Springview – SID 387
132nd and Pflug Road
Sarpy County, NE

Final Drainage Study

Project No.: 0124023.01-002

December 8, 2025

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STATE OF NEBRASKA

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INTRODUCTION

Springview is a proposed 40.58-acre residential development containing 94 single-family residential lots, located within the SE ¼ of Section 24, Township 13 North, Range 11 East, of Sarpy County, Nebraska. The site is bounded on the east by S 132nd Street, on the west by a grass field, on the north by the subdivision "Southcrest Hills" and agricultural land, and on the south by Pflug Road.

The site has been delineated into three drainage areas. Drainage Area A drains to the northwest towards Impact Point A. Drainage Area B drains south towards Impact Point B. Drainage Area C drains northeast to impact point C. These drainage areas are shown on the post-construction drainage map included in Appendix A. A separate PCSMP drainage study analyzes the aforementioned impact points and how they meet the City of Springfield regulations for post construction stormwater management. This study analyzes the storm sewer associated with the proposed development.

STORM DRAINAGE DESIGN METHODS

The internal storm sewer system for Springview was analyzed according to the standards and practices as outlined in the Omaha Regional Stormwater Design Manual and was sized for a 10-year frequency storm event in a non-pressurized flow condition. The rational method (Q=CiA) is an approved method for pipe sizing for drainage areas less than 200 acres and was used to design the storm system. The runoff coefficient was assumed using the ultimate development of the site, using Table 2-3 of the Omaha Regional Stormwater Design Manual. The resulting coefficient used for this study was 0.52 for residential areas of zoning R4 per the Omaha Regional Stormwater Design Manual. An initial time of concentration of 10 minutes was used for the residential area. From the Omaha Regional Stormwater Design Manual, a time of concentration of 10 minutes yields an intensity of 6.9 in/hr.

For each portion of the project, sub-basins were delineated for the inlet structures. A drainage basin map is included in Appendix C. The curb inlet capacity calculations and pipe capacity calculations are shown in Appendix A. Energy Dissipation Calculations are shown in Appendix D. 100-year storm flow cross sections and calculations are shown in Appendix E.

CONCLUSION

In conclusion, this drainage study shows the proposed storm sewer system for this project will adequately provide drainage as required by the methods and procedures of the Omaha Regional Stormwater Design Manual.

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CURB INLET CAPACITIES
10 YEAR STORM FREQUENCY
Springview
Springfield, NE

Version 3.0

ITEM	UNITS	Project # 125139.01 - 002		ST #	0		10 Year Storm Frequency		
		By: GG		Rev. Date: 07/22/25		Checked: 0		Sheet: 1	
CONTRIBUTING AREA		A1	A1-b	A1-a	A1-EAST	A1-WEST	A6	A7	A8
STREET CLASSIFICATION		SUMP	SOUTH	NORTH	EAST	WEST	LOCAL	LOCAL	SUMP
DRAINAGE AREA	A (acres)	2.17	1.87	0.31	1.07	1.10	5.11	3.99	4.50
TIME OF CONCENTRATION	t (min)	10	10	10	10	10	10	10	10
RAINFALL INTENSITY	i (in/hr)	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90
COMPOSITE RUNOFF COEFFICIEN	C	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
DESIGN DISCHARGE, Qd = CiA	Qd (cfs)	7.80	6.70	1.10	3.84	3.96	18.33	14.31	16.14
CARRYOVER FLOW, Qc, FROM PRECEDING INLET/CATCH AREA	Qc (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	1.05	0.46
TOTAL DISCHARGE, Q = Qd + Qc	Q (cfs)	7.80	6.70	1.10	3.84	3.96	18.33	15.36	16.60
LONG. STREET SLOPE @ GUTTER	So (ft/ft)	0.0000	0.0000	0.0000	0.0050	0.0050	0.0100	0.0100	0.0000
CROSS SLOPE OF PAVEMENT	Sx (ft/ft)	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
WIDTH OF STREET	w (ft)	28	28	28	28	28	28	28	28
IS THE STREET WARPED @ INLET	yes/no	no	no	no	no	no	no	no	no
FLOW TO # OF SIDES OF STREET	No. (#)	2	1	1	2	2	2	2	2
IF # = 1, KEEP FLOW ON ONE SIDE	yes/no	no	yes	yes	no	no	no	no	no
FLOW IN 1 GUTTER	Qg (cfs)	3.90	6.70	1.10	1.92	1.98	9.17	7.68	8.30
DEPTH OF FLOW IN GUTTER	y (ft)	n/a	n/a	n/a	0.21	0.21	0.35	0.33	n/a
RATIO OF WIDTH OF GUTTER	W/T (ft/ft)	n/a	n/a	n/a	0.262335	0.259363	0.203704	0.203704	n/a
DEPRESSION TO WIDTH OF FLOW	See Note:	<c>			<c>	<c>	<b>	<b>	<c>
RATIO OF FLOW IN DEPRESSED GUTTER TO TOTAL GUTTER FLOW	Eo	n/a	n/a	n/a	0.82	0.81	0.70	0.70	n/a
REQ'D. CURB-OPENING LENGTH FOR 100% INTERCEPTION	Lt (ft)	n/a	n/a	n/a	5.86	5.96	15.08	14.00	n/a
DESIGN LENGTH OF CURB INLET	L (ft)	12	12	12	12	12	12	12	12
% INTERCEPT. 1-(1-L/LT)^1.8	e (%)	n/a	n/a	n/a	100.00%	100.00%	94.27%	96.99%	n/a
FLOW INTERCEPTED PER INLET	Qi (cfs)	3.90	6.70	1.10	1.92	1.98	8.64	7.45	8.30
FLOW CARRIED DOWN TO NEXT INLET/CATCH AREA	Qc (cfs)	n/a	n/a	n/a	0.00	0.00	1.05	0.46	n/a
ALLOWED DEPTH ABOVE GUTTER FLOWLINE (Usually Curb	Hcurb (ft)	0.42	0.42	0.42	n/a	n/a	n/a	n/a	0.42
THROAT OPENING AT SUMP INLET	h (ft)	0.42	0.42	0.42	n/a	n/a	n/a	n/a	0.42
MAX. ALLOWED DEPTH OF PONDI	Hmax (ft)	0.84	0.84	0.84	n/a	n/a	n/a	n/a	0.84
DEPTH OF PONDING	H (ft)	0.254681	0.37	0.11	n/a	n/a	n/a	n/a	0.42
FLOW CARRIED ON OTHER SIDE	Qc (cfs)								
CUMULATIVE FLOW	Qt (cfs)								
NOTES:							Carry over to A7	Carry over to A8	

<a> Depth for 1 side of street > crown height. Excess flow is carried on other side. See "Flow Carried On Other Side."
<b> Flow is in both sides of street, depth of flow is equal for both sides and exceeds the crown height.
<c> Flow is equally distributed in both sides of street, depth of flow is below the crown height.
<d> Flow may exceed curb height for warped section.

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CURB INLET CAPACITIES
10 YEAR STORM FREQUENCY
Springview
Springfield, NE

Version 3.0

ITEM	UNITS	Project # 125139.01 - 002 By: GG		Rev. Date: 07/22/25	ST # 0	Checked: 0	10 Year Storm Frequency	Sheet: 2	
CONTRIBUTING AREA		A8-b	A8-a	A8-NORTH	A8-SOUTH	A9	A9-b	A9-a	A9-EAST
STREET CLASSIFICATION		EAST	WEST	NORTH	SOUTH	SUMP	NORTH	SOUTH	EAST
DRAINAGE AREA	A (acres)	3.22	1.27	0.61	3.89	3.22	0.67	2.55	3.19
TIME OF CONCENTRATION	t (min)	10	10	10	10	10	10	10	10
RAINFALL INTENSITY	i (in/hr)	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90
COMPOSITE RUNOFF COEFFICIEN	C	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
DESIGN DISCHARGE, Qd = CiA	Qd (cfs)	11.57	4.57	2.19	13.95	11.55	2.41	9.14	11.45
CARRYOVER FLOW, Qc, FROM PRECEDING INLET/CATCH AREA	Qc (cfs)	0.46	0.00	0.00	0.46	0.00	0.00	0.00	0.00
TOTAL DISCHARGE, Q = Qd + Qc	Q (cfs)	12.03	4.57	2.19	14.41	11.55	2.41	9.14	11.45
LONG. STREET SLOPE @ GUTTER	So (ft/ft)	0.0000	0.0000	0.0050	0.0050	0.0000	0.0000	0.0000	0.0050
CROSS SLOPE OF PAVEMENT	Sx (ft/ft)	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
WIDTH OF STREET	w (ft)	28	28	28	28	28	28	28	28
IS THE STREET WARPED @ INLET	yes/no	no	no	no	no	no	no	no	no
FLOW TO # OF SIDES OF STREET	No. (#)	1	1	2	2	2	1	1	2
IF # = 1, KEEP FLOW ON ONE SIDE	yes/no	yes	yes	no	no	no	yes	yes	no
FLOW IN 1 GUTTER	Qg (cfs)	12.03	4.57	1.09	7.21	5.78	2.41	9.14	5.72
DEPTH OF FLOW IN GUTTER	y (ft)	n/a	n/a	0.17	0.36	n/a	n/a	n/a	0.33
RATIO OF WIDTH OF GUTTER DEPRESSION TO WIDTH OF FLOW	W/T (ft/ft) See Note:	n/a	n/a	0.323874 <c>	0.203704 <b>	n/a <c>	n/a	n/a	0.203704 <b>
RATIO OF FLOW IN DEPRESSED GUTTER TO TOTAL GUTTER FLOW	Eo	n/a	n/a	0.89	0.70	n/a	n/a	n/a	0.70
REQ'D. CURB-OPENING LENGTH FOR 100% INTERCEPTION	Lt (ft)	n/a	n/a	4.42	11.07	n/a	n/a	n/a	10.05
DESIGN LENGTH OF CURB INLET	L (ft)	12	12	12	12	12	12	12	12
% INTERCEPT. 1-(1-L/LT)^1.8	e (%)	n/a	n/a	100.00%	100.00%	n/a	n/a	n/a	100.00%
FLOW INTERCEPTED PER INLET	Qi (cfs)	12.03	4.57	1.09	7.21	5.78	2.41	9.14	5.72
FLOW CARRIED DOWN TO NEXT INLET/CATCH AREA	Qc (cfs)	n/a	n/a	0.00	0.00	n/a	n/a	n/a	0.00
ALLOWED DEPTH ABOVE GUTTER FLOWLINE (Usually Curb	Hcurb (ft)	0.42	0.42	n/a	n/a	0.42	0.42	0.42	n/a
THROAT OPENING AT SUMP INLET	h (ft)	0.42	0.42	n/a	n/a	0.42	0.42	0.42	n/a
MAX. ALLOWED DEPTH OF PONDI	Hmax (ft)	0.84	0.84	n/a	n/a	0.84	0.84	0.84	n/a
DEPTH OF PONDING	H (ft)	0.554881	0.28	n/a	n/a	0.33	0.19	0.45	n/a
FLOW CARRIED ON OTHER SIDE	Qc (cfs)								
CUMULATIVE FLOW	Qt (cfs)								
NOTES:									

<a> Depth for 1 side of street > crown height. Excess flow is carried on other side. See "Flow Carried On Other Side."
<b> Flow is in both sides of street, depth of flow is equal for both sides and exceeds the crown height.
<c> Flow is equally distributed in both sides of street, depth of flow is below the crown height.
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ITEM	UNITS	Project # 125139.01 - 002 By: GG		Rev. Date: 07/22/25	ST # 0	Checked: 0	10 Year Storm Frequency	Sheet: 3	
CONTRIBUTING AREA		A9-WEST	B1	B2	B4	C1-a	C1-b	#	#
STREET CLASSIFICATION		WEST	LOCAL	LOCAL	SUMP	LOCAL	LOCAL		
DRAINAGE AREA	A (acres)	0.03	1.21	3.58	1.25	0.70	1.05	0.00	0.00
TIME OF CONCENTRATION	t (min)	10	10	10	10	10	10	10	10
RAINFALL INTENSITY	i (in/hr)	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90
COMPOSITE RUNOFF COEFFICIEN	C	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.56
DESIGN DISCHARGE, Qd = CiA	Qd (cfs)	0.11	4.32	12.86	4.49	2.53	3.78	0.00	0.00
CARRYOVER FLOW, Qc, FROM PRECEDING INLET/CATCH AREA	Qc (cfs)	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00
TOTAL DISCHARGE, Q = Qd + Qc	Q (cfs)	0.11	4.32	12.86	4.62	2.53	3.78	0.00	0.00
LONG. STREET SLOPE @ GUTTER	So (ft/ft)	0.0050	0.0084	0.0100	0.0000	0.0438	0.0438	0.0000	0.0000
CROSS SLOPE OF PAVEMENT	Sx (ft/ft)	0.0200	0.0200	0.0200	0.0050	0.0200	0.0200	0.0200	0.0200
WIDTH OF STREET	w (ft)	28	28	28	28	28	28	25	25
IS THE STREET WARPED @ INLET	yes/no	no	no	no	no	no	no	no	no
FLOW TO # OF SIDES OF STREET	No. (#)	2	1	2	1	1	1	2	2
IF # = 1, KEEP FLOW ON ONE SIDE	yes/no	no	no	no	yes	no	no	no	no
FLOW IN 1 GUTTER	Qg (cfs)	0.05	4.32	6.43	4.62	2.53	3.78	0.00	0.00
DEPTH OF FLOW IN GUTTER	y (ft)	0.05	0.26	0.31	n/a	0.15	0.18	n/a	n/a
RATIO OF WIDTH OF GUTTER DEPRESSION TO WIDTH OF FLOW	W/T (ft/ft) See Note:	1.002201 <c>	0.213211	0.203704 <b>	n/a	0.35555	0.30577	n/a <c>	n/a <c>
RATIO OF FLOW IN DEPRESSED GUTTER TO TOTAL GUTTER FLOW	Eo	1.00	0.72	0.70	n/a	0.92	0.87	n/a	n/a
REQ'D. CURB-OPENING LENGTH FOR 100% INTERCEPTION	Lt (ft)	1.17	10.27	12.99	n/a	11.85	14.41	n/a	n/a
DESIGN LENGTH OF CURB INLET	L (ft)	12	12	12	12	12	12	12	12
% INTERCEPT. 1-(1-L/LT)^1.8	e (%)	100.00%	100.00%	99.03%	n/a	100.00%	96.01%	n/a	n/a
FLOW INTERCEPTED PER INLET	Qi (cfs)	0.05	4.32	6.37	4.62	2.53	3.63	0.00	0.00
FLOW CARRIED DOWN TO NEXT INLET/CATCH AREA	Qc (cfs)	0.00	0.00	0.13	n/a	0.00	0.15	n/a	n/a
ALLOWED DEPTH ABOVE GUTTER FLOWLINE (Usually Curb	Hcurb (ft)	n/a	n/a	n/a	0.42	n/a	n/a	n/a	n/a
THROAT OPENING AT SUMP INLET	h (ft)	n/a	n/a	n/a	0.42	n/a	n/a	n/a	n/a
MAX. ALLOWED DEPTH OF PONDI	Hmax (ft)	n/a	n/a	n/a	0.84	n/a	n/a	n/a	n/a
DEPTH OF PONDING	H (ft)	n/a	n/a	n/a	0.29	n/a	n/a	n/a	n/a
FLOW CARRIED ON OTHER SIDE	Qc (cfs)								
CUMULATIVE FLOW	Qt (cfs)								
NOTES:				Carrry over to B4					

<a> Depth for 1 side of street > crown height. Excess flow is carried on other side. See "Flow Carried On Other Side."
<b> Flow is in both sides of street, depth of flow is equal for both sides and exceeds the crown height.
<c> Flow is equally distributed in both sides of street, depth of flow is below the crown height.
<d> Flow may exceed curb height for warped section.

COMPUTATION FORM	Springview	Calculated By GG	X Prelim Design	Drainage Area Private
STORM DRAINAGE SYSTEM DESIGN BY THE RATIONAL METHOD	Storm Sewer	Date		LRA Project No.
	10 Year Storm (28)	Checked By AG	Final Design	City Project No. N/A

Location (1)	Conveyance From (2)	Conveyance To (3)	Direct Runoff: W.S. or S.B. No. (4)	O.F.L ft. (5)	W.C. Type (6)	S % (7)	V f.p.s. (8)	Ti min. (9)	i in./hr. (10)	A Ac. (11)	C (12)	q c.f.s. (13)	System Q c.f.s. (14)	Travel Time: Convey System / Size Descrip. (15)	Slope Min. % (16)	Slope Design % (17)	(System Design) V Design f.p.s. (18)	Cap. (All.) c.f.s. (19)	Length ft. (20)	t min. (21)	Total Runoff: T.O.C min. (22)	i in./hr. (23)	Total A Ac. (24)	Composite C (25)	Design Q c.f.s. (26)	Remarks (27)
1	ST1	ST2	A1-b	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.87	0.52	6.70		18.000" = Design Size		1.5% = Design Slope				USE	10.00	6.90	1.87	0.52	6.70	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													6.70	18	0.41	1.50	7.35	12.87	31	0.1	0.1	T.O.C at End of Pipe				thus, 100 year flow = 12.01 cfs
																										Pipe Capacity sufficient to pass 100-year flow
2	ST2	ST3	A1-a	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.31	0.52	1.10		18.000" = Design Size		5.41% = Design Slope				USE	10.00	6.90	2.17	0.52	7.80	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													7.80	18	0.55	5.41	12.28	24.43	128	0.2	0.2	T.O.C at End of Pipe				thus, 100 year flow = 13.98 cfs
																										Pipe Capacity sufficient to pass 100-year flow
3	ST3	ST4	A2	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.23	0.52	0.81		18.000" = Design Size		2.29% = Design Slope				USE	10.00	6.90	2.40	0.52	8.61	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													8.61	18	0.67	2.29	9.17	15.90	157	0.3	0.3	T.O.C at End of Pipe				thus, 100 year flow = 15.44 cfs
																										Pipe Capacity sufficient to pass 100-year flow
4	ST4	ST5	A3	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.38	0.52	1.38		18.000" = Design Size		2.91% = Design Slope				USE	10.00	6.90	2.78	0.52	9.99	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													9.99	18	0.90	2.91	10.41	17.92	152	0.2	0.2	T.O.C at End of Pipe				thus, 100 year flow = 17.91 cfs
																										Pipe Capacity sufficient to pass 100-year flow
5	ST5	ST6	A4	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.24	0.52	0.86		24.000" = Design Size		0.8% = Design Slope				USE	10.00	6.90	3.02	0.52	10.85	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													10.85	24	0.23	0.80	6.55	20.23	133	0.3	0.3	T.O.C at End of Pipe				thus, 100 year flow = 19.46 cfs
																										Pipe Capacity sufficient to pass 100-year flow
6	ST6	ST7	A5	0	GRA	0.0	0.0	0.0																		
	INLET	FES		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.22	0.52	0.78		24.000" = Design Size		0.9% = Design Slope				USE	10.00	6.90	3.24	0.52	11.63	Note: 100 year flow = 1.25*CiA, where I = 9.9 in/hr
													11.63	24	0.26	0.90	6.96	21.46	72	0.2	0.2	T.O.C at End of Pipe				thus, 100 year flow = 20.86 cfs
																										Pipe Capacity sufficient to pass 100-year flow
7	ST8	ST9	A6 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	2.55	0.52	9.17		18.000" = Design Size		1% = Design Slope				USE	10.00	6.90	2.55	0.52	9.17	
													9.17	18	0.76	1.00	6.70	10.50	36	0.1	0.1	T.O.C at End of Pipe				

REMINDER: Check Storm Drain System Design For Major Storm Provisions	* Watercourse Legend Fig. 2-2		NOTES:	
	FOR - Forest	NBG - Bare Ground	Storm Frequency = 10 Year	
	FAL - Fallow	GWW - Grass Waterway	Manning's n = 0.013	
	GRA - Grass/Lawn	SGF - Shallow Gutter Flow		

COMPUTATION FORM

STORM DRAINAGE SYSTEM DESIGN
BY THE RATIONAL METHOD

(28)

Springview
Storm Sewer
10 Year Storm

Calculated By	GG	X	Prelim Design
Date			
Checked By	AG		Final Design

Drainage Area	Private
LRA Project No.	
City Project No.	N/A

Location	Conveyance		Direct Runoff										System Q	Travel Time			(System Design)				Total Runoff					Remarks
	From	To	W.S. or S.B. No.	O.F.L	W.C. Type	S	V	Ti	i	A	C	q		Convey System / Size Descrip.	Slope Min.	Design	V Design	Cap. (All.)	Length	t	T.O.C	i	Total A	Composite C	Design Q	
				ft.		%	f.p.s.	min.	in./hr.	Ac.		c.f.s.	c.f.s.		%	Design %	f.p.s.	c.f.s.	ft.	min.	min.	in./hr.	Ac.		c.f.s.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
8	ST9	ST10	A6 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	2.55	0.52	9.17		24.000" = Design Size		1.69% = Design Slope				USE	10.00	6.90	5.11	0.52	18.33	
													18.33	24	0.66	1.69	9.87	29.41	129	0.2	0.2	T.O.C at End of Pipe				
9	ST10	ST12	N/A	0	GRA	0.0	0.0	0.0																		
	MANHOLE	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.00	0.00	0.00		24.000" = Design Size		0.8% = Design Slope				USE	10.00	6.90	5.11	0.52	18.33	
													18.33	24	0.66	0.80	7.29	20.23	142	0.3	0.3	T.O.C at End of Pipe				
10	ST11	ST12	A7 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.99	0.52	7.15		18.000" = Design Size		3.65% = Design Slope				USE	10.00	6.90	1.99	0.52	7.15	
													7.15	18	0.46	3.65	10.39	20.07	33	0.1	0.1	T.O.C at End of Pipe				
11	ST12	ST13	A7 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.99	0.52	7.15		30.000" = Design Size		1.78% = Design Slope				USE	10.00	6.90	9.10	0.52	32.64	
													32.64	30	0.63	1.78	11.63	54.72	139	0.2	0.2	T.O.C at End of Pipe				
12	ST13	ST14	N/A	0	GRA	0.0	0.0	0.0																		
	MANHOLE	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.00	0.00	0.00		30.000" = Design Size		1.78% = Design Slope				USE	10.00	6.90	9.10	0.52	32.64	
													32.64	30	0.63	1.78	11.63	54.72	195	0.3	0.3	T.O.C at End of Pipe				
13	ST14	ST15	A8-b	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	3.22	0.52	11.57		30.000" = Design Size		1.25% = Design Slope				USE	10.00	6.90	12.32	0.52	44.21	
													44.21	30	1.16	1.25	10.64	45.86	36	0.1	0.1	T.O.C at End of Pipe				
14	ST15	ST17	A8-a	0	GRA	0.0	0.0	0.0																		
	INLET	FES		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.27	0.52	4.57		36.000" = Design Size		0.75% = Design Slope				USE	10.00	6.90	13.59	0.52	48.78	
													48.78	36	0.53	0.75	9.16	57.76	52	0.1	0.1	T.O.C at End of Pipe				

REMINDER: Check Storm Drain System Design For Major Storm Provisions

* Watercourse Legend Fig. 2-2
FOR - Forest
FAL - Fallow
GRA - Grass/Lawn
NBG - Bare Ground
GWW - Grass Waterway
SGF - Shallow Gutter Flow

NOTES:

Storm Frequency = 10 Year
Manning's n = 0.013

COMPUTATION FORM	Springview	Calculated By	GG	X	Prelim Design	Drainage Area	Private
STORM DRAINAGE SYSTEM DESIGN BY THE RATIONAL METHOD	Storm Sewer	Date				LRA Project No.	
	10 Year Storm (28)	Checked By	AG		Final Design	City Project No.	N/A

Location	Conveyance		Direct Runoff										System Q	Travel Time (System Design)							Total Runoff					Remarks
	From	To		O.F.L	W.C. Type	S	V	Ti	i	A	C	q		Convey System / Size Descrip.	Slope Min.	Slope Design	V Design	Cap. (All.)	Length	t	T.O.C	i	Total A	Composite C	Design Q	
			W.S. or S.B. No.	ft.		%	f.p.s.	min.	in./hr.	Ac.		c.f.s.	c.f.s.		%	%	f.p.s.	c.f.s.	ft.	min.	min.	in./hr.	Ac.		c.f.s.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
16	ST19	ST21	B1	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.21	0.52	4.32		18.000" = Design Size		4.57% = Design Slope				USE	10.00	6.90	1.21	0.52	4.32	
													4.32	18	0.17	4.57	9.81	22.46	37	0.1	0.1	T.O.C at End of Pipe				
17	ST18	ST21	B2 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.79	0.52	6.43		18.000" = Design Size		3.63% = Design Slope				USE	10.00	6.90	1.79	0.52	6.43	
													6.43	18	0.37	3.63	10.08	20.01	41	0.1	0.1	T.O.C at End of Pipe				
18	ST20	ST21	B2 (HALF)	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.79	0.52	6.43		18.000" = Design Size		3.57% = Design Slope				USE	10.00	6.90	1.79	0.52	6.43	
													6.43	18	0.37	3.57	10.02	19.85	48	0.1	0.1	T.O.C at End of Pipe				
19	ST21	ST22	N/A	0	GRA	0.0	0.0	0.0																		
	MANHOLE	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.00	0.00	0.00		24.000" = Design Size		1.25% = Design Slope				USE	10.00	6.90	4.79	0.52	17.18	
													17.18	24	0.58	1.25	8.65	25.29	130	0.3	0.3	T.O.C at End of Pipe				
20	ST22	ST23	B4	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.25	0.52	4.49		24.000" = Design Size		8.05% = Design Slope				USE	10.00	6.90	6.04	0.52	21.67	
													21.67	24	0.92	8.05	18.44	64.19	64	0.1	0.1	T.O.C at End of Pipe				
21	ST23	ST24	N/A	0	GRA	0.0	0.0	0.0																		
	MANHOLE	FES		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.00	0.00	0.00		24.000" = Design Size		1.36% = Design Slope				USE	10.00	6.90	6.04	0.52	21.67	
													21.67	24	0.92	1.36	9.37	26.38	24	0.0	0.0	T.O.C at End of Pipe				
22	ST25	ST26	C1-b	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	1.05	0.52	3.78		18.000" = Design Size		0.78% = Design Slope				USE	10.00	6.90	1.05	0.52	3.78	
													3.78	18	0.13	0.78	4.98	9.28	33	0.1	0.1	T.O.C at End of Pipe				

REMINDER: Check Storm Drain System Design For Major Storm Provisions

* Watercourse Legend Fig. 2-2

FOR - Forest	NBG - Bare Ground
FAL - Fallow	GWW - Grass Waterway
GRA - Grass/Lawn	SGF - Shallow Gutter Flow

NOTES:

Storm Frequency = 10 Year
Manning's n = 0.013

COMPUTATION FORM STORM DRAINAGE SYSTEM DESIGN BY THE RATIONAL METHOD	Springview Storm Sewer 10 Year Storm (28)	Calculated By: GG Date: Checked By: AG	X Prelim Design Final Design	Drainage Area: Private LRA Project No.: City Project No.: N/A

Location	Conveyance		Direct Runoff										System Q	Travel Time						(System Design)	Total Runoff					Remarks
	From	To	W.S. or S.B. No.	O.F.L	W.C. Type	S	V	Ti	i	A	C	q		Convey System / Size Descrip.	Slope		V Design	Cap. (All.)	Length	t	T.O.C	i	Total A	Composite C	Design Q	
				ft.		%	f.p.s.	min.	in./hr.	Ac.		c.f.s.	c.f.s.		Min. %	Design %	f.p.s.	c.f.s.	ft.	min.	min.	in./hr.	Ac.		c.f.s.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
23	ST26	ST27	C1-a	0	GRA	0.0	0.0	0.0																		
	INLET	FES		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.70	0.52	2.53		18.000" = Design Size		0.78% = Design Slope				USE	10.00	6.90	1.76	0.52	6.30	
													6.30	18	0.36	0.78	5.64	9.28	62	0.2	0.2	T.O.C at End of Pipe				
24	ST28	ST29	A9-a	0	GRA	0.0	0.0	0.0																		
	INLET	INLET		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	2.55	0.52	9.14		18.000" = Design Size		1.25% = Design Slope				USE	10.00	6.90	2.55	0.52	9.14	
													9.14	18	0.76	1.25	7.34	11.74	31	0.1	0.1	T.O.C at End of Pipe				
25	ST29	ST30	A9-b	0	GRA	0.0	0.0	0.0																		
	INLET	MANHOLE		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.67	0.52	2.41		18.000" = Design Size		9.39% = Design Slope				USE	10.00	6.90	3.22	0.52	11.55	
													11.55	18	1.21	9.39	16.70	32.19	153	0.2	0.2	T.O.C at End of Pipe				
26	ST30	ST31	N/A	0	GRA	0.0	0.0	0.0																		
	MANHOLE	FES		0	SGF	0.0	0.0	0.0																		
				0	GWW	0.0	0.0	0.0																		
							SUM	0.0													0.0	T.O.C at Beginning of Pipe				
							USE	10.0	6.9	0.00	0.00	0.00		18.000" = Design Size		1.5% = Design Slope				USE	10.00	6.90	3.22	0.52	11.55	
													11.55	18	1.21	1.50	8.23	12.87	27	0.1	0.1	T.O.C at End of Pipe				

REMINDER: Check Storm Drain System Design For Major Storm Provisions	* Watercourse Legend Fig. 2-2 FOR - Forest FAL - Fallow GRA - Grass/Lawn	NBG - Bare Ground GWW - Grass Waterway SGF - Shallow Gutter Flow	NOTES: Storm Frequency = 10 Year Manning's n = 0.013

Appendix B

Design Tables and Graphs

It is often desirable to develop a composite runoff coefficient based on the percentage of different types of surface in the drainage area. Composites can be made with Tables 2-3 and 2-4. The composite procedure can be applied to an entire drainage area or to typical "sample" blocks as a guide to selection of reasonable values of the coefficient for an entire area.

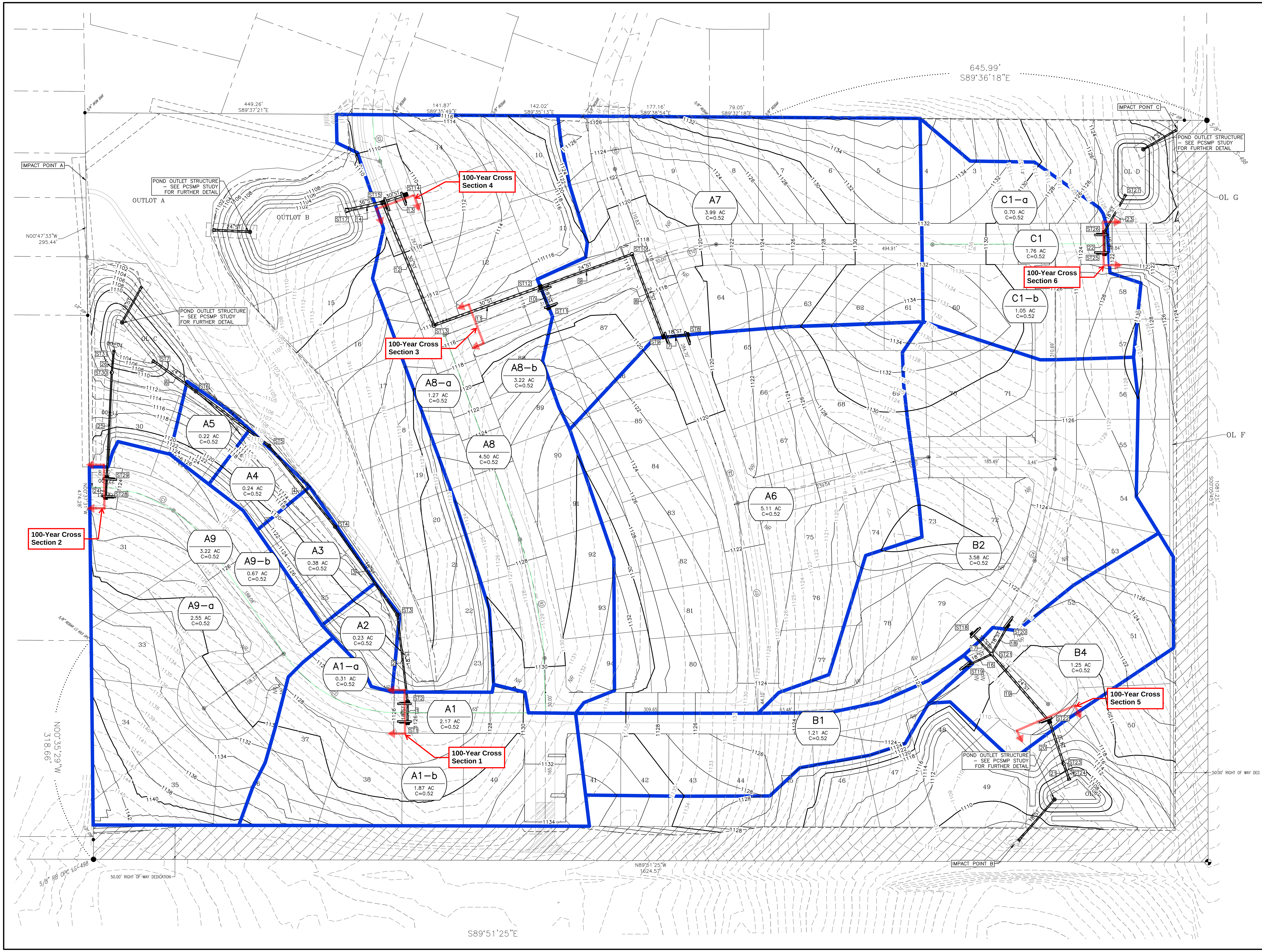
Table 2-3 Recommended Runoff Coefficients

Description Of Area		Runoff Coefficient
Pavement Areas	Asphaltic and Concrete	0.95
	Brick	0.85
	Roofs	0.95
Business Areas	Downtown	0.70 to 0.95
Neighborhood		0.50 to 0.70
Residential Areas	Single-Family	0.30 to 0.50
	R-1 and R-2 – 20,000 sq. ft.	0.49
	R-3 and R-4 – 10,000 sq. ft.	0.52
	R-5 and R-6 – 8,500 sq. ft.	0.57
	Multi-units, detached	0.40 to 0.60
	Multi-units, attached	0.60 to 0.75
	Suburban	0.25 to 0.40
	Apartment	0.50 to 0.70
Industrial Area	Light	0.50 to 0.80
	Heavy	0.60 to 0.90
Parks & Cemeteries		0.10 to 0.25
Playgrounds		0.20 to 0.35
Railroad Yard		0.20 to 0.35
Turfed Slope Areas	Flat, 0 to 1%	0.25
	Average, 1 to 3%	0.35
	Hilly, 3 to 10%	0.40
	Steep, 10%+	0.45
Cultivated Ground	Flat, 0 to 1%	0.10
	Average, 1 to 3%	0.20
	Hilly, 3 to 10%+	0.25
	Steep, 10%+	0.30
*No Ground Cover	Recently Disturbed Soil	0.50 to 0.70

*This condition is intended to be used only for sizing temporary "construction site" sediment control detention ponds.

Appendix C

Drainage Map



LAMP RYNEARSON

LAMPRYNEARSON.COM

OMAHA, NEBRASKA
14710 W. DODGE RD., STE. 100 (402) 496.2498
NE AUTHORIZATION NO.: CA0130

FORT COLLINS, COLORADO
4715 INNOVATION DR., STE. 100 (970) 226.0342

KANSAS CITY, MISSOURI
9001 STATE LINE RD., STE. 200 (816) 361.0440
MO AUTH. NO.: E-2013011903 | LS-2019043127

0 60' 120'

PRELIMINARY

NOT RELEASED FOR CONSTRUCTION

DRAINAGE MAP
PIPE CALCULATIONS

SPRINGVIEW
SARPY COUNTY, NEBRASKA

811 Know what's below. Call before you dig.

ALL UTILITIES ARE SHOWN BASED ON THE INFORMATION AVAILABLE TO THE ENGINEER. THERE IS NO GUARANTEE ALL FACILITIES ARE SHOWN OR THAT THE LOCATION, DEPTH, AND SIZE OF EACH FACILITY IS CORRECT. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES AND SERVICE LINES PRIOR TO CONSTRUCTION.

REVISIONS

DESIGNER / DRAFTER
GRANT GOODRICH

DATE
12/8/2025

PROJECT NUMBER
0125139.01

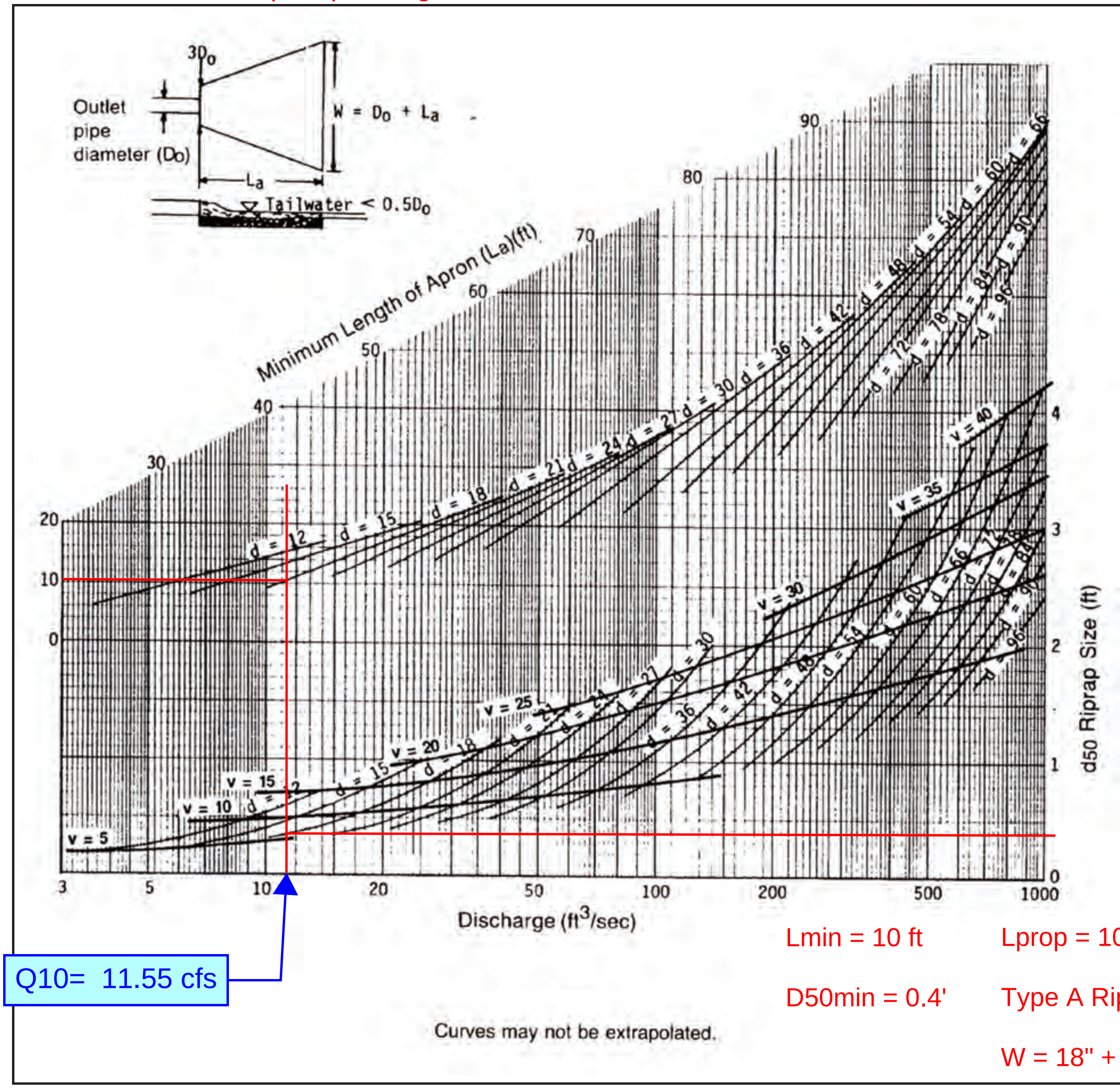
BOOK AND PAGE

SHEET
1 OF 1

Appendix D

Energy Dissipation Calculations

ST31 FES Outlet Rip Rap Sizing



Lmin = 10 ft

Lprop = 10 ft

D50min = 0.4'

Type A Rip Rap

W = 18" + 10' = 11.5'

Figure 7-1 Design of Riprap Apron Under Minimum Tailwater Conditions Source: Dekalb County Manual

ST7 FES Outlet Rip Rap Sizing

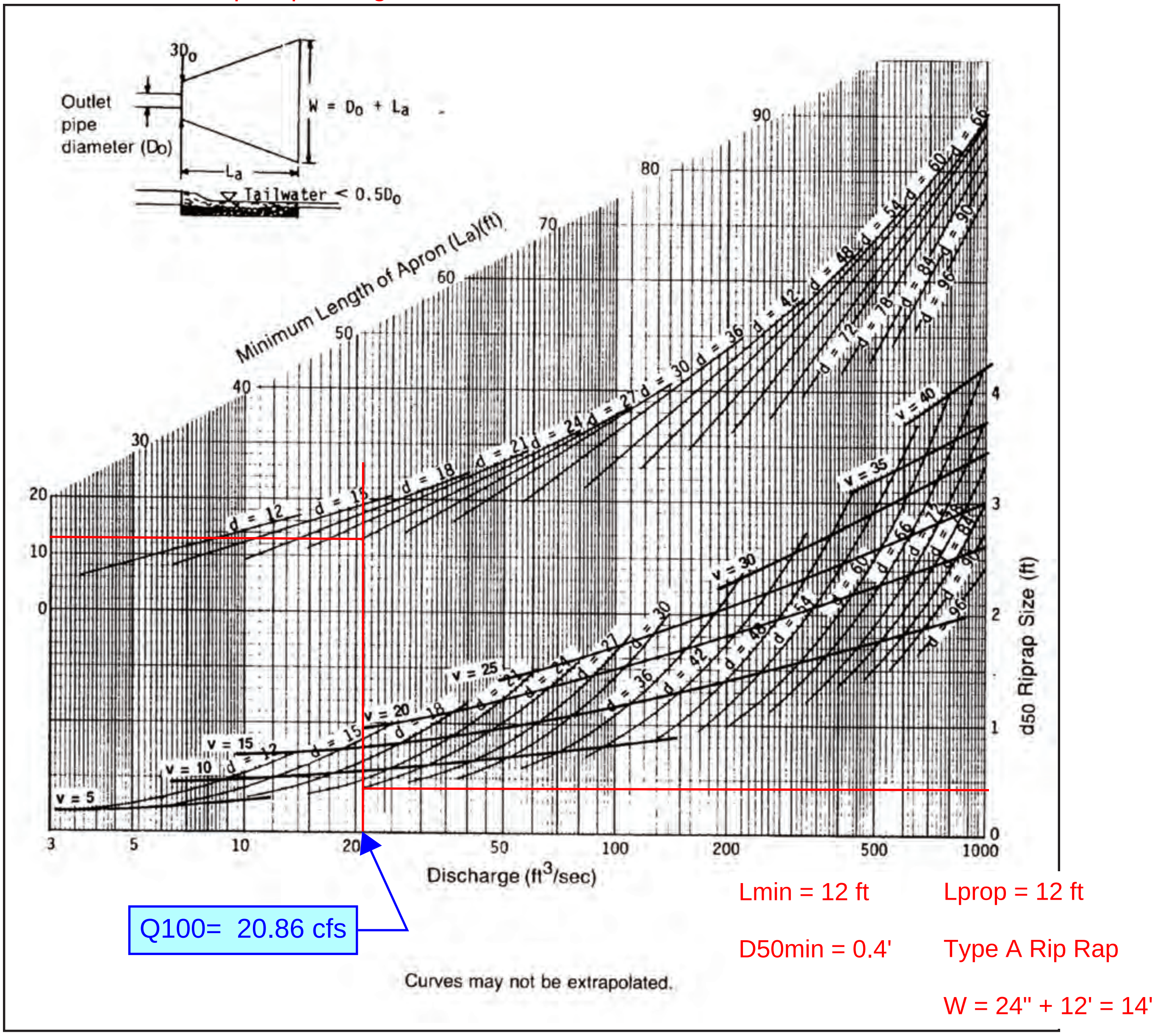
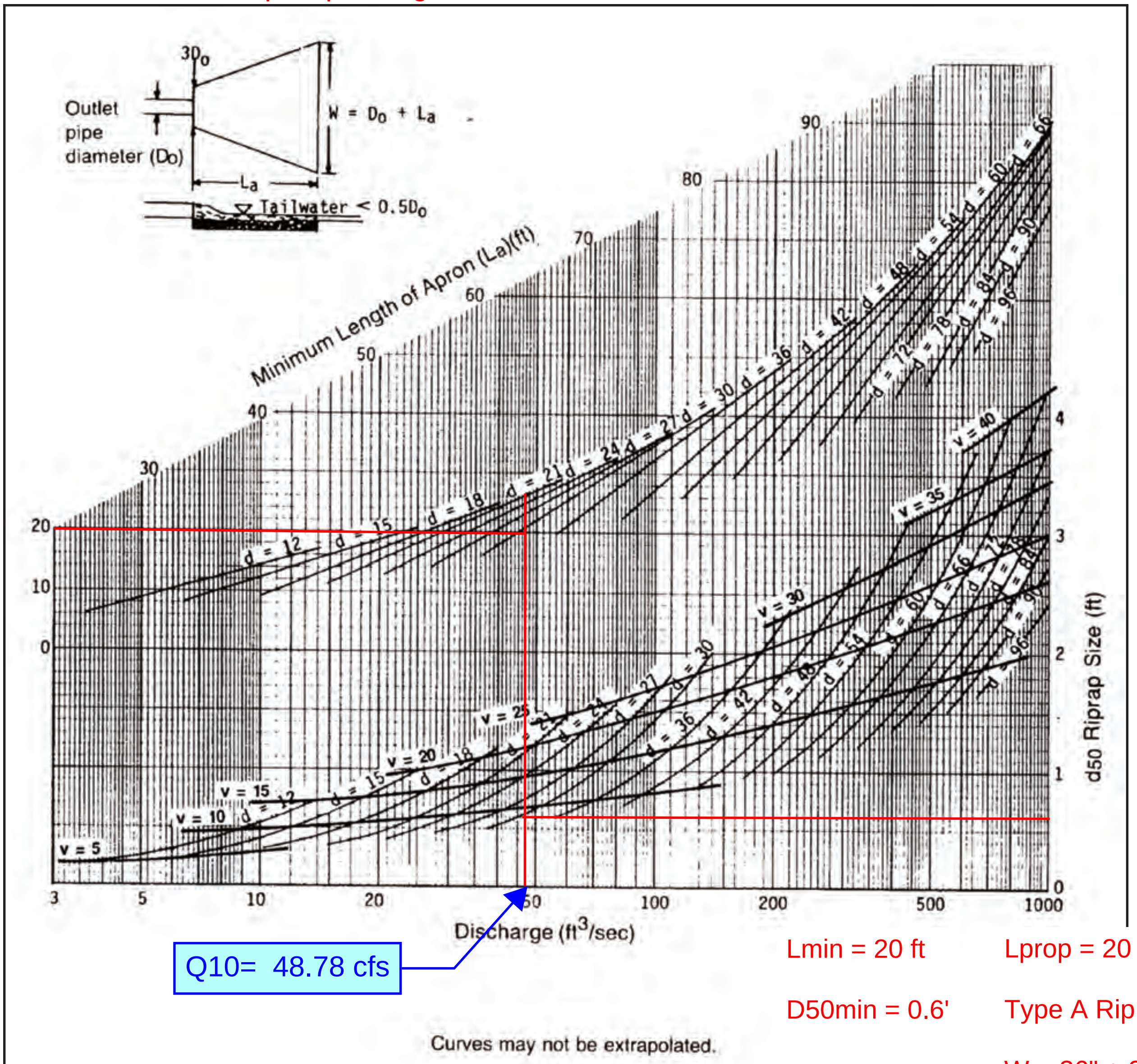


Figure 7-1 Design of Riprap Apron Under Minimum Tailwater Conditions Source: Dekalb County Manual

ST17 FES Outlet Rip Rap Sizing



Lmin = 20 ft

Lprop = 20 ft

D50min = 0.6'

Type A Rip Rap

W = 36" + 20' = 23'

Figure 7-1 Design of Riprap Apron Under Minimum Tailwater Conditions Source: Dekalb County Manual

ST24 FES Outlet Rip Rap Sizing

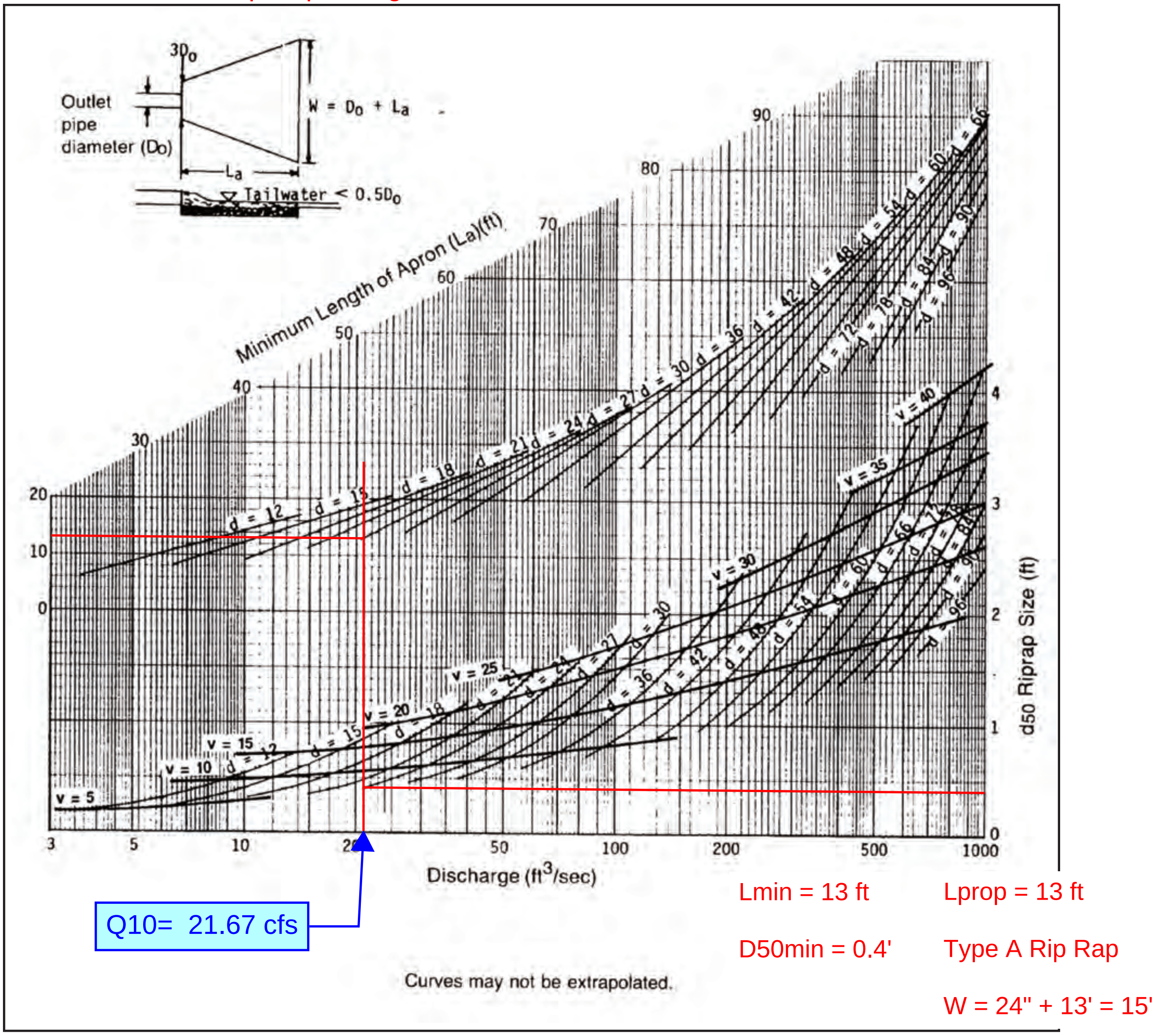


Figure 7-1 Design of Riprap Apron Under Minimum Tailwater Conditions Source: Dekalb County Manual

ST27 FES Outlet Rip Rap Sizing

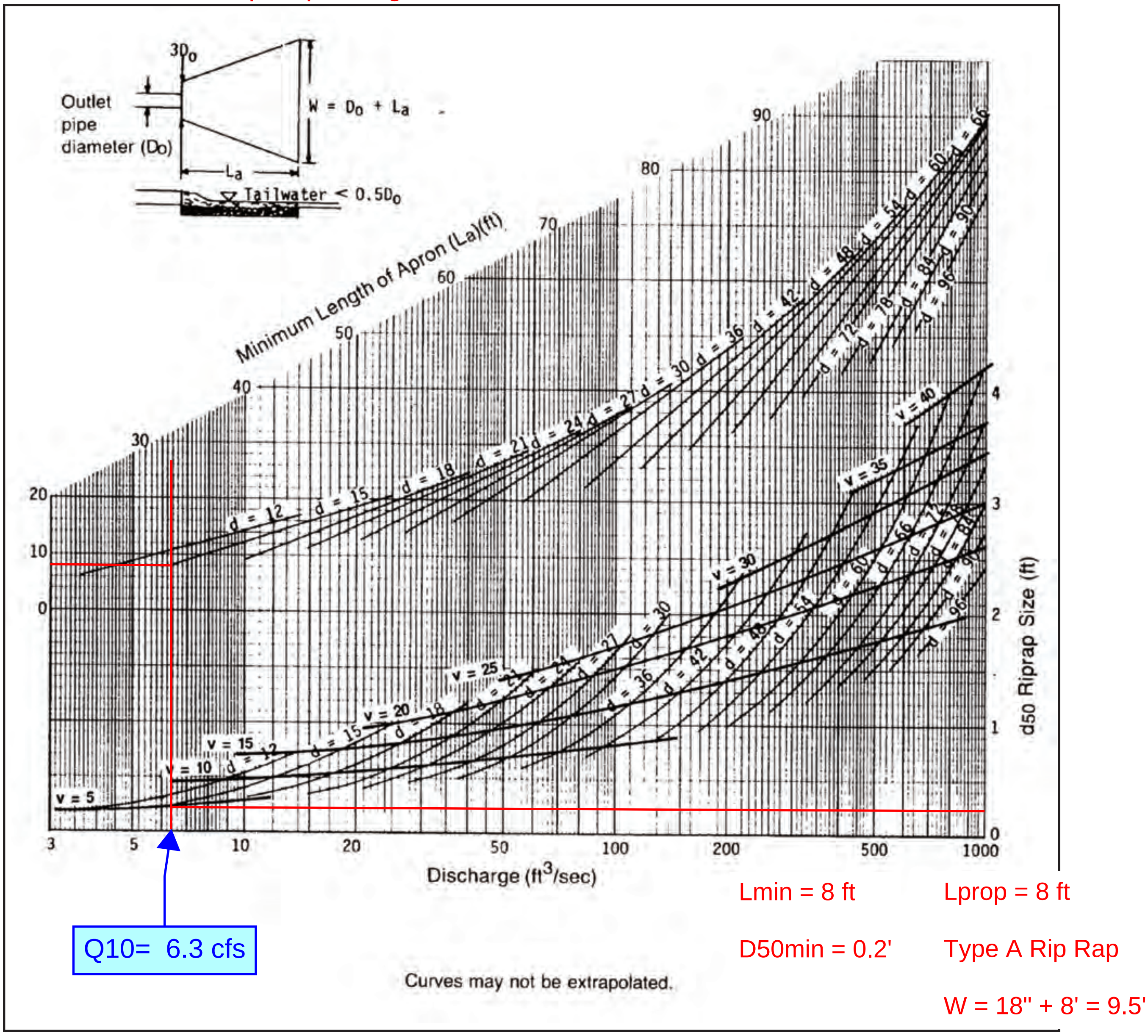


Figure 7-1 Design of Riprap Apron Under Minimum Tailwater Conditions Source: Dekalb County Manual

Appendix E

100-Year Storm Flow Cross Sections

100-year Flow Calculations

Q_100 = 1.25*C*I*A =

CROSS SECTION 1

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	2.17	ac	(Area A1)
100 Year Flow	Q100=	13.96	cfs	
Pipe Capacity	P=	24.43	cfs	*See pipe design calculations for Pipe #2
Peak 100-Yr Overland Flow	Q100-P=	0.00	cfs	

CROSS SECTION 2

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	3.22	ac	(Area A9)
100 Year Flow	Q100=	20.72	cfs	
Pipe Capacity	P=	32.19	cfs	*See pipe design calculations for Pipe #25
Peak 100-Yr Overland Flow	Q100-P=	0.00	cfs	

CROSS SECTION 3

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	9.30	ac	(Area A6 + Area A7 + 0.2 ac of Area A8)
100 Year Flow	Q100=	59.85	cfs	
Pipe Capacity	P=	54.72	cfs	*See pipe design calculations for Pipe #11
Peak 100-Yr Overland Flow	Q100-P=	5.13	cfs	

CROSS SECTION 4

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	13.60	ac	(Area A6 + Area A7 + Area A8)
100 Year Flow	Q100=	87.52	cfs	
Pipe Capacity	P=	57.76	cfs	*See pipe design calculations for Pipe #14
Peak 100-Yr Overland Flow	Q100-P=	29.76	cfs	

CROSS SECTION 5

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	6.04	ac	(Area B1 + Area B2 + Area B4)
100 Year Flow	Q100=	38.87	cfs	
Pipe Capacity	P=	26.38	cfs	*See pipe design calculations for Pipe #21
Peak 100-Yr Overland Flow	Q100-P=	12.49	cfs	

CROSS SECTION 6

Runoff Coefficient	C=	0.52		
100 year storm intensity	I=	9.9	in/hr	
Drainage Area	A=	1.76	ac	(Area C1)
100 Year Flow	Q100=	11.33	cfs	
Pipe Capacity	P=	9.28	cfs	*See pipe design calculations for Pipe #23
Peak 100-Yr Overland Flow	Q100-P=	2.05	cfs	

See vicinity map for cross section location.

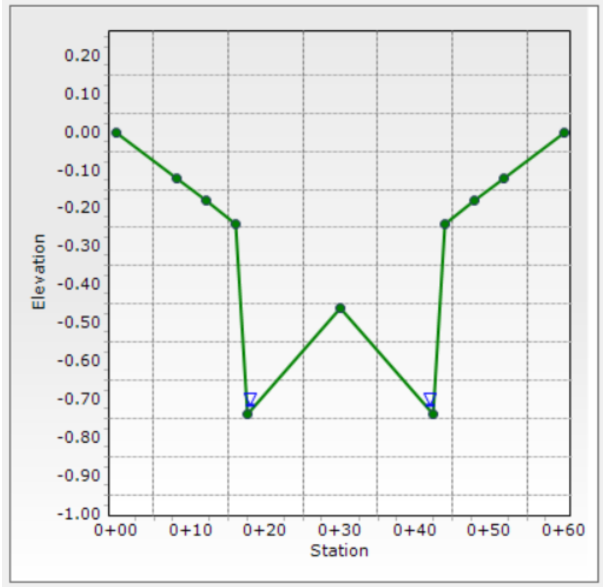
Cross Section for CROSS SECTION 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.005 ft/ft
Normal Depth	0.27 in
Discharge	0.01 cfs

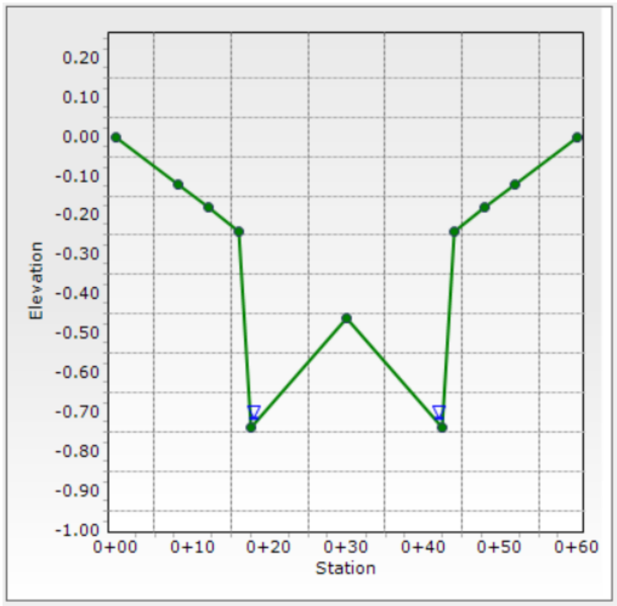


See vicinity map for cross section location.

Cross Section for CROSS SECTION 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	0.27 in
Discharge	0.01 cfs



See vicinity map for cross section location.

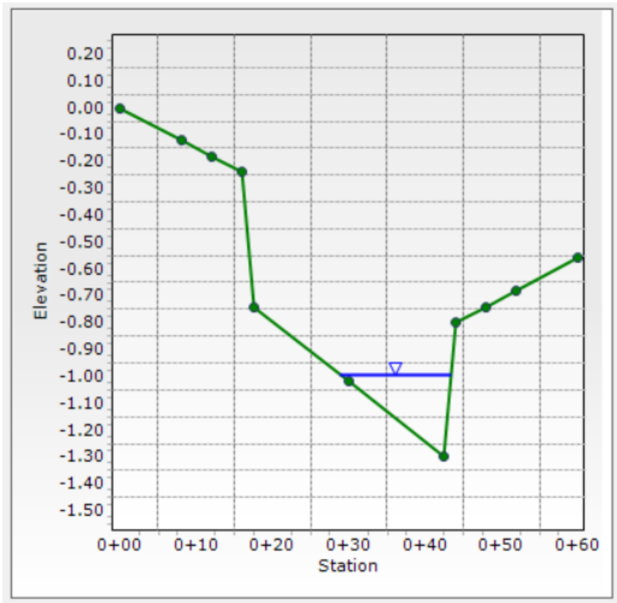
Cross Section for CROSS SECTION 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.005 ft/ft
Normal Depth	3.63 in
Discharge	5.13 cfs

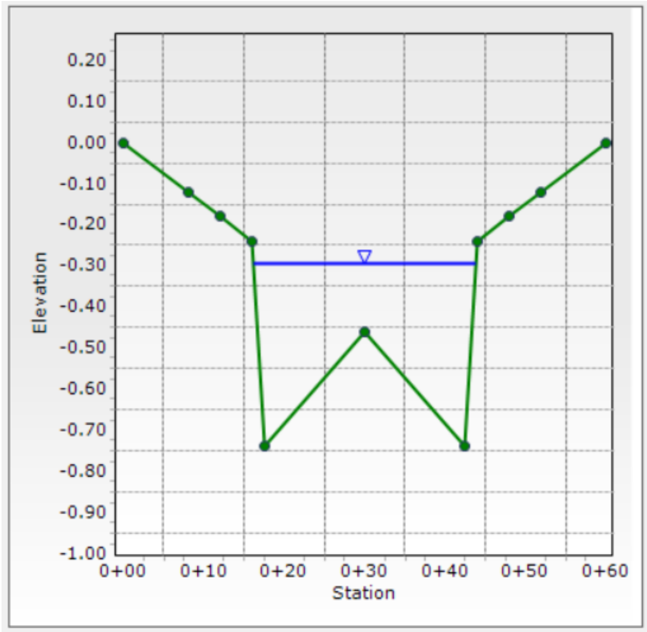


See vicinity map for cross section location.

Cross Section for CROSS SECTION 4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 ft/ft
Normal Depth	5.29 in
Discharge	29.76 cfs



See vicinity map for cross section location.

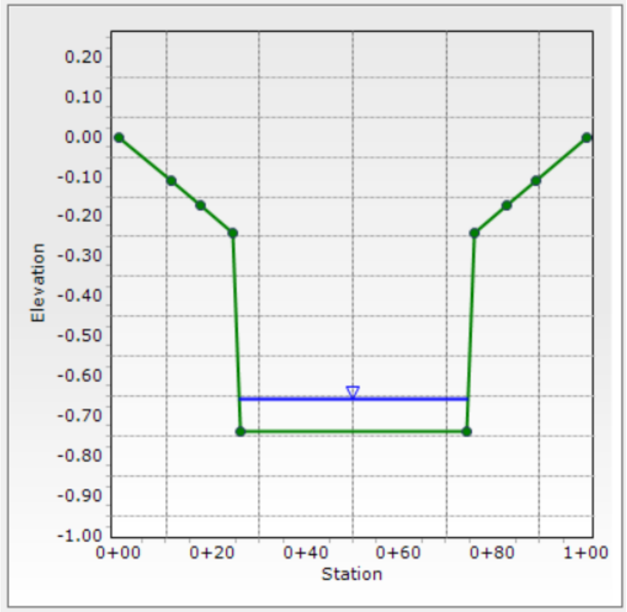
Cross Section for CROSS SECTION 5

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.020 ft/ft
Normal Depth	1.00 in
Discharge	12.49 cfs



See vicinity map for cross section location.

Cross Section for CROSS SECTION 6

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.044 ft/ft
Normal Depth	1.32 in
Discharge	2.05 cfs