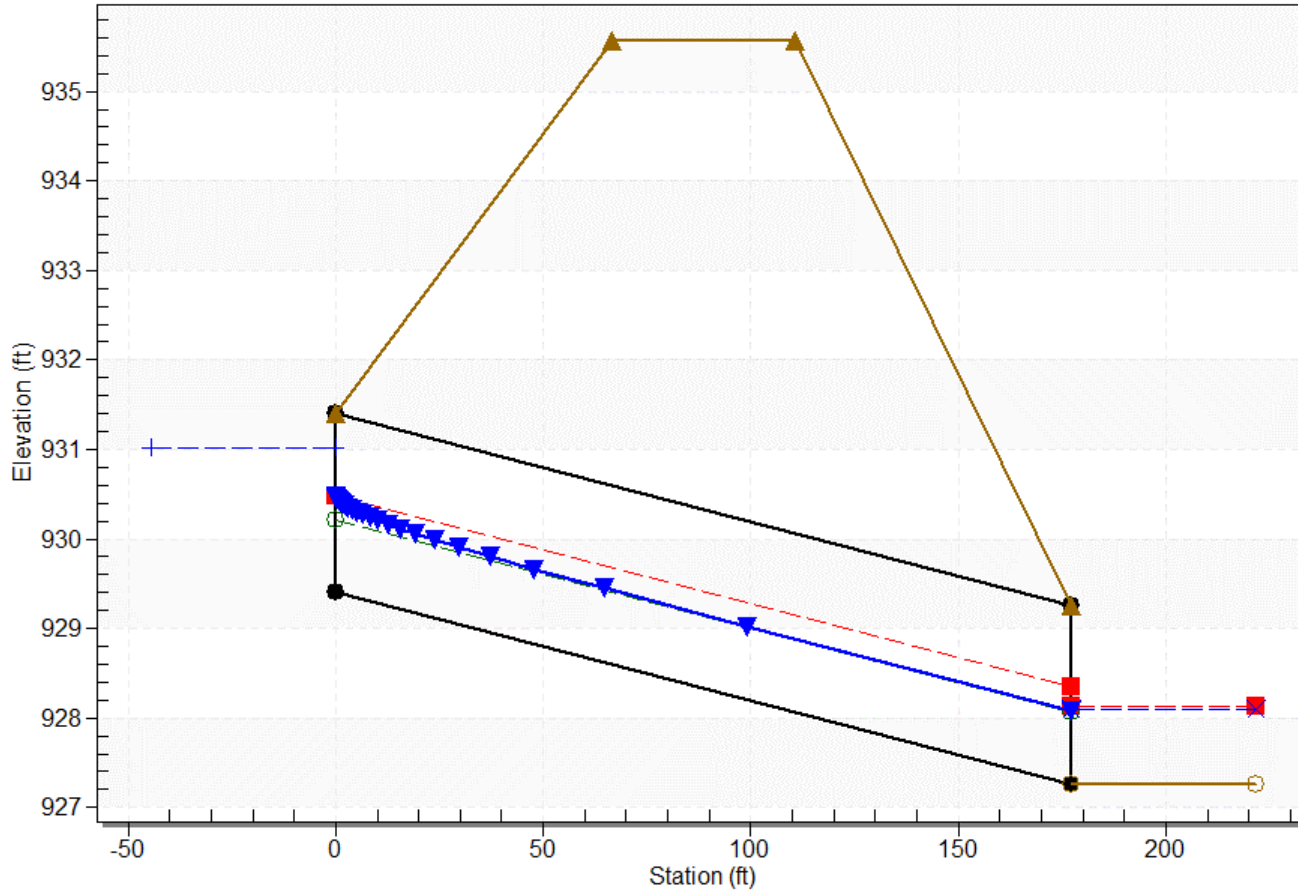
Performance Curve
Culvert: Pr. 24" Circular Culvert



Water Surface Profile Plot for Culvert: Pr. 24" Circular Culvert

Crossing - Taylor Road - Bridge Abutment, Design Discharge - 9.2 cfs

Culvert - Pr. 24" Circular Culvert, Culvert Discharge - 9.2 cfs



Site Data - Pr. 24" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 929.40 ft

Outlet Station: 177.30 ft

Outlet Elevation: 927.26 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 24" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material:

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: Taylor Road - Bridge Abutment

Table 2 - Downstream Channel Rating Curve (Crossing: Taylor Road - Bridge Abutment)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
7.34	927.96	0.70	5.23	1.59	1.10
7.60	927.98	0.72	5.28	1.63	1.10
7.86	928.00	0.74	5.33	1.67	1.09
8.12	928.01	0.75	5.38	1.71	1.09
8.38	928.03	0.77	5.42	1.75	1.09
8.64	928.05	0.79	5.47	1.79	1.08
8.90	928.07	0.81	5.51	1.83	1.08
9.24	928.09	0.83	5.57	1.88	1.08
9.42	928.10	0.84	5.60	1.91	1.08
9.68	928.12	0.86	5.64	1.94	1.07
9.94	928.14	0.88	5.68	1.98	1.07

Tailwater Channel Data - Taylor Road - Bridge Abutment

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 ft

Channel Slope: 0.0363

Channel Manning's n: 0.0300

Channel Invert Elevation: 927.26 ft

Roadway Data for Crossing: Taylor Road - Bridge Abutment

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 ft

Crest Elevation: 935.56 ft

Roadway Surface: Paved

Roadway Top Width: 44.00 ft

County Station	FAI/LC 39+98.06 (Taylor Road)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 24
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User Input	
pH _a	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	***707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with invert	***707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate	707.24 Aluminum Spiral Rib	707.25 Aluminum Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe -Round, Pipe Arch, or Box	Culvert or Liner Pipe -Round or Pipe Arch	Culvert or Liner Pipe - Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16	0.5	16	N/A	N/A	N/A	16
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0.5	10	N/A	N/A	12	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gauge	Thickness (inches)	16	14	12	10	8	7	5	3	1	Casing	0.5										

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 or Liner Pipe - Round	Storm Sewer - Round

Notes:
 Many metal options are eliminated when abrasion level equals 4 or greater
 Aluminum is only available between pH levels ranging from 5.0 to less than 9.0
 Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
 Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.0
 Options were eliminated when the NCSPA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limitations
 Epoxy is required on all concrete surfaces when pH<5
 ** Smooth lined conduit
 ***Minimum gauges set per industry comments; see Reference Data
 Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined=	25
Galvanized=	0



Job Name: FAI/LIC-70-0.00/0.00 Job No.: 96808
 Location: ODOT District 5 Sheet: 1 of 1
 Task: Culvert Discharge - Ramp C (sta. 61+40)
 Calculated By: CEF Date: 4/22/2024
 Checked By: DMG Date: 4/24/2024

Weighted Runoff Coefficient

Drainage Area = 3.57 ac
 Paved Area: 0.59
 Unpaved Area: 2.98

Paved Area "C" Value: 0.90
 Unpaved Area "C" Value: 0.50

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.57

Time of Concentration

Time of Concentration from Ditch Calculations

Run 12: I-70 Median Ditch Outlet = 24.08 minutes

Culvert Time of Concentration = 24.08 minutes

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

i₂ = 2.56 in/hr
 i₅ = 3.09 in/hr
 i₁₀ = 3.5 in/hr
 i₂₅ = 4.03 in/hr
 i₅₀ = 4.39 in/hr
 i₁₀₀ = 4.72 in/hr

$$Q = CiA$$

Q₂ = 5.18 cfs
 Q₅ = 6.25 cfs
 Q₁₀ = 7.08 cfs
 Q₂₅ = 8.15 cfs
 Q₅₀ = 8.88 cfs
 Q₁₀₀ = 9.54 cfs

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 7.08 cfs

Design Flow: 8.88 cfs

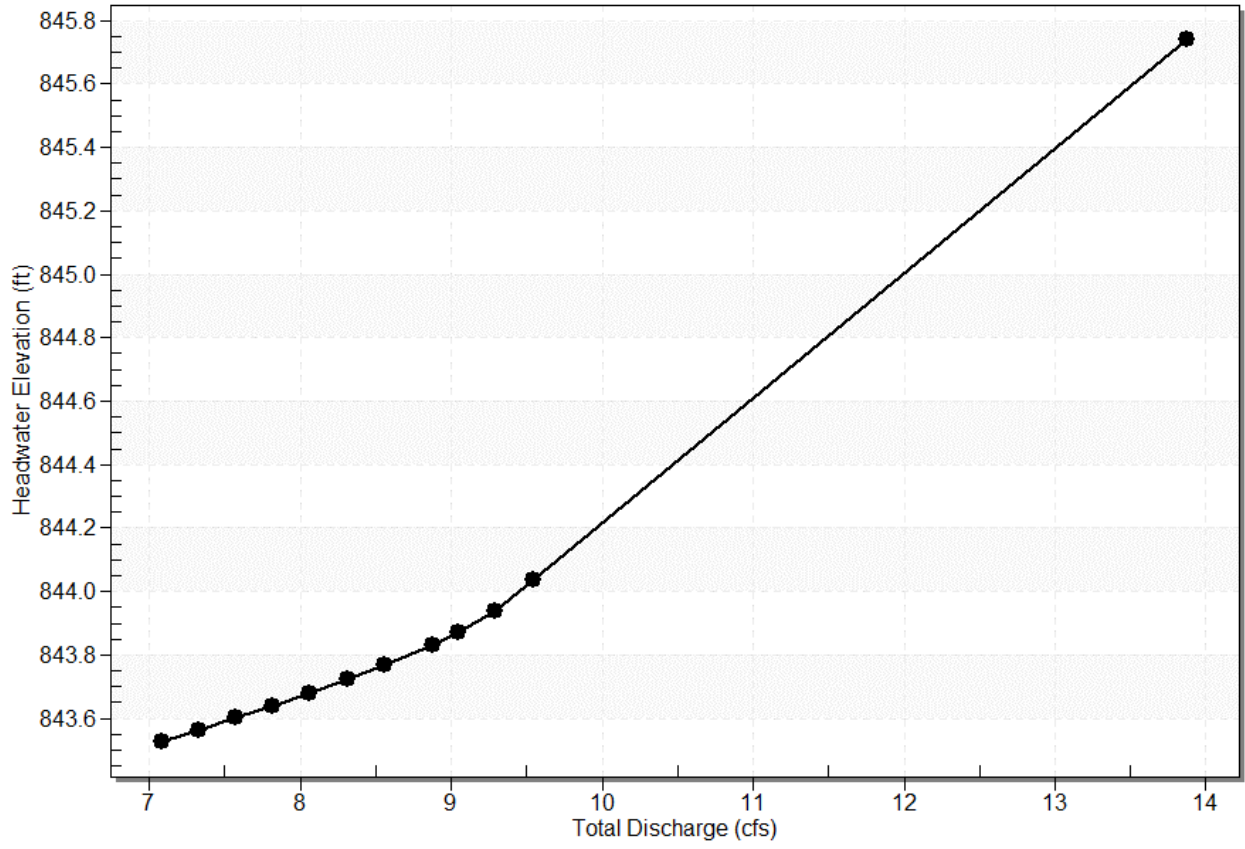
Maximum Flow: 9.54 cfs

Table 1 - Summary of Culvert Flows at Crossing: Ramp C - Sta. 61+40

Headwater Elevation (ft)	Total Discharge (cfs)	Pr. 18" Circular Culvert Replacement Discharge (cfs)	Roadway Discharge (cfs)	Iterations
843.53	7.08	7.08	0.00	1
843.56	7.33	7.33	0.00	1
843.60	7.57	7.57	0.00	1
843.64	7.82	7.82	0.00	1
843.68	8.06	8.06	0.00	1
843.72	8.31	8.31	0.00	1
843.77	8.56	8.56	0.00	1
843.83	8.88	8.88	0.00	1
843.87	9.05	9.05	0.00	1
843.94	9.29	9.29	0.00	1
844.04	9.54	9.54	0.00	1
845.72	13.40	13.40	0.00	Overtopping

Rating Curve Plot for Crossing: Ramp C - Sta. 61+40

Total Rating Curve
Crossing: Ramp C - Sta. 61+40



Culvert Data: Pr. 18" Circular Culvert Replacement

Table 1 - Culvert Summary Table: Pr. 18" Circular Culvert Replacement

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)
7.08 cfs	7.08 cfs	843.53	1.65	1.708	7-M2c	1.09	1.03	1.03	0.53	5.47	4.41
7.33 cfs	7.33 cfs	843.56	1.69	1.745	7-M2c	1.12	1.05	1.05	0.54	5.56	4.45
7.57 cfs	7.57 cfs	843.60	1.74	1.782	7-M2c	1.15	1.07	1.07	0.54	5.64	4.50
7.82 cfs	7.82 cfs	843.64	1.79	1.820	7-M2c	1.19	1.08	1.08	0.55	5.72	4.54
8.06 cfs	8.06 cfs	843.68	1.84	1.860	7-M2c	1.23	1.10	1.10	0.56	5.81	4.58
8.31 cfs	8.31 cfs	843.72	1.89	1.902	7-M2c	1.27	1.12	1.12	0.57	5.89	4.62
8.56 cfs	8.56 cfs	843.77	1.94	1.946	7-M2c	1.34	1.13	1.13	0.58	5.98	4.65
8.88 cfs	8.88 cfs	843.83	2.01	2.012	7-M2c	1.50	1.15	1.15	0.59	6.09	4.70
9.05 cfs	9.05 cfs	843.87	2.04	2.050	7-M2c	1.50	1.16	1.16	0.60	6.15	4.73
9.29 cfs	9.29 cfs	843.94	2.10	2.117	7-M2c	1.50	1.18	1.18	0.61	6.24	4.76
9.54 cfs	9.54 cfs	844.04	2.16	2.216	7-M2c	1.50	1.19	1.19	0.62	6.33	4.80

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

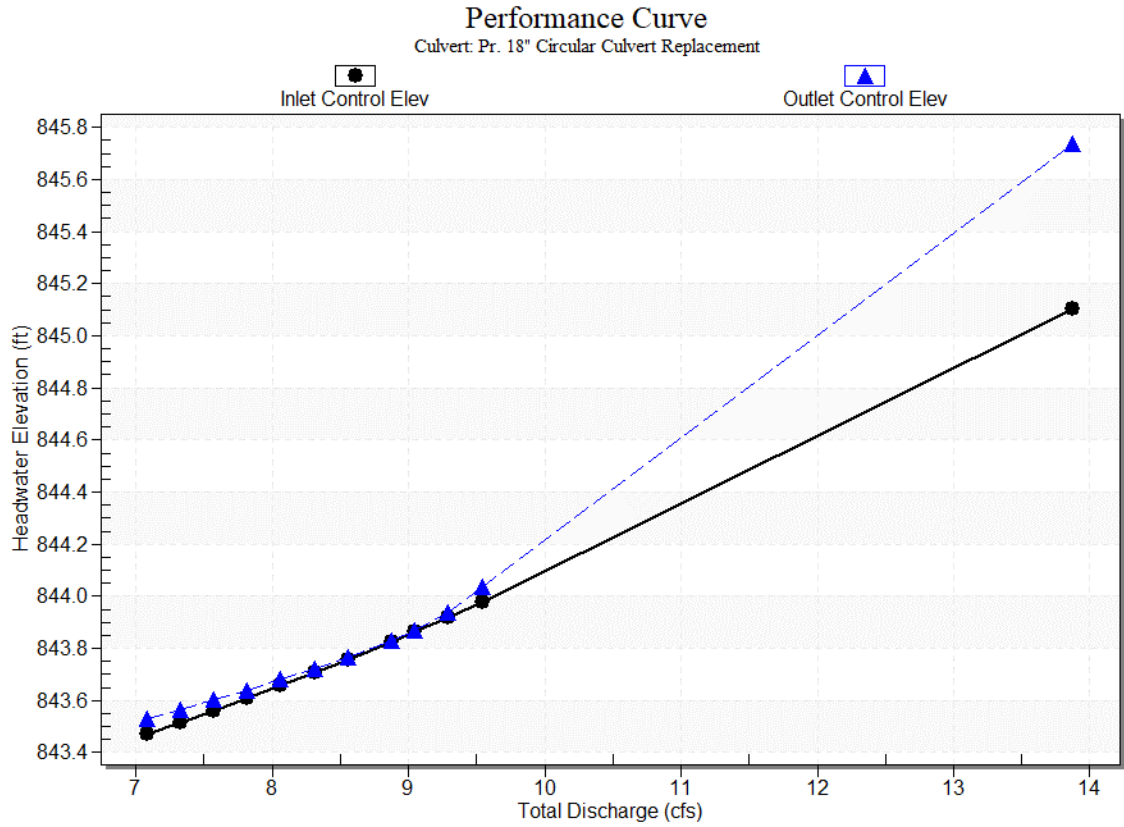
Inlet Elevation (invert): 841.82 ft,

Outlet Elevation (invert): 841.18 ft

Culvert Length: 127.70 ft,

Culvert Slope: 0.0050

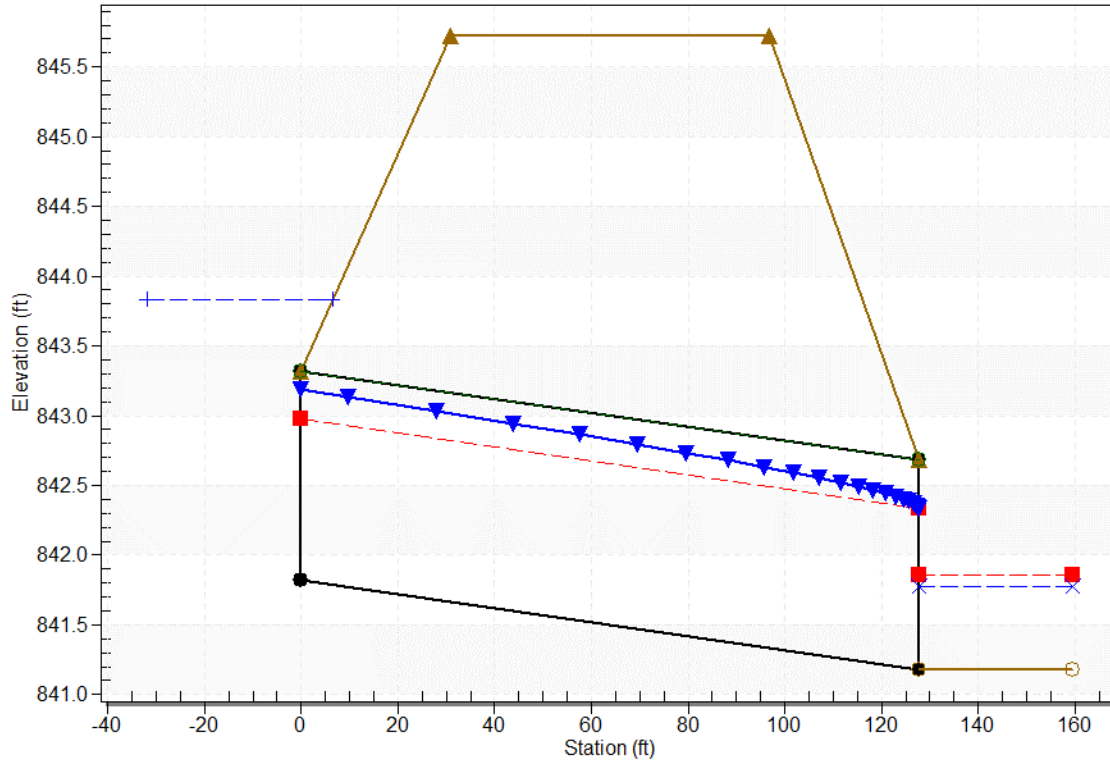
Culvert Performance Curve Plot: Pr. 18" Circular Culvert Replacement



Water Surface Profile Plot for Culvert: Pr. 18" Circular Culvert Replacement

Crossing - Ramp C - Sta. 61+40, Design Discharge - 8.9 cfs

Culvert - Pr. 18" Circular Culvert Replacement, Culvert Discharge - 8.9 cfs



Site Data - Pr. 18" Circular Culvert Replacement

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 841.82 ft

Outlet Station: 127.70 ft

Outlet Elevation: 841.18 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 18" Circular Culvert Replacement

Barrel Shape: Circular

Barrel Diameter: 1.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: Ramp C - Sta. 61+40

Table 2 - Downstream Channel Rating Curve (Crossing: Ramp C - Sta. 61+40)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
7.08	841.71	0.53	4.41	0.98	1.24
7.33	841.72	0.54	4.45	1.00	1.25
7.57	841.72	0.54	4.50	1.02	1.25
7.82	841.73	0.55	4.54	1.04	1.25
8.06	841.74	0.56	4.58	1.05	1.25
8.31	841.75	0.57	4.62	1.07	1.26
8.56	841.76	0.58	4.65	1.09	1.26
8.88	841.77	0.59	4.70	1.11	1.26
9.05	841.78	0.60	4.73	1.12	1.26
9.29	841.79	0.61	4.76	1.14	1.26
9.54	841.80	0.62	4.80	1.15	1.27

Tailwater Channel Data - Ramp C - Sta. 61+40

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0300

Channel Manning's n: 0.0300

Channel Invert Elevation: 841.18 ft

Roadway Data for Crossing: Ramp C - Sta. 61+40

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 55.00 ft

Crest Elevation: 845.72 ft

Roadway Surface: Paved

Roadway Top Width: 66.00 ft

County Station	FAJ/LIC 61+50 (RAMP C)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 18
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User Input	
pH _w	Abrasion Level
7.5	2.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	**707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Bituminous paved invert	**707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Bituminous paved invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized Culvert or Liner Pipe-Round, Pipe Arch, or Box	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate Culvert or Liner Pipe-Round, Pipe Arch, and Arch	707.24 Aluminum Spiral Rib Storm Sewer or Liner Pipe-Round	707.25 Aluminum Box Culvert -Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe-Round, Pipe Arch, or Box	Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe -Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16	0.5	16	N/A	N/A	N/A	16
min gauge or thickness	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A
max gauge or thickness	1/4 or 1/2	14	14	14	14	14	14	14	N/A	N/A	14	14	N/A	14	14	14	0.5	12	N/A	14	N/A	12
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14	N/A	N/A
Gauge	Thickness (inches)	16	0.064																			
		14	0.079																			
		12	0.109																			
		10	0.138																			
		8	0.168																			
		7	0.188																			
		5	0.219																			
		3	0.249																			
		1	0.28																			
		Casing	0.5																			

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

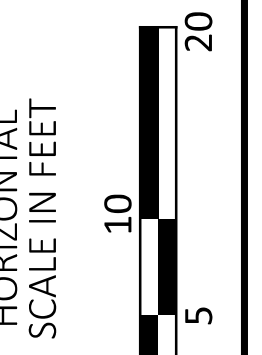
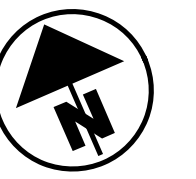
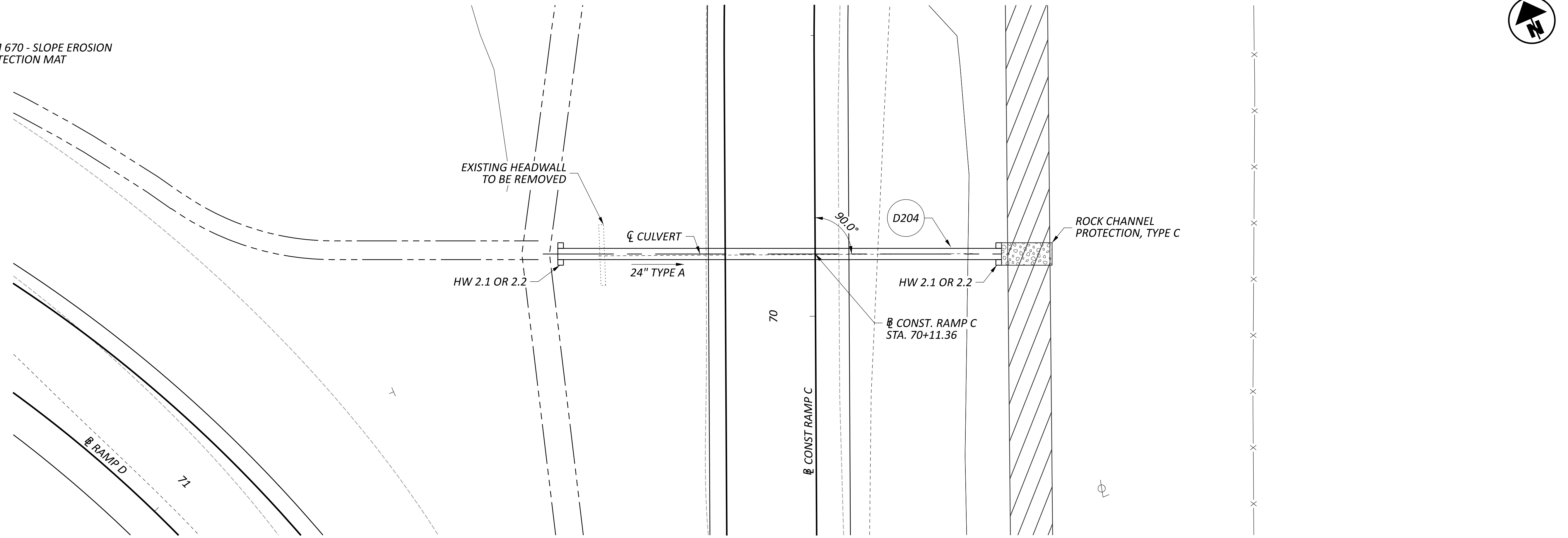
Plastic Conduit Durability Results													
Material	707.33 Corrugated Polyethylene Smooth Lined Pipe	707.34 Polyethylene Plastic Pipe Based on Outside Diameter (OD)	707.35 Polyethylene Profile Wall Pipe	707.42 Polyvinyl Chloride Corrugated Smooth Interior Pipe	707.43 Polyvinyl Chloride Profile Wall 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 or Liner Pipe - Round	Storm Sewer - Round

Notes:

- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.
- Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.1
- Options were eliminated when the NCSRA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limiter
- Epoxy is required on all concrete surfaces when pH<4
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Dat.
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of wat

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0

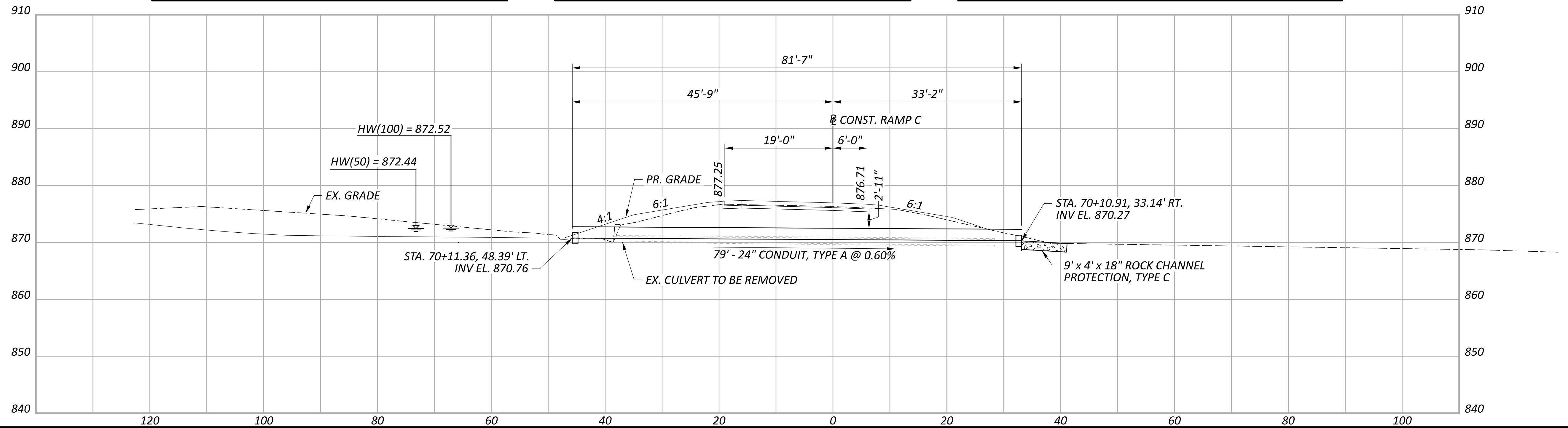
LEGEND
 ITEM 670 - SLOPE EROSION PROTECTION MAT



EXISTING STRUCTURE	
TYPE:	CIRCULAR CONCRETE
SIZE:	24"
SKEW:	0.0°
ALIGNMENT:	TANGENT
DATE BUILT:	7/1/1966
CONDITION:	GOOD
CFN:	1984377

PROPOSED STRUCTURE	
TYPE:	24" CIRCULAR CONDUIT, TYPE A, 707.01 (0.218) GALVANIZED, 707.01 (0.064) ALUMINIZED), 707.04 POLYMERIC COATED, 706.01, 706.02, 707.33, 707.35 OR 707.42
SKEW:	0.0°
ALIGNMENT:	TANGENT
CFN:	

HYDRAULIC DATA	
DRAINAGE AREA =	3.63 ACRES
Q (50) =	9.81 CFS
V (50) =	6.11 FT/S
HW (50) =	872.44 FT
Q (100) =	10.55 CFS
V (100) =	6.22 FT/S
HW (100) =	872.52 FT
ORDINARY HIGH WATER MARK:	N/A
DESIGN SERVICE LIFE:	75 YEARS
ABRASION LEVEL:	1.0
pH:	7.6



**CULVERT DETAIL
 RAMP C - STA. 70+11.09**

DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DIMG 06/28/24
PROJECT ID	96808
SHEET TOTAL	P.0868 P.0986



Job Name: FAI/LIC-70-0.00/0.00 Job No.: 96808
 Location: ODOT District 5 Sheet: 1 of 1
 Task: Culvert Dischage - Ramp C (sta. 70+11.00)
 Calculated By: CEF Date: 4/22/2024
 Checked By: DMG Date: 4/24/2024

Weighted Runoff Coefficient

Drainage Area = 3.63 ac	
Paved Area: 1.31	Paved Area "C" Value: 0.90
Unpaved Area: 2.32	Unpaved Area "C" Value: 0.50

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.64

Time of Concentration

Time of Concentration from Storm System Calculuations

Run 13: I-70 EB Concrete Barrier = 10.00 minutes

Time of Concentration from Ditch Calculuations

EB I70 and Ramp C/D infield ditch = 26.21 minutes *

*Includes storm system time of concentration

Culvert Time of Concentration = 26.21 minutes

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

i₂ = 2.43 in/hr
 i₅ = 2.94 in/hr
 i₁₀ = 3.33 in/hr
 i₂₅ = 3.84 in/hr
 i₅₀ = 4.19 in/hr
 i₁₀₀ = 4.51 in/hr

$$Q = CiA$$

Q₂ = 5.69 cfs
 Q₅ = 6.88 cfs
 Q₁₀ = 7.79 cfs
 Q₂₅ = 8.99 cfs
 Q₅₀ = 9.81 cfs
 Q₁₀₀ = 10.55 cfs

HY-8 Culvert Analysis Report

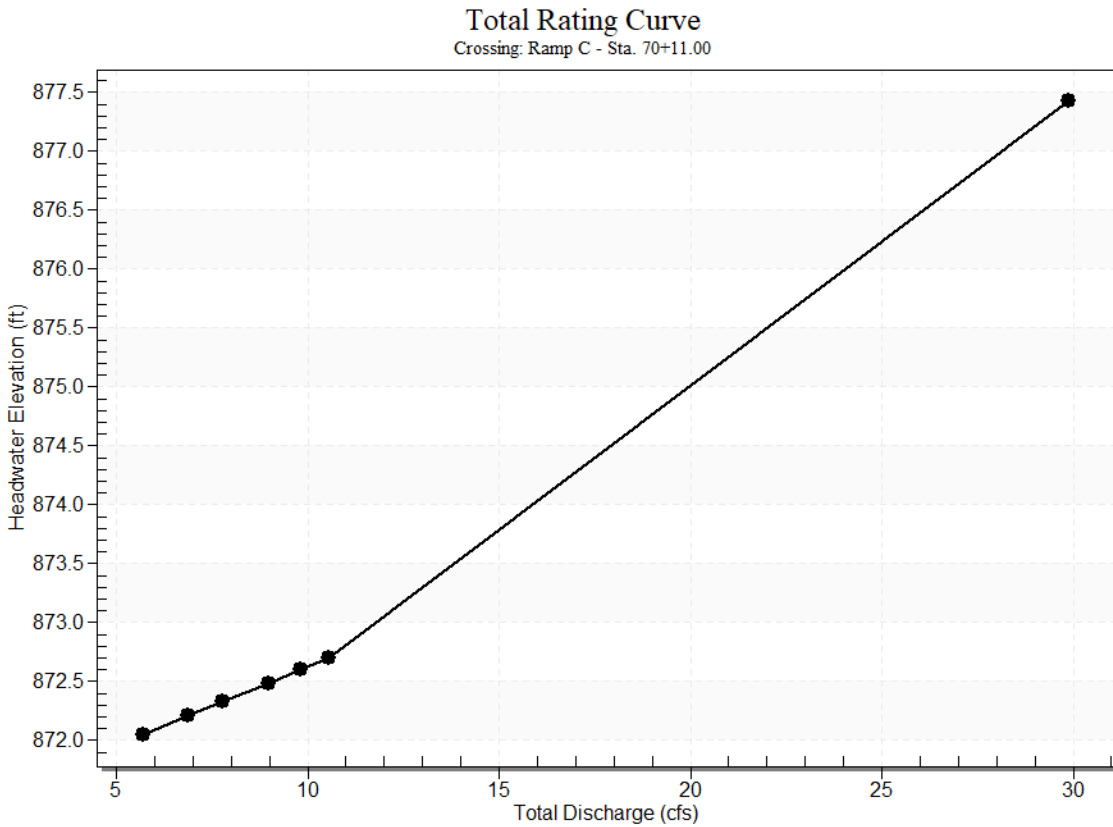
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: Ramp C - Sta. 70+11.00

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Pr. 21" Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
872.05	2 year	5.69	5.69	0.00	1
872.21	5 year	6.88	6.88	0.00	1
872.33	10 year	7.79	7.79	0.00	1
872.49	25 year	8.99	8.99	0.00	1
872.60	50 year	9.81	9.81	0.00	1
872.70	100 year	10.55	10.55	0.00	1
877.36	Overtopping	27.88	27.88	0.00	Overtopping

Rating Curve Plot for Crossing: Ramp C - Sta. 70+11.00



Culvert Data: Pr. 21" Culvert

Table 1 - Culvert Summary Table: Pr. 21" Culvert

Disc harg e Nam es	Total Disc harg e (cfs)	Culv ert Disc harg e (cfs)	Head water Eleva tion (ft)	Inle t Con trol Dep th (ft)	Out let Con trol Dep th (ft)	Fl o w Ty pe	Nor mal Dep th (ft)	Crit ical De pth (ft)	Ou tle t De pth (ft)	Tail water r Dept h (ft)	Outl et Vel ocit y (ft/ s)	Tail water r Velo city (ft/s)
2 year	5.69 cfs	5.69 cfs	872.0 5	1.29	0.73 4	1- S2 n	0.80	0.8 8	0.8 0	1.00	5.32	0.94
5 year	6.88 cfs	6.88 cfs	872.2 1	1.45	0.90 9	1- S2 n	0.89	0.9 7	0.8 9	1.08	5.58	0.99
10 year	7.79 cfs	7.79 cfs	872.3 3	1.57	1.05 1	1- S2 n	0.96	1.0 3	0.9 6	1.13	5.76	1.02
25 year	8.99 cfs	8.99 cfs	872.4 9	1.73	1.25 0	1- S2 n	1.05	1.1 1	1.0 5	1.19	5.95	1.05
50 year	9.81 cfs	9.81 cfs	872.6 0	1.84	1.39 4	5- S2 n	1.12	1.1 7	1.1 2	1.23	6.06	1.08
100 year	10.55 cfs	10.55 cfs	872.7 0	1.94	1.53 1	5- S2 n	1.17	1.2 1	1.1 8	1.27	6.14	1.10

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 870.76 ft,

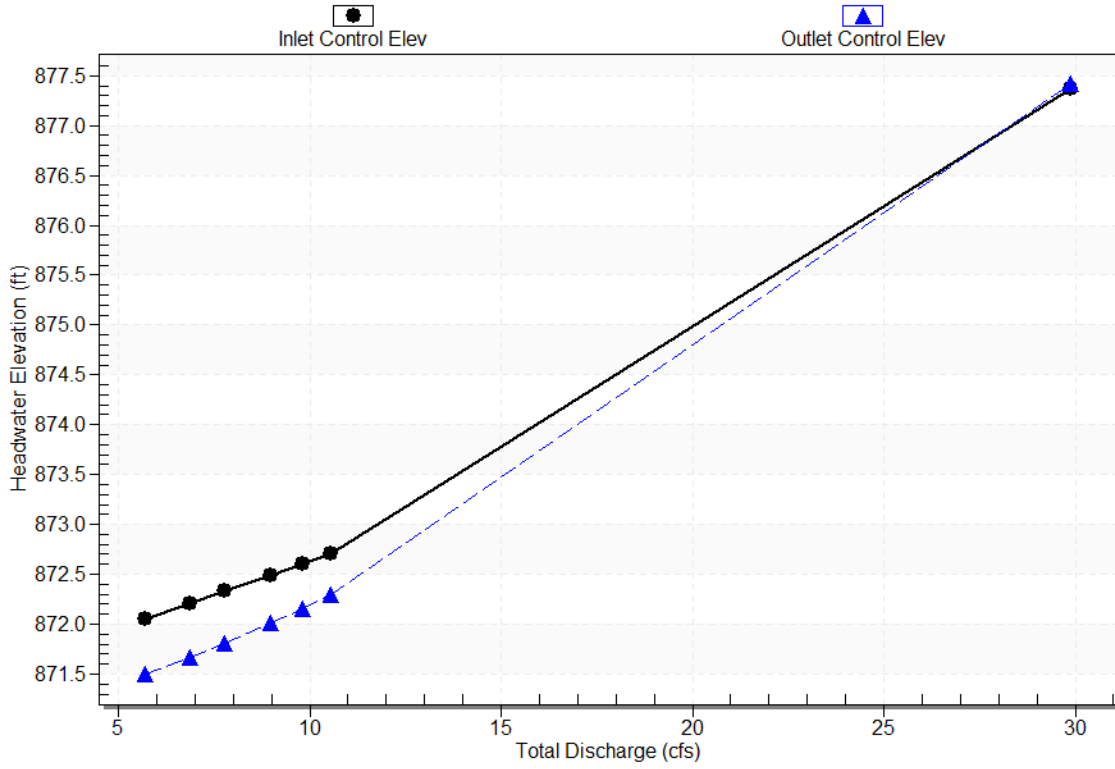
Outlet Elevation (invert): 870.27 ft

Culvert Length: 81.53 ft,

Culvert Slope: 0.0060

Culvert Performance Curve Plot: Pr. 21" Culvert

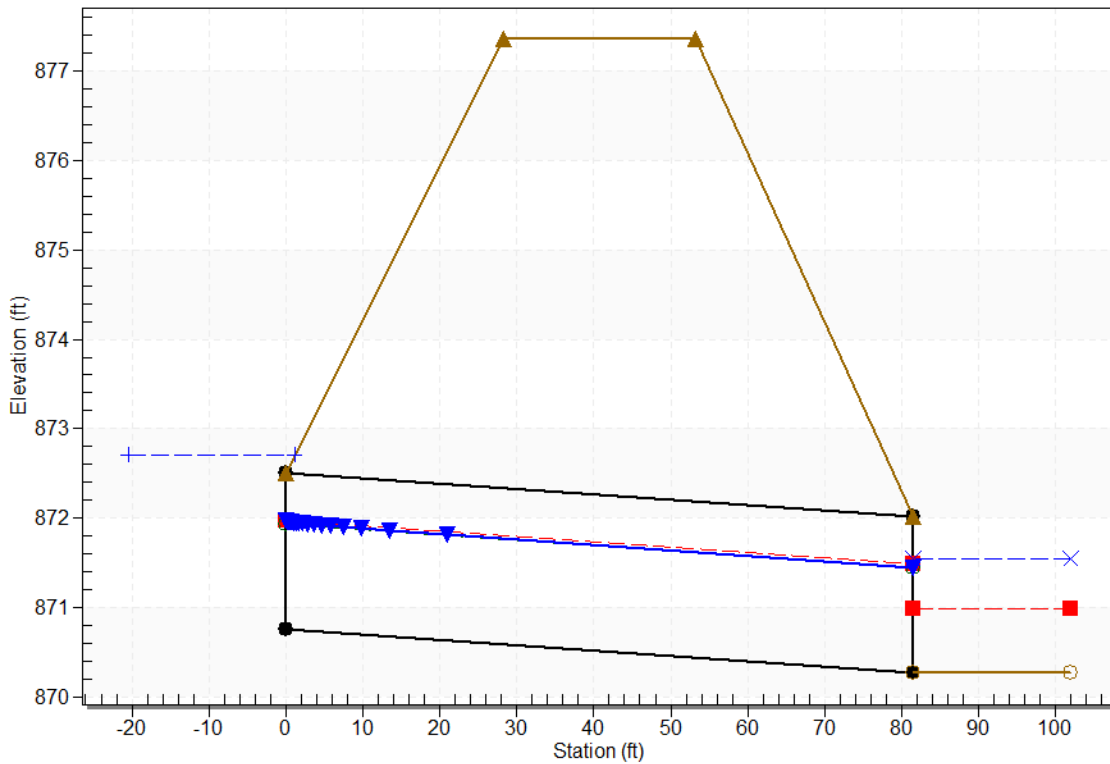
Performance Curve Culvert: Pr. 21" Culvert



Water Surface Profile Plot for Culvert: Pr. 21" Culvert

Crossing - Ramp C - Sta. 70+11.00, Design Discharge - 10.6 cfs

Culvert - Pr. 21" Culvert , Culvert Discharge - 10.6 cfs



Site Data - Pr. 21" Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 870.76 ft

Outlet Station: 81.53 ft

Outlet Elevation: 870.27 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 21" Culvert

Barrel Shape: Circular

Barrel Diameter: 1.75 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: Ramp C - Sta. 70+11.00

Table 2 - Downstream Channel Rating Curve (Crossing: Ramp C - Sta. 70+11.00)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
5.69	871.27	1.00	0.94	0.31	0.23
6.88	871.35	1.08	0.99	0.34	0.24
7.79	871.40	1.13	1.02	0.35	0.24
8.99	871.46	1.19	1.05	0.37	0.24
9.81	871.50	1.23	1.08	0.38	0.24
10.55	871.54	1.27	1.10	0.40	0.24

Tailwater Channel Data - Ramp C - Sta. 70+11.00

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 6.00 (:1)

Channel Slope: 0.0050

Channel Manning's n: 0.0700

Channel Invert Elevation: 870.27 ft

Roadway Data for Crossing: Ramp C - Sta. 70+11.00

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 40.00 ft

Crest Elevation: 877.36 ft

Roadway Surface: Paved

Roadway Top Width: 25.00 ft

County Station	FA/LIC 70+11 (RAMP C)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 21
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User Input	
pH _w	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	***707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Invert	***707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized Culvert or Liner Pipe-Round, Pipe Arch, or Box	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate Culvert or Liner Pipe-Round, Pipe Arch, and Arch	707.24 Aluminum Spiral Rib Storm Sewer or Liner Pipe-Round	707.25 Aluminum Box Culvert -Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round		Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe -Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16		16	N/A	N/A	N/A	16
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	N/A	N/A	N/A
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A
max gauge or thickness	1/4 or 1/2	12	12	12	12	12	12	12	N/A	N/A	12	12	N/A	12	12	12	0.5	12	N/A	14	N/A	12
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14	N/A	N/A
Gauge	Thickness (inches)	16	0.054																			
		14	0.079																			
		12	0.109																			
		10	0.138																			
		8	0.168																			
		7	0.188																			
		5	0.219																			
		3	0.249																			
		1	0.28																			
		Casing	0.5																			

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 or Liner Pipe - Round	Storm Sewer - Round

Notes:

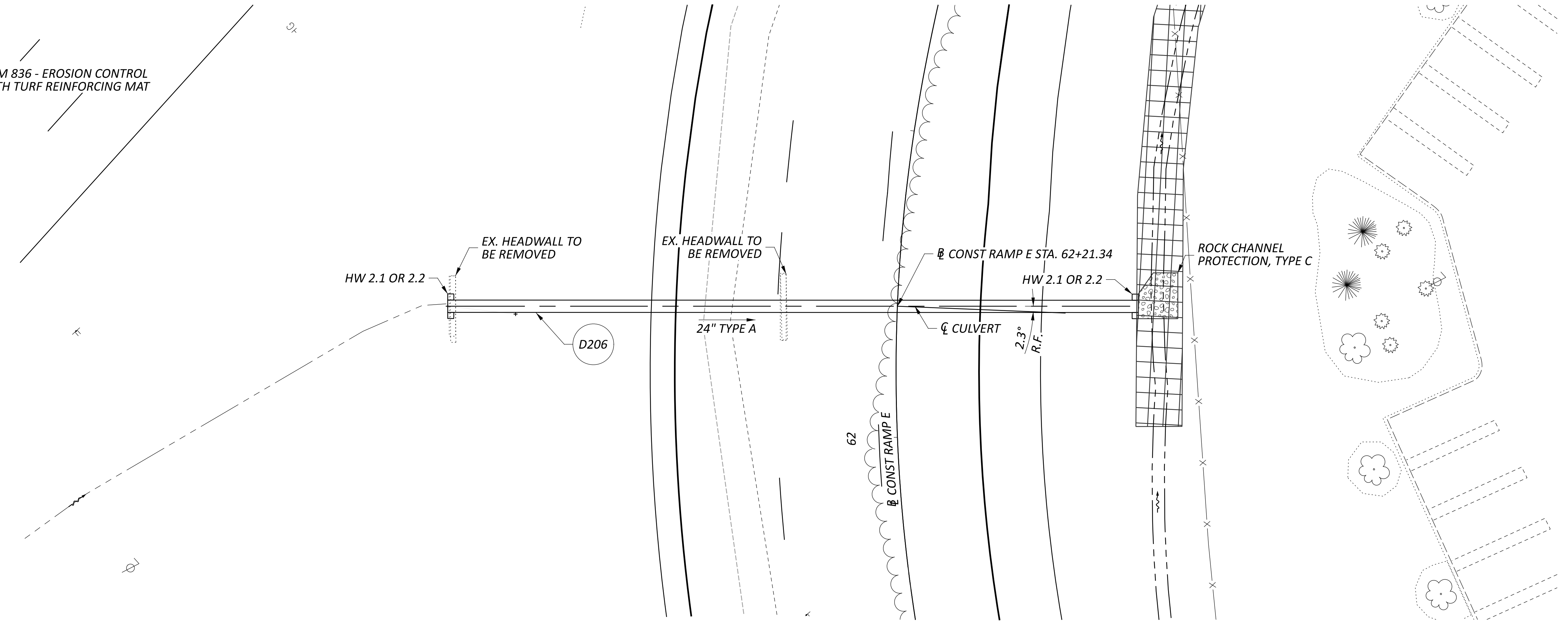
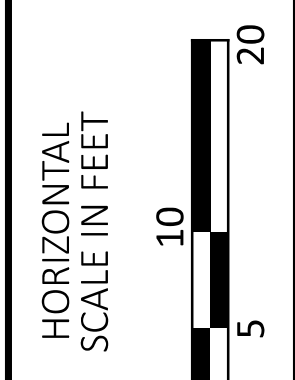
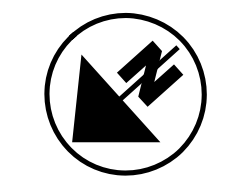
- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.
- Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.1
- Options were eliminated when the NCSRA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limiter
- Epoxy is required on all concrete surfaces when pH<4
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Dat.
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of wat

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0

FA/LIC-70-0.00/0.00

MODEL: Ramp E - Sta. 62+20 PAPER SIZE: 34x42 (in.) DATE: 6/27/2024 TIME: 11:23:12 AM USER: cflach
 pw:\ohiodot-pw.bentley.com\ohiodot-pw-02\Documents\01.Active Projects\District 05\Fairfield\96808\403-Engineering_Carpenter-Marty\Drawings\Sheets\96808_DC206.dgn

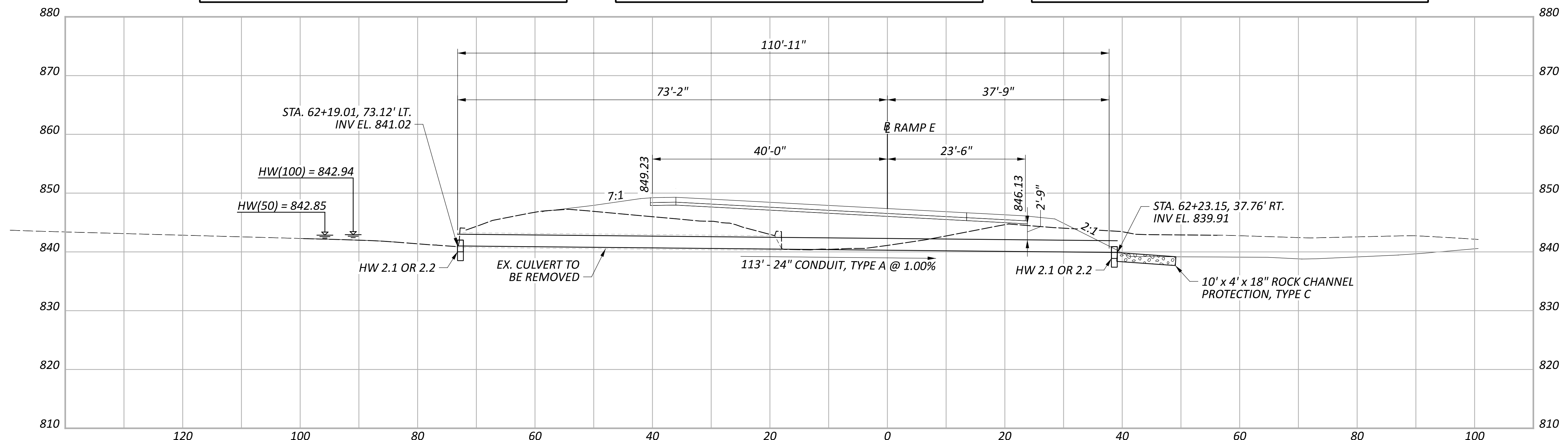
LEGEND
 ITEM 836 - EROSION CONTROL WITH TURF REINFORCING MAT



EXISTING STRUCTURE	
TYPE:	CIRCULAR CONCRETE
SIZE:	24"
SKEW:	2.3° R.F.
ALIGNMENT:	CURVE
DATE BUILT:	7/1/1966
CONDITION:	GOOD
CFN:	1984376

PROPOSED STRUCTURE	
TYPE:	24" CIRCULAR CONDUIT, TYPE A, 707.01 (0.218) GALVANIZED, 707.01 (0.064) ALUMINIZED, 707.04 POLYMERIC COATED, 706.01, 706.02, 707.33, 707.35 OR 707.42
SKEW:	2.3° R.F.
ALIGNMENT:	CURVE
CFN:	

HYDRAULIC DATA					
DRAINAGE AREA =	3.20 ACRES				
Q (50) =	11.25 CFS	V (50) =	3.71 FT/S	HW (50) =	842.85 FT
Q (100) =	12.10 CFS	V (100) =	3.95 FT/S	HW (100) =	842.94 FT
ORDINARY HIGH WATER MARK:	N/A				
DESIGN SERVICE LIFE:	75 YEARS				
ABRASION LEVEL:	1.0				
pH:	7.6				



CULVERT DETAIL
RAMP E - STA. 62+21.34

DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DIMG 06/28/24
PROJECT ID	96808
SHEET TOTAL	P.0869 P.0986

Job Name: FAI/LIC-70-0.00/0.00 Job No.: 96808
 Location: ODOT District 5 Sheet: 1 of 1
 Task: Culvert Discharge - Ramp E (Sta. 62+20)
 Calculated By: CEF Date: 4/22/2024
 Checked By: DMG Date: 4/24/2024

Weighted Runoff Coefficient

Drainage Area = 3.20 ac	Paved Area "C" Value: 0.90
Paved Area: 1.50	Unpaved Area "C" Value: 0.50
Unpaved Area: 1.70	

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.69

**Time of Concentration from Ditch Flow
Shallow Concentrated Flow**

$$V = \frac{3.3ks^{1/2}}{k} = \frac{3.3 * (0.457) * (3.5\%)^{1/2}}{0.035} = 0.282 \text{ fps}$$

$$t_s = \frac{L}{60V} = \frac{38}{(60) * (0.28)} = 2.24 \text{ min}$$

L = 38 ft

$$V = \frac{3.3ks^{1/2}}{k} = \frac{3.3 * (0.457) * (2\%)^{1/2}}{0.02} = 0.213 \text{ fps}$$

$$t_s = \frac{L}{60V} = \frac{200}{(60) * (0.21)} = 15.63 \text{ min}$$

L = 200 ft

2.24 mins + 15.63 min
 Culvert Time of Concentration = 17.87 minutes

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

Q = CiA

i ₂ = 3.06 in/hr	Q ₂ = 6.74 cfs
i ₅ = 3.66 in/hr	Q ₅ = 8.06 cfs
i ₁₀ = 4.11 in/hr	Q ₁₀ = 9.05 cfs
i ₂₅ = 4.7 in/hr	Q ₂₅ = 10.34 cfs
i ₅₀ = 5.11 in/hr	Q ₅₀ = 11.25 cfs
i ₁₀₀ = 5.5 in/hr	Q ₁₀₀ = 12.10 cfs

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 9.05 cfs

Design Flow: 11.25 cfs

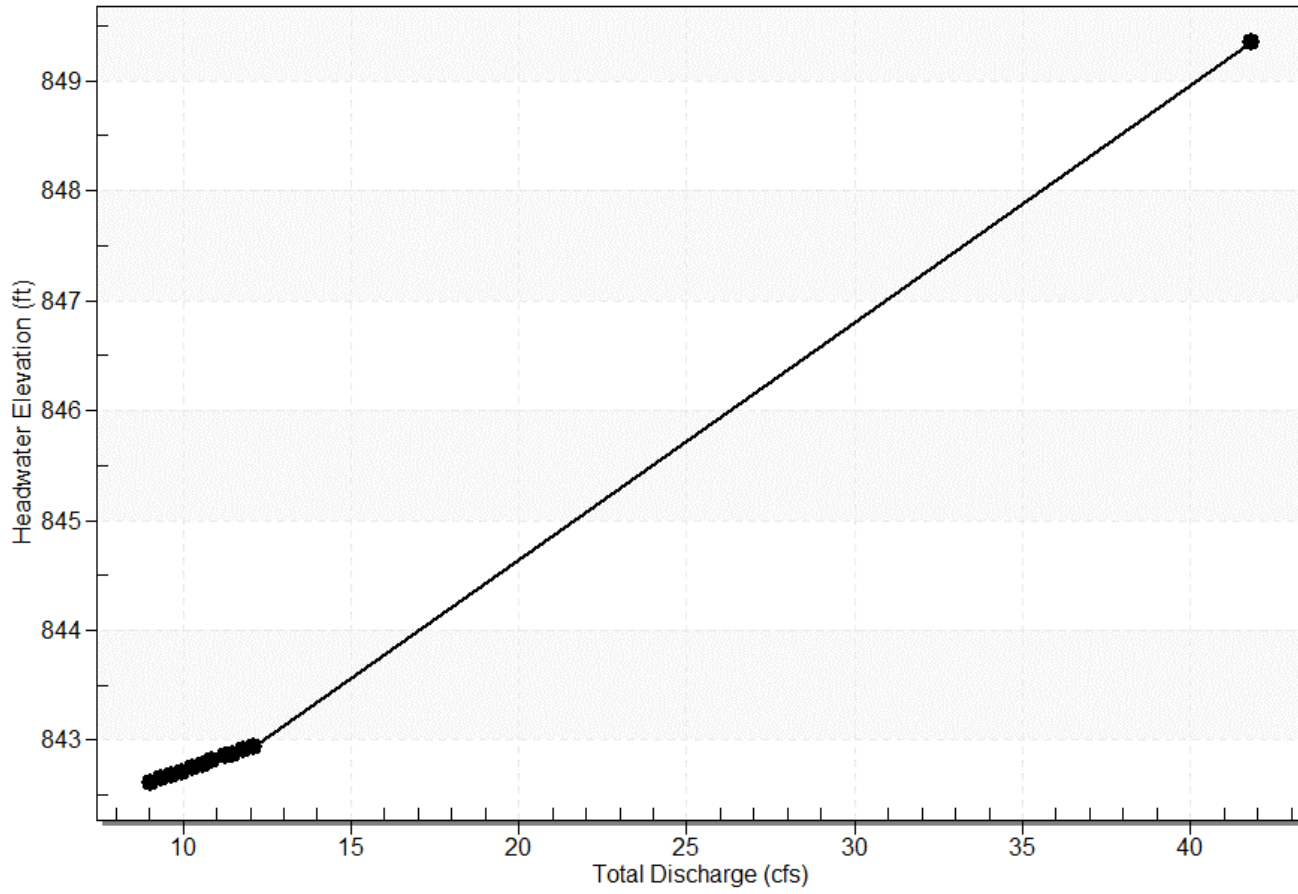
Maximum Flow: 12.10 cfs

Table 1 - Summary of Culvert Flows at Crossing: Ramp E - Sta. 62+20

Headwater Elevation (ft)	Total Discharge (cfs)	Pr. 24" Culvert Replacement Discharge (cfs)	Roadway Discharge (cfs)	Iterations
842.61	9.05	9.05	0.00	1
842.65	9.36	9.36	0.00	1
842.68	9.66	9.66	0.00	1
842.71	9.96	9.96	0.00	1
842.75	10.27	10.27	0.00	1
842.78	10.57	10.57	0.00	1
842.81	10.88	10.88	0.00	1
842.85	11.25	11.25	0.00	1
842.88	11.49	11.49	0.00	1
842.91	11.79	11.79	0.00	1
842.94	12.10	12.10	0.00	1
849.30	40.23	40.23	0.00	Overtopping

Rating Curve Plot for Crossing: Ramp E - Sta. 62+20

Total Rating Curve
Crossing: Ramp E - Sta. 62+20



Culvert Data: Pr. 24" Culvert Replacement

Table 1 - Culvert Summary Table: Pr. 24" Culvert Replacement

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)
9.05 cfs	9.05 cfs	842.61	1.59	0.987	1-JS1t	0.84	1.07	1.75	0.80	3.10	3.13
9.36 cfs	9.36 cfs	842.65	1.63	1.024	1-JS1t	0.86	1.09	1.77	0.82	3.19	3.15
9.66 cfs	9.66 cfs	842.68	1.66	1.061	1-JS1t	0.87	1.11	1.78	0.83	3.27	3.18
9.96 cfs	9.96 cfs	842.71	1.69	1.100	1-JS1t	0.89	1.13	1.79	0.84	3.36	3.21
10.27 cfs	10.27 cfs	842.75	1.73	1.138	1-JS1t	0.90	1.15	1.81	0.86	3.44	3.23
10.57 cfs	10.57 cfs	842.78	1.76	1.178	1-JS1t	0.92	1.16	1.82	0.87	3.53	3.26
10.88 cfs	10.88 cfs	842.81	1.79	1.218	1-S2n	0.93	1.18	0.93	0.88	7.58	3.28
11.25 cfs	11.25 cfs	842.85	1.83	1.267	1-JS1t	0.95	1.20	1.85	0.90	3.71	3.31
11.49 cfs	11.49 cfs	842.88	1.86	1.299	1-JS1t	0.96	1.22	1.85	0.90	3.78	3.33
11.79 cfs	11.79 cfs	842.91	1.89	1.341	1-JS1t	0.98	1.23	1.87	0.92	3.87	3.36
12.10 cfs	12.10 cfs	842.94	1.92	1.383	1-JS1t	0.99	1.25	1.88	0.93	3.95	3.38

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 841.02 ft,

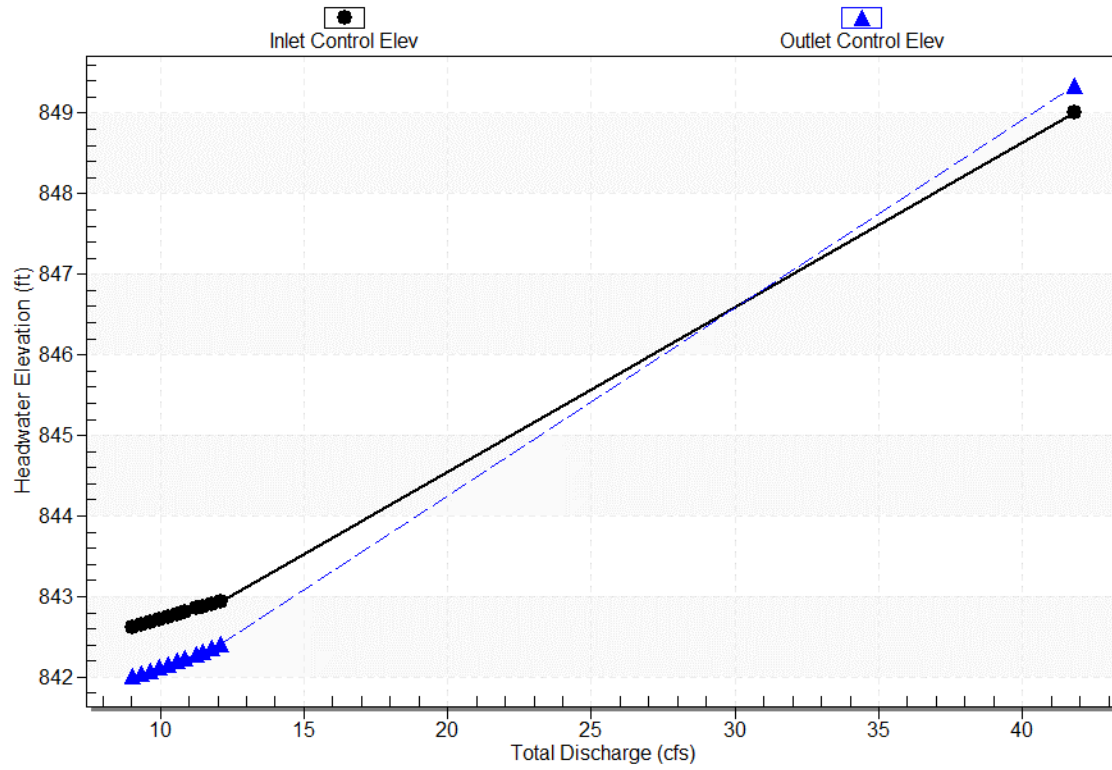
Outlet Elevation (invert): 839.91 ft

Culvert Length: 111.01 ft,

Culvert Slope: 0.0100

Culvert Performance Curve Plot: Pr. 24" Culvert Replacement

Performance Curve
Culvert: Pr. 24" Culvert Replacement



Site Data - Pr. 24" Culvert Replacement

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 841.02 ft

Outlet Station: 111.00 ft

Outlet Elevation: 839.91 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 24" Culvert Replacement

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: Ramp E - Sta. 62+20

Table 2 - Downstream Channel Rating Curve (Crossing: Ramp E - Sta. 62+20)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
9.05	841.66	0.80	3.13	1.33	0.74
9.36	841.68	0.82	3.15	1.36	0.74
9.66	841.69	0.83	3.18	1.38	0.74
9.96	841.70	0.84	3.21	1.40	0.74
10.27	841.72	0.86	3.23	1.42	0.74
10.57	841.73	0.87	3.26	1.44	0.75
10.88	841.74	0.88	3.28	1.46	0.75
11.25	841.76	0.90	3.31	1.49	0.75
11.49	841.76	0.90	3.33	1.50	0.75
11.79	841.78	0.92	3.36	1.52	0.75
12.10	841.79	0.93	3.38	1.54	0.75

Tailwater Channel Data - Ramp E - Sta. 62+20

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0266

Channel Manning's n: 0.0500

Channel Invert Elevation: 840.86 ft

Roadway Data for Crossing: Ramp E - Sta. 62+20

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 50.00 ft

Crest Elevation: 849.30 ft

Roadway Surface: Paved

Roadway Top Width: 64.00 ft

County Station	FAJ/LIC 62+20 (RAMP E)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 24
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User Input	
pH _w	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	**707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Bituminous paved invert	**707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Bituminous paved invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized Culvert or Liner Pipe-Round, Pipe Arch, or Box	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate Culvert or Liner Pipe-Round, Pipe Arch, and Arch	707.24 Aluminum Spiral Rib Storm Sewer or Liner Pipe-Round	707.25 Aluminum Box Culvert -Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe-Round, Pipe Arch, or Box	Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe -Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16	0.5	16	N/A	N/A	N/A	16
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A
max gauge or thickness	1/4 or 1/2	12	12	12	12	12	12	12	N/A	N/A	12	12	N/A	12	12	12	0.5	10	N/A	12	N/A	10
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12	N/A
Gauge	Thickness (inches)	16	0.064	14	0.079	12	0.109	10	0.138	8	0.168	7	0.188	5	0.219	3	0.249	1	0.28	Casing	0.5	

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

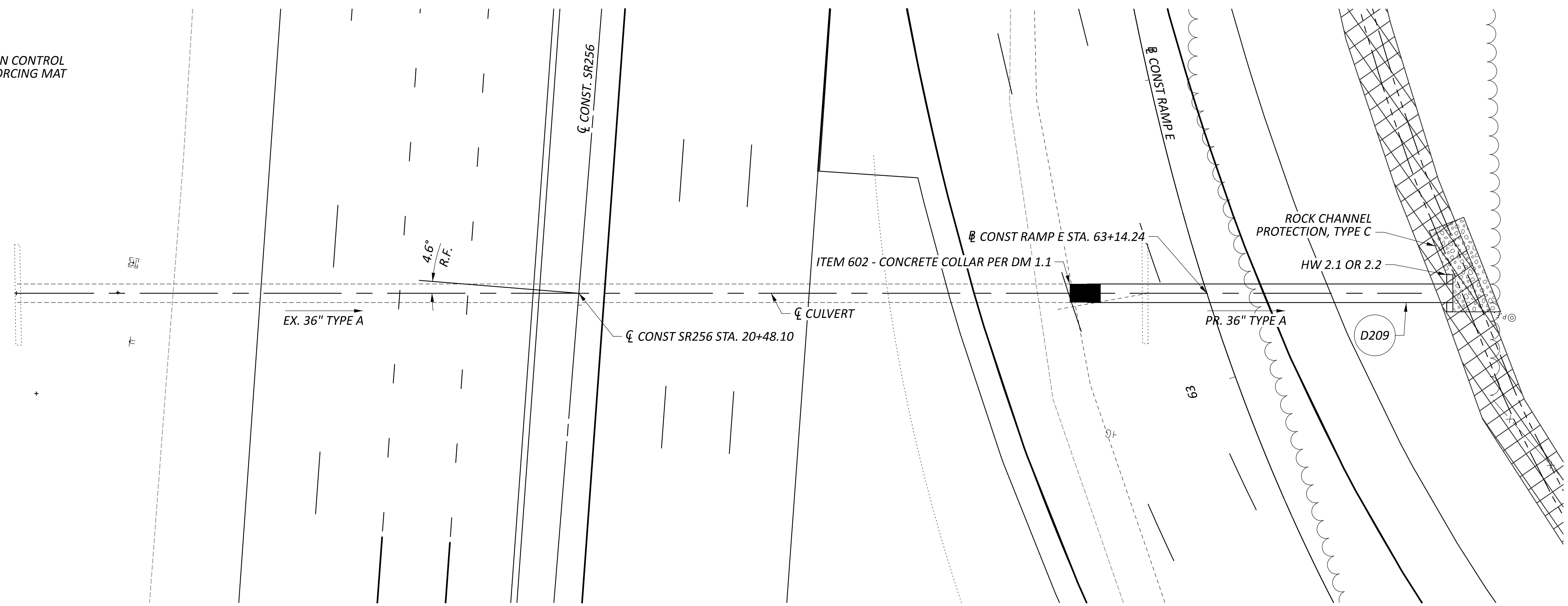
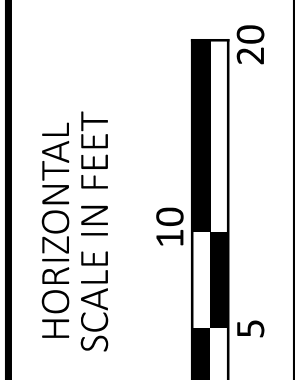
Plastic Conduit Durability Results													
Material	707.33 Corrugated Polyethylene Smooth Lined Pipe	707.34 Polyethylene Plastic Pipe Based on Outside Diameter (OD)	707.35 Polyethylene Profile Wall Pipe	707.42 Polyvinyl Chloride Corrugated Smooth Interior Pipe	707.43 Polyvinyl Chloride Profile Wall 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 or Liner Pipe - Round	Storm Sewer - Round

Notes:

- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.
- Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.1
- Options were eliminated when the NCSRA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limiter
- Epoxy is required on all concrete surfaces when pH<4
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Dat.
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of wat

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0

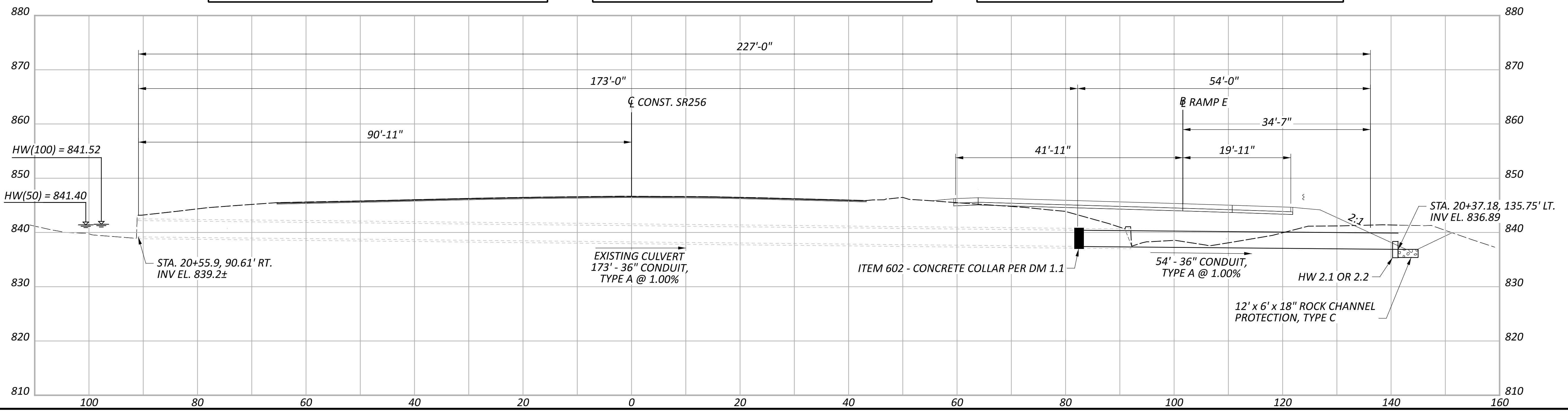
LEGEND
 ITEM 836 - EROSION CONTROL WITH TURF REINFORCING MAT



EXISTING STRUCTURE	
TYPE:	CONCRETE
SIZE:	36" CIRCULAR
SKEW:	4.6° R.F.
ALIGNMENT:	TANGENT
DATE BUILT:	
CONDITION:	GOOD
CFN:	1876343

PROPOSED STRUCTURE	
TYPE:	36" CIRCULAR CONCRETE CONDUIT, TYPE A, 706.01 OR 706.02
SKEW:	4.6° R.F.
ALIGNMENT:	TANGENT
CFN:	

HYDRAULIC DATA					
DRAINAGE AREA =	15.95 ACRES				
Q (50) =	21.89 CFS	V (50) =	9.02 FT/S	HW (50) =	841.40 FT
Q (100) =	24.01 CFS	V (100) =	9.14 FT/S	HW (100) =	841.52 FT
ORDINARY HIGH WATER MARK:	N/A				
DESIGN SERVICE LIFE:	75 YEARS				
ABRASION LEVEL:	1.0				
pH:	7.6				



CULVERT DETAIL
SR256 - STA. 20+48.10

DESIGN AGENCY	CARPENTER MARTY
DESIGNER	CEF
REVIEWER	DIMG 06/28/24
PROJECT ID	96808
SHEET TOTAL	P.0870 P.0986

FAI/LIC-70-0.00/0.00

MODEL: SR256 - 20+48 PAPER SIZE: 34x22 (in.) DATE: 6/27/2024 TIME: 11:23:33 AM USER: cflach
 pw:\ohiodot-pw-bentley.com\ohiodot-pw-02\Documents\01 Active Projects\District 05\Fairfield\96808\403-Engineering_Carpenter-Marty\Drawings\Sheets\96808_DC207.dgn



Job Name: <u>FAI/LIC-70-0.00/0.00</u>	Job No.: <u>96808</u>
Location: <u>ODOT District 5</u>	Sheet: <u>1</u> of <u>1</u>
Task: <u>Culvert Discharge - SR256 (Sta. 20+48)</u>	
Calculated By: <u>CEF</u>	Date: <u>4/22/2024</u>
Checked By: <u>DMG</u>	Date: <u>4/24/2024</u>

Weighted Runoff Coefficient

Drainage Area = 15.95 ac
C = 0.70

Time of Concentration

Time of Concentration from Concentrated Flow on Ditch Calculations

EB Ramp E sta. 61+50 sta. 64+20= 84.5 minutes*
*Includes storm system time of concentration

Culvert Time of Concentration = 84.5 minutes

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

$$Q = CiA$$

i ₂ =	1.05	in/hr	Q ₂ =	11.73	cfs
i ₅ =	1.3	in/hr	Q ₅ =	14.52	cfs
i ₁₀ =	1.49	in/hr	Q ₁₀ =	16.64	cfs
i ₂₅ =	1.76	in/hr	Q ₂₅ =	19.66	cfs
i ₅₀ =	1.96	in/hr	Q ₅₀ =	21.89	cfs
i ₁₀₀ =	2.15	in/hr	Q ₁₀₀ =	24.01	cfs

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 16.64 cfs

Design Flow: 21.89 cfs

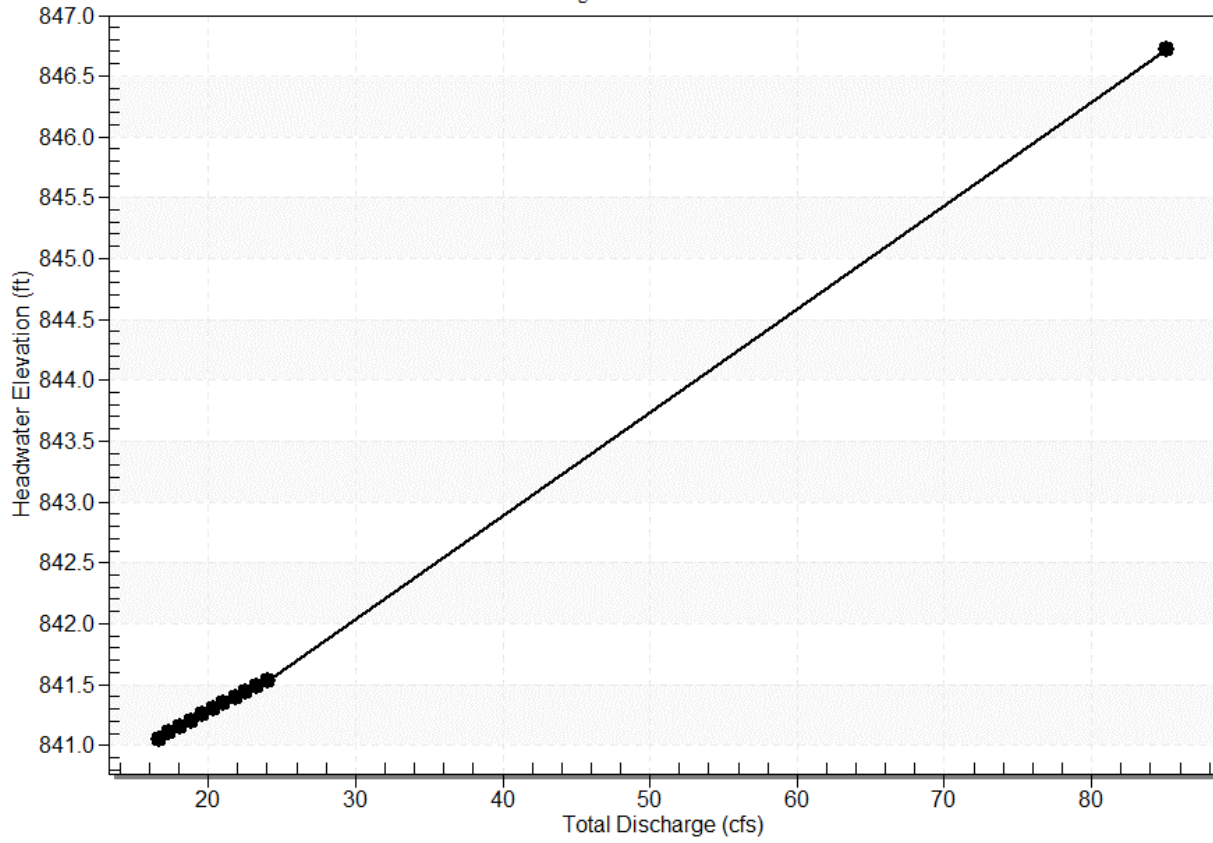
Maximum Flow: 24.01 cfs

Table 1 - Summary of Culvert Flows at Crossing: SR256 - Sta. 20+48

Headwater Elevation (ft)	Total Discharge (cfs)	Extension Ex. 36" Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
841.05	16.64	16.64	0.00	1
841.10	17.38	17.38	0.00	1
841.15	18.11	18.11	0.00	1
841.20	18.85	18.85	0.00	1
841.25	19.59	19.59	0.00	1
841.30	20.33	20.33	0.00	1
841.34	21.06	21.06	0.00	1
841.40	21.89	21.89	0.00	1
841.44	22.54	22.54	0.00	1
841.48	23.27	23.27	0.00	1
841.52	24.01	24.01	0.00	1
846.67	83.16	83.16	0.00	Overtopping

Rating Curve Plot for Crossing: SR256 - Sta. 20+48

Total Rating Curve
Crossing: SR256 - Sta. 20+48



Culvert Data: Extension Ex. 36" Culvert

Table 1 - Culvert Summary Table: Extension Ex. 36" Culvert

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)
16.64 cfs	16.64 cfs	841.05	1.86	0.0*	1-S2n	0.97	1.30	0.97	0.86	8.36	5.23
17.38 cfs	17.38 cfs	841.10	1.91	0.0*	1-S2n	1.00	1.33	1.00	0.88	8.46	5.29
18.11 cfs	18.11 cfs	841.15	1.96	0.0*	1-S2n	1.02	1.36	1.02	0.89	8.56	5.35
18.85 cfs	18.85 cfs	841.20	2.01	0.0*	1-S2n	1.04	1.39	1.04	0.91	8.65	5.41
19.59 cfs	19.59 cfs	841.25	2.06	0.0*	1-S2n	1.06	1.42	1.06	0.93	8.74	5.46
20.33 cfs	20.33 cfs	841.30	2.11	0.0*	1-S2n	1.08	1.45	1.08	0.95	8.83	5.52
21.06 cfs	21.06 cfs	841.34	2.15	0.0*	1-S2n	1.10	1.47	1.10	0.96	8.92	5.57
21.89 cfs	21.89 cfs	841.40	2.21	0.0*	1-S2n	1.13	1.50	1.13	0.98	9.02	5.63
22.54 cfs	22.54 cfs	841.44	2.25	0.0*	1-S2n	1.15	1.53	1.15	1.00	8.99	5.67
23.27 cfs	23.27 cfs	841.48	2.29	0.0*	1-S2n	1.17	1.55	1.17	1.01	9.17	5.72
24.01 cfs	24.01 cfs	841.52	2.34	0.0*	1-S2n	1.19	1.58	1.20	1.03	9.14	5.77

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 839.19 ft,

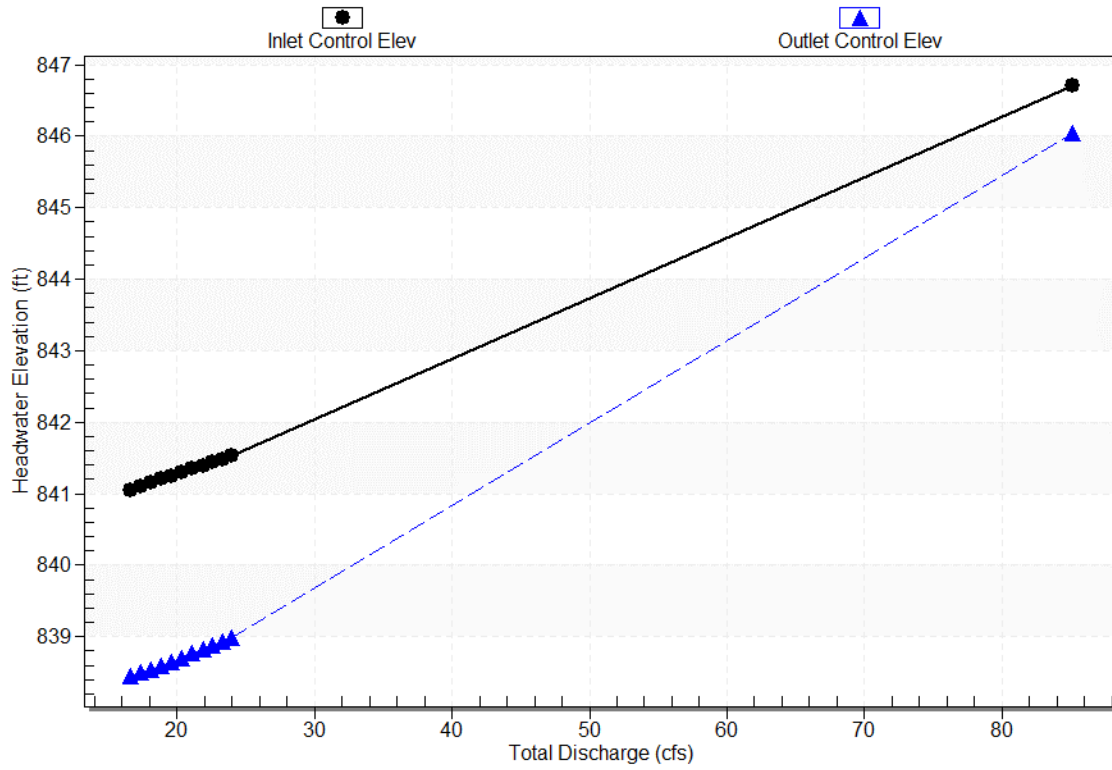
Outlet Elevation (invert): 836.89 ft

Culvert Length: 227.13 ft,

Culvert Slope: 0.0101

Culvert Performance Curve Plot: Extension Ex. 36" Culvert

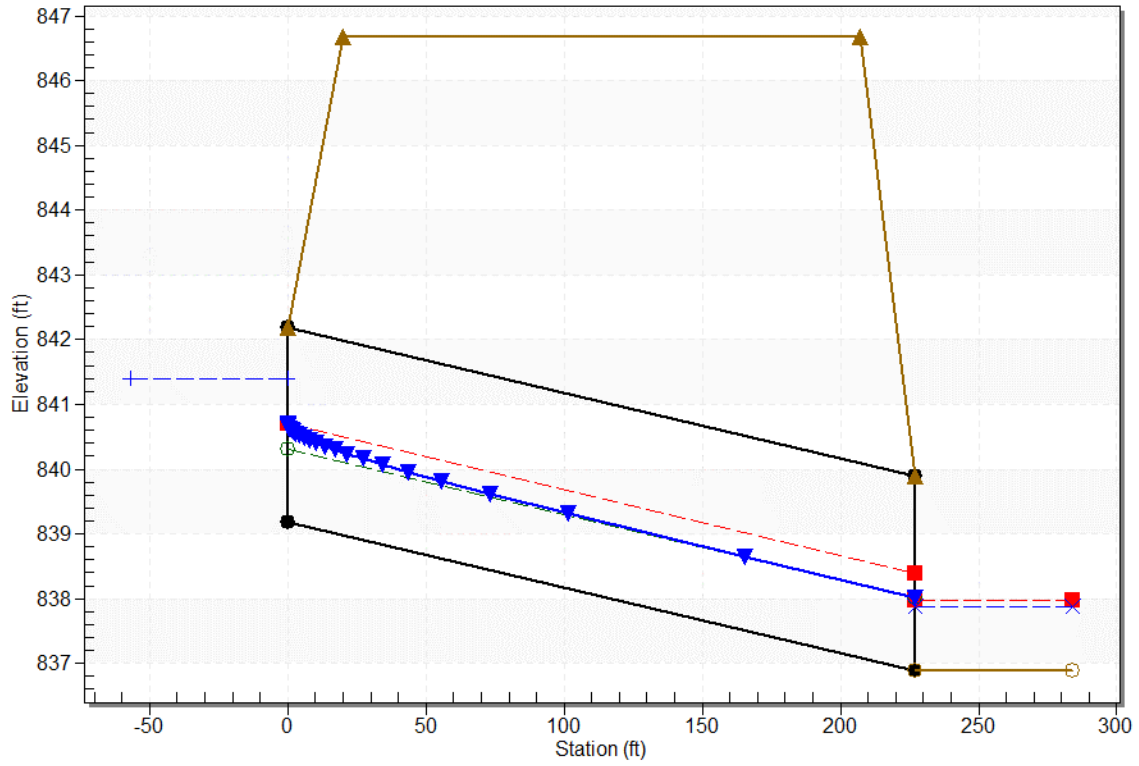
Performance Curve
Culvert: Extension Ex. 36" Culvert



Water Surface Profile Plot for Culvert: Extension Ex. 36" Culvert

Crossing - SR256 - Sta. 20+48, Design Discharge - 21.9 cfs

Culvert - Extension Ex. 36" Culvert, Culvert Discharge - 21.9 cfs



Site Data - Extension Ex. 36" Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 839.19 ft

Outlet Station: 227.12 ft

Outlet Elevation: 836.89 ft

Number of Barrels: 1

Culvert Data Summary - Extension Ex. 36" Culvert

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall ($K_e=0.5$)

Inlet Depression: None

Tailwater Data for Crossing: SR256 - Sta. 20+48

Table 2 - Downstream Channel Rating Curve (Crossing: SR256 - Sta. 20+48)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
16.64	837.75	0.86	5.23	1.34	1.20
17.38	837.77	0.88	5.29	1.37	1.21
18.11	837.78	0.89	5.35	1.39	1.21
18.85	837.80	0.91	5.41	1.42	1.21
19.59	837.82	0.93	5.46	1.45	1.22
20.33	837.84	0.95	5.52	1.48	1.22
21.06	837.85	0.96	5.57	1.50	1.22
21.89	837.87	0.98	5.63	1.53	1.22
22.54	837.89	1.00	5.67	1.55	1.23
23.27	837.90	1.01	5.72	1.58	1.23
24.01	837.92	1.03	5.77	1.60	1.23

Tailwater Channel Data - SR256 - Sta. 20+48

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 2.00 (1:1)

Channel Slope: 0.0250

Channel Manning's n: 0.0300

Channel Invert Elevation: 836.89 ft

Roadway Data for Crossing: SR256 - Sta. 20+48

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 60.00 ft

Crest Elevation: 846.67 ft

Roadway Surface: Paved

Roadway Top Width: 187.00 ft

County Station	FAJ/LIC 20+48 (SR256)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 36
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User Input	
pH _w	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	**707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Invert	**707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized Culvert or Liner Pipe-Round, Pipe Arch, or Box	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate Culvert or Liner Pipe-Round, Pipe Arch, and Arch	707.24 Aluminum Spiral Rib Storm Sewer or Liner Pipe-Round	707.25 Aluminum Box Culvert -Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe-Round, Pipe Arch, or Box	Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe -Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16	0.5	14	N/A	N/A	N/A	14
min gauge or thickness	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	10	10	10	10	10	10	10	N/A	N/A	10	10	N/A	12	12	12	0.5	8	N/A	12	N/A	8
1	10	10	10	10	10	10	10	10	N/A	N/A	10	10	N/A	N/A	N/A	N/A	N/A	10	N/A	N/A	N/A	10
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gauge	Thickness (inches)	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
14	0.079																					
12	0.109																					
10	0.138																					
8	0.168																					
7	0.188																					
5	0.219																					
3	0.249																					
1	0.28																					
Casing	0.5																					

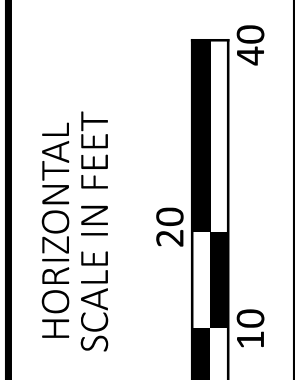
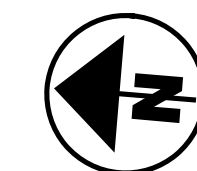
Concrete Conduit Durability Results						
Material	**706.01 Non-reinforced Concrete Pipe	**706.02 Reinforced Concrete Circular Pipe, Epoxy Coated	**706.03 Reinforced Concrete Pipe, Epoxy Coated	**706.04 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	**706.05 Precast Reinforced Concrete 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 or Liner Pipe - Round	Storm Sewer - Round

Notes:

- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.
- Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.1
- Options were eliminated when the NCSRA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limiter
- Epoxy is required on all concrete surfaces when pH<4
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Dat.
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water

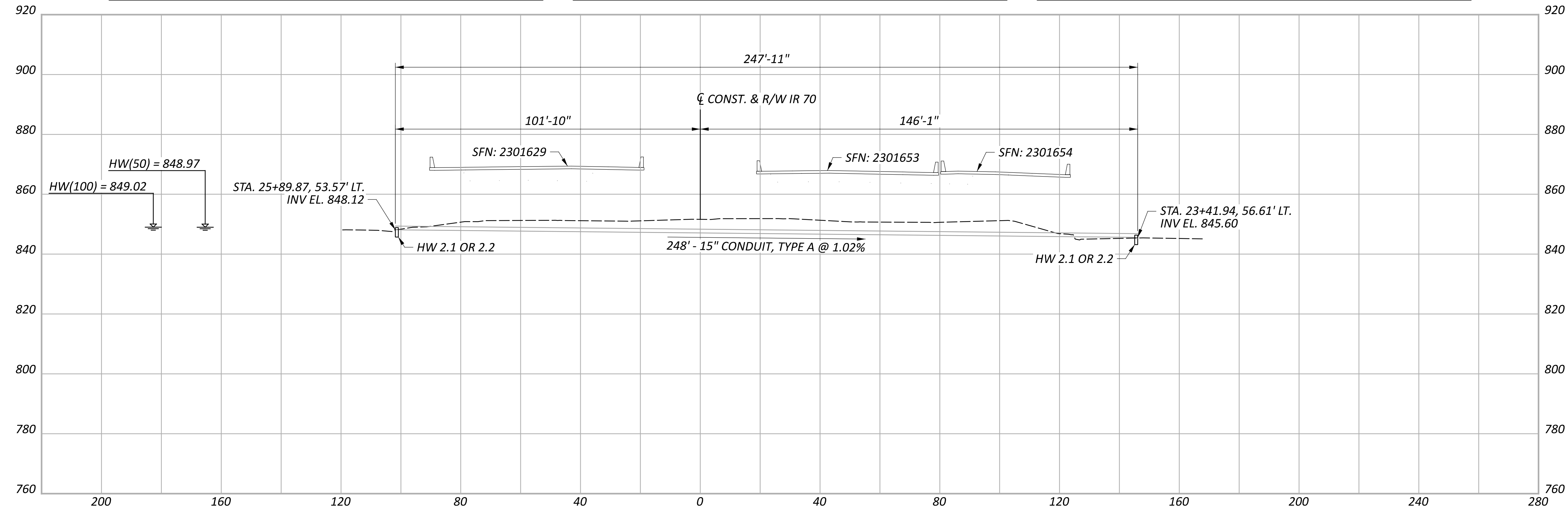
Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0



EXISTING STRUCTURE	
TYPE:	CIRCULAR CONCRETE
SIZE:	15"
SKEW:	12.5° L.F.
ALIGNMENT:	TANGENT
DATE BUILT:	
CONDITION:	GOOD
CFN:	1876345

PROPOSED STRUCTURE	
TYPE:	24" CIRCULAR CONDUIT, TYPE A, 707.01 (0.218) GALVANIZED, 707.01 (0.064) ALUMINIZED, 707.04 POLYMERIC COATED, 706.01, 706.02, 707.33, 707.35 OR 707.42
SKEW:	12.7° L.F.
ALIGNMENT:	TANGENT
CFN:	

HYDRAULIC DATA		
DRAINAGE AREA =	0.57 ACRES	
Q (50) =	2.17 CFS	V (50) = 5.07 FT/S
Q (100) =	2.35 CFS	V (100) = 5.18 FT/S
ORDINARY HIGH WATER MARK:	N/A	
DESIGN SERVICE LIFE:	75 YEARS	
ABRASION LEVEL:	1	
pH:	7.6	



CULVERT DETAIL
 SR 256 BRIDGE ABUTMENT (LEFT)



Job Name: FAI/LIC-70 Job No.: 96808
 Location: Fairfield and Licking Counties Sheet: 1 of 1
 Task: Culvert - SR256 Bridge Abutment (left)
 Calculated By: CEF Date: 5/7/2024
 Checked By: DMG Date: 5/7/2024

Weighted Runoff Coefficient

Drainage Area = 0.57 ac
 Paved Area: 0.23 Paved Area "C" Value: 0.90
 Unpaved Area: 0.34 Unpaved Area "C" Value: 0.40

$$"C" = \frac{(\text{Paved Area} * \text{Paved Area "C"}) + (\text{Unpaved Area} * \text{Unpaved Area "C"})}{\text{Total Area}}$$

Runoff Coefficient = 0.60

Shallow Concentrated Flow

$$V = 3.3ks^{1/2} = (3.3) * (0.457) * (3.1\%)^{1/2} = 0.266 \text{ fps}$$

k = 0.457
 s = 0.031

$$t_s = \frac{L}{60V} = \frac{173}{(60) * (0.27)} = 10.86 \text{ min}$$

L = 173 ft

Time of Concentration

T = 10.86 min

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

$$Q = CiA$$

i ₂ = 3.94 in/hr	Q ₂ = 1.36 cfs
i ₅ = 4.66 in/hr	Q ₅ = 1.60 cfs
i ₁₀ = 5.16 in/hr	Q ₁₀ = 1.77 cfs
i ₂₅ = 5.83 in/hr	Q ₂₅ = 2.00 cfs
i ₅₀ = 6.31 in/hr	Q ₅₀ = 2.17 cfs
i ₁₀₀ = 6.83 in/hr	Q ₁₀₀ = 2.35 cfs

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 1.77 cfs

Design Flow: 2.17 cfs

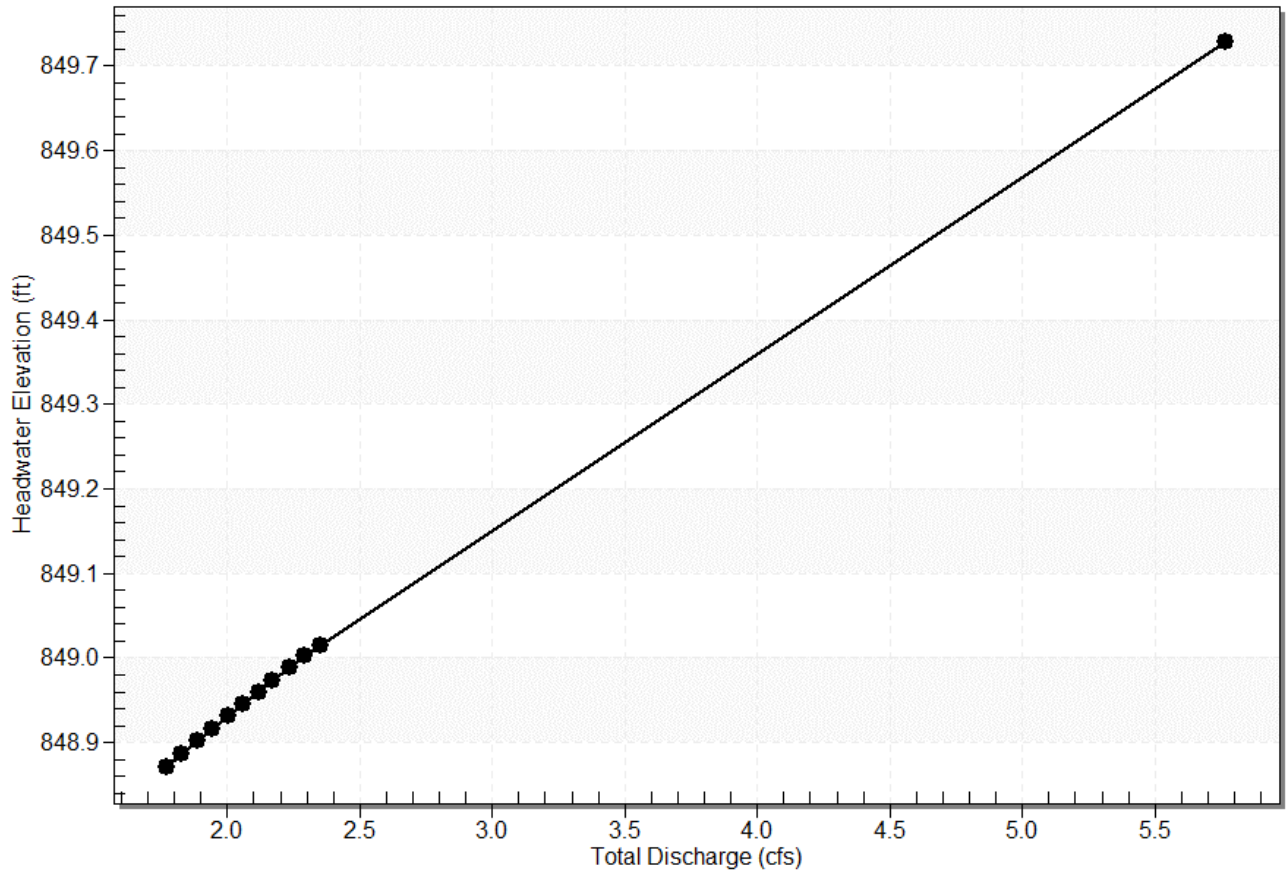
Maximum Flow: 2.35 cfs

Table 1 - Summary of Culvert Flows at Crossing: SR256 - Left Bridge Abutment

Headwater Elevation (ft)	Total Discharge (cfs)	Pr. 15" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
848.87	1.77	1.77	0.00	1
848.89	1.83	1.83	0.00	1
848.90	1.89	1.89	0.00	1
848.92	1.94	1.94	0.00	1
848.93	2.00	2.00	0.00	1
848.95	2.06	2.06	0.00	1
848.96	2.12	2.12	0.00	1
848.97	2.17	2.17	0.00	1
848.99	2.23	2.23	0.00	1
849.00	2.29	2.29	0.00	1
849.02	2.35	2.35	0.00	1
849.70	5.32	5.32	0.00	Overtopping

Rating Curve Plot for Crossing: SR256 - Left Bridge Abutment

Total Rating Curve
Crossing: SR256 - Left Bridge Abutment



Culvert Data: Pr. 15" Circular Culvert

Table 1 - Culvert Summary Table: Pr. 15" Circular Culvert

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)
1.77 cfs	1.77 cfs	848.87	0.75	0.0*	1-S2n	0.43	0.53	0.43	0.19	4.79	3.01
1.83 cfs	1.83 cfs	848.89	0.77	0.0*	1-S2n	0.43	0.54	0.43	0.19	4.84	3.03
1.89 cfs	1.89 cfs	848.90	0.78	0.0*	1-S2n	0.44	0.55	0.44	0.19	4.88	3.06
1.94 cfs	1.94 cfs	848.92	0.80	0.0*	1-S2n	0.45	0.55	0.45	0.20	4.92	3.09
2.00 cfs	2.00 cfs	848.93	0.81	0.0*	1-S2n	0.46	0.56	0.46	0.20	4.96	3.11
2.06 cfs	2.06 cfs	848.95	0.83	0.0*	1-S2n	0.46	0.57	0.46	0.20	5.00	3.14
2.12 cfs	2.12 cfs	848.96	0.84	0.0*	1-S2n	0.47	0.58	0.47	0.21	5.03	3.16
2.17 cfs	2.17 cfs	848.97	0.85	0.0*	1-S2n	0.48	0.59	0.48	0.21	5.07	3.19
2.23 cfs	2.23 cfs	848.99	0.87	0.0*	1-S2n	0.48	0.60	0.48	0.21	5.11	3.21
2.29 cfs	2.29 cfs	849.00	0.88	0.0*	1-S2n	0.49	0.60	0.49	0.22	5.14	3.24
2.35 cfs	2.35 cfs	849.02	0.90	0.0*	1-S2n	0.50	0.61	0.50	0.22	5.18	3.26

* Full Flow Headwater elevation is below inlet invert.

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 848.12 ft,

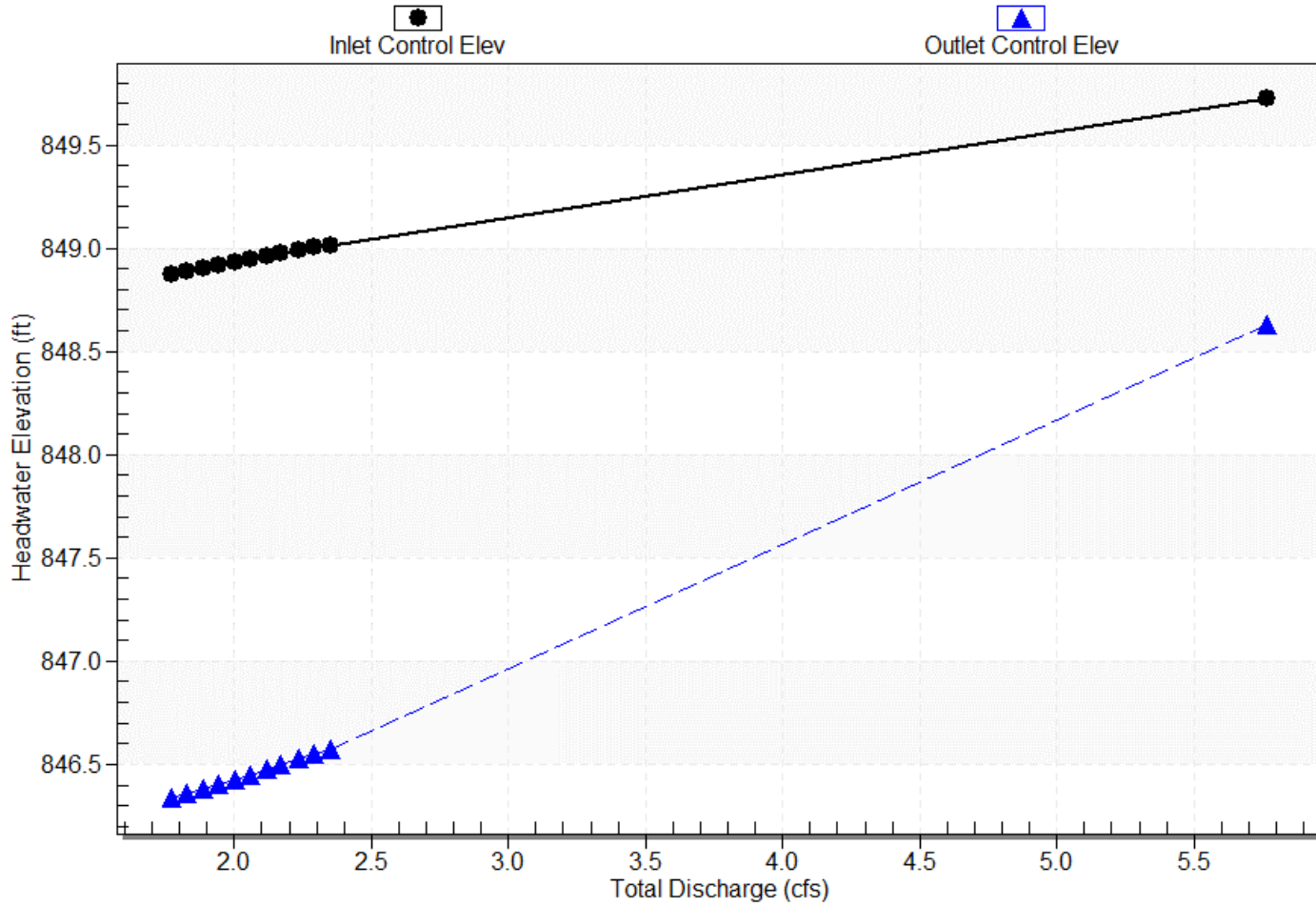
Outlet Elevation (invert): 845.60 ft

Culvert Length: 248.01 ft,

Culvert Slope: 0.0102

Culvert Performance Curve Plot: Pr. 15" Circular Culvert

Performance Curve
Culvert: Pr. 15" Circular Culvert



Site Data - Pr. 15" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 848.12 ft

Outlet Station: 248.00 ft

Outlet Elevation: 845.60 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 15" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 1.25 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Data for Crossing: SR256 - Left Bridge Abutment

Table 2 - Downstream Channel Rating Curve (Crossing: SR256 - Left Bridge Abutment)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
1.77	845.79	0.19	3.01	0.61	1.42
1.83	845.79	0.19	3.03	0.62	1.43
1.89	845.79	0.19	3.06	0.63	1.43
1.94	845.80	0.20	3.09	0.64	1.43
2.00	845.80	0.20	3.11	0.65	1.44
2.06	845.80	0.20	3.14	0.66	1.44
2.12	845.81	0.21	3.16	0.67	1.44
2.17	845.81	0.21	3.19	0.68	1.44
2.23	845.81	0.21	3.21	0.69	1.45
2.29	845.82	0.22	3.24	0.70	1.45
2.35	845.82	0.22	3.26	0.71	1.45

Tailwater Channel Data - SR256 - Left Bridge Abutment

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 2.00 ft

Side Slope (H:V): 6.00 (1:1)

Channel Slope: 0.0520

Channel Manning's n: 0.0300

Channel Invert Elevation: 845.60 ft

Roadway Data for Crossing: SR256 - Left Bridge Abutment

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 ft

Crest Elevation: 849.70 ft

Roadway Surface: Paved

Roadway Top Width: 39.00 ft

County Station	FAI/LC 1+77 (Trail)	Route Station	70	Section	0.00/0.00	PID	96808	Shape Span x Rise	Circular 15
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User Input	
pH _a	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	***707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with invert	***707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized interior liner	**707.20 Galvanized Coated Steel Conduits with precoated interior liner	**748.06 Steel Casing Pipe non-galvanized	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate	707.24 Aluminum Spiral Rib	707.25 Aluminum Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe -Round, Pipe Arch, or Box	Culvert or Liner Pipe -Round or Pipe Arch	Culvert or Liner Pipe - Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	N/A	N/A	N/A	N/A	16	N/A	N/A	N/A	16
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	14	14	14	14	14	14	14	N/A	N/A	14	14	N/A	N/A	N/A	N/A	N/A	0.5	12	N/A	N/A	12
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gauge	Thickness (inches)	16	14	12	10	8	7	5	3	1	Casing	0.5										
16	0.064																					
14	0.079																					
12	0.109																					
10	0.138																					
8	0.168																					
7	0.189																					
5	0.218																					
3	0.249																					
1	0.28																					
Casing	0.5																					

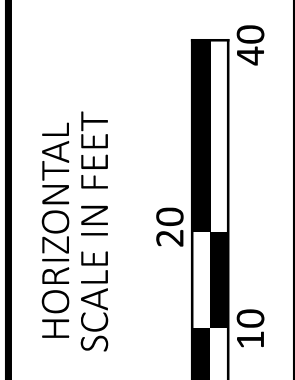
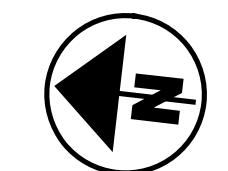
Concrete Conduit Durability Results						
Material	**706.01 Non-reinforced Concrete Pipe	**706.02 Reinforced Concrete Circular Pipe	**706.03 Reinforced Concrete Pipe, Epoxy Coated	**706.04 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	**706.05 Precast Reinforced Concrete Box Sections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

Notes:
 Many metal options are eliminated when abrasion level equals 4 or greater
 Aluminum is only available between pH levels ranging from 5.0 to less than 9.0
 Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
 Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.0
 Options were eliminated when the NCSPA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limitations
 Epoxy is required on all concrete surfaces when pH<5
 ** Smooth lined conduit
 ***Minimum gauges set per industry comments; see Reference Data
 Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0

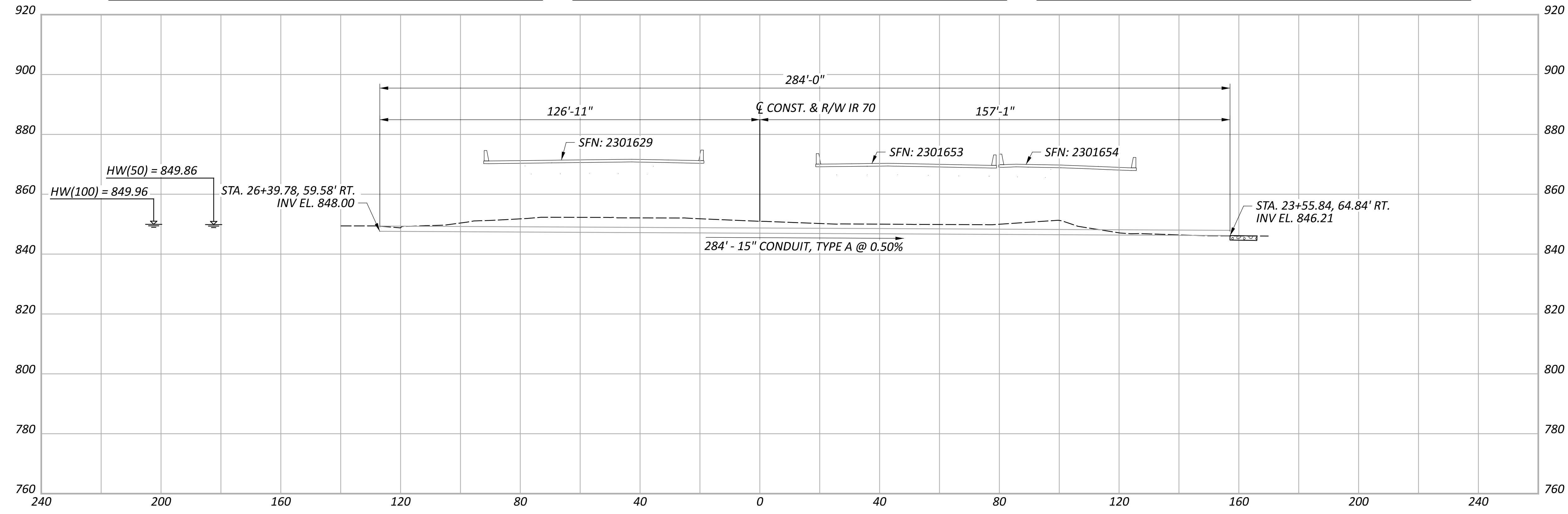
LEGEND
 ITEM 670 - SLOPE EROSION PROTECTION MAT



EXISTING STRUCTURE	
TYPE:	CIRCULAR CONCRETE
SIZE:	15"
SKEW:	10.1° L.F.
ALIGNMENT:	TANGENT
DATE BUILT:	
CONDITION:	GOOD
CFN:	1876345

PROPOSED STRUCTURE	
TYPE:	21" CIRCULAR CONDUIT, TYPE A, 707.01 (0.218) GALVANIZED, 707.01 (0.064) ALUMINIZED, 707.04 POLYMERIC COATED, 706.01, 706.02, 707.33, 707.35 OR 707.42
SKEW:	10.9° L.F.
ALIGNMENT:	TANGENT
CFN:	

HYDRAULIC DATA		
DRAINAGE AREA =	1.51 ACRES	
Q (50) =	V (50) =	HW (50) =
9.95 CFS	6.19 FT/S	849.86 FT
Q (100) =	V (100) =	HW (100) =
10.70 CFS	6.28 FT/S	849.96 FT
ORDINARY HIGH WATER MARK:	N/A	
DESIGN SERVICE LIFE:	75 YEARS	
ABRASION LEVEL:	1	
pH:	7.6	



CULVERT DETAIL
 SR 256 BRIDGE ABUTMENT (RIGHT)

DESIGN AGENCY

 DESIGNER
 CEF
 REVIEWER
 DMG 06/28/24
 PROJECT ID
 96808
 SHEET TOTAL
 P.0872 | P.0986

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 7.93 cfs

Design Flow: 9.95 cfs

Maximum Flow: 10.70 cfs

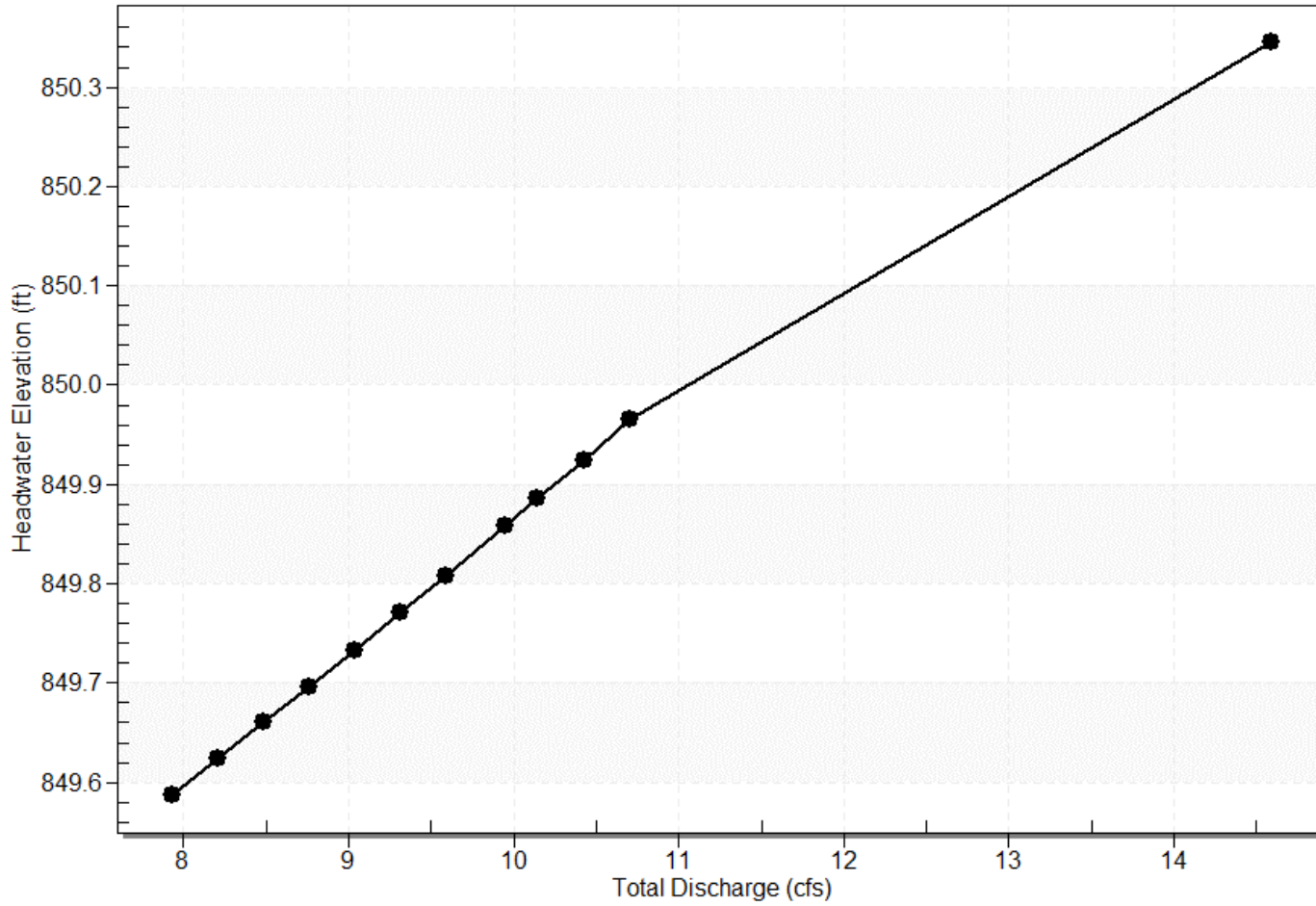
Table 1 - Summary of Culvert Flows at Crossing: SR256 - Right Bridge Abutment

Headwater Elevation (ft)	Total Discharge (cfs)	Pr. 21" Circular Culvert Discharge (cfs)	Roadway Discharge (cfs)	Iterations
849.59	7.93	7.93	0.00	1
849.62	8.21	8.21	0.00	1
849.66	8.48	8.48	0.00	1
849.70	8.76	8.76	0.00	1
849.73	9.04	9.04	0.00	1
849.77	9.31	9.31	0.00	1
849.81	9.59	9.59	0.00	1
849.86	9.95	9.95	0.00	1
849.89	10.15	10.15	0.00	1
849.92	10.42	10.42	0.00	1
849.96	10.70	10.70	0.00	1
850.27	12.50	12.50	0.00	Overtopping

Rating Curve Plot for Crossing: SR256 - Right Bridge Abutment

Total Rating Curve

Crossing: SR256 - Right Bridge Abutment



Culvert Data: Pr. 21" Circular Culvert

Table 1 - Culvert Summary Table: Pr. 21" Circular Culvert

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)
7.93 cfs	7.93 cfs	849.59	1.59	0.110	1-S2n	0.96	1.04	0.96	0.14	5.89	29.35
8.21 cfs	8.21 cfs	849.62	1.62	0.190	1-S2n	0.98	1.06	0.98	0.14	5.94	29.72
8.48 cfs	8.48 cfs	849.66	1.66	0.271	1-S2n	1.00	1.08	1.00	0.14	5.98	30.10
8.76 cfs	8.76 cfs	849.70	1.70	0.354	1-S2n	1.02	1.10	1.02	0.14	6.03	30.46
9.04 cfs	9.04 cfs	849.73	1.73	0.439	1-S2n	1.04	1.12	1.04	0.15	6.07	30.81
9.31 cfs	9.31 cfs	849.77	1.77	0.526	5-S2n	1.06	1.14	1.06	0.15	6.11	31.15
9.59 cfs	9.59 cfs	849.81	1.81	0.615	5-S2n	1.08	1.15	1.08	0.15	6.15	31.47
9.95 cfs	9.95 cfs	849.86	1.86	0.732	5-S2n	1.11	1.17	1.11	0.16	6.19	31.90
10.15 cfs	10.15 cfs	849.89	1.89	0.797	5-S2n	1.12	1.19	1.12	0.16	6.22	32.14
10.42 cfs	10.42 cfs	849.92	1.92	0.891	5-S2n	1.14	1.20	1.14	0.16	6.25	32.45
10.70 cfs	10.70 cfs	849.96	1.96	0.987	5-S2n	1.17	1.22	1.17	0.16	6.28	32.78

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 848.00 ft,

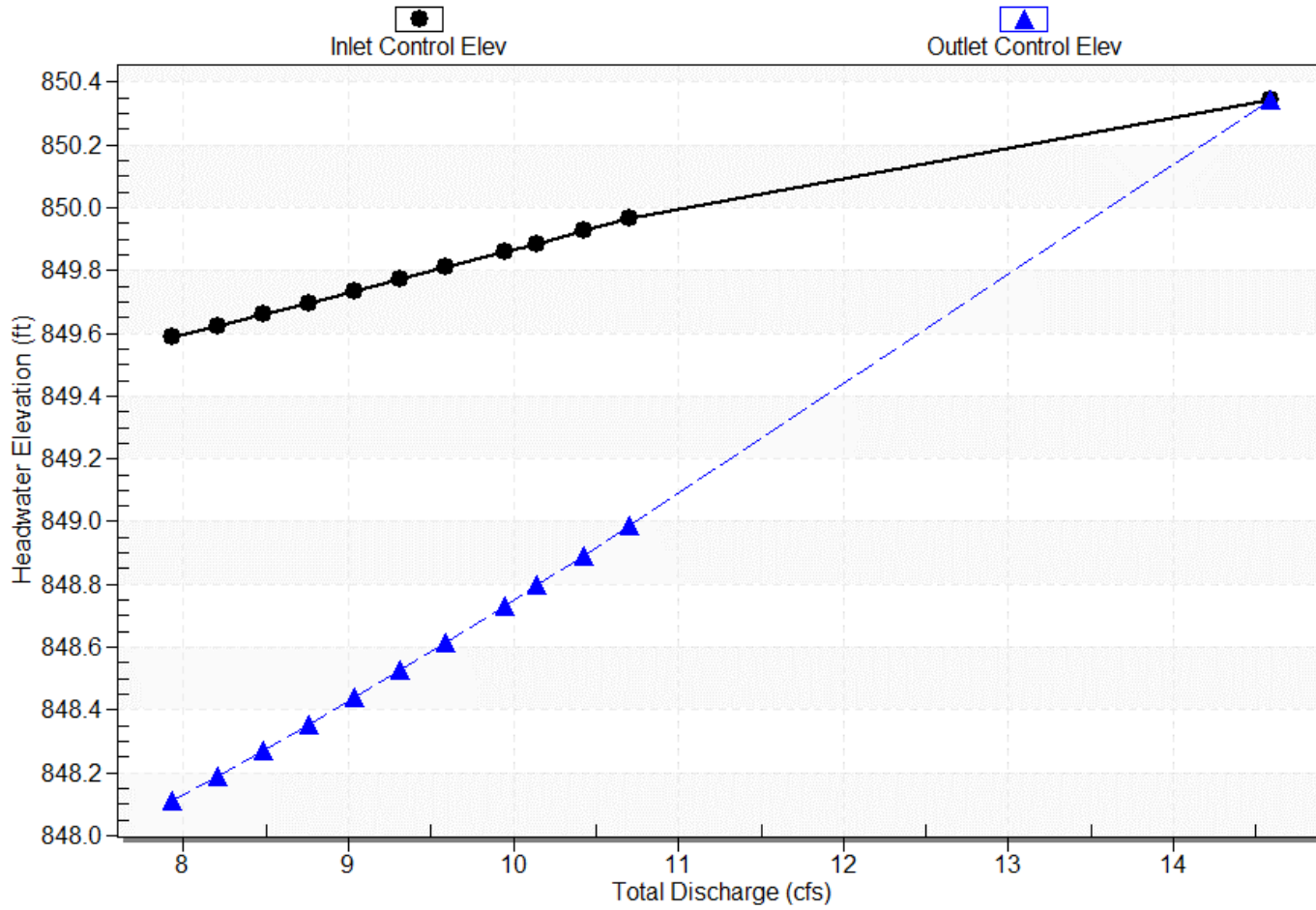
Outlet Elevation (invert): 846.21 ft

Culvert Length: 284.01 ft,

Culvert Slope: 0.0063

Culvert Performance Curve Plot: Pr. 21" Circular Culvert

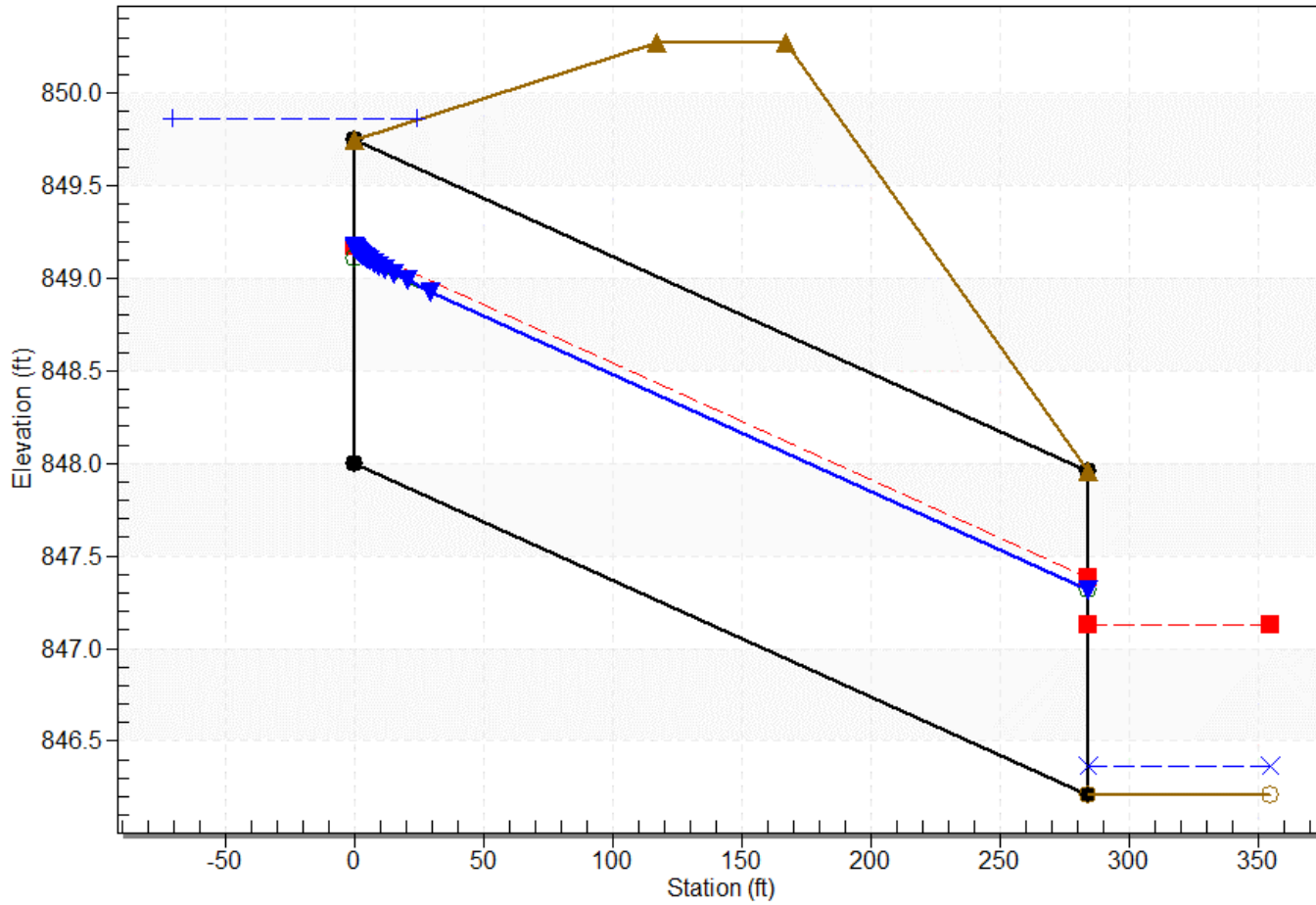
Performance Curve
Culvert: Pr. 21" Circular Culvert



Water Surface Profile Plot for Culvert: Pr. 21" Circular Culvert

Crossing - SR256 - Right Bridge Abutment, Design Discharge - 9.9 cfs

Culvert - Pr. 21" Circular Culvert, Culvert Discharge - 9.9 cfs



Site Data - Pr. 21" Circular Culvert

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 848.00 ft

Outlet Station: 284.00 ft

Outlet Elevation: 846.21 ft

Number of Barrels: 1

Culvert Data Summary - Pr. 21" Circular Culvert

Barrel Shape: Circular

Barrel Diameter: 1.75 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Data for Crossing: SR256 - Right Bridge Abutment

Table 2 - Downstream Channel Rating Curve (Crossing: SR256 - Right Bridge Abutment)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
7.93	846.35	0.14	29.35	50.58	14.07
8.21	846.35	0.14	29.72	51.69	14.10
8.48	846.35	0.14	30.10	52.76	14.13
8.76	846.35	0.14	30.46	53.84	14.16
9.04	846.36	0.15	30.81	54.91	14.18
9.31	846.36	0.15	31.15	55.98	14.20
9.59	846.36	0.15	31.47	57.05	14.21
9.95	846.37	0.16	31.90	58.39	14.24
10.15	846.37	0.16	32.14	59.10	14.25
10.42	846.37	0.16	32.45	60.13	14.27
10.70	846.37	0.16	32.78	61.11	14.30

Tailwater Channel Data - SR256 - Right Bridge Abutment

Tailwater Channel Option: Rectangular Channel

Bottom Width: 2.00 ft

Channel Slope: 6.0000

Channel Manning's n: 0.0300

Channel Invert Elevation: 846.21 ft

Roadway Data for Crossing: SR256 - Right Bridge Abutment

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 25.00 ft

Crest Elevation: 850.27 ft

Roadway Surface: Paved

Roadway Top Width: 50.50 ft

County Station	FAI/LIC	Route Station	70	Section	0.00/0.00	PID	96808	Shape	Circular
	SR 256 Bridge Abutment (right)							Span x Rise	21

User Input	
pH _a	Abrasion Level
7.5	1.0

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

Metal Conduit Durability Results																						
Material	707.01, 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 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 Coated over galvanized steel	***707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with invert	***707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate	707.24 Aluminum Spiral Rib	707.25 Aluminum Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape	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	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe -Round	Liner Pipe -Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe -Round, Pipe Arch, or Box	Culvert or Liner Pipe -Round or Pipe Arch	Culvert or Liner Pipe - Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
Corr. Depth (Inches)	16	16	16	16	16	16	16	16	N/A	N/A	16	16	N/A	16	16	16	0.5	16	N/A	N/A	N/A	16
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0.5	12	N/A	N/A	14	N/A
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gauge	Thickness (Inches)	16	14	12	10	8	7	5	3	1	Casing	0.5										
16	0.064																					
14	0.079																					
12	0.109																					
10	0.138																					
8	0.168																					
7	0.189																					
5	0.218																					
3	0.249																					
1	0.28																					
Casing	0.5																					

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 or Liner Pipe - Round	Storm Sewer - Round

Notes:

Many metal options are eliminated when abrasion level equals 4 or greater
 Aluminum is only available between pH levels ranging from 5.0 to less than 9.0
 Aluminized protective coating is 0 years when pH levels are outside of allowable for Aluminum
 Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.0
 Options were eliminated when the NCSPA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limitations
 Epoxy is required on all concrete surfaces when pH<5
 ** Smooth lined conduit
 ***Minimum gauges set per industry comments; see Reference Data
 Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0



UNIVERSAL CULVERT DESIGN

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT DISTRICT 5

Description : Ramp D Drive Pipe Sta. 75+50

Designer : WCS

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.) : 858.60 **Outlet Invert Elevation (ft.) :** 855.92 **Tailwater Elevation (ft.) :** 855.92 **Overflow Elevation (ft.) :** 862.10
Allowable Headwater Elevation (ft.) : 862.10 or Diameter + 0 ft. (*whichever is less*)
Pipe Length (ft.) : 57.12 **Culvert Slope (ft./ft.) :** 0.0469 **Design Manning 'n' :** 0.0120
Design Discharge (cfs) : 4.50 @ 50 yrs. **Flood Discharge (cfs) :** 4.80 @ 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							
4.50	1	18 in.	859.77	N/A	1 - C	10.60	0.43	0.81	0.0120	INLET	0.00	D	0.00
4.50	1	15 in.	859.89	N/A	1 - C	10.76	0.47	0.86	0.0120	INLET	0.00	D - 1	0.00
4.50	1	12 in.	860.31	858.25	2 - E	10.84	0.52	0.89	0.0120	INLET	0.00	D - 2	0.00
4.50	1	21 in.	859.70	N/A	1 - C	10.45	0.41	0.78	0.0120	INLET	0.00	D + 1	0.00
4.80	1	18 in.	859.82	N/A	1 - C	10.80	0.45	0.84	0.0120	INLET	0.00	F	0.00
4.80	1	15 in.	859.95	N/A	1 - C	10.97	0.48	0.89	0.0120	INLET	0.00	F - 1	0.00
4.80	1	12 in.	860.45	858.45	2 - E	10.99	0.54	0.91	0.0120	INLET	0.00	F - 2	0.00
4.80	1	21 in.	859.74	N/A	1 - C	10.65	0.42	0.80	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)													
4.50	1	18 in.	859.82	N/A	1 - C	6.26	0.64	0.81	0.0249	INLET	0.00	D	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.)
	4.50	1	15 in.	860.04	N/A	1 - C	6.24	0.71	0.86	0.0250	INLET	0.00	D - 1	0.00
	4.50	1	12 in.	860.87	861.21	2 - F	6.12	1.00	0.89	0.0251	OUTLET**	0.00	D - 2	0.00
	4.50	1	21 in.	859.74	N/A	1 - C	6.21	0.60	0.78	0.0248	INLET	0.00	D + 1	0.00
	4.80	1	18 in.	859.87	N/A	1 - C	6.37	0.66	0.84	0.0249	INLET	0.00	F	0.00
	4.80	1	15 in.	860.13	858.60	2 - E	6.33	0.74	0.89	0.0250	INLET	0.00	F - 1	0.00
	4.80	1	12 in.	861.09	861.82	2 - F	6.42	1.00	0.91	0.0251	OUTLET**	0.00	F - 2	0.00
	4.80	1	21 in.	859.78	N/A	1 - C	6.32	0.62	0.80	0.0248	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (3 x 1 in. corrugations)														
	4.50	1	36 in.	859.50	N/A	1 - C	5.39	0.53	0.66	0.0281	INLET	0.00	D	0.00
	4.50	1	42 in.	859.45	N/A	1 - C	5.31	0.50	0.63	0.0278	INLET	0.00	D + 1	0.00
	4.80	1	36 in.	859.53	N/A	1 - C	5.49	0.54	0.69	0.0281	INLET	0.00	F	0.00
	4.80	1	42 in.	859.48	N/A	1 - C	5.42	0.52	0.66	0.0278	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations)														
Diameter exceeds 1.25 HWA	4.50	1	60 in.	859.43	N/A	1 - C	4.49	0.49	0.58	0.0332	INLET	0.00	D	0.00
	4.50	1	66 in.	859.45	N/A	1 - C	4.45	0.48	0.56	0.0330	INLET	0.00	D + 1	0.00
	4.80	1	60 in.	859.45	N/A	1 - C	4.57	0.51	0.60	0.0332	INLET	0.00	F	0.00
	4.80	1	66 in.	859.46	N/A	1 - C	4.53	0.49	0.58	0.0330	INLET	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.25	2	60 in.	859.29	N/A	1 - C	3.63	0.36	0.41	0.0332	INLET	0.00	D	0.00
	2.25	2	66 in.	859.32	N/A	1 - C	3.61	0.35	0.40	0.0330	INLET	0.00	D + 1	0.00
	2.40	2	60 in.	859.30	N/A	1 - C	3.71	0.37	0.42	0.0332	INLET	0.00	F	0.00
	2.40	2	66 in.	859.33	N/A	1 - C	3.68	0.36	0.41	0.0330	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations, Field Paved Invert)														
Diameter exceeds 1.25 HWA	4.50	1	60 in.	859.43	N/A	1 - C	5.31	0.44	0.58	0.0260	INLET	0.00	D	0.00
	4.50	1	66 in.	859.45	N/A	1 - C	5.25	0.43	0.56	0.0260	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.)
	4.80	1	60 in.	859.45	N/A	1 - C	5.42	0.45	0.60	0.0260	INLET	0.00	F	0.00
	4.80	1	66 in.	859.46	N/A	1 - C	5.35	0.44	0.58	0.0260	INLET	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.25	2	60 in.	859.29	N/A	1 - C	4.32	0.32	0.41	0.0260	INLET	0.00	D	0.00
	2.25	2	66 in.	859.32	N/A	1 - C	4.25	0.31	0.40	0.0260	INLET	0.00	D + 1	0.00
	2.40	2	60 in.	859.30	N/A	1 - C	4.40	0.33	0.42	0.0260	INLET	0.00	F	0.00
	2.40	2	66 in.	859.33	N/A	1 - C	4.34	0.32	0.41	0.0260	INLET	0.00	F + 1	0.00



UNIVERSAL CULVERT DESIGN

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT DISTRICT 5

Description : SR 204 Drive Pipe Sta. 39+50

Designer : WCS

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.) : 907.77 **Outlet Invert Elevation (ft.) :** 907.46 **Tailwater Elevation (ft.) :** 907.48 **Overflow Elevation (ft.) :** 910.24
Allowable Headwater Elevation (ft.) : 911.04 or Diameter + 0 ft. (*whichever is less*)
Pipe Length (ft.) : 33.00 **Culvert Slope (ft./ft.) :** 0.0094 **Design Manning 'n' :** 0.0120
Design Discharge (cfs) : 3.90 @ 10 yrs. **Flood Discharge (cfs) :** 4.45 @ 25 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							
3.90	1	15 in.	908.95	N/A	1 - C	5.72	0.68	0.80	0.0120	INLET	0.00	D	0.00
3.90	1	12 in.	909.23	909.18	2 - E	5.41	0.86	0.84	0.0120	INLET	0.00	D - 1	0.00
3.90	1	18 in.	908.85	N/A	1 - C	5.71	0.62	0.76	0.0120	INLET	0.00	D + 1	0.00
4.45	1	15 in.	909.05	N/A	1 - C	5.90	0.74	0.86	0.0120	INLET	0.00	F	0.00
4.45	1	12 in.	909.46	909.44	2 - E	5.67	1.00	0.88	0.0120	INLET	0.00	F - 1	0.00
4.45	1	18 in.	908.94	N/A	1 - C	5.91	0.66	0.81	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)													
3.90	1	18 in.	908.89	909.02	1 - A	4.38	0.95	0.76	0.0249	OUTLET*	0.00	D	0.00
3.90	1	15 in.	909.04	909.20	1 - A	4.71	1.14	0.80	0.0250	OUTLET*	0.00	D - 1	0.00
3.60	1	12 in.	909.63	910.57	2 - F	5.29	1.00	0.81	0.0251	OUTLET**	0.30	D - 2	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.)
	3.90	1	21 in.	908.82	908.94	1 - A	4.18	0.86	0.72	0.0248	OUTLET*	0.00	D + 1	0.00
	4.45	1	18 in.	908.98	909.13	1 - A	4.58	1.05	0.81	0.0249	OUTLET*	0.00	F	0.00
	4.45	1	15 in.	909.19	909.48	2 - F	4.97	1.25	0.86	0.0250	OUTLET**	0.00	F - 1	0.00
	3.55	1	12 in.	910.00	911.26	2 - F	5.25	1.00	0.80	0.0251	OUTLET**	0.90	F - 2	0.00
	4.45	1	21 in.	908.90	909.03	1 - A	4.35	0.93	0.77	0.0248	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (3 x 1 in. corrugations)														
	3.90	1	36 in.	908.60	908.74	1 - A	3.73	0.73	0.62	0.0281	OUTLET*	0.00	D	0.00
	3.90	1	42 in.	908.56	908.70	1 - A	3.64	0.69	0.59	0.0278	OUTLET*	0.00	D + 1	0.00
	4.45	1	36 in.	908.66	908.81	1 - A	3.86	0.78	0.66	0.0281	OUTLET*	0.00	F	0.00
	4.45	1	42 in.	908.62	908.76	1 - A	3.77	0.74	0.63	0.0278	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations)														
Diameter exceeds 1.25 HWA	3.90	1	60 in.	908.56	908.60	1 - A	3.43	0.68	0.54	0.0332	OUTLET*	0.00	D	0.00
	3.90	1	66 in.	908.58	908.58	1 - A	3.38	0.66	0.52	0.0330	OUTLET*	0.00	D + 1	0.00
	4.45	1	60 in.	908.60	908.66	1 - A	3.55	0.72	0.57	0.0332	OUTLET*	0.00	F	0.00
	4.45	1	66 in.	908.61	908.64	1 - A	3.50	0.70	0.56	0.0330	OUTLET*	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	1.95	2	60 in.	908.44	908.35	1 - C	1.99	0.49	0.38	0.0332	INLET	0.00	D	0.00
	1.95	2	66 in.	908.47	908.34	1 - C	1.97	0.47	0.37	0.0330	INLET	0.00	D + 1	0.00
	2.23	2	60 in.	908.45	908.39	1 - C	2.07	0.52	0.40	0.0332	INLET	0.00	F	0.00
	2.23	2	66 in.	908.49	908.38	1 - C	2.04	0.50	0.39	0.0330	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations, Field Paved Invert)														
Diameter exceeds 1.25 HWA	3.90	1	60 in.	908.56	908.62	1 - A	3.43	0.60	0.54	0.0260	OUTLET*	0.00	D	0.00
	3.90	1	66 in.	908.58	908.59	1 - A	3.38	0.59	0.52	0.0260	OUTLET*	0.00	D + 1	0.00
	4.45	1	60 in.	908.60	908.68	1 - A	3.55	0.64	0.57	0.0260	OUTLET*	0.00	F	0.00
	4.45	1	66 in.	908.61	908.65	1 - A	3.50	0.63	0.56	0.0260	OUTLET*	0.00	F + 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.)
Diameter exceeds 1.25 HWA	1.95	2	60 in.	908.44	908.36	1 - C	2.35	0.43	0.38	0.0260	INLET	0.00	D	0.00
	1.95	2	66 in.	908.47	908.35	1 - C	2.33	0.42	0.37	0.0260	INLET	0.00	D + 1	0.00
	2.23	2	60 in.	908.45	908.41	1 - C	2.45	0.46	0.40	0.0260	INLET	0.00	F	0.00
	2.23	2	66 in.	908.49	908.39	1 - C	2.41	0.45	0.39	0.0260	INLET	0.00	F + 1	0.00



UNIVERSAL CULVERT DESIGN

PID : 96808 **Date :** 04/25/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT DISTRICT 5

Description : SR 204 Drive Pipe Sta. 45+80

Designer : WCS

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.) : 906.17 **Outlet Invert Elevation (ft.) :** 905.82 **Tailwater Elevation (ft.) :** 905.82 **Overflow Elevation (ft.) :** 908.89
Allowable Headwater Elevation (ft.) : 908.89 or Diameter + 0 ft. (*whichever is less*)
Pipe Length (ft.) : 41.00 **Culvert Slope (ft./ft.) :** 0.0085 **Design Manning 'n' :** 0.0120
Design Discharge (cfs) : 5.00 @ 10 yrs. **Flood Discharge (cfs) :** 5.90 @ 25 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							
5.00	1	18 in.	907.42	N/A	1 - C	5.87	0.73	0.86	0.0120	INLET	0.00	D	0.00
5.00	1	15 in.	907.56	N/A	1 - C	5.81	0.83	0.91	0.0120	INLET	0.00	D - 1	0.00
5.00	1	12 in.	908.12	908.22	2 - F	6.63	1.00	0.92	0.0120	OUTLET**	0.00	D - 2	0.00
5.00	1	21 in.	907.34	N/A	1 - C	5.83	0.68	0.82	0.0120	INLET	0.00	D + 1	0.00
5.90	1	18 in.	907.54	N/A	1 - C	6.12	0.80	0.94	0.0120	INLET	0.00	F	0.00
5.90	1	15 in.	907.76	907.66	2 - E	5.97	0.94	0.98	0.0120	INLET	0.00	F - 1	0.00
5.90	1	12 in.	908.61	908.80	2 - F	7.65	1.00	0.95	0.0120	OUTLET**	0.00	F - 2	0.00
5.90	1	21 in.	907.45	N/A	1 - C	6.11	0.74	0.89	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)													
5.00	1	18 in.	907.48	907.66	1 - A	4.77	1.21	0.86	0.0249	OUTLET*	0.00	D	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.)
	5.00	1	15 in.	907.77	908.29	2 - F	5.25	1.25	0.91	0.0250	OUTLET**	0.00	D - 1	0.00
	3.50	1	12 in.	908.81	910.97	2 - F	5.20	1.00	0.80	0.0251	OUTLET**	1.50	D - 2	0.00
	5.00	1	21 in.	907.38	907.51	1 - A	4.52	1.03	0.82	0.0248	OUTLET*	0.00	D + 1	0.00
	5.90	1	18 in.	907.64	907.85	1 - A	5.07	1.37	0.94	0.0249	OUTLET*	0.00	F	0.00
	5.90	1	15 in.	908.10	908.88	2 - F	5.70	1.25	0.98	0.0250	OUTLET**	0.00	F - 1	0.00
	3.50	1	12 in.	909.53	912.63	2 - F	5.20	1.00	0.80	0.0251	OUTLET**	2.40	F - 2	0.00
	5.90	1	21 in.	907.50	907.66	1 - A	4.77	1.15	0.89	0.0248	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (3 x 1 in. corrugations)														
	5.00	1	36 in.	907.12	907.28	1 - A	3.99	0.85	0.70	0.0281	OUTLET*	0.00	D	0.00
	5.00	1	42 in.	907.07	907.22	1 - A	3.88	0.80	0.67	0.0278	OUTLET*	0.00	D + 1	0.00
	5.90	1	36 in.	907.22	907.38	1 - A	4.17	0.93	0.76	0.0281	OUTLET*	0.00	F	0.00
	5.90	1	42 in.	907.15	907.32	1 - A	4.05	0.87	0.73	0.0278	OUTLET*	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations)														
Diameter exceeds 1.25 HWA	5.00	1	60 in.	907.03	907.12	1 - A	3.67	0.78	0.61	0.0332	OUTLET*	0.00	D	0.00
	5.00	1	66 in.	907.04	907.09	1 - A	3.61	0.76	0.59	0.0330	OUTLET*	0.00	D + 1	0.00
	5.90	1	60 in.	907.09	907.21	1 - A	3.83	0.85	0.66	0.0332	OUTLET*	0.00	F	0.00
	5.90	1	66 in.	907.09	907.18	1 - A	3.78	0.82	0.65	0.0330	OUTLET*	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.50	2	60 in.	906.87	906.84	1 - C	2.07	0.56	0.43	0.0332	INLET	0.00	D	0.00
	2.50	2	66 in.	906.90	906.82	1 - C	2.05	0.54	0.42	0.0330	INLET	0.00	D + 1	0.00
	2.95	2	60 in.	906.90	906.89	1 - C	2.17	0.61	0.47	0.0332	INLET	0.00	F	0.00
	2.95	2	66 in.	906.93	906.88	1 - C	2.16	0.59	0.45	0.0330	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations, Field Paved Invert)														
Diameter exceeds 1.25 HWA	5.00	1	60 in.	907.03	907.12	1 - A	3.67	0.70	0.61	0.0260	OUTLET*	0.00	D	0.00
	5.00	1	66 in.	907.04	907.10	1 - A	3.61	0.68	0.59	0.0260	OUTLET*	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.)
	5.90	1	60 in.	907.09	907.21	1 - A	3.83	0.75	0.66	0.0260	OUTLET*	0.00	F	0.00
	5.90	1	66 in.	907.09	907.18	1 - A	3.78	0.73	0.65	0.0260	OUTLET*	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.50	2	60 in.	906.87	906.84	1 - C	2.46	0.50	0.43	0.0260	INLET	0.00	D	0.00
	2.50	2	66 in.	906.90	906.82	1 - C	2.42	0.49	0.42	0.0260	INLET	0.00	D + 1	0.00
	2.95	2	60 in.	906.90	906.90	1 - C	2.58	0.54	0.47	0.0260	INLET	0.00	F	0.00
	2.95	2	66 in.	906.93	906.88	1 - C	2.55	0.53	0.45	0.0260	INLET	0.00	F + 1	0.00

Job Name: FAI/LIC-70 Job No.: 96808
 Location: Fairfield and Licking Counties Sheet: 1 of 1
 Task: Taylor Road - Drive Pipe (Sta. 53+00)
 Calculated By: CEF Date: 5/7/2024
 Checked By: DMG Date: 5/7/2024

Time of Concentration from Ditch Calculations

Drainage Area = 1.43 ac

C = 0.7

Time of Concentration = 16.09 mins

*from ditch calcs for Taylor Road (Sta. 54+50 to Sta. 53+00)

Intensity Zone C			
Freq.	a	b	c
2	56.299	10.000	0.876
5	67.933	11.000	0.869
10	84.550	13.000	0.882
25	95.736	14.000	0.871
50	96.783	14.000	0.850
100	80.436	11.500	0.794

$$i = \frac{a}{(t+b)^c}$$

$$Q = CiA$$

$i_2 =$	3.24	in/hr	$Q_2 =$	3.25	cfs
$i_5 =$	3.87	in/hr	$Q_5 =$	3.88	cfs
$i_{10} =$	4.33	in/hr	$Q_{10} =$	4.34	cfs
$i_{25} =$	4.94	in/hr	$Q_{25} =$	4.95	cfs
$i_{50} =$	5.36	in/hr	$Q_{50} =$	5.37	cfs
$i_{100} =$	5.78	in/hr	$Q_{100} =$	5.79	cfs



UNIVERSAL CULVERT DESIGN

PID : 96808 **Date :** 05/06/2024 **Project :** FAI/LIC-70-0.00/0.00

Location : ODOT DISTRICT 5

Description : Drive Pipe: Taylor Road - Sta. 53+00.00

Designer : CEF

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.) : 947.11 **Outlet Invert Elevation (ft.) :** 946.58 **Tailwater Elevation (ft.) :** 946.58 **Overflow Elevation (ft.) :** 949.94
Allowable Headwater Elevation (ft.) : 949.94 or Diameter + 0 ft. (*whichever is less*)
Pipe Length (ft.) : 24.50 **Culvert Slope (ft./ft.) :** 0.0216 **Design Manning 'n' :** 0.0120
Design Discharge (cfs) : 4.34 @ 10 yrs. **Flood Discharge (cfs) :** 4.95 @ 25 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					
4.34	1	18 in.	948.26	N/A	1 - C	7.96	0.52	0.80	0.0120	INLET	0.00	D	0.00	
4.34	1	15 in.	948.37	N/A	1 - C	8.02	0.57	0.84	0.0120	INLET	0.00	D - 1	0.00	
4.34	1	12 in.	948.75	948.39	2 - E	7.96	0.66	0.87	0.0120	INLET	0.00	D - 2	0.00	
4.34	1	21 in.	948.19	N/A	1 - C	7.84	0.49	0.76	0.0120	INLET	0.00	D + 1	0.00	
4.95	1	18 in.	948.35	N/A	1 - C	8.25	0.56	0.86	0.0120	INLET	0.00	F	0.00	
4.95	1	15 in.	948.49	N/A	1 - C	8.30	0.61	0.90	0.0120	INLET	0.00	F - 1	0.00	
4.95	1	12 in.	949.04	948.68	2 - E	8.16	0.72	0.92	0.0120	INLET	0.00	F - 2	0.00	
4.95	1	21 in.	948.27	N/A	1 - C	8.15	0.53	0.82	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)														
4.34	1	18 in.	948.30	N/A	1 - C	4.65	0.78	0.80	0.0249	INLET	0.00	D	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.)
	4.34	1	15 in.	948.50	948.62	2 - F	4.92	0.91	0.84	0.0250	OUTLET*	0.00	D - 1	0.00
	4.34	1	12 in.	949.27	949.77	2 - F	5.96	1.00	0.87	0.0251	OUTLET**	0.00	D - 2	0.00
	4.34	1	21 in.	948.22	N/A	1 - C	4.65	0.72	0.76	0.0248	INLET	0.00	D + 1	0.00
	4.95	1	18 in.	948.41	N/A	1 - C	4.80	0.85	0.86	0.0249	INLET	0.00	F	0.00
	4.95	1	15 in.	948.69	948.74	2 - F	5.22	1.03	0.90	0.0250	OUTLET*	0.00	F - 1	0.00
	4.45	1	12 in.	949.71	950.46	2 - F	6.06	1.00	0.88	0.0251	OUTLET**	0.50	F - 2	0.00
	4.95	1	21 in.	948.31	N/A	1 - C	4.81	0.78	0.82	0.0248	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (3 x 1 in. corrugations)														
	4.34	1	36 in.	947.99	N/A	1 - C	3.84	0.63	0.65	0.0281	INLET	0.00	D	0.00
	4.34	1	42 in.	947.94	N/A	1 - C	3.73	0.59	0.62	0.0278	INLET	0.00	D + 1	0.00
	4.95	1	36 in.	948.06	N/A	1 - C	3.98	0.67	0.70	0.0281	INLET	0.00	F	0.00
	4.95	1	42 in.	948.00	N/A	1 - C	3.87	0.63	0.67	0.0278	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations)														
Diameter exceeds 1.25 HWA	4.34	1	60 in.	947.93	948.03	1 - A	3.53	0.58	0.57	0.0332	OUTLET*	0.00	D	0.00
	4.34	1	66 in.	947.95	948.01	1 - A	3.49	0.57	0.55	0.0330	OUTLET*	0.00	D + 1	0.00
	4.95	1	60 in.	947.97	948.10	1 - A	3.65	0.62	0.61	0.0332	OUTLET*	0.00	F	0.00
	4.95	1	66 in.	947.98	948.07	1 - A	3.60	0.60	0.59	0.0330	OUTLET*	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.17	2	60 in.	947.79	947.75	1 - C	2.74	0.42	0.40	0.0332	INLET	0.00	D	0.00
	2.17	2	66 in.	947.82	947.73	1 - C	2.72	0.41	0.39	0.0330	INLET	0.00	D + 1	0.00
	2.48	2	60 in.	947.81	947.80	1 - C	2.85	0.45	0.43	0.0332	INLET	0.00	F	0.00
	2.48	2	66 in.	947.84	947.78	1 - C	2.83	0.43	0.42	0.0330	INLET	0.00	F + 1	0.00
Corrugated Metal Pipe (6 x 2 in. corrugations, Field Paved Invert)														
Diameter exceeds 1.25 HWA	4.34	1	60 in.	947.93	N/A	1 - C	3.53	0.52	0.57	0.0260	INLET	0.00	D	0.00
	4.34	1	66 in.	947.95	N/A	1 - C	3.49	0.51	0.55	0.0260	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.)
	4.95	1	60 in.	947.97	N/A	1 - C	3.65	0.55	0.61	0.0260	INLET	0.00	F	0.00
	4.95	1	66 in.	947.98	N/A	1 - C	3.60	0.54	0.59	0.0260	INLET	0.00	F + 1	0.00
Diameter exceeds 1.25 HWA	2.17	2	60 in.	947.79	N/A	1 - C	2.95	0.37	0.40	0.0260	INLET	0.00	D	0.00
	2.17	2	66 in.	947.82	N/A	1 - C	2.91	0.36	0.39	0.0260	INLET	0.00	D + 1	0.00
	2.48	2	60 in.	947.81	N/A	1 - C	3.06	0.40	0.43	0.0260	INLET	0.00	F	0.00
	2.48	2	66 in.	947.84	N/A	1 - C	3.01	0.39	0.42	0.0260	INLET	0.00	F + 1	0.00

VIII. End of Bridge Drainage Design

There are nine bridges within the project limits. The three bridges over Blacklick Creek are in the sag of IR 70, so the bridges will require scuppers and no end drainage. The three bridges over SR 256 and the two bridges over Palmer Road will require erosion protection at the western corners. The erosion protection was designed per ODOT SCD DM-4.1. Taylor Road bridge water will drain to the closed storm sewer system.



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - SR256 Eastbound Bridge (Northwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
64+65	Begin																	
62+61	CB-3A	204.00	0.90	0.10	10.00	2.24	12.24	0.0198	0.0160	0.0160	10.00	0.1667	4.90	0.37	0.08	0.45	0.085	5.29



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - SR256 CD Bridge (Eastbound I70) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
64+43	Begin																	
62+40	CB-3A	203.00	0.90	0.17	10.00	1.63	11.63	0.0174	0.0400	0.0160	10.00	0.1667	5.01	0.72	0.05	0.77	0.149	3.72



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - SR256 Westbound Bridge (Northwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
64+86	Begin																	
62+80	CB-3A	206.00	0.90	0.22	10.00	1.90	11.90	0.0190	0.0160	0.0160	10.00	0.1667	4.96	0.62	0.35	0.96	0.113	7.08



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - SR256 Westbound Bridge (Southwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
64+72	Begin																	
62+66	CB-3A	206.00	0.90	0.10	10.00	2.27	12.27	0.0193	0.0160	0.0160	10.00	0.1667	4.90	0.37	0.09	0.46	0.085	5.34



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - Palmer Eastbound Bridge (Northwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.):** 10 **Total Allow. Spread (ft.):** 10.00 **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.)
166+17	Begin																	
164+50	CB-3A	167.00	0.90	0.13	10.00	2.19	12.19	0.0105	0.0160	0.0160	10.00	0.1667	4.91	0.43	0.14	0.57	0.104	6.51



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - Palmer Eastbound Bridge (Southwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
166+75	Begin																	
165+08	CB-3A	167.00	0.90	0.08	10.00	2.45	12.45	0.0105	0.0160	0.0160	10.00	0.1667	4.87	0.32	0.05	0.37	0.088	5.51



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - Palmer Westbound Bridge (Northwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
165+17	Begin																	
163+50	CB-3A	167.00	0.90	0.08	10.00	2.46	12.46	0.0104	0.0160	0.0160	10.00	0.1667	4.87	0.32	0.05	0.37	0.088	5.52



INLET SPACING DESIGN

PID : 96808 **Date :** 06/25/2024 **Project :** FAI/LIC-70-0.00/0.00 **Location :** ODOT District 5

Description : End of Bridge - Palmer Westbound Bridge (Southwest Corner) **Designer :** CEF

Rainfall Area: C **Storm Frequency (yr.) :** 10 **Total Allow. Spread (ft.) :** 10.00 **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.)
165+75	Begin																	
164+08	CB-3A	167.00	0.90	0.13	10.00	2.20	12.20	0.0104	0.0160	0.0160	10.00	0.1667	4.91	0.43	0.14	0.57	0.104	6.52

IX. Best Management Practice Calculations

The preliminary estimated project earth disturbed area for this project is 122.83 acres. The required BMP treatment percentage (T%) is 22.88% of the area for both water quality and quantity, which is 28.10 acres. For this project, a detention basin will be used to treat the water. The detention basin will be in the infield of the eastbound IR 70 exit ramp to Taylor Road. The detention basin will treat 29.09 acres of project area within permanent right-of-way. The detention basin will outlet to the outer ditch of IR 70, which will eventually drain to Blacklick Creek.



Post Construction - Project Summary

Project Data

		Units
Project EDA	122.83	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)	3.99	acres
Does Entire Site Drain to Large River (>100 sq. miles)?	No	
Water Quality Treatment Required	Yes	
Water Quantity Treatment Required	Yes	

Treatment Percent and Treatment Requirement

Aix (Project EDA that is inside the existing right-of-way)	107.00	acres
Ain (New Impervious Area in New Permanent R/W)	3.99	acres
T% (Treatment Percent)	22.88	%
Treatment Requirement	28.10	acres

BMPs Provided

BMP Name	BMP Type	Contributing Drainage Area (acres)	Contributing Drainage Area in ODOT R/W (acres)
Det. #1	Extended Detention Basin	40.98	29.09

Treatment Provided

Total Area with ODOT R/W Treated (acres)	29.09
Treatment Requirements (acres)	28.10
Treatment Check	Good

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



Ohio Department of Transportation - Office of Hydraulic Engineering
Post-Construction BMP Calculation Spreadsheet

Water Quality Volume (WQ_v)

Drainage Area #1	Values	Units
Tributary Area within Existing R/W	22.35	acres
Impervious Trib. Area Outside Existing R/W	1.44	acres
Pervious Trib. Area Outside Existing R/W	17.19	acres
Total Tributary Area	40.98	acres
Impervious Tributary Area	23.79	acres
Impervious fraction (i)	0.58	fraction
Volumetric Runoff Coefficient (R _v)	0.57	NA
Precipitation (P)	0.90	inches
WQ_v	1.760	ac-ft

Yellow: Requires Input (See instructions tab)



Extended Detention Basin / Retention Basin

Drainage Area #	Total Tributary Area (acres)	Tributary Area within the R/W (acres)	WQ _v (ac-ft)
Det. #1	40.98	29.09	1.760

Yellow: Requires Input (See instructions tab)

Total Treatment Credit Earned from Extended Detention (within R/W):¹

29.09	acres
-------	-------

(Treatment is for quality and quantity)

	Extended Detention #1	
	Values	Notes / Checks
WQ _v (ac-ft)	1.760	Calculation
Detention or Retention	Detention	Drop Down List
Minimum WQ _v (ac-ft)	1.760	Calculation
Design WQ _v (ac-ft) ²	1.900	GOOD
Min. Time to Drain WQ _v (hrs) ³	48	By Rule
Design Time to Drain WQ _v	81.6	GOOD
50% WQ _v (ac-ft)	0.880	Calculation
Min. Time to Drain 50% WQ _v (hrs) ⁴	16	Calculation
Design Time to Drain 50% WQ _v	17.4	GOOD
Min. Forebay and Micropool Vol. (ac-ft) ⁵	0.176	Calculation
Design Forebay Volume (ac-ft)	0.200	GOOD
Design Micropool Volume (ac-ft)	0.200	GOOD
Minimum Permanent Pond Vol. (ac-ft) ⁶	0.000	Calculation
Design Permanent Pond Vol. (ac-ft)		Not required

BMP Design Considerations	Answer	Design Check
1. Is the stage/storage table and graph provided?	Yes	Good
2. Are all detention basin outlets shown in detail?	No	CHECK DESIGN
3. Is a drawdown hydrograph provided?	Yes	Good
4. Has a summary of all input and output into a basin routing software been provided?	Yes	Good
5. Is scour protection provided at inlets and outlets?	No	CHECK DESIGN
6. Have detention basin overflow structures (catch basin and overflow weir) been sized appropriately?	No	CHECK DESIGN
7. Has tailwater been considered?	Yes	Good
8. Is the detention basin located outside of any FEMA designated floodplains?	Yes	Good
9. Are the limits of Item 670, Slope Erosion Protection, shown on the plans?	No	CHECK DESIGN
10. Are anti-seep collars included in the plans?	No	CHECK DESIGN
11. Has maintenance access been considered?	No	CHECK DESIGN
12. Have safety concerns been considered and addressed?	Yes	Good

Project Summary

Title	FAI/LIC-70- 0.00/0.00
Engineer	Colleen Flach
Company	Carpenter Marty Transportation
Date	5/1/2024

Notes	Design and analysis for the detention basin located in the infield of the eastbound exit ramp at the I-70/Taylor Road interchange.
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Subsection: User Notifications

User Notifications

Message Id	17
Scenario	10 year
Element Type	Composite Outlet Structure
Element Id	47
Label	Composite Outlet Structure - Perforated Riser
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information

Message Id	17
Scenario	25 year
Element Type	Composite Outlet Structure
Element Id	47
Label	Composite Outlet Structure - Perforated Riser
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information

Message Id	17
Scenario	50 year
Element Type	Composite Outlet Structure
Element Id	47
Label	Composite Outlet Structure - Perforated Riser
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information

Message Id	17
Scenario	100 year
Element Type	Composite Outlet Structure
Element Id	47
Label	Composite Outlet Structure - Perforated Riser
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information

Subsection: Modified Rational Grand Summary

Modified Rational Method

$$Q = CiA * \text{Units Conversion; Where conversion} = 43560 / (12 * 3600)$$

Frequency (years)	Area (acres)	Adjusted C Coefficient	Duration (hours)	Intensity (in/h)	Flow (Peak) (ft ³ /s)	Flow (Allowable) (ft ³ /s)	Volume (inflow) (ac-ft)	Volume (Storage) (ac-ft)
10	36.100	0.701	1.080	1.817	46.34	40.98	4.14	0.48
25	36.100	0.701	1.080	2.134	54.44	47.86	4.86	0.59
50	36.100	0.701	1.080	2.365	60.32	52.77	5.38	0.67
100	36.100	0.701	1.080	2.575	65.68	57.09	5.86	0.77

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
CM-1	10 year	10	4.13	1.100	45.48
CM-1	25 year	25	4.86	1.100	53.43
CM-1	50 year	50	5.38	1.100	59.20
CM-1	100 year	100	5.86	1.100	64.46

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)
O-1	10 year	10	3.95	1.400	33.68
O-1	25 year	25	4.67	1.300	43.49
O-1	50 year	50	5.19	1.250	50.25
O-1	100 year	100	5.67	1.250	56.18

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft ³ /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PO-1 (IN)	10 year	10	4.13	1.100	45.48	(N/A)	(N/A)
PO-1 (OUT)	10 year	10	3.95	1.400	33.68	922.46	2.43
PO-1 (IN)	25 year	25	4.86	1.100	53.43	(N/A)	(N/A)
PO-1 (OUT)	25 year	25	4.67	1.300	43.49	922.59	2.53
PO-1 (IN)	50 year	50	5.38	1.100	59.20	(N/A)	(N/A)
PO-1 (OUT)	50 year	50	5.19	1.250	50.25	922.68	2.59
PO-1 (IN)	100 year	100	5.86	1.100	64.46	(N/A)	(N/A)
PO-1 (OUT)	100 year	100	5.67	1.250	56.18	922.75	2.65

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.017	8.246
0.033	7.759
0.050	7.330
0.067	6.948
0.083	6.606
0.100	6.299
0.117	6.020
0.133	5.767
0.150	5.535
0.167	5.322
0.183	5.126
0.200	4.945
0.217	4.776
0.233	4.620
0.250	4.474
0.267	4.338
0.283	4.210
0.300	4.090
0.317	3.977
0.333	3.871
0.350	3.770
0.367	3.675
0.383	3.585
0.400	3.499
0.417	3.418
0.433	3.340
0.450	3.267
0.467	3.196
0.483	3.129
0.500	3.065
0.517	3.003
0.533	2.944
0.550	2.888
0.567	2.834
0.583	2.781
0.600	2.731
0.617	2.683
0.633	2.637
0.650	2.592
0.667	2.549
0.683	2.507
0.700	2.467
0.717	2.428
0.733	2.390

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.750	2.354
0.767	2.319
0.783	2.284
0.800	2.251
0.817	2.219
0.833	2.188
0.850	2.158
0.867	2.129
0.883	2.100
0.900	2.073
0.917	2.046
0.933	2.020
0.950	1.994
0.967	1.969
0.983	1.945
1.000	1.922
1.017	1.899
1.033	1.876
1.050	1.855
1.067	1.833
1.083	1.813
1.100	1.792
1.117	1.773
1.133	1.753
1.150	1.734
1.167	1.716
1.183	1.698
1.200	1.680
1.217	1.663
1.233	1.646
1.250	1.630
1.267	1.613
1.283	1.598
1.300	1.582
1.317	1.567
1.333	1.552
1.350	1.537
1.367	1.523
1.383	1.509
1.400	1.495
1.417	1.482
1.433	1.469
1.450	1.456
1.467	1.443

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
1.483	1.431
1.500	1.418
1.517	1.406
1.533	1.395
1.550	1.383
1.567	1.372
1.583	1.360
1.600	1.349
1.617	1.338
1.633	1.328
1.650	1.317
1.667	1.307
1.683	1.297
1.700	1.287
1.717	1.277
1.733	1.268
1.750	1.258
1.767	1.249
1.783	1.240
1.800	1.231
1.817	1.222
1.833	1.213
1.850	1.204
1.867	1.196
1.883	1.187
1.900	1.179
1.917	1.171
1.933	1.163
1.950	1.155
1.967	1.147
1.983	1.140
2.000	1.132
2.017	1.125
2.033	1.117
2.050	1.110
2.067	1.103
2.083	1.096
2.100	1.089
2.117	1.082
2.133	1.075
2.150	1.069
2.167	1.062
2.183	1.055
2.200	1.049

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.217	1.043
2.233	1.036
2.250	1.030
2.267	1.024
2.283	1.018
2.300	1.012
2.317	1.006
2.333	1.000
2.350	0.995
2.367	0.989
2.383	0.984
2.400	0.978
2.417	0.973
2.433	0.967
2.450	0.962
2.467	0.957
2.483	0.951
2.500	0.946
2.517	0.941
2.533	0.936
2.550	0.931
2.567	0.926
2.583	0.921
2.600	0.916
2.617	0.912
2.633	0.907
2.650	0.902
2.667	0.898
2.683	0.893
2.700	0.889
2.717	0.884
2.733	0.880
2.750	0.875
2.767	0.871
2.783	0.867
2.800	0.863
2.817	0.858
2.833	0.854
2.850	0.850
2.867	0.846
2.883	0.842
2.900	0.838
2.917	0.834
2.933	0.830

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.950	0.827
2.967	0.823
2.983	0.819
3.000	0.815
3.017	0.811
3.033	0.808
3.050	0.804
3.067	0.801
3.083	0.797
3.100	0.793
3.117	0.790
3.133	0.786
3.150	0.783
3.167	0.780
3.183	0.776
3.200	0.773
3.217	0.770
3.233	0.766
3.250	0.763
3.267	0.760
3.283	0.757
3.300	0.754
3.317	0.750
3.333	0.747
3.350	0.744
3.367	0.741
3.383	0.738
3.400	0.735
3.417	0.732
3.433	0.729
3.450	0.726
3.467	0.723
3.483	0.720
3.500	0.718
3.517	0.715
3.533	0.712
3.550	0.709
3.567	0.706
3.583	0.704
3.600	0.701
3.617	0.698
3.633	0.696
3.650	0.693
3.667	0.690

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
3.683	0.688
3.700	0.685
3.717	0.683
3.733	0.680
3.750	0.678
3.767	0.675
3.783	0.673
3.800	0.670
3.817	0.668
3.833	0.665
3.850	0.663
3.867	0.660
3.883	0.658
3.900	0.656
3.917	0.653
3.933	0.651
3.950	0.649
3.967	0.647
3.983	0.644
4.000	0.642
4.017	0.640
4.033	0.638
4.050	0.635
4.067	0.633
4.083	0.631
4.100	0.629
4.117	0.627
4.133	0.625
4.150	0.623
4.167	0.620
4.183	0.618
4.200	0.616
4.217	0.614
4.233	0.612
4.250	0.610
4.267	0.608
4.283	0.606
4.300	0.604
4.317	0.602
4.333	0.600
4.350	0.598
4.367	0.597
4.383	0.595
4.400	0.593

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
4.417	0.591
4.433	0.589
4.450	0.587
4.467	0.585
4.483	0.583
4.500	0.582
4.517	0.580
4.533	0.578
4.550	0.576
4.567	0.574
4.583	0.573
4.600	0.571
4.617	0.569
4.633	0.567
4.650	0.566
4.667	0.564
4.683	0.562
4.700	0.561
4.717	0.559
4.733	0.557
4.750	0.556
4.767	0.554
4.783	0.552
4.800	0.551
4.817	0.549
4.833	0.548
4.850	0.546
4.867	0.544
4.883	0.543
4.900	0.541
4.917	0.540
4.933	0.538
4.950	0.537
4.967	0.535
4.983	0.534
5.000	0.532
5.017	0.531
5.033	0.529
5.050	0.528
5.067	0.526
5.083	0.525
5.100	0.523
5.117	0.522
5.133	0.520

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.150	0.519
5.167	0.518
5.183	0.516
5.200	0.515
5.217	0.513
5.233	0.512
5.250	0.511
5.267	0.509
5.283	0.508
5.300	0.507
5.317	0.505
5.333	0.504
5.350	0.503
5.367	0.501
5.383	0.500
5.400	0.499
5.417	0.497
5.433	0.496
5.450	0.495
5.467	0.493
5.483	0.492
5.500	0.491
5.517	0.490
5.533	0.488
5.550	0.487
5.567	0.486
5.583	0.485
5.600	0.483
5.617	0.482
5.633	0.481
5.650	0.480
5.667	0.479
5.683	0.477
5.700	0.476
5.717	0.475
5.733	0.474
5.750	0.473
5.767	0.472
5.783	0.470
5.800	0.469
5.817	0.468
5.833	0.467
5.850	0.466
5.867	0.465

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.883	0.464
5.900	0.462
5.917	0.461
5.933	0.460
5.950	0.459
5.967	0.458
5.983	0.457
6.000	0.456
6.167	0.445
6.333	0.435
6.500	0.426
6.667	0.417
6.833	0.408
7.000	0.400
7.167	0.392
7.333	0.384
7.500	0.377
7.667	0.370
7.833	0.363
8.000	0.356
8.167	0.350
8.333	0.344
8.500	0.338
8.667	0.333
8.833	0.327
9.000	0.322
9.167	0.317
9.333	0.312
9.500	0.307
9.667	0.303
9.833	0.298
10.000	0.294
10.167	0.290
10.333	0.286
10.500	0.282
10.667	0.278
10.833	0.274
11.000	0.271
11.167	0.267
11.333	0.264
11.500	0.261
11.667	0.257
11.833	0.254
12.000	0.251

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
12.167	0.248
12.333	0.245
12.500	0.243
12.667	0.240
12.833	0.237
13.000	0.234
13.167	0.232
13.333	0.229
13.500	0.227
13.667	0.224
13.833	0.222
14.000	0.220
14.167	0.218
14.333	0.215
14.500	0.213
14.667	0.211
14.833	0.209
15.000	0.207
15.167	0.205
15.333	0.203
15.500	0.201
15.667	0.199
15.833	0.197
16.000	0.196
16.167	0.194
16.333	0.192
16.500	0.191
16.667	0.189
16.833	0.187
17.000	0.186
17.167	0.184
17.333	0.183
17.500	0.181
17.667	0.180
17.833	0.178
18.000	0.177
18.167	0.175
18.333	0.174
18.500	0.172
18.667	0.171
18.833	0.170
19.000	0.168
19.167	0.167
19.333	0.166

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 10 year

Return Event: 10 years

Storm Event: IDF Curve Equation - 1 - 10
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
19.500	0.165
19.667	0.163
19.833	0.162
20.000	0.161
20.167	0.160
20.333	0.159
20.500	0.158
20.667	0.157
20.833	0.155
21.000	0.154
21.167	0.153
21.333	0.152
21.500	0.151
21.667	0.150
21.833	0.149
22.000	0.148
22.167	0.147
22.333	0.146
22.500	0.145
22.667	0.144
22.833	0.144
23.000	0.143
23.167	0.142
23.333	0.141
23.500	0.140
23.667	0.139
23.833	0.138
24.000	0.137

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.017	9.051
0.033	8.556
0.050	8.116
0.067	7.722
0.083	7.367
0.100	7.045
0.117	6.752
0.133	6.484
0.150	6.237
0.167	6.011
0.183	5.801
0.200	5.606
0.217	5.424
0.233	5.255
0.250	5.097
0.267	4.949
0.283	4.809
0.300	4.678
0.317	4.555
0.333	4.438
0.350	4.327
0.367	4.222
0.383	4.123
0.400	4.028
0.417	3.938
0.433	3.852
0.450	3.770
0.467	3.692
0.483	3.617
0.500	3.545
0.517	3.476
0.533	3.410
0.550	3.347
0.567	3.286
0.583	3.228
0.600	3.172
0.617	3.117
0.633	3.065
0.650	3.015
0.667	2.966
0.683	2.919
0.700	2.873
0.717	2.829
0.733	2.787

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.750	2.746
0.767	2.706
0.783	2.667
0.800	2.630
0.817	2.593
0.833	2.558
0.850	2.524
0.867	2.490
0.883	2.458
0.900	2.426
0.917	2.396
0.933	2.366
0.950	2.337
0.967	2.309
0.983	2.281
1.000	2.254
1.017	2.228
1.033	2.202
1.050	2.177
1.067	2.153
1.083	2.129
1.100	2.106
1.117	2.083
1.133	2.061
1.150	2.040
1.167	2.018
1.183	1.998
1.200	1.978
1.217	1.958
1.233	1.938
1.250	1.919
1.267	1.901
1.283	1.883
1.300	1.865
1.317	1.847
1.333	1.830
1.350	1.813
1.367	1.797
1.383	1.781
1.400	1.765
1.417	1.749
1.433	1.734
1.450	1.719
1.467	1.704

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
1.483	1.690
1.500	1.676
1.517	1.662
1.533	1.648
1.550	1.635
1.567	1.622
1.583	1.609
1.600	1.596
1.617	1.583
1.633	1.571
1.650	1.559
1.667	1.547
1.683	1.535
1.700	1.524
1.717	1.512
1.733	1.501
1.750	1.490
1.767	1.479
1.783	1.469
1.800	1.458
1.817	1.448
1.833	1.438
1.850	1.428
1.867	1.418
1.883	1.408
1.900	1.399
1.917	1.389
1.933	1.380
1.950	1.371
1.967	1.362
1.983	1.353
2.000	1.344
2.017	1.335
2.033	1.327
2.050	1.318
2.067	1.310
2.083	1.302
2.100	1.294
2.117	1.286
2.133	1.278
2.150	1.270
2.167	1.262
2.183	1.255
2.200	1.247

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.217	1.240
2.233	1.232
2.250	1.225
2.267	1.218
2.283	1.211
2.300	1.204
2.317	1.197
2.333	1.191
2.350	1.184
2.367	1.177
2.383	1.171
2.400	1.164
2.417	1.158
2.433	1.152
2.450	1.145
2.467	1.139
2.483	1.133
2.500	1.127
2.517	1.121
2.533	1.115
2.550	1.109
2.567	1.104
2.583	1.098
2.600	1.092
2.617	1.087
2.633	1.081
2.650	1.076
2.667	1.070
2.683	1.065
2.700	1.060
2.717	1.055
2.733	1.049
2.750	1.044
2.767	1.039
2.783	1.034
2.800	1.029
2.817	1.024
2.833	1.020
2.850	1.015
2.867	1.010
2.883	1.005
2.900	1.001
2.917	0.996
2.933	0.991

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.950	0.987
2.967	0.982
2.983	0.978
3.000	0.974
3.017	0.969
3.033	0.965
3.050	0.961
3.067	0.956
3.083	0.952
3.100	0.948
3.117	0.944
3.133	0.940
3.150	0.936
3.167	0.932
3.183	0.928
3.200	0.924
3.217	0.920
3.233	0.916
3.250	0.912
3.267	0.909
3.283	0.905
3.300	0.901
3.317	0.898
3.333	0.894
3.350	0.890
3.367	0.887
3.383	0.883
3.400	0.880
3.417	0.876
3.433	0.873
3.450	0.869
3.467	0.866
3.483	0.862
3.500	0.859
3.517	0.856
3.533	0.852
3.550	0.849
3.567	0.846
3.583	0.843
3.600	0.839
3.617	0.836
3.633	0.833
3.650	0.830
3.667	0.827

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
3.683	0.824
3.700	0.821
3.717	0.818
3.733	0.815
3.750	0.812
3.767	0.809
3.783	0.806
3.800	0.803
3.817	0.800
3.833	0.797
3.850	0.795
3.867	0.792
3.883	0.789
3.900	0.786
3.917	0.783
3.933	0.781
3.950	0.778
3.967	0.775
3.983	0.773
4.000	0.770
4.017	0.767
4.033	0.765
4.050	0.762
4.067	0.760
4.083	0.757
4.100	0.754
4.117	0.752
4.133	0.749
4.150	0.747
4.167	0.744
4.183	0.742
4.200	0.740
4.217	0.737
4.233	0.735
4.250	0.732
4.267	0.730
4.283	0.728
4.300	0.725
4.317	0.723
4.333	0.721
4.350	0.718
4.367	0.716
4.383	0.714
4.400	0.712

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
4.417	0.710
4.433	0.707
4.450	0.705
4.467	0.703
4.483	0.701
4.500	0.699
4.517	0.696
4.533	0.694
4.550	0.692
4.567	0.690
4.583	0.688
4.600	0.686
4.617	0.684
4.633	0.682
4.650	0.680
4.667	0.678
4.683	0.676
4.700	0.674
4.717	0.672
4.733	0.670
4.750	0.668
4.767	0.666
4.783	0.664
4.800	0.662
4.817	0.660
4.833	0.658
4.850	0.657
4.867	0.655
4.883	0.653
4.900	0.651
4.917	0.649
4.933	0.647
4.950	0.645
4.967	0.644
4.983	0.642
5.000	0.640
5.017	0.638
5.033	0.637
5.050	0.635
5.067	0.633
5.083	0.631
5.100	0.630
5.117	0.628
5.133	0.626

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.150	0.625
5.167	0.623
5.183	0.621
5.200	0.620
5.217	0.618
5.233	0.616
5.250	0.615
5.267	0.613
5.283	0.611
5.300	0.610
5.317	0.608
5.333	0.607
5.350	0.605
5.367	0.603
5.383	0.602
5.400	0.600
5.417	0.599
5.433	0.597
5.450	0.596
5.467	0.594
5.483	0.593
5.500	0.591
5.517	0.590
5.533	0.588
5.550	0.587
5.567	0.585
5.583	0.584
5.600	0.582
5.617	0.581
5.633	0.579
5.650	0.578
5.667	0.577
5.683	0.575
5.700	0.574
5.717	0.572
5.733	0.571
5.750	0.570
5.767	0.568
5.783	0.567
5.800	0.566
5.817	0.564
5.833	0.563
5.850	0.561
5.867	0.560

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.883	0.559
5.900	0.557
5.917	0.556
5.933	0.555
5.950	0.554
5.967	0.552
5.983	0.551
6.000	0.550
6.167	0.537
6.333	0.525
6.500	0.514
6.667	0.503
6.833	0.493
7.000	0.483
7.167	0.473
7.333	0.464
7.500	0.456
7.667	0.447
7.833	0.439
8.000	0.431
8.167	0.424
8.333	0.417
8.500	0.410
8.667	0.403
8.833	0.397
9.000	0.390
9.167	0.384
9.333	0.378
9.500	0.373
9.667	0.367
9.833	0.362
10.000	0.357
10.167	0.352
10.333	0.347
10.500	0.342
10.667	0.338
10.833	0.333
11.000	0.329
11.167	0.325
11.333	0.321
11.500	0.317
11.667	0.313
11.833	0.309
12.000	0.306

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
12.167	0.302
12.333	0.298
12.500	0.295
12.667	0.292
12.833	0.288
13.000	0.285
13.167	0.282
13.333	0.279
13.500	0.276
13.667	0.273
13.833	0.271
14.000	0.268
14.167	0.265
14.333	0.262
14.500	0.260
14.667	0.257
14.833	0.255
15.000	0.252
15.167	0.250
15.333	0.248
15.500	0.245
15.667	0.243
15.833	0.241
16.000	0.239
16.167	0.237
16.333	0.235
16.500	0.233
16.667	0.231
16.833	0.229
17.000	0.227
17.167	0.225
17.333	0.223
17.500	0.221
17.667	0.219
17.833	0.218
18.000	0.216
18.167	0.214
18.333	0.212
18.500	0.211
18.667	0.209
18.833	0.208
19.000	0.206
19.167	0.204
19.333	0.203

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 25 year

Return Event: 25 years

Storm Event: IDF Curve Equation - 1 - 25
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
19.500	0.201
19.667	0.200
19.833	0.199
20.000	0.197
20.167	0.196
20.333	0.194
20.500	0.193
20.667	0.192
20.833	0.190
21.000	0.189
21.167	0.188
21.333	0.186
21.500	0.185
21.667	0.184
21.833	0.183
22.000	0.182
22.167	0.180
22.333	0.179
22.500	0.178
22.667	0.177
22.833	0.176
23.000	0.175
23.167	0.174
23.333	0.173
23.500	0.172
23.667	0.170
23.833	0.169
24.000	0.168

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.017	9.685
0.033	9.168
0.050	8.708
0.067	8.295
0.083	7.922
0.100	7.584
0.117	7.276
0.133	6.994
0.150	6.735
0.167	6.496
0.183	6.274
0.200	6.068
0.217	5.877
0.233	5.698
0.250	5.530
0.267	5.373
0.283	5.226
0.300	5.087
0.317	4.955
0.333	4.831
0.350	4.713
0.367	4.602
0.383	4.496
0.400	4.395
0.417	4.299
0.433	4.208
0.450	4.120
0.467	4.037
0.483	3.957
0.500	3.880
0.517	3.807
0.533	3.736
0.550	3.669
0.567	3.604
0.583	3.541
0.600	3.481
0.617	3.423
0.633	3.367
0.650	3.313
0.667	3.260
0.683	3.210
0.700	3.161
0.717	3.114
0.733	3.068

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.750	3.024
0.767	2.981
0.783	2.939
0.800	2.899
0.817	2.860
0.833	2.822
0.850	2.785
0.867	2.749
0.883	2.714
0.900	2.680
0.917	2.647
0.933	2.615
0.950	2.584
0.967	2.553
0.983	2.523
1.000	2.494
1.017	2.466
1.033	2.438
1.050	2.411
1.067	2.385
1.083	2.359
1.100	2.334
1.117	2.310
1.133	2.286
1.150	2.262
1.167	2.240
1.183	2.217
1.200	2.195
1.217	2.174
1.233	2.153
1.250	2.132
1.267	2.112
1.283	2.092
1.300	2.073
1.317	2.054
1.333	2.035
1.350	2.017
1.367	1.999
1.383	1.982
1.400	1.965
1.417	1.948
1.433	1.931
1.450	1.915
1.467	1.899

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
1.483	1.883
1.500	1.868
1.517	1.853
1.533	1.838
1.550	1.823
1.567	1.809
1.583	1.795
1.600	1.781
1.617	1.767
1.633	1.754
1.650	1.741
1.667	1.728
1.683	1.715
1.700	1.702
1.717	1.690
1.733	1.678
1.750	1.666
1.767	1.654
1.783	1.642
1.800	1.631
1.817	1.619
1.833	1.608
1.850	1.597
1.867	1.587
1.883	1.576
1.900	1.566
1.917	1.555
1.933	1.545
1.950	1.535
1.967	1.525
1.983	1.515
2.000	1.506
2.017	1.496
2.033	1.487
2.050	1.478
2.067	1.469
2.083	1.460
2.100	1.451
2.117	1.442
2.133	1.433
2.150	1.425
2.167	1.416
2.183	1.408
2.200	1.400

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.217	1.392
2.233	1.384
2.250	1.376
2.267	1.368
2.283	1.360
2.300	1.353
2.317	1.345
2.333	1.338
2.350	1.331
2.367	1.323
2.383	1.316
2.400	1.309
2.417	1.302
2.433	1.295
2.450	1.288
2.467	1.281
2.483	1.275
2.500	1.268
2.517	1.262
2.533	1.255
2.550	1.249
2.567	1.242
2.583	1.236
2.600	1.230
2.617	1.224
2.633	1.218
2.650	1.212
2.667	1.206
2.683	1.200
2.700	1.194
2.717	1.189
2.733	1.183
2.750	1.177
2.767	1.172
2.783	1.166
2.800	1.161
2.817	1.155
2.833	1.150
2.850	1.145
2.867	1.139
2.883	1.134
2.900	1.129
2.917	1.124
2.933	1.119

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.950	1.114
2.967	1.109
2.983	1.104
3.000	1.099
3.017	1.095
3.033	1.090
3.050	1.085
3.067	1.081
3.083	1.076
3.100	1.071
3.117	1.067
3.133	1.062
3.150	1.058
3.167	1.053
3.183	1.049
3.200	1.045
3.217	1.040
3.233	1.036
3.250	1.032
3.267	1.028
3.283	1.024
3.300	1.020
3.317	1.015
3.333	1.011
3.350	1.007
3.367	1.003
3.383	1.000
3.400	0.996
3.417	0.992
3.433	0.988
3.450	0.984
3.467	0.980
3.483	0.977
3.500	0.973
3.517	0.969
3.533	0.966
3.550	0.962
3.567	0.958
3.583	0.955
3.600	0.951
3.617	0.948
3.633	0.944
3.650	0.941
3.667	0.937

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
3.683	0.934
3.700	0.931
3.717	0.927
3.733	0.924
3.750	0.921
3.767	0.918
3.783	0.914
3.800	0.911
3.817	0.908
3.833	0.905
3.850	0.902
3.867	0.898
3.883	0.895
3.900	0.892
3.917	0.889
3.933	0.886
3.950	0.883
3.967	0.880
3.983	0.877
4.000	0.874
4.017	0.871
4.033	0.869
4.050	0.866
4.067	0.863
4.083	0.860
4.100	0.857
4.117	0.854
4.133	0.852
4.150	0.849
4.167	0.846
4.183	0.843
4.200	0.841
4.217	0.838
4.233	0.835
4.250	0.833
4.267	0.830
4.283	0.828
4.300	0.825
4.317	0.822
4.333	0.820
4.350	0.817
4.367	0.815
4.383	0.812
4.400	0.810

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
4.417	0.807
4.433	0.805
4.450	0.802
4.467	0.800
4.483	0.798
4.500	0.795
4.517	0.793
4.533	0.790
4.550	0.788
4.567	0.786
4.583	0.783
4.600	0.781
4.617	0.779
4.633	0.777
4.650	0.774
4.667	0.772
4.683	0.770
4.700	0.768
4.717	0.766
4.733	0.763
4.750	0.761
4.767	0.759
4.783	0.757
4.800	0.755
4.817	0.753
4.833	0.751
4.850	0.748
4.867	0.746
4.883	0.744
4.900	0.742
4.917	0.740
4.933	0.738
4.950	0.736
4.967	0.734
4.983	0.732
5.000	0.730
5.017	0.728
5.033	0.726
5.050	0.724
5.067	0.722
5.083	0.720
5.100	0.718
5.117	0.717
5.133	0.715

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.150	0.713
5.167	0.711
5.183	0.709
5.200	0.707
5.217	0.705
5.233	0.704
5.250	0.702
5.267	0.700
5.283	0.698
5.300	0.696
5.317	0.695
5.333	0.693
5.350	0.691
5.367	0.689
5.383	0.688
5.400	0.686
5.417	0.684
5.433	0.682
5.450	0.681
5.467	0.679
5.483	0.677
5.500	0.676
5.517	0.674
5.533	0.672
5.550	0.671
5.567	0.669
5.583	0.667
5.600	0.666
5.617	0.664
5.633	0.663
5.650	0.661
5.667	0.659
5.683	0.658
5.700	0.656
5.717	0.655
5.733	0.653
5.750	0.652
5.767	0.650
5.783	0.649
5.800	0.647
5.817	0.645
5.833	0.644
5.850	0.642
5.867	0.641

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.883	0.639
5.900	0.638
5.917	0.637
5.933	0.635
5.950	0.634
5.967	0.632
5.983	0.631
6.000	0.629
6.167	0.615
6.333	0.602
6.500	0.589
6.667	0.577
6.833	0.566
7.000	0.555
7.167	0.544
7.333	0.534
7.500	0.524
7.667	0.515
7.833	0.505
8.000	0.497
8.167	0.488
8.333	0.480
8.500	0.472
8.667	0.465
8.833	0.458
9.000	0.451
9.167	0.444
9.333	0.437
9.500	0.431
9.667	0.425
9.833	0.419
10.000	0.413
10.167	0.407
10.333	0.402
10.500	0.397
10.667	0.391
10.833	0.386
11.000	0.381
11.167	0.377
11.333	0.372
11.500	0.368
11.667	0.363
11.833	0.359
12.000	0.355

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
12.167	0.351
12.333	0.347
12.500	0.343
12.667	0.339
12.833	0.335
13.000	0.332
13.167	0.328
13.333	0.325
13.500	0.322
13.667	0.318
13.833	0.315
14.000	0.312
14.167	0.309
14.333	0.306
14.500	0.303
14.667	0.300
14.833	0.297
15.000	0.294
15.167	0.292
15.333	0.289
15.500	0.286
15.667	0.284
15.833	0.281
16.000	0.279
16.167	0.277
16.333	0.274
16.500	0.272
16.667	0.270
16.833	0.267
17.000	0.265
17.167	0.263
17.333	0.261
17.500	0.259
17.667	0.257
17.833	0.255
18.000	0.253
18.167	0.251
18.333	0.249
18.500	0.247
18.667	0.245
18.833	0.243
19.000	0.242
19.167	0.240
19.333	0.238

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
19.500	0.236
19.667	0.235
19.833	0.233
20.000	0.231
20.167	0.230
20.333	0.228
20.500	0.227
20.667	0.225
20.833	0.224
21.000	0.222
21.167	0.221
21.333	0.219
21.500	0.218
21.667	0.216
21.833	0.215
22.000	0.214
22.167	0.212
22.333	0.211
22.500	0.210
22.667	0.208
22.833	0.207
23.000	0.206
23.167	0.204
23.333	0.203
23.500	0.202
23.667	0.201
23.833	0.200
24.000	0.198

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.017	10.827
0.033	10.185
0.050	9.623
0.067	9.127
0.083	8.685
0.100	8.289
0.117	7.931
0.133	7.606
0.150	7.310
0.167	7.039
0.183	6.789
0.200	6.559
0.217	6.345
0.233	6.147
0.250	5.962
0.267	5.789
0.283	5.627
0.300	5.475
0.317	5.332
0.333	5.197
0.350	5.070
0.367	4.950
0.383	4.835
0.400	4.727
0.417	4.624
0.433	4.526
0.450	4.432
0.467	4.343
0.483	4.257
0.500	4.176
0.517	4.097
0.533	4.022
0.550	3.951
0.567	3.881
0.583	3.815
0.600	3.751
0.617	3.690
0.633	3.630
0.650	3.573
0.667	3.518
0.683	3.465
0.700	3.413
0.717	3.363
0.733	3.315

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
0.750	3.268
0.767	3.223
0.783	3.179
0.800	3.137
0.817	3.096
0.833	3.056
0.850	3.017
0.867	2.979
0.883	2.942
0.900	2.906
0.917	2.872
0.933	2.838
0.950	2.805
0.967	2.773
0.983	2.742
1.000	2.711
1.017	2.681
1.033	2.652
1.050	2.624
1.067	2.596
1.083	2.569
1.100	2.543
1.117	2.517
1.133	2.492
1.150	2.467
1.167	2.443
1.183	2.420
1.200	2.397
1.217	2.374
1.233	2.352
1.250	2.331
1.267	2.309
1.283	2.289
1.300	2.268
1.317	2.248
1.333	2.229
1.350	2.210
1.367	2.191
1.383	2.172
1.400	2.154
1.417	2.137
1.433	2.119
1.450	2.102
1.467	2.085

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
1.483	2.069
1.500	2.053
1.517	2.037
1.533	2.021
1.550	2.006
1.567	1.991
1.583	1.976
1.600	1.961
1.617	1.947
1.633	1.933
1.650	1.919
1.667	1.905
1.683	1.892
1.700	1.878
1.717	1.865
1.733	1.853
1.750	1.840
1.767	1.827
1.783	1.815
1.800	1.803
1.817	1.791
1.833	1.779
1.850	1.768
1.867	1.757
1.883	1.745
1.900	1.734
1.917	1.723
1.933	1.713
1.950	1.702
1.967	1.692
1.983	1.681
2.000	1.671
2.017	1.661
2.033	1.651
2.050	1.642
2.067	1.632
2.083	1.622
2.100	1.613
2.117	1.604
2.133	1.595
2.150	1.586
2.167	1.577
2.183	1.568
2.200	1.559

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.217	1.551
2.233	1.542
2.250	1.534
2.267	1.526
2.283	1.517
2.300	1.509
2.317	1.501
2.333	1.493
2.350	1.486
2.367	1.478
2.383	1.470
2.400	1.463
2.417	1.455
2.433	1.448
2.450	1.441
2.467	1.434
2.483	1.427
2.500	1.420
2.517	1.413
2.533	1.406
2.550	1.399
2.567	1.392
2.583	1.386
2.600	1.379
2.617	1.373
2.633	1.366
2.650	1.360
2.667	1.353
2.683	1.347
2.700	1.341
2.717	1.335
2.733	1.329
2.750	1.323
2.767	1.317
2.783	1.311
2.800	1.305
2.817	1.300
2.833	1.294
2.850	1.288
2.867	1.283
2.883	1.277
2.900	1.272
2.917	1.266
2.933	1.261

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
2.950	1.256
2.967	1.250
2.983	1.245
3.000	1.240
3.017	1.235
3.033	1.230
3.050	1.225
3.067	1.220
3.083	1.215
3.100	1.210
3.117	1.205
3.133	1.200
3.150	1.196
3.167	1.191
3.183	1.186
3.200	1.182
3.217	1.177
3.233	1.172
3.250	1.168
3.267	1.163
3.283	1.159
3.300	1.155
3.317	1.150
3.333	1.146
3.350	1.142
3.367	1.137
3.383	1.133
3.400	1.129
3.417	1.125
3.433	1.121
3.450	1.117
3.467	1.113
3.483	1.109
3.500	1.105
3.517	1.101
3.533	1.097
3.550	1.093
3.567	1.089
3.583	1.085
3.600	1.081
3.617	1.078
3.633	1.074
3.650	1.070
3.667	1.067

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
3.683	1.063
3.700	1.059
3.717	1.056
3.733	1.052
3.750	1.049
3.767	1.045
3.783	1.042
3.800	1.038
3.817	1.035
3.833	1.031
3.850	1.028
3.867	1.025
3.883	1.021
3.900	1.018
3.917	1.015
3.933	1.011
3.950	1.008
3.967	1.005
3.983	1.002
4.000	0.999
4.017	0.996
4.033	0.992
4.050	0.989
4.067	0.986
4.083	0.983
4.100	0.980
4.117	0.977
4.133	0.974
4.150	0.971
4.167	0.968
4.183	0.965
4.200	0.962
4.217	0.959
4.233	0.957
4.250	0.954
4.267	0.951
4.283	0.948
4.300	0.945
4.317	0.943
4.333	0.940
4.350	0.937
4.367	0.934
4.383	0.932
4.400	0.929

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
4.417	0.926
4.433	0.924
4.450	0.921
4.467	0.918
4.483	0.916
4.500	0.913
4.517	0.911
4.533	0.908
4.550	0.906
4.567	0.903
4.583	0.901
4.600	0.898
4.617	0.896
4.633	0.893
4.650	0.891
4.667	0.888
4.683	0.886
4.700	0.883
4.717	0.881
4.733	0.879
4.750	0.876
4.767	0.874
4.783	0.872
4.800	0.869
4.817	0.867
4.833	0.865
4.850	0.862
4.867	0.860
4.883	0.858
4.900	0.856
4.917	0.854
4.933	0.851
4.950	0.849
4.967	0.847
4.983	0.845
5.000	0.843
5.017	0.841
5.033	0.838
5.050	0.836
5.067	0.834
5.083	0.832
5.100	0.830
5.117	0.828
5.133	0.826

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.150	0.824
5.167	0.822
5.183	0.820
5.200	0.818
5.217	0.816
5.233	0.814
5.250	0.812
5.267	0.810
5.283	0.808
5.300	0.806
5.317	0.804
5.333	0.802
5.350	0.800
5.367	0.798
5.383	0.796
5.400	0.794
5.417	0.793
5.433	0.791
5.450	0.789
5.467	0.787
5.483	0.785
5.500	0.783
5.517	0.782
5.533	0.780
5.550	0.778
5.567	0.776
5.583	0.774
5.600	0.773
5.617	0.771
5.633	0.769
5.650	0.767
5.667	0.766
5.683	0.764
5.700	0.762
5.717	0.760
5.733	0.759
5.750	0.757
5.767	0.755
5.783	0.754
5.800	0.752
5.817	0.750
5.833	0.749
5.850	0.747
5.867	0.745

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
5.883	0.744
5.900	0.742
5.917	0.741
5.933	0.739
5.950	0.737
5.967	0.736
5.983	0.734
6.000	0.733
6.167	0.717
6.333	0.703
6.500	0.689
6.667	0.676
6.833	0.663
7.000	0.651
7.167	0.639
7.333	0.628
7.500	0.617
7.667	0.606
7.833	0.596
8.000	0.587
8.167	0.577
8.333	0.568
8.500	0.560
8.667	0.551
8.833	0.543
9.000	0.535
9.167	0.528
9.333	0.520
9.500	0.513
9.667	0.506
9.833	0.500
10.000	0.493
10.167	0.487
10.333	0.481
10.500	0.475
10.667	0.469
10.833	0.463
11.000	0.458
11.167	0.453
11.333	0.447
11.500	0.442
11.667	0.437
11.833	0.433
12.000	0.428

Subsection: I-D-F from a, b, n coeff.

Return Event: 100 years
Storm Event: IDF Curve Equation - 1 - 100
Year

Label: IDF Curve Equation - 1

Scenario: 100 year

I-D-F Curve

Time (hours)	Intensity (in/h)
12.167	0.423
12.333	0.419
12.500	0.414
12.667	0.410
12.833	0.406
13.000	0.402
13.167	0.398
13.333	0.394
13.500	0.390
13.667	0.386
13.833	0.383
14.000	0.379
14.167	0.376
14.333	0.372
14.500	0.369
14.667	0.366
14.833	0.362
15.000	0.359
15.167	0.356
15.333	0.353
15.500	0.350
15.667	0.347
15.833	0.344
16.000	0.342
16.167	0.339
16.333	0.336
16.500	0.333
16.667	0.331
16.833	0.328
17.000	0.326
17.167	0.323
17.333	0.321
17.500	0.318
17.667	0.316
17.833	0.314
18.000	0.311
18.167	0.309
18.333	0.307
18.500	0.305
18.667	0.303
18.833	0.300
19.000	0.298
19.167	0.296
19.333	0.294

Subsection: I-D-F from a, b, n coeff.

Label: IDF Curve Equation - 1

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

I-D-F Curve

Time (hours)	Intensity (in/h)
19.500	0.292
19.667	0.290
19.833	0.289
20.000	0.287
20.167	0.285
20.333	0.283
20.500	0.281
20.667	0.279
20.833	0.278
21.000	0.276
21.167	0.274
21.333	0.272
21.500	0.271
21.667	0.269
21.833	0.267
22.000	0.266
22.167	0.264
22.333	0.263
22.500	0.261
22.667	0.260
22.833	0.258
23.000	0.257
23.167	0.255
23.333	0.254
23.500	0.252
23.667	0.251
23.833	0.250
24.000	0.248

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	918.25	918.26	918.29	918.34	918.41
0.250	918.50	918.60	918.73	918.86	919.02
0.500	919.19	919.37	919.56	919.77	919.98
0.750	920.21	920.45	920.69	920.94	921.20
1.000	921.46	921.73	921.99	922.19	922.33
1.250	922.40	922.44	922.46	922.46	922.45
1.500	922.43	922.41	922.39	922.36	922.34
1.750	922.31	922.28	922.26	922.23	922.19
2.000	922.16	922.12	922.08	922.04	922.00
2.250	921.97	921.95	921.92	921.90	921.88
2.500	921.86	921.84	921.83	921.81	921.80
2.750	921.79	921.78	921.77	921.76	921.76
3.000	921.75	921.74	921.74	921.73	921.72
3.250	921.72	921.71	921.71	921.70	921.70
3.500	921.70	921.69	921.69	921.68	921.68
3.750	921.67	921.67	921.66	921.66	921.65
4.000	921.65	921.64	921.64	921.63	921.63
4.250	921.63	921.62	921.62	921.61	921.61
4.500	921.60	921.60	921.59	921.59	921.58
4.750	921.58	921.57	921.57	921.57	921.56
5.000	921.56	921.55	921.55	921.54	921.54
5.250	921.53	921.53	921.52	921.52	921.51
5.500	921.51	921.51	921.50	921.50	921.49
5.750	921.49	921.48	921.48	921.47	921.47
6.000	921.46	921.46	921.46	921.45	921.45
6.250	921.44	921.44	921.43	921.43	921.42
6.500	921.42	921.42	921.41	921.41	921.40
6.750	921.40	921.39	921.39	921.38	921.38
7.000	921.38	921.37	921.37	921.36	921.36
7.250	921.35	921.35	921.34	921.34	921.34
7.500	921.33	921.33	921.32	921.32	921.31
7.750	921.31	921.30	921.30	921.30	921.29
8.000	921.29	921.28	921.28	921.27	921.27
8.250	921.27	921.26	921.26	921.25	921.25
8.500	921.24	921.24	921.23	921.23	921.23
8.750	921.22	921.22	921.21	921.21	921.20
9.000	921.20	921.19	921.19	921.18	921.18
9.250	921.18	921.17	921.17	921.16	921.16
9.500	921.15	921.15	921.14	921.14	921.14
9.750	921.13	921.13	921.12	921.12	921.11
10.000	921.11	921.10	921.10	921.10	921.09

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	921.09	921.08	921.08	921.07	921.07
10.500	921.06	921.06	921.06	921.05	921.05
10.750	921.04	921.04	921.03	921.03	921.02
11.000	921.02	921.02	921.01	921.01	921.00
11.250	921.00	920.99	920.99	920.99	920.98
11.500	920.98	920.97	920.97	920.96	920.96
11.750	920.96	920.95	920.95	920.94	920.94
12.000	920.93	920.93	920.93	920.92	920.92
12.250	920.91	920.91	920.90	920.90	920.90
12.500	920.89	920.89	920.88	920.88	920.87
12.750	920.87	920.87	920.86	920.86	920.85
13.000	920.85	920.84	920.84	920.84	920.83
13.250	920.83	920.82	920.82	920.82	920.81
13.500	920.81	920.80	920.80	920.79	920.79
13.750	920.79	920.78	920.78	920.77	920.77
14.000	920.77	920.76	920.76	920.75	920.75
14.250	920.74	920.74	920.74	920.73	920.73
14.500	920.72	920.72	920.71	920.71	920.71
14.750	920.70	920.70	920.69	920.69	920.68
15.000	920.68	920.68	920.67	920.67	920.66
15.250	920.66	920.65	920.65	920.65	920.64
15.500	920.64	920.63	920.63	920.62	920.62
15.750	920.62	920.61	920.61	920.60	920.60
16.000	920.60	920.59	920.59	920.58	920.58
16.250	920.57	920.57	920.57	920.56	920.56
16.500	920.55	920.55	920.55	920.54	920.54
16.750	920.53	920.53	920.52	920.52	920.52
17.000	920.51	920.51	920.50	920.50	920.50
17.250	920.49	920.49	920.48	920.48	920.48
17.500	920.47	920.47	920.46	920.46	920.46
17.750	920.45	920.45	920.44	920.44	920.44
18.000	920.43	920.43	920.42	920.42	920.42
18.250	920.41	920.41	920.40	920.40	920.40
18.500	920.39	920.39	920.38	920.38	920.38
18.750	920.37	920.37	920.36	920.36	920.36
19.000	920.35	920.35	920.34	920.34	920.34
19.250	920.33	920.33	920.32	920.32	920.32
19.500	920.31	920.31	920.30	920.30	920.30
19.750	920.29	920.29	920.29	920.28	920.28
20.000	920.27	920.27	920.27	920.26	920.26
20.250	920.25	920.25	920.25	920.24	920.24

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	920.23	920.23	920.23	920.22	920.22
20.750	920.21	920.21	920.21	920.20	920.20
21.000	920.19	920.19	920.19	920.18	920.18
21.250	920.17	920.17	920.17	920.16	920.16
21.500	920.15	920.15	920.15	920.14	920.14
21.750	920.14	920.13	920.13	920.12	920.12
22.000	920.12	920.11	920.11	920.10	920.10
22.250	920.10	920.09	920.09	920.08	920.08
22.500	920.08	920.07	920.07	920.07	920.06
22.750	920.06	920.05	920.05	920.05	920.04
23.000	920.04	920.04	920.03	920.03	920.02
23.250	920.02	920.02	920.01	920.01	920.01
23.500	920.00	920.00	919.99	919.99	919.99
23.750	919.98	919.98	919.98	919.97	919.97
24.000	919.96	919.96	919.96	919.95	919.95
24.250	919.95	919.94	919.94	919.93	919.93
24.500	919.93	919.92	919.92	919.92	919.91
24.750	919.91	919.91	919.90	919.90	919.89
25.000	919.89	919.89	919.88	919.88	919.88
25.250	919.87	919.87	919.87	919.86	919.86
25.500	919.86	919.85	919.85	919.84	919.84
25.750	919.84	919.83	919.83	919.83	919.82
26.000	919.82	919.82	919.81	919.81	919.81
26.250	919.80	919.80	919.80	919.79	919.79
26.500	919.79	919.78	919.78	919.77	919.77
26.750	919.77	919.76	919.76	919.76	919.75
27.000	919.75	919.75	919.74	919.74	919.74
27.250	919.73	919.73	919.73	919.72	919.72
27.500	919.71	919.71	919.71	919.70	919.70
27.750	919.70	919.69	919.69	919.69	919.68
28.000	919.68	919.68	919.67	919.67	919.66
28.250	919.66	919.66	919.65	919.65	919.65
28.500	919.64	919.64	919.64	919.63	919.63
28.750	919.63	919.62	919.62	919.62	919.61
29.000	919.61	919.61	919.60	919.60	919.60
29.250	919.59	919.59	919.59	919.58	919.58
29.500	919.58	919.57	919.57	919.57	919.56
29.750	919.56	919.56	919.55	919.55	919.55
30.000	919.54	919.54	919.54	919.53	919.53
30.250	919.53	919.52	919.52	919.52	919.51
30.500	919.51	919.51	919.50	919.50	919.50

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.750	919.49	919.49	919.49	919.48	919.48
31.000	919.48	919.47	919.47	919.47	919.47
31.250	919.46	919.46	919.46	919.45	919.45
31.500	919.45	919.44	919.44	919.44	919.43
31.750	919.43	919.43	919.42	919.42	919.42
32.000	919.42	919.41	919.41	919.41	919.40
32.250	919.40	919.40	919.39	919.39	919.39
32.500	919.38	919.38	919.38	919.38	919.37
32.750	919.37	919.37	919.36	919.36	919.36
33.000	919.35	919.35	919.35	919.35	919.34
33.250	919.34	919.34	919.33	919.33	919.33
33.500	919.33	919.32	919.32	919.32	919.31
33.750	919.31	919.31	919.31	919.30	919.30
34.000	919.30	919.29	919.29	919.29	919.29
34.250	919.28	919.28	919.28	919.27	919.27
34.500	919.27	919.27	919.26	919.26	919.26
34.750	919.25	919.25	919.25	919.25	919.24
35.000	919.24	919.24	919.23	919.23	919.23
35.250	919.22	919.22	919.22	919.22	919.21
35.500	919.21	919.21	919.20	919.20	919.20
35.750	919.20	919.19	919.19	919.19	919.18
36.000	919.18	919.18	919.18	919.17	919.17
36.250	919.17	919.16	919.16	919.16	919.16
36.500	919.15	919.15	919.15	919.15	919.14
36.750	919.14	919.14	919.13	919.13	919.13
37.000	919.13	919.12	919.12	919.12	919.12
37.250	919.11	919.11	919.11	919.11	919.10
37.500	919.10	919.10	919.09	919.09	919.09
37.750	919.09	919.08	919.08	919.08	919.08
38.000	919.07	919.07	919.07	919.07	919.06
38.250	919.06	919.06	919.06	919.05	919.05
38.500	919.05	919.05	919.04	919.04	919.04
38.750	919.04	919.03	919.03	919.03	919.03
39.000	919.02	919.02	919.02	919.02	919.01
39.250	919.01	919.01	919.01	919.00	919.00
39.500	919.00	919.00	918.99	918.99	918.99
39.750	918.99	918.99	918.98	918.98	918.98
40.000	918.98	918.97	918.97	918.97	918.97
40.250	918.96	918.96	918.96	918.96	918.96
40.500	918.95	918.95	918.95	918.95	918.94
40.750	918.94	918.94	918.94	918.94	918.93

Subsection: Time vs. Elevation

Return Event: 10 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
41.000	918.93	918.93	918.93	918.92	918.92
41.250	918.92	918.92	918.92	918.91	918.91
41.500	918.91	918.91	918.91	918.90	918.90
41.750	918.90	918.90	918.90	918.89	918.89
42.000	918.89	918.89	918.88	918.88	918.88
42.250	918.88	918.87	918.87	918.87	918.87
42.500	918.87	918.86	918.86	918.86	918.86
42.750	918.86	918.85	918.85	918.85	918.85
43.000	918.85	918.84	918.84	918.84	918.84
43.250	918.84	918.83	918.83	918.83	918.83
43.500	918.83	918.82	918.82	918.82	918.82
43.750	918.82	918.81	918.81	918.81	918.81
44.000	918.81	918.80	918.80	918.80	918.80
44.250	918.80	918.79	918.79	918.79	918.79
44.500	918.79	918.79	918.78	918.78	918.78
44.750	918.78	918.78	918.77	918.77	918.77
45.000	918.77	918.77	918.77	918.76	918.76
45.250	918.76	918.76	918.76	918.75	918.75
45.500	918.75	918.75	918.75	918.74	918.74
45.750	918.74	918.74	918.74	918.74	918.73
46.000	918.73	918.73	918.73	918.73	918.72
46.250	918.72	918.72	918.72	918.72	918.72
46.500	918.71	918.71	918.71	918.71	918.71
46.750	918.71	918.70	918.70	918.70	918.70
47.000	918.70	918.70	918.69	918.69	918.69
47.250	918.69	918.69	918.69	918.68	918.68
47.500	918.68	918.68	918.68	918.68	918.68
47.750	918.67	918.67	918.67	918.67	918.67
48.000	918.67	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	918.25	918.26	918.30	918.36	918.44
0.250	918.54	918.66	918.81	918.96	919.14
0.500	919.34	919.55	919.77	920.01	920.26
0.750	920.51	920.78	921.05	921.34	921.63
1.000	921.91	922.17	922.36	922.48	922.55
1.250	922.58	922.59	922.58	922.57	922.54
1.500	922.52	922.49	922.46	922.43	922.40
1.750	922.36	922.33	922.30	922.27	922.23
2.000	922.19	922.15	922.11	922.06	922.02
2.250	921.99	921.96	921.93	921.91	921.89
2.500	921.87	921.85	921.83	921.82	921.81
2.750	921.79	921.78	921.77	921.77	921.76
3.000	921.75	921.75	921.74	921.73	921.73
3.250	921.72	921.72	921.71	921.71	921.70
3.500	921.70	921.69	921.69	921.68	921.68
3.750	921.67	921.67	921.66	921.66	921.65
4.000	921.65	921.65	921.64	921.64	921.63
4.250	921.63	921.62	921.62	921.61	921.61
4.500	921.60	921.60	921.59	921.59	921.59
4.750	921.58	921.58	921.57	921.57	921.56
5.000	921.56	921.55	921.55	921.54	921.54
5.250	921.54	921.53	921.53	921.52	921.52
5.500	921.51	921.51	921.50	921.50	921.49
5.750	921.49	921.49	921.48	921.48	921.47
6.000	921.47	921.46	921.46	921.45	921.45
6.250	921.44	921.44	921.44	921.43	921.43
6.500	921.42	921.42	921.41	921.41	921.40
6.750	921.40	921.40	921.39	921.39	921.38
7.000	921.38	921.37	921.37	921.36	921.36
7.250	921.36	921.35	921.35	921.34	921.34
7.500	921.33	921.33	921.32	921.32	921.32
7.750	921.31	921.31	921.30	921.30	921.29
8.000	921.29	921.28	921.28	921.28	921.27
8.250	921.27	921.26	921.26	921.25	921.25
8.500	921.25	921.24	921.24	921.23	921.23
8.750	921.22	921.22	921.21	921.21	921.20
9.000	921.20	921.20	921.19	921.19	921.18
9.250	921.18	921.17	921.17	921.16	921.16
9.500	921.16	921.15	921.15	921.14	921.14
9.750	921.13	921.13	921.12	921.12	921.11
10.000	921.11	921.11	921.10	921.10	921.09

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	921.09	921.08	921.08	921.08	921.07
10.500	921.07	921.06	921.06	921.05	921.05
10.750	921.04	921.04	921.04	921.03	921.03
11.000	921.02	921.02	921.01	921.01	921.00
11.250	921.00	921.00	920.99	920.99	920.98
11.500	920.98	920.97	920.97	920.97	920.96
11.750	920.96	920.95	920.95	920.94	920.94
12.000	920.94	920.93	920.93	920.92	920.92
12.250	920.91	920.91	920.91	920.90	920.90
12.500	920.89	920.89	920.88	920.88	920.88
12.750	920.87	920.87	920.86	920.86	920.86
13.000	920.85	920.85	920.84	920.84	920.83
13.250	920.83	920.83	920.82	920.82	920.81
13.500	920.81	920.80	920.80	920.80	920.79
13.750	920.79	920.78	920.78	920.78	920.77
14.000	920.77	920.76	920.76	920.76	920.75
14.250	920.75	920.74	920.74	920.73	920.73
14.500	920.73	920.72	920.72	920.71	920.71
14.750	920.70	920.70	920.69	920.69	920.69
15.000	920.68	920.68	920.67	920.67	920.66
15.250	920.66	920.66	920.65	920.65	920.64
15.500	920.64	920.64	920.63	920.63	920.62
15.750	920.62	920.61	920.61	920.61	920.60
16.000	920.60	920.59	920.59	920.58	920.58
16.250	920.58	920.57	920.57	920.56	920.56
16.500	920.56	920.55	920.55	920.54	920.54
16.750	920.53	920.53	920.53	920.52	920.52
17.000	920.51	920.51	920.51	920.50	920.50
17.250	920.49	920.49	920.49	920.48	920.48
17.500	920.47	920.47	920.47	920.46	920.46
17.750	920.45	920.45	920.45	920.44	920.44
18.000	920.43	920.43	920.42	920.42	920.42
18.250	920.41	920.41	920.40	920.40	920.40
18.500	920.39	920.39	920.39	920.38	920.38
18.750	920.37	920.37	920.37	920.36	920.36
19.000	920.35	920.35	920.35	920.34	920.34
19.250	920.33	920.33	920.33	920.32	920.32
19.500	920.31	920.31	920.31	920.30	920.30
19.750	920.29	920.29	920.29	920.28	920.28
20.000	920.28	920.27	920.27	920.26	920.26
20.250	920.26	920.25	920.25	920.24	920.24

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	920.24	920.23	920.23	920.22	920.22
20.750	920.22	920.21	920.21	920.20	920.20
21.000	920.20	920.19	920.19	920.18	920.18
21.250	920.18	920.17	920.17	920.16	920.16
21.500	920.16	920.15	920.15	920.14	920.14
21.750	920.14	920.13	920.13	920.13	920.12
22.000	920.12	920.11	920.11	920.11	920.10
22.250	920.10	920.09	920.09	920.09	920.08
22.500	920.08	920.08	920.07	920.07	920.06
22.750	920.06	920.06	920.05	920.05	920.04
23.000	920.04	920.04	920.03	920.03	920.03
23.250	920.02	920.02	920.01	920.01	920.01
23.500	920.00	920.00	920.00	919.99	919.99
23.750	919.98	919.98	919.98	919.97	919.97
24.000	919.97	919.96	919.96	919.95	919.95
24.250	919.95	919.94	919.94	919.94	919.93
24.500	919.93	919.93	919.92	919.92	919.91
24.750	919.91	919.91	919.90	919.90	919.90
25.000	919.89	919.89	919.89	919.88	919.88
25.250	919.87	919.87	919.87	919.86	919.86
25.500	919.86	919.85	919.85	919.85	919.84
25.750	919.84	919.84	919.83	919.83	919.83
26.000	919.82	919.82	919.81	919.81	919.81
26.250	919.80	919.80	919.80	919.79	919.79
26.500	919.79	919.78	919.78	919.78	919.77
26.750	919.77	919.77	919.76	919.76	919.76
27.000	919.75	919.75	919.75	919.74	919.74
27.250	919.73	919.73	919.73	919.72	919.72
27.500	919.72	919.71	919.71	919.71	919.70
27.750	919.70	919.69	919.69	919.69	919.68
28.000	919.68	919.68	919.67	919.67	919.67
28.250	919.66	919.66	919.66	919.65	919.65
28.500	919.65	919.64	919.64	919.64	919.63
28.750	919.63	919.62	919.62	919.62	919.61
29.000	919.61	919.61	919.60	919.60	919.60
29.250	919.59	919.59	919.59	919.58	919.58
29.500	919.58	919.57	919.57	919.57	919.56
29.750	919.56	919.56	919.55	919.55	919.55
30.000	919.54	919.54	919.54	919.53	919.53
30.250	919.53	919.52	919.52	919.52	919.51
30.500	919.51	919.51	919.51	919.50	919.50

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.750	919.50	919.49	919.49	919.49	919.48
31.000	919.48	919.48	919.48	919.47	919.47
31.250	919.46	919.46	919.46	919.45	919.45
31.500	919.45	919.44	919.44	919.44	919.44
31.750	919.43	919.43	919.43	919.42	919.42
32.000	919.42	919.41	919.41	919.41	919.40
32.250	919.40	919.40	919.40	919.39	919.39
32.500	919.39	919.38	919.38	919.38	919.37
32.750	919.37	919.37	919.37	919.36	919.36
33.000	919.36	919.35	919.35	919.35	919.34
33.250	919.34	919.34	919.34	919.33	919.33
33.500	919.33	919.32	919.32	919.32	919.32
33.750	919.31	919.31	919.31	919.30	919.30
34.000	919.30	919.29	919.29	919.29	919.29
34.250	919.28	919.28	919.28	919.27	919.27
34.500	919.27	919.27	919.26	919.26	919.26
34.750	919.26	919.25	919.25	919.25	919.24
35.000	919.24	919.24	919.23	919.23	919.23
35.250	919.23	919.22	919.22	919.22	919.21
35.500	919.21	919.21	919.21	919.20	919.20
35.750	919.20	919.19	919.19	919.19	919.19
36.000	919.18	919.18	919.18	919.17	919.17
36.250	919.17	919.17	919.16	919.16	919.16
36.500	919.15	919.15	919.15	919.15	919.14
36.750	919.14	919.14	919.14	919.13	919.13
37.000	919.13	919.12	919.12	919.12	919.12
37.250	919.11	919.11	919.11	919.11	919.10
37.500	919.10	919.10	919.10	919.09	919.09
37.750	919.09	919.09	919.08	919.08	919.08
38.000	919.08	919.07	919.07	919.07	919.06
38.250	919.06	919.06	919.06	919.05	919.05
38.500	919.05	919.05	919.04	919.04	919.04
38.750	919.04	919.03	919.03	919.03	919.03
39.000	919.02	919.02	919.02	919.02	919.02
39.250	919.01	919.01	919.01	919.01	919.00
39.500	919.00	919.00	919.00	918.99	918.99
39.750	918.99	918.99	918.98	918.98	918.98
40.000	918.98	918.97	918.97	918.97	918.97
40.250	918.97	918.96	918.96	918.96	918.96
40.500	918.95	918.95	918.95	918.95	918.95
40.750	918.94	918.94	918.94	918.94	918.93

Subsection: Time vs. Elevation

Return Event: 25 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
41.000	918.93	918.93	918.93	918.92	918.92
41.250	918.92	918.92	918.92	918.91	918.91
41.500	918.91	918.91	918.91	918.90	918.90
41.750	918.90	918.90	918.89	918.89	918.89
42.000	918.89	918.89	918.88	918.88	918.88
42.250	918.88	918.88	918.87	918.87	918.87
42.500	918.87	918.87	918.86	918.86	918.86
42.750	918.86	918.85	918.85	918.85	918.85
43.000	918.85	918.84	918.84	918.84	918.84
43.250	918.84	918.83	918.83	918.83	918.83
43.500	918.83	918.82	918.82	918.82	918.82
43.750	918.82	918.81	918.81	918.81	918.81
44.000	918.81	918.81	918.80	918.80	918.80
44.250	918.80	918.80	918.79	918.79	918.79
44.500	918.79	918.79	918.78	918.78	918.78
44.750	918.78	918.78	918.78	918.77	918.77
45.000	918.77	918.77	918.77	918.76	918.76
45.250	918.76	918.76	918.76	918.75	918.75
45.500	918.75	918.75	918.75	918.75	918.74
45.750	918.74	918.74	918.74	918.74	918.73
46.000	918.73	918.73	918.73	918.73	918.73
46.250	918.72	918.72	918.72	918.72	918.72
46.500	918.72	918.71	918.71	918.71	918.71
46.750	918.71	918.70	918.70	918.70	918.70
47.000	918.70	918.70	918.70	918.69	918.69
47.250	918.69	918.69	918.69	918.69	918.68
47.500	918.68	918.68	918.68	918.68	918.68
47.750	918.67	918.67	918.67	918.67	918.67
48.000	918.67	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	918.25	918.26	918.30	918.37	918.46
0.250	918.57	918.71	918.86	919.04	919.24
0.500	919.45	919.68	919.92	920.18	920.44
0.750	920.72	921.01	921.31	921.61	921.92
1.000	922.18	922.39	922.53	922.62	922.66
1.250	922.68	922.67	922.66	922.63	922.61
1.500	922.57	922.54	922.51	922.47	922.44
1.750	922.40	922.37	922.33	922.29	922.26
2.000	922.22	922.17	922.13	922.08	922.03
2.250	922.00	921.97	921.94	921.91	921.89
2.500	921.87	921.85	921.84	921.82	921.81
2.750	921.80	921.79	921.78	921.77	921.76
3.000	921.75	921.75	921.74	921.73	921.73
3.250	921.72	921.72	921.71	921.71	921.70
3.500	921.70	921.69	921.69	921.68	921.68
3.750	921.68	921.67	921.67	921.66	921.66
4.000	921.65	921.65	921.64	921.64	921.63
4.250	921.63	921.62	921.62	921.61	921.61
4.500	921.61	921.60	921.60	921.59	921.59
4.750	921.58	921.58	921.57	921.57	921.56
5.000	921.56	921.55	921.55	921.55	921.54
5.250	921.54	921.53	921.53	921.52	921.52
5.500	921.51	921.51	921.50	921.50	921.50
5.750	921.49	921.49	921.48	921.48	921.47
6.000	921.47	921.46	921.46	921.45	921.45
6.250	921.45	921.44	921.44	921.43	921.43
6.500	921.42	921.42	921.41	921.41	921.41
6.750	921.40	921.40	921.39	921.39	921.38
7.000	921.38	921.37	921.37	921.37	921.36
7.250	921.36	921.35	921.35	921.34	921.34
7.500	921.33	921.33	921.33	921.32	921.32
7.750	921.31	921.31	921.30	921.30	921.29
8.000	921.29	921.29	921.28	921.28	921.27
8.250	921.27	921.26	921.26	921.26	921.25
8.500	921.25	921.24	921.24	921.23	921.23
8.750	921.22	921.22	921.22	921.21	921.21
9.000	921.20	921.20	921.19	921.19	921.18
9.250	921.18	921.17	921.17	921.17	921.16
9.500	921.16	921.15	921.15	921.14	921.14
9.750	921.13	921.13	921.13	921.12	921.12
10.000	921.11	921.11	921.10	921.10	921.09

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	921.09	921.09	921.08	921.08	921.07
10.500	921.07	921.06	921.06	921.05	921.05
10.750	921.05	921.04	921.04	921.03	921.03
11.000	921.02	921.02	921.01	921.01	921.01
11.250	921.00	921.00	920.99	920.99	920.98
11.500	920.98	920.98	920.97	920.97	920.96
11.750	920.96	920.95	920.95	920.95	920.94
12.000	920.94	920.93	920.93	920.92	920.92
12.250	920.92	920.91	920.91	920.90	920.90
12.500	920.89	920.89	920.89	920.88	920.88
12.750	920.87	920.87	920.86	920.86	920.86
13.000	920.85	920.85	920.84	920.84	920.84
13.250	920.83	920.83	920.82	920.82	920.81
13.500	920.81	920.81	920.80	920.80	920.79
13.750	920.79	920.79	920.78	920.78	920.77
14.000	920.77	920.76	920.76	920.76	920.75
14.250	920.75	920.74	920.74	920.74	920.73
14.500	920.73	920.72	920.72	920.71	920.71
14.750	920.70	920.70	920.70	920.69	920.69
15.000	920.68	920.68	920.67	920.67	920.67
15.250	920.66	920.66	920.65	920.65	920.64
15.500	920.64	920.64	920.63	920.63	920.62
15.750	920.62	920.62	920.61	920.61	920.60
16.000	920.60	920.59	920.59	920.59	920.58
16.250	920.58	920.57	920.57	920.57	920.56
16.500	920.56	920.55	920.55	920.54	920.54
16.750	920.54	920.53	920.53	920.52	920.52
17.000	920.52	920.51	920.51	920.50	920.50
17.250	920.49	920.49	920.49	920.48	920.48
17.500	920.47	920.47	920.47	920.46	920.46
17.750	920.45	920.45	920.45	920.44	920.44
18.000	920.43	920.43	920.43	920.42	920.42
18.250	920.41	920.41	920.41	920.40	920.40
18.500	920.39	920.39	920.39	920.38	920.38
18.750	920.37	920.37	920.37	920.36	920.36
19.000	920.35	920.35	920.35	920.34	920.34
19.250	920.34	920.33	920.33	920.32	920.32
19.500	920.32	920.31	920.31	920.30	920.30
19.750	920.30	920.29	920.29	920.28	920.28
20.000	920.28	920.27	920.27	920.27	920.26
20.250	920.26	920.25	920.25	920.25	920.24

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	920.24	920.23	920.23	920.23	920.22
20.750	920.22	920.21	920.21	920.21	920.20
21.000	920.20	920.19	920.19	920.19	920.18
21.250	920.18	920.17	920.17	920.17	920.16
21.500	920.16	920.15	920.15	920.15	920.14
21.750	920.14	920.13	920.13	920.13	920.12
22.000	920.12	920.11	920.11	920.11	920.10
22.250	920.10	920.10	920.09	920.09	920.08
22.500	920.08	920.08	920.07	920.07	920.06
22.750	920.06	920.06	920.05	920.05	920.05
23.000	920.04	920.04	920.03	920.03	920.03
23.250	920.02	920.02	920.02	920.01	920.01
23.500	920.00	920.00	920.00	919.99	919.99
23.750	919.99	919.98	919.98	919.97	919.97
24.000	919.97	919.96	919.96	919.96	919.95
24.250	919.95	919.94	919.94	919.94	919.93
24.500	919.93	919.93	919.92	919.92	919.92
24.750	919.91	919.91	919.90	919.90	919.90
25.000	919.89	919.89	919.89	919.88	919.88
25.250	919.88	919.87	919.87	919.87	919.86
25.500	919.86	919.85	919.85	919.85	919.84
25.750	919.84	919.84	919.83	919.83	919.83
26.000	919.82	919.82	919.82	919.81	919.81
26.250	919.81	919.80	919.80	919.79	919.79
26.500	919.79	919.78	919.78	919.78	919.77
26.750	919.77	919.77	919.76	919.76	919.76
27.000	919.75	919.75	919.75	919.74	919.74
27.250	919.74	919.73	919.73	919.72	919.72
27.500	919.72	919.71	919.71	919.71	919.70
27.750	919.70	919.70	919.69	919.69	919.69
28.000	919.68	919.68	919.67	919.67	919.67
28.250	919.66	919.66	919.66	919.65	919.65
28.500	919.65	919.64	919.64	919.64	919.63
28.750	919.63	919.63	919.62	919.62	919.62
29.000	919.61	919.61	919.61	919.60	919.60
29.250	919.60	919.59	919.59	919.59	919.58
29.500	919.58	919.58	919.57	919.57	919.57
29.750	919.56	919.56	919.56	919.55	919.55
30.000	919.55	919.54	919.54	919.54	919.53
30.250	919.53	919.53	919.52	919.52	919.52
30.500	919.51	919.51	919.51	919.50	919.50

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.750	919.50	919.49	919.49	919.49	919.48
31.000	919.48	919.48	919.48	919.47	919.47
31.250	919.46	919.46	919.46	919.45	919.45
31.500	919.45	919.45	919.44	919.44	919.44
31.750	919.43	919.43	919.43	919.42	919.42
32.000	919.42	919.41	919.41	919.41	919.41
32.250	919.40	919.40	919.40	919.39	919.39
32.500	919.39	919.38	919.38	919.38	919.38
32.750	919.37	919.37	919.37	919.36	919.36
33.000	919.36	919.35	919.35	919.35	919.35
33.250	919.34	919.34	919.34	919.33	919.33
33.500	919.33	919.32	919.32	919.32	919.32
33.750	919.31	919.31	919.31	919.30	919.30
34.000	919.30	919.30	919.29	919.29	919.29
34.250	919.28	919.28	919.28	919.28	919.27
34.500	919.27	919.27	919.26	919.26	919.26
34.750	919.26	919.25	919.25	919.25	919.24
35.000	919.24	919.24	919.24	919.23	919.23
35.250	919.23	919.22	919.22	919.22	919.22
35.500	919.21	919.21	919.21	919.20	919.20
35.750	919.20	919.19	919.19	919.19	919.19
36.000	919.18	919.18	919.18	919.18	919.17
36.250	919.17	919.17	919.16	919.16	919.16
36.500	919.16	919.15	919.15	919.15	919.14
36.750	919.14	919.14	919.14	919.13	919.13
37.000	919.13	919.13	919.12	919.12	919.12
37.250	919.12	919.11	919.11	919.11	919.10
37.500	919.10	919.10	919.10	919.09	919.09
37.750	919.09	919.09	919.08	919.08	919.08
38.000	919.08	919.07	919.07	919.07	919.07
38.250	919.06	919.06	919.06	919.06	919.05
38.500	919.05	919.05	919.05	919.04	919.04
38.750	919.04	919.04	919.03	919.03	919.03
39.000	919.03	919.02	919.02	919.02	919.02
39.250	919.01	919.01	919.01	919.01	919.00
39.500	919.00	919.00	919.00	918.99	918.99
39.750	918.99	918.99	918.98	918.98	918.98
40.000	918.98	918.98	918.97	918.97	918.97
40.250	918.97	918.96	918.96	918.96	918.96
40.500	918.95	918.95	918.95	918.95	918.95
40.750	918.94	918.94	918.94	918.94	918.93

Subsection: Time vs. Elevation

Return Event: 50 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
41.000	918.93	918.93	918.93	918.93	918.92
41.250	918.92	918.92	918.92	918.91	918.91
41.500	918.91	918.91	918.91	918.90	918.90
41.750	918.90	918.90	918.90	918.89	918.89
42.000	918.89	918.89	918.88	918.88	918.88
42.250	918.88	918.88	918.87	918.87	918.87
42.500	918.87	918.87	918.86	918.86	918.86
42.750	918.86	918.86	918.85	918.85	918.85
43.000	918.85	918.85	918.84	918.84	918.84
43.250	918.84	918.84	918.83	918.83	918.83
43.500	918.83	918.83	918.82	918.82	918.82
43.750	918.82	918.82	918.81	918.81	918.81
44.000	918.81	918.81	918.80	918.80	918.80
44.250	918.80	918.80	918.79	918.79	918.79
44.500	918.79	918.79	918.78	918.78	918.78
44.750	918.78	918.78	918.78	918.77	918.77
45.000	918.77	918.77	918.77	918.76	918.76
45.250	918.76	918.76	918.76	918.76	918.75
45.500	918.75	918.75	918.75	918.75	918.74
45.750	918.74	918.74	918.74	918.74	918.74
46.000	918.73	918.73	918.73	918.73	918.73
46.250	918.72	918.72	918.72	918.72	918.72
46.500	918.72	918.71	918.71	918.71	918.71
46.750	918.71	918.71	918.70	918.70	918.70
47.000	918.70	918.70	918.70	918.69	918.69
47.250	918.69	918.69	918.69	918.69	918.68
47.500	918.68	918.68	918.68	918.68	918.68
47.750	918.67	918.67	918.67	918.67	918.67
48.000	918.67	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	918.25	918.26	918.31	918.38	918.48
0.250	918.60	918.75	918.91	919.10	919.32
0.500	919.54	919.79	920.05	920.33	920.61
0.750	920.91	921.22	921.53	921.85	922.14
1.000	922.37	922.54	922.65	922.72	922.75
1.250	922.75	922.74	922.72	922.69	922.66
1.500	922.63	922.59	922.55	922.51	922.47
1.750	922.44	922.40	922.36	922.32	922.28
2.000	922.24	922.19	922.14	922.09	922.04
2.250	922.00	921.97	921.94	921.92	921.90
2.500	921.88	921.86	921.84	921.83	921.81
2.750	921.80	921.79	921.78	921.77	921.76
3.000	921.76	921.75	921.74	921.74	921.73
3.250	921.72	921.72	921.71	921.71	921.70
3.500	921.70	921.69	921.69	921.69	921.68
3.750	921.68	921.67	921.67	921.66	921.66
4.000	921.65	921.65	921.64	921.64	921.63
4.250	921.63	921.62	921.62	921.62	921.61
4.500	921.61	921.60	921.60	921.59	921.59
4.750	921.58	921.58	921.57	921.57	921.56
5.000	921.56	921.56	921.55	921.55	921.54
5.250	921.54	921.53	921.53	921.52	921.52
5.500	921.51	921.51	921.51	921.50	921.50
5.750	921.49	921.49	921.48	921.48	921.47
6.000	921.47	921.46	921.46	921.46	921.45
6.250	921.45	921.44	921.44	921.43	921.43
6.500	921.42	921.42	921.42	921.41	921.41
6.750	921.40	921.40	921.39	921.39	921.38
7.000	921.38	921.38	921.37	921.37	921.36
7.250	921.36	921.35	921.35	921.34	921.34
7.500	921.34	921.33	921.33	921.32	921.32
7.750	921.31	921.31	921.30	921.30	921.30
8.000	921.29	921.29	921.28	921.28	921.27
8.250	921.27	921.27	921.26	921.26	921.25
8.500	921.25	921.24	921.24	921.23	921.23
8.750	921.23	921.22	921.22	921.21	921.21
9.000	921.20	921.20	921.19	921.19	921.18
9.250	921.18	921.18	921.17	921.17	921.16
9.500	921.16	921.15	921.15	921.14	921.14
9.750	921.14	921.13	921.13	921.12	921.12
10.000	921.11	921.11	921.10	921.10	921.09

Subsection: Time vs. Elevation

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.250	921.09	921.09	921.08	921.08	921.07
10.500	921.07	921.06	921.06	921.06	921.05
10.750	921.05	921.04	921.04	921.03	921.03
11.000	921.02	921.02	921.02	921.01	921.01
11.250	921.00	921.00	920.99	920.99	920.99
11.500	920.98	920.98	920.97	920.97	920.96
11.750	920.96	920.96	920.95	920.95	920.94
12.000	920.94	920.93	920.93	920.93	920.92
12.250	920.92	920.91	920.91	920.90	920.90
12.500	920.90	920.89	920.89	920.88	920.88
12.750	920.87	920.87	920.87	920.86	920.86
13.000	920.85	920.85	920.84	920.84	920.84
13.250	920.83	920.83	920.82	920.82	920.82
13.500	920.81	920.81	920.80	920.80	920.79
13.750	920.79	920.79	920.78	920.78	920.77
14.000	920.77	920.77	920.76	920.76	920.75
14.250	920.75	920.74	920.74	920.74	920.73
14.500	920.73	920.72	920.72	920.71	920.71
14.750	920.71	920.70	920.70	920.69	920.69
15.000	920.68	920.68	920.68	920.67	920.67
15.250	920.66	920.66	920.65	920.65	920.65
15.500	920.64	920.64	920.63	920.63	920.62
15.750	920.62	920.62	920.61	920.61	920.60
16.000	920.60	920.60	920.59	920.59	920.58
16.250	920.58	920.57	920.57	920.57	920.56
16.500	920.56	920.55	920.55	920.55	920.54
16.750	920.54	920.53	920.53	920.52	920.52
17.000	920.52	920.51	920.51	920.50	920.50
17.250	920.50	920.49	920.49	920.48	920.48
17.500	920.48	920.47	920.47	920.46	920.46
17.750	920.46	920.45	920.45	920.44	920.44
18.000	920.44	920.43	920.43	920.42	920.42
18.250	920.42	920.41	920.41	920.40	920.40
18.500	920.40	920.39	920.39	920.38	920.38
18.750	920.38	920.37	920.37	920.36	920.36
19.000	920.36	920.35	920.35	920.34	920.34
19.250	920.34	920.33	920.33	920.32	920.32
19.500	920.32	920.31	920.31	920.30	920.30
19.750	920.30	920.29	920.29	920.29	920.28
20.000	920.28	920.27	920.27	920.27	920.26
20.250	920.26	920.25	920.25	920.25	920.24

Subsection: Time vs. Elevation

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.500	920.24	920.23	920.23	920.23	920.22
20.750	920.22	920.21	920.21	920.21	920.20
21.000	920.20	920.19	920.19	920.19	920.18
21.250	920.18	920.17	920.17	920.17	920.16
21.500	920.16	920.15	920.15	920.15	920.14
21.750	920.14	920.14	920.13	920.13	920.12
22.000	920.12	920.12	920.11	920.11	920.10
22.250	920.10	920.10	920.09	920.09	920.08
22.500	920.08	920.08	920.07	920.07	920.07
22.750	920.06	920.06	920.05	920.05	920.05
23.000	920.04	920.04	920.04	920.03	920.03
23.250	920.02	920.02	920.02	920.01	920.01
23.500	920.00	920.00	920.00	919.99	919.99
23.750	919.99	919.98	919.98	919.98	919.97
24.000	919.97	919.96	919.96	919.96	919.95
24.250	919.95	919.95	919.94	919.94	919.93
24.500	919.93	919.93	919.92	919.92	919.92
24.750	919.91	919.91	919.91	919.90	919.90
25.000	919.89	919.89	919.89	919.88	919.88
25.250	919.88	919.87	919.87	919.87	919.86
25.500	919.86	919.86	919.85	919.85	919.84
25.750	919.84	919.84	919.83	919.83	919.83
26.000	919.82	919.82	919.82	919.81	919.81
26.250	919.81	919.80	919.80	919.80	919.79
26.500	919.79	919.79	919.78	919.78	919.77
26.750	919.77	919.77	919.76	919.76	919.76
27.000	919.75	919.75	919.75	919.74	919.74
27.250	919.74	919.73	919.73	919.73	919.72
27.500	919.72	919.71	919.71	919.71	919.70
27.750	919.70	919.70	919.69	919.69	919.69
28.000	919.68	919.68	919.68	919.67	919.67
28.250	919.66	919.66	919.66	919.65	919.65
28.500	919.65	919.64	919.64	919.64	919.63
28.750	919.63	919.63	919.62	919.62	919.62
29.000	919.61	919.61	919.61	919.60	919.60
29.250	919.60	919.59	919.59	919.59	919.58
29.500	919.58	919.58	919.57	919.57	919.57
29.750	919.56	919.56	919.56	919.55	919.55
30.000	919.55	919.54	919.54	919.54	919.53
30.250	919.53	919.53	919.52	919.52	919.52
30.500	919.51	919.51	919.51	919.50	919.50

Subsection: Time vs. Elevation

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.750	919.50	919.49	919.49	919.49	919.48
31.000	919.48	919.48	919.48	919.47	919.47
31.250	919.47	919.46	919.46	919.46	919.45
31.500	919.45	919.45	919.44	919.44	919.44
31.750	919.43	919.43	919.43	919.42	919.42
32.000	919.42	919.42	919.41	919.41	919.41
32.250	919.40	919.40	919.40	919.39	919.39
32.500	919.39	919.38	919.38	919.38	919.38
32.750	919.37	919.37	919.37	919.36	919.36
33.000	919.36	919.35	919.35	919.35	919.35
33.250	919.34	919.34	919.34	919.33	919.33
33.500	919.33	919.33	919.32	919.32	919.32
33.750	919.31	919.31	919.31	919.30	919.30
34.000	919.30	919.30	919.29	919.29	919.29
34.250	919.28	919.28	919.28	919.28	919.27
34.500	919.27	919.27	919.27	919.26	919.26
34.750	919.26	919.25	919.25	919.25	919.25
35.000	919.24	919.24	919.24	919.23	919.23
35.250	919.23	919.22	919.22	919.22	919.22
35.500	919.21	919.21	919.21	919.20	919.20
35.750	919.20	919.20	919.19	919.19	919.19
36.000	919.18	919.18	919.18	919.18	919.17
36.250	919.17	919.17	919.16	919.16	919.16
36.500	919.16	919.15	919.15	919.15	919.15
36.750	919.14	919.14	919.14	919.13	919.13
37.000	919.13	919.13	919.12	919.12	919.12
37.250	919.12	919.11	919.11	919.11	919.11
37.500	919.10	919.10	919.10	919.09	919.09
37.750	919.09	919.09	919.08	919.08	919.08
38.000	919.08	919.07	919.07	919.07	919.07
38.250	919.06	919.06	919.06	919.06	919.05
38.500	919.05	919.05	919.05	919.04	919.04
38.750	919.04	919.04	919.03	919.03	919.03
39.000	919.03	919.02	919.02	919.02	919.02
39.250	919.01	919.01	919.01	919.01	919.00
39.500	919.00	919.00	919.00	918.99	918.99
39.750	918.99	918.99	918.99	918.98	918.98
40.000	918.98	918.98	918.97	918.97	918.97
40.250	918.97	918.96	918.96	918.96	918.96
40.500	918.96	918.95	918.95	918.95	918.95
40.750	918.94	918.94	918.94	918.94	918.93

Subsection: Time vs. Elevation

Return Event: 100 years

Label: PO-1 (OUT)

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Elevation (ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
41.000	918.93	918.93	918.93	918.93	918.92
41.250	918.92	918.92	918.92	918.92	918.91
41.500	918.91	918.91	918.91	918.90	918.90
41.750	918.90	918.90	918.90	918.89	918.89
42.000	918.89	918.89	918.89	918.88	918.88
42.250	918.88	918.88	918.87	918.87	918.87
42.500	918.87	918.87	918.86	918.86	918.86
42.750	918.86	918.86	918.85	918.85	918.85
43.000	918.85	918.85	918.84	918.84	918.84
43.250	918.84	918.84	918.83	918.83	918.83
43.500	918.83	918.83	918.82	918.82	918.82
43.750	918.82	918.82	918.81	918.81	918.81
44.000	918.81	918.81	918.80	918.80	918.80
44.250	918.80	918.80	918.79	918.79	918.79
44.500	918.79	918.79	918.79	918.78	918.78
44.750	918.78	918.78	918.78	918.77	918.77
45.000	918.77	918.77	918.77	918.76	918.76
45.250	918.76	918.76	918.76	918.76	918.75
45.500	918.75	918.75	918.75	918.75	918.74
45.750	918.74	918.74	918.74	918.74	918.74
46.000	918.73	918.73	918.73	918.73	918.73
46.250	918.72	918.72	918.72	918.72	918.72
46.500	918.72	918.71	918.71	918.71	918.71
46.750	918.71	918.71	918.70	918.70	918.70
47.000	918.70	918.70	918.70	918.69	918.69
47.250	918.69	918.69	918.69	918.69	918.68
47.500	918.68	918.68	918.68	918.68	918.68
47.750	918.68	918.67	918.67	918.67	918.67
48.000	918.67	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Volume

Return Event: 10 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.00	0.00	0.02	0.04	0.07
0.250	0.11	0.16	0.22	0.28	0.35
0.500	0.44	0.53	0.63	0.74	0.85
0.750	0.98	1.12	1.26	1.41	1.58
1.000	1.74	1.92	2.10	2.24	2.34
1.250	2.39	2.42	2.43	2.43	2.42
1.500	2.41	2.40	2.38	2.36	2.34
1.750	2.33	2.31	2.29	2.26	2.24
2.000	2.22	2.19	2.16	2.13	2.11
2.250	2.09	2.07	2.05	2.04	2.02
2.500	2.01	2.00	1.99	1.98	1.97
2.750	1.96	1.96	1.95	1.94	1.94
3.000	1.93	1.93	1.93	1.92	1.92
3.250	1.91	1.91	1.91	1.90	1.90
3.500	1.90	1.90	1.89	1.89	1.89
3.750	1.88	1.88	1.88	1.87	1.87
4.000	1.87	1.86	1.86	1.86	1.85
4.250	1.85	1.85	1.85	1.84	1.84
4.500	1.84	1.83	1.83	1.83	1.82
4.750	1.82	1.82	1.81	1.81	1.81
5.000	1.81	1.80	1.80	1.80	1.79
5.250	1.79	1.79	1.78	1.78	1.78
5.500	1.78	1.77	1.77	1.77	1.76
5.750	1.76	1.76	1.76	1.75	1.75
6.000	1.75	1.74	1.74	1.74	1.73
6.250	1.73	1.73	1.73	1.72	1.72
6.500	1.72	1.71	1.71	1.71	1.71
6.750	1.70	1.70	1.70	1.69	1.69
7.000	1.69	1.69	1.68	1.68	1.68
7.250	1.67	1.67	1.67	1.67	1.66
7.500	1.66	1.66	1.65	1.65	1.65
7.750	1.65	1.64	1.64	1.64	1.63
8.000	1.63	1.63	1.63	1.62	1.62
8.250	1.62	1.61	1.61	1.61	1.61
8.500	1.60	1.60	1.60	1.59	1.59
8.750	1.59	1.59	1.58	1.58	1.58
9.000	1.57	1.57	1.57	1.57	1.56
9.250	1.56	1.56	1.55	1.55	1.55
9.500	1.55	1.54	1.54	1.54	1.53
9.750	1.53	1.53	1.53	1.52	1.52
10.000	1.52	1.51	1.51	1.51	1.51

Subsection: Time vs. Volume

Return Event: 10 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	1.50	1.50	1.50	1.50	1.49
10.500	1.49	1.49	1.48	1.48	1.48
10.750	1.48	1.47	1.47	1.47	1.47
11.000	1.46	1.46	1.46	1.45	1.45
11.250	1.45	1.45	1.44	1.44	1.44
11.500	1.44	1.43	1.43	1.43	1.42
11.750	1.42	1.42	1.42	1.41	1.41
12.000	1.41	1.41	1.40	1.40	1.40
12.250	1.40	1.39	1.39	1.39	1.39
12.500	1.38	1.38	1.38	1.38	1.37
12.750	1.37	1.37	1.36	1.36	1.36
13.000	1.36	1.35	1.35	1.35	1.35
13.250	1.34	1.34	1.34	1.34	1.33
13.500	1.33	1.33	1.33	1.32	1.32
13.750	1.32	1.32	1.31	1.31	1.31
14.000	1.31	1.30	1.30	1.30	1.30
14.250	1.29	1.29	1.29	1.29	1.28
14.500	1.28	1.28	1.28	1.27	1.27
14.750	1.27	1.27	1.26	1.26	1.26
15.000	1.25	1.25	1.25	1.25	1.24
15.250	1.24	1.24	1.24	1.23	1.23
15.500	1.23	1.23	1.22	1.22	1.22
15.750	1.22	1.21	1.21	1.21	1.21
16.000	1.20	1.20	1.20	1.20	1.19
16.250	1.19	1.19	1.19	1.18	1.18
16.500	1.18	1.18	1.17	1.17	1.17
16.750	1.17	1.17	1.16	1.16	1.16
17.000	1.16	1.15	1.15	1.15	1.15
17.250	1.14	1.14	1.14	1.14	1.13
17.500	1.13	1.13	1.13	1.12	1.12
17.750	1.12	1.12	1.12	1.11	1.11
18.000	1.11	1.11	1.10	1.10	1.10
18.250	1.10	1.09	1.09	1.09	1.09
18.500	1.08	1.08	1.08	1.08	1.08
18.750	1.07	1.07	1.07	1.07	1.06
19.000	1.06	1.06	1.06	1.06	1.05
19.250	1.05	1.05	1.05	1.04	1.04
19.500	1.04	1.04	1.04	1.03	1.03
19.750	1.03	1.03	1.02	1.02	1.02
20.000	1.02	1.02	1.01	1.01	1.01
20.250	1.01	1.00	1.00	1.00	1.00

Subsection: Time vs. Volume

Return Event: 10 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	1.00	0.99	0.99	0.99	0.99
20.750	0.98	0.98	0.98	0.98	0.97
21.000	0.97	0.97	0.97	0.97	0.96
21.250	0.96	0.96	0.96	0.95	0.95
21.500	0.95	0.95	0.95	0.94	0.94
21.750	0.94	0.94	0.93	0.93	0.93
22.000	0.93	0.93	0.92	0.92	0.92
22.250	0.92	0.92	0.91	0.91	0.91
22.500	0.91	0.90	0.90	0.90	0.90
22.750	0.90	0.89	0.89	0.89	0.89
23.000	0.89	0.88	0.88	0.88	0.88
23.250	0.87	0.87	0.87	0.87	0.87
23.500	0.86	0.86	0.86	0.86	0.86
23.750	0.85	0.85	0.85	0.85	0.85
24.000	0.84	0.84	0.84	0.84	0.84
24.250	0.83	0.83	0.83	0.83	0.83
24.500	0.82	0.82	0.82	0.82	0.82
24.750	0.81	0.81	0.81	0.81	0.81
25.000	0.80	0.80	0.80	0.80	0.80
25.250	0.79	0.79	0.79	0.79	0.79
25.500	0.78	0.78	0.78	0.78	0.78
25.750	0.78	0.77	0.77	0.77	0.77
26.000	0.77	0.76	0.76	0.76	0.76
26.250	0.76	0.75	0.75	0.75	0.75
26.500	0.75	0.74	0.74	0.74	0.74
26.750	0.74	0.74	0.73	0.73	0.73
27.000	0.73	0.73	0.72	0.72	0.72
27.250	0.72	0.72	0.71	0.71	0.71
27.500	0.71	0.71	0.71	0.70	0.70
27.750	0.70	0.70	0.70	0.69	0.69
28.000	0.69	0.69	0.69	0.68	0.68
28.250	0.68	0.68	0.68	0.68	0.67
28.500	0.67	0.67	0.67	0.67	0.66
28.750	0.66	0.66	0.66	0.66	0.66
29.000	0.65	0.65	0.65	0.65	0.65
29.250	0.64	0.64	0.64	0.64	0.64
29.500	0.64	0.63	0.63	0.63	0.63
29.750	0.63	0.63	0.62	0.62	0.62
30.000	0.62	0.62	0.62	0.61	0.61
30.250	0.61	0.61	0.61	0.60	0.60
30.500	0.60	0.60	0.60	0.60	0.59

Subsection: Time vs. Volume

Return Event: 10 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.750	0.59	0.59	0.59	0.59	0.59
31.000	0.58	0.58	0.58	0.58	0.58
31.250	0.58	0.58	0.57	0.57	0.57
31.500	0.57	0.57	0.57	0.56	0.56
31.750	0.56	0.56	0.56	0.56	0.55
32.000	0.55	0.55	0.55	0.55	0.55
32.250	0.54	0.54	0.54	0.54	0.54
32.500	0.54	0.54	0.53	0.53	0.53
32.750	0.53	0.53	0.53	0.52	0.52
33.000	0.52	0.52	0.52	0.52	0.52
33.250	0.51	0.51	0.51	0.51	0.51
33.500	0.51	0.51	0.50	0.50	0.50
33.750	0.50	0.50	0.50	0.50	0.49
34.000	0.49	0.49	0.49	0.49	0.49
34.250	0.49	0.48	0.48	0.48	0.48
34.500	0.48	0.48	0.48	0.47	0.47
34.750	0.47	0.47	0.47	0.47	0.47
35.000	0.46	0.46	0.46	0.46	0.46
35.250	0.46	0.45	0.45	0.45	0.45
35.500	0.45	0.45	0.45	0.44	0.44
35.750	0.44	0.44	0.44	0.44	0.44
36.000	0.43	0.43	0.43	0.43	0.43
36.250	0.43	0.43	0.42	0.42	0.42
36.500	0.42	0.42	0.42	0.42	0.42
36.750	0.41	0.41	0.41	0.41	0.41
37.000	0.41	0.41	0.40	0.40	0.40
37.250	0.40	0.40	0.40	0.40	0.40
37.500	0.39	0.39	0.39	0.39	0.39
37.750	0.39	0.39	0.39	0.38	0.38
38.000	0.38	0.38	0.38	0.38	0.38
38.250	0.38	0.37	0.37	0.37	0.37
38.500	0.37	0.37	0.37	0.37	0.36
38.750	0.36	0.36	0.36	0.36	0.36
39.000	0.36	0.36	0.35	0.35	0.35
39.250	0.35	0.35	0.35	0.35	0.35
39.500	0.35	0.34	0.34	0.34	0.34
39.750	0.34	0.34	0.34	0.34	0.34
40.000	0.33	0.33	0.33	0.33	0.33
40.250	0.33	0.33	0.33	0.33	0.32
40.500	0.32	0.32	0.32	0.32	0.32
40.750	0.32	0.32	0.32	0.31	0.31

Subsection: Time vs. Volume

Return Event: 10 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
41.000	0.31	0.31	0.31	0.31	0.31
41.250	0.31	0.31	0.30	0.30	0.30
41.500	0.30	0.30	0.30	0.30	0.30
41.750	0.30	0.30	0.29	0.29	0.29
42.000	0.29	0.29	0.29	0.29	0.29
42.250	0.29	0.29	0.28	0.28	0.28
42.500	0.28	0.28	0.28	0.28	0.28
42.750	0.28	0.28	0.27	0.27	0.27
43.000	0.27	0.27	0.27	0.27	0.27
43.250	0.27	0.27	0.26	0.26	0.26
43.500	0.26	0.26	0.26	0.26	0.26
43.750	0.26	0.26	0.26	0.25	0.25
44.000	0.25	0.25	0.25	0.25	0.25
44.250	0.25	0.25	0.25	0.25	0.24
44.500	0.24	0.24	0.24	0.24	0.24
44.750	0.24	0.24	0.24	0.24	0.24
45.000	0.24	0.23	0.23	0.23	0.23
45.250	0.23	0.23	0.23	0.23	0.23
45.500	0.23	0.23	0.22	0.22	0.22
45.750	0.22	0.22	0.22	0.22	0.22
46.000	0.22	0.22	0.22	0.22	0.21
46.250	0.21	0.21	0.21	0.21	0.21
46.500	0.21	0.21	0.21	0.21	0.21
46.750	0.21	0.20	0.20	0.20	0.20
47.000	0.20	0.20	0.20	0.20	0.20
47.250	0.20	0.20	0.20	0.20	0.20
47.500	0.19	0.19	0.19	0.19	0.19
47.750	0.19	0.19	0.19	0.19	0.19
48.000	0.19	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Volume

Return Event: 25 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.00	0.01	0.02	0.05	0.08
0.250	0.13	0.19	0.25	0.33	0.42
0.500	0.51	0.62	0.74	0.87	1.01
0.750	1.15	1.31	1.48	1.66	1.85
1.000	2.05	2.22	2.36	2.45	2.50
1.250	2.52	2.53	2.52	2.51	2.49
1.500	2.47	2.45	2.43	2.41	2.39
1.750	2.36	2.34	2.32	2.29	2.27
2.000	2.24	2.21	2.18	2.15	2.12
2.250	2.10	2.08	2.06	2.04	2.03
2.500	2.01	2.00	1.99	1.98	1.97
2.750	1.97	1.96	1.95	1.95	1.94
3.000	1.94	1.93	1.93	1.92	1.92
3.250	1.92	1.91	1.91	1.91	1.90
3.500	1.90	1.90	1.89	1.89	1.89
3.750	1.88	1.88	1.88	1.87	1.87
4.000	1.87	1.87	1.86	1.86	1.86
4.250	1.85	1.85	1.85	1.84	1.84
4.500	1.84	1.83	1.83	1.83	1.83
4.750	1.82	1.82	1.82	1.81	1.81
5.000	1.81	1.80	1.80	1.80	1.80
5.250	1.79	1.79	1.79	1.78	1.78
5.500	1.78	1.77	1.77	1.77	1.77
5.750	1.76	1.76	1.76	1.75	1.75
6.000	1.75	1.74	1.74	1.74	1.74
6.250	1.73	1.73	1.73	1.72	1.72
6.500	1.72	1.72	1.71	1.71	1.71
6.750	1.70	1.70	1.70	1.70	1.69
7.000	1.69	1.69	1.68	1.68	1.68
7.250	1.67	1.67	1.67	1.67	1.66
7.500	1.66	1.66	1.66	1.65	1.65
7.750	1.65	1.64	1.64	1.64	1.64
8.000	1.63	1.63	1.63	1.62	1.62
8.250	1.62	1.62	1.61	1.61	1.61
8.500	1.60	1.60	1.60	1.60	1.59
8.750	1.59	1.59	1.58	1.58	1.58
9.000	1.58	1.57	1.57	1.57	1.56
9.250	1.56	1.56	1.56	1.55	1.55
9.500	1.55	1.54	1.54	1.54	1.54
9.750	1.53	1.53	1.53	1.52	1.52
10.000	1.52	1.52	1.51	1.51	1.51

Subsection: Time vs. Volume

Return Event: 25 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	1.50	1.50	1.50	1.50	1.49
10.500	1.49	1.49	1.49	1.48	1.48
10.750	1.48	1.47	1.47	1.47	1.47
11.000	1.46	1.46	1.46	1.46	1.45
11.250	1.45	1.45	1.44	1.44	1.44
11.500	1.44	1.43	1.43	1.43	1.43
11.750	1.42	1.42	1.42	1.42	1.41
12.000	1.41	1.41	1.40	1.40	1.40
12.250	1.40	1.39	1.39	1.39	1.39
12.500	1.38	1.38	1.38	1.38	1.37
12.750	1.37	1.37	1.37	1.36	1.36
13.000	1.36	1.36	1.35	1.35	1.35
13.250	1.35	1.34	1.34	1.34	1.34
13.500	1.33	1.33	1.33	1.33	1.32
13.750	1.32	1.32	1.32	1.31	1.31
14.000	1.31	1.31	1.30	1.30	1.30
14.250	1.29	1.29	1.29	1.29	1.28
14.500	1.28	1.28	1.28	1.27	1.27
14.750	1.27	1.27	1.26	1.26	1.26
15.000	1.26	1.25	1.25	1.25	1.25
15.250	1.24	1.24	1.24	1.24	1.23
15.500	1.23	1.23	1.23	1.22	1.22
15.750	1.22	1.22	1.21	1.21	1.21
16.000	1.21	1.20	1.20	1.20	1.20
16.250	1.19	1.19	1.19	1.19	1.18
16.500	1.18	1.18	1.18	1.17	1.17
16.750	1.17	1.17	1.16	1.16	1.16
17.000	1.16	1.15	1.15	1.15	1.15
17.250	1.14	1.14	1.14	1.14	1.14
17.500	1.13	1.13	1.13	1.13	1.12
17.750	1.12	1.12	1.12	1.11	1.11
18.000	1.11	1.11	1.10	1.10	1.10
18.250	1.10	1.10	1.09	1.09	1.09
18.500	1.09	1.08	1.08	1.08	1.08
18.750	1.07	1.07	1.07	1.07	1.07
19.000	1.06	1.06	1.06	1.06	1.05
19.250	1.05	1.05	1.05	1.05	1.04
19.500	1.04	1.04	1.04	1.03	1.03
19.750	1.03	1.03	1.03	1.02	1.02
20.000	1.02	1.02	1.01	1.01	1.01
20.250	1.01	1.01	1.00	1.00	1.00

Subsection: Time vs. Volume

Return Event: 25 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	1.00	0.99	0.99	0.99	0.99
20.750	0.98	0.98	0.98	0.98	0.98
21.000	0.97	0.97	0.97	0.97	0.96
21.250	0.96	0.96	0.96	0.96	0.95
21.500	0.95	0.95	0.95	0.94	0.94
21.750	0.94	0.94	0.94	0.93	0.93
22.000	0.93	0.93	0.92	0.92	0.92
22.250	0.92	0.92	0.91	0.91	0.91
22.500	0.91	0.91	0.90	0.90	0.90
22.750	0.90	0.89	0.89	0.89	0.89
23.000	0.89	0.88	0.88	0.88	0.88
23.250	0.88	0.87	0.87	0.87	0.87
23.500	0.87	0.86	0.86	0.86	0.86
23.750	0.86	0.85	0.85	0.85	0.85
24.000	0.84	0.84	0.84	0.84	0.84
24.250	0.83	0.83	0.83	0.83	0.83
24.500	0.82	0.82	0.82	0.82	0.82
24.750	0.81	0.81	0.81	0.81	0.81
25.000	0.80	0.80	0.80	0.80	0.80
25.250	0.80	0.79	0.79	0.79	0.79
25.500	0.79	0.78	0.78	0.78	0.78
25.750	0.78	0.77	0.77	0.77	0.77
26.000	0.77	0.76	0.76	0.76	0.76
26.250	0.76	0.76	0.75	0.75	0.75
26.500	0.75	0.75	0.74	0.74	0.74
26.750	0.74	0.74	0.73	0.73	0.73
27.000	0.73	0.73	0.73	0.72	0.72
27.250	0.72	0.72	0.72	0.71	0.71
27.500	0.71	0.71	0.71	0.70	0.70
27.750	0.70	0.70	0.70	0.69	0.69
28.000	0.69	0.69	0.69	0.69	0.68
28.250	0.68	0.68	0.68	0.68	0.67
28.500	0.67	0.67	0.67	0.67	0.67
28.750	0.66	0.66	0.66	0.66	0.66
29.000	0.65	0.65	0.65	0.65	0.65
29.250	0.65	0.64	0.64	0.64	0.64
29.500	0.64	0.63	0.63	0.63	0.63
29.750	0.63	0.63	0.62	0.62	0.62
30.000	0.62	0.62	0.62	0.61	0.61
30.250	0.61	0.61	0.61	0.61	0.60
30.500	0.60	0.60	0.60	0.60	0.60

Subsection: Time vs. Volume

Return Event: 25 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.750	0.59	0.59	0.59	0.59	0.59
31.000	0.59	0.58	0.58	0.58	0.58
31.250	0.58	0.58	0.57	0.57	0.57
31.500	0.57	0.57	0.57	0.56	0.56
31.750	0.56	0.56	0.56	0.56	0.55
32.000	0.55	0.55	0.55	0.55	0.55
32.250	0.55	0.54	0.54	0.54	0.54
32.500	0.54	0.54	0.53	0.53	0.53
32.750	0.53	0.53	0.53	0.53	0.52
33.000	0.52	0.52	0.52	0.52	0.52
33.250	0.51	0.51	0.51	0.51	0.51
33.500	0.51	0.51	0.50	0.50	0.50
33.750	0.50	0.50	0.50	0.50	0.49
34.000	0.49	0.49	0.49	0.49	0.49
34.250	0.49	0.48	0.48	0.48	0.48
34.500	0.48	0.48	0.48	0.47	0.47
34.750	0.47	0.47	0.47	0.47	0.47
35.000	0.46	0.46	0.46	0.46	0.46
35.250	0.46	0.46	0.45	0.45	0.45
35.500	0.45	0.45	0.45	0.45	0.44
35.750	0.44	0.44	0.44	0.44	0.44
36.000	0.44	0.43	0.43	0.43	0.43
36.250	0.43	0.43	0.43	0.42	0.42
36.500	0.42	0.42	0.42	0.42	0.42
36.750	0.41	0.41	0.41	0.41	0.41
37.000	0.41	0.41	0.41	0.40	0.40
37.250	0.40	0.40	0.40	0.40	0.40
37.500	0.39	0.39	0.39	0.39	0.39
37.750	0.39	0.39	0.39	0.38	0.38
38.000	0.38	0.38	0.38	0.38	0.38
38.250	0.38	0.37	0.37	0.37	0.37
38.500	0.37	0.37	0.37	0.37	0.36
38.750	0.36	0.36	0.36	0.36	0.36
39.000	0.36	0.36	0.36	0.35	0.35
39.250	0.35	0.35	0.35	0.35	0.35
39.500	0.35	0.34	0.34	0.34	0.34
39.750	0.34	0.34	0.34	0.34	0.34
40.000	0.33	0.33	0.33	0.33	0.33
40.250	0.33	0.33	0.33	0.33	0.32
40.500	0.32	0.32	0.32	0.32	0.32
40.750	0.32	0.32	0.32	0.31	0.31

Subsection: Time vs. Volume

Return Event: 25 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
41.000	0.31	0.31	0.31	0.31	0.31
41.250	0.31	0.31	0.31	0.30	0.30
41.500	0.30	0.30	0.30	0.30	0.30
41.750	0.30	0.30	0.29	0.29	0.29
42.000	0.29	0.29	0.29	0.29	0.29
42.250	0.29	0.29	0.28	0.28	0.28
42.500	0.28	0.28	0.28	0.28	0.28
42.750	0.28	0.28	0.27	0.27	0.27
43.000	0.27	0.27	0.27	0.27	0.27
43.250	0.27	0.27	0.27	0.26	0.26
43.500	0.26	0.26	0.26	0.26	0.26
43.750	0.26	0.26	0.26	0.26	0.25
44.000	0.25	0.25	0.25	0.25	0.25
44.250	0.25	0.25	0.25	0.25	0.25
44.500	0.24	0.24	0.24	0.24	0.24
44.750	0.24	0.24	0.24	0.24	0.24
45.000	0.24	0.23	0.23	0.23	0.23
45.250	0.23	0.23	0.23	0.23	0.23
45.500	0.23	0.23	0.23	0.22	0.22
45.750	0.22	0.22	0.22	0.22	0.22
46.000	0.22	0.22	0.22	0.22	0.22
46.250	0.21	0.21	0.21	0.21	0.21
46.500	0.21	0.21	0.21	0.21	0.21
46.750	0.21	0.21	0.20	0.20	0.20
47.000	0.20	0.20	0.20	0.20	0.20
47.250	0.20	0.20	0.20	0.20	0.20
47.500	0.19	0.19	0.19	0.19	0.19
47.750	0.19	0.19	0.19	0.19	0.19
48.000	0.19	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Volume

Return Event: 50 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.00	0.01	0.02	0.05	0.09
0.250	0.14	0.21	0.28	0.36	0.46
0.500	0.57	0.69	0.82	0.96	1.11
0.750	1.28	1.46	1.64	1.84	2.05
1.000	2.24	2.38	2.48	2.55	2.58
1.250	2.59	2.59	2.58	2.56	2.54
1.500	2.52	2.49	2.47	2.44	2.42
1.750	2.39	2.36	2.34	2.31	2.29
2.000	2.26	2.23	2.19	2.16	2.13
2.250	2.10	2.08	2.06	2.05	2.03
2.500	2.02	2.01	1.99	1.98	1.98
2.750	1.97	1.96	1.95	1.95	1.94
3.000	1.94	1.93	1.93	1.93	1.92
3.250	1.92	1.91	1.91	1.91	1.90
3.500	1.90	1.90	1.89	1.89	1.89
3.750	1.89	1.88	1.88	1.88	1.87
4.000	1.87	1.87	1.86	1.86	1.86
4.250	1.85	1.85	1.85	1.84	1.84
4.500	1.84	1.84	1.83	1.83	1.83
4.750	1.82	1.82	1.82	1.81	1.81
5.000	1.81	1.81	1.80	1.80	1.80
5.250	1.79	1.79	1.79	1.78	1.78
5.500	1.78	1.78	1.77	1.77	1.77
5.750	1.76	1.76	1.76	1.75	1.75
6.000	1.75	1.75	1.74	1.74	1.74
6.250	1.73	1.73	1.73	1.72	1.72
6.500	1.72	1.72	1.71	1.71	1.71
6.750	1.70	1.70	1.70	1.70	1.69
7.000	1.69	1.69	1.68	1.68	1.68
7.250	1.68	1.67	1.67	1.67	1.66
7.500	1.66	1.66	1.66	1.65	1.65
7.750	1.65	1.64	1.64	1.64	1.64
8.000	1.63	1.63	1.63	1.62	1.62
8.250	1.62	1.62	1.61	1.61	1.61
8.500	1.61	1.60	1.60	1.60	1.59
8.750	1.59	1.59	1.59	1.58	1.58
9.000	1.58	1.57	1.57	1.57	1.56
9.250	1.56	1.56	1.56	1.55	1.55
9.500	1.55	1.55	1.54	1.54	1.54
9.750	1.53	1.53	1.53	1.53	1.52
10.000	1.52	1.52	1.51	1.51	1.51

Subsection: Time vs. Volume

Return Event: 50 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	1.51	1.50	1.50	1.50	1.49
10.500	1.49	1.49	1.49	1.48	1.48
10.750	1.48	1.48	1.47	1.47	1.47
11.000	1.46	1.46	1.46	1.46	1.45
11.250	1.45	1.45	1.45	1.44	1.44
11.500	1.44	1.43	1.43	1.43	1.43
11.750	1.42	1.42	1.42	1.42	1.41
12.000	1.41	1.41	1.41	1.40	1.40
12.250	1.40	1.40	1.39	1.39	1.39
12.500	1.38	1.38	1.38	1.38	1.37
12.750	1.37	1.37	1.37	1.36	1.36
13.000	1.36	1.36	1.35	1.35	1.35
13.250	1.35	1.34	1.34	1.34	1.34
13.500	1.33	1.33	1.33	1.33	1.32
13.750	1.32	1.32	1.32	1.31	1.31
14.000	1.31	1.31	1.30	1.30	1.30
14.250	1.30	1.29	1.29	1.29	1.29
14.500	1.28	1.28	1.28	1.27	1.27
14.750	1.27	1.27	1.26	1.26	1.26
15.000	1.26	1.25	1.25	1.25	1.25
15.250	1.24	1.24	1.24	1.24	1.23
15.500	1.23	1.23	1.23	1.22	1.22
15.750	1.22	1.22	1.21	1.21	1.21
16.000	1.21	1.20	1.20	1.20	1.20
16.250	1.19	1.19	1.19	1.19	1.18
16.500	1.18	1.18	1.18	1.17	1.17
16.750	1.17	1.17	1.16	1.16	1.16
17.000	1.16	1.15	1.15	1.15	1.15
17.250	1.15	1.14	1.14	1.14	1.14
17.500	1.13	1.13	1.13	1.13	1.12
17.750	1.12	1.12	1.12	1.11	1.11
18.000	1.11	1.11	1.11	1.10	1.10
18.250	1.10	1.10	1.09	1.09	1.09
18.500	1.09	1.08	1.08	1.08	1.08
18.750	1.08	1.07	1.07	1.07	1.07
19.000	1.06	1.06	1.06	1.06	1.05
19.250	1.05	1.05	1.05	1.05	1.04
19.500	1.04	1.04	1.04	1.03	1.03
19.750	1.03	1.03	1.03	1.02	1.02
20.000	1.02	1.02	1.01	1.01	1.01
20.250	1.01	1.01	1.00	1.00	1.00

Subsection: Time vs. Volume

Return Event: 50 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	1.00	0.99	0.99	0.99	0.99
20.750	0.99	0.98	0.98	0.98	0.98
21.000	0.97	0.97	0.97	0.97	0.97
21.250	0.96	0.96	0.96	0.96	0.95
21.500	0.95	0.95	0.95	0.95	0.94
21.750	0.94	0.94	0.94	0.93	0.93
22.000	0.93	0.93	0.93	0.92	0.92
22.250	0.92	0.92	0.91	0.91	0.91
22.500	0.91	0.91	0.90	0.90	0.90
22.750	0.90	0.90	0.89	0.89	0.89
23.000	0.89	0.88	0.88	0.88	0.88
23.250	0.88	0.87	0.87	0.87	0.87
23.500	0.87	0.86	0.86	0.86	0.86
23.750	0.86	0.85	0.85	0.85	0.85
24.000	0.85	0.84	0.84	0.84	0.84
24.250	0.84	0.83	0.83	0.83	0.83
24.500	0.83	0.82	0.82	0.82	0.82
24.750	0.82	0.81	0.81	0.81	0.81
25.000	0.81	0.80	0.80	0.80	0.80
25.250	0.80	0.79	0.79	0.79	0.79
25.500	0.79	0.78	0.78	0.78	0.78
25.750	0.78	0.77	0.77	0.77	0.77
26.000	0.77	0.77	0.76	0.76	0.76
26.250	0.76	0.76	0.75	0.75	0.75
26.500	0.75	0.75	0.74	0.74	0.74
26.750	0.74	0.74	0.74	0.73	0.73
27.000	0.73	0.73	0.73	0.72	0.72
27.250	0.72	0.72	0.72	0.71	0.71
27.500	0.71	0.71	0.71	0.70	0.70
27.750	0.70	0.70	0.70	0.70	0.69
28.000	0.69	0.69	0.69	0.69	0.68
28.250	0.68	0.68	0.68	0.68	0.67
28.500	0.67	0.67	0.67	0.67	0.67
28.750	0.66	0.66	0.66	0.66	0.66
29.000	0.65	0.65	0.65	0.65	0.65
29.250	0.65	0.64	0.64	0.64	0.64
29.500	0.64	0.64	0.63	0.63	0.63
29.750	0.63	0.63	0.62	0.62	0.62
30.000	0.62	0.62	0.62	0.61	0.61
30.250	0.61	0.61	0.61	0.61	0.60
30.500	0.60	0.60	0.60	0.60	0.60

Subsection: Time vs. Volume

Return Event: 50 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.750	0.59	0.59	0.59	0.59	0.59
31.000	0.59	0.58	0.58	0.58	0.58
31.250	0.58	0.58	0.57	0.57	0.57
31.500	0.57	0.57	0.57	0.56	0.56
31.750	0.56	0.56	0.56	0.56	0.56
32.000	0.55	0.55	0.55	0.55	0.55
32.250	0.55	0.54	0.54	0.54	0.54
32.500	0.54	0.54	0.54	0.53	0.53
32.750	0.53	0.53	0.53	0.53	0.52
33.000	0.52	0.52	0.52	0.52	0.52
33.250	0.52	0.51	0.51	0.51	0.51
33.500	0.51	0.51	0.51	0.50	0.50
33.750	0.50	0.50	0.50	0.50	0.49
34.000	0.49	0.49	0.49	0.49	0.49
34.250	0.49	0.48	0.48	0.48	0.48
34.500	0.48	0.48	0.48	0.47	0.47
34.750	0.47	0.47	0.47	0.47	0.47
35.000	0.46	0.46	0.46	0.46	0.46
35.250	0.46	0.46	0.45	0.45	0.45
35.500	0.45	0.45	0.45	0.45	0.44
35.750	0.44	0.44	0.44	0.44	0.44
36.000	0.44	0.43	0.43	0.43	0.43
36.250	0.43	0.43	0.43	0.42	0.42
36.500	0.42	0.42	0.42	0.42	0.42
36.750	0.42	0.41	0.41	0.41	0.41
37.000	0.41	0.41	0.41	0.40	0.40
37.250	0.40	0.40	0.40	0.40	0.40
37.500	0.40	0.39	0.39	0.39	0.39
37.750	0.39	0.39	0.39	0.39	0.38
38.000	0.38	0.38	0.38	0.38	0.38
38.250	0.38	0.38	0.37	0.37	0.37
38.500	0.37	0.37	0.37	0.37	0.37
38.750	0.36	0.36	0.36	0.36	0.36
39.000	0.36	0.36	0.36	0.35	0.35
39.250	0.35	0.35	0.35	0.35	0.35
39.500	0.35	0.35	0.34	0.34	0.34
39.750	0.34	0.34	0.34	0.34	0.34
40.000	0.33	0.33	0.33	0.33	0.33
40.250	0.33	0.33	0.33	0.33	0.32
40.500	0.32	0.32	0.32	0.32	0.32
40.750	0.32	0.32	0.32	0.32	0.31

Subsection: Time vs. Volume

Return Event: 50 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
41.000	0.31	0.31	0.31	0.31	0.31
41.250	0.31	0.31	0.31	0.30	0.30
41.500	0.30	0.30	0.30	0.30	0.30
41.750	0.30	0.30	0.30	0.29	0.29
42.000	0.29	0.29	0.29	0.29	0.29
42.250	0.29	0.29	0.29	0.28	0.28
42.500	0.28	0.28	0.28	0.28	0.28
42.750	0.28	0.28	0.28	0.27	0.27
43.000	0.27	0.27	0.27	0.27	0.27
43.250	0.27	0.27	0.27	0.26	0.26
43.500	0.26	0.26	0.26	0.26	0.26
43.750	0.26	0.26	0.26	0.26	0.25
44.000	0.25	0.25	0.25	0.25	0.25
44.250	0.25	0.25	0.25	0.25	0.25
44.500	0.24	0.24	0.24	0.24	0.24
44.750	0.24	0.24	0.24	0.24	0.24
45.000	0.24	0.23	0.23	0.23	0.23
45.250	0.23	0.23	0.23	0.23	0.23
45.500	0.23	0.23	0.23	0.22	0.22
45.750	0.22	0.22	0.22	0.22	0.22
46.000	0.22	0.22	0.22	0.22	0.22
46.250	0.21	0.21	0.21	0.21	0.21
46.500	0.21	0.21	0.21	0.21	0.21
46.750	0.21	0.21	0.20	0.20	0.20
47.000	0.20	0.20	0.20	0.20	0.20
47.250	0.20	0.20	0.20	0.20	0.20
47.500	0.19	0.19	0.19	0.19	0.19
47.750	0.19	0.19	0.19	0.19	0.19
48.000	0.19	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Volume

Return Event: 100 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.00	0.01	0.02	0.06	0.10
0.250	0.16	0.22	0.30	0.40	0.50
0.500	0.62	0.75	0.89	1.05	1.21
0.750	1.39	1.59	1.79	2.00	2.21
1.000	2.37	2.49	2.57	2.62	2.64
1.250	2.65	2.64	2.62	2.60	2.58
1.500	2.55	2.53	2.50	2.47	2.44
1.750	2.41	2.39	2.36	2.33	2.30
2.000	2.27	2.24	2.21	2.17	2.13
2.250	2.11	2.09	2.07	2.05	2.04
2.500	2.02	2.01	2.00	1.99	1.98
2.750	1.97	1.96	1.96	1.95	1.94
3.000	1.94	1.93	1.93	1.93	1.92
3.250	1.92	1.91	1.91	1.91	1.90
3.500	1.90	1.90	1.90	1.89	1.89
3.750	1.89	1.88	1.88	1.88	1.87
4.000	1.87	1.87	1.86	1.86	1.86
4.250	1.85	1.85	1.85	1.85	1.84
4.500	1.84	1.84	1.83	1.83	1.83
4.750	1.82	1.82	1.82	1.81	1.81
5.000	1.81	1.81	1.80	1.80	1.80
5.250	1.79	1.79	1.79	1.78	1.78
5.500	1.78	1.78	1.77	1.77	1.77
5.750	1.76	1.76	1.76	1.75	1.75
6.000	1.75	1.75	1.74	1.74	1.74
6.250	1.73	1.73	1.73	1.73	1.72
6.500	1.72	1.72	1.71	1.71	1.71
6.750	1.71	1.70	1.70	1.70	1.69
7.000	1.69	1.69	1.69	1.68	1.68
7.250	1.68	1.67	1.67	1.67	1.67
7.500	1.66	1.66	1.66	1.65	1.65
7.750	1.65	1.65	1.64	1.64	1.64
8.000	1.63	1.63	1.63	1.63	1.62
8.250	1.62	1.62	1.61	1.61	1.61
8.500	1.61	1.60	1.60	1.60	1.59
8.750	1.59	1.59	1.59	1.58	1.58
9.000	1.58	1.57	1.57	1.57	1.57
9.250	1.56	1.56	1.56	1.55	1.55
9.500	1.55	1.55	1.54	1.54	1.54
9.750	1.53	1.53	1.53	1.53	1.52
10.000	1.52	1.52	1.51	1.51	1.51

Subsection: Time vs. Volume

Return Event: 100 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
10.250	1.51	1.50	1.50	1.50	1.50
10.500	1.49	1.49	1.49	1.48	1.48
10.750	1.48	1.48	1.47	1.47	1.47
11.000	1.47	1.46	1.46	1.46	1.45
11.250	1.45	1.45	1.45	1.44	1.44
11.500	1.44	1.44	1.43	1.43	1.43
11.750	1.42	1.42	1.42	1.42	1.41
12.000	1.41	1.41	1.41	1.40	1.40
12.250	1.40	1.40	1.39	1.39	1.39
12.500	1.39	1.38	1.38	1.38	1.37
12.750	1.37	1.37	1.37	1.36	1.36
13.000	1.36	1.36	1.35	1.35	1.35
13.250	1.35	1.34	1.34	1.34	1.34
13.500	1.33	1.33	1.33	1.33	1.32
13.750	1.32	1.32	1.32	1.31	1.31
14.000	1.31	1.31	1.30	1.30	1.30
14.250	1.30	1.29	1.29	1.29	1.29
14.500	1.28	1.28	1.28	1.28	1.27
14.750	1.27	1.27	1.27	1.26	1.26
15.000	1.26	1.25	1.25	1.25	1.25
15.250	1.24	1.24	1.24	1.24	1.23
15.500	1.23	1.23	1.23	1.22	1.22
15.750	1.22	1.22	1.21	1.21	1.21
16.000	1.21	1.20	1.20	1.20	1.20
16.250	1.19	1.19	1.19	1.19	1.18
16.500	1.18	1.18	1.18	1.17	1.17
16.750	1.17	1.17	1.17	1.16	1.16
17.000	1.16	1.16	1.15	1.15	1.15
17.250	1.15	1.14	1.14	1.14	1.14
17.500	1.13	1.13	1.13	1.13	1.12
17.750	1.12	1.12	1.12	1.12	1.11
18.000	1.11	1.11	1.11	1.10	1.10
18.250	1.10	1.10	1.09	1.09	1.09
18.500	1.09	1.08	1.08	1.08	1.08
18.750	1.08	1.07	1.07	1.07	1.07
19.000	1.06	1.06	1.06	1.06	1.06
19.250	1.05	1.05	1.05	1.05	1.04
19.500	1.04	1.04	1.04	1.04	1.03
19.750	1.03	1.03	1.03	1.02	1.02
20.000	1.02	1.02	1.02	1.01	1.01
20.250	1.01	1.01	1.00	1.00	1.00

Subsection: Time vs. Volume

Return Event: 100 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
20.500	1.00	1.00	0.99	0.99	0.99
20.750	0.99	0.98	0.98	0.98	0.98
21.000	0.97	0.97	0.97	0.97	0.97
21.250	0.96	0.96	0.96	0.96	0.95
21.500	0.95	0.95	0.95	0.95	0.94
21.750	0.94	0.94	0.94	0.93	0.93
22.000	0.93	0.93	0.93	0.92	0.92
22.250	0.92	0.92	0.92	0.91	0.91
22.500	0.91	0.91	0.90	0.90	0.90
22.750	0.90	0.90	0.89	0.89	0.89
23.000	0.89	0.89	0.88	0.88	0.88
23.250	0.88	0.87	0.87	0.87	0.87
23.500	0.87	0.86	0.86	0.86	0.86
23.750	0.86	0.85	0.85	0.85	0.85
24.000	0.85	0.84	0.84	0.84	0.84
24.250	0.84	0.83	0.83	0.83	0.83
24.500	0.83	0.82	0.82	0.82	0.82
24.750	0.82	0.81	0.81	0.81	0.81
25.000	0.81	0.80	0.80	0.80	0.80
25.250	0.80	0.79	0.79	0.79	0.79
25.500	0.79	0.78	0.78	0.78	0.78
25.750	0.78	0.77	0.77	0.77	0.77
26.000	0.77	0.77	0.76	0.76	0.76
26.250	0.76	0.76	0.75	0.75	0.75
26.500	0.75	0.75	0.74	0.74	0.74
26.750	0.74	0.74	0.74	0.73	0.73
27.000	0.73	0.73	0.73	0.72	0.72
27.250	0.72	0.72	0.72	0.71	0.71
27.500	0.71	0.71	0.71	0.71	0.70
27.750	0.70	0.70	0.70	0.70	0.69
28.000	0.69	0.69	0.69	0.69	0.68
28.250	0.68	0.68	0.68	0.68	0.68
28.500	0.67	0.67	0.67	0.67	0.67
28.750	0.66	0.66	0.66	0.66	0.66
29.000	0.66	0.65	0.65	0.65	0.65
29.250	0.65	0.64	0.64	0.64	0.64
29.500	0.64	0.64	0.63	0.63	0.63
29.750	0.63	0.63	0.63	0.62	0.62
30.000	0.62	0.62	0.62	0.61	0.61
30.250	0.61	0.61	0.61	0.61	0.60
30.500	0.60	0.60	0.60	0.60	0.60

Subsection: Time vs. Volume

Return Event: 100 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
30.750	0.59	0.59	0.59	0.59	0.59
31.000	0.59	0.58	0.58	0.58	0.58
31.250	0.58	0.58	0.58	0.57	0.57
31.500	0.57	0.57	0.57	0.57	0.56
31.750	0.56	0.56	0.56	0.56	0.56
32.000	0.55	0.55	0.55	0.55	0.55
32.250	0.55	0.54	0.54	0.54	0.54
32.500	0.54	0.54	0.54	0.53	0.53
32.750	0.53	0.53	0.53	0.53	0.52
33.000	0.52	0.52	0.52	0.52	0.52
33.250	0.52	0.51	0.51	0.51	0.51
33.500	0.51	0.51	0.51	0.50	0.50
33.750	0.50	0.50	0.50	0.50	0.50
34.000	0.49	0.49	0.49	0.49	0.49
34.250	0.49	0.48	0.48	0.48	0.48
34.500	0.48	0.48	0.48	0.48	0.47
34.750	0.47	0.47	0.47	0.47	0.47
35.000	0.46	0.46	0.46	0.46	0.46
35.250	0.46	0.46	0.45	0.45	0.45
35.500	0.45	0.45	0.45	0.45	0.44
35.750	0.44	0.44	0.44	0.44	0.44
36.000	0.44	0.43	0.43	0.43	0.43
36.250	0.43	0.43	0.43	0.42	0.42
36.500	0.42	0.42	0.42	0.42	0.42
36.750	0.42	0.41	0.41	0.41	0.41
37.000	0.41	0.41	0.41	0.40	0.40
37.250	0.40	0.40	0.40	0.40	0.40
37.500	0.40	0.39	0.39	0.39	0.39
37.750	0.39	0.39	0.39	0.39	0.38
38.000	0.38	0.38	0.38	0.38	0.38
38.250	0.38	0.38	0.37	0.37	0.37
38.500	0.37	0.37	0.37	0.37	0.37
38.750	0.36	0.36	0.36	0.36	0.36
39.000	0.36	0.36	0.36	0.35	0.35
39.250	0.35	0.35	0.35	0.35	0.35
39.500	0.35	0.35	0.34	0.34	0.34
39.750	0.34	0.34	0.34	0.34	0.34
40.000	0.34	0.33	0.33	0.33	0.33
40.250	0.33	0.33	0.33	0.33	0.33
40.500	0.32	0.32	0.32	0.32	0.32
40.750	0.32	0.32	0.32	0.32	0.31

Subsection: Time vs. Volume

Return Event: 100 years

Label: PO-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Time vs. Volume (ac-ft)

Output Time increment = 0.050 hours

Time on left represents time for first value in each row.

Time (hours)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
41.000	0.31	0.31	0.31	0.31	0.31
41.250	0.31	0.31	0.31	0.30	0.30
41.500	0.30	0.30	0.30	0.30	0.30
41.750	0.30	0.30	0.30	0.29	0.29
42.000	0.29	0.29	0.29	0.29	0.29
42.250	0.29	0.29	0.29	0.28	0.28
42.500	0.28	0.28	0.28	0.28	0.28
42.750	0.28	0.28	0.28	0.27	0.27
43.000	0.27	0.27	0.27	0.27	0.27
43.250	0.27	0.27	0.27	0.26	0.26
43.500	0.26	0.26	0.26	0.26	0.26
43.750	0.26	0.26	0.26	0.26	0.25
44.000	0.25	0.25	0.25	0.25	0.25
44.250	0.25	0.25	0.25	0.25	0.25
44.500	0.24	0.24	0.24	0.24	0.24
44.750	0.24	0.24	0.24	0.24	0.24
45.000	0.24	0.24	0.23	0.23	0.23
45.250	0.23	0.23	0.23	0.23	0.23
45.500	0.23	0.23	0.23	0.22	0.22
45.750	0.22	0.22	0.22	0.22	0.22
46.000	0.22	0.22	0.22	0.22	0.22
46.250	0.21	0.21	0.21	0.21	0.21
46.500	0.21	0.21	0.21	0.21	0.21
46.750	0.21	0.21	0.20	0.20	0.20
47.000	0.20	0.20	0.20	0.20	0.20
47.250	0.20	0.20	0.20	0.20	0.20
47.500	0.20	0.19	0.19	0.19	0.19
47.750	0.19	0.19	0.19	0.19	0.19
48.000	0.19	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Outlet Input Data

Return Event: 10 years

Label: Composite Outlet Structure - Perforated Riser

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	918.25 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	923.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Riser Orifice - 1	Forward	Orifice - 1	918.25	923.00
Orifice-Circular	Riser Orifice - 2	Forward	Orifice - 1	918.50	923.00
Orifice-Circular	Riser Orifice - 3	Forward	Orifice - 1	918.75	923.00
Orifice-Circular	Riser Orifice - 4	Forward	Orifice - 1	919.25	923.00
Orifice-Circular	Riser Orifice - 5	Forward	Orifice - 1	919.75	923.00
Orifice-Circular	Riser Orifice - 6	Forward	Orifice - 1	920.25	923.00
Orifice-Circular	Riser Orifice - 7	Forward	Orifice - 1	920.75	923.00
Orifice-Circular	Riser Orifice - 8	Forward	Orifice - 1	921.25	923.00
Orifice-Circular	Riser Orifice - 9	Forward	Orifice - 1	921.75	923.00
Inlet Box	Riser - 1	Forward	TW	921.70	923.00
Orifice-Circular	Orifice - 1	Forward	TW	918.25	923.00
Rectangular Weir	Overflow Weir - 1	Forward	TW	922.00	923.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
<hr/>	
Number of Openings	1
Elevation	921.70 ft
Orifice Area	5.24 ft ²
Orifice Coefficient	0.600
Weir Length	9.17 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	1
Elevation	918.25 ft
Orifice Diameter	4.167 in
Orifice Coefficient	0.600

Structure ID: Overflow Weir - 1	
Structure Type: Rectangular Weir	
<hr/>	
Number of Openings	1
Elevation	922.00 ft
Weir Length	15.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

Structure ID: Riser Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	8
Elevation	918.25 ft
Orifice Diameter	1.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 2	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	6
Elevation	918.50 ft
Orifice Diameter	1.000 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 3	
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Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

Structure Type: Orifice-Circular

Number of Openings	6
Elevation	918.75 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 4
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.25 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 5
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 6
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 7
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 8
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall
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Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Outlet Input Data

Return Event: 25 years

Label: Composite Outlet Structure - Perforated Riser

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	918.25 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	923.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Riser Orifice - 1	Forward	Orifice - 1	918.25	923.00
Orifice-Circular	Riser Orifice - 2	Forward	Orifice - 1	918.50	923.00
Orifice-Circular	Riser Orifice - 3	Forward	Orifice - 1	918.75	923.00
Orifice-Circular	Riser Orifice - 4	Forward	Orifice - 1	919.25	923.00
Orifice-Circular	Riser Orifice - 5	Forward	Orifice - 1	919.75	923.00
Orifice-Circular	Riser Orifice - 6	Forward	Orifice - 1	920.25	923.00
Orifice-Circular	Riser Orifice - 7	Forward	Orifice - 1	920.75	923.00
Orifice-Circular	Riser Orifice - 8	Forward	Orifice - 1	921.25	923.00
Orifice-Circular	Riser Orifice - 9	Forward	Orifice - 1	921.75	923.00
Inlet Box	Riser - 1	Forward	TW	921.70	923.00
Orifice-Circular	Orifice - 1	Forward	TW	918.25	923.00
Rectangular Weir	Overflow Weir - 1	Forward	TW	922.00	923.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 25 year

Return Event: 25 years
Storm Event: IDF Curve Equation - 1 - 25
Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
<hr/>	
Number of Openings	1
Elevation	921.70 ft
Orifice Area	5.24 ft ²
Orifice Coefficient	0.600
Weir Length	9.17 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	1
Elevation	918.25 ft
Orifice Diameter	4.167 in
Orifice Coefficient	0.600

Structure ID: Overflow Weir - 1	
Structure Type: Rectangular Weir	
<hr/>	
Number of Openings	1
Elevation	922.00 ft
Weir Length	15.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

Structure ID: Riser Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	8
Elevation	918.25 ft
Orifice Diameter	1.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 2	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	6
Elevation	918.50 ft
Orifice Diameter	1.000 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 3	
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Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 25 year

Return Event: 25 years
Storm Event: IDF Curve Equation - 1 - 25
Year

Structure Type: Orifice-Circular

Number of Openings	6
Elevation	918.75 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 4
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.25 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 5
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 6
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 7
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 8
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 25 year

Return Event: 25 years
Storm Event: IDF Curve Equation - 1 - 25
Year

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall
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Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 50 year

Return Event: 50 years
 Storm Event: IDF Curve Equation - 1 - 50
 Year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	918.25 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	923.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Riser Orifice - 1	Forward	Orifice - 1	918.25	923.00
Orifice-Circular	Riser Orifice - 2	Forward	Orifice - 1	918.50	923.00
Orifice-Circular	Riser Orifice - 3	Forward	Orifice - 1	918.75	923.00
Orifice-Circular	Riser Orifice - 4	Forward	Orifice - 1	919.25	923.00
Orifice-Circular	Riser Orifice - 5	Forward	Orifice - 1	919.75	923.00
Orifice-Circular	Riser Orifice - 6	Forward	Orifice - 1	920.25	923.00
Orifice-Circular	Riser Orifice - 7	Forward	Orifice - 1	920.75	923.00
Orifice-Circular	Riser Orifice - 8	Forward	Orifice - 1	921.25	923.00
Orifice-Circular	Riser Orifice - 9	Forward	Orifice - 1	921.75	923.00
Inlet Box	Riser - 1	Forward	TW	921.70	923.00
Orifice-Circular	Orifice - 1	Forward	TW	918.25	923.00
Rectangular Weir	Overflow Weir - 1	Forward	TW	922.00	923.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 50 year

Return Event: 50 years
Storm Event: IDF Curve Equation - 1 - 50
Year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
<hr/>	
Number of Openings	1
Elevation	921.70 ft
Orifice Area	5.24 ft ²
Orifice Coefficient	0.600
Weir Length	9.17 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	1
Elevation	918.25 ft
Orifice Diameter	4.167 in
Orifice Coefficient	0.600

Structure ID: Overflow Weir - 1	
Structure Type: Rectangular Weir	
<hr/>	
Number of Openings	1
Elevation	922.00 ft
Weir Length	15.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

Structure ID: Riser Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	8
Elevation	918.25 ft
Orifice Diameter	1.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 2	
Structure Type: Orifice-Circular	
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Number of Openings	6
Elevation	918.50 ft
Orifice Diameter	1.000 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 3	
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Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 50 year

Return Event: 50 years

Storm Event: IDF Curve Equation - 1 - 50
Year

Structure Type: Orifice-Circular

Number of Openings	6
Elevation	918.75 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 4
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.25 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 5
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 6
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 7
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 8
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 50 year

Return Event: 50 years
Storm Event: IDF Curve Equation - 1 - 50
Year

Structure ID: Riser Orifice - 9	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	4
Elevation	921.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600
<hr/>	
Structure ID: TW	
Structure Type: TW Setup, DS Channel	
<hr/>	
Tailwater Type	Free Outfall
<hr/>	
Convergence Tolerances	
<hr/>	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s
<hr/>	

Subsection: Outlet Input Data

Return Event: 100 years

Label: Composite Outlet Structure - Perforated Riser

Storm Event: IDF Curve Equation - 1 - 100 Year

Scenario: 100 year

Requested Pond Water Surface Elevations	
Minimum (Headwater)	918.25 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	923.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Riser Orifice - 1	Forward	Orifice - 1	918.25	923.00
Orifice-Circular	Riser Orifice - 2	Forward	Orifice - 1	918.50	923.00
Orifice-Circular	Riser Orifice - 3	Forward	Orifice - 1	918.75	923.00
Orifice-Circular	Riser Orifice - 4	Forward	Orifice - 1	919.25	923.00
Orifice-Circular	Riser Orifice - 5	Forward	Orifice - 1	919.75	923.00
Orifice-Circular	Riser Orifice - 6	Forward	Orifice - 1	920.25	923.00
Orifice-Circular	Riser Orifice - 7	Forward	Orifice - 1	920.75	923.00
Orifice-Circular	Riser Orifice - 8	Forward	Orifice - 1	921.25	923.00
Orifice-Circular	Riser Orifice - 9	Forward	Orifice - 1	921.75	923.00
Inlet Box	Riser - 1	Forward	TW	921.70	923.00
Orifice-Circular	Orifice - 1	Forward	TW	918.25	923.00
Rectangular Weir	Overflow Weir - 1	Forward	TW	922.00	923.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Subsection: Outlet Input Data

Return Event: 100 years

Label: Composite Outlet Structure - Perforated Riser

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Structure ID: Riser - 1	
Structure Type: Inlet Box	
<hr/>	
Number of Openings	1
Elevation	921.70 ft
Orifice Area	5.24 ft ²
Orifice Coefficient	0.600
Weir Length	9.17 ft
Weir Coefficient	3.00 (ft ^{0.5})/s
K Reverse	1.000
Manning's n	0.000
Key, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	1
Elevation	918.25 ft
Orifice Diameter	4.167 in
Orifice Coefficient	0.600

Structure ID: Overflow Weir - 1	
Structure Type: Rectangular Weir	
<hr/>	
Number of Openings	1
Elevation	922.00 ft
Weir Length	15.00 ft
Weir Coefficient	3.00 (ft ^{0.5})/s

Structure ID: Riser Orifice - 1	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	8
Elevation	918.25 ft
Orifice Diameter	1.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 2	
Structure Type: Orifice-Circular	
<hr/>	
Number of Openings	6
Elevation	918.50 ft
Orifice Diameter	1.000 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 3	
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Subsection: Outlet Input Data

Label: Composite Outlet Structure - Perforated Riser

Scenario: 100 year

Return Event: 100 years

Storm Event: IDF Curve Equation - 1 - 100
Year

Structure Type: Orifice-Circular

Number of Openings	6
Elevation	918.75 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 4
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.25 ft
Orifice Diameter	0.750 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 5
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	919.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 6
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 7
Structure Type: Orifice-Circular

Number of Openings	6
Elevation	920.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 8
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.25 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Subsection: Outlet Input Data

Return Event: 100 years

Label: Composite Outlet Structure - Perforated Riser

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Structure ID: Riser Orifice - 9
Structure Type: Orifice-Circular

Number of Openings	4
Elevation	921.75 ft
Orifice Diameter	0.500 in
Orifice Coefficient	0.600

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall
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Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft ³ /s
Flow Tolerance (Maximum)	10.000 ft ³ /s

Subsection: Elevation-Volume-Flow Table (Pond)

Label: PO-1

Scenario: 10 year

Return Event: 10 years
 Storm Event: IDF Curve Equation - 1 - 10
 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
918.25	0.00	0.00	0.437	0.00	0.00	0.00
918.50	0.08	0.11	0.453	0.00	0.08	53.91
918.75	0.21	0.23	0.469	0.00	0.21	109.78
919.25	0.35	0.47	0.501	0.00	0.35	227.29
919.75	0.46	0.73	0.535	0.00	0.46	352.75
920.25	0.54	1.00	0.569	0.00	0.54	486.40
920.75	0.62	1.30	0.603	0.00	0.62	628.29
921.25	0.69	1.61	0.638	0.00	0.69	778.63
921.70	0.74	1.90	0.670	0.00	0.74	921.18
921.75	1.06	1.94	0.674	0.00	1.06	937.76
922.00	5.30	2.11	0.692	0.00	5.30	1,024.64
922.25	17.65	2.28	0.710	0.00	17.65	1,121.80
922.75	55.93	2.65	0.746	0.00	55.93	1,336.28
923.00	74.64	2.83	0.765	0.00	74.64	1,446.43

Subsection: Elevation-Volume-Flow Table (Pond)

Label: PO-1

Scenario: 25 year

Return Event: 25 years
 Storm Event: IDF Curve Equation - 1 - 25
 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
918.25	0.00	0.00	0.437	0.00	0.00	0.00
918.50	0.08	0.11	0.453	0.00	0.08	53.91
918.75	0.21	0.23	0.469	0.00	0.21	109.78
919.25	0.35	0.47	0.501	0.00	0.35	227.29
919.75	0.46	0.73	0.535	0.00	0.46	352.75
920.25	0.54	1.00	0.569	0.00	0.54	486.40
920.75	0.62	1.30	0.603	0.00	0.62	628.29
921.25	0.69	1.61	0.638	0.00	0.69	778.63
921.70	0.74	1.90	0.670	0.00	0.74	921.18
921.75	1.06	1.94	0.674	0.00	1.06	937.76
922.00	5.30	2.11	0.692	0.00	5.30	1,024.64
922.25	17.65	2.28	0.710	0.00	17.65	1,121.80
922.75	55.93	2.65	0.746	0.00	55.93	1,336.28
923.00	74.64	2.83	0.765	0.00	74.64	1,446.43

Subsection: Elevation-Volume-Flow Table (Pond)

Label: PO-1

Scenario: 50 year

Return Event: 50 years
 Storm Event: IDF Curve Equation - 1 - 50
 Year

Infiltration	
Infiltration Method (Computed)	No Infiltration
Initial Conditions	
Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
918.25	0.00	0.00	0.437	0.00	0.00	0.00
918.50	0.08	0.11	0.453	0.00	0.08	53.91
918.75	0.21	0.23	0.469	0.00	0.21	109.78
919.25	0.35	0.47	0.501	0.00	0.35	227.29
919.75	0.46	0.73	0.535	0.00	0.46	352.75
920.25	0.54	1.00	0.569	0.00	0.54	486.40
920.75	0.62	1.30	0.603	0.00	0.62	628.29
921.25	0.69	1.61	0.638	0.00	0.69	778.63
921.70	0.74	1.90	0.670	0.00	0.74	921.18
921.75	1.06	1.94	0.674	0.00	1.06	937.76
922.00	5.30	2.11	0.692	0.00	5.30	1,024.64
922.25	17.65	2.28	0.710	0.00	17.65	1,121.80
922.75	55.93	2.65	0.746	0.00	55.93	1,336.28
923.00	74.64	2.83	0.765	0.00	74.64	1,446.43

Subsection: Elevation-Volume-Flow Table (Pond)

Return Event: 100 years
 Storm Event: IDF Curve Equation - 1 - 100
 Year

Label: PO-1

Scenario: 100 year

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft ³ /s)	Storage (ac-ft)	Area (acres)	Infiltration (ft ³ /s)	Flow (Total) (ft ³ /s)	2S/t + O (ft ³ /s)
918.25	0.00	0.00	0.437	0.00	0.00	0.00
918.50	0.08	0.11	0.453	0.00	0.08	53.91
918.75	0.21	0.23	0.469	0.00	0.21	109.78
919.25	0.35	0.47	0.501	0.00	0.35	227.29
919.75	0.46	0.73	0.535	0.00	0.46	352.75
920.25	0.54	1.00	0.569	0.00	0.54	486.40
920.75	0.62	1.30	0.603	0.00	0.62	628.29
921.25	0.69	1.61	0.638	0.00	0.69	778.63
921.70	0.74	1.90	0.670	0.00	0.74	921.18
921.75	1.06	1.94	0.674	0.00	1.06	937.76
922.00	5.30	2.11	0.692	0.00	5.30	1,024.64
922.25	17.65	2.28	0.710	0.00	17.65	1,121.80
922.75	55.93	2.65	0.746	0.00	55.93	1,336.28
923.00	74.64	2.83	0.765	0.00	74.64	1,446.43

Subsection: Level Pool Pond Routing Summary

Return Event: 10 years
 Storm Event: IDF Curve Equation - 1 - 10
 Year

Label: PO-1 (IN)

Scenario: 10 year

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	45.48 ft ³ /s	Time to Peak (Flow, In)	1.100 hours
Flow (Peak Outlet)	33.68 ft ³ /s	Time to Peak (Flow, Outlet)	1.400 hours

Elevation (Water Surface, Peak)	922.46 ft
Volume (Peak)	2.43 ac-ft

Mass Balance (ac-ft)

Volume (Initial)	0.00 ac-ft
Volume (Total Inflow)	4.13 ac-ft
Volume (Total Infiltration)	0.00 ac-ft
Volume (Total Outlet Outflow)	3.95 ac-ft
Volume (Retained)	0.19 ac-ft
Volume (Unrouted)	0.00 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary

Label: PO-1 (IN)

Scenario: 25 year

Return Event: 25 years
 Storm Event: IDF Curve Equation - 1 - 25
 Year

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	53.43 ft ³ /s	Time to Peak (Flow, In)	1.100 hours
Flow (Peak Outlet)	43.49 ft ³ /s	Time to Peak (Flow, Outlet)	1.300 hours

Elevation (Water Surface, Peak)	922.59 ft
Volume (Peak)	2.53 ac-ft

Mass Balance (ac-ft)

Volume (Initial)	0.00 ac-ft
Volume (Total Inflow)	4.86 ac-ft
Volume (Total Infiltration)	0.00 ac-ft
Volume (Total Outlet Outflow)	4.67 ac-ft
Volume (Retained)	0.19 ac-ft
Volume (Unrouted)	0.00 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary

Return Event: 50 years
 Storm Event: IDF Curve Equation - 1 - 50
 Year

Label: PO-1 (IN)

Scenario: 50 year

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	59.20 ft ³ /s	Time to Peak (Flow, In)	1.100 hours
Flow (Peak Outlet)	50.25 ft ³ /s	Time to Peak (Flow, Outlet)	1.250 hours

Elevation (Water Surface, Peak)	922.68 ft
Volume (Peak)	2.59 ac-ft

Mass Balance (ac-ft)

Volume (Initial)	0.00 ac-ft
Volume (Total Inflow)	5.38 ac-ft
Volume (Total Infiltration)	0.00 ac-ft
Volume (Total Outlet Outflow)	5.19 ac-ft
Volume (Retained)	0.19 ac-ft
Volume (Unrouted)	0.00 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary

Return Event: 100 years
 Storm Event: IDF Curve Equation - 1 - 100
 Year

Label: PO-1 (IN)

Scenario: 100 year

Infiltration

Infiltration Method (Computed)	No Infiltration
-----------------------------------	-----------------

Initial Conditions

Elevation (Water Surface, Initial)	918.25 ft
Volume (Initial)	0.00 ac-ft
Flow (Initial Outlet)	0.00 ft ³ /s
Flow (Initial Infiltration)	0.00 ft ³ /s
Flow (Initial, Total)	0.00 ft ³ /s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary

Flow (Peak In)	64.46 ft ³ /s	Time to Peak (Flow, In)	1.100 hours
Flow (Peak Outlet)	56.18 ft ³ /s	Time to Peak (Flow, Outlet)	1.250 hours

Elevation (Water Surface, Peak)	922.75 ft
Volume (Peak)	2.65 ac-ft

Mass Balance (ac-ft)

Volume (Initial)	0.00 ac-ft
Volume (Total Inflow)	5.86 ac-ft
Volume (Total Infiltration)	0.00 ac-ft
Volume (Total Outlet Outflow)	5.67 ac-ft
Volume (Retained)	0.19 ac-ft
Volume (Unrouted)	0.00 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	CM-1	4.13	1.100	45.48
Flow (In)	PO-1	4.13	1.100	45.48

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Scenario: 25 year

Return Event: 25 years
Storm Event: IDF Curve Equation - 1 - 25
Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	CM-1	4.86	1.100	53.43
Flow (In)	PO-1	4.86	1.100	53.43

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Scenario: 50 year

Return Event: 50 years
Storm Event: IDF Curve Equation - 1 - 50
Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	CM-1	5.38	1.100	59.20
Flow (In)	PO-1	5.38	1.100	59.20

Subsection: Pond Inflow Summary

Label: PO-1 (IN)

Scenario: 100 year

Return Event: 100 years
Storm Event: IDF Curve Equation - 1 - 100
Year

Summary for Hydrograph Addition at 'PO-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	CM-1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (hours)	Flow (Peak) (ft ³ /s)
Flow (From)	CM-1	5.86	1.100	64.46
Flow (In)	PO-1	5.86	1.100	64.46

Subsection: C and Area (Pre-Development)

Label: CM-1

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

C and Area Results (Pre-Development)

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Existing Highway	0.500	36.100	(N/A)
Weighted C & Total Area --->	0.500	36.100	18.050

Subsection: C and Area (Post-Development)

Label: CM-1

Scenario: 10 year

Return Event: 10 years
Storm Event: IDF Curve Equation - 1 - 10
Year

C and Area Results

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Impervious	0.900	12.130	(N/A)
Ditches and Side Slopes	0.600	23.970	(N/A)
Weighted C & Total Area --->	0.701	36.100	25.299

Subsection: Rational Pre-Development Peak Flow

Return Event: 10 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

Summary of Rational Method Peak Discharges
--- Pre-Development Conditions ---

Q = CiA * Unit Conversion; Where Conversion = 43560 / (12 * 3600)

Frequency (years)	C Coefficient	C Adjustment Factor	C Coefficient (Final)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)
10	0.500	1.000	0.500	2.251	36.100	40.98

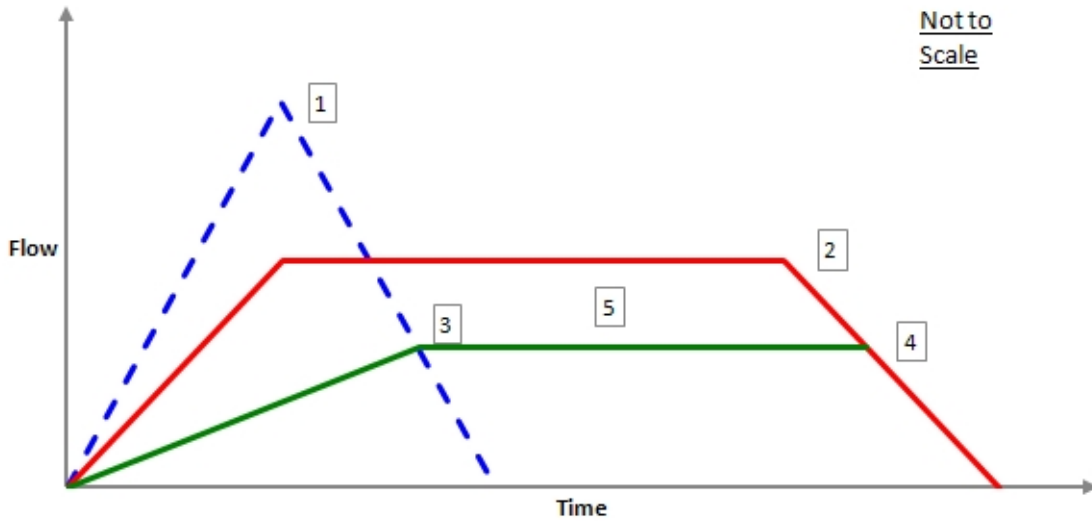
Subsection: Modified Rational Graph

Label: CM-1

Scenario: 10 year

Return Event: 10 years
 Storm Event: IDF Curve Equation - 1 - 10
 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	1.080 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	1.080	hours	Time of Duration (Modified Rational, Critical)	1.080	hours
Intensity (Modified Rational, Peak)	1.817	in/h	Intensity (Modified Rational, Critical)	1.817	in/h
Flow (Modified Rational, Peak)	46.34	ft ³ /s	Flow (Modified Rational, Critical)	46.34	ft ³ /s

[3]	
First Outflow Breakpoint (Modified Rational, Method T)	0.000 hours
Flow (Modified Rational, Allowable)	40.98 ft ³ /s

[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	1.205	hours	Storage (Modified Rational, Estimated)	0.48	ac-ft
Flow (Modified Rational, Allowable)	40.98	ft ³ /s			

Subsection: Modified Rational Storm Calculations

Return Event: 10 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 10
Year

Scenario: 10 year

C Coefficient (Weighted)	C Coefficient (Adjusted)	Duration (hours)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)	Volume (Inflow) (ac-ft)	Volume (Storage) (ac-ft)
0.701	0.701	2.000	1.132	36.100	28.88	(N/A)	(N/A)

Subsection: C and Area (Pre-Development)

Return Event: 25 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

C and Area Results (Pre-Development)

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Existing Highway	0.500	36.100	(N/A)
Weighted C & Total Area --->	0.500	36.100	18.050

Subsection: C and Area (Post-Development)

Label: CM-1

Scenario: 25 year

Return Event: 25 years
Storm Event: IDF Curve Equation - 1 - 25
Year

C and Area Results

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Impervious	0.900	12.130	(N/A)
Ditches and Side Slopes	0.600	23.970	(N/A)
Weighted C & Total Area --->	0.701	36.100	25.299

Subsection: Rational Pre-Development Peak Flow

Return Event: 25 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

Summary of Rational Method Peak Discharges
--- Pre-Development Conditions ---

$Q = CiA * \text{Unit Conversion; Where Conversion} = 43560 / (12 * 3600)$

Frequency (years)	C Coefficient	C Adjustment Factor	C Coefficient (Final)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)
25	0.500	1.000	0.500	2.630	36.100	47.86

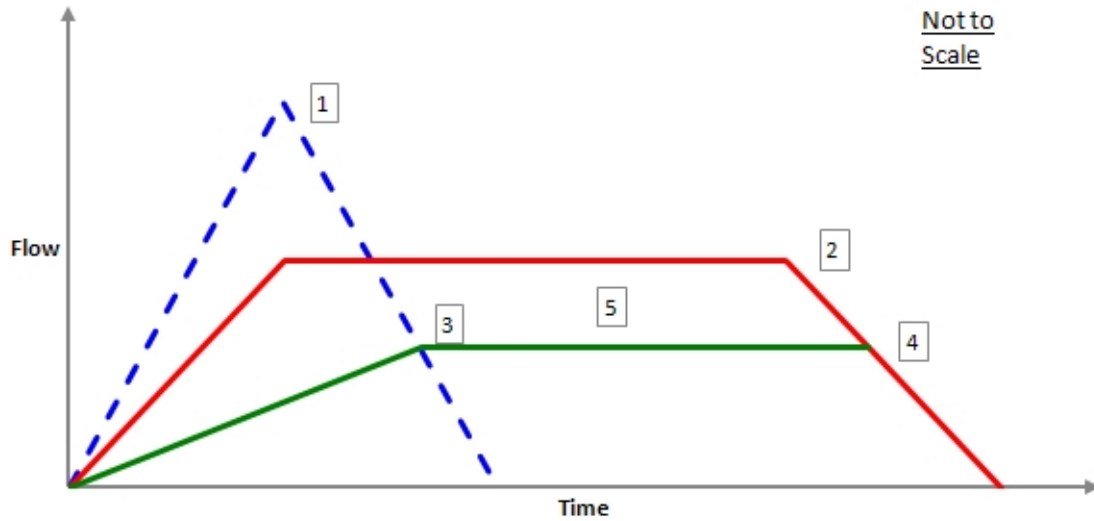
Subsection: Modified Rational Graph

Label: CM-1

Scenario: 25 year

Return Event: 25 years
 Storm Event: IDF Curve Equation - 1 - 25
 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	1.080 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	1.080	hours	Time of Duration (Modified Rational, Critical)	1.080	hours
Intensity (Modified Rational, Peak)	2.134	in/h	Intensity (Modified Rational, Critical)	2.134	in/h
Flow (Modified Rational, Peak)	54.44	ft ³ /s	Flow (Modified Rational, Critical)	54.44	ft ³ /s

[3]	
First Outflow Breakpoint (Modified Rational, Method T)	0.000 hours
Flow (Modified Rational, Allowable)	47.86 ft ³ /s

[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	1.210	hours	Storage (Modified Rational, Estimated)	0.59	ac-ft
Flow (Modified Rational, Allowable)	47.86	ft ³ /s			

Subsection: Modified Rational Storm Calculations

Return Event: 25 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 25
Year

Scenario: 25 year

C Coefficient (Weighted)	C Coefficient (Adjusted)	Duration (hours)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)	Volume (Inflow) (ac-ft)	Volume (Storage) (ac-ft)
0.701	0.701	2.000	1.344	36.100	34.28	(N/A)	(N/A)

Subsection: C and Area (Pre-Development)

Label: CM-1

Scenario: 50 year

Return Event: 50 years
Storm Event: IDF Curve Equation - 1 - 50
Year

C and Area Results (Pre-Development)

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Existing Highway	0.500	36.100	(N/A)
Weighted C & Total Area --->	0.500	36.100	18.050

Subsection: C and Area (Post-Development)

Label: CM-1

Scenario: 50 year

Return Event: 50 years
Storm Event: IDF Curve Equation - 1 - 50
Year

C and Area Results

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Impervious	0.900	12.130	(N/A)
Ditches and Side Slopes	0.600	23.970	(N/A)
Weighted C & Total Area --->	0.701	36.100	25.299

Subsection: Rational Pre-Development Peak Flow

Return Event: 50 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

Summary of Rational Method Peak Discharges
--- Pre-Development Conditions ---

Q = CiA * Unit Conversion; Where Conversion = 43560 / (12 * 3600)

Frequency (years)	C Coefficient	C Adjustment Factor	C Coefficient (Final)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)
50	0.500	1.000	0.500	2.899	36.100	52.77

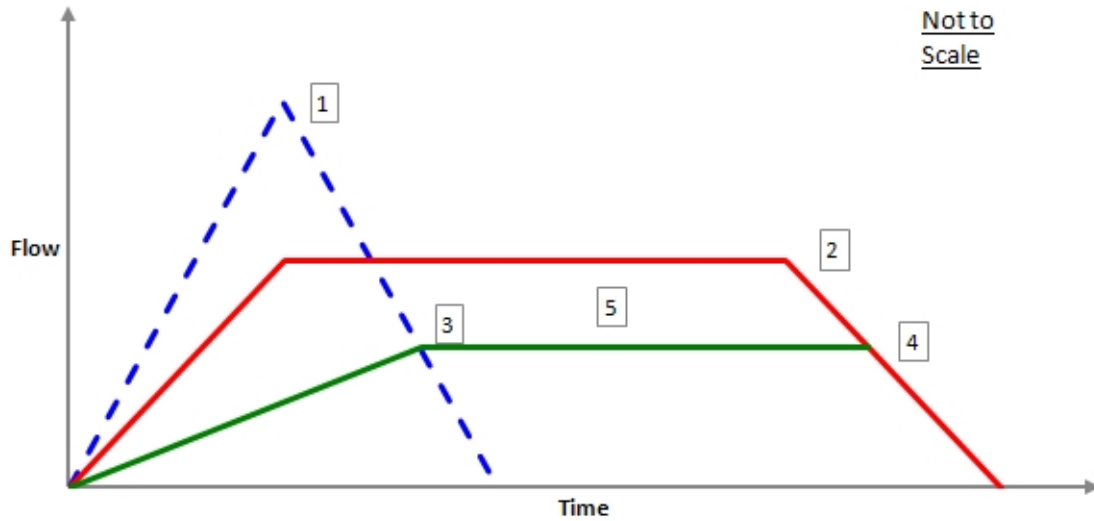
Subsection: Modified Rational Graph

Label: CM-1

Scenario: 50 year

Return Event: 50 years
 Storm Event: IDF Curve Equation - 1 - 50
 Year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	1.080 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	1.080	hours	Time of Duration (Modified Rational, Critical)	1.080	hours
Intensity (Modified Rational, Peak)	2.365	in/h	Intensity (Modified Rational, Critical)	2.365	in/h
Flow (Modified Rational, Peak)	60.32	ft ³ /s	Flow (Modified Rational, Critical)	60.32	ft ³ /s

[3]	
First Outflow Breakpoint (Modified Rational, Method T)	0.000 hours
Flow (Modified Rational, Allowable)	52.77 ft ³ /s

[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	1.215	hours	Storage (Modified Rational, Estimated)	0.67	ac-ft
Flow (Modified Rational, Allowable)	52.77	ft ³ /s			

Subsection: Modified Rational Storm Calculations

Return Event: 50 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 50
Year

Scenario: 50 year

C Coefficient (Weighted)	C Coefficient (Adjusted)	Duration (hours)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)	Volume (Inflow) (ac-ft)	Volume (Storage) (ac-ft)
0.701	0.701	2.000	1.506	36.100	38.41	(N/A)	(N/A)

Subsection: C and Area (Pre-Development)

Return Event: 100 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

C and Area Results (Pre-Development)

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Existing Highway	0.500	36.100	(N/A)
Weighted C & Total Area --->	0.500	36.100	18.050

Subsection: C and Area (Post-Development)

Label: CM-1

Scenario: 100 year

Return Event: 100 years
Storm Event: IDF Curve Equation - 1 - 100
Year

C and Area Results

Soil/Surface Description	C Coefficient	Area (acres)	Area (Adjusted) (acres)
Impervious	0.900	12.130	(N/A)
Ditches and Side Slopes	0.600	23.970	(N/A)
Weighted C & Total Area --->	0.701	36.100	25.299

Subsection: Rational Pre-Development Peak Flow

Return Event: 100 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

Summary of Rational Method Peak Discharges
--- Pre-Development Conditions ---

Q = CiA * Unit Conversion; Where Conversion = 43560 / (12 * 3600)

Frequency (years)	C Coefficient	C Adjustment Factor	C Coefficient (Final)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)
100	0.500	1.000	0.500	3.137	36.100	57.09

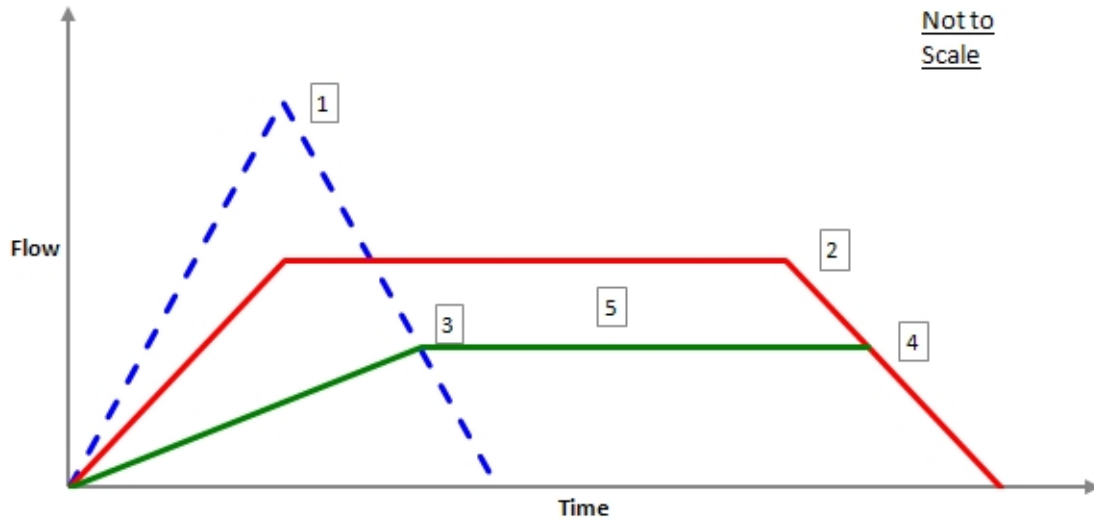
Subsection: Modified Rational Graph

Return Event: 100 years
 Storm Event: IDF Curve Equation - 1 - 100 Year

Label: CM-1

Scenario: 100 year

Method Type	Method T
Time of Duration (Modified Rational, Critical)	1.080 hours



[1]			[2]		
Time of Concentration (Modified Rational, Composite)	1.080	hours	Time of Duration (Modified Rational, Critical)	1.080	hours
Intensity (Modified Rational, Peak)	2.575	in/h	Intensity (Modified Rational, Critical)	2.575	in/h
Flow (Modified Rational, Peak)	65.68	ft ³ /s	Flow (Modified Rational, Critical)	65.68	ft ³ /s

[3]	
First Outflow Breakpoint (Modified Rational, Method T)	0.000 hours
Flow (Modified Rational, Allowable)	57.09 ft ³ /s

[4]			[5]		
Second Outflow Breakpoint (Modified Rational)	1.221	hours	Storage (Modified Rational, Estimated)	0.77	ac-ft
Flow (Modified Rational, Allowable)	57.09	ft ³ /s			

Subsection: Modified Rational Storm Calculations

Return Event: 100 years

Label: CM-1

Storm Event: IDF Curve Equation - 1 - 100
Year

Scenario: 100 year

C Coefficient (Weighted)	C Coefficient (Adjusted)	Duration (hours)	Intensity (in/h)	Area (acres)	Flow (Peak) (ft ³ /s)	Volume (Inflow) (ac-ft)	Volume (Storage) (ac-ft)
0.701	0.701	2.000	1.671	36.100	42.63	(N/A)	(N/A)

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