

June 9, 2025

Daniel Torres, PE
Principal Engineer
El Paso County Department of Public Works
2880 International Circle
Colorado Springs, CO 80910

RE: Filing 1A Amendment 1 – Drainage Conformance Letter

Mr. Torres,

Purpose:

This drainage conformance letter provides a summary of the modifications made to the approved Filing 1A Construction Documents and the drainage implications associated with these changes. The purpose of this amendment is to extend the culvert to allow for a cohesive walking surface for the meandering trail that runs along the back of lots fronting Cattlemen Run.

Previously Approved Plan & Report:

Per the Final Drainage Report for Mayberry, Colorado Springs – Filing No. 1A Replat done by JPS Engineering and approved by El Paso County Planning & Community Development Department on June 27th, 2022, a culvert conveys runoff from the existing culverts under Highway 94, Basin EC11 to a swale which would convey the runoff through the culvert EC11 just north of the Atchison Way and Cattlemen Run intersection. Culvert EC11 conveys offsite runoff to Channel C, which is ultimately tributary to the Log Road roadside ditch. During larger storm events, the Filing No. 1A Final Drainage Report describes the headwater on the northern side of culvert EC11 reaching levels that may overtop Cattlemen Run and use Atchison Way as an emergency overflow conveyance.

Proposed Modification:

The proposed modifications involves the adjustment of the berm grading and extending the existing culvert (EC11) further north by approximately 160 feet. The purpose of the culvert extension is to allow for a cohesive walking surface for the meandering trail without the need to insert a bridge over the channel. The existing 30.00" flared end section will be moved 160' north of its previously approved location. During major storm events, the area between Filing 1 Lot 15 and Filing 3 Lot 1 will act as an emergency overflow where water will continue south and utilize Atchison Way as the conveyance to continue south to Channel C.

The rest of the grading and drainage infrastructure remains consistent with the original approved plans.

Drainage Impact Assessment:

A drainage analysis was performed to evaluate the impacts of the proposed berm modifications and the relocation of the flared end section. Flow rates from the JPS Engineering Final Drainage Report were used in the analysis. As documented in the approved report, the design flow is 24.4 CFS and the major storm flow is 149.5 CFS.

A culvert analysis was conducted using Hydraflow Express, incorporating the proposed berm grading and updated culvert length. The results indicate that during major storm events, runoff will begin to overtop at elevation 6068 and flow south between Lots 6 and 15 within the proposed sunken emergency overflow path, providing additional conveyance capacity. The flow will ultimately overtop Atchison Way, consistent with the approved drainage plan.

To verify that homes on Lots 6 and 15 remain protected during such events, a weir analysis was performed using the FHWA Hydraulic Toolbox. This analysis determined the water surface elevation at the point of overtopping the back of sidewalk along Cattlemen Run to be 6067.34. This elevation is below the top of foundation and finished floor elevations of the adjacent existing and proposed homes, confirming no risk of flooding. The emergency overflow will be contained within Tract area.

Under minor storm events or dry conditions, the emergency overflow path between Lots 6 and 15 will function as a dry swale.

Please see the appendices for relevant information from the approved drainage report and the hydraulic computations.

Conclusion:

This amendment proposes a minor modification that aligns with the original drainage design intent. No additional stormwater detention or conveyance features are required, and no adverse impacts are anticipated downstream, as flow volumes are not increased beyond the design assumptions outlined in the approved Filing 1 drainage report.



Sincerely,

R&R Engineers-Surveyors, Inc.



Tim Stackhouse, PE
Senior Project Manager

APPENDIX A

REFERENCED INFORMATION

The site is impacted by several large off-site drainage areas within the Ellicott Consolidated Drainage Basin. Off-site flows from Basin EC11 north of this property cross State Highway 94 in a triple 30-inch CMP culvert crossing, and continue flowing southeasterly through an existing grass-lined swale across Basin D to Design Point #5, with historic peak flows of $Q_5 = 30.6$ cfs and $Q_{100} = 174.9$ cfs (SCS Method).

Off-site flows from Basin EC10 north of this property cross State Highway 94 in another triple 30-inch CMP culvert crossing near the northeast corner of this site. These flows drain through an existing grass-lined swale across Basin E to Design Point #6, with historic peak flows of $Q_5 = 19.1$ cfs and $Q_{100} = 111.4$ cfs (SCS Method). As shown on Sheet EX2, two existing driveway culverts on the south side of SH94 convey flows from the roadside ditch on the south side of SH94 easterly to converge with the existing swale on the downstream side of the triple 30-inch CMP culverts, combining with Basin EC10. These flows continue southeasterly in the existing swale within Basin E.

Drainage from Basins A-C continues flowing southeasterly off-site within existing broad natural channels through the adjoining properties to the south and east. The downstream drainage continues southeast to a more defined natural channel, forming the West Tributary to the Middle Fork of Black Squirrel Creek. Historic drainage from Basins D and E flows southeast to the westerly ditch along "Old" Log Road, then turns east and follows the southerly ditch of Handle Road to its confluence with the main channel of the Middle Fork of Black Squirrel Creek.

2. Developed Drainage Conditions

The developed drainage basins and projected flows are shown in Figures D1, D1.1, and D2.1 (Appendix E). The developed site has been divided into five major basins (A-E) and six major design points (DP1-DP6), as shown on the enclosed Drainage Plan. Hydrologic flow schematics and calculations are enclosed in Appendix B. The development of Mayberry, Colorado Springs Phase One lies within Basins C, D, and E, and developed flows from the initial phase of the project impact Design Points #5 and #6.

Off-site Basin EC11 will combine with flows from on-site Basins C and D at Design Point #5, with undetained developed peak flows of $Q_5 = 226.6$ cfs and $Q_{100} = 461.4$ cfs. Developed flows at this location will be detained to historic levels by routing flows through the proposed Detention Ponds C1 and D prior to discharging at the easterly site boundary. Detention Pond C1 will be located at the southeast corner of the Filing No. 1 development area, and this pond will be constructed with the initial phase of development. Detention Pond D will be located at the southeast corner of the Phase 1 development area, and this pond will be constructed with Filing No. 3.

As summarized in Appendix B2, based on the calculated detention pond discharge rates, the flows from off-site Basin EC11 and detained discharges from Detention Ponds C1 and D

combine at Design Point #5 with total detained peak flows of $Q_5 = 27.1$ cfs and $Q_{100} = 170.6$ cfs (below historic rates).

Filing No. 1

Off-site flows from Basin EC11 will be conveyed southerly through Culvert EC11 flowing south within Atchison Way along the east side of Filing No. 1. The proposed 30" RCP culvert provides sufficient capacity to convey the off-site flow within the allowable criteria for local street overtopping. The culvert headwater depth will be conveyed within the allowable street capacity of Atchison Way (allowable 100-year street capacity of approximately 215.2 cfs per Appendix D1).

Storm sewer C1.2-C1.5A consists of a 30"-36" RCP system extending east on Village Main Street from Market Place Drive to connect with Storm Sewer C1.6 at the east boundary of Filing No. 1. Flows from Basins C1.2, C1.3, C1.4, C1.5, and C1.6 will be intercepted by storm inlets discharging into this system.

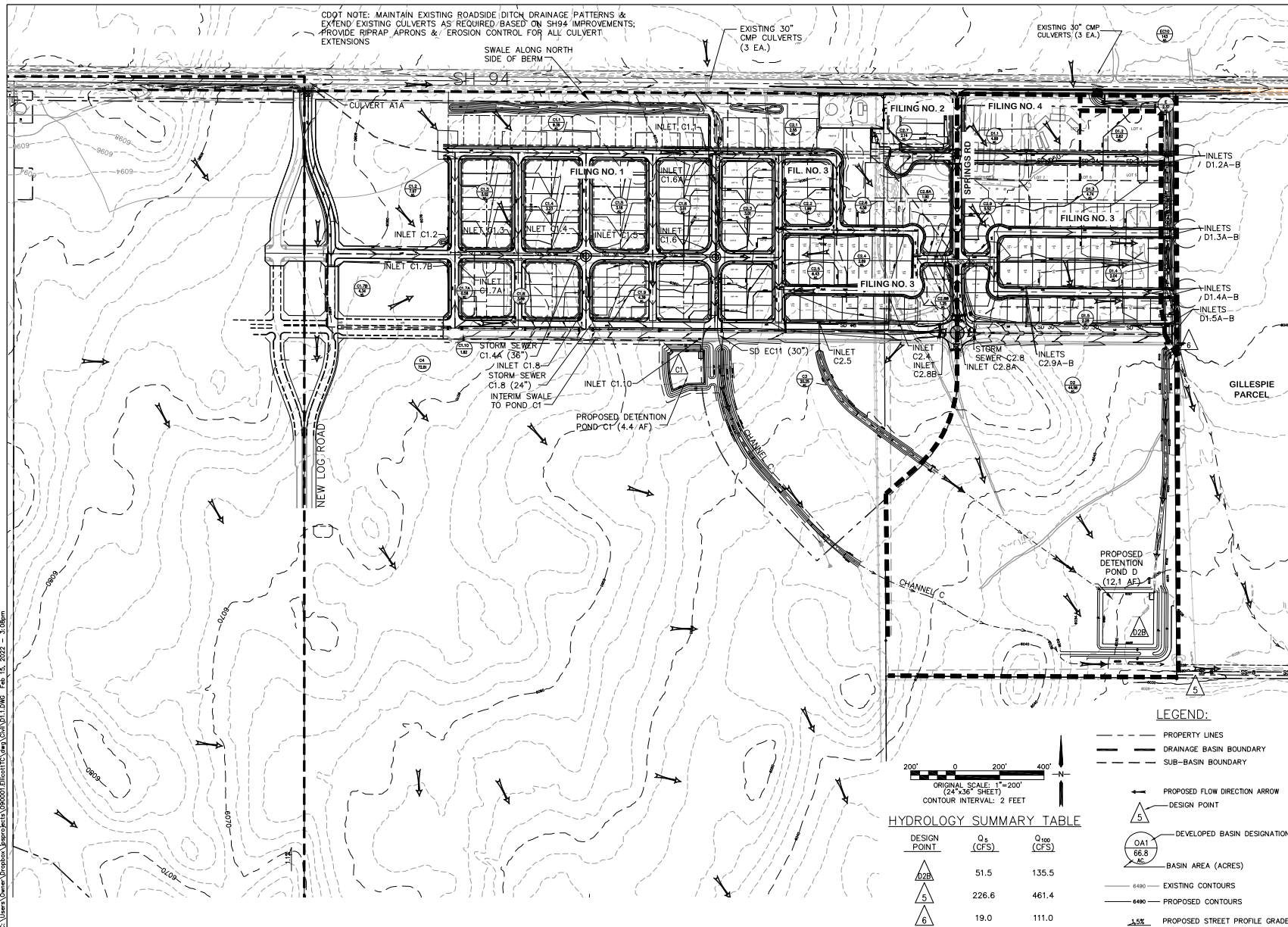
Storm sewer C1.8 consists of a 24-inch RCP storm sewer extending east on Mayberry Drive from Garden Park Avenue to connect with Storm Sewer C1.9 at the east boundary of Filing No. 1.

Combined Filing No. 1 flows from Basins C1.1-C1.10 will drain to Detention Pond C1 at the southeast corner of Filing No. 1. Developed peak flows entering Detention Pond C1 at Design Point #C1.10A are calculated as $Q_5 = 37.2$ cfs and $Q_{100} = 90.6$ cfs (Rational Method).

3. Emergency Conditions Analysis

In the event of clogging, the storm inlets within the Phase 1 development area will overflow to the adjoining public streets, which all generally flow southeasterly. Emergency overflows would sheet flow southeasterly along the public streets, flowing into Detention Pond C1, Channels C1-C3, and Detention Pond D.

There are no significant upstream developed areas and no existing off-site detention facilities impacting the Phase 1 area. In accordance with guidance in the City of Colorado Springs Drainage Criteria Manual (Chapter 6, Section 12.0), off-site Basin EC11 has been evaluated to ensure that the fully developed emergency conditions off-site flows can be safely conveyed through the Atchison Way corridor within the Mayberry site. As detailed in the HEC-HMS calculations in Appendix B2, the fully developed flows from Basin EC11 have been calculated as $Q_5 = 49.2$ cfs and $Q_{100} = 196.0$ cfs (SCS Method). In addition to the capacity of the 30" Storm Drain EC11, Atchison Way provides an allowable 100-year street capacity of approximately 215.2 cfs (see street capacity calculations in Appendix D1), which is sufficient to convey the emergency conditions off-site flows through the site within the right-of-way.



MAYBERRY, COLORADO SPRINGS

JPS
ENGINEERING

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80903

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-800-922-1987
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FOR THE MARKING OF UNDERGROUND
MEMBER UTILITIES.

No.	REVISION	BY	DATE

PHASE 1 PUD
DEVELOPED DRAINAGE PLAN

HORIZ. SCALE:	1"=200'	DRAWN:	B
VERT. SCALE:	N/A	DESIGNED:	JF
SURVEYED:	RAMPART	CHECKED:	JF
CREATED:	12/03/00	LAST MODIFIED:	2/15/01
PROJECT NO:	090001	MODIFIED BY:	JF

D1.1

MAYBERRY, COLORADO SPRINGS - FILING 1A
CULVERT DESIGN SUMMARY

BASIN	DESIGN POINT	RD CL ELEV	INV IN ELEV	INV OUT ELEV	PIPE LENGTH (FT)	# of CULVERTS	PIPE DIA (FT)	TOTAL Q ₅ (CFS)	PER PIPE Q ₅ (CFS)	Q ₅ MAX ALLOWABLE HEADWATER ¹	CALC Q ₅ HW ELEV	TOTAL Q ₁₀₀ (CFS)	PER PIPE Q ₁₀₀ (CFS)	Q ₁₀₀ MAX ALLOWABLE HEADWATER ²	CALC Q ₁₀₀ HW ELEV
EC11	EC11	6065.64	6060.50	6047.87	920.1	1	2.5	24.4	24.4	6063.0	6062.99	149.5	149.5	6066.2	6066.1

¹ Q₅ MAX. ALLOWABLE HEADWATER, HW/D = 1.0

² Q₁₀₀ MAX. ALLOWABLE HEADWATER = 12" DEPTH AT GUTTER FLOWLINE (PER DCM TABLE 6-1)

HY-8 Culvert Analysis Report

Crossing Discharge Data – Culvert EC11

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

Minimum Flow: 10 cfs

Design Flow: 24.4 cfs

Maximum Flow: 149.5 cfs

Table 1 - Summary of Culvert Flows at Crossing: Crossing EC11

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert EC11 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6061.97	10.00	10.00	0.00	1
6062.96	23.95	23.95	0.00	1
6062.99	24.40	24.40	0.00	1
6065.67	51.85	50.17	1.51	34
6065.78	65.80	50.27	15.28	6
6065.85	79.75	50.34	29.28	5
6065.92	93.70	50.41	43.11	4
6065.97	107.65	50.48	57.10	4
6066.02	121.60	50.54	70.82	3
6066.07	135.55	50.60	84.81	3
6066.11	149.50	50.66	98.77	3
6065.64	50.15	50.15	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing EC11

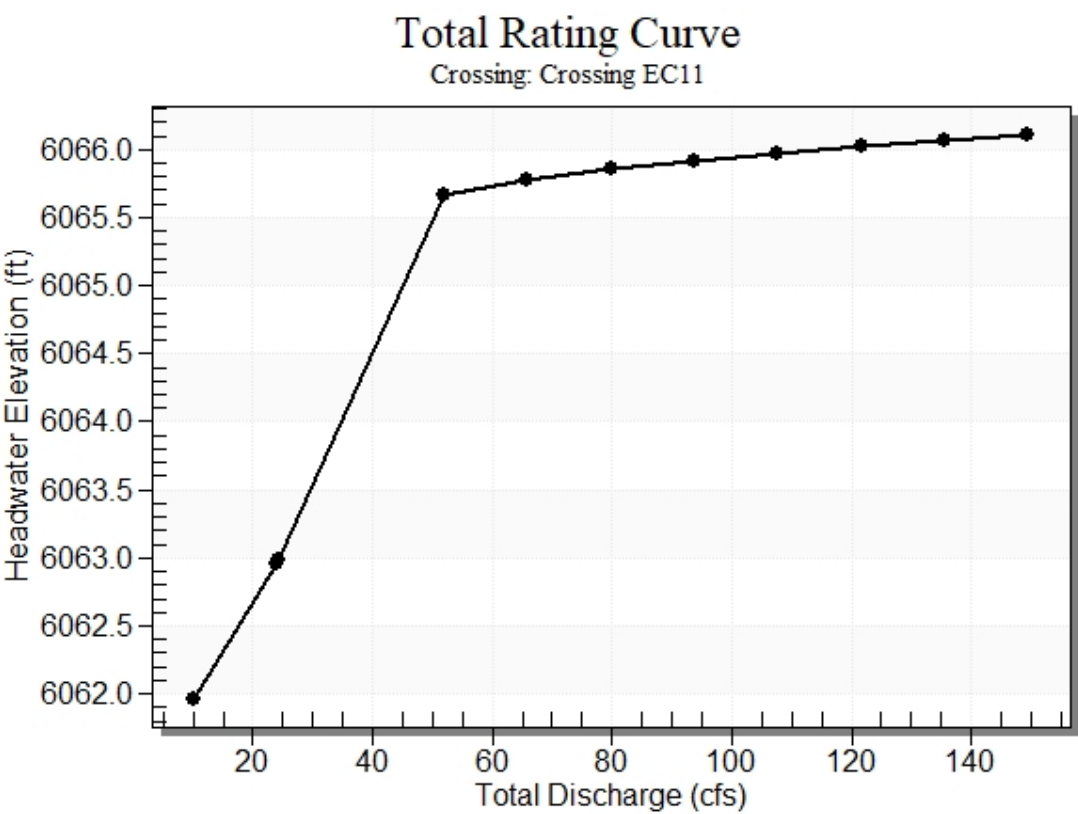


Table 2 - Culvert Summary Table: Culvert EC11

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)
10.00	10.00	6061.97	1.468	0.0*	1-S2n	0.753	1.054	0.753	0.438	7.763	1.660
23.95	23.95	6062.96	2.459	0.0*	1-S2n	1.214	1.662	1.214	0.722	9.797	2.226
24.40	24.40	6062.99	2.490	0.0*	1-S2n	1.228	1.678	1.228	0.730	9.843	2.240
51.85	50.17	6065.67	5.020	5.170	7-M2c	2.500	2.301	2.301	1.111	10.614	2.839
65.80	50.27	6065.78	5.033	5.279	7-M2c	2.500	2.303	2.303	1.264	10.631	3.052
79.75	50.34	6065.85	5.044	5.354	7-M2c	2.500	2.304	2.304	1.402	10.645	3.232
93.70	50.41	6065.92	5.053	5.416	7-M2c	2.500	2.304	2.304	1.527	10.657	3.388
107.65	50.48	6065.97	5.062	5.472	7-M2c	2.500	2.305	2.305	1.643	10.668	3.527
121.60	50.54	6066.02	5.070	5.522	7-M2c	2.500	2.306	2.306	1.752	10.679	3.652
135.55	50.60	6066.07	5.078	5.570	7-M2c	2.500	2.306	2.306	1.853	10.689	3.767
149.50	50.66	6066.11	5.086	5.615	7-M2c	2.500	2.307	2.307	1.950	10.700	3.873

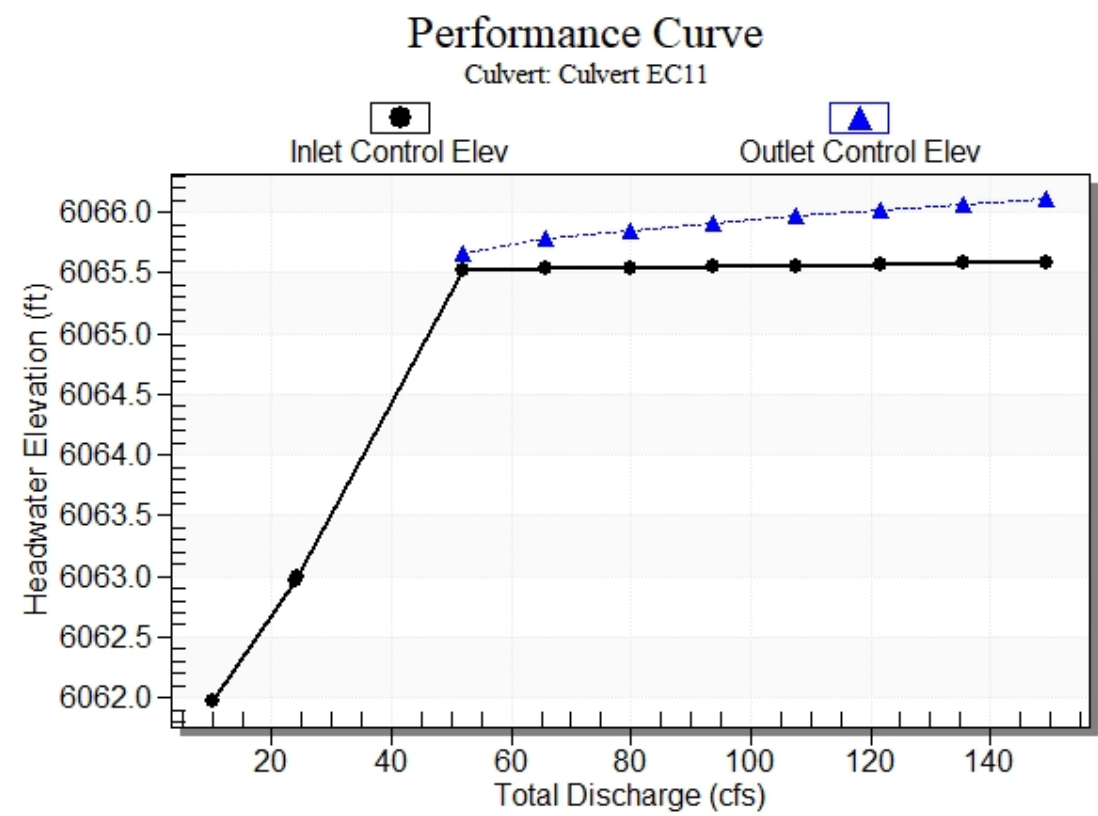
* Full Flow Headwater elevation is below inlet invert.

Straight Culvert

Inlet Elevation (invert): 6060.50 ft, Outlet Elevation (invert): 6047.87 ft

Culvert Length: 920.19 ft, Culvert Slope: 0.0137

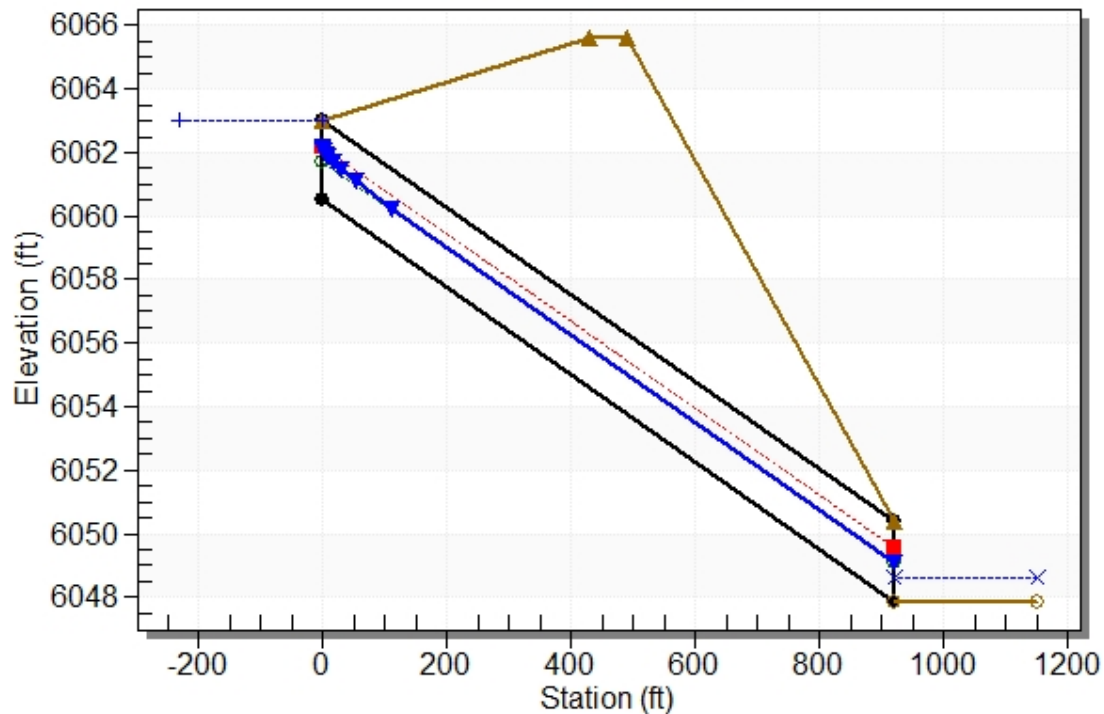
Culvert Performance Curve Plot: Culvert EC11



Water Surface Profile Plot for Culvert: Culvert EC11

Crossing - Crossing EC11, Design Discharge - 24.4 cfs

Culvert - Culvert EC11, Culvert Discharge - 24.4 cfs



Site Data - Culvert EC11

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6060.50 ft

Outlet Station: 920.10 ft

Outlet Elevation: 6047.87 ft

Number of Barrels: 1

Culvert Data Summary - Culvert EC11

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0130

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting

Inlet Depression: None

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing EC11)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
10.00	6048.31	0.44	1.66	0.11	0.47
23.95	6048.59	0.72	2.23	0.18	0.50
24.40	6048.60	0.73	2.24	0.18	0.51
51.85	6048.98	1.11	2.84	0.28	0.54
65.80	6049.13	1.26	3.05	0.32	0.54
79.75	6049.27	1.40	3.23	0.35	0.55
93.70	6049.40	1.53	3.39	0.38	0.56
107.65	6049.51	1.64	3.53	0.41	0.56
121.60	6049.62	1.75	3.65	0.44	0.57
135.55	6049.72	1.85	3.77	0.46	0.57
149.50	6049.82	1.95	3.87	0.49	0.58

Tailwater Channel Data - Crossing EC11

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 12.00 ft

Side Slope (H:V): 4.00 (_:1)

Channel Slope: 0.0040

Channel Manning's n: 0.0300

Channel Invert Elevation: 6047.87 ft

Roadway Data for Crossing: Crossing EC11

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 100.00 ft

Crest Elevation: 6065.64 ft

Roadway Surface: Paved

Roadway Top Width: 60.00 ft

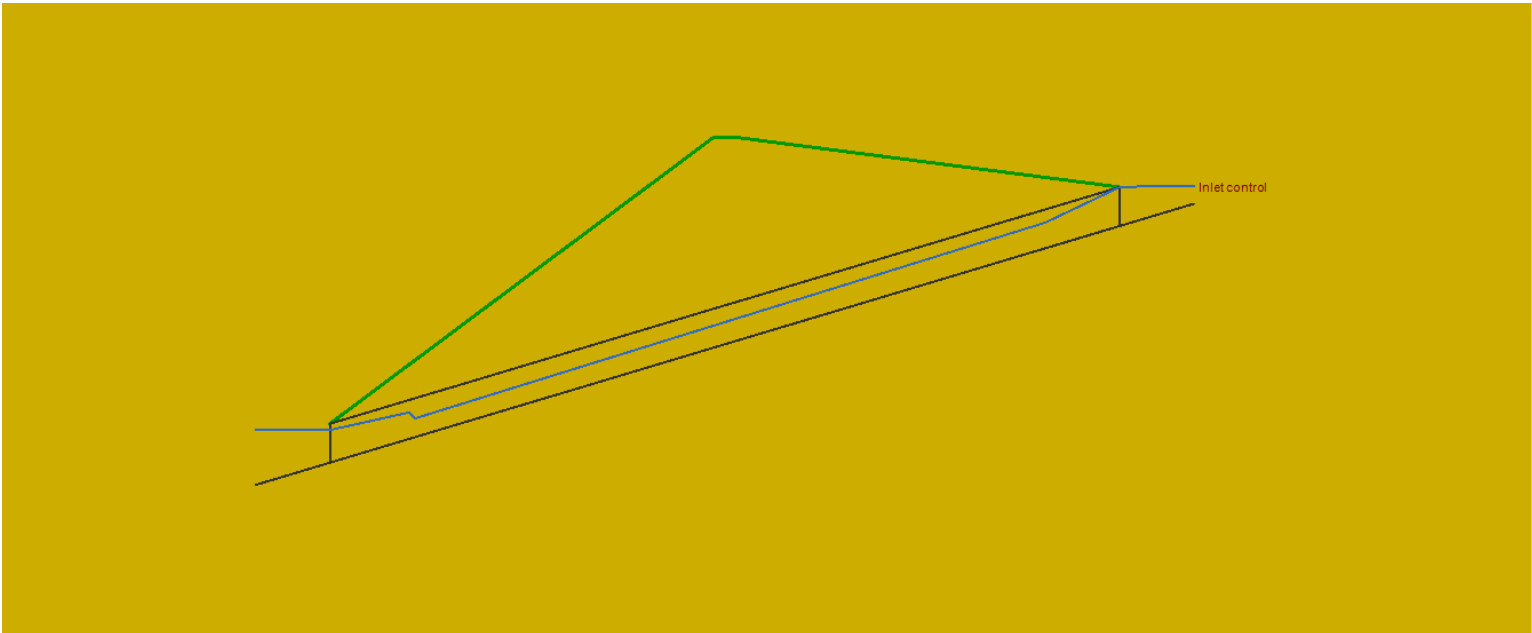
APPENDIX B

HYDRAULIC COMPUTATIONS

Culvert Report

Filing 1A Amendment - EC11 Culvert Extention (Design Flow)

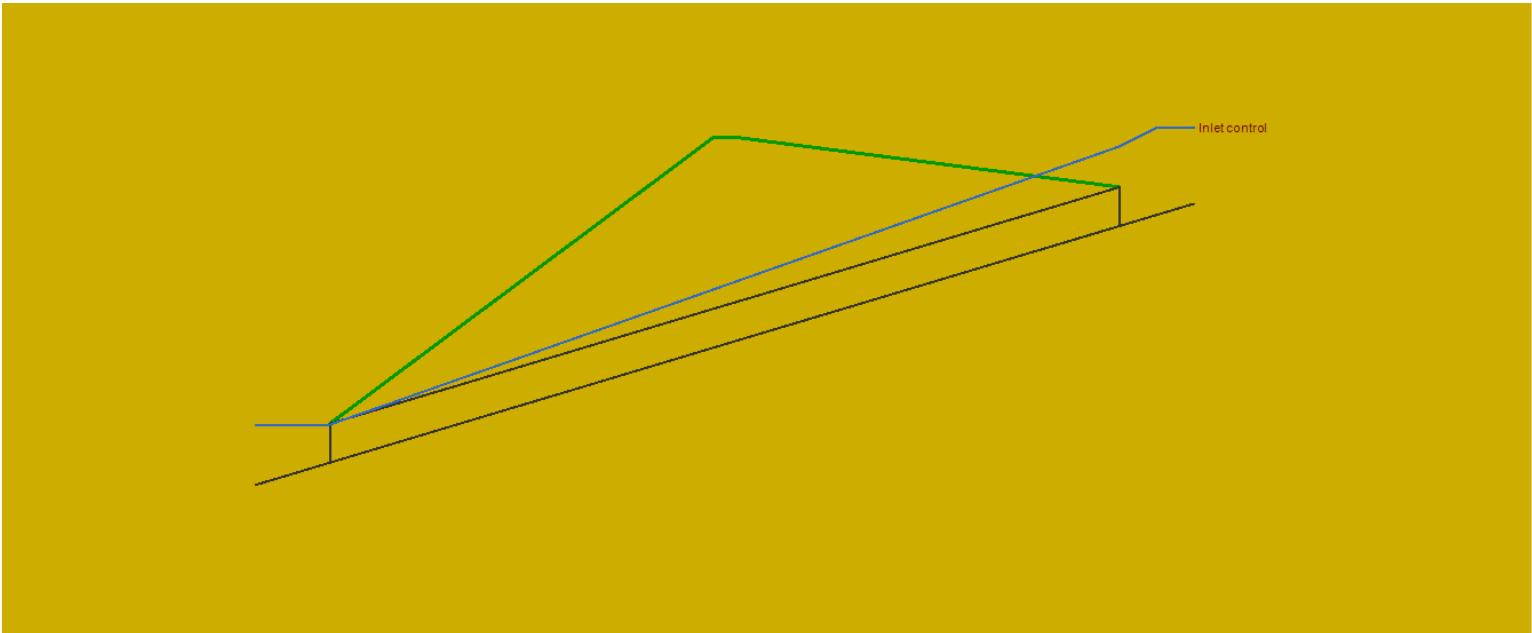
Invert Elev Dn (ft)	= 6047.08	Calculations	
Pipe Length (ft)	= 1062.00	Qmin (cfs)	= 10.00
Slope (%)	= 1.43	Qmax (cfs)	= 150.00
Invert Elev Up (ft)	= 6062.30	Tailwater Elev (ft)	= (dc+D)/2
Rise (in)	= 30.0		
Shape	= Circular	Highlighted	
Span (in)	= 30.0	Qtotal (cfs)	= 25.00
No. Barrels	= 1	Qpipe (cfs)	= 25.00
n-Value	= 0.012	Qovertop (cfs)	= 0.00
Culvert Type	= Circular Concrete	Veloc Dn (ft/s)	= 5.68
Culvert Entrance	= Groove end projecting (C)	Veloc Up (ft/s)	= 7.02
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.2	HGL Dn (ft)	= 6049.18
		HGL Up (ft)	= 6064.00
Embankment		Hw Elev (ft)	= 6064.87
Top Elevation (ft)	= 6068.00	Hw/D (ft)	= 1.03
Top Width (ft)	= 30.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 60.00		



Culvert Report

Filing 1A Amendment - EC11 Culvert Extention (100-year Flow)

Invert Elev Dn (ft)	= 6047.08	Calculations	
Pipe Length (ft)	= 1062.00	Qmin (cfs)	= 10.00
Slope (%)	= 1.43	Qmax (cfs)	= 150.00
Invert Elev Up (ft)	= 6062.30	Tailwater Elev (ft)	= (dc+D)/2
Rise (in)	= 30.0		
Shape	= Circular	Highlighted	
Span (in)	= 30.0	Qtotal (cfs)	= 150.00
No. Barrels	= 1	Qpipe (cfs)	= 59.27
n-Value	= 0.012	Qovertop (cfs)	= 90.73
Culvert Type	= Circular Concrete	Veloc Dn (ft/s)	= 12.14
Culvert Entrance	= Groove end projecting (C)	Veloc Up (ft/s)	= 12.07
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.2	HGL Dn (ft)	= 6049.52
		HGL Up (ft)	= 6067.42
Embankment		Hw Elev (ft)	= 6068.63
Top Elevation (ft)	= 6068.00	Hw/D (ft)	= 2.53
Top Width (ft)	= 30.00	Flow Regime	= Inlet Control
Crest Width (ft)	= 60.00		



Hydraulic Analysis Report

Project Data

Project Title: EC11 Overflow Weir at Cattleman Run

Designer: Lynn O'Grady

Project Date: Wednesday, May 21, 2025

Project Units: U.S. Customary Units

Notes: This hydraulic analysis report was utilized to calculate the water level the 100-year storm event emergency overflow overtops Cattleman Run before it continues south within Atchison Way.

Weir Analysis: Weir Analysis

Notes:

Input Parameters

Irregular Weir

Coefficient: 3.1000

Irregular Weir Geometry

Station (ft)	Elevation (ft)
0.00	6066.14
61.40	6066.21

Tailwater (above crest): 0.00 ft

Applied Coefficients

0	3.03061
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Flow: 149.5000 cfs

Result Parameters

Head: 0.8992 ft