



INNOVATIVE DESIGN. CLASSIC RESULTS.

**STERLING RANCH MDDP AMENDMENT NO. 2 &
PRELIMINARY DRAINAGE REPORT
FOR
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1**

Prepared for:
CLASSIC SRJ LAND, LLC
2138 FLYING HORSE CLUB DRIVE
COLORADO SPRINGS CO 80921
(719) 592-9333

Prepared by:
CLASSIC CONSULTING
619 N. CASCADE AVE SUITE 200
COLORADO SPRINGS CO 80903
(719) 785-0790

Job No. 1183.22

PCD Project No.
SKP-22-004 / SP-22-004



Basin SC-1 ($Q_5 = 2$ cfs, $Q_{100} = 6$ cfs) is a small basin due west of the elementary school site that consists of mainly the eastern slope of the Sand Creek channel. No impervious development is proposed other than the required maintenance access road/trail as presented on the Sand Creek channel plans. At this time, this area is not anticipated to be captured and routed to a formal stormwater quality facility. However, given the minimal unconnected impervious area and sizeable receiving pervious are within this basin, the WQCV reduction = 100% with 0 untreated WQCV. (See Appendix)

After development of the Sterling Ranch East Preliminary Plan No. 1, the majority of the upstream tributary area of Basins EX-9, EX-9A and EX-10A is routed to proposed treatment facilities (Pond FSD-14A, Pond FSD-14B and FSD- 11B). The remaining portion of **Basin EX-9 ($Q_5 = 2$ cfs, $Q_{100} = 8$ cfs)** is a small basin of 6.0 ac. that will remain undeveloped and continue to sheet flow in a southerly direction and exit along the south boundary at Design Point 6. These minor flows will combine with the previously described release from Pond FSD-14B through a proposed level spreader structure. The final design and construction timing of this facility will be detailed in a future Final Drainage Report for this area.

Flow does not match
summary table

The remaining portion of **Basin EX-9A ($Q_5 = 4$ cfs, $Q_{100} = 16$ cfs)** is a basin of 12.7 ac. that will remain undeveloped and continue to sheet flow in a southerly direction and exit along the south boundary at Design Point 6A. The pre-development flow at this location **Design Point 6A ($Q_5 = 7$ cfs, $Q_{100} = 19$ cfs)**. Thus, the downstream corridor will continue to adequately handle these off-site flows.

The remaining portion of **Basin EX-10A ($Q_5 = 18$ cfs, $Q_{100} = 50$ cfs)** is a basin of 60.4 ac. that will remain undeveloped and continue to sheet flow in a southerly direction and exit along the south boundary at Design Point 7. The pre-development flow at this location **Design Point 7 ($Q_5 = 110$ cfs, $Q_{100} = 249$ cfs)**. Thus, the downstream corridor will continue to adequately handle these off-site flows.

STERLING RANCH EAST PRELIMINARY PLAN NO. 1

Flow Comparison along South Boundary

This Report (SWMM 5.1) Pre-Dev. Conditions			This Report (SWMM 5.1) Developed Conditions		2018 SR MDDP (HEC-HMS) Pre-Dev. Conditions	
Design Point (South Bndy.)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)
4	46	105	0.5	3.5	21.5	107.4
4A	1	5	0.5	3.5		
5	5	23	4	10	1.7	20.5
5A	2	9	2	7		
6	59	122	2.0	48.9	23.9	125.2
6A	7	19	4	11		
7	110	249	18	50	57.1	277.9
56	60	160	60	160	42.5	202.9

Include discussion on DP's
where developed 5-year
flow is large than 2018
MDDP 5-year flows

FLOODPLAIN STATEMENT

Portions of this site are located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Numbers 08041C 0533G and 08041C 0535G with effective dates of December 7, 2018 and the previously mentioned LOMR 08-08-0541P with an effective date of July 23, 2009. (See Appendix). JR Engineering, LLC is coordinating a CLOMR/LOMR for this stretch of Sand Creek that is adjacent to the site and defined as Reach SC-8 (south of Briargate Pkwy.) and SC-9 north of Briargate Pkwy.)

DRAINAGE AND BRIDGE FEES

This site lies entirely within the Sand Creek Drainage Basin boundaries.

Fees are calculated using the following impervious acreage method approved by El Paso County. The final fee estimate will be included in the Final Drainage Report(s), however, the following represent fee estimates based on the Sterling Ranch East Preliminary Plan No. 1 submittal with a total area of 321.37 acres with the following different land uses proposed:

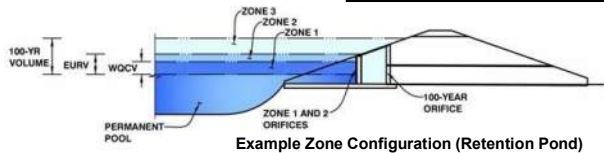


DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: **STERLING RANCH EAST PRELIMINARY PLAN NO. 1**

Basin ID: **POND FSD-14B**



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.87	1.242	Orifice Plate
Zone 2 (EURV)	5.31	3.352	Orifice Plate
Zone 3 (100-year)	6.74	2.380	Weir&Pipe (Restrict)
Total (all zones)		6.974	

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)

Centroid 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 = sq. 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	1.40	2.80	4.20				
Orifice Area (sq. inches)	5.00	5.00	16.00	16.00				

	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 with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Overflow Weir Front Edge Height, H_o = ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = feet
Overflow Weir Grate Slope = H:V
Horiz. Length of Weir Sides = feet
Overflow Grate Type =
Debris Clogging % = %

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = feet
Overflow Weir Slope Length = feet
Grate Open Area / 100-yr Orifice Area =
Overflow Grate Open Area w/o Debris = ft²
Overflow Grate Open Area w/ Debris = ft²

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

Depth to Invert of Outlet Pipe = ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = inches
Restrictor Plate Height Above Pipe Invert = inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = ft²
Outlet Orifice Centroid = feet
Half-Central Angle of Restrictor Plate on Pipe = 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
Basin Volume at Top of Freeboard = acre-ft

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.48
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.48
CUHP Runoff Volume (acre-ft) =	1.242	4.594	3.357	4.422	5.279	6.449	7.604	9.024	13.911
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	3.357	4.422	5.279	6.449	7.604	9.024	13.911
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.6	1.2	1.6	15.1	29.9	48.9	110.3
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.02	0.03	0.24	0.47	0.78	1.75
Peak Inflow Q (cfs) =	N/A	N/A	62.8	82.7	97.1	125.5	151.1	186.4	287.4
Peak Outflow Q (cfs) =	0.6	2.1	1.5	2.0	2.6	12.3	25.1	48.9	148.6
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	1.7	1.6	0.8	0.8	1.0	1.3
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.0	0.3	0.7	1.4	2.2
Max Velocity through Grate 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) =	48	72	68	72	75	73	71	68	61
Time to Drain 99% of Inflow Volume (hours) =	51	79	73	79	83	83	82	81	77
Maximum Ponding Depth (ft) =	2.87	5.31	4.38	5.03	5.54	5.83	6.08	6.43	6.99
Area at Maximum Ponding Depth (acres) =	0.96	1.59	1.49	1.56	1.61	1.64	1.67	1.70	1.76
Maximum Volume Stored (acre-ft) =	1.242	4.599	3.151	4.143	4.951	5.439	5.836	6.443	7.396

Outflow ratio needs to be closer to 1.0

or fill these in based on 139 Ac. historic contributing area. Add a note to this sheet either way.

Developed Subcatchment Runoff

+ Basin not changed from pre-development conditions