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February 28, 2023

El Paso County Planning and Community Development Department
2880 International Circle
Colorado Springs, CO 80910

**SUBJECT: Rollin Ridge Filing No. 1 Subdivision
Certification Letter**

Ladies and Gentlemen:

Based upon information gathered from periodic site visits to the project, JPS Engineering, Inc. is of the opinion that the subdivision improvements have been constructed in general compliance with the approved design plans as filed with El Paso County.

The site and adjacent properties (as affected by work performed under the County permit) appear to be stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements.

Drainage improvements for this project include two on-site private Detention Basins. The facilities provide the required storage volume and will meet the required release rates, as documented by the attached MHFD design forms. The As-Built drawings accurately depict the installation of the Detention Basin improvements and verify the detention volume provided.

Sincerely,
JPS Engineering, Inc.

John P. Schwab, P.E.
Colorado P.E. No. 29891



**ACCEPTED for FILE
Engineering Review**

03/09/2023 10:04:06 AM
dotlaforce

**EPC Planning & Community
Development Department**

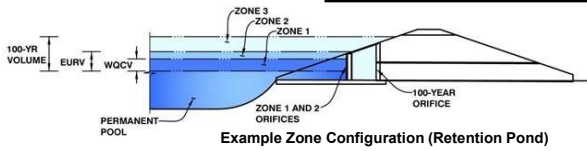
Not For Construction

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **ROLLIN RIDGE ESTATES**

Basin ID: **A - INTERIM CONDITIONS (FILING NO. 1 RESIDENTIAL ONLY)**



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.62	0.268	Orifice Plate
Zone 2 (EURV)	4.52	0.136	Orifice Plate
Zone 3 (100-year)	9.44	1.261	Weir&Pipe (Restrict)
		1.665	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft ²
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	4.52	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft ²
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft ²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.39	2.79					
Orifice Area (sq. inches)	0.99	1.38	1.38					
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft ²
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	9.80	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	8.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	% grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _g =	9.80	N/A	feet
Over Flow Weir Slope Length =	8.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	13.67	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	44.80	N/A	ft ²
Overflow Grate Open Area w/ Debris =	22.40	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	1.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	30.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	19.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	3.28	N/A	ft ²
Outlet Orifice Centroid =	0.89	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.84	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =	11.00	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	30.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth =	0.98	feet
Stage at Top of Freeboard =	12.98	feet
Basin Area at Top of Freeboard =	0.51	acres

Routed Hydrograph Results

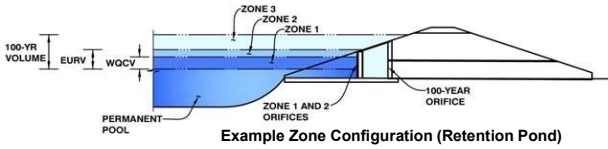
	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =									
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.07
Calculated Runoff Volume (acre-ft) =	0.268	0.404	0.270	0.413	0.917	2.425	3.490	5.015	7.948
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.267	0.403	0.270	0.413	0.917	2.425	3.492	5.013	7.943
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.02	0.16	0.52	0.78	1.11	1.72
Predevelopment Peak Q (cfs) =	0.0	0.0	0.5	1.0	8.8	28.5	42.4	60.7	94.0
Peak Inflow Q (cfs) =	4.9	7.4	5.0	7.6	16.7	43.5	62.4	88.9	139.2
Peak Outflow Q (cfs) =	0.2	0.2	0.2	0.2	0.3	13.8	35.5	55.0	116.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.0	0.5	0.8	0.9	1.2
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Gate 1	Overflow Gate 1	Spillway	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.3	0.8	1.2	1.2
Max Velocity through Gate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	46	39	46	64	88	84	78	70
Time to Drain 99% of Inflow Volume (hours) =	42	50	42	50	71	100	97	92	87
Maximum Ponding Depth (ft) =	3.46	4.35	3.48	4.40	6.83	10.14	10.44	11.08	11.75
Area at Maximum Ponding Depth (acres) =	0.13	0.16	0.14	0.16	0.25	0.39	0.40	0.43	0.46
Maximum Volume Stored (acre-ft) =	0.245	0.376	0.248	0.385	0.874	1.925	2.043	2.312	2.604

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: **ROLLIN RIDGE ESTATES**

Basin ID: **B**



	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.17	0.072	Orifice Plate
Zone 2 (EURV)	1.52	0.039	Orifice Plate
Zone 3 (100-year)	3.30	0.266	Weir&Pipe (Restrict)
		0.377	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = ft (distance below the filtration media surface)
 Underdrain Orifice Diameter = inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = ft²
 Underdrain Orifice Centroid = feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Orifice Plate = ft (relative to basin bottom at Stage = 0 ft)
 Orifice Plate: Orifice Vertical Spacing = inches
 Orifice Plate: Orifice Area per Row = inches

Calculated Parameters for Plate

WQ Orifice Area per Row = ft²
 Elliptical Half-Width = feet
 Elliptical Slot Centroid = feet
 Elliptical Slot Area = ft²

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.44	0.89					
Orifice Area (sq. inches)	0.52	0.56	0.56					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Invert of Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Depth at top of Zone using Vertical Orifice = ft (relative to basin bottom at Stage = 0 ft)
 Vertical Orifice Diameter = inches

Calculated Parameters for Vertical Orifice

Vertical Orifice Area = ft²
 Vertical Orifice Centroid = feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, H _o =	2.60	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	0.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	2.50	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H _g =	2.60	N/A	feet
Over Flow Weir Slope Length =	2.50	N/A	feet
Grate Open Area / 100-yr Orifice Area =	5.39	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	7.00	N/A	ft ²
Overflow Grate Open Area w/ Debris =	3.50	N/A	ft ²

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.00	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	12.40		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	1.30	N/A	ft ²
Outlet Orifice Centroid =	0.58	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	1.96	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = ft (relative to basin bottom at Stage = 0 ft)
 Spillway Crest Length = feet
 Spillway End Slopes = H:V
 Freeboard above Max Water Surface = feet

Calculated Parameters for Spillway

Spillway Design Flow Depth = feet
 Stage at Top of Freeboard = feet
 Basin Area at Top of Freeboard = acres

Routed Hydrograph Results

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in) =	0.072	0.111	0.075	0.110	0.202	0.450	0.655	0.962	1.616
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.071	0.110	0.074	0.109	0.201	0.449	0.653	0.961	1.614
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.01	0.12	0.37	0.60	0.92	1.55
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.2	1.4	4.4	7.1	10.9	18.4
Peak Inflow Q (cfs) =	1.3	2.0	1.4	2.0	3.7	8.2	11.8	17.3	28.9
Peak Outflow Q (cfs) =	0.0	0.1	0.0	0.1	0.1	3.8	7.5	10.5	22.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.1	0.9	1.1	1.0	1.2
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Plate	Overflow Gate 1	Overflow Gate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.5	1.1	1.5	1.7
Max Velocity through Gate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	47	40	47	61	64	60	55	46
Time to Drain 99% of Inflow Volume (hours) =	42	51	43	51	67	75	72	69	63
Maximum Ponding Depth (ft) =	1.11	1.45	1.14	1.44	2.13	2.86	3.01	3.41	4.09
Area at Maximum Ponding Depth (acres) =	0.10	0.12	0.10	0.12	0.14	0.16	0.17	0.18	0.19
Maximum Volume Stored (acre-ft) =	0.065	0.102	0.068	0.102	0.191	0.301	0.327	0.395	0.523