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EPC STORMWATER REVIEW COMMENTS IN ORANGE BOXES WITH BLACK TEXT

FINAL DRAINAGE REPORT
FOR
STERLING RANCH EAST
FILING NO. 3

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PCD Project No. SF2428

FINAL DRAINAGE REPORT FOR
STERLING RANCH EAST FILING NO. 3

ENGINEER'S STATEMENT:
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

____ ____________________
Marc A. Whorton Colorado P.E. #37155 Date

OWNER'S/DEVELOPER'S STATEMENT:
I, the owner/developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: CLASSIC SRJ LAND, LLC

By: ____________________________________

Title: ____________________________________

Address: 2138 Flying Horse Club Drive

Colorado Springs, CO 80921

EL PASO COUNTY:
Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

______________________________ ____________________
Joshua Palmer, P.E. Date
County Engineer, / ECM Administrator

Conditions:

FINAL DRAINAGE REPORT FOR STERLING RANCH EAST FILING NO. 3

TABLE OF CONTENTS:

PURPOSE	Page 4
GENERAL DESCRIPTION	Page 4
EXISTING DRAINAGE CONDITIONS	Page 4
PROPOSED DRAINAGE CONDITIONS	Page 8
DETENTION/SWQ FACILITIES	Page 17
DRAINAGE CRITERIA	Page 18
FLOODPLAIN STATEMENT	Page 20
DRAINAGE AND BRIDGE FEES	Page 21
CONSTRUCTION COST OPINION	Page 22
SUMMARY	Page 23
REFERENCES	Page 24

APPENDICES

VICINITY MAP

SOILS MAP (WEB SOIL SURVEY)

F.E.M.A. MAP

HYDROLOGIC / HYDRAULIC CALCULATIONS

STORMWATER QUALITY / BMP CALCULATIONS

HGL CALCULATIONS

REFERENCE DOCUMENTS

DRAINAGE MAPS

PURPOSE

The purpose of this Final Drainage Report is to address on-site and off-site drainage patterns and identify specific drainage improvements and facilities required to minimize impacts to the adjacent properties.

GENERAL DESCRIPTION

The Sterling Ranch East Filing No. 3 is 74.745-acre site located in portions sections 33 and 34, township 12 south, range 65 west of the sixth principal meridian. 187 urban residential lots are planned along with a 11.9 ac. Elementary School site, 5.3 ac. pond tract, 3.5 ac. tract for Sand Creek and 3.6 ac. open space/buffer tract along south boundary. The site is bounded on the north by Sterling Ranch Road and planned public ROW (Lake Tahoe Drive), to the south by existing platted 5-ac. residential lots (Bar J-B Acres Filing No. 2 and Pawnee Rancheros Filing No. 2), to the east by future Sterling Ranch East Filing No. 5 (zoned for future urban development), and to the west by existing Sand Creek. The site is split between the upper portion of the Sand Creek East Fork and Sand Creek Drainage Basin. Urban single family residential is proposed in this Filing that is consistent with the approved Sterling Ranch Sketch Plan and Sterling Ranch East Preliminary Plan No. 1. (SKP-22-004 and SP-22-004)

The average soil condition reflects Hydrologic Group “A” (Blakeland loamy sand and Columbine gravelly sandy loam) and Group “B” (Pring coarse sandy loam) as determined by the “Web Soil Survey of El Paso County Area,” prepared by the Natural Resources Conservation Service (see map in Appendix).

EXISTING DRAINAGE CONDITIONS

The Sterling Ranch East Filing No. 3 property is located in the upper portion of the Sand Creek Drainage Basin with the east half of the property within the East Fork. A good portion of the site is undisturbed and covered with native grasses with no trees or other vegetation.

However, the southwest corner has been recently disturbed with the construction of the temporary detention pond (FSD-11B), a material borrow area in the central portion of the site and gravel access roads from to and from the site at the northeast corner. A gravel access road also exists along the south boundary within several public utility and access easements. Sterling Ranch Road has also recently been constructed which cuts off all historic drainage from the north. However, this site has been previously studied in the “2018 Sterling Ranch MDDP”, prepared by M&S Civil Consultants, Inc., June 2018 and most recently by “MDDP Amendment for Sterling Ranch”, prepared by JR Engineering, LLC, dated September 2022 and “Sterling Ranch MDDP Amendment No. 2 & Preliminary Drainage Report for Sterling Ranch East Preliminary Plan 1”, prepared by Classic Consulting, dated January 2023. The latter report analyzed the pre-development conditions for the flows off-site to the south. The entire site currently drains as sheet flow in a southerly direction within the previously studied pre-development basins EX-4A, EX-7, EX-7A, EX-8, EX-8A and EX-9. These are referenced in the Appendix.

The following basins are within the proposed Preliminary Plan area and also within the Sand Creek main basin boundary:

Basin EX-4A (Q_5 = 19 cfs, Q_{100} = 50 cfs) consists of the smaller portion of the property (44.2 acres) south of the Briargate Pkwy. crossing that currently sheet flows in a southwesterly direction directly into the Sand Creek main channel. These sheet flows are then conveyed downstream as channel flow towards the south property boundary. This basin differs from the MDDP as it only represents the on-site existing flows from the east side of the channel as defined by the current ownership boundary and does not include the off-site flows from the development along the west side of the channel or the significant existing off-site channel flow itself. Recent improvements within this basin include: construction of Sterling Ranch Road and its associated culvert crossing of Sand Creek (CDR-226).

Basin EX-7 (Q_5 = 46 cfs, Q_{100} = 105 cfs) consists of approximately 152.8 acres of property that sheet flows in a southerly direction. This basin is similar to the MDDP and the east basin line defines the westerly edge of the East Fork basin. The sheet flows become more concentrated towards the south end of the basin as the topography becomes steeper and more defined south of the proposed Sterling Ranch Road crossing. The existing flows exit the property along the south Sterling Ranch boundary within the well-defined natural channel at **Design Point 4**. Given the difference in hydrologic modeling (SWMM 5.1 vs. HEC-HMS) these flows are fairly consistent with the flows determined by the MDDP at DP-4 (Q_5 = 21.5 cfs, Q_{100} = 107.4 cfs). Recent improvements within this basin include: construction of Sterling Ranch Road, along with the overlot grading of much of Sterling Ranch East Filing No. 1 (SF2235), the construction of Pond FSD-14A just north of Sterling Ranch Road and the on-site interim Pond FSD-11B. With the introduction of these improvements, nearly all of the tributary area for this existing basin is now being captured and treated, which is consistent with Sterling Ranch MDDP Amendment 2 & PDR for Sterling Ranch East Prelim. Plan Filing 1-4. Thus, the downstream natural channel corridor through the existing rural lots within the Pawnee Rancheros Filing 2 Subd. and south of Mustang Place, just east of Mustang Road will continue to handle these off-site flows adequately.

Basin EX-7A (Q_5 = 1 cfs, Q_{100} = 5 cfs) consists of a small basin of only 2.4 ac. that sheet flows in a southerly direction. The MDDP included this small basin as a part of Basin EX-7. However, a more detailed look at this area finds that the larger basin EX-7 seems to all be tributary to the defined natural channel while Basin EX-7A appears to sheet flow off-site towards the Mustang Place cul-de-sac. These minor sheet flows ultimately combine with the pre-developed flows from Basin EX-7 south of Mustang Place within the natural channel. Again, with the construction of the Pond FSD-11B, the majority of the tributary area for this existing basin will be captured and treated. Thus, the downstream natural channel corridor will continue to handle these off-site flows adequately.

<u>Sand Creek East Fork</u>

Basin EX-8 (Q_5 = 5 cfs, Q_{100} = 23 cfs) consists of approximately 32.2 acres of property that sheet flows in a southerly direction. This basin is similar to the MDDP and the north portion of the west basin line defines the westerly edge of the East Fork basin. This basin incorporates the majority of MDDP basins EX-8. The flows seem to remain as sheet flows as they exit the property along the south boundary at **Design Point 5**. Again, these flows seem consistent with the flows determined by the MDDP at DP-5 (Q_5 = 1.7 cfs, Q_{100} = 20.5 cfs). Upon construction of the proposed development, the majority of the tributary area to this basin will be routed towards Pond FSD-11B. The remaining large lot rear yard sheet flows from Basin EF-A will be treated by runoff reduction techniques through long buffer areas and then continue to sheet flow off-site where the downstream properties will continue to adequately handle these less than historic sheet flows.

Basin EX-8A (Q_5 = 2 cfs, Q_{100} = 9 cfs) consists of a small basin of 6.6 ac. that sheet flows in a southerly direction. The MDDP included this small basin as a part of Bain EX-8. However, a more detailed look at this area finds that the larger basin EX-8 seems to sheet flow through properties east of Cochise Road while Basin EX-8A sheet flows off-site along the south boundary at **Design Point 5A** directly down the Cochise Road corridor. These off-site flows seem to ultimately combine further south within the Cochise Road corridor. Upon construction the proposed development, the majority of the tributary area to this basin will be routed towards Pond FSD-11B. The remaining large lot rear yard sheet flows from Basin EF-A will be treated by runoff reduction techniques through long buffer areas and then continue to sheet flow off-site where the downstream properties will continue to adequately handle these less than historic sheet flows.

Basin EX-9 (Q_5 = 59 cfs, Q_{100} = 122 cfs) consists of approximately 139.3 acres of property that sheet flows in a southerly direction. This basin is similar to the MDDP with the northern portion of the west basin line defining the westerly edge of the East Fork basin. The flows seem to remain as sheet flows as they exit the property along the south boundary at **Design Point 6**. Again, these flows seem consistent with the flows determined by the MDDP at DP-6 (Q_5 = 23.9 cfs, Q_{100} = 125.2 cfs). Recent improvements within this basin include: construction of Sterling Ranch Road, along with the overlot grading of much of Sterling Ranch East Filing No. 1 (SF2235), the construction of

Pond FSD-14A just north of Sterling Ranch Road. With the introduction of these improvements, much of the tributary area for this existing basin is now being captured and treated, which is consistent with Sterling Ranch MDDP Amendment 2 & PDR for Sterling Ranch East Prelim. Plan Filing 1-4. Upon construction of the proposed development, the majority of the tributary area to this basin will be routed towards Pond FSD-11B. The remaining large lot rear yard sheet flows will be treated by runoff reduction techniques through long buffer areas and then continue to sheet flow off-site where the downstream properties within the Pawnee Rancheros Filing 1 Subd. will continue to adequately handle these less than historic sheet flows.

Include discussion in report discussing interim drainage scenario without SRE 5 being developed. How do flows get to and interact with this development?

PROPOSED DRAINAGE CONDITIONS

As described in the General Description of the report, this proposed Final Plat contains 74.745 acres of urban residential lots. This report remains consistent with the recently approved MDDP and Preliminary Drainage Report for Sterling Ranch East Preliminary Plan Filings 1-4. (SP-22-004)

and existing? Below the text references two existing ponds and the proposed pond. Clarify.

Development of these urban lots proposed will consist of overlot grading and utility installation for the planned roadways and lots. Per the El Paso County ECM, Section I.7.1.B, all urban lots are required to provide Water Quality Capture Volume (WQCV). Thus, the proposed FSD facility within this development will provide WQCV along with an Excess Urban Runoff Volume (EURV) in the lower portion of the facility storage volume with an outlet control device. Frequent and infrequent inflows are released at rates approximating undeveloped conditions. This concept provides some mitigation of increased runoff volume by releasing a portion of the increased runoff at a low rate over an extended period of time, up to 72 hours. This means that frequent storms, smaller than the 2-year event, will be reduced to very low flows near or below the sediment carrying threshold value for downstream drainage ways. Also, by incorporating an outlet structure that limits the 100-year runoff to the undeveloped condition rate, the discharge hydrograph for storms between the 2 year and the 100-year event will approximate the hydrograph for the undeveloped conditions and will help effectively mitigate the effects of development. As reasonably possible, WQCV will be provided for all new roads and urban lots.

Pond FSD-11B

For each design point or basin description, state how water quality is addressed. In the existing basin section it is stated that some of the sub-basins will receive treatment through runoff reduction. Identify these types of specifics in the proposed basins.

This report will describe each developed basin tributary to the proposed FSD-11B facility. This final design will include sizing of all inlets, storm systems and FSD facilities including all required appurtenances.

The following developed basin descriptions will start at the northeast corner of the project and move southwest and describe how this development proposes to handle both the off-site and on-site drainage conditions. The off-site basins within Sterling Ranch Road are also being analyzed for final design condition adjacent to the site to confirm sizing as determined in the "Final Drainage Letter for Sterling Ranch Road and Briargate Parkway Interim Plan", prepared by JR Engineering, approved July 2023. (CDR221)

Indicate throughout report if infrastructure is public or private

Design Point 1 (Q_5 = 6 cfs, Q_{100} = 12 cfs) represents the 2.6 ac. off-site basin OS-1 within the east side of Sterling Ranch Road just south of Briargate Pkwy. This flow travels as C&G flow in a southerly direction towards Design Point 1. At this location, an existing 15' Type R at-grade inlet collects **(Q_5 = 6 cfs, Q_{100} = 10.4 cfs)** with a flow-by of **(Q_5 = 0 cfs, Q_{100} = 1.6 cfs).** The collected flows are then routed to the existing public storm system along the west side of Sterling Ranch Road as accounted for within the previously mentioned JR Eng. report. The flow-by continues down the street towards Design 2.

Design Point 2 (Q_5 = 1 cfs, Q_{100} = 4 cfs) represents flow-by from DP-1 and the 0.68 ac. off-site basin OS-2 within the east side of Sterling Ranch Road. This combined flow travels as C&G flow in a southerly direction towards Design Point 2. At this location, an existing crosspan conveys these flows further downstream towards Design 27.

Design Point 3 (Q_5 = 4 cfs, Q_{100} = 10 cfs) represents the anticipated 3.7 ac. off-site basin OS-3 within the future Sterling Ranch East Filing No. 5 development. This flow travels as C&G flow in a southerly direction towards Design Point 3. At this location, a future 10' Type R at-grade inlet collects **(Q_5 = 3.9 cfs, Q_{100} = 7.1 cfs)** with a flow-by of **(Q_5 = 0.1 cfs, Q_{100} = 2.9 cfs).** The collected flow will be routed via future storm sewer towards the future Pond FSD-14B within the Sterling Ranch East Filing No. 5 development. This flow-by continues down the future street towards Design 4.

Design Point 4 (Q_5 = 2 cfs, Q_{100} = 7 cfs) represents flow-by from DP-3 and the anticipated 1.6 ac. off-site basin OS-4 within the future Sterling Ranch East Filing No. 5 development. This flow travels as C&G flow in a southwesterly direction towards Design Point 4. At this location, a proposed crosspan conveys these flows further downstream towards Design 5.

Design Point 5 (Q_5 = 5 cfs, Q_{100} = 16 cfs) represents the flows from DP-4 and the anticipated 3.3 ac. off-site basin OS-5 within the future Sterling Ranch East Filing No. 5 development. This combined flow travels as C&G flow in a southeasterly direction towards Design Point 5. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed via storm sewer south down Bentonville Way. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill around the corner and over the highpoint in Bentonville Way. **Design Point 6 (Q_5 = 2 cfs, Q_{100} = 6 cfs)** represents developed flows from Basin A (1.4 ac.) along the south side of Lake Tahoe Dr. These developed flows travel as curb and gutter flow towards Design Point 6. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 5 and be routed via storm sewer south down Bentonville Way.

start new paragraph

Design Point 7 (Q_5 = 4 cfs, Q_{100} = 10 cfs) represents developed flows from Basin B (3.3 ac.). These developed flows travel as curb and gutter flow south towards Design Point 7. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer in Bixby Ct. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill over the highpoint to the west in Bixby Ct. **Design Point 8 (Q_5 = 3 cfs, Q_{100} = 6 cfs)** represents developed flows from Basin C (1.8 ac.) along the west side of Bentonville Way. These developed flows travel as curb and gutter flow towards Design Point 8. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 7 and be routed via storm sewer further west in Bixby Ct.

Design Point 9 (Q_5 = 6 cfs, Q_{100} = 15 cfs) represents the developed flows from Basins D (3.4 ac.) and E (1.8 ac.). This combined flow travels as C&G flow in a southerly direction towards Design Point 9. At this location, a proposed 10' Type R at-grade inlet collects **(Q_5 = 5.3 cfs, Q_{100} = 8.7 cfs)** with a flow-by of **(Q_5 = 0.7 cfs, Q_{100} = 6.3 cfs).** The collected flow will be routed via proposed storm sewer towards the public system in Bixby Ct. This flow-by continues down the street, around the corner to the west towards Design 10.

The map shows this may flow to DP 8 instead of 10 with the inlet place on the east side of the street and the HP in the cross pan

Design Point 10 (Q_5 = 6 cfs, Q_{100} = 20 cfs) represents the flow-by from DP-9 and developed flows from Basins F (1.8 ac.) and G (2.5 ac.). These developed flows travel as curb and gutter flow south towards Bixby Ct. and then around the corner to Design Point 10. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer in Bixby Ct. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill over the highpoint to the west in Bixby Ct. **Design Point 11 (Q_5 = 0.9 cfs, Q_{100} = 2.1 cfs)** represents developed flows from the small Basin H (0.51 ac.) along the south side of Bixby Ct. These developed flows travel as curb and gutter flow towards Design Point 11. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 10 and be routed via public storm sewer further west in Bixby Ct.

Design Point 12 (Q_5 = 4 cfs, Q_{100} = 9 cfs) represents the developed flows from Basins I (1.8 ac.) and J (0.85 ac.). This combined flow travels as C&G flow in a southerly direction towards Design Point 12. At this location, a proposed 10' Type R at-grade inlet collects **(Q_5 = 4.0 cfs, Q_{100} = 6.7 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 2.3 cfs).** The collected flow will be routed via proposed storm sewer south down Laguna Niguel Dr. This 100-yr. flow-by is anticipated to not turn the corner but continue south down Laguna Niguel Dr. towards Design Point 15.

Design Point 13 (Q_5 = 3 cfs, Q_{100} = 8 cfs) represents developed flows from Basin K (2.6 ac.). These developed flows travel as curb and gutter flow west towards Design Point 13. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill around the corner down Laguna Niguel Dr. **Design Point 14 (Q_5 = 0.8 cfs, Q_{100} = 1.7 cfs)** represents developed flows from the small Basin L (0.36 ac.) along the south side of Amarillo Place. These developed flows travel as curb and gutter flow towards Design Point 14. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 13 and be routed via public storm sewer further south down Laguna Niguel Dr.

Design Point 15 (Q_5 = 5 cfs, Q_{100} = 14 cfs) represents the anticipated 100-yr. flow-by from DP-12 and developed flows from Basins M (2.8 ac.) and N (1.1 ac.). These developed flows travel as curb and gutter flow south towards Bixby Ct. and then around the corner to Design Point 15. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer in Bixby Ct. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill over the highpoint to the west in Bixby Ct. **Design Point 16 (Q_5 = 1 cfs, Q_{100} = 3 cfs)** represents developed flows from the small Basin O (0.86 ac.) along the south side of Bixby Ct. These developed flows travel as curb and gutter flow towards Design Point 16. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 15 and be routed via public storm sewer further west in Bixby Ct.

Design Point 17 (Q_5 = 3 cfs, Q_{100} = 7 cfs) represents the developed flows from Basin P (2.3 ac.). These developed flows travel as curb and gutter flow towards Design Point 17. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer in Bixby Ct. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill over the highpoint to the west in Bixby Ct. **Design Point 18 (Q_5 = 1.2 cfs, Q_{100} = 2.8 cfs)** represents developed flows from the small

Basin Q (0.67 ac.) along the south side of Bixby Ct. These developed flows travel as curb and gutter flow towards Design Point 18. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 17 and be routed via public storm sewer further west in Bixby Ct.

Design Point 19 (Q_5 = 6 cfs, Q_{100} = 13 cfs) represents the developed flows from Basins T (2.6 ac.) and U (1.4 ac.). This combined flow travels as C&G flow in a southerly direction towards Design Point 19. At this location, a proposed 10' Type R at-grade inlet collects **(Q_5 = 5.1 cfs, Q_{100} = 7.6 cfs)** with a flow-by of **(Q_5 = 0.9 cfs, Q_{100} = 5.4 cfs).** The collected flow will be routed via proposed storm sewer south down Lubbock Trail. The 5-yr. flow-by is expected to turn the corner and head towards Design Point 20, with the 100-yr. flow-by anticipated to not turn the corner but continue south down Lubbock Trail towards Design Point 22.

Design Point 20 (Q_5 = 7 cfs, Q_{100} = 13 cfs) represents developed flows from the 5-yr. flow-by from Design Point 19 and Basin R (3.9 ac.). These developed flows travel as curb and gutter flow towards Design Point 20. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed west via the public storm sewer. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill around the corner down Lubbock Trail. **Design Point 21 (Q_5 = 3 cfs, Q_{100} = 6 cfs)** represents developed flows from Basin S (2.0 ac.) along the south side of Amarillo Place. These developed flows travel as curb and gutter flow towards Design Point 21. At this location, a proposed 5' Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 20 and be routed via public storm sewer further south down Lubbock Trail.

Design Point 22 (Q_5 = 1.2 cfs, Q_{100} = 8.9 cfs) represents the developed flows from the 100-yr. flow-by from Design Point 19 and Basin V (1.1 ac.). These developed flows travel as curb and gutter flow towards Design Point 22. At this location, a proposed 10' Type R sump inlet completely collects these flows. The collected flow will be routed south via the public storm sewer in Lubbock Trail. The emergency overflow route for this sump condition is ponding a max. of 12” and then spill over the highpoint to the west and directly into Pond FSD 11-B.

Design Point 23 (Q_5 = 3 cfs, Q_{100} = 8 cfs) represents developed flows from Basin W (1.8 ac.) along the west side of Lubbock Trail. These developed flows travel as curb and gutter flow towards Design Point 23. At this location, a proposed 5’ Type R sump inlet completely collects these flows. The collected flow will combine with the collected flows from Design Point 22 and be routed via public storm sewer further south in Lubbock Trail.

Design Point 24 (Q_5 = 53 cfs, Q_{100} = 128 cfs) represents the total developed flows of all the previously mentioned design points and the total pond inflow at the proposed easterly forebay/impact structure. At this 54” RCP pond inflow a Type VI Impact Stilling Basin will be installed.

Sterling Ranch Road Corridor

The following Basins and Design Points are within the Sterling Ranch Road corridor that were originally designed, approved and now constructed under the following projects: “Sterling Ranch Road & Briargate Parkway Segment 2 Street Plans”, prepared by JR Engineering and the approved “Drainage Letter for Sterling Ranch Road and Briargate Pkwy. Interim Plan”, also prepared by JR Engineering (both found under PCD No. CDR-221) and “Sterling Ranch East Filing No. 1 Construction Plans” and “Final Drainage Report for Sterling Ranch East Filing No. 1”, both prepared by CCES (PCD No. SF2235). All the Design Points below help confirm the public storm system design through this corridor.

Design Point 25 (Q_5 = 4 cfs, Q_{100} = 9 cfs) represents existing flows from Basin B1 (1.7 ac.) along the west side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 25. At this location, an existing 15’ Type R at-grade inlet collects **(Q_5 = 4.0 cfs, Q_{100} = 8.6 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 0.4 cfs).** The collected flow will be routed via proposed storm sewer towards the public 42” RCP along the west side of

Sterling Ranch Road. The 100-yr. flow-by continues south down Sterling Ranch Road towards Design Point 26.

Design Point 26 (Q_5 = 3 cfs, Q_{100} = 8 cfs) represents existing flows from the 100-yr. flow-by from Design Point 25 and Basin B3 (1.5 ac.) along the west side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 26. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 3.0 cfs, Q_{100} = 6.3 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 1.7 cfs).** The collected flow will be routed via proposed storm sewer towards the public 60" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues south down Sterling Ranch Road towards Design Point 28. **Design Point 27 (Q_5 = 3 cfs, Q_{100} = 7 cfs)** represents existing flows from the flow-by from Design Point 2 and Basin B4 (0.87 ac.) along the east side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 27. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 3.0 cfs, Q_{100} = 5.8 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 1.2 cfs).** The collected flow will be routed via proposed storm sewer towards the public 60" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues south down Sterling Ranch Road towards Design Point 29.

Design Point 28 (Q_5 = 2 cfs, Q_{100} = 6 cfs) represents existing flows from the 100-yr. flow-by from Design Point 26 and Basin B5 (0.9 ac.) along the west side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 28. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 2.0 cfs, Q_{100} = 5.3 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 0.7 cfs).** The collected flow will be routed via proposed storm sewer towards the public 60" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues southwest down Sterling Ranch Road towards Design Point 30. **Design Point 29 (Q_5 = 2 cfs, Q_{100} = 5 cfs)** represents existing flows from the 100-yr. flow-by from Design Point 27 and Basin B6 (1.0 ac.) along the east side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southwesterly direction towards Design Point 29. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 2.0 cfs, Q_{100} = 4.7 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100}**

= 0.3 cfs). The collected flow will be routed via proposed storm sewer towards the public 60" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues southwest down Sterling Ranch Road towards Design Point 31.

Design Point 30 (Q_5 = 3 cfs, Q_{100} = 7 cfs) represents existing flows from the 100-yr. flow-by from Design Point 28 and Basin B7 (1.6 ac.) along the west side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 30. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 3.0 cfs, Q_{100} = 5.8 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 1.2 cfs).** The collected flow will be routed via proposed storm sewer towards the public 72" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues southwest down Sterling Ranch Road towards Design Point 32. **Design Point 31 (Q_5 = 2 cfs, Q_{100} = 4 cfs)** represents existing flows from the 100-yr. flow-by from Design Point 29 and Basin B8 (1.2 ac.) along the east side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southwesterly direction towards Design Point 31. At this location, an existing 10' Type R at-grade inlet collects **(Q_5 = 2.0 cfs, Q_{100} = 3.9 cfs)** with a flow-by of **(Q_5 = 0.0 cfs, Q_{100} = 0.1 cfs).** The collected flow will be routed via proposed storm sewer towards the public 72" RCP along the west side of Sterling Ranch Road. The 100-yr. flow-by continues southwest down Sterling Ranch Road towards Design Point 33.

Design Point 32 (Q_5 = 3 cfs, Q_{100} = 9 cfs) represents existing flows from the 100-yr. flow-by from Design Point 30 and Basin B9 (2.0 ac.) along the west side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southerly direction towards Design Point 32. At this location, an existing 15' Type R sump inlet completely collects the developed flows. The collected flows are then routed via existing storm sewer south towards Pond FSD-11B. The emergency overflow route for this sump condition is ponding a max. of 12" and then spill over the sidewalk and directly into Sand Creek. **Design Point 33 (Q_5 = 3 cfs, Q_{100} = 7 cfs)** represents existing flows from the 100-yr. flow-by from Design Point 31 and Basin B10 (2.2 ac.) along the east side of Sterling Ranch Road. These flows travel as curb and gutter flows in a southwesterly direction towards Design Point 33. At this location, an existing 15' Type R sump inlet completely collects the developed flows. The collected flow will combine with the flow from Design Point 32 and then routed via existing storm sewer towards Pond FSD-11B. **Pipe Run 35 (Q_5 = 20 cfs, Q_{100} = 43 cfs)** represents the anticipated developed flows from the future elementary school site, Basin X (9.8 ac.). These future developed flows will then combine with the upstream flows from Design Points 32 and 33 and be routed via an existing 42" RCP storm outfall directly into Pond FSD-11B as represented by **Design Point 34 (Q_5 = 23 cfs, Q_{100} = 51 cfs).** At this location, a concrete forebay is proposed as the westerly inflow into Pond FSD-11B.

Include discussion of flows existing site and how they compare to existing flows.

DETENTION / STORMWATER QUALITY FACILITY

As required, storm water quality measures will be utilized in order to reduce the amount of sediment, debris and pollutants that are allowed to enter Sand Creek. These features include but are not limited to three Ponds (FSD-11B, FSD-14A and FSD-14B) and runoff reduction RPA's (All owned and maintained by Sterling Ranch Metro District). Pond FSD-11B will have final design data included in this report while Pond FSD-14A is currently constructed under (SP2235) and Pond FSD-14B will have final design data contained in the Sterling Ranch East Filing No. 5 FDR. All urban areas require detention and will provide a Water Quality Capture Volume (WQCV) and Excess Urban Runoff Volume (EURV) in the lower portion of the facility storage volume that will release the more frequent storms at a slower rate to help minimize the effects of development of the property. The proposed facilities are to be private facilities with ownership and maintenance by the Sterling Ranch Metropolitan District. After completion of construction and upon the Board of County Commissioners acceptance, all the drainage facilities within the public Right-of-Way will be owned and maintained by El Paso County.

What is the final design project for this? Not just the early grading and preliminary plan. If the pond is not fully installed it needs to be prior to the construction of this filing.

Provide the EDARP Project number Pond FSD-14B will be constructed under. If this project is using proposed facilities for treatment, those facilities must be installed prior to construction of this filing.

The following represents the proposed **Pond FSD-11B design**:

(See MHFD-Detention Design Sheets in Appendix)

Total Tributary acreage: 66.79 Ac.

1.207 Ac.-ft. WQCV required

2.894 Ac.-ft. EURV required

2.492 Ac.-ft. 100-yr. Storage

6.594 Ac.-ft. Total

Total In-flow: **Q_5 = 73 cfs, Q_{100} = 178 cfs**

Pond Design Release: **Q_5 = 1.4 cfs, Q_{100} = 42.1 cfs**

(Ownership and maintenance by the Sterling Ranch Metro District)

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014. Individual on-site developed basin design used for detention/SWQ basin sizing, inlet sizing and storm system routing was calculated using the Rational Method. Runoff Coefficients are based on the imperviousness of the particular land use and the hydrologic soil type in accordance with Table 6-6. The average rainfall intensity, by recurrence interval found in the Intensity-Duration-Frequency (IDF) curves in Figure 6-5. (See Appendix)

The City of Colorado Springs/El Paso County DCM requires the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized. Implementation of these four steps helps to achieve storm water permit requirements.

This site adheres to this **Four Step Process** as follows:

1. **Employ Runoff Reduction Practices:** All proposed lot impervious area (roof tops, patios, etc.) will sheet flow across landscaped portions of front and rear yards and through open space areas to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets or detention facilities. This will minimize directly connected impervious areas within the project site.

This paragraph should be under step 3 because it shows how treating the WQCV is achieved.

Reference the Stormwater Quality Treatment Plan Map in the Appendix for the following calculations:

Area treated in proposed permanent Pond FSD-11B (Includes off-site basins OS-4, OS-5, OS-6, B9, B10)	66.79 ac.
Area treated in existing permanent Pond FSD-14A (Includes off-site basins OS-1, OS-2, B1 thru B8)	12.05 ac.
Area treated in future permanent Pond FSD-14B (Includes off-site basin OS-3)	3.70 ac.
Area of runoff reduction water quality treatment (Basins AA thru FF – Rear yards thru 75' buffer tract) Reference Runoff Reduction Calculations in Appendix for these areas	12.15 ac.
Filing No. 3 total platted area	**<u>74.745 ac.</u>**

Clarify that no disturbance associated with this filing will occur in this basin, otherwise the construction of this project will be contingent on the future ponds installation.

2. **Stabilize Drainageways:** After developed flows utilize the runoff reduction practices through the front and rear yards, developed flows will travel via curb and gutter within the public streets and eventually public storm systems. These collected flows are then routed directly to the proposed extended detention basins (full-spectrum facilities).

•All RPAs and SPAs are considered PCMs and therefore require a signed PCM Maintenance Agreement and an O&M Manual.
•All RPAs and SPAs will need to be within a no build drainage easement or tract shown in the project Drainage Report, GEC Plans, and Site Plat.
•RPA and SPA cannot be located in County ROW.
•RPA areas cannot be located in wetlands.
•Provide a detail in the plans that shows the UIA to RPA interface with the vertical drop of 1-3"
•Vegetation in RPAs and SPAs should have a uniform density of at least 80%.

across landscaped rear yards and then through undeveloped property prior to being released off-site.

Discuss all applicable exclusions - the stream stabilization exclusion is proposed per the water quality maps.

3. **Provide Water Quality Capture Volume (WQCV):** Runoff from this development will be treated through capture and slow release of the WQCV and excess urban runoff volume (EURV) in the proposed Full-Spectrum permanent Extended Detention Basins designed per current El Paso County drainage criteria. For the 12.15 ac. of rear yards and buffer area that is not able to be captured and routed to one of the permanent EDB's, Runoff Reduction practices are required and provided in the 75' buffer tract along the south boundary. Reference Runoff Reduction Calculations in Appendix for these areas that show a 100% WQCV Reduction and meets El Paso County standards.

4. **Consider need for Industrial and Commercial BMPs**: No industrial or commercial uses are proposed within this development. However, a site-specific storm water quality and erosion control plan and narrative along with the grading and erosion control plan is submitted with this Final Plat application. Details such as site-specific sediment and erosion control construction BMP's as well as temporary and permanent BMP's will be detailed in this plan and narrative to protect receiving waters. BMP's will be constructed and maintained as the development has been graded and erosion control methods employed.

FLOODPLAIN STATEMENT

A portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C0533G with effective date of December 7, 2018 (See Appendix). However, the portion of the site that lies within the current 100-yr. FEMA floodplain will be platted as a tract for open space/channel corridor with future channel improvements to be constructed by developer. Please reference the "Sand Creek Restoration Plans – a portion of the Sand Creek Channel Sterling Ranch", prepared by JR Engineering (CDR204).

DRAINAGE AND BRIDGE FEES

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

The following are anticipated drainage and bridge fees using the following impervious acreage method approved by El Paso County.

Sterling Ranch East Filing No. 3 has a total area of 74.745 acres with the following different land uses proposed:

13.221 Ac.	Open Space/Pond/Sand Creek/Trail Tracts (Tracts A-E & G)
11.857 Ac.	Future Elementary School (Tract F)
10.885 Ac.	0.5 ac. Lots (Lots 69-87 within 0.5 Ac. zone area)
38.782 Ac.	Urban Lots (Avg. Lot Size = 7,611 SF)
74.745 Ac.	**Total**

The percent imperviousness for this subdivision is calculated as follows:

Fees for Open Space/Pond/Sand Creek/Trail Tracts

(Per El Paso County Percent Impervious Chart: 7**%**)

13.221 Ac. x 7% = **0.93 Impervious Ac.**

Fees for Future School Tract (undeveloped)

(Per El Paso County Percent Impervious Chart: 0**%**)

11,857 Ac. x 0% = **0.00 Impervious Ac.**

Fees for 0.5 Ac. Lots

(Per El Paso County Percent Impervious Chart: 25**%**)

10.885 Ac. x 25% = **2.72 Impervious Ac.**

Fees for Urban Lots (Avg. lot size 7,611 SF)

(Per El Paso County Percent Impervious Chart: 48**%**)

38.782 Ac. x 25% = **18.62 Impervious Ac.**

Total Impervious Acreage: **22.27 Imp. Ac.** (Drainage Fees)

Total Impervious Acreage: **22.27 Imp. Ac.** (Bridge Fees)

However, per the ECM 3.10.4.a, this development requests a reduction of drainage fees based on proposed construction of an on-site full-spectrum detention/stormwater quality facility (Pond FSD-11B) as shown in the MDDP and PDR. This reduction is based on the Engineers Estimate found in the FAE and described below:

There is no section 3.10 that discusses fee reductions

CONSTRUCTION COST OPINION

Private Full-Spectrum Detention Facility (FSD-11B)

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	Eastern Forebay Structure	1 EA	$110,000.00	$ 110,000.00
2.	Western Forebay Structure	1 EA	$ 60,000.00	$ 60,000.00
3.	Concrete Outlet Structure	1 EA	$ 50,000.00	$ 50,000.00
4.	Concrete Trickle Channel	680 LF	$65.00/LF	$ 44,200.00
5.	Handrail	115 LF	$220.00/LF	$ 25,300.00
6.	Rip-Rap Spillway	670 CY	$80/CY	$ 53,600.00
7.	Outlet pipe (24” RCP)	130 LF	$98/CY	$ 12,740.00
SUB-TOTAL				$ 355,840.00
10% ENGINEERING				$ 35,584.00
5% CONTINGENCY				$ 17,792.00
TOTAL				**$ 409,216.00**

The following calculations are based on the 2024 Sand Creek drainage/bridge fees:

ESTIMATED FEE TOTALS:

Indicate if fees will be paid or intending to use credits. If credits will be used, please provide table listing credits which have been used, add this filing, and then what credits will be remaining.

Bridge Fees

$ 10,484.00 x 22.27 Impervious Ac. **$ 233,478.68**

Drainage Fees

$ 25,632.00 x 22.27 Impervious Ac. = $ 570,824.64
(50% Reduction for FSD-11B construction costs) $ (204,608.00)
$ 366,216.64

SUMMARY

The proposed Sterling Ranch East Filing No. 3 is within the Sand Creek Drainage Basin. Recommendations are made within this report concerning necessary improvements that will be required as a result of development of this property. The points of storm water release from the proposed site are required to be at or below the calculated historic flow quantities. The development of the proposed site does not significantly impact any downstream facility or property to an extent greater than that which currently exists in the pre-development conditions. All drainage facilities within this report were sized according to the Drainage Criteria Manuals and the full-spectrum storm water quality requirements.

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC

Marc A. Whorton, P.E.
Project Manager

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REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual as revised in November 1991 and October 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014.

2. “Urban Storm Drainage Criteria Manual Volume 1, 2 & 3” Urban Drainage and Flood Control District, dated January 2016.

3. “Final Drainage Report for Forest Gate Subdivision” Law & Mariotti Consultants, Inc. dated October 2004.

4. “Sand Creek Drainage Basin Planning Study,” Kiowa Engineering Corporation, dated March 1996.

5. “2018 Sterling Ranch MDDP”, M&S Civil Consultants, Inc., June 2018

6. “Final Drainage Report for Retreat at TimberRidge Filing No. 1”, Classic Consulting, approved November, 2020.

7. “Final Drainage Report for Retreat at TimberRidge Filing No. 2”, Classic Consulting, approved September, 2022.

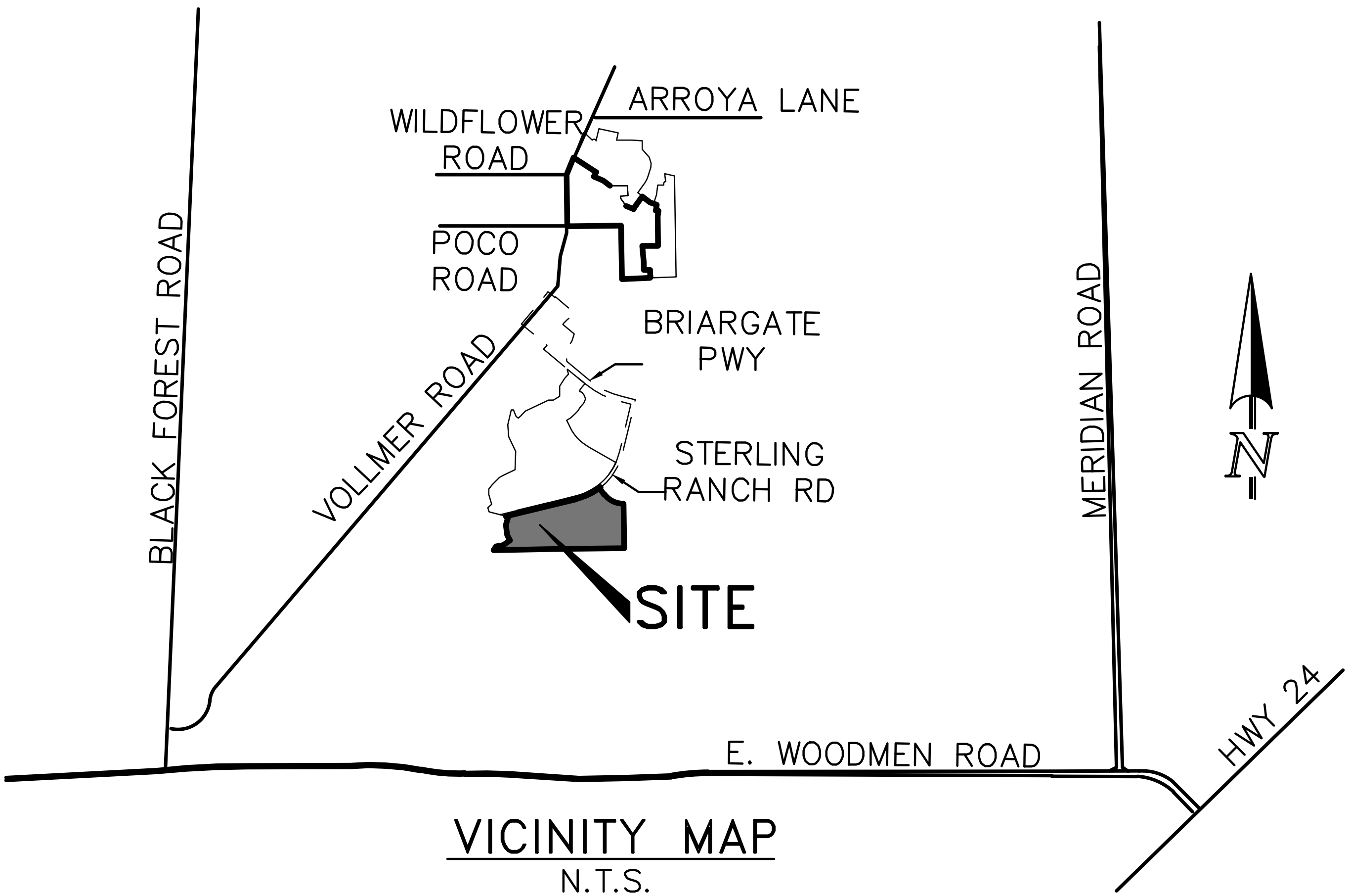
8. “Sterling Ranch MDDP Amendment No. 2 & Preliminary Drainage Report for Sterling Ranch East Preliminary Plan No. 1”, Classic Consulting, January 2023

9. “Drainage Letter for Sterling Ranch Road and Briargate Pkwy. Interim Plan”, JR Engineering, July 2023

10. “Preliminary Drainage Report for Sterling Ranch East Filing No. 5”, Classic Consulting, January 2024.

APPENDIX

VICINITY MAP

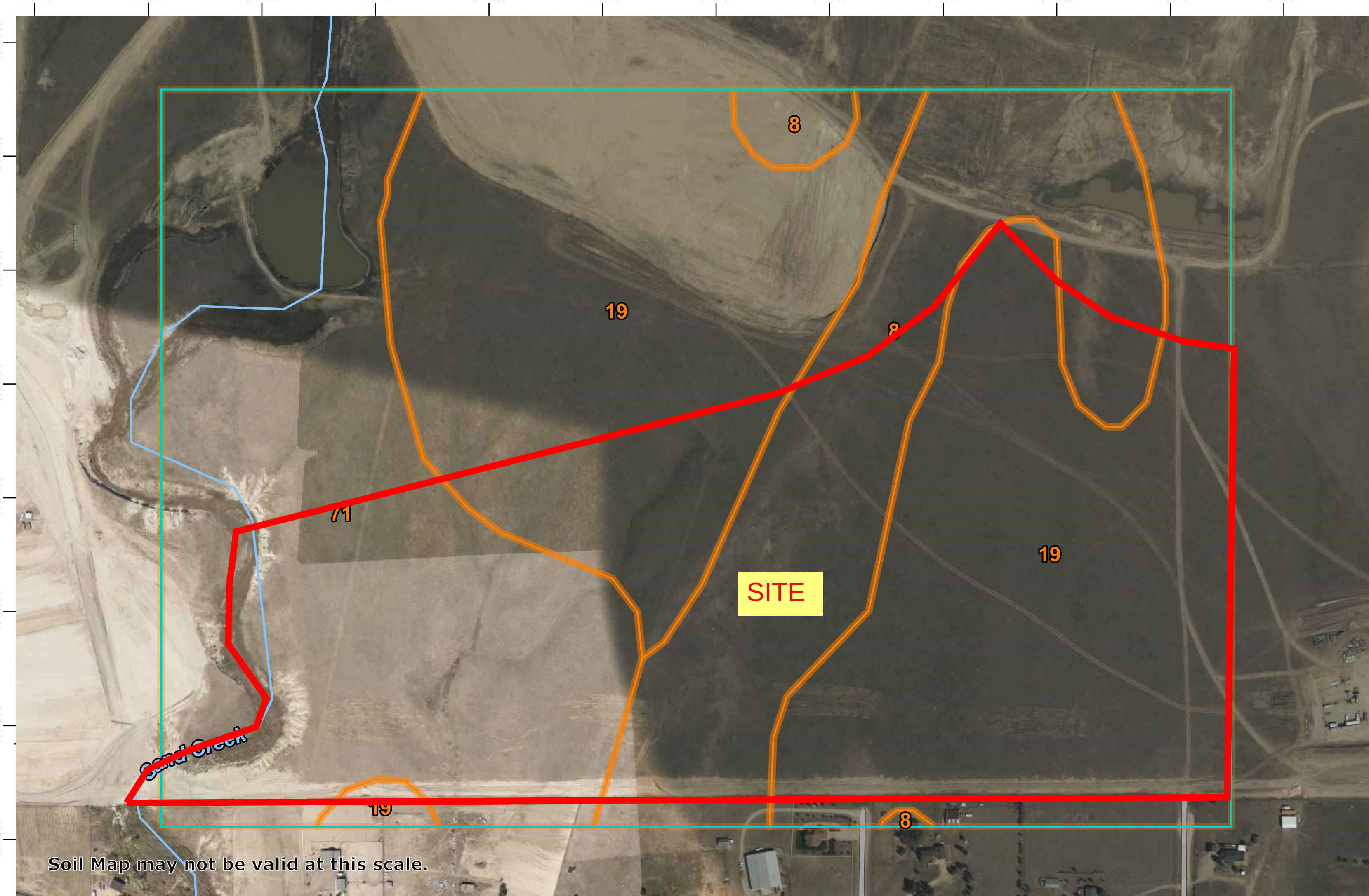


VICINITY MAP

N.T.S.

SOILS MAP (S.C.S SURVEY)

Soil Map—El Paso County Area, Colorado



Map Scale: 1:5,490 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2018—May 26, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	28.4	18.8%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	77.4	51.1%
71	Pring coarse sandy loam, 3 to 8 percent slopes	45.6	30.1%
Totals for Area of Interest		**151.4**	**100.0%**

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Blakeland and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blakeland

Setting

Landform: Hills, flats
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent

Landform: Swales
Hydric soil rating: Yes

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

El Paso County Area, Colorado

71—Pring coarse sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369k
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Pring and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Pleasant

Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes

Other soils

Percent of map unit:

Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023

F.E.M.A. MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

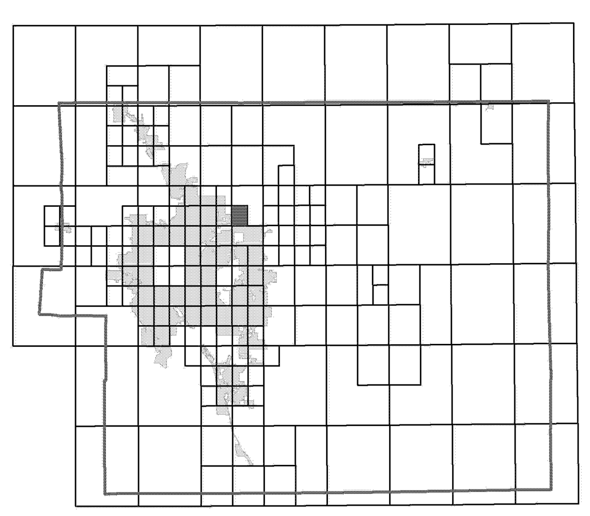
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

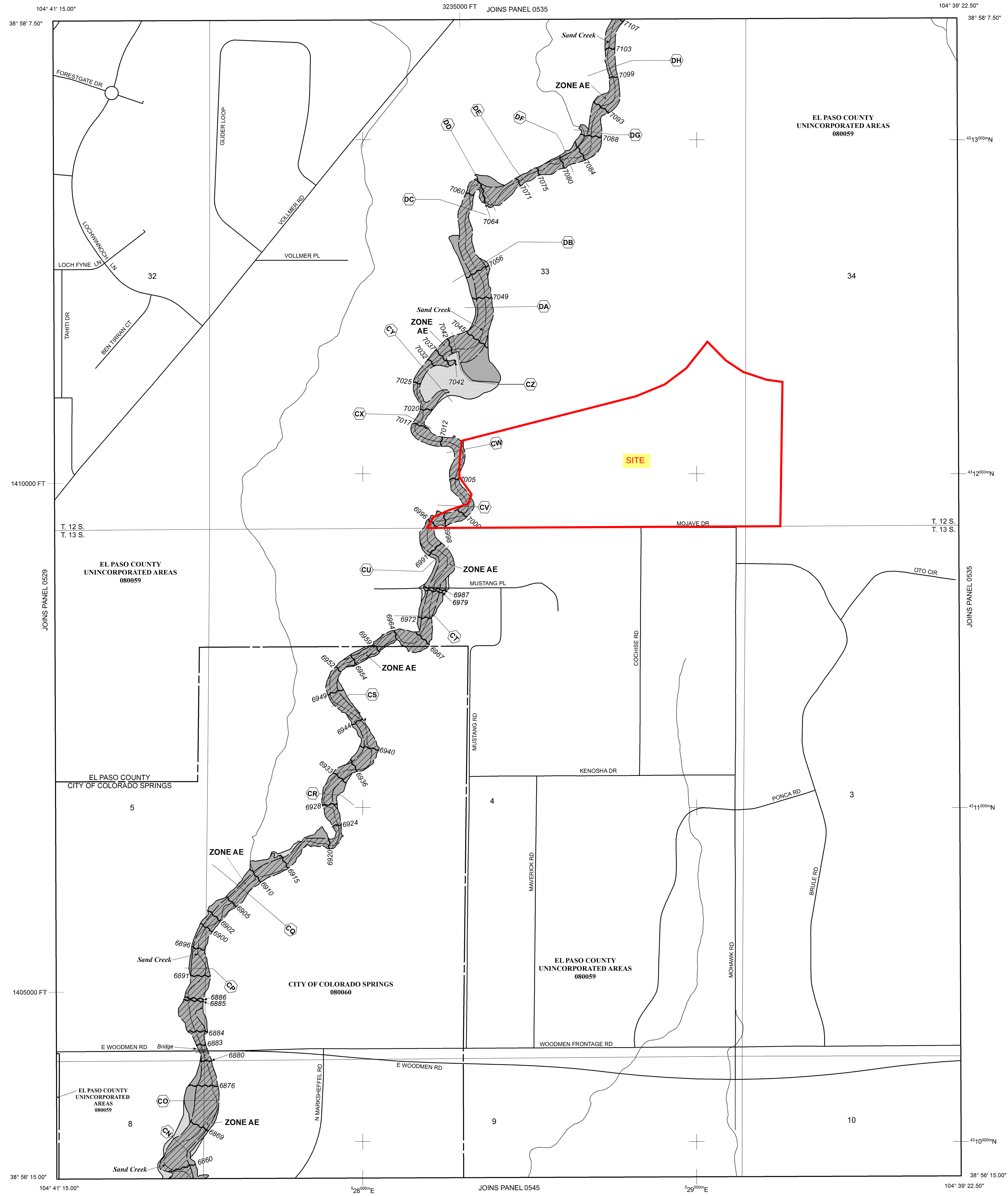
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 65 WEST, AND TOWNSHIP 13 SOUTH, RANGE 65 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A —— A	Cross section line
23 - - - - 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0533G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 533 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0533	G
EL PASO COUNTY	080059	0533	G

Notice to User: The **Map Number** shown below should be used when placing map orders: the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 08041C0533G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

HYDROLOGIC / HYDRAULIC CALCULATIONS

For Colorado Springs and much of the Fountain Creek watershed, the 1-hour depths are fairly uniform and are summarized in Table 6-2. Depending on the location of the project, rainfall depths may be calculated using the described method and the NOAA Atlas maps shown in Figures 6-6 through 6-17.

Table 6-2. Rainfall Depths for Colorado Springs

Return Period	1-Hour Depth	6-Hour Depth	24-Hour Depth
2	1.19	1.70	2.10
5	1.50	2.10	2.70
10	1.75	2.40	3.20
25	2.00	2.90	3.60
50	2.25	3.20	4.20
100	2.52	3.50	4.60

Where Z= 6,840 ft/100

These depths can be applied to the design storms or converted to intensities (inches/hour) for the Rational Method as described below. However, as the basin area increases, it is unlikely that the reported point rainfalls will occur uniformly over the entire basin. To account for this characteristic of rain storms an adjustment factor, the Depth Area Reduction Factor (DARF) is applied. This adjustment to rainfall depth and its effect on design storms is also described below. The UDFCD UD-Rain spreadsheet, available on UDFCD's website, also provides tools to calculate point rainfall depths and Intensity-Duration-Frequency curves[2] and should produce similar depth calculation results.

2.2 Design Storms

Design storms are used as input into rainfall/runoff models and provide a representation of the typical temporal distribution of rainfall events when the creation or routing of runoff hydrographs is required. It has long been observed that rainstorms in the Front Range of Colorado tend to occur as either short-duration, high-intensity, localized, convective thunderstorms (cloud bursts) or longer-duration, lower-intensity, broader, frontal (general) storms. The significance of these two types of events is primarily determined by the size of the drainage basin being studied. Thunderstorms can create high rates of runoff within a relatively small area, quickly, but their influence may not be significant very far downstream. Frontal storms may not create high rates of runoff within smaller drainage basins due to their lower intensity, but tend to produce larger flood flows that can be hazardous over a broader area and extend further downstream.

- **Thunderstorms**: Based on the extensive evaluation of rain storms completed in the Carlton study (Carlton 2011), it was determined that typical thunderstorms have a duration of about 2 hours. The study evaluated over 300,000 storm cells using gage-adjusted NEXRAD data, collected over a 14-year period (1994 to 2008). Storms lasting longer than 3 hours were rarely found. Therefore, the results of the Carlton study have been used to define the shorter duration design storms.

  To determine the temporal distribution of thunderstorms, 22 gage-adjusted NEXRAD storm cells were studied in detail. Through a process described in a technical memorandum prepared by the City of Colorado Springs (City of Colorado Springs 2012), the results of this analysis were interpreted and normalized to the 1-hour rainfall depth to create the distribution shown in Table 6-3 with a 5 minute time interval for drainage basins up to 1 square mile in size. This distribution represents the rainfall

Table 6-6. Runoff Coefficients for Rational Method
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2 Time of Concentration

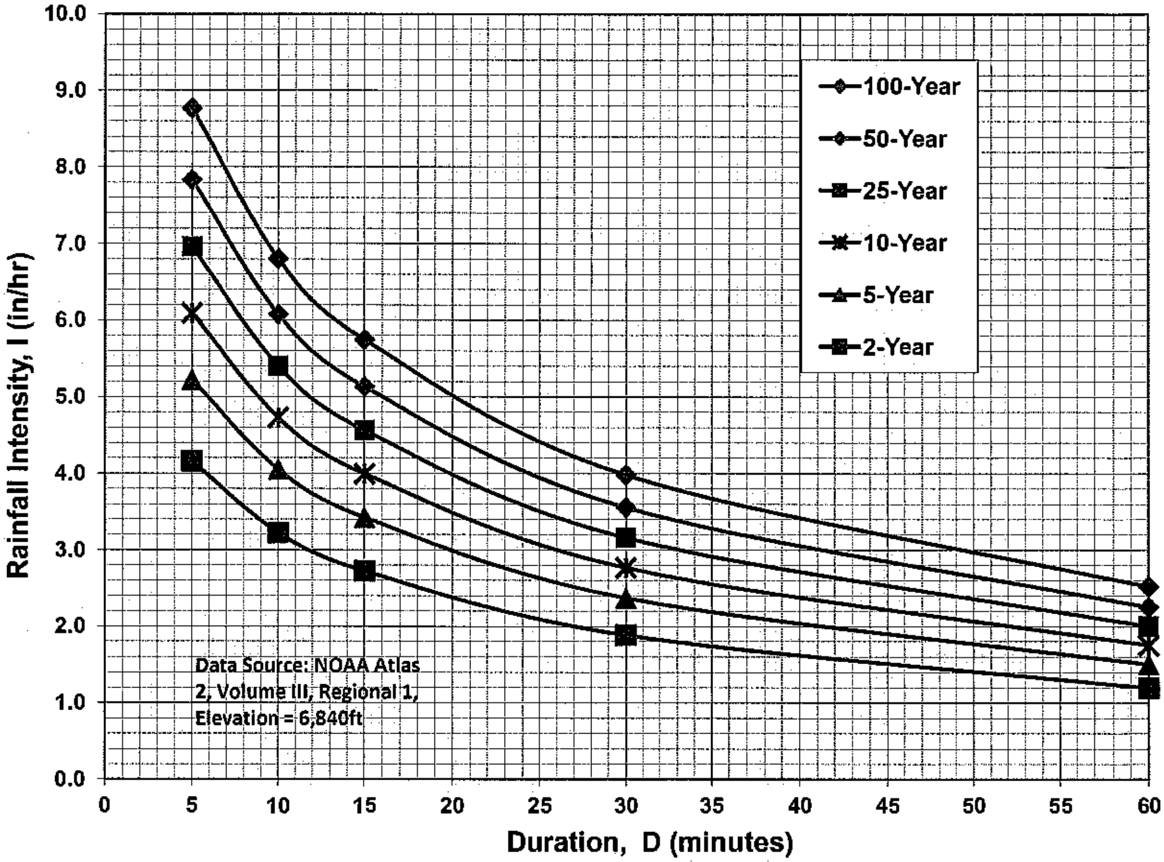
One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

Table 6-10. NRCS Curve Numbers for Frontal Storms & Thunderstorms for Developed Conditions (ARCII)

Fully Developed Urban Areas (vegetation established)[1]	Treatment	Hydrologic Condition	% I	Pre-Development CN HSG A	HSG B	HSG C	HSG D
Open space (lawns, parks, golf courses, cemeteries, etc.):							
Poor condition (grass cover < 50%)	-----	-----	---	68	79	86	89
Fair condition (grass cover 50% to 75%)	-----	-----	---	49	69	79	84
Good condition (grass cover > 75%)	-----	-----	---	39	61	74	80
Impervious areas:							
Paved parking lots, roofs, driveways, etc. (excluding right-of-way	-----	-----	---	98	98	98	98
Streets and roads:							
Paved; curbs and storm sewers (excluding right-of-way)	-----	-----	---	98	98	98	98
Paved; open ditches (including right-of-way)	-----	-----	---	83	89	92	93
Gravel (including right-of-way)	-----	-----	---	76	85	89	91
Dirt (including right-of-way)	-----	-----	---	72	82	87	89
Western desert urban areas:							
Natural desert landscaping (pervious areas only)	-----	-----	---	63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)	-----	-----	---	96	96	96	96
Urban districts:							
Commercial and business	-----	-----	85	89	92	94	95
Industrial	-----	-----	72	81	88	91	93
Residential districts by average lot size:							
1/8 acre or less (town houses)	-----	-----	65	77	85	90	92
1/4 acre	-----	-----	38	61	75	83	87
1/3 acre	-----	-----	30	57	72	81	86
1/2 acre	-----	-----	25	54	70	80	85
1 acre	-----	-----	20	51	68	79	84
2 acres	-----	-----	12	46	65	77	82
Developing Urban Areas[1]	**Treatment[2]**	**Hydrologic Condition[3]**	**% I**	**HSG A**	**HSG B**	**HSG C**	**HSG D**
Newly graded areas (pervious areas only, no vegetation)	-----	-----	---	77	86	91	94
Cultivated Agricultural Lands[1]	**Treatment**	**Hydrologic Condition**	**% I**	**HSG A**	**HSG B**	**HSG C**	**HSG D**
Fallow	Bare soil	-----	---	77	86	91	94
	Crop residue cover (CR)	Poor	---	76	85	90	93
		Good	---	74	83	88	90
Row crops	Straight row (SR)	Poor	---	72	81	88	91
		Good	---	67	78	85	89
	SR + CR	Poor	---	71	80	87	90
		Good	---	64	75	82	85
	Contoured (C)	Poor	---	70	79	84	88
		Good	---	65	75	82	86
	C + CR	Poor	---	69	78	83	87
		Good	---	64	74	81	85
	Contoured & terraced (C&T)	Poor	---	66	74	80	82
		Good	---	62	71	78	81
	C&T+ CR	Poor	---	65	73	79	81
		Good	---	61	70	77	80
Small grain	SR	Poor	---	65	76	84	88
		Good	---	63	75	83	87
	SR + CR	Poor	---	64	75	83	86
		Good	---	60	72	80	84
	C	Poor	---	63	74	82	85
		Good	---	61	73	81	84
	C + CR Poor	Poor	---	62	73	81	84
		Good	---	60	72	80	83
	C&T	Poor	---	61	72	79	82
		Good	---	59	70	78	81
	C&T+ CR	Poor	---	60	71	78	81
		Good	---	58	69	77	80

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

I_{100} = -2.52 ln(D) + 12.735

I_{50} = -2.25 ln(D) + 11.375

I_{25} = -2.00 ln(D) + 10.111

I_{10} = -1.75 ln(D) + 8.847

I_{5} = -1.50 ln(D) + 7.583

I_{2} = -1.19 ln(D) + 6.035

Note: Values calculated by equations may not precisely duplicate values read from figure.

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
DATE: *09/20/24*
CALCULATED BY: *MAW*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

		C VALUE DCM TABLE 6-6						C VALUE DCM TABLE 6-6						WEIGHTED "C" VALUE			WEIGHTED CA			DCM TABLE 6-6
BASIN	TOTAL AREA (AC)	LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)	WEIGHTED % IMPERVIOUS
A	1.40	RES 1/6 AC.	52.5%	1.40	0.32	0.38	0.55			0.00	0.89	0.90	0.96	0.32	0.38	0.55	**0.45**	**0.53**	**0.76**	52.5%
B	3.30	RES 1/6 AC.	52.5%	3.30	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.06**	**1.24**	**1.80**	52.5%
C	1.80	RES 1/6 AC.	52.5%	1.35	0.32	0.38	0.55	STREET	100.0%	0.45	0.89	0.90	0.96	0.46	0.51	0.65	**0.83**	**0.91**	**1.17**	64.4%
D	3.40	RES 1/6 AC.	52.5%	3.40	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.09**	**1.28**	**1.85**	52.5%
E	1.80	RES 1/6 AC.	52.5%	1.80	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
F	1.80	RES 1/6 AC.	52.5%	1.80	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
G	2.50	RES 1/6 AC.	52.5%	2.50	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.80**	**0.94**	**1.36**	52.5%
H	0.51	RES 1/2 AC.	25.0%	0.34	0.15	0.22	0.46	STREET	100.0%	0.17	0.89	0.90	0.96	0.40	0.45	0.63	**0.20**	**0.23**	**0.32**	50.0%
I	1.80	RES 1/6 AC.	52.5%	1.80	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
J	0.85	RES 1/6 AC.	52.5%	0.45	0.32	0.38	0.55	STREET	100.0%	0.40	0.89	0.90	0.96	0.59	0.62	0.74	**0.50**	**0.53**	**0.63**	74.9%
K	2.60	RES 1/6 AC.	52.5%	2.60	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.83**	**0.98**	**1.42**	52.5%
L	0.36	RES 1/6 AC.	52.5%	0.24	0.32	0.38	0.55	STREET	100.0%	0.12	0.89	0.90	0.96	0.51	0.55	0.68	**0.18**	**0.20**	**0.25**	68.3%
M	2.80	RES 1/6 AC.	52.5%	2.80	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.90**	**1.05**	**1.53**	52.5%
N	1.10	RES 1/6 AC.	52.5%	1.10	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.35**	**0.41**	**0.60**	52.5%
O	0.86	RES 1/2 AC.	25.0%	0.57	0.15	0.22	0.46	STREET	100.0%	0.29	0.89	0.90	0.96	0.40	0.45	0.63	**0.34**	**0.39**	**0.54**	50.3%
P	2.30	RES 1/6 AC.	52.5%	2.30	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.74**	**0.86**	**1.25**	52.5%
Q	0.67	RES 1/2 AC.	25.0%	0.45	0.15	0.22	0.46	STREET	100.0%	0.22	0.89	0.90	0.96	0.39	0.44	0.62	**0.26**	**0.30**	**0.42**	49.6%
R	3.90	RES 1/8 AC.	65.0%	3.90	0.41	0.45	0.59			0.00	0.02	0.08	0.35	0.41	0.45	0.59	**1.60**	**1.76**	**2.30**	65.0%
S	2.00	RES 1/6 AC.	52.5%	2.00	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.64**	**0.75**	**1.09**	52.5%
T	2.60	RES 1/6 AC.	52.5%	2.60	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.83**	**0.98**	**1.42**	52.5%
U	1.40	RES 1/8 AC.	65.0%	0.85	0.41	0.45	0.59	STREET	100.0%	0.55	0.89	0.90	0.96	0.60	0.63	0.74	**0.84**	**0.88**	**1.03**	78.8%
V	1.10	RES 1/6 AC.	52.5%	0.85	0.32	0.38	0.55	STREET	100.0%	0.25	0.02	0.08	0.35	0.25	0.31	0.50	**0.28**	**0.34**	**0.55**	63.3%
W	1.80	RES 1/4 AC.	40.0%	1.20	0.23	0.30	0.50	STREET	100.0%	0.60	0.89	0.90	0.96	0.45	0.50	0.65	**0.81**	**0.90**	**1.18**	60.0%
X	9.80	SCHOOL	70%	9.80	0.45	0.49	0.62			0.00	0.02	0.08	0.35	0.45	0.49	0.62	**4.41**	**4.80**	**6.08**	70.0%
Y	4.80	POND	7.0%	4.80	0.05	0.12	0.39			0.00	0.02	0.08	0.35	0.05	0.12	0.39	**0.24**	**0.58**	**1.87**	7.0%
Z	3.40	SAND CREEK	7.0%	3.40	0.05	0.12	0.39			0.00	0.02	0.08	0.35	0.05	0.12	0.39	**0.17**	**0.41**	**1.33**	7.0%
AA	0.55	OPEN SPACE	2.0%	0.39	0.03	0.09	0.36	TRAIL	80.0%	0.16	0.57	0.59	0.70	0.19	0.24	0.46	**0.10**	**0.13**	**0.25**	24.7%
BB	1.10	OPEN SPACE	2.0%	0.88	0.03	0.09	0.36	TRAIL	80.0%	0.22	0.57	0.59	0.70	0.14	0.19	0.43	**0.15**	**0.21**	**0.47**	17.6%
CC	1.60	RES 1/2 AC.	25.0%	1.48	0.15	0.22	0.46	TRAIL	80.0%	0.12	0.57	0.59	0.70	0.18	0.25	0.48	**0.29**	**0.40**	**0.76**	29.1%
DD	2.70	RES 1/2 AC.	25.0%	2.53	0.15	0.22	0.46	TRAIL	80.0%	0.17	0.57	0.59	0.70	0.18	0.24	0.48	**0.48**	**0.66**	**1.28**	28.5%
EE	4.90	RES 1/2 AC.	25.0%	4.57	0.15	0.22	0.46	TRAIL	80.0%	0.33	0.57	0.59	0.70	0.18	0.24	0.48	**0.87**	**1.20**	**2.33**	28.7%
FF	1.30	RES 1/2 AC.	25.0%	1.22	0.15	0.22	0.46	TRAIL	80.0%	0.08	0.57	0.59	0.70	0.18	0.24	0.47	**0.23**	**0.32**	**0.62**	28.4%
OS-1	2.60	RES 1/8 AC.	65.0%	1.30	0.41	0.45	0.59	STREET	100.0%	1.30	0.89	0.90	0.96	0.65	0.68	0.78	**1.69**	**1.76**	**2.02**	82.5%
OS-2	0.68	STREET	100.0%	0.34	0.89	0.90	0.96	OPEN SPACE	7%	0.34	0.05	0.12	0.39	0.47	0.51	0.68	**0.32**	**0.35**	**0.46**	53.5%
OS-3	3.70	RES 1/6 AC.	52.5%	3.70	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.18**	**1.39**	**2.02**	52.5%
OS-4	1.60	RES 1/6 AC.	52.5%	1.60	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.51**	**0.60**	**0.87**	52.5%
OS-5	3.30	RES 1/6 AC.	52.5%	3.30	0.32	0.38	0.55			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.06**	**1.24**	**1.80**	52.5%
OS-6	0.44	STREET	100%	0.07	0.89	0.90	0.96	PARK	7.0%	0.37	0.05	0.12	0.39	0.18	0.24	0.48	**0.08**	**0.11**	**0.21**	21.8%

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
DATE: *09/20/24*
CALCULATED BY: *MAW*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

		C VALUE DCM TABLE 6-6						C VALUE DCM TABLE 6-6						WEIGHTED "C" VALUE			WEIGHTED CA			DCM TABLE 6-6
BASIN	TOTAL AREA (AC)	LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)	WEIGHTED % IMPERVIOUS
B1	1.70	STREET	100%	1.10	0.89	0.90	0.96	OPEN SPACE	7.0%	0.60	0.05	0.12	0.39	0.59	0.62	0.76	**1.01**	**1.06**	**1.29**	67.2%
B3	1.50	STREET	100%	0.90	0.89	0.90	0.96	OPEN SPACE	7.0%	0.60	0.05	0.12	0.39	0.55	0.59	0.73	**0.83**	**0.88**	**1.10**	62.8%
B4	0.87	STREET	100%	0.49	0.89	0.90	0.96	OPEN SPACE	7.0%	0.38	0.05	0.12	0.39	0.52	0.56	0.71	**0.46**	**0.49**	**0.62**	59.4%
B5	0.90	STREET	100%	0.52	0.89	0.90	0.96	OPEN SPACE	7.0%	0.38	0.05	0.12	0.39	0.54	0.57	0.72	**0.48**	**0.51**	**0.65**	60.7%
B6	1.00	STREET	100%	0.60	0.89	0.90	0.96	OPEN SPACE	7.0%	0.40	0.05	0.12	0.39	0.55	0.59	0.73	**0.55**	**0.59**	**0.73**	62.8%
B7	1.60	STREET	100%	0.75	0.89	0.90	0.96	OPEN SPACE	7.0%	0.85	0.05	0.12	0.39	0.44	0.49	0.66	**0.71**	**0.78**	**1.05**	50.6%
B8	1.20	STREET	100%	0.65	0.89	0.90	0.96	OPEN SPACE	7.0%	0.55	0.05	0.12	0.39	0.51	0.54	0.70	**0.61**	**0.65**	**0.84**	57.4%
B9	2.00	STREET	100%	0.95	0.89	0.90	0.96	OPEN SPACE	7.0%	1.05	0.05	0.12	0.39	0.45	0.49	0.66	**0.90**	**0.98**	**1.32**	51.2%
B10	2.20	STREET	100%	1.05	0.89	0.90	0.96	OPEN SPACE	7.0%	1.15	0.05	0.12	0.39	0.45	0.49	0.66	**0.99**	**1.08**	**1.46**	51.4%
TOTAL AREA TRIBUTARY TO POND FSD-11B	**66.79**	**53.8%**																		
Tributary Area to 54" RCP Easterly Outfall	**52.79**	**51.0%**																		
Tributary Area to 42" RCP Westerly Outfall	**14.00**	**64.4%**																		
Basins tributary to Pond FSD-14A	12.05	64.6%																		
Basins tributary to Pond FSD-14B	3.70	52.5%																		
Basins using Runoff Reduction	12.15	27.5%																		

JOB NAME:	*STERLING RANCH EAST FILING NO. 3*
JOB NUMBER:	*1183.33*
DATE:	*09/20/24*
CALC'D BY:	*MAW*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}}$$

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

* For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
BASIN	CA(2)	CA(5)	CA(100)	C(5)	Length *(ft)*	Height *(ft)*	Tc *(min)*	Length *(ft)*	Slope *(%)*	Velocity *(fps)*	Tc *(min)*	TOTAL *(min)*	I(2) *(in/hr)*	I(5) *(in/hr)*	I(100) *(in/hr)*	Q(2) *(cfs)*	Q(5) *(cfs)*	Q(100) *(cfs)*
A	0.45	0.53	0.76	0.12	50	1	10.0	500	1.5%	2.4	3.4	13.4	2.95	3.70	6.20	1	**2**	**5**
B	1.06	1.24	1.80	0.12	100	2	14.1	730	1.8%	2.7	4.5	18.6	2.56	3.20	5.37	3	**4**	**10**
C	0.83	0.91	1.17	0.12	100	2	14.1	600	1.8%	2.7	3.7	17.8	2.61	3.26	5.48	2	**3**	**6**
D	1.09	1.28	1.85	0.12	100	2	14.1	450	1.8%	2.7	2.8	16.9	2.67	3.34	5.61	3	**4**	**10**
E	0.58	0.68	0.98	0.12	100	2	14.1	275	1.5%	2.4	1.9	15.9	2.74	3.43	5.76	2	**2**	**6**
F	0.58	0.68	0.98	0.12	100	2	14.1	400	1.5%	2.4	2.7	16.8	2.68	3.35	5.63	2	**2**	**6**
G	0.80	0.94	1.36	0.12	100	2	14.1	500	1.5%	2.4	3.4	17.5	2.63	3.29	5.53	2	**3**	**8**
H	0.20	0.23	0.32	0.12	50	1	10.0	175	1.5%	2.4	1.2	11.1	3.17	3.97	6.66	0.6	**0.9**	**2.1**
I	0.58	0.68	0.98	0.12	100	2	14.1	400	1.5%	2.4	2.7	16.8	2.68	3.35	5.63	2	**2**	**6**
J	0.50	0.53	0.63	0.12	50	1	10.0	350	1.5%	2.4	2.4	12.3	3.05	3.81	6.40	1.5	**2**	**4**
K	0.83	0.98	1.42	0.12	100	2	14.1	350	2.6%	3.2	1.8	15.9	2.74	3.43	5.77	2	**3**	**8**
L	0.18	0.20	0.25	0.12	50	1	10.0	160	2.6%	3.2	0.8	10.8	3.21	4.02	6.74	0.6	**0.8**	**1.7**
M	0.90	1.05	1.53	0.12	100	2	14.1	325	2.9%	3.4	1.6	15.7	2.76	3.46	5.80	2	**4**	**9**
N	0.35	0.41	0.60	0.12	100	2	14.1	300	2.9%	3.4	1.5	15.5	2.77	3.47	5.82	1.0	**1.4**	**3.5**

JOB NAME:	*STERLING RANCH EAST FILING NO. 3*
JOB NUMBER:	*1183.33*
DATE:	*09/20/24*
CALC'D BY:	*MAW*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}}$$

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

* For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED CA(2)	CA(5)	CA(100)	OVERLAND C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL FLOW Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
O	0.34	0.39	0.54	0.12	50	1	10.0	350	1.5%	2.4	2.4	12.3	3.05	3.81	6.40	1	1	3
P	0.74	0.86	1.25	0.12	100	2	14.1	200	1.5%	2.4	1.4	15.4	2.78	3.48	5.84	2	3	7
Q	0.26	0.30	0.42	0.12	50	1	10.0	200	1.5%	2.4	1.4	11.3	3.15	3.94	6.62	0.8	1.2	2.8
R	1.60	1.76	2.30	0.12	100	2	14.1	600	2.3%	3.0	3.3	17.4	2.64	3.30	5.54	4	6	13
S	0.64	0.75	1.09	0.12	100	2	14.1	350	2.3%	3.0	1.9	16.0	2.74	3.42	5.75	2	3	6
T	0.83	0.98	1.42	0.12	100	2	14.1	675	1.5%	2.4	4.6	18.7	2.55	3.19	5.36	2	3	8
U	0.84	0.88	1.03	0.12	50	1	10.0	675	1.5%	2.4	4.6	14.5	2.85	3.57	5.99	2	3	6
V	0.28	0.34	0.55	0.12	100	2	14.1	300	1.5%	2.4	2.0	16.1	2.73	3.41	5.73	1	1.2	3.2
W	0.81	0.90	1.18	0.12	50	1	10.0	300	1.5%	2.4	2.0	12.0	3.08	3.86	6.47	2	3	8
X	4.41	4.80	6.08	0.12	40	1.2	7.8	300	2.0%	2.8	1.8	9.6	3.35	4.20	7.05	15	20	43
Y	0.24	0.58	1.87	0.12	100	1	17.7	500	1.0%	2.0	4.2	21.9	2.36	2.96	4.96	0.6	1.7	9.3
Z	0.17	0.41	1.33	0.12	65	14	5.2	700	1.0%	0.7	16.7	21.8	2.36	2.96	4.96	0.4	1.2	6.6
AA	0.10	0.13	0.25	0.12	100	5.5	10.1					10.1	3.29	4.12	6.91	0.3	0.5	1.7
BB	0.15	0.21	0.47	0.12	100	8	8.9					8.9	3.43	4.30	7.22	0.5	0.9	3.4
CC	0.29	0.40	0.76	0.12	100	2.5	13.1	125	2.5%	1.6	1.3	14.4	2.86	3.58	6.01	0.8	1.4	4.6

JOB NAME:	*STERLING RANCH EAST FILING NO. 3*
JOB NUMBER:	*1183.33*
DATE:	*09/20/24*
CALC'D BY:	*MAW*

Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}}$$

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

* For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED CA(2)	WEIGHTED CA(5)	WEIGHTED CA(100)	OVERLAND C(5)	OVERLAND Length (ft)	OVERLAND Height (ft)	OVERLAND Tc (min)	STREET / CHANNEL FLOW Length (ft)	STREET / CHANNEL FLOW Slope (%)	STREET / CHANNEL FLOW Velocity (fps)	STREET / CHANNEL FLOW Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	INTENSITY I(5) (in/hr)	INTENSITY I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	TOTAL FLOWS Q(5) (cfs)	TOTAL FLOWS Q(100) (cfs)
DD	0.48	0.66	1.28	0.12	100	2.5	13.1	150	2.0%	1.4	1.8	14.8	2.82	3.54	5.94	1.3	**2**	**8**
EE	0.87	1.20	2.33	0.12	100	2.5	13.1	150	2.0%	1.4	1.8	14.8	2.82	3.54	5.94	2.5	**4**	**14**
FF	0.23	0.32	0.62	0.12	65	2	9.8	125	2.0%	1.4	1.5	11.3	3.15	3.94	6.62	0.7	**1.2**	**4.1**
OS-1	1.69	1.76	2.02	0.08	40	0.8	9.3	900	2.5%	3.2	4.7	14.0	2.89	3.62	6.08	5	**6**	**12**
OS-2	0.32	0.35	0.46	0.12	50	1	10.0	400	1.6%	2.5	2.6	12.6	3.02	3.78	6.35	1.0	**1.3**	**2.9**
OS-3	1.18	1.39	2.02	0.08	100	2	14.7	900	1.8%	2.7	5.6	20.2	2.46	3.07	5.16	3	**4**	**10**
OS-4	0.51	0.60	0.87	0.12	40	0.8	8.9	900	2.5%	3.2	4.7	13.6	2.93	3.66	6.15	1	**2**	**5**
OS-5	1.06	1.24	1.80	0.12	100	2	14.1	300	1.5%	2.4	2.0	16.1	2.73	3.41	5.73	3	**4**	**10**
OS-6	0.08	0.11	0.21	0.12	100	2	14.1	50	1.5%	2.4	0.3	14.4	2.86	3.58	6.01	0.2	**0.4**	**1.3**

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Return Period	1-Hour Depth
2	1.19
5	1.50
10	1.75
25	2.00
50	2.25
100	2.52

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}}$$

$$V = C_v S_w^{0.5}$$

Tc=L/V

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
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Paved areas and shallow paved swales	20

$$t_c = \frac{L}{180} + 10$$

* For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED CA(2)	CA(5)	CA(100)	OVERLAND C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL FLOW Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
B1	1.01	1.06	1.29	0.12	10	0.3	3.9	1100	2.4%	3.1	5.9	9.8	3.32	4.16	6.98	3	**4**	**9**
B3	0.83	0.88	1.10	0.12	40	1.2	7.8	600	1.5%	2.4	4.1	11.9	3.09	3.87	6.50	3	**3**	**7**
B4	0.83	0.49	0.62	0.12	30	0.9	6.7	450	1.5%	2.4	3.1	9.8	3.32	4.16	6.98	3	**2**	**4**
B5	0.48	0.51	0.65	0.12	30	0.9	6.7	500	1.5%	2.4	3.4	10.1	3.28	4.11	6.90	2	**2**	**4**
B6	0.55	0.59	0.73	0.12	30	0.9	6.7	500	1.5%	2.4	3.4	10.1	3.28	4.11	6.90	2	**2**	**5**
B7	0.71	0.78	1.05	0.12	70	2.5	9.7	500	1.5%	2.4	3.4	13.1	2.97	3.72	6.25	2	**3**	**7**
B8	0.61	0.65	0.84	0.12	30	0.9	6.7	575	1.5%	2.4	3.9	10.7	3.22	4.03	6.77	2	**3**	**6**
B9	0.90	0.98	1.32	0.12	40	1.2	7.8	750	1.5%	2.4	5.1	12.9	2.99	3.75	6.29	3	**4**	**8**
B10	0.99	1.08	1.46	0.12	30	0.9	6.7	600	1.5%	2.4	4.1	10.8	3.20	4.01	6.73	3	**4**	**10**

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
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CALCULATED BY: *MAW*

*ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Facility/ Inlet Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	OS-1	1.76	2.02	14.0	3.62	6.08	6	12	Exist. 15' Type R At-grade Inlet
2	OS-2, Flow-by from DP-1	0.35	0.72	16.6	3.37	5.65	1	4	Exist. Crosspan
3	OS-3	1.39	2.02	20.2	3.07	5.16	4	10	Future 10' Type R At-grade Inlet
4	OS-4, Flow-by from DP-3	0.61	1.46	21.2	3.00	5.03	2	7	Prop. 6' Crosspan
5	OS-4, OS-5 (Anticicpated off-site flows from SRE Fil. 5)	1.85	3.26	22.2	2.93	4.92	5	16	Prop. 10' Type R Sump Inlet
6	A, OS-6 (Anticicpated off-site flows from SRE Fil. 5)	0.63	0.97	13.4	3.70	6.20	2	6	Prop. 5' Type R Sump Inlet
7	B	1.24	1.80	18.6	3.20	5.37	4	10	Prop. 10' Type R Sump Inlet
8	C	0.91	1.17	17.8	3.26	5.48	3	6	Prop. 5' Type R Sump Inlet
9	D, E	1.95	2.83	18.8	3.18	5.35	6	15	Prop. 10' At-Grade Type R Inlet
10	DP-9 Flow-by, F, G	1.85	3.53	17.5	3.29	5.53	6	20	Prop. 10' Type R Sump Inlet
11	H	0.23	0.32	11.1	3.97	6.66	0.9	2.1	Prop. 5' Type R Sump Inlet
12	I, J	1.20	1.61	18.8	3.18	5.34	4	9	Prop. 10' At-Grade Type R Inlet
13	K, 5-yr. Fllow-by from DP-12	0.99	1.42	15.9	3.43	5.77	3	8	Prop. 5' Type R Sump Inlet
14	L	0.20	0.25	10.8	4.02	6.74	0.8	1.7	Prop. 5' Type R Sump Inlet

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
DATE: *09/20/24*
CALCULATED BY: *MAW*

*ALL STORM SEWER TO BE PRIVATE UNLESS OTHERWISE NOTED

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Facility/ Inlet Size*
					I(5)	I(100)	Q(5)	Q(100)	
15	M, N, 100-yr. Flow-by DP-12	1.46	2.53	18.8	3.18	5.34	5	14	Prop. 10' Type R Sump Inlet
16	O	0.39	0.54	12.3	3.81	6.40	1	3	Prop. 5' Type R Sump Inlet
17	P	0.86	1.25	15.4	3.48	5.84	3	7	Prop. 5' Type R Sump Inlet
18	Q	0.30	0.42	11.3	3.94	6.62	1.2	2.8	Prop. 5' Type R Sump Inlet
19	T, U	1.85	2.45	19.1	3.16	5.31	6	13	Prop. 10' At-Grade Type R Inlet
20	R, 5-yr Flow-by from DP-19	2.05	2.30	17.4	3.30	5.54	7	13	Prop. 10' Type R Sump Inlet
21	S	0.75	1.09	16.0	3.42	5.75	3	6	Prop. 5' Type R Sump Inlet
22	V, 100-yr Flow-by from DP-19	0.34	1.55	16.1	3.41	5.73	1.2	8.9	Prop. 10' Type R Sump Inlet
23	W	0.90	1.18	12.0	3.86	6.47	3	8	Prop. 5' Type R Sump Inlet
24	**Pond Inflow (Easterly Forebay)**	**19.40**	**27.87**	**25.3**	**2.73**	**4.59**	**53**	**128**	**Prop. 54" RCP**
25	B1	1.06	1.29	9.8	4.16	6.98	4	9	Exist. 15' Type R At-grade Inlet
26	B3, Flow-by from DP-25	0.88	1.16	11.9	3.87	6.50	3	8	Exist. 10' Type R At-grade Inlet
27	B4, Flow-by from DP-2	0.83	1.34	19.7	3.11	5.22	3	7	Exist. 10' Type R At-grade Inlet
28	B5, Flow-by from DP-26	0.51	0.89	12.9	3.75	6.30	2	6	Exist. 10' Type R At-grade Inlet

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FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Facility/ Inlet Size*
29	B6, Flow-by from DP-27	0.59	0.96	20.7	3.04	5.10	2	5	Exist. 10' Type R At-grade Inlet
30	B7, Flow-by from DP-28	0.78	1.16	13.9	3.64	6.11	3	7	Exist. 10' Type R At-grade Inlet
31	B8, Flow-by from DP-29	0.65	0.90	21.7	2.97	4.98	2	4	Exist. 10' Type R At-grade Inlet
32	B9, Flow-by from DP-30	0.98	1.52	15.9	3.44	5.77	3	9	Exist. 15' Type R Sump Inlet
33	B10, Flow-by from DP-31	1.08	1.47	23.7	2.83	4.76	3	7	Exist. 15' Type R Sump Inlet
34	**Pond Inflow (Westerly Forebay - X, DP-32, DP-33)**	**6.87**	**9.06**	**16.9**	**3.34**	**5.61**	**23**	**51**	**Prop. 42" RCP**
	Total Pond Inflow (DP-24, DP-34 and Y),	**26.85**	**38.80**	**25.3**	**2.73**	**4.59**	**73**	**178**	**Pond FSD-11B**

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
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* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM SLOPE.
REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin / Design Point / Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Pipe Size*
1	DP-5	1.85	3.26	22.2	2.93	4.92	5	16	PROP. 24" RCP
2	DP-6	0.63	0.97	13.4	3.70	6.20	2	6	PROP. 18" RCP
3	PR-1, PR-2	2.48	4.23	23.2	2.86	4.81	7	20	PROP. 30" RCP
4	DP-7	1.24	1.80	18.6	3.20	5.37	4	10	PROP. 24" RCP
5	DP-8	0.91	1.17	17.8	3.26	5.48	3	6	PROP. 18" RCP
6	PR-3, PR-4, PR-5	4.63	7.20	23.4	2.85	4.79	13	34	PROP. 36" RCP
7	DP-9 Capture	1.72	1.64	18.8	3.18	5.35	5	9	PROP. 24" RCP
8	PR-6, PR-7	6.35	8.84	23.6	2.84	4.76	18	42	PROP. 36" RCP
9	DP-10	1.85	3.53	17.5	3.29	5.53	6	20	PROP. 30" RCP
10	DP-11	0.23	0.32	11.1	3.97	6.66	0.9	2.1	PROP. 18" RCP
11	PR-8, PR-9, PR-10	8.42	12.69	24.4	2.79	4.68	23	59	PROP. 42" RCP
12	DP-12 Capture	1.19	1.21	18.8	3.18	5.34	4	6	PROP. 18" RCP
13	DP-13	0.99	1.42	15.9	3.43	5.77	3	8	PROP. 18" RCP

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
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REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin / Design Point / Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Pipe Size*
14	DP-14	0.20	0.25	10.8	4.02	6.74	0.8	1.7	PROP. 18" RCP
15	PR-13, PR-14	1.19	1.66	15.9	3.43	5.77	4	10	PROP. 24" RCP
16	PR-12, PR-15	2.38	2.87	19.4	3.14	5.26	7	15	PROP. 24" RCP
17	PR-11, PR-16	10.80	15.56	24.4	2.79	4.68	30	73	PROP. 42" RCP
18	DP-15	1.46	2.53	18.8	3.18	5.34	5	14	PROP. 24" RCP
19	DP-16	0.39	0.54	12.3	3.81	6.40	1	3	PROP. 18" RCP
20	PR-17, PR-18, PR-19	12.65	18.63	24.8	2.76	4.64	35	86	PROP. 48" RCP
21	DP-17	0.86	1.25	15.4	3.48	5.84	3	7	PROP. 18" RCP
22	DP-18	0.30	0.42	11.3	3.94	6.62	1.2	2.8	PROP. 18" RCP
23	PR-20, PR-21, PR-22	13.81	20.30	25.2	2.74	4.60	38	93	PROP. 48" RCP
24	DP-19 Capture	1.56	1.44	19.1	3.16	5.31	5	8	PROP. 18" RCP
25	DP-20	2.05	2.30	17.4	3.30	5.54	7	13	PROP. 24" RCP
26	DP-21	0.75	1.09	16.0	3.42	5.75	3	6	PROP. 18" RCP

JOB NAME: *STERLING RANCH EAST FILING NO. 3*
JOB NUMBER: *1183.33*
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REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.
PIPES ARE TO BE PRIVATE UNLESS OTHERWISE NOTED.
PRIVATE STORM MATERIALS TO BE RCP OR DOUBLE WALL POLYPROPYLENE (DWPP) TO BE SELECTED BY CONTRACTOR

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin / Design Point / Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Pipe Size*
27	PR-25, PR-26	2.80	3.39	17.5	3.29	5.53	9	19	PROP. 30" RCP
28	PR-24, PR-27	4.36	4.83	19.3	3.15	5.28	14	26	PROP. 30" RCP
29	DP-22	0.34	1.55	16.1	3.41	5.73	1.2	8.9	PROP. 18" RCP
30	DP-23	0.90	1.18	12.0	3.86	6.47	3	8	PROP. 18" RCP
31	PR-26, PR-27, PR-28	5.60	7.56	19.4	3.14	5.27	18	40	PROP. 36" RCP
32	**TOTAL INFLOW POND FSD 11 B (EASTERLY FOREBAY)**	**19.40**	**27.87**	**25.3**	**2.73**	**4.59**	**53**	**128**	**PROP. 54" RCP**
33	DP-32	0.98	1.52	15.9	3.44	5.77	3	9	PROP. 18" RCP
34	DP-33, PR-33	2.06	2.98	16.9	3.34	5.61	7	17	PROP. 24" RCP
35	X (Future Elem. School Site)	4.80	6.08	9.6	4.20	7.05	20	43	PROP. 36" RCP
36	**TOTAL INFLOW POND FSD 11 B (WESTERLY FOREBAY)**	**6.87**	**9.06**	**16.9**	**3.34**	**5.61**	**23**	**51**	**PROP. 42" RCP**

Please use updated version from MHFD

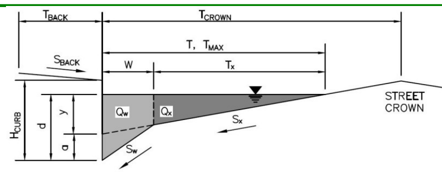
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-1



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	32.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

allowed to be 20'

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	12.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**5.8**	**32.7**	**cfs**

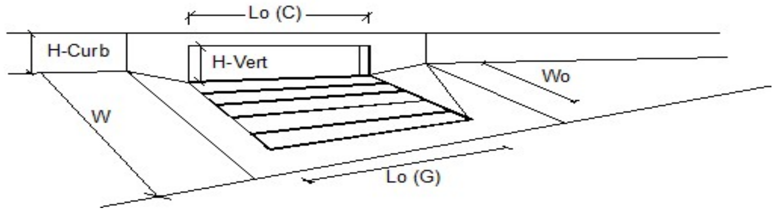
WARNING: MINOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Provide Inlet summary before inlet design spreadsheets

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MINOR STORM'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**6.0**	**10.4**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.6**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**87**	**%**

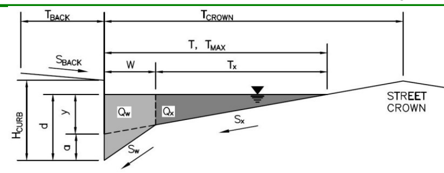
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-3



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

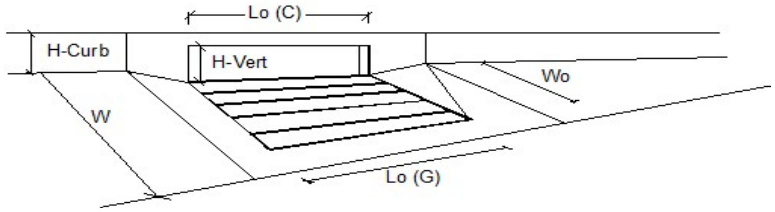
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**13.3**	**13.3**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.9**	**7.1**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.1**	**2.9**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**71**	**%**

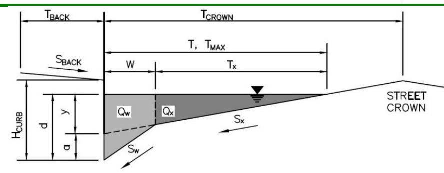
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-5



Gutter Geometry (Enter data in the blue cells)

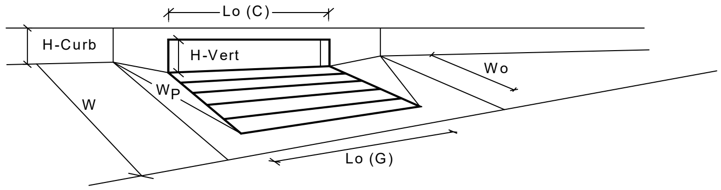
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet: CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.0	16.0	cfs

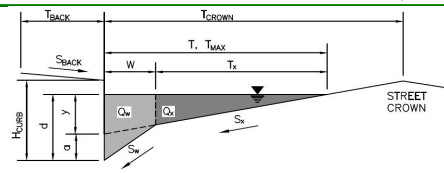
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-6



Gutter Geometry (Enter data in the blue cells)

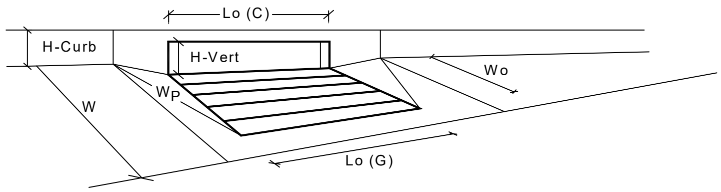
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.0	6.0	cfs

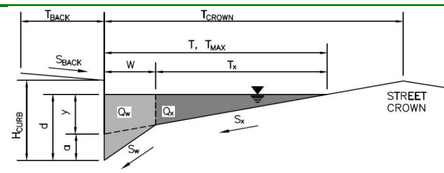
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-7



Gutter Geometry (Enter data in the blue cells)

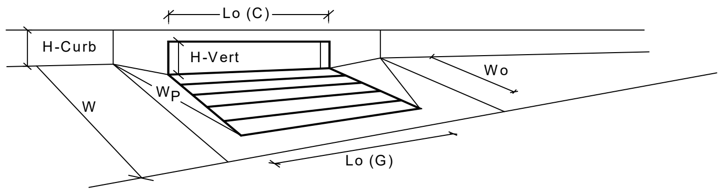
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



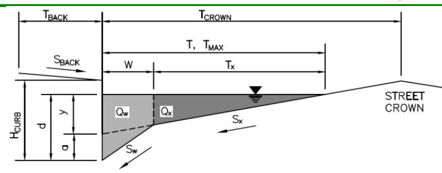
		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	4.0	10.0	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-8



Gutter Geometry (Enter data in the blue cells)

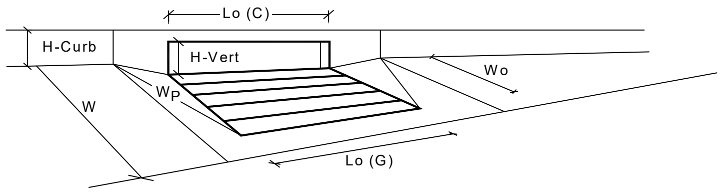
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	3.0	6.0	cfs

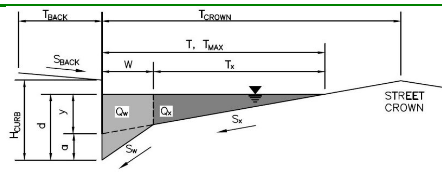
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-9



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**13.4**	**13.4**	**cfs**

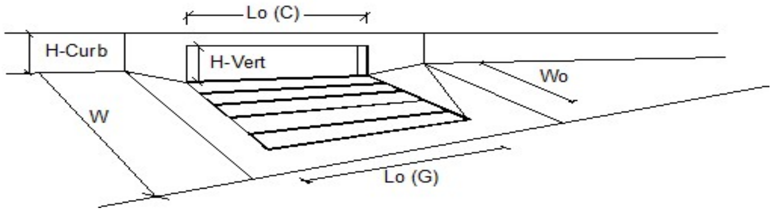
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

WARNING: MAJOR STORM max. allowable capacity is less than the design flow given on sheet 'Inlet Management'

Flow exceeds maximum allowable value, please revise

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: WARNING: Q > ALLOWABLE Q FOR MAJOR STORM		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.3**	**8.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.7**	**6.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**88**	**58**	**%**

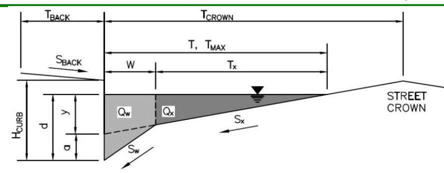
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-10



Gutter Geometry (Enter data in the blue cells)

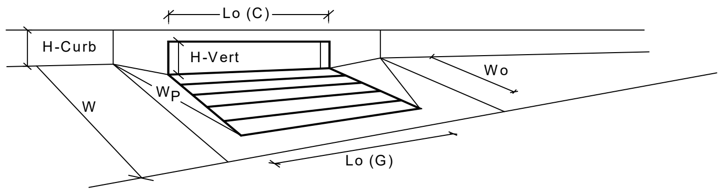
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

		MINOR	MAJOR	
Low Head Performance Reduction (Calculated)				
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	6.0	20.0	cfs

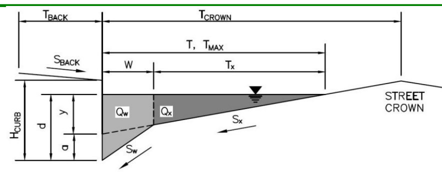
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-11



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Warning 01 Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.106	please revise

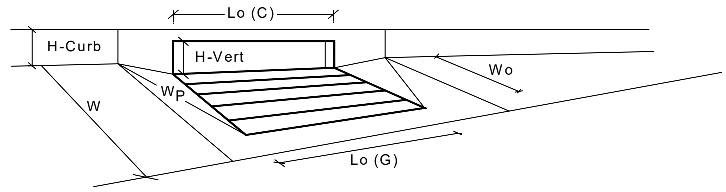
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

Warning 01: Manning's n-value does not meet the USDCM recommended design range.

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.9	2.1	cfs

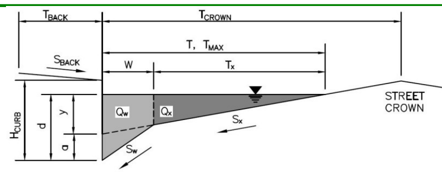
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-12



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.029	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

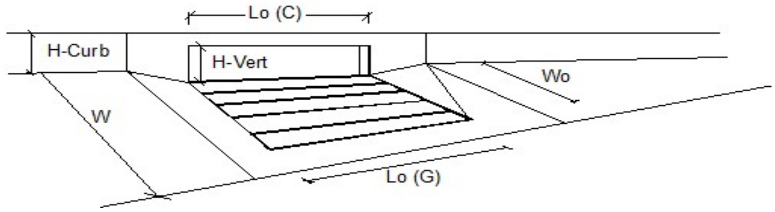
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**17.9**	**18.5**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**4.0**	**6.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**2.3**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**99**	**75**	**%**

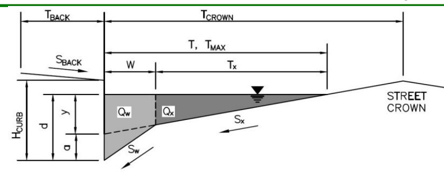
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-13



Gutter Geometry (Enter data in the blue cells)

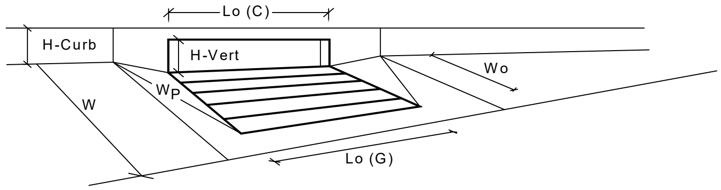
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	3.0	8.0	cfs

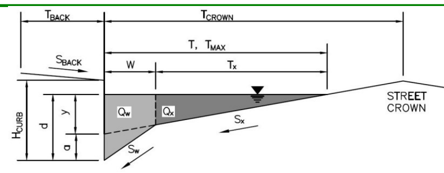
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-14



Gutter Geometry (Enter data in the blue cells)

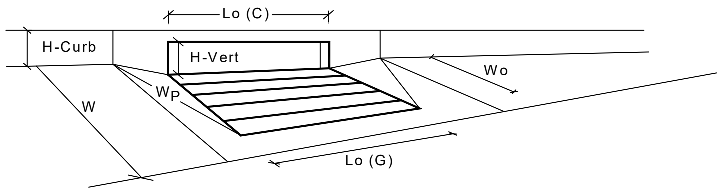
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLEET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	0.8	1.7	cfs

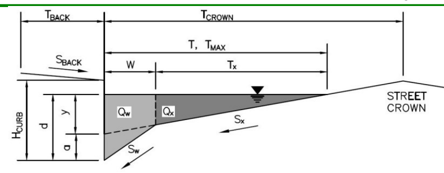
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-15



Gutter Geometry (Enter data in the blue cells)

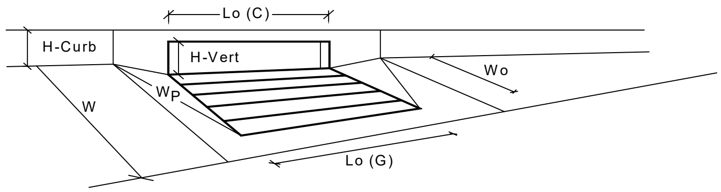
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	5.0	14.0	cfs

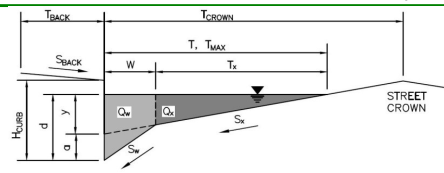
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-16



Gutter Geometry (Enter data in the blue cells)

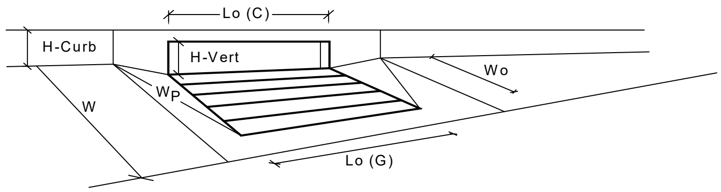
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening	MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.0	3.0	cfs

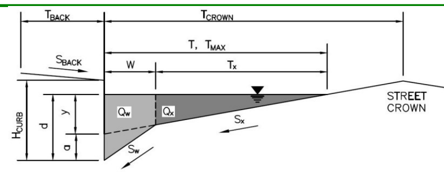
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-17



Gutter Geometry (Enter data in the blue cells)

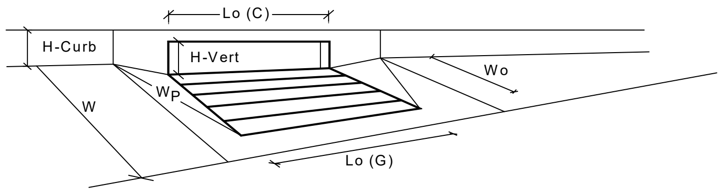
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	7.0	cfs

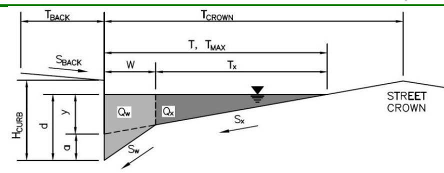
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-18



Gutter Geometry (Enter data in the blue cells)

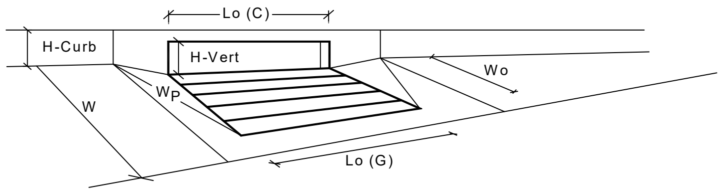
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



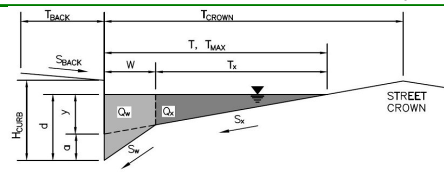
			MINOR	MAJOR	
Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.2	2.8	cfs

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-19



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.035	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.012	

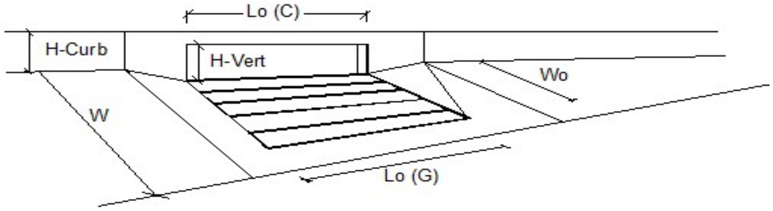
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**22.6**	**27.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**5.1**	**7.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.9**	**5.4**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**84**	**59**	**%**

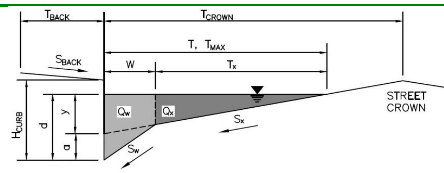
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-20



Gutter Geometry (Enter data in the blue cells)

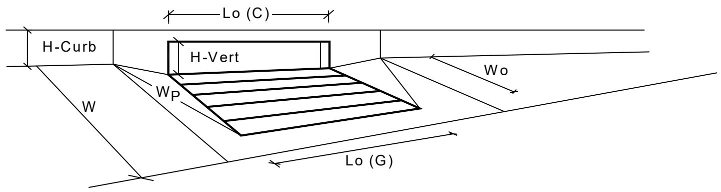
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet — CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	7.0	13.0	cfs

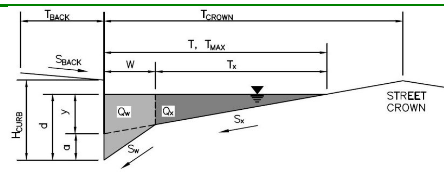
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-21



Gutter Geometry (Enter data in the blue cells)

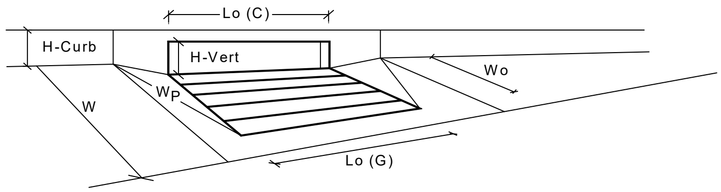
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet: CDOT Type R Curb Opening	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	6.0	cfs

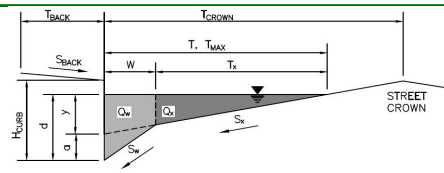
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-22



Gutter Geometry (Enter data in the blue cells)

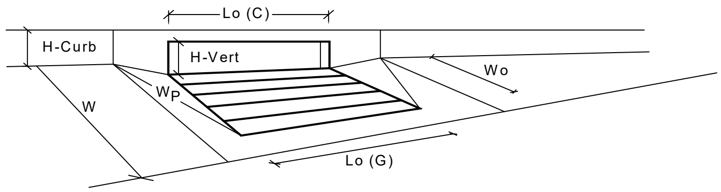
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) — CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**8.3**	**25.5**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.2	8.9	cfs

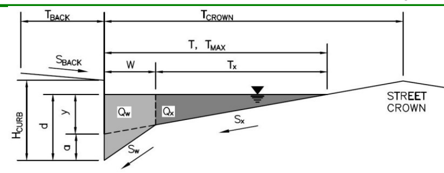
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-23



Gutter Geometry (Enter data in the blue cells)

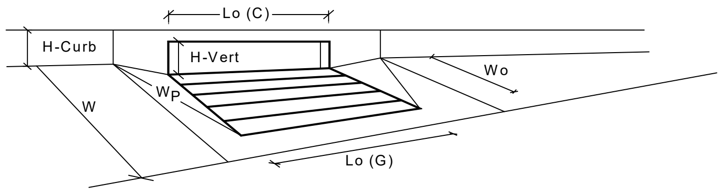
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	12.0	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.77	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**5.4**	**12.3**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	8.0	cfs

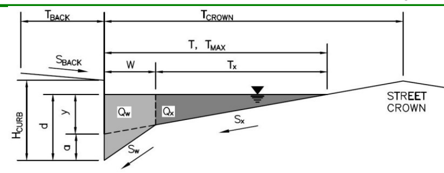
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-25



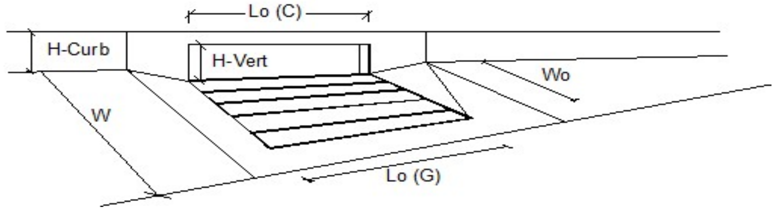
Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**41.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**4.0**	**8.6**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**0.4**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**95**	**%**

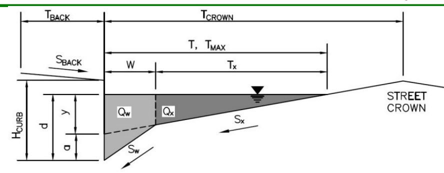
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-26



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

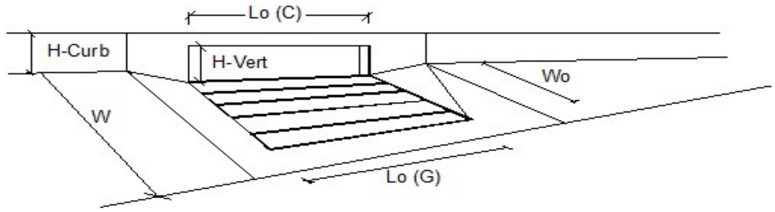
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**41.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**3.0**	**6.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**1.7**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**79**	**%**

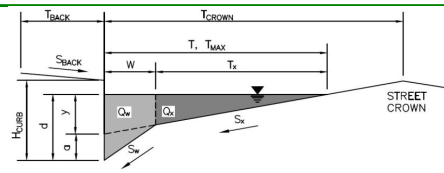
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-27



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

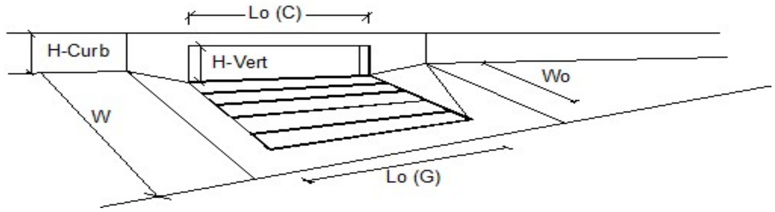
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**32.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input) CDOT Type R Curb Opening				
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.0**	**5.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**83**	**%**

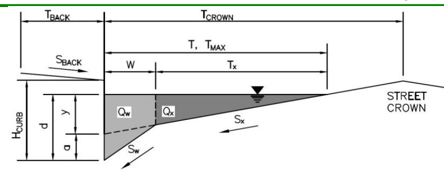
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3   FDR

Inlet ID: DP-28



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

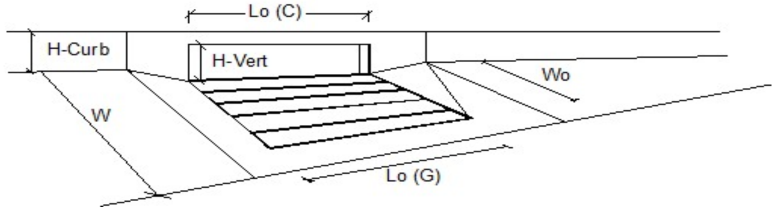
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**41.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



		MINOR	MAJOR	
Design Information (Input)				
Type of Inlet (CDOT Type R Curb Opening)	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')	a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**2.0**	**5.3**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**0.7**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**88**	**%**

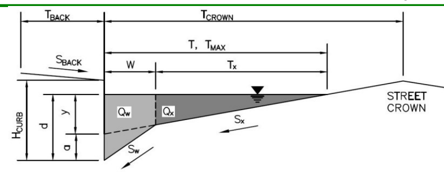
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-29



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

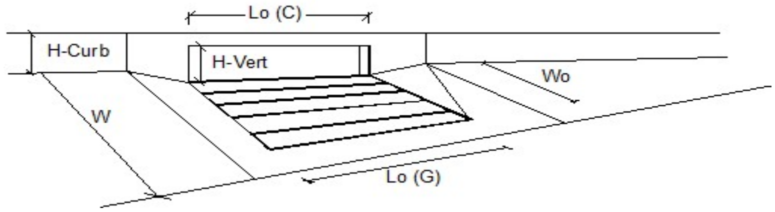
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**32.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.0**	**4.7**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**0.3**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**94**	**%**

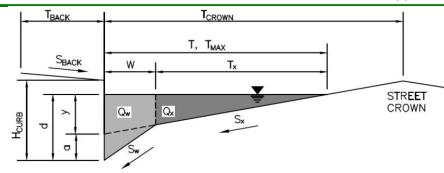
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-30



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	32.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

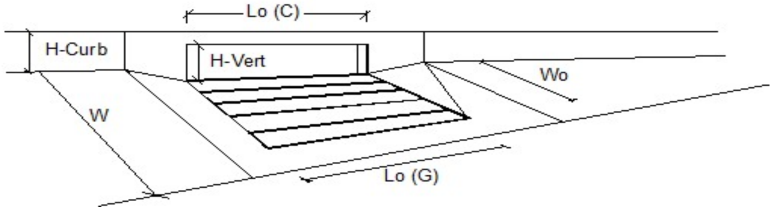
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	**Q_{allow} =**	**17.0**	**41.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	

Street Hydraulics: OK - Q < Allowable Street Capacity'		MINOR	MAJOR	
Total Inlet Interception Capacity	**Q =**	**3.0**	**5.8**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)	**Q_b =**	**0.0**	**1.2**	**cfs**
Capture Percentage = Q_a/Q_o =	**C% =**	**100**	**83**	**%**

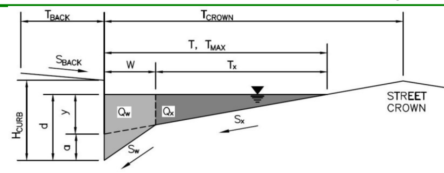
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-31



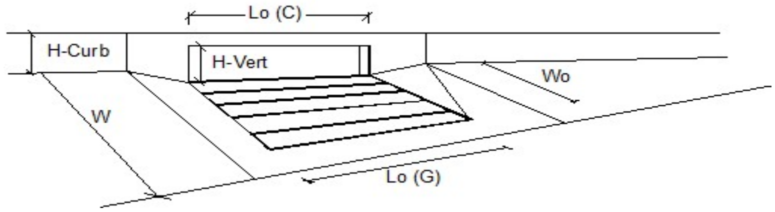
Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	26.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012		
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_X =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	**17.0**	**32.8**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'
Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a')		a_{LOCAL} =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)		No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)		L_o =	10.00	10.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)		W_o =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)		C_f-G =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)		C_f-C =	0.10	0.10	
Street Hydraulics: OK - Q < Allowable Street Capacity'			MINOR	MAJOR	
Total Inlet Interception Capacity		**Q =**	**2.0**	**3.9**	**cfs**
Total Inlet Carry-Over Flow (flow bypassing inlet)		**Q_b =**	**0.0**	**0.1**	**cfs**
Capture Percentage = Q_a/Q_o =		**C% =**	**100**	**99**	**%**

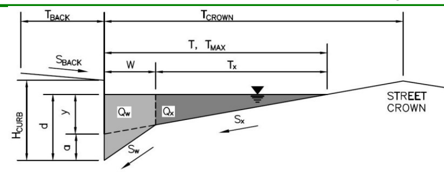
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-32



Gutter Geometry (Enter data in the blue cells)

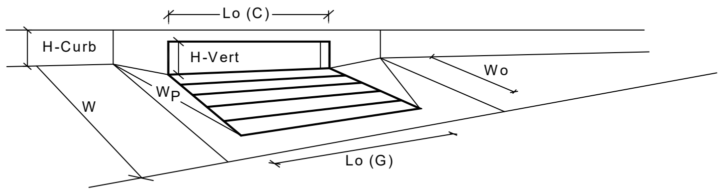
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**9.7**	**39.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	9.0	cfs

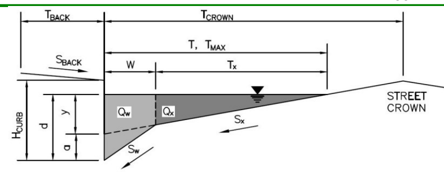
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: STERLING RANCH EAST FILING NO. 3 FDR

Inlet ID: DP-33



Gutter Geometry (Enter data in the blue cells)

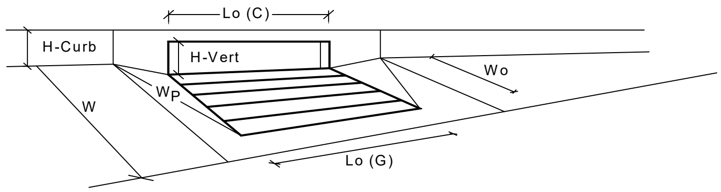
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	14.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.012	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	26.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	20.0	26.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	12.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type R Curb Opening		MINOR	MAJOR	
Type of Inlet		Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	12.0	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	15.00	15.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	

Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.33	0.83	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.57	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	0.79	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	

		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	**9.7**	**39.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	3.0	7.0	cfs

54 in. RCP Outlet (Pipe Run 32)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Diameter	54.0 in
Discharge	130.00 cfs

Results

Normal Depth	32.1 in
Flow Area	9.8 ft²
Wetted Perimeter	7.9 ft
Hydraulic Radius	14.9 in
Top Width	4.42 ft
Critical Depth	40.3 in
Percent Full	59.4 %
Critical Slope	0.005 ft/ft
Velocity	13.21 ft/s
Velocity Head	2.71 ft
Specific Energy	5.38 ft
Froude Number	1.561
Maximum Discharge	211.53 cfs
Discharge Full	196.64 cfs
Slope Full	0.004 ft/ft
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	59.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	32.1 in
Critical Depth	40.3 in
Channel Slope	0.010 ft/ft
Critical Slope	0.005 ft/ft

54" RCP OUTFALL
IMPACT STRUCTURE CALCULATIONS

Flowmaster calcs.
A = 9.8 sf
V = 13.2 ft/s

Using the above:
W = 10.71 use 11.0'
D = 3.13

Based on the determined
W and D above:
H = 8.25'
L = 14.67'
a = 5.5'
b = 4.13'
c = 5.5'
d = 1.83'
e = 0.92'
f = 1.38'
t = 0.92'

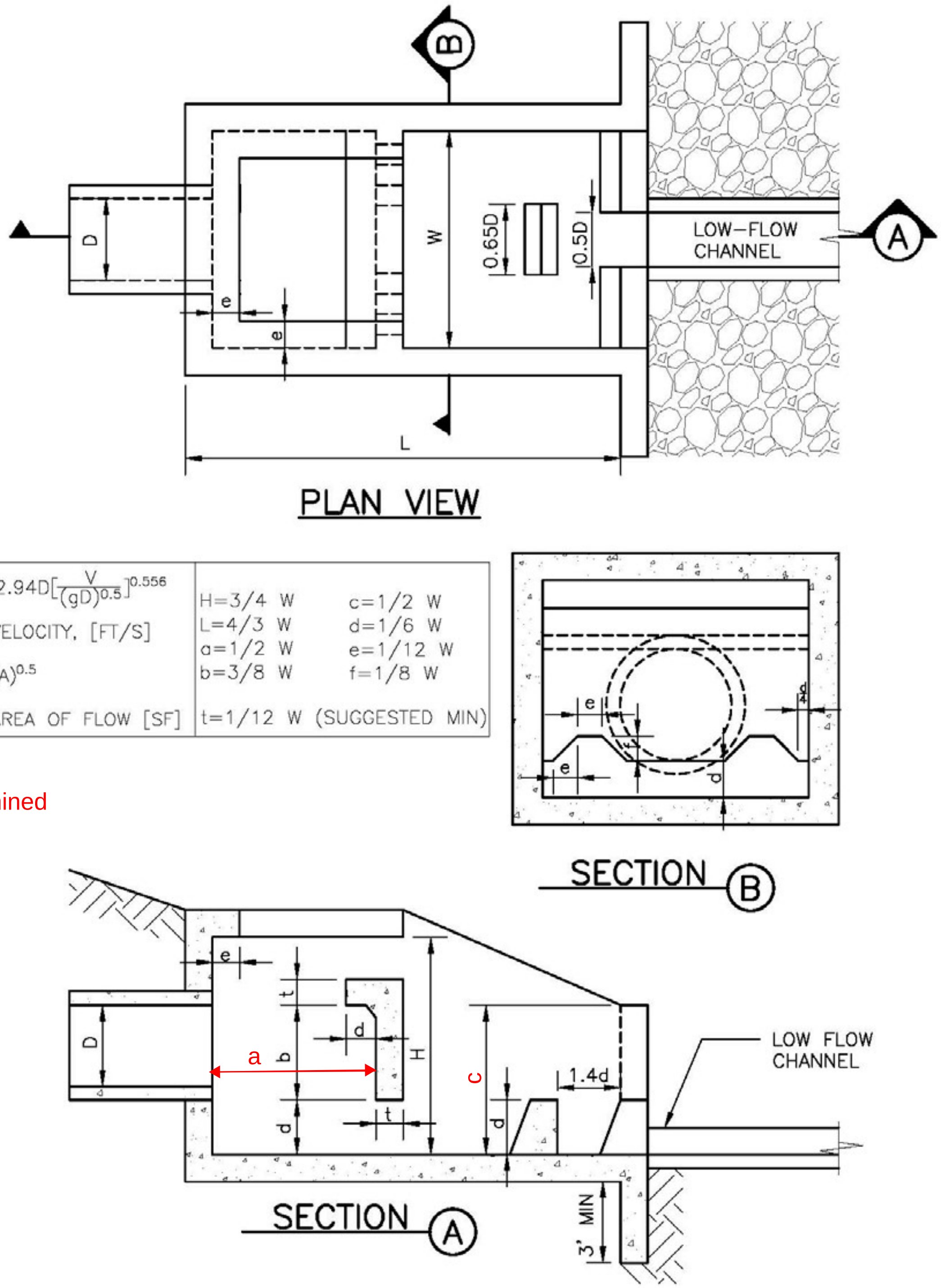
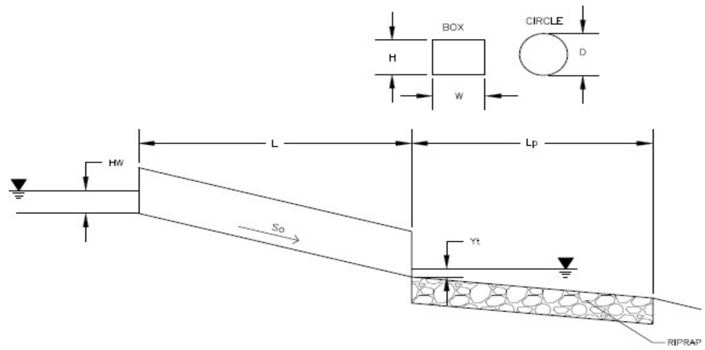


Figure 9-45. UDFCD modified USBR type VI impacts stilling basin (general design dimensions)

DETERMINATION OF CULVERT HEADWATER AND OUTLET PROTECTION

MHFD-Culvert, Version 4.00 (May 2020)

Project: STERLING RANCH EAST FILING NO. 3
ID: POND FSD 11B OUTFALL



Soil Type:
Choose One:
(●) Sandy
( ) Non-Sandy

Design Information:

Design Discharge	Q =	42.1	cfs
Circular Culvert:			
Barrel Diameter in Inches	D =	24	inches
Inlet Edge Type (Choose from pull-down list)		Grooved Edge Projecting	
OR:			
Box Culvert:		**OR**	
Barrel Height (Rise) in Feet	H (Rise) =		ft
Barrel Width (Span) in Feet	W (Span) =		ft
Inlet Edge Type (Choose from pull-down list)			
Number of Barrels	# Barrels =	1	
Inlet Elevation	Elev IN =	6994.5	ft
Outlet Elevation **OR** Slope	So =	0.0231	ft/ft
Culvert Length	L =	130	ft
Manning's Roughness	n =	0.013	
Bend Loss Coefficient	k_b =	0	
Exit Loss Coefficient	k_x =	1	
Tailwater Surface Elevation	$Y_{t,\ Elevation}$ =		ft
Max Allowable Channel Velocity	V =	5	ft/s

Calculated Results:

Culvert Cross Sectional Area Available	A =	3.14	ft^2
Culvert Normal Depth	Y_n =	2.00	ft
Culvert Critical Depth	Y_c =	1.96	ft
Froude Number	Fr =	-	**Pressure flow!**
Entrance Loss Coefficient	k_e =	0.20	
Friction Loss Coefficient	k_f =	1.61	
Sum of All Loss Coefficients	k_s =	2.81	ft
Headwater:			
Inlet Control Headwater	HW_I =	7.16	ft
Outlet Control Headwater	HW_O =	6.80	ft
Design Headwater Elevation	**HW =**	**7001.66**	**ft**
Headwater/Diameter OR Headwater/Rise Ratio	**HW/D =**	**3.58**	**HW/D > 1.5!**
Outlet Protection:			
Flow/(Diameter^2.5)	Q/D^2.5 =	7.44	$ft^{0.5}/s$
Tailwater Surface Height	Y_t =	0.80	ft
Tailwater/Diameter	Yt/D =	0.40	
Expansion Factor	1/(2*tan(Θ)) =	1.82	
Flow Area at Max Channel Velocity	A_t =	8.42	ft^2
Width of Equivalent Conduit for Multiple Barrels	W_{eq} =	-	ft
Length of Riprap Protection	**L_p =**	**16**	**ft**
Width of Riprap Protection at Downstream End	**T =**	**11**	**ft**
Adjusted Diameter for Supercritical Flow	Da =	-	ft
Minimum Theoretical Riprap Size	d_{50} min=	12	in
Nominal Riprap Size	d_{50} nominal=	18	in
MHFD Riprap Type	**Type =**	**H**	

Add note as to why HW/D is so high

STORMWATER QUALITY CALCULATIONS

Provide design calculation for size of
- trickle channel
- riprap for emergency spillway
-

CLASSIC
CONSULTING
ENGINEERS & SURVEYORS

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer:	Marc A. Whorton, P.E.
Company:	Classic Consulting
Date:	September 25, 2024
Project:	Sterling Ranch East Filing No. 3
Location:	Pond 11B - 42" RCP Westerly Outfall

1. Basin Storage Volume	
A) Effective Imperviousness of Tributary Area, I_a	I_a = 64.4 %
B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)	i = 0.644
C) Contributing Watershed Area	Area = 14.000 ac
D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm	d_6 = 0.42 in
E) Design Concept (Select EURV when also designing for flood control)	Choose One: ◯ Water Quality Capture Volume (WQCV); ◉ Excess Urban Runoff Volume (EURV)
F) Design Volume (WQCV) Based on 40-hour Drain Time ($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area$)	V_{DESIGN}= ac-ft
G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume ($V_{WQCV\ OTHER} = (d_6*(V_{DESIGN}/0.43))$)	$V_{DESIGN\ OTHER}$= 0.287 ac-ft
H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$V_{DESIGN\ USER}$= ac-ft
I) NRCS Hydrologic Soil Groups of Tributary Watershed	
i) Percentage of Watershed consisting of Type A Soils	HSG_A = 65 %
ii) Percentage of Watershed consisting of Type B Soils	HSG_B = 35 %
iii) Percentage of Watershed consisting of Type C/D Soils	$HSG_{C/D}$ = 0 %
J) Excess Urban Runoff Volume (EURV) Design Volume For HSG A: $EURV_A = 1.68 * i^{1.28}$ For HSG B: $EURV_B = 1.36 * i^{1.08}$ For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$	$EURV_{DESIGN}$ = 1.071 ac-f t
K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)	$EURV_{DESIGN\ USER}$= ac-f t
2. Basin Shape: Length to Width Ratio (A basin length to width ratio of at least 2:1 will improve TSS reduction.)	L : W = 2.0 : 1
3. Basin Side Slopes	
A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred)	Z = 4.00 ft / ft
4. Inlet	
A) Describe means of providing energy dissipation at concentrated inflow locations:	Concrete Forebay
5. Forebay	
A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV)	V_{FMIN} = 0.009 ac-ft
B) Actual Forebay Volume	V_F = 0.009 ac-ft
C) Forebay Depth (D_F = 18 inch maximum)	D_F = 18.0 in
D) Forebay Discharge	
i) Undetained 100-year Peak Discharge	Q_{100} = 51.00 cfs
ii) Forebay Discharge Design Flow ($Q_F = 0.02 * Q_{100}$)	Q_F = 1.02 cfs
E) Forebay Discharge Design	Choose One: ◯ Berm With Pipe; ◉ Wall with Rect. Notch; ◯ Wall with V-Notch Weir — Flow too small for berm w/ pipe
F) Discharge Pipe Size (minimum 8-inches)	Calculated D_P = in
G) Rectangular Notch Width	Calculated W_N = 5.6 in

Design Procedure Form: Extended Detention Basin (EDB)

UD-BMP (Version 3.07, March 2018)

Designer:	Marc A. Whorton, P.E.
Company:	Classic Consulting
Date:	September 25, 2024
Project:	Sterling Ranch East Filing No. 3
Location:	Pond 11B - 54" RCP Easterly Outfall

1. Basin Storage Volume	
A) Effective Imperviousness of Tributary Area, I_a	I_a = 51.0 %
B) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)	i = 0.510
C) Contributing Watershed Area	Area = 52.790 ac
D) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm	d_6 = 0.42 in
E) Design Concept (Select EURV when also designing for flood control)	Choose One: ○ Water Quality Capture Volume (WQCV) ◉ Excess Urban Runoff Volume (EURV)
F) Design Volume (WQCV) Based on 40-hour Drain Time ($V_{DESIGN} = (1.0 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i) / 12 * Area$)	V_{DESIGN}= ac-ft
G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume ($V_{WQCV\ OTHER} = (d_6*(V_{DESIGN}/0.43))$	$V_{DESIGN\ OTHER}$= 0.898 ac-ft
H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$V_{DESIGN\ USER}$= ac-ft
I) NRCS Hydrologic Soil Groups of Tributary Watershed	
i) Percentage of Watershed consisting of Type A Soils	HSG_A = 65 %
ii) Percentage of Watershed consisting of Type B Soils	HSG_B = 35 %
iii) Percentage of Watershed consisting of Type C/D Soils	$HSG_{C/D}$ = 0 %
J) Excess Urban Runoff Volume (EURV) Design Volume For HSG A: $EURV_A = 1.68 * i^{1.28}$ For HSG B: $EURV_B = 1.36 * i^{1.08}$ For HSG C/D: $EURV_{C/D} = 1.20 * i^{1.08}$	$EURV_{DESIGN}$ = 3.041 ac-f t
K) User Input of Excess Urban Runoff Volume (EURV) Design Volume (Only if a different EURV Design Volume is desired)	$EURV_{DESIGN\ USER}$= ac-f t
2. Basin Shape: Length to Width Ratio (A basin length to width ratio of at least 2:1 will improve TSS reduction.)	L : W = 2.0 : 1
3. Basin Side Slopes	
A) Basin Maximum Side Slopes (Horizontal distance per unit vertical, 4:1 or flatter preferred)	Z = 4.00 ft / ft
4. Inlet	Concrete Forebay
A) Describe means of providing energy dissipation at concentrated inflow locations:	
5. Forebay	
A) Minimum Forebay Volume (V_{FMIN} = 3% of the WQCV)	V_{FMIN} = 0.027 ac-ft
B) Actual Forebay Volume	V_F = 0.027 ac-ft
C) Forebay Depth (D_F = 30 inch maximum)	D_F = 30.0 in
D) Forebay Discharge	
i) Undetained 100-year Peak Discharge	Q_{100} = 128.00 cfs
ii) Forebay Discharge Design Flow ($Q_F = 0.02 * Q_{100}$)	Q_F = 2.56 cfs
E) Forebay Discharge Design	Choose One: ○ Berm With Pipe ◉ Wall with Rect. Notch ○ Wall with V-Notch Weir
F) Discharge Pipe Size (minimum 8-inches)	Calculated D_P = in
G) Rectangular Notch Width	Calculated W_N = 8.3 in

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer:	**Marc A. Whorton, P.E.**
Company:	**Classic Consulting**
Date:	**September 23, 2024**
Project:	**Sterling Ranch East Filing No. 3**
Location:	**El Paso County, Colorado**

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.53 inches

Depth of Average Runoff Producing Storm, d_6 = 0.42 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	SPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA	UIA:RPA			
Area ID	Basin AA	Basin BB	Basin CC	Basin DD1	Basin DD2	Basin EE1	Basin EE2	Basin EE3	Basin FF			
Downstream Design Point ID	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site	Off-site			
Downstream BMP Type	None	None	None	None	None	None	None	None	None			
DCIA (ft^2)	--	--	--	--	--	--	--	--	--			
UIA (ft^2)	--	12,786	46,741	41,293	41,293	50,141	50,141	50,141	33,452			
RPA (ft^2)	--	35,130	23,633	21,241	21,241	20,635	20,635	20,635	10,359			
SPA (ft^2)	23,958	--	--	--	--	--	--	--	--			
HSG A (%)	0%	30%	100%	100%	100%	100%	100%	100%	100%			
HSG B (%)	100%	70%	0%	0%	0%	0%	0%	0%	0%			
HSG C/D (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%			
Average Slope of RPA (ft/ft)	--	0.030	0.028	0.020	0.020	0.028	0.028	0.028	0.029			
UIA:RPA Interface Width (ft)	--	90.00	280.00	260.00	260.00	250.00	250.00	250.00	140.00			

CALCULATED RUNOFF RESULTS

Area ID	Basin AA	Basin BB	Basin CC	Basin DD1	Basin DD2	Basin EE1	Basin EE2	Basin EE3	Basin FF			
UIA:RPA Area (ft^2)	--	47,916	70,374	62,534	62,534	70,776	70,776	70,776	43,811			
L / W Ratio	--	5.92	0.90	0.93	0.93	1.13	1.13	1.13	2.24			
UIA / Area	--	0.2668	0.6642	0.6603	0.6603	0.7084	0.7084	0.7084	0.7636			
Runoff (in)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Runoff (ft^3)	0	0	0	0	0	0	0	0	0			
Runoff Reduction (ft^3)	1058	458	1675	1480	1480	1797	1797	1797	1199			

CALCULATED WQCV RESULTS

Area ID	Basin AA	Basin BB	Basin CC	Basin DD1	Basin DD2	Basin EE1	Basin EE2	Basin EE3	Basin FF			
WQCV (ft^3)	0	520	1902	1681	1681	2041	2041	2041	1361			
WQCV Reduction (ft^3)	0	520	1902	1681	1681	2041	2041	2041	1361			
WQCV Reduction (%)	0%	100%	100%	100%	100%	100%	100%	100%	100%			
Untreated WQCV (ft^3)	0	0	0	0	0	0	0	0	0			

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	Off-site											
DCIA (ft^2)	0											
UIA (ft^2)	325,988											
RPA (ft^2)	173,509											
SPA (ft^2)	23,958											
Total Area (ft^2)	523,455											
Total Impervious Area (ft^2)	325,988											
WQCV (ft^3)	13,267											
WQCV Reduction (ft^3)	13,267											
WQCV Reduction (%)	100%											
Untreated WQCV (ft^3)	0											

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	523,455
Total Impervious Area (ft^2)	325,988
WQCV (ft^3)	13,267
WQCV Reduction (ft^3)	13,267
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0

Include a figure delineating all proposed UIA, RPA, and SPA areas to be utilized for runoff reduction. This form may be further reviewed once a figure is provided clearly delineating the 8 UIA:RPA areas.

Please put this drainage map with the other drainage maps for the site.

100 50 0 100 200

SCALE: 1" = 100'

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION CENTER OF COLORADO
IT'S THE LAW

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NO.	REVISION	DATE

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200 (719)785-0790
Colorado Springs, Colorado 80903 (719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 3

FINAL DRAINAGE REPORT
STORMWATER QUALITY TREATMENT PLAN MAP

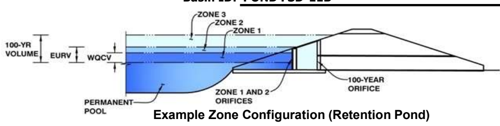
DESIGNED BY	MAW	SCALE	DATE 6/1/23
DRAWN BY	MAW	(H) 1"= 100'	SHEET 1 OF 1
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.33

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

Project: STERLING RANCH EAST FILING NO. 3

Basin ID: POND FSD-11B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	66.79	acres
Watershed Length =	2,600	ft
Watershed Length to Centroid =	1,150	ft
Watershed Slope =	0.035	ft/ft
Watershed Imperviousness =	53.80%	percent
Percentage Hydrologic Soil Group A =	65.0%	percent
Percentage Hydrologic Soil Group B =	35.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	1.207	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	4.101	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	3.296	acre-feet	1.19	inches
5-yr Runoff Volume (P1 = 1.5 in.) =	4.338	acre-feet	1.50	inches
10-yr Runoff Volume (P1 = 1.75 in.) =	5.433	acre-feet	1.75	inches
25-yr Runoff Volume (P1 = 2 in.) =	7.032	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.25 in.) =	8.315	acre-feet	2.25	inches
100-yr Runoff Volume (P1 = 2.52 in.) =	10.065	acre-feet	2.52	inches
500-yr Runoff Volume (P1 = 3.1 in.) =	13.312	acre-feet	3.10	inches
Approximate 2-yr Detention Volume =	2.802	acre-feet		
Approximate 5-yr Detention Volume =	3.731	acre-feet		
Approximate 10-yr Detention Volume =	4.668	acre-feet		
Approximate 25-yr Detention Volume =	5.448	acre-feet		
Approximate 50-yr Detention Volume =	5.922	acre-feet		
Approximate 100-yr Detention Volume =	6.594	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	1.207	acre-feet
Zone 2 Volume (EURV - Zone 1) =	2.894	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	2.492	acre-feet
Total Detention Basin Volume =	6.594	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	129	0.003		
7002	--	2.00	--	--	--	3,637	0.083	3,766	0.086
7004	--	4.00	--	--	--	26,517	0.609	33,920	0.779
7006	--	6.00	--	--	--	65,201	1.497	125,638	2.884
7008	--	8.00	--	--	--	106,164	2.437	297,003	6.818
7010	--	10.00	--	--	--	145,132	3.332	548,299	12.587
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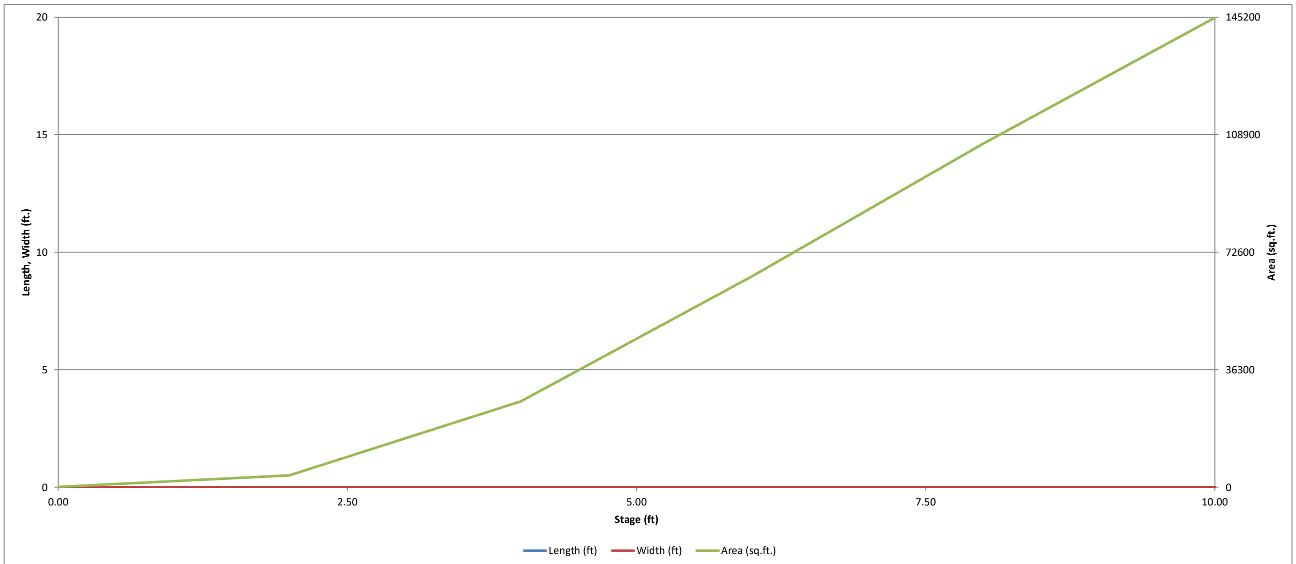
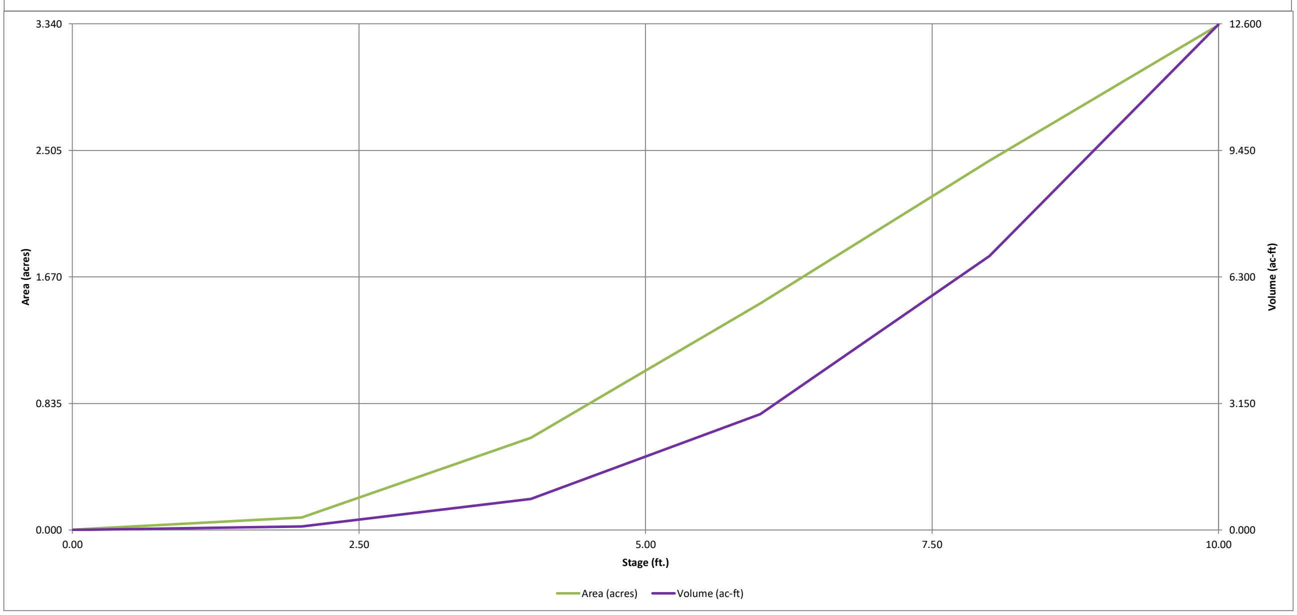
DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)





✓ = calcs match details in plans

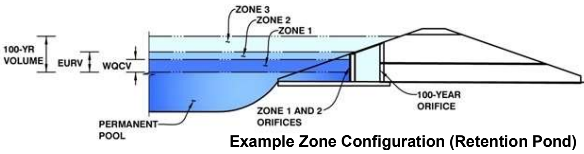
X = calcs do not match details in plans

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: STERLING RANCH EAST FILING NO. 3

Basin ID: POND FSD-11B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.59	1.207	Orifice Plate
Zone 2 (EURV)	6.73	2.894	Orifice Plate
Zone 3 (100-year)	7.91	2.492	Weir&Pipe (Restrict)
Total (all zones)		6.594	

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)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	6.83	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	27.32	inches
Orifice Plate: Orifice Area per Row =	N/A	sq. 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	2.30	4.60					
Orifice Area (sq. inches)	3.14	4.91	15.90					

	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)

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

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.83	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	7.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Type =	Close Mesh Grate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	6.83	N/A	feet
Overflow Weir Slope Length =	4.00	N/A	feet
Grate Open Area / 100-yr Orifice Area =	7.92	N/A	
Overflow Grate Open Area w/o Debris =	22.15	N/A	ft^2
Overflow Grate Open Area w/ Debris =	11.07	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 =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	20.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	2.80	N/A	ft^2
Outlet Orifice Centroid =	0.90	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	2.30	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	8.25	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	90.00	feet
Spillway End Slopes =	3.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.75	feet
Stage at Top of Freeboard =	10.00	feet
Basin Area at Top of Freeboard =	3.33	acres
Basin Volume at Top of Freeboard =	12.59	acre-ft

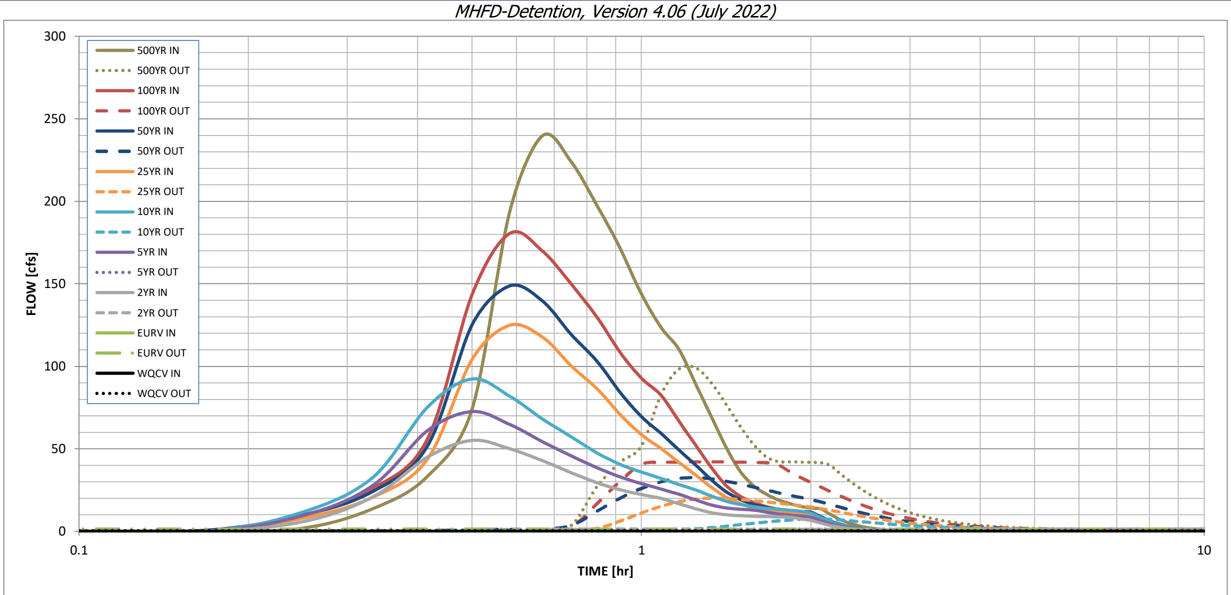
Routed Hydrograph Results

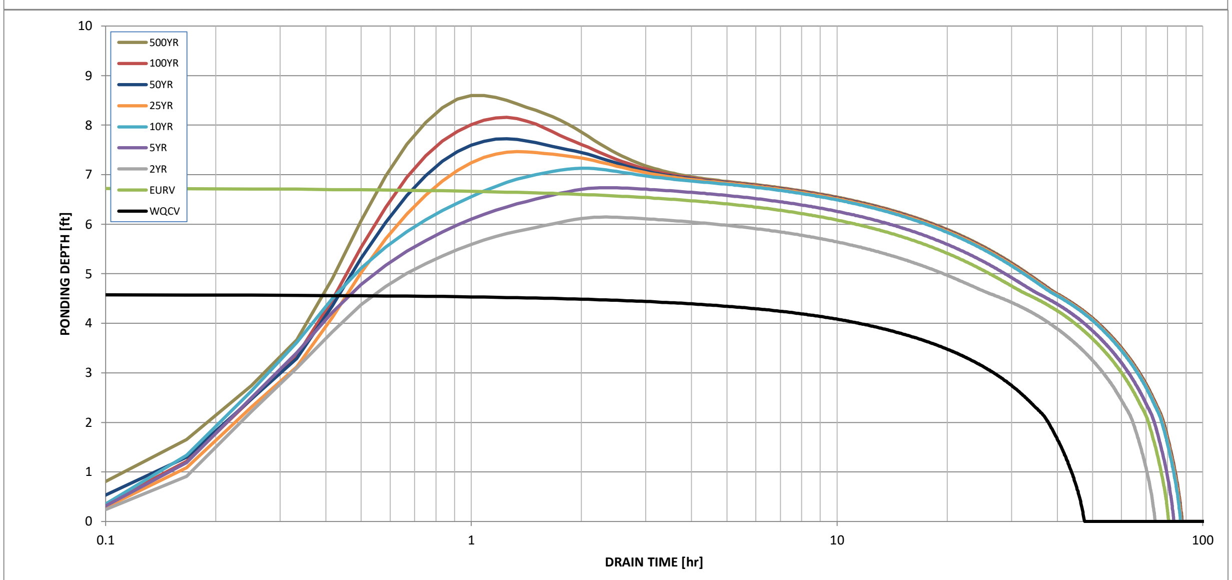
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

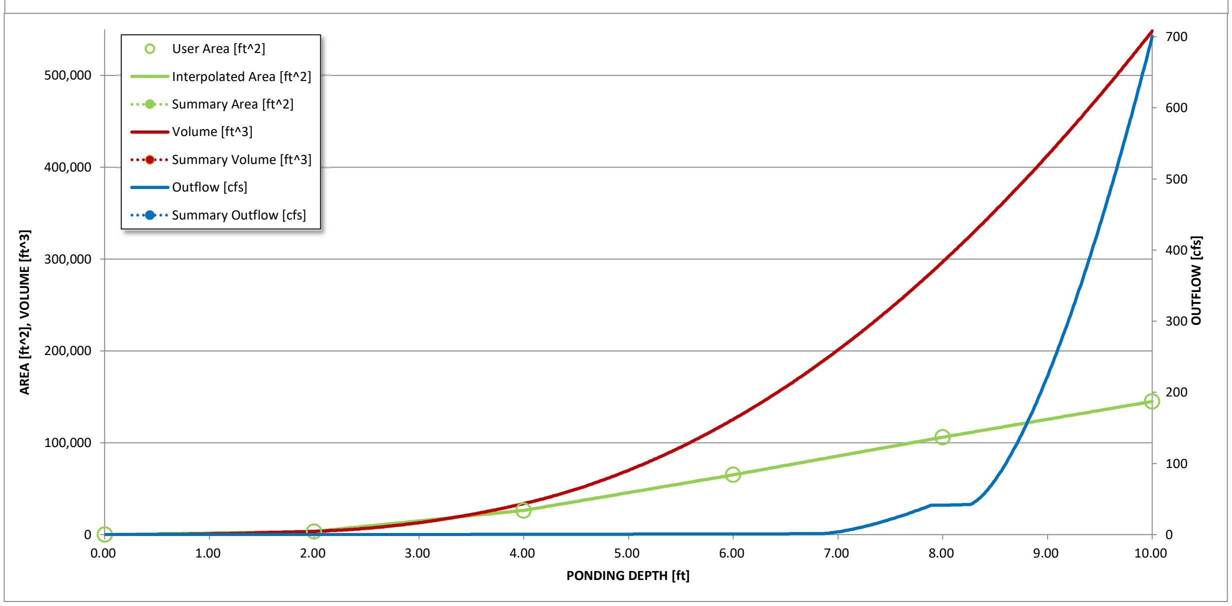
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.10
CUHP Runoff Volume (acre-ft) =	1.207	4.101	3.296	4.338	5.433	7.032	8.315	10.065	13.312
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	3.296	4.338	5.433	7.032	8.315	10.065	13.312
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.9	1.5	11.4	33.1	46.6	67.2	102.9
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	0.17	0.50	0.70	1.01	1.54
Peak Inflow Q (cfs) =	N/A	N/A	55.1	72.6	92.4	124.8	148.7	180.5	239.7
Peak Outflow Q (cfs) =	0.5	1.4	1.2	1.4	7.6	20.1	32.5	42.1	99.0
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.9	0.7	0.6	0.7	0.6	1.0
Structure Controlling Flow =	Plate	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	0.3	0.8	1.4	1.8	1.9
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) =	42	68	64	70	72	70	69	67	64
Time to Drain 99% of Inflow Volume (hours) =	**45**	75	69	78	80	79	78	77	75
Maximum Ponding Depth (ft) =	4.59	6.73	6.14	6.74	7.13	7.47	7.72	8.15	8.60
Area at Maximum Ponding Depth (acres) =	0.87	1.84	1.56	1.84	2.03	2.18	2.31	2.50	2.70
Maximum Volume Stored (acre-ft) =	1.215	4.102	3.098	4.102	4.876	5.571	6.154	7.189	8.334

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.07	1.99
	0:15:00	0.00	0.00	5.75	9.45	11.73	7.89	9.91	9.64	13.75
	0:20:00	0.00	0.00	20.95	27.87	32.86	20.78	24.24	25.95	33.31
	0:25:00	0.00	0.00	44.93	61.06	75.33	43.86	51.82	56.04	73.80
	0:30:00	0.00	0.00	55.12	72.62	92.39	104.10	125.01	143.41	193.70
	0:35:00	0.00	0.00	50.01	64.71	81.84	124.83	148.67	180.50	239.73
	0:40:00	0.00	0.00	42.81	54.39	68.08	117.66	139.56	169.81	223.91
	0:45:00	0.00	0.00	35.57	45.69	57.30	100.29	119.31	149.82	197.56
	0:50:00	0.00	0.00	29.54	38.66	47.58	86.50	103.20	129.84	171.50
	0:55:00	0.00	0.00	25.20	32.95	40.47	70.78	84.19	108.46	143.66
	1:00:00	0.00	0.00	22.29	28.93	35.85	58.58	69.47	92.79	123.55
	1:05:00	0.00	0.00	19.91	25.61	32.05	50.21	59.35	82.44	110.18
	1:10:00	0.00	0.00	16.67	22.43	28.33	41.68	49.18	66.62	88.91
	1:15:00	0.00	0.00	13.61	18.98	25.05	33.99	40.01	51.92	69.06
	1:20:00	0.00	0.00	11.30	15.87	21.24	26.54	31.00	38.33	50.57
	1:25:00	0.00	0.00	10.04	14.22	18.13	20.62	23.90	27.59	36.14
	1:30:00	0.00	0.00	9.43	13.39	16.21	16.73	19.29	21.19	27.58
	1:35:00	0.00	0.00	9.08	12.84	14.90	14.28	16.37	17.44	22.49
	1:40:00	0.00	0.00	8.89	11.63	13.97	12.78	14.55	14.98	19.10
	1:45:00	0.00	0.00	8.74	10.55	13.32	11.76	13.33	13.33	16.81
	1:50:00	0.00	0.00	8.62	9.80	12.86	11.12	12.57	12.20	15.22
	1:55:00	0.00	0.00	7.59	9.25	12.21	10.66	12.03	11.42	14.14
	2:00:00	0.00	0.00	6.61	8.58	11.08	10.36	11.67	10.99	13.55
	2:05:00	0.00	0.00	4.99	6.48	8.27	7.89	8.87	8.37	10.29
	2:10:00	0.00	0.00	3.57	4.59	5.83	5.55	6.23	5.90	7.24
	2:15:00	0.00	0.00	2.53	3.25	4.13	3.94	4.42	4.21	5.16
	2:20:00	0.00	0.00	1.78	2.26	2.90	2.77	3.11	2.97	3.64
	2:25:00	0.00	0.00	1.22	1.51	1.99	1.90	2.12	2.03	2.48
	2:30:00	0.00	0.00	0.81	1.01	1.34	1.30	1.45	1.38	1.69
	2:35:00	0.00	0.00	0.50	0.66	0.86	0.85	0.95	0.91	1.11
	2:40:00	0.00	0.00	0.27	0.39	0.49	0.50	0.56	0.53	0.64
	2:45:00	0.00	0.00	0.12	0.19	0.22	0.24	0.27	0.26	0.31
	2:50:00	0.00	0.00	0.04	0.06	0.06	0.08	0.08	0.08	0.09
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

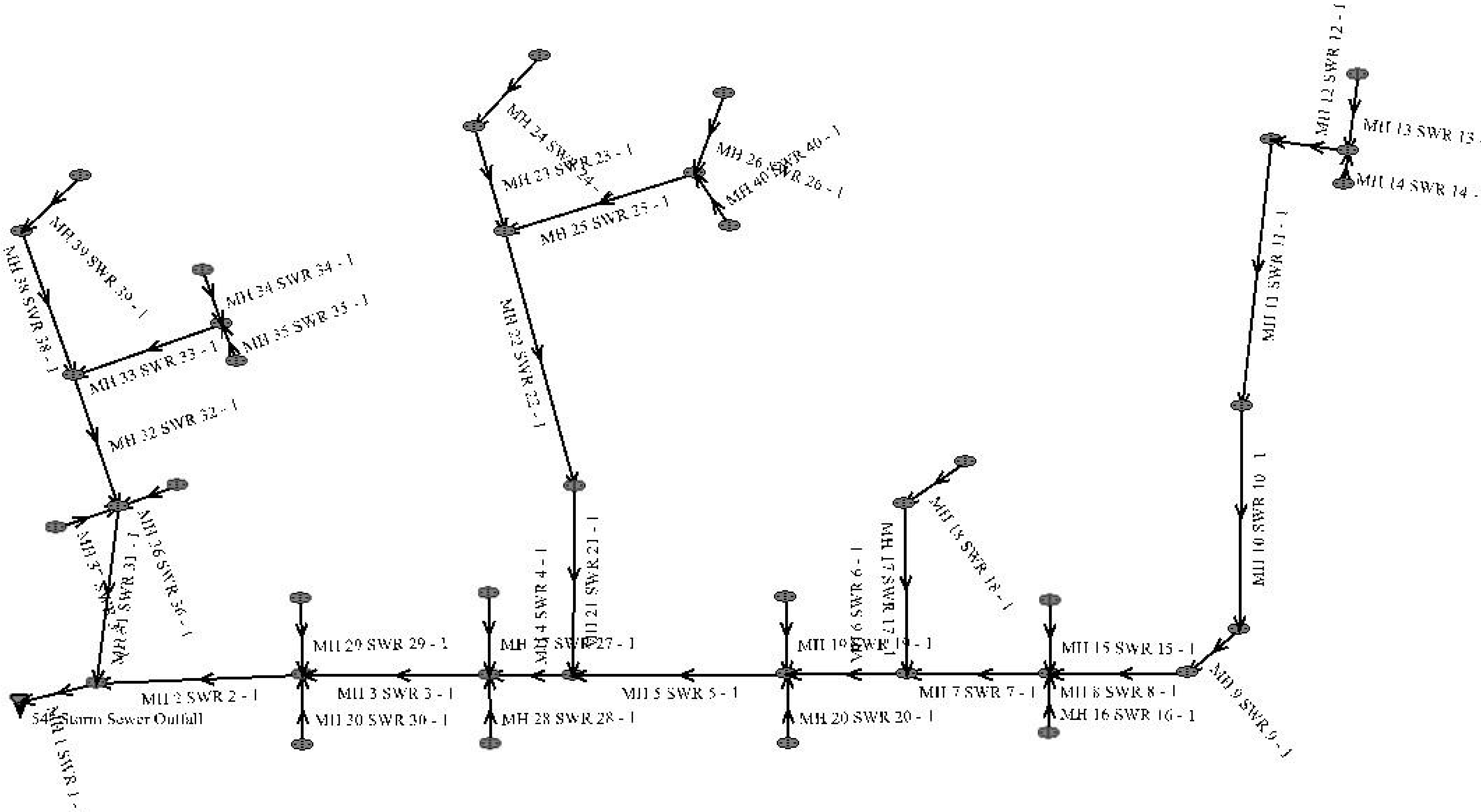
For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

HGL CALCULATIONS

CLASSIC CONSULTING ENGINEERS & SURVEYORS

54" STORM OUTFALL
100 HGL MAP



Sterling Ranch East Filing No. 3

100-yr. HGL Calculations

System Input Summary

Rainfall Parameters

Rainfall Return Period: 100
Rainfall Calculation Method: Table

Time	Intensity
5	8.68
10	6.93
20	5.19
30	4.16
40	3.44
60	2.42
120	0.67

Rational Method Constraints

Minimum Urban Runoff Coeff.: 0.20
Maximum Rural Overland Len. (ft): 500
Maximum Urban Overland Len. (ft): 300
Used UDFCD Tc. Maximum: Yes

Sizer Constraints

Minimum Sewer Size (in): 18.00
Maximum Depth to Rise Ratio: 0.90
Maximum Flow Velocity (fps): 18.0
Minimum Flow Velocity (fps): 2.0

Backwater Calculations:

Tailwater Elevation (ft): 7008.15

Manhole Input Summary:

		Given Flow		Sub Basin Information						
Element Name	**Ground Elevation (ft)**	**Total Known Flow (cfs)**	**Local Contribution (cfs)**	**Drainage Area (Ac.)**	**Runoff Coefficient**	**5yr Coefficient**	**Overland Length (ft)**	**Overland Slope (%)**	**Gutter Length (ft)**	**Gutter Velocity (fps)**
54" Storm Sewer Outfall	7011.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 1 SWR 1 - 1	7023.50	130.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 31 SWR 31 - 1	7022.02	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 37 SWR 37 - 1	7022.23	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 32 SWR 32 - 1	7026.00	26.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 33 SWR 33 - 1	7024.02	19.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 34 SWR 34 - 1	7024.50	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MH 35 SWR 35 - 1	7024.32	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 38 SWR 38 - 1	7026.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 39 SWR 39 - 1	7027.03	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 36 SWR 36 - 1	7022.23	8.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 2 SWR 2 - 1	7026.85	96.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 3 SWR 3 - 1	7029.12	89.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 27 SWR 27 - 1	7029.38	14.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 28 SWR 28 - 1	7029.38	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 4 SWR 4 - 1	7029.61	75.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 5 SWR 5 - 1	7033.12	62.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 20 SWR 20 - 1	7033.42	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 6 SWR 6 - 1	7035.59	45.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 17 SWR 17 - 1	7036.33	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 18 SWR 18 - 1	7036.86	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 7 SWR 7 - 1	7034.86	37.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 16 SWR 16 - 1	7035.12	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 8 SWR 8 - 1	7036.93	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 9 SWR 9 - 1	7038.01	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 10 SWR 10 - 1	7044.56	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 11 SWR 11 - 1	7048.51	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 12 SWR 12 - 1	7048.29	23.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 13 SWR 13 - 1	7048.51	19.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 14 SWR 14 - 1	7048.51	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 15 SWR 15 - 1	7035.12	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 19 SWR 19 - 1	7033.42	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MH 21 SWR 21 - 1	7033.33	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 22 SWR 22 - 1	7038.38	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 25 SWR 25 - 1	7037.38	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 40 SWR 40 - 1	7037.56	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 26 SWR 26 - 1	7037.49	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 23 SWR 23 - 1	7039.99	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 24 SWR 24 - 1	7040.51	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 30 SWR 30 - 1	7027.14	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MH 29 SWR 29 - 1	7027.14	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Manhole Output Summary:

	Local Contribution					Total Design Flow				
Element Name	**Overland Time (min)**	**Gutter Time (min)**	**Basin Tc (min)**	**Intensity (in/hr)**	**Local Contrib (cfs)**	**Coeff. Area**	**Intensity (in/hr)**	**Manhole Tc (min)**	**Peak Flow (cfs)**	**Comment**
54" Storm Sewer Outfall	0.00	0.00	0.00	0.00	0.00	408.07	0.32	0.18	130.00	
MH 1 SWR 1 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	130.00	Surface Water Present (Downstream)
MH 31 SWR 31 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	
MH 37 SWR 37 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	
MH 32 SWR 32 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.00	

MH 33 SWR 33 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.00	
MH 34 SWR 34 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00	
MH 35 SWR 35 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 38 SWR 38 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	
MH 39 SWR 39 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	
MH 36 SWR 36 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.90	
MH 2 SWR 2 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.00	
MH 3 SWR 3 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.00	
MH 27 SWR 27 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00	
MH 28 SWR 28 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	
MH 4 SWR 4 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	
MH 5 SWR 5 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.00	
MH 20 SWR 20 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.10	
MH 6 SWR 6 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	
MH 17 SWR 17 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	
MH 18 SWR 18 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00	
MH 7 SWR 7 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.00	

MH 16 SWR 16 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	
MH 8 SWR 8 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	
MH 9 SWR 9 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	
MH 10 SWR 10 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	
MH 11 SWR 11 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	
MH 12 SWR 12 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	
MH 13 SWR 13 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.00	
MH 14 SWR 14 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 15 SWR 15 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 19 SWR 19 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	
MH 21 SWR 21 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	
MH 22 SWR 22 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	
MH 25 SWR 25 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	
MH 40 SWR 40 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.70	
MH 26 SWR 26 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	

MH 23 SWR 23 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 24 SWR 24 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	
MH 30 SWR 30 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.80	
MH 29 SWR 29 - 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	

Sewer Input Summary:

		Elevation			Loss Coefficients			Given Dimensions		
Element Name	**Sewer Length (ft)**	**Downstream Invert (ft)**	**Slope (%)**	**Upstream Invert (ft)**	**Mannings n**	**Bend Loss**	**Lateral Loss**	**Cross Section**	**Rise (ft or in)**	**Span (ft or in)**
MH 1 SWR 1 - 1	90.00	7010.83	1.0	7011.73	0.013	0.03	1.00	CIRCULAR	54.00 in	54.00 in
MH 31 SWR 31 - 1	116.61	7013.23	1.1	7014.51	0.013	0.63	0.00	CIRCULAR	36.00 in	36.00 in
MH 37 SWR 37 - 1	5.67	7016.01	2.0	7016.12	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 32 SWR 32 - 1	170.14	7015.01	1.0	7016.71	0.013	0.20	0.00	CIRCULAR	30.00 in	30.00 in
MH 33 SWR 33 - 1	105.50	7017.21	1.0	7018.26	0.013	1.32	0.00	CIRCULAR	30.00 in	30.00 in
MH 34 SWR 34 - 1	24.67	7018.76	3.0	7019.50	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 35 SWR 35 - 1	5.66	7019.26	3.0	7019.43	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 38 SWR 38 - 1	41.98	7018.21	6.1	7020.77	0.013	0.05	0.00	CIRCULAR	18.00 in	18.00 in
MH 39 SWR 39 - 1	29.37	7021.27	6.0	7023.03	0.013	0.38	0.00	CIRCULAR	18.00 in	18.00 in
MH 36 SWR 36 - 1	24.66	7015.51	3.0	7016.25	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 2 SWR 2 - 1	406.93	7013.18	1.3	7018.47	0.013	0.05	1.00	CIRCULAR	48.00 in	48.00 in

MH 3 SWR 3 - 1	367.09	7018.97	0.7	7021.54	0.013	0.05	1.00	CIRCULAR	48.00 in	48.00 in
MH 27 SWR 27 - 1	24.42	7023.04	4.0	7024.02	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 28 SWR 28 - 1	5.66	7023.04	4.0	7023.27	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 4 SWR 4 - 1	48.70	7022.04	1.0	7022.53	0.013	0.05	1.00	CIRCULAR	42.00 in	42.00 in
MH 5 SWR 5 - 1	432.40	7023.02	0.7	7026.05	0.013	0.05	1.00	CIRCULAR	42.00 in	42.00 in
MH 20 SWR 20 - 1	5.66	7027.55	5.0	7027.83	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 6 SWR 6 - 1	154.74	7026.55	0.6	7027.48	0.013	0.05	1.00	CIRCULAR	36.00 in	36.00 in
MH 17 SWR 17 - 1	79.98	7028.98	2.5	7030.98	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 18 SWR 18 - 1	29.37	7031.48	2.0	7032.07	0.013	0.38	0.00	CIRCULAR	18.00 in	18.00 in
MH 7 SWR 7 - 1	137.26	7027.98	0.9	7029.22	0.013	0.05	1.00	CIRCULAR	36.00 in	36.00 in
MH 16 SWR 16 - 1	5.66	7030.72	1.0	7030.78	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 8 SWR 8 - 1	121.71	7029.71	1.0	7030.93	0.013	0.05	1.00	CIRCULAR	30.00 in	30.00 in
MH 9 SWR 9 - 1	55.44	7031.44	1.0	7031.99	0.013	0.38	1.00	CIRCULAR	30.00 in	30.00 in
MH 10 SWR 10 - 1	363.47	7032.49	1.8	7039.03	0.013	0.38	1.00	CIRCULAR	30.00 in	30.00 in
MH 11 SWR 11 - 1	333.45	7039.37	0.7	7041.70	0.013	0.05	1.00	CIRCULAR	30.00 in	30.00 in
MH 12 SWR 12 - 1	37.46	7042.20	1.5	7042.76	0.013	1.32	1.00	CIRCULAR	30.00 in	30.00 in
MH 13 SWR 13 - 1	24.69	7043.26	1.0	7043.51	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 14 SWR 14 - 1	5.66	7043.45	1.0	7043.51	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 15 SWR 15 - 1	24.67	7030.22	1.0	7030.47	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 19 SWR 19 - 1	24.67	7027.05	2.5	7027.67	0.013	1.32	0.00	CIRCULAR	30.00 in	30.00 in
MH 21 SWR 21 - 1	225.45	7024.02	1.8	7028.08	0.013	1.32	1.00	CIRCULAR	24.00 in	24.00 in
MH 22 SWR 22 - 1	198.09	7028.50	1.2	7030.88	0.013	0.05	1.00	CIRCULAR	24.00 in	24.00 in
MH 25 SWR 25 - 1	100.91	7031.88	0.6	7032.49	0.013	1.32	0.00	CIRCULAR	24.00 in	24.00 in
MH 40 SWR 40 - 1	7.43	7032.99	5.0	7033.36	0.013	0.38	0.00	CIRCULAR	18.00 in	18.00 in
MH 26 SWR 26 - 1	27.36	7032.99	1.0	7033.26	0.013	0.63	0.00	CIRCULAR	18.00 in	18.00 in

MH 23 SWR 23 - 1	42.48	7032.38	5.0	7034.50	0.013	0.05	1.00	CIRCULAR	18.00 in	18.00 in
MH 24 SWR 24 - 1	29.37	7035.00	3.0	7035.88	0.013	0.38	1.00	CIRCULAR	18.00 in	18.00 in
MH 30 SWR 30 - 1	5.42	7019.97	5.0	7020.24	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in
MH 29 SWR 29 - 1	24.42	7019.97	5.0	7021.19	0.013	1.32	0.00	CIRCULAR	18.00 in	18.00 in

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Sewer Flow Summary:

	Full Flow Capacity		Critical Flow		Normal Flow						
Element Name	**Flow (cfs)**	**Velocity (fps)**	**Depth (in)**	**Velocity (fps)**	**Depth (in)**	**Velocity (fps)**	**Froude Number**	**Flow Condition**	**Flow (cfs)**	**Surcharged Length (ft)**	**Comment**
MH 1 SWR 1 - 1	197.18	12.40	40.26	10.22	32.01	13.24	1.57	Supercritical	130.00	0.00	
MH 31 SWR 31 - 1	70.14	9.92	24.71	7.73	19.48	10.25	1.58	Supercritical Jump	40.00	39.94	
MH 37 SWR 37 - 1	14.90	8.43	13.15	5.78	9.39	8.58	1.92	Supercritical	8.00	0.00	
MH 32 SWR 32 - 1	41.13	8.38	20.85	7.14	17.31	8.86	1.43	Supercritical	26.00	0.00	
MH 33 SWR 33 - 1	41.13	8.38	17.73	6.29	14.32	8.21	1.50	Supercritical	19.00	0.00	
MH 34 SWR 34 - 1	39.29	12.51	15.56	6.03	9.50	11.23	2.57	Supercritical	13.00	0.00	
MH 35 SWR 35 - 1	18.24	10.32	11.35	5.11	7.11	9.25	2.45	Supercritical	6.00	0.00	
MH 38 SWR 38 - 1	26.01	14.72	13.15	5.78	6.85	12.96	3.51	Supercritical	8.00	0.00	
MH 39 SWR 39 - 1	25.80	14.60	13.15	5.78	6.88	12.88	3.48	Supercritical	8.00	0.00	
MH 36 SWR 36 - 1	39.29	12.51	12.77	5.24	7.77	10.11	2.60	Supercritical	8.90	0.00	
MH 2 SWR 2 - 1	164.22	13.07	35.64	9.60	26.37	13.58	1.79	Supercritical	96.00	0.00	
MH 3 SWR 3 - 1	120.50	9.59	34.32	9.26	30.69	10.49	1.24	Supercritical	89.00	0.00	
MH 27 SWR 27 - 1	45.37	14.44	16.17	6.22	9.15	12.72	2.98	Supercritical	14.00	0.00	

MH 28 SWR 28 - 1	21.07	11.92	7.90	4.02	4.59	8.45	2.86	Pressurized	3.00	5.66	
MH 4 SWR 4 - 1	100.88	10.49	32.53	9.38	26.97	11.49	1.45	Supercritical	75.00	0.00	
MH 5 SWR 5 - 1	84.40	8.77	29.61	8.55	26.75	9.59	1.22	Supercritical	62.00	0.00	
MH 20 SWR 20 - 1	23.55	13.33	6.56	3.60	3.63	8.24	3.16	Pressurized	2.10	5.66	
MH 6 SWR 6 - 1	51.80	7.33	26.22	8.16	25.94	8.25	1.02	Supercritical	45.00	0.00	
MH 17 SWR 17 - 1	16.65	9.42	13.93	6.13	9.43	9.61	2.14	Supercritical Jump	9.00	19.61	
MH 18 SWR 18 - 1	14.90	8.43	13.93	6.13	10.09	8.82	1.88	Supercritical	9.00	0.00	
MH 7 SWR 7 - 1	63.45	8.98	23.74	7.48	19.75	9.32	1.42	Supercritical	37.00	0.00	
MH 16 SWR 16 - 1	22.68	7.22	13.58	5.46	11.15	6.99	1.46	Supercritical	10.00	0.00	
MH 8 SWR 8 - 1	41.13	8.38	19.58	6.78	16.04	8.61	1.47	Supercritical	23.00	0.00	
MH 9 SWR 9 - 1	41.13	8.38	19.58	6.78	16.04	8.61	1.47	Supercritical	23.00	0.00	
MH 10 SWR 10 - 1	55.18	11.24	19.58	6.78	13.51	10.73	2.04	Supercritical	23.00	0.00	
MH 11 SWR 11 - 1	34.41	7.01	19.58	6.78	17.94	7.51	1.18	Supercritical	23.00	0.00	
MH 12 SWR 12 - 1	50.37	10.26	19.58	6.78	14.23	10.03	1.84	Supercritical	23.00	0.00	
MH 13 SWR 13 - 1	22.68	7.22	18.82	7.19	16.81	8.09	1.26	Supercritical Jump	19.00	7.92	
MH 14 SWR 14 - 1	10.53	5.96	11.35	5.11	9.73	6.15	1.34	Pressurized	6.00	5.66	
MH 15 SWR 15 - 1	10.53	5.96	11.35	5.11	9.73	6.15	1.34	Pressurized	6.00	24.67	
MH 19 SWR 19 - 1	65.03	13.25	18.21	6.41	11.42	11.66	2.44	Supercritical	20.00	0.00	
MH 21 SWR 21 - 1	30.43	9.69	16.75	6.41	11.90	9.65	1.93	Supercritical Jump	15.00	94.52	
MH 22 SWR 22 - 1	24.85	7.91	16.75	6.41	13.45	8.28	1.53	Supercritical	15.00	0.00	
MH 25 SWR 25 - 1	17.57	5.59	13.58	5.46	12.97	5.77	1.09	Supercritical	10.00	0.00	
MH 40 SWR 40 - 1	23.55	13.33	5.88	3.39	3.27	7.74	3.13	Supercritical	1.70	0.00	
MH 26 SWR 26 - 1	10.53	5.96	13.15	5.78	11.73	6.56	1.25	Supercritical	8.00	0.00	

MH 23 SWR 23 - 1	23.55	13.33	11.35	5.11	6.20	11.14	3.19	Supercritical	6.00	0.00	
MH 24 SWR 24 - 1	18.24	10.32	11.35	5.11	7.11	9.25	2.45	Supercritical	6.00	0.00	
MH 30 SWR 30 - 1	23.55	13.33	7.62	3.93	4.19	8.96	3.18	Pressurized	2.80	5.42	
MH 29 SWR 29 - 1	23.55	13.33	12.29	5.45	6.73	11.62	3.18	Pressurized	7.00	24.42	

- A Froude number of 0 indicates that pressured flow occurs (adverse slope or undersized pipe).
- If the sewer is not pressurized, full flow represents the maximum gravity flow in the sewer.
- If the sewer is pressurized, full flow represents the pressurized flow conditions.

Sewer Sizing Summary:

			Existing		Calculated		Used			
Element Name	**Peak Flow (cfs)**	**Cross Section**	**Rise**	**Span**	**Rise**	**Span**	**Rise**	**Span**	**Area (ft^2)**	**Comment**
MH 1 SWR 1 - 1	130.00	CIRCULAR	54.00 in	54.00 in	48.00 in	48.00 in	54.00 in	54.00 in	15.90	
MH 31 SWR 31 - 1	40.00	CIRCULAR	36.00 in	36.00 in	30.00 in	30.00 in	36.00 in	36.00 in	7.07	
MH 37 SWR 37 - 1	8.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 32 SWR 32 - 1	26.00	CIRCULAR	30.00 in	30.00 in	27.00 in	27.00 in	30.00 in	30.00 in	4.91	
MH 33 SWR 33 - 1	19.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	
MH 34 SWR 34 - 1	13.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
MH 35 SWR 35 - 1	6.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 38 SWR 38 - 1	8.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 39 SWR 39 - 1	8.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 36 SWR 36 - 1	8.90	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	

MH 2 SWR 2 - 1	96.00	CIRCULAR	48.00 in	48.00 in	42.00 in	42.00 in	48.00 in	48.00 in	12.57	
MH 3 SWR 3 - 1	89.00	CIRCULAR	48.00 in	48.00 in	48.00 in	48.00 in	48.00 in	48.00 in	12.57	
MH 27 SWR 27 - 1	14.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
MH 28 SWR 28 - 1	3.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 4 SWR 4 - 1	75.00	CIRCULAR	42.00 in	42.00 in	42.00 in	42.00 in	42.00 in	42.00 in	9.62	
MH 5 SWR 5 - 1	62.00	CIRCULAR	42.00 in	42.00 in	42.00 in	42.00 in	42.00 in	42.00 in	9.62	
MH 20 SWR 20 - 1	2.10	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 6 SWR 6 - 1	45.00	CIRCULAR	36.00 in	36.00 in	36.00 in	36.00 in	36.00 in	36.00 in	7.07	
MH 17 SWR 17 - 1	9.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 18 SWR 18 - 1	9.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 7 SWR 7 - 1	37.00	CIRCULAR	36.00 in	36.00 in	30.00 in	30.00 in	36.00 in	36.00 in	7.07	
MH 16 SWR 16 - 1	10.00	CIRCULAR	24.00 in	24.00 in	18.00 in	18.00 in	24.00 in	24.00 in	3.14	
MH 8 SWR 8 - 1	23.00	CIRCULAR	30.00 in	30.00 in	27.00 in	27.00 in	30.00 in	30.00 in	4.91	
MH 9 SWR 9 - 1	23.00	CIRCULAR	30.00 in	30.00 in	27.00 in	27.00 in	30.00 in	30.00 in	4.91	
MH 10 SWR 10 - 1	23.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	
MH 11 SWR 11 - 1	23.00	CIRCULAR	30.00 in	30.00 in	27.00 in	27.00 in	30.00 in	30.00 in	4.91	
MH 12 SWR 12 - 1	23.00	CIRCULAR	30.00 in	30.00 in	24.00 in	24.00 in	30.00 in	30.00 in	4.91	
MH 13 SWR 13 - 1	19.00	CIRCULAR	24.00 in	24.00 in	24.00 in	24.00 in	24.00 in	24.00 in	3.14	
MH 14 SWR 14 - 1	6.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 15 SWR 15 - 1	6.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 19 SWR 19 - 1	20.00	CIRCULAR	30.00 in	30.00 in	21.00 in	21.00 in	30.00 in	30.00 in	4.91	
MH 21 SWR 21 - 1	15.00	CIRCULAR	24.00 in	24.00 in	21.00 in	21.00 in	24.00 in	24.00 in	3.14	
MH 22 SWR 22 - 1	15.00	CIRCULAR	24.00 in	24.00 in	21.00 in	21.00 in	24.00 in	24.00 in	3.14	
MH 25 SWR 25 - 1	10.00	CIRCULAR	24.00 in	24.00 in	21.00 in	21.00 in	24.00 in	24.00 in	3.14	
MH 40 SWR 40 - 1	1.70	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	

MH 26 SWR 26 - 1	8.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 23 SWR 23 - 1	6.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 24 SWR 24 - 1	6.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 30 SWR 30 - 1	2.80	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	
MH 29 SWR 29 - 1	7.00	CIRCULAR	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	18.00 in	1.77	

- Calculated diameter was determined by sewer hydraulic capacity rounded up to the nearest commercially available size.
- Sewer sizes should not decrease downstream.
- All hydraulics where calculated using the 'Used' parameters.

Grade Line Summary:

Tailwater Elevation (ft): 7008.15

	Invert Elev.		Downstream Manhole Losses		HGL		EGL		
Element Name	**Downstream (ft)**	**Upstream (ft)**	**Bend Loss (ft)**	**Lateral Loss (ft)**	**Downstream (ft)**	**Upstream (ft)**	**Downstream (ft)**	**Friction Loss (ft)**	**Upstream (ft)**
MH 1 SWR 1 - 1	7010.83	7011.73	0.00	0.00	7013.50	7015.09	7016.22	0.49	7016.71
MH 31 SWR 31 - 1	7013.23	7014.51	0.31	0.00	7016.52	7016.57	7017.02	0.48	7017.50
MH 37 SWR 37 - 1	7016.01	7016.12	0.42	0.00	7016.99	7017.61	7017.93	0.00	7017.93
MH 32 SWR 32 - 1	7015.01	7016.71	0.09	0.00	7016.66	7018.45	7017.67	1.57	7019.24
MH 33 SWR 33 - 1	7017.21	7018.26	0.31	0.00	7019.24	7019.74	7019.55	0.81	7020.35
MH 34 SWR 34 - 1	7018.76	7019.50	0.35	0.00	7020.09	7021.18	7021.51	0.00	7021.51

MH 35 SWR 35 - 1	7019.26	7019.43	0.24	0.00	7019.97	7021.00	7021.18	0.00	7021.18
MH 38 SWR 38 - 1	7018.21	7020.77	0.02	0.00	7018.78	7021.87	7021.39	1.00	7022.39
MH 39 SWR 39 - 1	7021.27	7023.03	0.12	0.00	7021.99	7024.13	7024.42	0.23	7024.65
MH 36 SWR 36 - 1	7015.51	7016.25	0.16	0.00	7016.73	7017.37	7017.75	0.00	7017.75
MH 2 SWR 2 - 1	7013.18	7018.47	0.05	0.13	7015.38	7021.44	7018.24	4.63	7022.87
MH 3 SWR 3 - 1	7018.97	7021.54	0.04	0.13	7021.61	7024.40	7023.24	2.49	7025.73
MH 27 SWR 27 - 1	7023.04	7024.02	0.41	0.00	7024.81	7026.01	7026.32	0.00	7026.32
MH 28 SWR 28 - 1	7023.04	7023.27	0.06	0.00	7025.75	7025.75	7025.79	0.00	7025.79
MH 4 SWR 4 - 1	7022.04	7022.53	0.05	0.00	7024.45	7025.24	7026.34	0.27	7026.61
MH 5 SWR 5 - 1	7023.02	7026.05	0.03	0.30	7026.24	7028.52	7026.94	2.72	7029.65
MH 20 SWR 20 - 1	7027.55	7027.83	0.03	0.00	7029.66	7029.66	7029.68	0.00	7029.68
MH 6 SWR 6 - 1	7026.55	7027.48	0.03	0.02	7028.71	7029.67	7029.77	0.93	7030.70
MH 17 SWR 17 - 1	7028.98	7030.98	0.53	0.00	7030.83	7032.14	7031.23	1.49	7032.72
MH 18 SWR 18 - 1	7031.48	7032.07	0.15	0.00	7032.32	7033.23	7033.53	0.28	7033.81
MH 7 SWR 7 - 1	7027.98	7029.22	0.02	0.20	7029.89	7031.20	7030.98	1.09	7032.07
MH 16 SWR 16 - 1	7030.72	7030.78	0.21	0.00	7031.75	7031.91	7032.34	0.04	7032.37
MH 8 SWR 8 - 1	7029.71	7030.93	0.02	0.08	7031.30	7032.56	7032.20	1.07	7033.27
MH 9 SWR 9 - 1	7031.44	7031.99	0.13	0.00	7032.77	7033.62	7033.92	0.41	7034.33
MH 10 SWR 10 - 1	7032.49	7039.03	0.13	0.00	7033.75	7040.66	7035.40	5.97	7041.37
MH 11 SWR 11 - 1	7039.37	7041.70	0.02	0.00	7040.86	7043.33	7041.74	2.31	7044.04
MH 12 SWR 12 - 1	7042.20	7042.76	0.45	0.00	7043.78	7044.39	7044.95	0.16	7045.10
MH 13 SWR 13 - 1	7043.26	7043.51	0.75	0.00	7045.29	7045.29	7045.85	0.08	7045.93
MH 14 SWR 14 - 1	7043.45	7043.51	0.24	0.00	7045.16	7045.18	7045.34	0.02	7045.36
MH 15 SWR 15 - 1	7030.22	7030.47	0.24	0.00	7032.13	7032.21	7032.30	0.08	7032.38
MH 19 SWR 19 - 1	7027.05	7027.67	0.34	0.00	7028.86	7029.80	7030.12	0.00	7030.12

MH 21 SWR 21 - 1	7024.02	7028.08	0.47	0.59	7027.31	7029.48	7027.66	2.45	7030.11
MH 22 SWR 22 - 1	7028.50	7030.88	0.02	0.00	7029.62	7032.28	7030.69	2.23	7032.91
MH 25 SWR 25 - 1	7031.88	7032.49	0.21	0.00	7032.97	7033.62	7033.48	0.60	7034.08
MH 40 SWR 40 - 1	7032.99	7033.36	0.01	0.00	7033.63	7034.14	7034.19	0.00	7034.19
MH 26 SWR 26 - 1	7032.99	7033.26	0.20	0.00	7033.96	7034.36	7034.63	0.24	7034.88
MH 23 SWR 23 - 1	7032.38	7034.50	0.01	0.17	7032.89	7035.45	7034.82	1.03	7035.85
MH 24 SWR 24 - 1	7035.00	7035.88	0.07	0.00	7035.59	7036.83	7036.92	0.31	7037.23
MH 30 SWR 30 - 1	7019.97	7020.24	0.05	0.00	7022.88	7022.89	7022.92	0.00	7022.92
MH 29 SWR 29 - 1	7019.97	7021.19	0.32	0.00	7022.95	7023.06	7023.19	0.11	7023.30

- Bend and Lateral losses only apply when there is an outgoing sewer. The system outfall, sewer #0, is not considered a sewer.
- Bend loss = Bend K * V_fi ^ 2/(2*g)
- Lateral loss = V_fo ^ 2/(2*g)- Junction Loss K * V_fi ^ 2/(2*g).
- Friction loss is always Upstream EGL - Downstream EGL.

REFERENCE DOCUMENTS

DRAINAGE LETTER
FOR
STERLING RANCH ROAD AND
BRIARGATE PARKWAY INTERIM PLAN

Prepared For:

SR Land, LLC
20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903
(719) 491-3024

July 2023
Project No. 25188.03
PCD Filing No: CDR221

Prepared By:
JR Engineering, LLC
5475 Tech Center Drive, Suite 235
Colorado Springs, CO 80919
719-593-2593

J·R ENGINEERING

DRAINAGE LETTER FOR STERLING RANCH ROAD & BRIARGATE PARKWAY

July 2023

ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by El Paso County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Mike Bramlett

COLORADO LICENSED PROFESSIONAL ENGINEER MIKE BRAMLETT 32314 05/08/23

Mike Bramlett, Colorado P.E. 32314
For and On Behalf of JR Engineering, LLC

DEVELOPER'S STATEMENT:

I, the developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: SR Land, LLC

By:

Title: MANAGER

Address: 20 Boulder Crescent, Suite 200
Colorado Springs, CO 80903

El Paso County:

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual, Volumes 1 and 2 and Engineering Criteria Manual, as amended.

Approved
By:Gilbert LaForce, P.E.
Date:07/25/2023 5:31:51 PM
El Paso County Department of Public Works

Joshua Palmer, P.E.
County Engineer/ ECM Administrator

Conditions:

KEY MAP

SCALE: NTS

LEGEND

BASIN ID
A: BASIN LABEL
B: AREA
C: C -100 YR
D: C-5 YR

DESIGN POINT
PROPOSED FLOW DIRECTION
BASIN DRAINAGE AREA
EXISTING STORM SEWER
STORM SEWER PROPOSED
PROPOSED R.O.W
PROPOSED PROPERTY LINES
PROPOSED SIDEWALK
EXISTING PROPERTY LINE
ROW EXISTING
FL EXISTING
SIDEWALK EXISTING
SECTION LINE
DRAINAGE ACCESS & MAINTENANCE EASEMENT
100 YEAR FLOODPLAIN

EXISTING 6100
PROPOSED 6100

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A1	4.09	70%	0.65	0.78	13.3	9.9	19.7
A2	5.05	67%	0.62	0.76	17.0	10.5	21.4
A3	1.94	64%	0.60	0.74	8.6	5.1	10.5
A4	1.52	70%	0.65	0.78	9.6	4.9	8.3
A5	0.63	88%	0.80	0.88	5.0	2.6	4.9
B1	1.82	68%	0.64	0.77	7.6	5.3	10.6
B2	1.90	64%	0.61	0.74	7.9	5.2	10.6
B3	1.27	64%	0.60	0.74	8.6	3.3	6.9
B4	1.33	61%	0.58	0.72	9.0	3.3	6.9
B5	0.89	61%	0.58	0.72	7.6	2.4	4.9
B6	0.91	63%	0.60	0.74	7.1	2.5	5.2
B7	1.08	52%	0.50	0.67	8.0	2.4	5.4
B8	1.16	58%	0.55	0.70	7.6	2.9	6.2
B9	1.98	51%	0.49	0.66	7.9	4.4	9.8
B10	2.19	53%	0.51	0.67	7.8	5.0	11.1
B11	3.53	26%	0.29	0.51	13.5	3.8	11.1
OS1	176.86	2%	0.09	0.35	29.2	40.1	261.9
OS2	39.27	2%	0.09	0.35	16.6	11.9	77.7

DESIGN POINT

DP	Q5 Total	Q100 Total
1	2.6	4.9
2	10.5	21.4
4	4.9	8.6
5	5.1	13.2
6	24.3	44.9
7	5.2	10.6
8	5.3	10.6
10	3.3	6.9
11	3.3	6.9
14	2.5	5.5
15	2.4	5.3
18	2.9	6.2
19	2.4	5.4
21	9.9	19.7
22	4.4	9.8
23	5.0	11.1
24	30.0	59.0
1A	19.7	34.1
OS1	40.1	261.9
OS2	42.7	314.2

Values in RED are from the "Sterling Ranch MDDP Amendment No. 2 & Preliminary Drainage Report for Sterling Ranch East Prelimininary Plan No. 1" by Classic Consulting.

100 50 0 100 200
ORIGINAL SCALE: 1" = 100'

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

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

J·R ENGINEERING
A Westrian Company
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	1"=100'
V-SCALE	N/A
DATE	06/29/23
DESIGNED BY	RAB
DRAWN BY	CGV
CHECKED BY	

STERLING RANCH ROAD & BRIARGATE DRAINAGE MAPS

PROPOSED DRAINAGE MAP

SHEET 5 OF 6

JOB NO. 25188.03

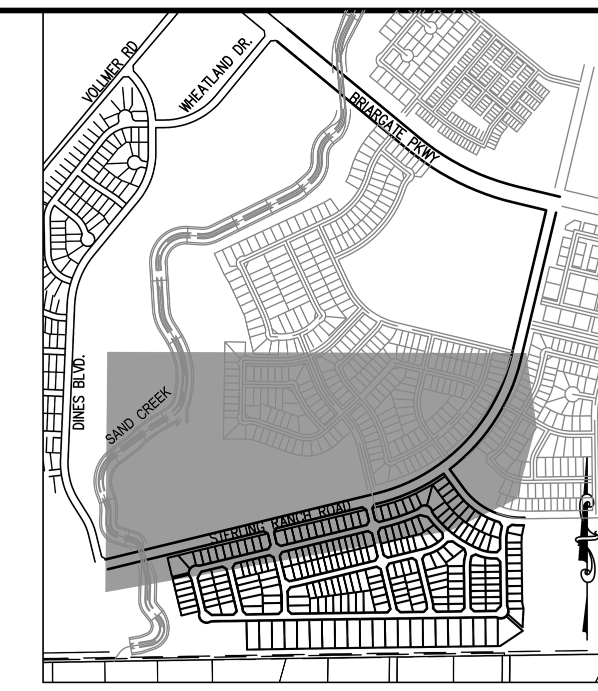
BASIN SUMMARY TABLE							
Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A1	4.09	70%	0.65	0.78	13.3	9.9	19.7
A2	5.05	67%	0.62	0.76	17.0	10.5	21.4
A3	1.94	64%	0.60	0.74	8.6	5.1	10.5
A4	1.52	70%	0.65	0.78	9.6	4.9	8.3
A5	0.63	88%	0.80	0.88	5.0	2.6	4.9
B1	1.82	68%	0.64	0.77	7.6	5.3	10.6
B2	1.90	64%	0.61	0.74	7.9	5.2	10.6
B3	1.27	64%	0.60	0.74	8.6	3.3	6.9
B4	1.33	61%	0.58	0.72	9.0	3.3	6.9
B5	0.89	61%	0.58	0.72	7.6	2.4	4.9
B6	0.91	63%	0.60	0.74	7.1	2.5	5.2
B7	1.08	52%	0.50	0.67	8.0	2.4	5.4
B8	1.16	58%	0.55	0.70	7.6	2.9	6.2
B9	1.98	51%	0.49	0.66	7.9	4.4	9.8
B10	2.19	53%	0.51	0.67	7.8	5.0	11.1
B11	3.53	26%	0.29	0.51	13.5	3.8	11.1
OS1	176.86	2%	0.09	0.35	29.2	40.1	261.9
OS2	39.27	2%	0.09	0.35	16.6	11.9	77.7

DESIGN POINT		
DP	Q5 Total	Q100 Total
1	2.6	4.9
2	10.5	21.4
4	4.9	8.6
5	5.1	13.2
6	24.3	44.9
7	5.2	10.6
8	5.3	10.6
10	3.3	6.9
11	3.3	6.9
14	2.5	5.5
15	2.4	5.3
18	2.9	6.2
19	2.4	5.4
21	9.9	19.7
22	4.4	9.8
23	5.0	11.1
24	30.0	59.0
1A	19.7	34.1
OS1	40.1	261.9
OS2	42.7	314.2

Values in RED are from the "Sterling Ranch MDDP Amendment No. 2 & Preliminary Drainage Report for Sterling Ranch East Prelimininary Plan No. 1" by Classic Consulting.

LEGEND

- BASIN ID — A: BASIN LABEL; B: AREA; C: C -100 YR; D: C-5 YR
- DESIGN POINT
- PROPOSED FLOW DIRECTION
- BASIN DRAINAGE AREA
- EXISTING STORM SEWER
- STORM SEWER PROPOSED
- PROPOSED R.O.W
- PROPOSED PROPERTY LINES
- PROPOSED SIDEWALK
- EXISTING PROPERTY LINE
- ROW EXISTING
- FL EXISTING
- SIDEWALK EXISTING
- SECTION LINE
- DRAINAGE ACCESS & MAINTENANCE EASEMENT
- 100 YEAR FLOODPLAIN
- EXISTING 6100
- PROPOSED 6100



KEY MAP

SCALE: NTS

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
SR LAND, LLC
20 BOULDER CRESCENT
SUITE 201
COLORADO SPRINGS, CO 80903
JAMES F. MORLEY
(719) 471-1742

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Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	1"=100'
V-SCALE	N/A
DATE	06/29/23
DESIGNED BY	RAB
DRAWN BY	CGV
CHECKED BY	

STERLING RANCH ROAD & BRIARGATE DRAINAGE MAPS

PROPOSED DRAINAGE MAP

SHEET 6 OF 6

JOB NO. 25188.03

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

INNOVATIVE DESIGN. CLASSIC RESULTS.

PRELIMINARY DRAINAGE REPORT
FOR
STERLING RANCH EAST FILING NO. 5
PRELIMINARY PLAN

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. 1183.25

PCD Project No. SP235

PRELIMINARY DRAINAGE REPORT FOR STERLING RANCH EAST FILING NO. 5

ENGINEER'S STATEMENT:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

COLORADO REGISTERED PROFESSIONAL ENGINEER MARC ALAN WHORTON 37155

Marc A. Whorton Colorado P.E. #37155

1/8/2024

Date

OWNER'S/DEVELOPER'S STATEMENT:

I, the owner/developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: CLASSIC SRJ LAND, LLC

By:

Title: VICE PRESIDENT

Address: 2138 Flying Horse Club Drive

Colorado Springs, CO 80921

EL PASO COUNTY:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

By: Gilbert LaForce, P.E.
Engineering Manager
On behalf of the
ECM Administrator
Date: 01/18/2024 9:29:37 AM
El Paso County Department of Public Works

Joshua Palmer, P.E.
County Engineer, / ECM Administrator

Conditions:

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION CENTER OF COLORADO
IT'S THE LAW

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NO.	REVISION	DATE
1	REVISED PER COUNTY COMMENTS	11/22/23

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

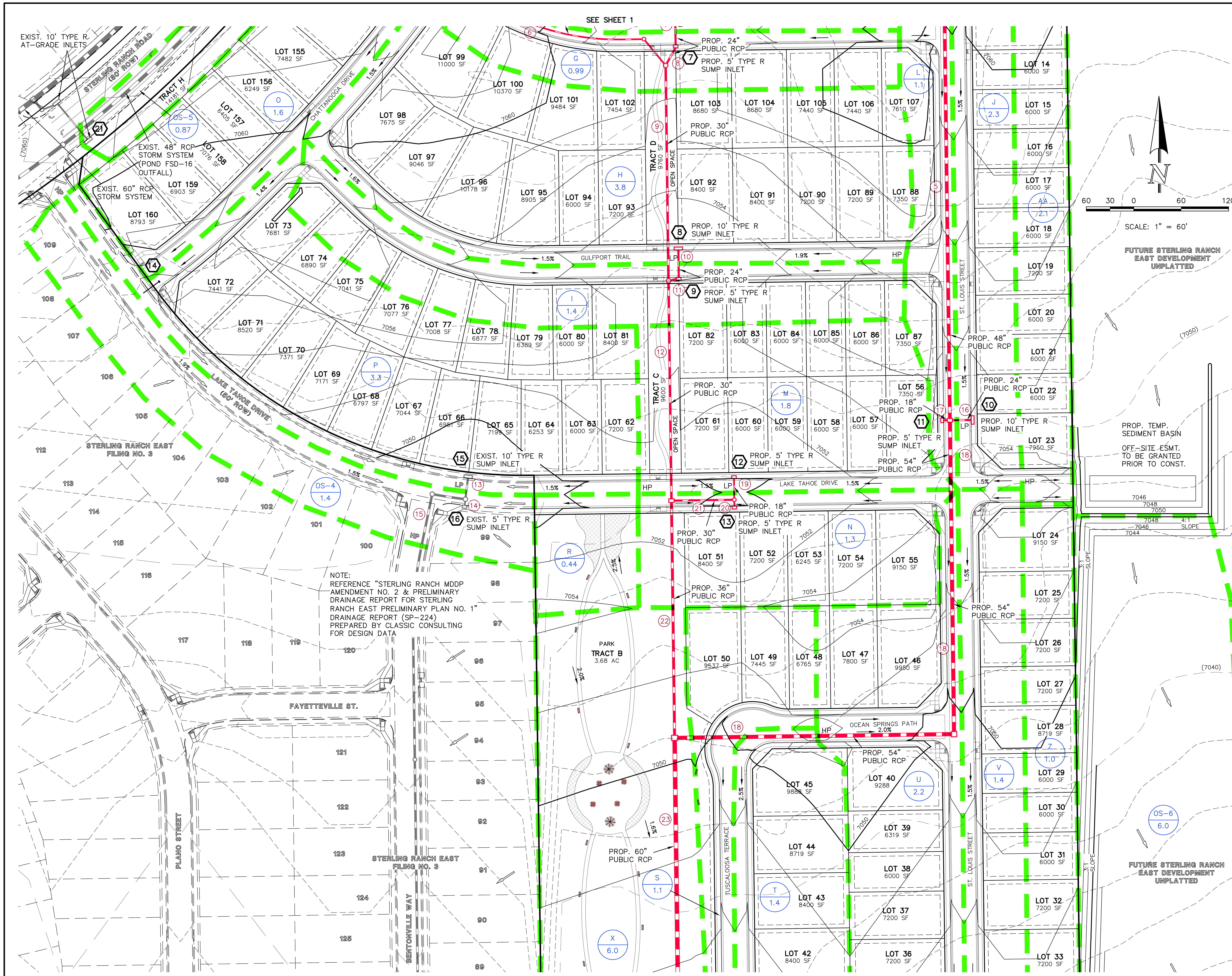
MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING

619 N. Cascade Avenue, Suite 200 (719)785–0790
Colorado Springs, Colorado 80903 (719)785–0799(Fax)

STERLING RANCH EAST FILING NO. 5
PRELIMINARY PLAN
PRELIMINARY DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE
DRAWN BY	MAW	(H) 1"= 60'	SHEET 1 OF 3
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.25



FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin / Design Point / Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Pipe Size*
1	**P4-B FUTURE VILLAGES AT STERLING RANCH PP**	**18.28**	**23.13**	**18.7**	**3.19**	**5.35**	**58**	**124**	**PROP. 48" RCP**
2	DP-3	1.27	1.79	16.4	3.39	5.68	4	10	PROP. 24" RCP
3	DP-4	0.23	0.33	12.1	3.84	6.45	0.9	2.1	PROP. 18" RCP
4	PR-2, PR-3	1.50	2.12	16.6	3.37	5.65	5	12	PROP. 24" RCP
5	**PR-1, PR-4**	**19.78**	**25.25**	**19.5**	**3.12**	**5.25**	**62**	**132**	**PROP. 48" RCP**
6	DP-5 COLLECTION	1.71	1.78	20.5	3.05	5.12	5.2	9.1	PROP. 18" RCP
7	DP-6	1.45	2.31	15.9	3.43	5.76	5	13	PROP. 24" RCP
8	PR-7, DP-7	1.81	2.84	15.9	3.43	5.76	6	16	PROP. 24" RCP
9	PR-6, PR-8	3.52	4.62	20.9	3.02	5.07	11	23	PROP. 30" RCP
10	DP-8	1.38	2.04	17.1	3.32	5.57	5	11	PROP. 24" RCP
11	PR-10, DP-9	1.89	2.80	17.1	3.32	5.57	6	16	PROP. 24" RCP
12	PR-9, PR-11	5.41	7.42	21.3	2.99	5.02	16	37	PROP. 30" RCP
13	DP-15	2.07	4.07	24.2	2.80	4.70	6	19	EXIST. 24" RCP
14	DP-16	0.63	0.97	14.4	3.58	6.01	2	6	EXIST. 18" RCP
15	PR-13, PR-14	2.70	5.04	25.4	2.73	4.58	7	23	EXIST. 30" RCP
16	DP-10	0.86	1.25	13.2	3.72	6.24	3	8	PROP. 24" RCP
17	DP-11	0.41	0.60	18.1	3.24	5.44	1.3	3.3	PROP. 18" RCP
18	**PR-5, PR-13, PR-14**	**21.05**	**27.10**	**19.7**	**3.11**	**5.22**	**65**	**141**	**PROP. 54" RCP**
19	DP-12	0.63	0.95	15.4	3.48	5.84	2	6	PROP. 18" RCP
20	DP-13	0.45	0.69	15.4	3.48	5.84	2	4	PROP. 18" RCP
21	PR-16, PR-17	1.08	1.64	15.5	3.47	5.82	4	10	PROP. 24" RCP
22	PR-12, PR-18	6.49	9.06	21.7	2.96	4.98	19	45	PROP. 36" RCP
23	**PR-15, PR-19**	**27.54**	**36.16**	**22.2**	**2.93**	**4.92**	**81**	**178**	**PROP. 60" RCP**
24	DP-17	0.41	0.60	18.1	3.24	5.44	1.3	3.3	PROP. 18" RCP
25	DP-18	0.53	0.76	16.7	3.36	5.64	2	4	PROP. 18" RCP
26	PR-21, PR-22	0.94	1.36	18.1	3.24	5.44	3	7	PROP. 24" RCP
27	**PR-20, PR-23 (IN-FLOW ULTIMATE CONDITION)**	**28.48**	**37.52**	**22.3**	**2.92**	**4.91**	**83**	**184**	**PROP. 60" RCP**
27	**PR-20, PR-23 (IN-FLOW INTERIM CONDITION - VILLAGES NOT DEVELOPED)**	**10.20**	**14.39**	**20.3**	**3.06**	**5.14**	**31**	**74**	**PROP. 60" RCP**
28	DP-19	1.35	1.96	18.1	3.24	5.44	4	11	PROP. 24" RCP
29	**DP-20, PR-25**	**1.50**	**2.13**	**18.2**	**3.23**	**5.43**	**5**	**12**	**PROP. 24" RCP**

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Facility/ Inlet Size*
1	OS-1	1.76	2.02	14.0	3.62	6.08	6	12	Exist. 15' Type R At-Grade Inlet
2	OS-2 and OS-1 Flow-By	0.56	1.16	16.6	3.37	5.65	2	7	
3	OS-3, A, B	1.27	1.79	16.4	3.39	5.68	4	10	Prop. 10' Type R Sump Inlet
4	C	0.23	0.33	12.1	3.84	6.45	0.9	2.1	Prop. 5' Type R Sump Inlet
5	D and DP-2 Flow On-Site	1.94	3.18	20.2	3.07	5.16	6	16	Prop. 10' Type R At-Grade Inlet
6	E, F	1.45	2.31	15.9	3.43	5.76	5	13	Prop. 10' Type R Sump Inlet
7	G	0.36	0.53	11.8	3.88	6.52	1.4	3.5	Prop. 5' Type R Sump Inlet
8	H	1.38	2.04	17.1	3.32	5.57	5	11	Prop. 10' Type R Sump Inlet
9	I	0.51	0.75	13.4	3.69	6.19	2	5	Prop. 5' Type R Sump Inlet
10	J	0.86	1.25	13.2	3.72	6.24	3	8	Prop. 10' Type R Sump Inlet
11	L	0.41	0.60	18.1	3.24	5.44	1.3	3.3	Prop. 5' Type R Sump Inlet
12	M	0.63	0.95	15.4	3.48	5.84	2	6	Prop. 5' Type R Sump Inlet
13	N	0.45	0.69	15.4	3.48	5.84	2	4	Prop. 5' Type R Sump Inlet
14	O and DP-5 Flow-By	0.83	2.27	22.2	2.93	4.92	2	11	Prop. 6' Crosspan
15	P and DP-14	2.07	4.07	24.2	2.80	4.70	6	19	Exist. 10' Type R Sump Inlet
16	OS-4, R	0.63	0.97	14.4	3.58	6.01	2	6	Exist. 5' Type R Sump Inlet
17	S	0.41	0.60	18.1	3.24	5.44	1.3	3.3	Prop. 5' Type R Sump Inlet
18	T	0.53	0.76	16.7	3.36	5.64	2	4	Prop. 5' Type R Sump Inlet
19	U, V	1.35	1.96	18.1	3.24	5.44	4	11	Prop. 10' Type R Sump Inlet
20	W	0.15	0.17	5.0	5.17	8.68	0.8	1.4	Prop. 5' Type R Sump Inlet
21	OS-5	0.58	0.69	9.2	4.25	7.14	2	5	Exist. 10' Type R At-Grade Inlet
	TOTAL BASINS TRIBUTARY TO POND FSD-14B	**30.70**	**41.99**	**23.1**	**2.88**	**4.83**	**88**	**203**	
	TOTAL BASINS TRIBUTARY TO POND FSD-14B (VILLAGES NOT DEV.)	**12.42**	**18.86**	**23.1**	**2.88**	**4.83**	**36**	**91**	
6 (MDDP) SOUTH BNDY.	**POND FSD-14B RELEASE AND BASIN Y1**	**REF. MHFD-DETENTION SPREADSHEET FOR CALCULATIONS**					**5.0**	**52.2**	Sheet flow from Level Spreader
6A (MDDP) SOUTH BNDY.	**BASINS Y2 AND OS-6**	**0.61**	**2.38**	**23.2**	**2.87**	**4.81**	**2**	**11**	Sheet flow

LEGEND

- EXISTING GROUND CONTOUR 5910
- PROPOSED FINISHED CONTOUR 5910
- SUBDIVISION BOUNDARY
- LOT LINE
- PROPOSED BASIN BOUNDARY
- DIRECTION OF DRAINAGE
- EXISTING STORM SEWER
- EXISTING STORM INLET
- PROPOSED STORM SEWER
- PROPOSED STORM INLET
- BASIN IDENTIFIER D / AREA IN ACRES 1.41
- DESIGN POINT 2
- PIPE RUN 2

SEE SHEET 3

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION CENTER OF COLORADO
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1	REVISED PER COUNTY COMMENTS	11/22/23

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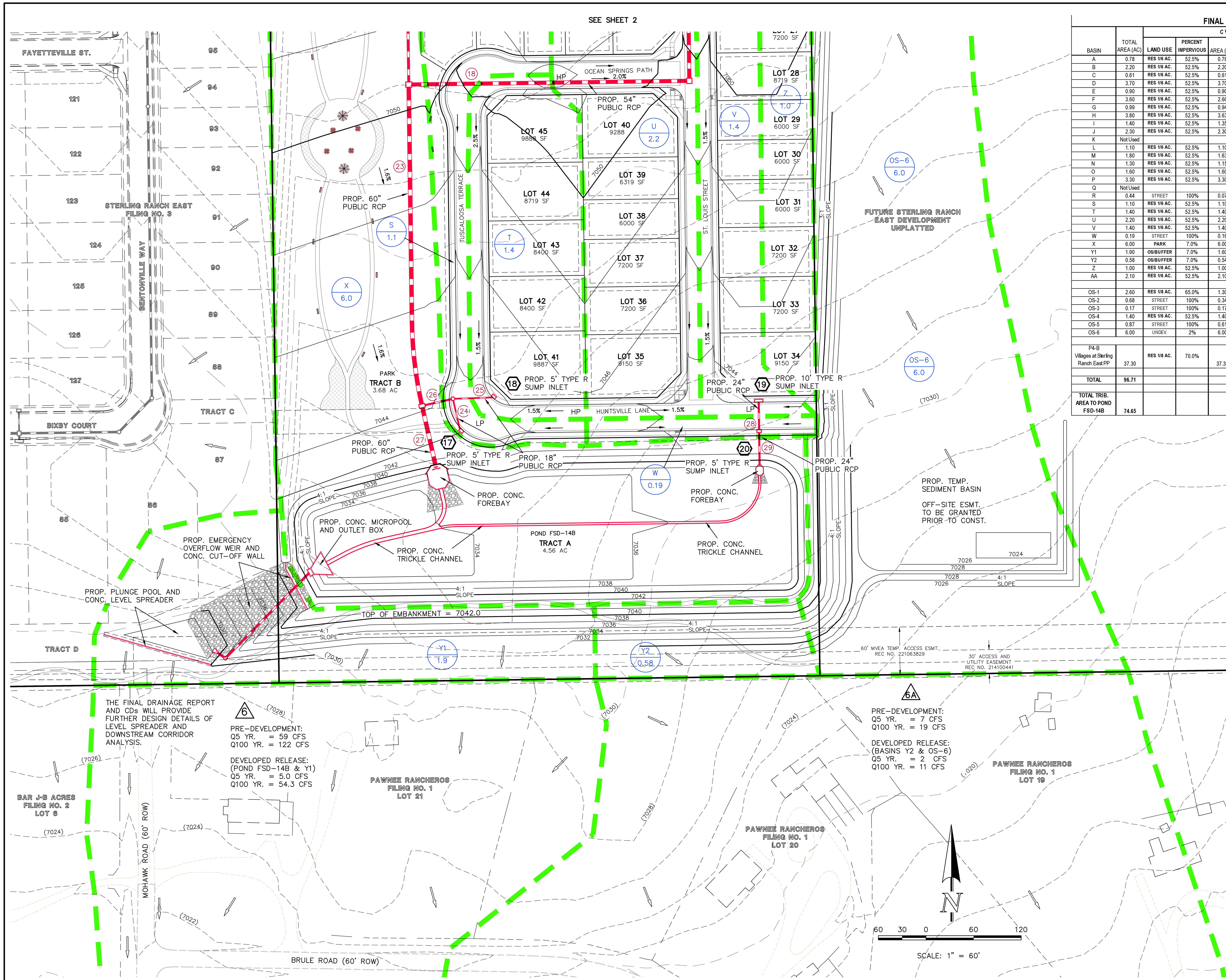
MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 5
PRELIMINARY PLAN
PRELIMINARY DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE
DRAWN BY	MAW	(H) 1"= 60'	SHEET 2 OF 3
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.25



FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	C VALUE DCM TABLE 6-6: LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(5)	C(100)	C VALUE DCM TABLE 6-6: LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(5)	C(100)	WEIGHTED "C" VALUE: C(5)	C(100)	WEIGHTED CA: CA(5)	CA(100)	DCM TABLE 6-6: WEIGHTED % IMPERVIOUS
A	0.78	RES 1/6 AC.	52.5%	0.78	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.29	0.43	52.5%
B	2.20	RES 1/6 AC.	52.5%	2.20	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.83	1.20	52.5%
C	0.61	RES 1/6 AC.	52.5%	0.61	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.23	0.33	52.5%
D	3.70	RES 1/6 AC.	52.5%	3.70	0.38	0.55			0.00	0.08	0.35	0.38	0.55	1.39	2.02	52.5%
E	0.90	RES 1/6 AC.	52.5%	0.90	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.34	0.49	52.5%
F	3.60	RES 1/6 AC.	52.5%	2.66	0.38	0.55	PARK	7.0%	0.94	0.12	0.39	0.31	0.50	1.11	1.82	40.6%
G	0.99	RES 1/6 AC.	52.5%	0.94	0.38	0.55	OPEN SPACE	7.0%	0.05	0.12	0.39	0.36	0.54	0.36	0.53	50.2%
H	3.80	RES 1/6 AC.	52.5%	3.63	0.38	0.55	OPEN SPACE	7.0%	0.17	0.12	0.39	0.36	0.54	1.38	2.04	50.5%
I	1.40	RES 1/6 AC.	52.5%	1.35	0.38	0.55	OPEN SPACE	7.0%	0.05	0.08	0.35	0.36	0.54	0.51	0.75	50.9%
J	2.30	RES 1/6 AC.	52.5%	2.30	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.86	1.25	52.5%
K	Not Used															
L	1.10	RES 1/6 AC.	52.5%	1.10	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.41	0.60	52.5%
M	1.80	RES 1/6 AC.	52.5%	1.63	0.38	0.55	OPEN SPACE	7.0%	0.17	0.12	0.39	0.35	0.53	0.63	0.95	48.2%
N	1.30	RES 1/6 AC.	52.5%	1.15	0.38	0.55	PARK	7.0%	0.15	0.12	0.39	0.35	0.53	0.45	0.69	47.3%
O	1.60	RES 1/6 AC.	52.5%	1.60	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.60	0.87	52.5%
P	3.30	RES 1/6 AC.	52.5%	3.30	0.38	0.55			0.00	0.08	0.35	0.38	0.55	1.24	1.80	52.5%
Q	Not Used															
R	0.44	STREET	100%	0.07	0.90	0.96	PARK	7.0%	0.37	0.12	0.39	0.24	0.48	0.11	0.21	21.8%
S	1.10	RES 1/6 AC.	52.5%	1.10	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.41	0.60	52.5%
T	1.40	RES 1/6 AC.	52.5%	1.40	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.53	0.76	52.5%
U	2.20	RES 1/6 AC.	52.5%	2.20	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.83	1.20	52.5%
V	1.40	RES 1/6 AC.	52.5%	1.40	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.53	0.76	52.5%
W	0.19	STREET	100%	0.16	0.90	0.96	OPEN SPACE	7.0%	0.03	0.12	0.39	0.78	0.87	0.15	0.17	85.3%
X	6.00	PARK	7.0%	6.00	0.12	0.39			0.00	0.08	0.35	0.12	0.39	0.72	2.34	7.0%
Y1	1.90	OS/BUFFER	7.0%	1.60	0.12	0.39	SIDEWALK	100.0%	0.30	0.90	0.96	0.24	0.48	0.46	0.91	21.7%
Y2	0.58	OS/BUFFER	7.0%	0.54	0.12	0.39	SIDEWALK	100.0%	0.04	0.08	0.35	0.12	0.39	0.07	0.22	13.4%
Z	1.00	RES 1/6 AC.	52.5%	1.00	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.38	0.55	52.5%
AA	2.10	RES 1/6 AC.	52.5%	2.10	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.79	1.14	52.5%
OS-1	2.60	RES 1/8 AC.	65.0%	1.30	0.45	0.59	STREET	100%	1.30	0.90	0.96	0.68	0.78	1.76	2.02	82.5%
OS-2	0.68	STREET	100%	0.34	0.90	0.96	OPEN SPACE	7.0%	0.34	0.12	0.39	0.51	0.68	0.35	0.46	53.5%
OS-3	0.17	STREET	100%	0.17	0.90	0.96			0.00	0.08	0.35	0.90	0.96	0.15	0.16	100.0%
OS-4	1.40	RES 1/6 AC.	52.5%	1.40	0.38	0.55			0.00	0.08	0.35	0.38	0.55	0.53	0.76	52.5%
OS-5	0.87	STREET	100%	0.61	0.90	0.96	OPEN SPACE	7.0%	0.26	0.12	0.39	0.67	0.79	0.58	0.69	72.2%
OS-6	6.00	UNDEV.	2%	6.00	0.09	0.36			0.00	0.12	0.39	0.09	0.36	0.54	2.16	2.0%
P4-B Villages at Sterling Ranch East PP	37.30	RES 1/8 AC.	70.0%	37.30	0.49	0.62			0.00	0.08	0.35	0.49	0.62	18.28	23.13	70.0%
TOTAL	96.71															
TOTAL TRIB. AREA TO POND FSD-14B	74.65															

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED: CA(2)	CA(5)	CA(100)	OVERLAND: C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL FLOW: Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY: I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	TOTAL FLOWS: Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	0.25	0.29	0.43	0.08	100	2	14.7	135	2.0%	2.8	0.8	15.4	2.78	3.48	5.84	0.7	1.0	2.5
B	0.70	0.83	1.20	0.08	100	2	14.7	260	1.5%	2.4	1.8	16.4	2.70	3.39	5.68	2	3	7
C	0.20	0.23	0.33	0.08	50	1	10.4	260	1.5%	2.4	1.8	12.1	3.07	3.84	6.45	0.6	0.9	2.1
D	1.18	1.39	2.02	0.08	100	2	14.7	900	1.8%	2.7	5.6	20.2	2.46	3.07	5.16	3	4	10
E	0.29	0.34	0.49	0.08	50	1	10.4	470	2.5%	3.2	2.5	12.8	3.00	3.75	6.30	0.9	1.3	3.1
F	0.90	1.11	1.82	0.12	100	2	14.1	270	1.5%	2.4	1.8	15.9	2.74	3.43	5.76	2	4	10
G	0.30	0.36	0.53	0.12	50	1	10.0	270	1.5%	2.4	1.8	11.8	3.10	3.88	6.52	0.9	1.4	3.5
H	1.17	1.38	2.04	0.12	100	2	14.1	450	1.5%	2.4	3.1	17.1	2.65	3.32	5.57	3	5	11
I	0.43	0.51	0.75	0.08	50	1	10.4	450	1.5%	2.4	3.1	13.4	2.94	3.69	6.19	1	2	5
J	0.74	0.86	1.25	0.08	50	1	10.4	630	3.5%	3.7	2.8	13.2	2.97	3.72	6.24	2	3	8
K	Not Used																	
L	0.35	0.41	0.60	0.08	100	2	14.7	500	1.5%	2.4	3.4	18.1	2.59	3.24	5.44	0.9	1.3	3.3
M	0.53	0.63	0.95	0.12	100	2	14.1	200	1.5%	2.4	1.4	15.4	2.78	3.48	5.84	1	2	6
N	0.38	0.45	0.69	0.12	100	2	14.1	200	1.5%	2.4	1.4	15.4	2.78	3.48	5.84	1	2	4
O	0.51	0.60	0.87	0.08	100	2	14.7	300	1.5%	2.4	2.0	16.7	2.69	3.36	5.64	1	2	5
P	1.06	1.24	1.80	0.08	100	2	14.7	420	1.5%	2.4	2.9	17.5	2.63	3.29	5.52	3	4	10
Q	Not Used																	
R	0.08	0.11	0.21	0.12	100	2	14.1	50	1.5%	2.4	0.3	14.4	2.86	3.58	6.01	0.2	0.4	1.3
S	0.35	0.41	0.60	0.08	100	2	14.7	500	1.5%	2.4	3.4	18.1	2.59	3.24	5.44	0.9	1.3	3.3
T	0.45	0.53	0.76	0.08	100	2	14.7	300	1.5%	2.4	2.0	16.7	2.69	3.36	5.64	1	2	4
U	0.70	0.83	1.20	0.08	100	2	14.7	500	1.5%	2.4	3.4	18.1	2.59	3.24	5.44	2	3	7
V	0.45	0.53	0.76	0.08	50	1	10.4	650	1.5%	2.4	4.4	14.8	2.83	3.54	5.95	1	2	5
W	0.14	0.15	0.17									5.0	4.12	5.17	8.68	0.6	0.8	1.4
X	0.30	0.72	2.34	0.08	100	2	14.7	500	2.0%	1.0	8.4	23.1	2.30	2.88	4.83	1	2	11
Y1	0.35	0.46	0.91	0.90	250	10	3.6					5.0	4.12	5.17	8.68	1.4	2	8
Y2	0.03	0.07	0.22	0.08	90	14	7.1					7.1	3.71	4.65	7.81	0.1	0.3	1.8
Z	0.32	0.38	0.55	0.08	65	2	10.2					10.2	3.27	4.09	6.87	1	2	4
AA	0.67	0.79	1.14	0.08	65	2	10.2					10.2	3.27	4.09	6.87	2	3	8
OS-1	1.69	1.76	2.02	0.08	40	0.8	9.3	900	2.5%	3.2	4.7	14.0	2.89	3.62	6.08	5	6	12
OS-2	0.32	0.35	0.46	0.12	50	1	10.0	400	1.6%	2.5	2.6	12.6	3.02	3.78	6.35	1.0	1.3	2.9
OS-3	0.15	0.15	0.16									5.0	4.12	5.17	8.68	0.6	0.8	1.4
OS-4	0.45	0.53	0.76	0.08	50	1	10.4	500	1.5%	2.4	3.4	13.8	2.91	3.65	6.13	1	2	5
OS-5	0.56	0.58	0.69	0.12	25	0.75	6.2	450	1.5%	2.4	3.1	9.2	3.39	4.25	7.14	2	2	5
OS-6	0.18	0.54	2.16	0.12	300	7	23.2					23.2	2.29	2.87	4.81	0.4	1.5	10
P4-B Villages at Sterling Ranch East PP	16.79	18.28	23.13	0.08	100	2	14.7	600	1.5%	2.4	4.1	18.7	2.55	3.19	5.35	43	58	124

LEGEND

EXISTING GROUND CONTOUR	5910
PROPOSED FINISHED CONTOUR	5910
SUBDIVISION BOUNDARY	
LOT LINE	
PROPOSED BASIN BOUNDARY	
DIRECTION OF DRAINAGE	
EXISTING STORM SEWER	
EXISTING STORM INLET	
PROPOSED STORM SEWER	
PROPOSED STORM INLET	
BASIN IDENTIFIER / AREA IN ACRES	D / 1.41
DESIGN POINT	2
PIPE RUN	2

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION CENTER OF COLORADO
IT'S THE LAW

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NO.	REVISION	DATE
1	REVISED PER COUNTY COMMENTS	11/22/23

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

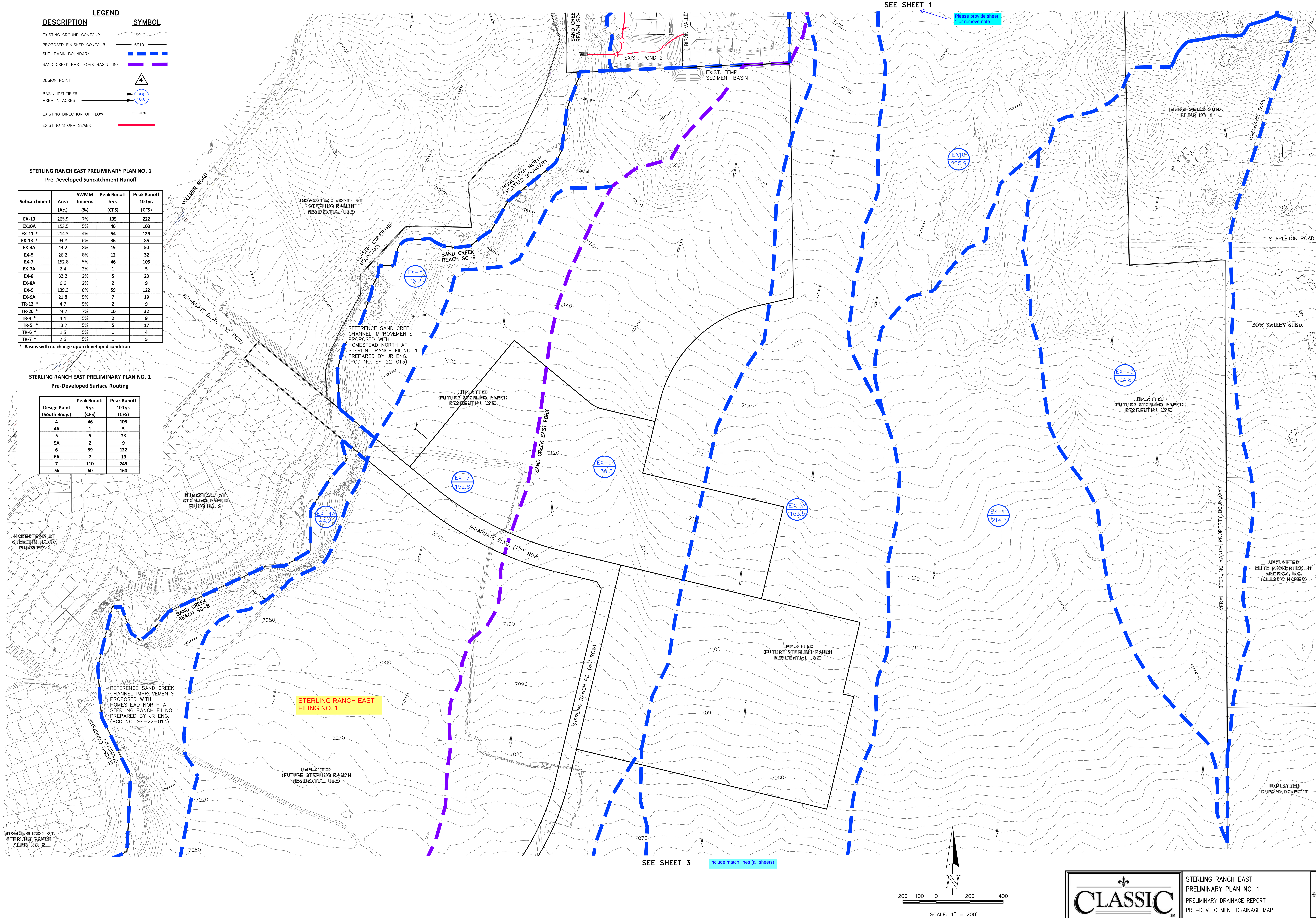
MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 5
PRELIMINARY PLAN
PRELIMINARY DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE
DRAWN BY	MAW	(H) 1"= 60'	SHEET 3 OF 3
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.25

DRAINAGE MAPS



STERLING RANCH EAST PRELIMINARY PLAN NO. 1
Pre-Developed Subcatchment Runoff

Subcatchment	Area (Ac.)	SWMM Imperv. (%)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)
EX-10	265.9	7%	105	222
EX10A	153.5	5%	46	103
EX-11 *	214.3	4%	54	129
EX-13 *	94.8	6%	36	85
EX-4A	44.2	8%	19	50
EX-5	26.2	8%	12	32
EX-7	152.8	5%	46	105
EX-7A	2.4	2%	1	5
EX-8	32.2	2%	5	23
EX-8A	6.6	2%	2	9
EX-9	139.3	8%	59	122
EX-9A	21.8	5%	7	19
TR-12 *	4.7	5%	2	9
TR-20 *	23.2	7%	10	32
TR-4 *	4.4	5%	2	9
TR-5 *	13.7	5%	5	17
TR-6 *	1.5	5%	1	4
TR-7 *	2.6	5%	1	5

* Basins with no change upon developed condition

STERLING RANCH EAST PRELIMINARY PLAN NO. 1
Pre-Developed Surface Routing

Design Point (South Bndy.)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)
4	46	105
4A	1	5
5	5	23
5A	2	9
6	59	122
6A	7	19
7	110	249
56	60	160

CLASSIC CONSULTING
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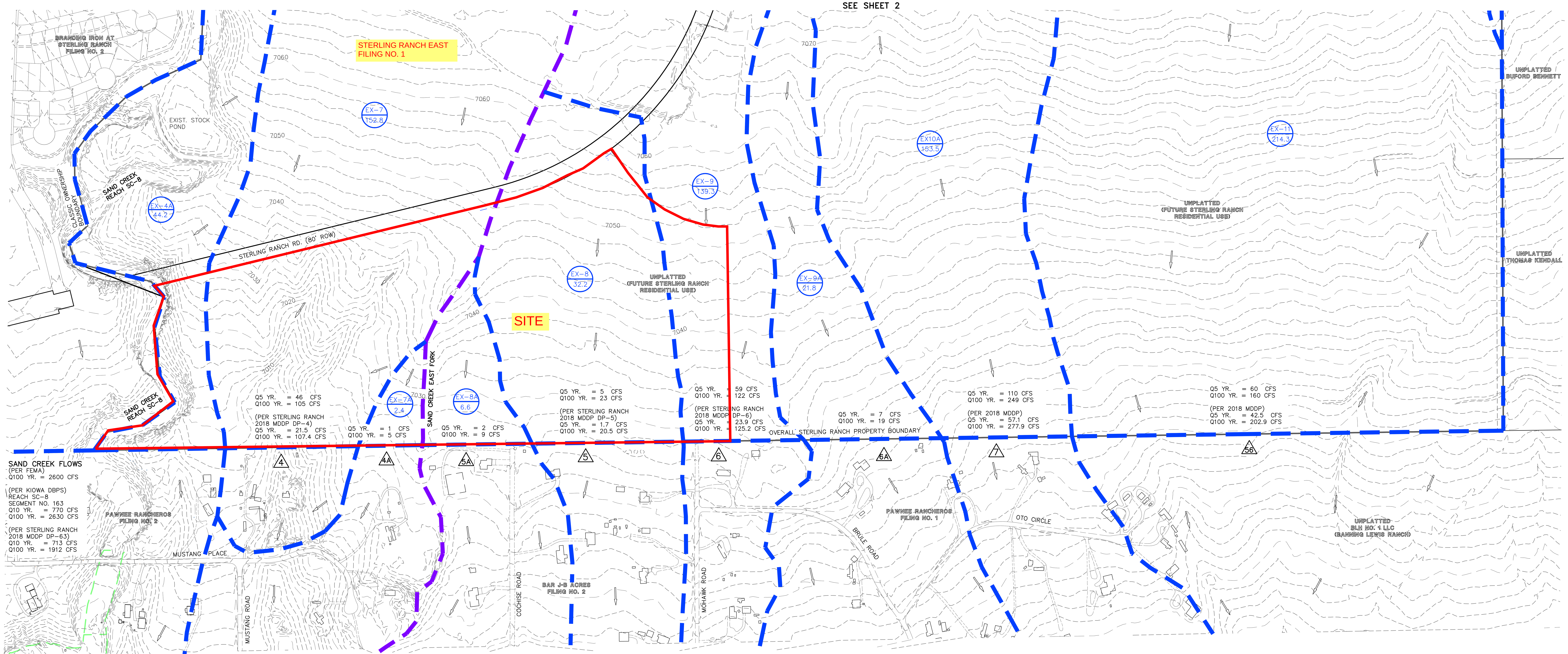
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
PRELIMINARY DRAINAGE REPORT
PRE-DEVELOPMENT DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE 4-1-22
DRAWN BY	MAW	(H) 1"= 200'	SHEET 2 OF 6
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.22

SEE SHEET 2



NOTE:

THE FOLLOWING LABELS AS SHOWN ALONG THE SOUTH BOUNDARY REPRESENT PRE-DEVELOPED FLOWS AS PRESENTED IN THE 2018 STERLING RANCH MDDP. SEE REFERENCE MATERIAL IN APPENDIX FOR ORIGINAL MAP.

(PER STERLING RANCH
2018 MDDP DP-5)
Q5 YR. = 1.7 CFS
Q100 YR. = 20.5 CFS

STERLING RANCH EAST PRELIMINARY PLAN NO. 1
Pre-Developed Subcatchment Runoff

Subcatchment	Area (Ac.)	SWMM Imperv. (%)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)
EX-10	265.9	7%	105	222
EX10A	153.5	5%	46	103
EX-11 *	214.3	4%	54	129
EX-13 *	94.8	6%	36	85
EX-4A	44.2	8%	19	50
EX-5	26.2	8%	12	32
EX-7	152.8	5%	46	105
EX-7A	2.4	2%	1	5
EX-8	32.2	2%	5	23
EX-8A	6.6	2%	2	9
EX-9	139.3	8%	59	122
EX-9A	21.8	5%	7	19
TR-12 *	4.7	5%	2	9
TR-20 *	23.2	7%	10	32
TR-4 *	4.4	5%	2	9
TR-5 *	13.7	5%	5	17
TR-6 *	1.5	5%	1	4
TR-7 *	2.6	5%	1	5

* Basins with no change upon developed condition

STERLING RANCH EAST PRELIMINARY PLAN NO. 1
Pre-Developed Surface Routing

Design Point (South Bndy.)	Peak Runoff 5 yr. (CFS)	Peak Runoff 100 yr. (CFS)
4	46	105
4A	1	5
5	5	23
5A	2	9
6	59	122
6A	7	19
7	110	249
56	60	160

LEGEND

DESCRIPTION	SYMBOL
EXISTING GROUND CONTOUR	6910
PROPOSED FINISHED CONTOUR	6910
SUB-BASIN BOUNDARY	
SAND CREEK EAST FORK BASIN LINE	
DESIGN POINT	4
BASIN IDENTIFIER / AREA IN ACRES	BB 10.0
EXISTING DIRECTION OF FLOW	
EXISTING STORM SEWER	

N

200 100 0 200 400

SCALE: 1" = 200'

CLASSIC CONSULTING
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STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
PRELIMINARY DRAINAGE REPORT
PRE-DEVELOPMENT DRAINAGE MAP

DESIGNED BY MAW	SCALE	DATE 4-1-22	
DRAWN BY MAW	(H) 1"= 200'	SHEET 3 OF 6	
CHECKED BY	(V) 1"= N/A	JOB NO. 1183.22	

Include maps and discussion in report discussing drainage scenarios without SRE 5 being developed. How do flows get to and interact with this development?

Include street names & lot #'s

Update map and legend to be consistent. Legend does not account for any "future" development. Map has existing items on proposed layers, etc

Please include an overall map and Key map of the entire filing, to include the basin labels, design points, and summary tables. Include table with design point summary

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED CA(2)	CA(5)	CA(100)	OVERLAND C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL FLOW Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	0.45	0.53	0.76	0.12	50	1	10.0	500	1.5%	2.4	3.4	13.4	2.95	3.70	6.20	1	**2**	**5**
B	1.06	1.24	1.80	0.12	100	2	14.1	730	1.8%	2.7	4.5	18.6	2.56	3.20	5.37	3	**4**	**10**
C	0.83	0.91	1.17	0.12	100	2	14.1	600	1.8%	2.7	3.7	17.8	2.61	3.26	5.48	2	**3**	**6**
D	1.09	1.28	1.85	0.12	100	2	14.1	450	1.8%	2.7	2.8	16.9	2.67	3.34	5.61	3	**4**	**10**
E	0.58	0.68	0.98	0.12	100	2	14.1	275	1.5%	2.4	1.9	15.9	2.74	3.43	5.76	2	**2**	**6**
F	0.58	0.68	0.98	0.12	100	2	14.1	400	1.5%	2.4	2.7	16.8	2.68	3.35	5.63	2	**2**	**6**
G	0.80	0.94	1.36	0.12	100	2	14.1	500	1.5%	2.4	3.4	17.5	2.63	3.29	5.53	2	**3**	**8**
H	0.20	0.23	0.32	0.12	50	1	10.0	175	1.5%	2.4	1.2	11.1	3.17	3.97	6.66	0.6	**0.9**	**2.1**
I	0.58	0.68	0.98	0.12	100	2	14.1	400	1.5%	2.4	2.7	16.8	2.68	3.35	5.63	2	**2**	**6**
J	0.50	0.53	0.63	0.12	50	1	10.0	350	1.5%	2.4	2.4	12.3	3.05	3.81	6.40	1.5	**2**	**4**
K	0.83	0.98	1.42	0.12	100	2	14.1	350	2.6%	3.2	1.8	15.9	2.74	3.43	5.77	2	**3**	**8**
L	0.18	0.20	0.25	0.12	50	1	10.0	160	2.6%	3.2	0.8	10.8	3.21	4.02	6.74	0.6	**0.8**	**1.7**
M	0.90	1.05	1.53	0.12	100	2	14.1	325	2.9%	3.4	1.6	15.7	2.76	3.46	5.80	2	**4**	**9**
N	0.35	0.41	0.60	0.12	100	2	14.1	300	2.9%	3.4	1.5	15.5	2.77	3.47	5.82	1.0	**1.4**	**3.5**
O	0.34	0.39	0.54	0.12	50	1	10.0	350	1.5%	2.4	2.4	12.3	3.05	3.81	6.40	1	**1**	**3**
P	0.74	0.86	1.25	0.12	100	2	14.1	200	1.5%	2.4	1.4	15.4	2.78	3.48	5.84	2	**3**	**7**
Q	0.26	0.30	0.42	0.12	50	1	10.0	200	1.5%	2.4	1.4	11.3	3.15	3.94	6.62	0.8	**1.2**	**2.8**
R	1.60	1.76	2.30	0.12	100	2	14.1	600	2.3%	3.0	3.3	17.4	2.64	3.30	5.54	4	**6**	**13**
S	0.64	0.75	1.09	0.12	100	2	14.1	350	2.3%	3.0	1.9	16.0	2.74	3.42	5.75	2	**3**	**6**
T	0.83	0.98	1.42	0.12	100	2	14.1	675	1.5%	2.4	4.6	18.7	2.55	3.19	5.36	2	**3**	**8**
U	0.84	0.88	1.03	0.12	50	1	10.0	675	1.5%	2.4	4.6	14.5	2.85	3.57	5.99	2	**3**	**6**
V	0.28	0.34	0.55	0.12	100	2	14.1	300	1.5%	2.4	2.0	16.1	2.73	3.41	5.73	1	**1.2**	**3.2**
W	0.81	0.90	1.18	0.12	50	1	10.0	300	1.5%	2.4	2.0	12.0	3.08	3.86	6.47	2	**3**	**8**
X	4.41	4.80	6.08	0.12	40	1.2	7.8	300	2.0%	2.8	1.8	9.6	3.35	4.20	7.05	15	**20**	**43**
Y	0.24	0.58	1.87	0.12	100	1	17.7	500	1.0%	2.0	4.2	21.9	2.36	2.96	4.96	0.6	**1.7**	**9.3**
Z	0.17	0.41	1.33	0.12	65	14	5.2	700	1.0%	0.7	16.7	21.8	2.36	2.96	4.96	0.4	**1.2**	**6.6**
AA	0.10	0.13	0.25	0.12	100	5.5	10.1					10.1	3.29	4.12	6.91	0.3	**0.5**	**1.7**
BB	0.15	0.21	0.47	0.12	100	8	8.9					8.9	3.43	4.30	7.22	0.5	**0.9**	**3.4**
CC	0.29	0.40	0.76	0.12	100	2.5	13.1	125	2.5%	1.6	1.3	14.4	2.86	3.58	6.01	0.8	**1.4**	**4.6**
DD	0.48	0.66	1.28	0.12	100	2.5	13.1	150	2.0%	1.4	1.8	14.8	2.82	3.54	5.94	1.3	**2**	**8**
EE	0.87	1.20	2.33	0.12	100	2.5	13.1	150	2.0%	1.4	1.8	14.8	2.82	3.54	5.94	2.5	**4**	**14**
FF	0.23	0.32	0.62	0.12	65	2	9.8	125	2.0%	1.4	1.5	11.3	3.15	3.94	6.62	0.7	**1.2**	**4.1**
OS-1	1.69	1.76	2.02	0.08	40	0.8	9.3	900	2.5%	3.2	4.7	14.0	2.89	3.62	6.08	5	**6**	**12**
OS-2	0.32	0.35	0.46	0.12	50	1	10.0	400	1.6%	2.5	2.6	12.6	3.02	3.78	6.35	1.0	**1.3**	**2.9**
OS-3	1.18	1.39	2.02	0.08	100	2	14.7	900	1.8%	2.7	5.6	20.2	2.46	3.07	5.16	3	**4**	**10**
OS-4	0.51	0.60	0.87	0.12	40	0.8	8.9	900	2.5%	3.2	4.7	13.6	2.93	3.66	6.15	1	**2**	**5**
OS-5	1.06	1.24	1.80	0.12	100	2	14.1	300	1.5%	2.4	2.0	16.1	2.73	3.41	5.73	3	**4**	**10**
OS-6	0.08	0.11	0.21	0.12	100	2	14.1	50	1.5%	2.4	0.3	14.4	2.86	3.58	6.01	0.2	**0.4**	**1.3**
B1	1.01	1.06	1.29	0.12	10	0.3	3.9	1100	2.4%	3.1	5.9	9.8	3.32	4.16	6.98	3	**4**	**9**
B3	0.83	0.88	1.10	0.12	40	1.2	7.8	600	1.5%	2.4	4.1	11.9	3.09	3.87	6.50	3	**3**	**7**
B4	0.83	0.49	0.62	0.12	30	0.9	6.7	450	1.5%	2.4	3.1	9.8	3.32	4.16	6.98	3	**2**	**4**
B5	0.48	0.51	0.65	0.12	30	0.9	6.7	500	1.5%	2.4	3.4	10.1	3.28	4.11	6.90	2	**2**	**4**
B6	0.55	0.59	0.73	0.12	30	0.9	6.7	500	1.5%	2.4	3.4	10.1	3.28	4.11	6.90	2	**2**	**5**
B7	0.71	0.78	1.05	0.12	70	2.5	9.7	500	1.5%	2.4	3.4	13.1	2.97	3.72	6.25	2	**3**	**7**
B8	0.61	0.65	0.84	0.12	30	0.9	6.7	575	1.5%	2.4	3.9	10.7	3.22	4.03	6.77	2	**3**	**6**
B9	0.90	0.98	1.32	0.12	40	1.2	7.8	750	1.5%	2.4	5.1	12.9	2.99	3.75	6.29	3	**4**	**8**
B10	0.99	1.08	1.46	0.12	30	0.9	6.7	600	1.5%	2.4	4.1	10.8	3.20	4.01	6.73	3	**4**	**10**

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	C VALUE DCM TABLE 6-6: LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	C VALUE DCM TABLE 6-6: LAND USE	PERCENT IMPERVIOUS	AREA (AC)	C(2)	C(5)	C(100)	WEIGHTED "C" VALUE C(2)	C(5)	C(100)	WEIGHTED CA CA(2)	CA(5)	CA(100)	DCM TABLE 6-6 WEIGHTED % IMPERVIOUS
A	1.40	RES 1/6 AC.	52.5%	1.40	**0.32**	**0.38**	**0.55**			0.00	0.89	0.90	0.96	0.32	0.38	0.55	**0.45**	**0.53**	**0.76**	52.5%
B	3.30	RES 1/6 AC.	52.5%	3.30	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.06**	**1.24**	**1.80**	52.5%
C	1.80	RES 1/6 AC.	52.5%	1.35	**0.32**	**0.38**	**0.55**	STREET	100.0%	0.45	0.89	0.90	0.96	0.46	0.51	0.65	**0.83**	**0.91**	**1.17**	64.4%
D	3.40	RES 1/6 AC.	52.5%	3.40	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.09**	**1.28**	**1.85**	52.5%
E	1.80	RES 1/6 AC.	52.5%	1.80	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
F	1.80	RES 1/6 AC.	52.5%	1.80	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
G	2.50	RES 1/6 AC.	52.5%	2.50	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.80**	**0.94**	**1.36**	52.5%
H	0.51	RES 1/2 AC.	25.0%	0.34	**0.15**	**0.22**	**0.46**	STREET	100.0%	0.17	0.89	0.90	0.96	0.40	0.45	0.63	**0.20**	**0.23**	**0.32**	50.0%
I	1.80	RES 1/6 AC.	52.5%	1.80	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.58**	**0.68**	**0.98**	52.5%
J	0.85	RES 1/6 AC.	52.5%	0.45	**0.32**	**0.38**	**0.55**	STREET	100.0%	0.40	0.89	0.90	0.96	0.59	0.62	0.74	**0.50**	**0.53**	**0.63**	74.9%
K	2.60	RES 1/6 AC.	52.5%	2.60	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.83**	**0.98**	**1.42**	52.5%
L	0.36	RES 1/6 AC.	52.5%	0.24	**0.32**	**0.38**	**0.55**	STREET	100.0%	0.12	0.89	0.90	0.96	0.51	0.55	0.68	**0.18**	**0.20**	**0.25**	68.3%
M	2.80	RES 1/6 AC.	52.5%	2.80	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.90**	**1.05**	**1.53**	52.5%
N	1.10	RES 1/6 AC.	52.5%	1.10	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.35**	**0.41**	**0.60**	52.5%
O	0.86	RES 1/2 AC.	25.0%	0.57	**0.15**	**0.22**	**0.46**	STREET	100.0%	0.29	0.89	0.90	0.96	0.40	0.45	0.63	**0.34**	**0.39**	**0.54**	50.3%
P	2.30	RES 1/6 AC.	52.5%	2.30	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.74**	**0.86**	**1.25**	52.5%
Q	0.67	RES 1/2 AC.	25.0%	0.45	**0.15**	**0.22**	**0.46**	STREET	100.0%	0.22	0.89	0.90	0.96	0.39	0.44	0.62	**0.26**	**0.30**	**0.42**	49.6%
R	3.90	RES 1/8 AC.	65.0%	3.90	**0.41**	**0.45**	**0.59**			0.00	0.02	0.08	0.35	0.41	0.45	0.59	**1.60**	**1.76**	**2.30**	65.0%
S	2.00	RES 1/6 AC.	52.5%	2.00	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.64**	**0.75**	**1.09**	52.5%
T	2.60	RES 1/6 AC.	52.5%	2.60	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.83**	**0.98**	**1.42**	52.5%
U	1.40	RES 1/8 AC.	65.0%	0.85	**0.41**	**0.45**	**0.59**	STREET	100.0%	0.55	0.89	0.90	0.96	0.60	0.63	0.74	**0.84**	**0.88**	**1.03**	78.8%
V	1.10	RES 1/6 AC.	52.5%	0.85	**0.32**	**0.38**	**0.55**	STREET	100.0%	0.25	0.02	0.08	0.35	0.25	0.31	0.50	**0.28**	**0.34**	**0.55**	63.3%
W	1.80	RES 1/4 AC.	40.0%	1.20	**0.23**	**0.30**	**0.50**	STREET	100.0%	0.60	0.89	0.90	0.96	0.45	0.50	0.65	**0.81**	**0.90**	**1.18**	60.0%
X	9.80	SCHOOL	70%	9.80	0.45	0.49	0.62			0.00	0.02	0.08	0.35	0.45	0.49	0.62	**4.41**	**4.80**	**6.08**	70.0%
Y	4.80	POND	7.0%	4.80	**0.05**	**0.12**	**0.39**			0.00	0.02	0.08	0.35	0.05	0.12	0.39	**0.24**	**0.58**	**1.87**	7.0%
Z	3.40	SAND CREEK	7.0%	3.40	**0.05**	**0.12**	**0.39**			0.00	0.02	0.08	0.35	0.05	0.12	0.39	**0.17**	**0.41**	**1.33**	7.0%
AA	0.55	OPEN SPACE	2.0%	0.39	**0.03**	**0.09**	**0.36**	TRAIL	80.0%	0.16	0.57	0.59	0.70	0.19	0.24	0.46	**0.10**	**0.13**	**0.25**	24.7%
BB	1.10	OPEN SPACE	2.0%	0.88	**0.03**	**0.09**	**0.36**	TRAIL	80.0%	0.22	0.57	0.59	0.70	0.14	0.19	0.43	**0.15**	**0.21**	**0.47**	17.6%
CC	1.60	RES 1/2 AC.	25.0%	1.48	**0.15**	**0.22**	**0.46**	TRAIL	80.0%	0.12	0.57	0.59	0.70	0.18	0.25	0.48	**0.29**	**0.40**	**0.76**	29.1%
DD	2.70	RES 1/2 AC.	25.0%	2.53	**0.15**	**0.22**	**0.46**	TRAIL	80.0%	0.17	0.57	0.59	0.70	0.18	0.24	0.48	**0.48**	**0.66**	**1.28**	28.5%
EE	4.90	RES 1/2 AC.	25.0%	4.57	**0.15**	**0.22**	**0.46**	TRAIL	80.0%	0.33	0.57	0.59	0.70	0.18	0.24	0.48	**0.87**	**1.20**	**2.33**	28.7%
FF	1.30	RES 1/2 AC.	25.0%	1.22	**0.15**	**0.22**	**0.46**	TRAIL	80.0%	0.08	0.57	0.59	0.70	0.18	0.24	0.47	**0.23**	**0.32**	**0.62**	28.4%
OS-1	2.60	RES 1/8 AC.	65.0%	1.30	**0.41**	**0.45**	**0.59**	STREET	100.0%	1.30	0.89	0.90	0.96	0.65	0.68	0.78	**1.69**	**1.76**	**2.02**	82.5%
OS-2	0.68	STREET	100.0%	0.34	0.89	0.90	0.96	OPEN SPACE	7%	0.34	**0.05**	**0.12**	**0.39**	0.47	0.51	0.68	**0.32**	**0.35**	**0.46**	53.5%
OS-3	3.70	RES 1/6 AC.	52.5%	3.70	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.18**	**1.39**	**2.02**	52.5%
OS-4	1.60	RES 1/6 AC.	52.5%	1.60	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**0.51**	**0.60**	**0.87**	52.5%
OS-5	3.30	RES 1/6 AC.	52.5%	3.30	**0.32**	**0.38**	**0.55**			0.00	0.02	0.08	0.35	0.32	0.38	0.55	**1.06**	**1.24**	**1.80**	52.5%
OS-6	0.44	STREET	100%	0.07	0.89	0.90	0.96	PARK	7.0%	0.37	**0.05**	**0.12**	**0.39**	0.18	0.24	0.48	**0.08**	**0.11**	**0.21**	21.8%
B1	1.70	STREET	100%	1.10	0.89	0.90	0.96	OPEN SPACE	7.0%	0.60	**0.05**	**0.12**	**0.39**	0.59	0.62	0.76	**1.01**	**1.06**	**1.29**	67.2%
B3	1.50	STREET	100%	0.90	0.89	0.90	0.96	OPEN SPACE	7.0%	0.60	**0.05**	**0.12**	**0.39**	0.55	0.59	0.73	**0.83**	**0.88**	**1.10**	62.8%
B4	0.87	STREET	100%	0.49	0.89	0.90	0.96	OPEN SPACE	7.0%	0.38	**0.05**	**0.12**	**0.39**	0.52	0.56	0.71	**0.46**	**0.49**	**0.62**	59.4%
B5	0.90	STREET	100%	0.52	0.89	0.90	0.96	OPEN SPACE	7.0%	0.38	**0.05**	**0.12**	**0.39**	0.54	0.57	0.72	**0.48**	**0.51**	**0.65**	60.7%
B6	1.00	STREET	100%	0.60	0.89	0.90	0.96	OPEN SPACE	7.0%	0.40	**0.05**	**0.12**	**0.39**	0.55	0.59	0.73	**0.55**	**0.59**	**0.73**	62.8%
B7	1.60	STREET	100%	0.75	0.89	0.90	0.96	OPEN SPACE	7.0%	0.85	**0.05**	**0.12**	**0.39**	0.44	0.49	0.66	**0.71**	**0.78**	**1.05**	50.6%
B8	1.20	STREET	100%	0.65	0.89	0.90	0.96	OPEN SPACE	7.0%	0.55	**0.05**	**0.12**	**0.39**	0.51	0.54	0.70	**0.61**	**0.65**	**0.84**	57.4%
B9	2.00	STREET	100%	0.95	0.89	0.90	0.96	OPEN SPACE	7.0%	1.05	**0.05**	**0.12**	**0.39**	0.45	0.49	0.66	**0.90**	**0.98**	**1.32**	51.2%
B10	2.20	STREET	100%	1.05	0.89	0.90	0.96	OPEN SPACE	7.0%	1.15	**0.05**	**0.12**	**0.39**	0.45	0.49	0.66	**0.99**	**1.08**	**1.46**	51.4%

SEE SHEET 2

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NO.	REVISION	DATE

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

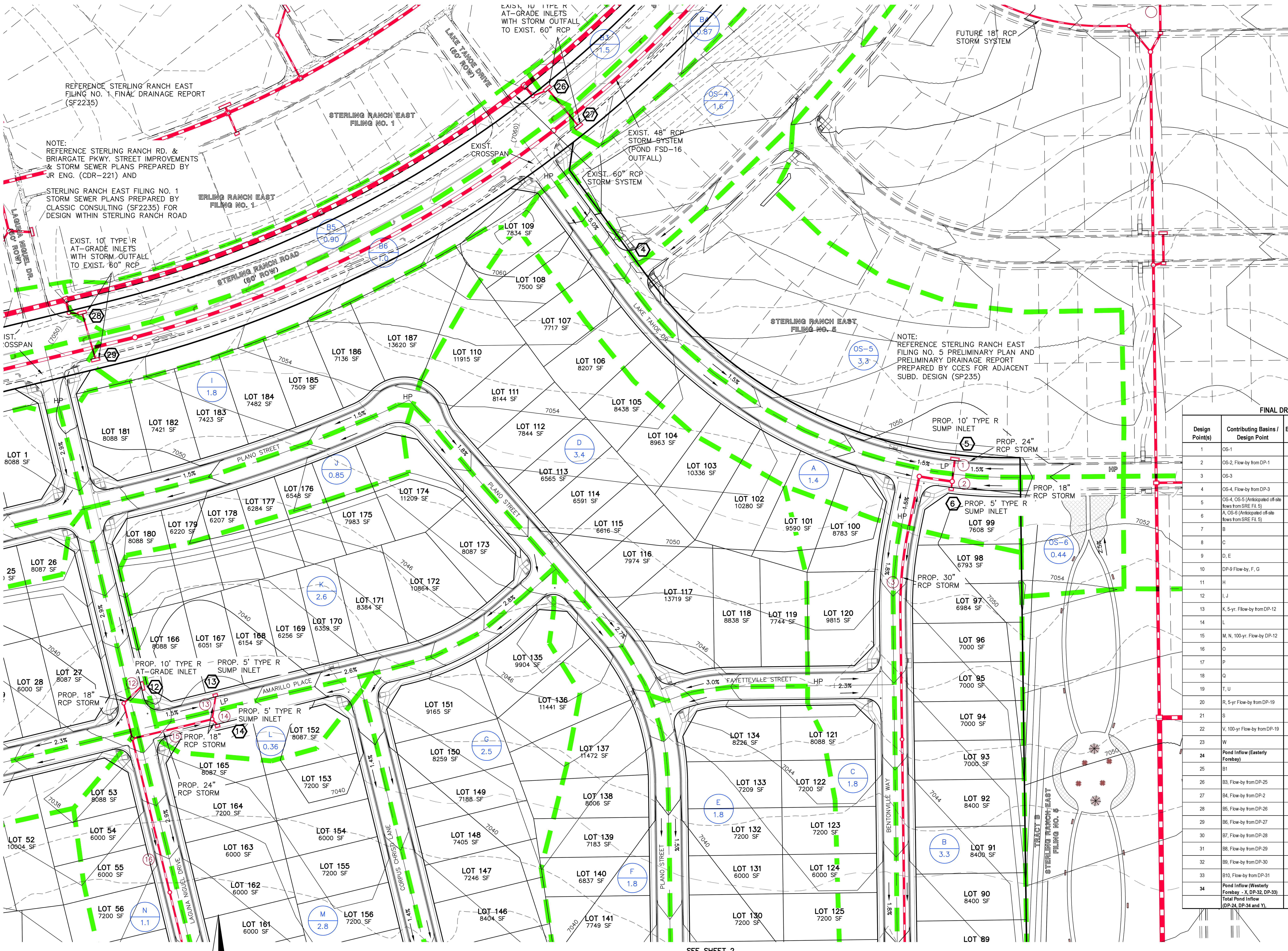
MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 3

FINAL DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY	MAW	SCALE	DATE 6/1/23
DRAWN BY	MAW	(H) 1"= 60'	SHEET 1 OF 5
CHECKED BY		(V) 1"= N/A	JOB NO. 1183.33



LEGEND

- EXISTING GROUND CONTOUR — 5910
- PROPOSED FINISHED CONTOUR — 5910
- SUBDIVISION BOUNDARY
- LOT LINE
- PROPOSED BASIN BOUNDARY
- FUTURE/OFFSITE BASIN BOUNDARY
- OVERFLOW ROUTE
- DIRECTION OF DRAINAGE
- EXISTING STORM SEWER
- EXISTING STORM INLET
- PROPOSED STORM SEWER
- PROPOSED STORM INLET
- BASIN IDENTIFIER / AREA IN ACRES — D 1.41
- DESIGN POINT — 2
- PIPE RUN — 2

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins / Design Point	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Facility/ Inlet Size*
1	OS-1	1.76	2.02	14.0	3.62	6.08	6	12	Exist. 15' Type R At-grade Inlet
2	OS-2, Flow-by from DP-1	0.35	0.72	16.6	3.37	5.65	1	4	Exist. Crosspan
3	OS-3	1.39	2.02	20.2	3.07	5.16	4	10	Future 10' Type R At-grade Inlet
4	OS-4, Flow-by from DP-3	0.61	1.46	21.2	3.00	5.03	2	7	Prop. 6' Crosspan
5	OS-4, OS-5 (Anticicpated off-site flows from SRE Fil. 5)	1.85	3.26	22.2	2.93	4.92	5	16	Prop. 10' Type R Sump Inlet
6	A, OS-6 (Anticicpated off-site flows from SRE Fil. 5)	0.63	0.97	13.4	3.70	6.20	2	6	Prop. 5' Type R Sump Inlet
7	B	1.24	1.80	18.6	3.20	5.37	4	10	Prop. 10' Type R Sump Inlet
8	C	0.91	1.17	17.8	3.26	5.48	3	6	Prop. 5' Type R Sump Inlet
9	D, E	1.95	2.83	18.8	3.18	5.35	6	15	Prop. 10' At-Grade Type R Inlet
10	DP-9 Flow-by, F, G	1.85	3.53	17.5	3.29	5.53	6	20	Prop. 10' Type R Sump Inlet
11	H	0.23	0.32	11.1	3.97	6.66	0.9	2.1	Prop. 5' Type R Sump Inlet
12	I, J	1.20	1.61	18.8	3.18	5.34	4	9	Prop. 10' At-Grade Type R Inlet
13	K, 5-yr. Fllow-by from DP-12	0.99	1.42	15.9	3.43	5.77	3	8	Prop. 5' Type R Sump Inlet
14	L	0.20	0.25	10.8	4.02	6.74	0.8	1.7	Prop. 5' Type R Sump Inlet
15	M, N, 100-yr. Flow-by DP-12	1.46	2.53	18.8	3.18	5.34	5	14	Prop. 10' Type R Sump Inlet
16	O	0.39	0.54	12.3	3.81	6.40	1	3	Prop. 5' Type R Sump Inlet
17	P	0.86	1.25	15.4	3.48	5.84	3	7	Prop. 5' Type R Sump Inlet
18	Q	0.30	0.42	11.3	3.94	6.62	1.2	2.8	Prop. 5' Type R Sump Inlet
19	T, U	1.85	2.45	19.1	3.16	5.31	6	13	Prop. 10' At-Grade Type R Inlet
20	R, 5-yr Flow-by from DP-19	2.05	2.30	17.4	3.30	5.54	7	13	Prop. 10' Type R Sump Inlet
21	S	0.75	1.09	16.0	3.42	5.75	3	6	Prop. 5' Type R Sump Inlet
22	V, 100-yr Flow-by from DP-19	0.34	1.55	16.1	3.41	5.73	1.2	8.9	Prop. 10' Type R Sump Inlet
23	W	0.90	1.18	12.0	3.86	6.47	3	8	Prop. 5' Type R Sump Inlet
24	**Pond Inflow (Easterly Forebay)**	**19.40**	**27.87**	**25.3**	**2.73**	**4.59**	**53**	**128**	**Prop. 54" RCP**
25	B1	1.06	1.29	9.8	4.16	6.98	4	9	Exist. 15' Type R At-grade Inlet
26	B3, Flow-by from DP-25	0.88	1.16	11.9	3.87	6.50	3	8	Exist. 10' Type R At-grade Inlet
27	B4, Flow-by from DP-2	0.83	1.34	19.7	3.11	5.22	3	7	Exist. 10' Type R At-grade Inlet
28	B5, Flow-by from DP-26	0.51	0.89	12.9	3.75	6.30	2	6	Exist. 10' Type R At-grade Inlet
29	B6, Flow-by from DP-27	0.59	0.96	20.7	3.04	5.10	2	5	Exist. 10' Type R At-grade Inlet
30	B7, Flow-by from DP-28	0.78	1.16	13.9	3.64	6.11	3	7	Exist. 10' Type R At-grade Inlet
31	B8, Flow-by from DP-29	0.65	0.90	21.7	2.97	4.98	2	4	Exist. 10' Type R At-grade Inlet
32	B9, Flow-by from DP-30	0.98	1.52	15.9	3.44	5.77	3	9	Exist. 15' Type R Sump Inlet
33	B10, Flow-by from DP-31	1.08	1.47	23.7	2.83	4.76	3	7	Exist. 15' Type R Sump Inlet
34	**Pond Inflow (Westerly Forebay - X, DP-32, DP-33)**	**6.87**	**9.06**	**16.9**	**3.34**	**5.61**	**23**	**51**	**Prop. 42" RCP**
	Total Pond Inflow (DP-24, DP-34 and Y),	**26.85**	**38.80**	**25.3**	**2.73**	**4.59**	**73**	**178**	**Pond FSD-11B**

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NO.	REVISION	DATE

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MARC A. WHORTON, COLORADO P.E. #37155 — DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200, Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 3

FINAL DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY MAW	SCALE	DATE	6/1/23
DRAWN BY MAW	(H) 1"= 60'	SHEET 2	OF 5
CHECKED BY	(V) 1"= N/A	JOB NO.	1183.33

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basin / Design Point / Pipe Run	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		Pipe Size*
					I(5)	I(100)	Q(5)	Q(100)	
1	DP-5	1.85	3.26	22.2	2.93	4.92	5	16	PROP. 24" RCP
2	DP-6	0.63	0.97	13.4	3.70	6.20	2	6	PROP. 18" RCP
3	PR-1, PR-2	2.48	4.23	23.2	2.86	4.81	7	20	PROP. 30" RCP
4	DP-7	1.24	1.80	18.6	3.20	5.37	4	10	PROP. 24" RCP
5	DP-8	0.91	1.17	17.8	3.26	5.48	3	6	PROP. 18" RCP
6	PR-3, PR-4, PR-5	4.63	7.20	23.4	2.85	4.79	13	34	PROP. 36" RCP
7	DP-9 Capture	1.72	1.64	18.8	3.18	5.35	5	9	PROP. 24" RCP
8	PR-6, PR-7	6.35	8.84	23.6	2.84	4.76	18	42	PROP. 36" RCP
9	DP-10	1.85	3.53	17.5	3.29	5.53	6	20	PROP. 30" RCP
10	DP-11	0.23	0.32	11.1	3.97	6.66	0.9	2.1	PROP. 18" RCP
11	PR-8, PR-9, PR-10	8.42	12.69	24.4	2.79	4.68	23	59	PROP. 42" RCP
12	DP-12 Capture	1.19	1.21	18.8	3.18	5.34	4	6	PROP. 18" RCP
13	DP-13	0.99	1.42	15.9	3.43	5.77	3	8	PROP. 18" RCP
14	DP-14	0.20	0.25	10.8	4.02	6.74	0.8	1.7	PROP. 18" RCP
15	PR-13, PR-14	1.19	1.66	15.9	3.43	5.77	4	10	PROP. 24" RCP
16	PR-12, PR-15	2.38	2.87	19.4	3.14	5.26	7	15	PROP. 24" RCP
17	PR-11, PR-16	10.80	15.56	24.4	2.79	4.68	30	73	PROP. 42" RCP
18	DP-15	1.46	2.53	18.8	3.18	5.34	5	14	PROP. 24" RCP
19	DP-16	0.39	0.54	12.3	3.81	6.40	1	3	PROP. 18" RCP
20	PR-17, PR-18, PR-19	12.65	18.63	24.8	2.76	4.64	35	86	PROP. 48" RCP
21	DP-17	0.86	1.25	15.4	3.48	5.84	3	7	PROP. 18" RCP
22	DP-18	0.30	0.42	11.3	3.94	6.62	1.2	2.8	PROP. 18" RCP
23	PR-20, PR-21, PR-22	13.81	20.30	25.2	2.74	4.60	38	93	PROP. 48" RCP
24	DP-19 Capture	1.56	1.44	19.1	3.16	5.31	5	8	PROP. 18" RCP
25	DP-20	2.05	2.30	17.4	3.30	5.54	7	13	PROP. 24" RCP
26	DP-21	0.75	1.09	16.0	3.42	5.75	3	6	PROP. 18" RCP
27	PR-25, PR-26	2.80	3.39	17.5	3.29	5.53	9	19	PROP. 30" RCP
28	PR-24, PR-27	4.36	4.83	19.3	3.15	5.28	14	26	PROP. 30" RCP
29	DP-22	0.34	1.55	16.1	3.41	5.73	1.2	8.9	PROP. 18" RCP
30	DP-23	0.90	1.18	12.0	3.86	6.47	3	8	PROP. 18" RCP
31	PR-26, PR-27, PR-28	5.60	7.56	19.4	3.14	5.27	18	40	PROP. 36" RCP
32	**TOTAL INFLOW POND FSD 11-B (EASTERLY FOREBAY)**	**19.40**	**27.87**	**25.3**	**2.73**	**4.59**	**53**	**128**	**PROP. 54" RCP**
33	DP-32	0.98	1.52	15.9	3.44	5.77	3	9	PROP. 18" RCP
34	DP-33, PR-33	2.06	2.98	16.9	3.34	5.61	7	17	PROP. 24" RCP
35	X (Future Elem. School Site)	4.80	6.08	9.6	4.20	7.05	20	43	PROP. 36" RCP
36	**TOTAL INFLOW POND FSD 11-B (WESTERLY FOREBAY)**	**6.87**	**9.06**	**16.9**	**3.34**	**5.61**	**23**	**51**	**PROP. 42" RCP**

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DEVELOPED DRAINAGE MAP

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DRAWN BY	MAW	(H) 1"= 60'	SHEET	3 OF 5
CHECKED BY		(V) 1"= N/A	JOB NO.	1183.33

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NO.	REVISION	DATE

REVIEW:

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC

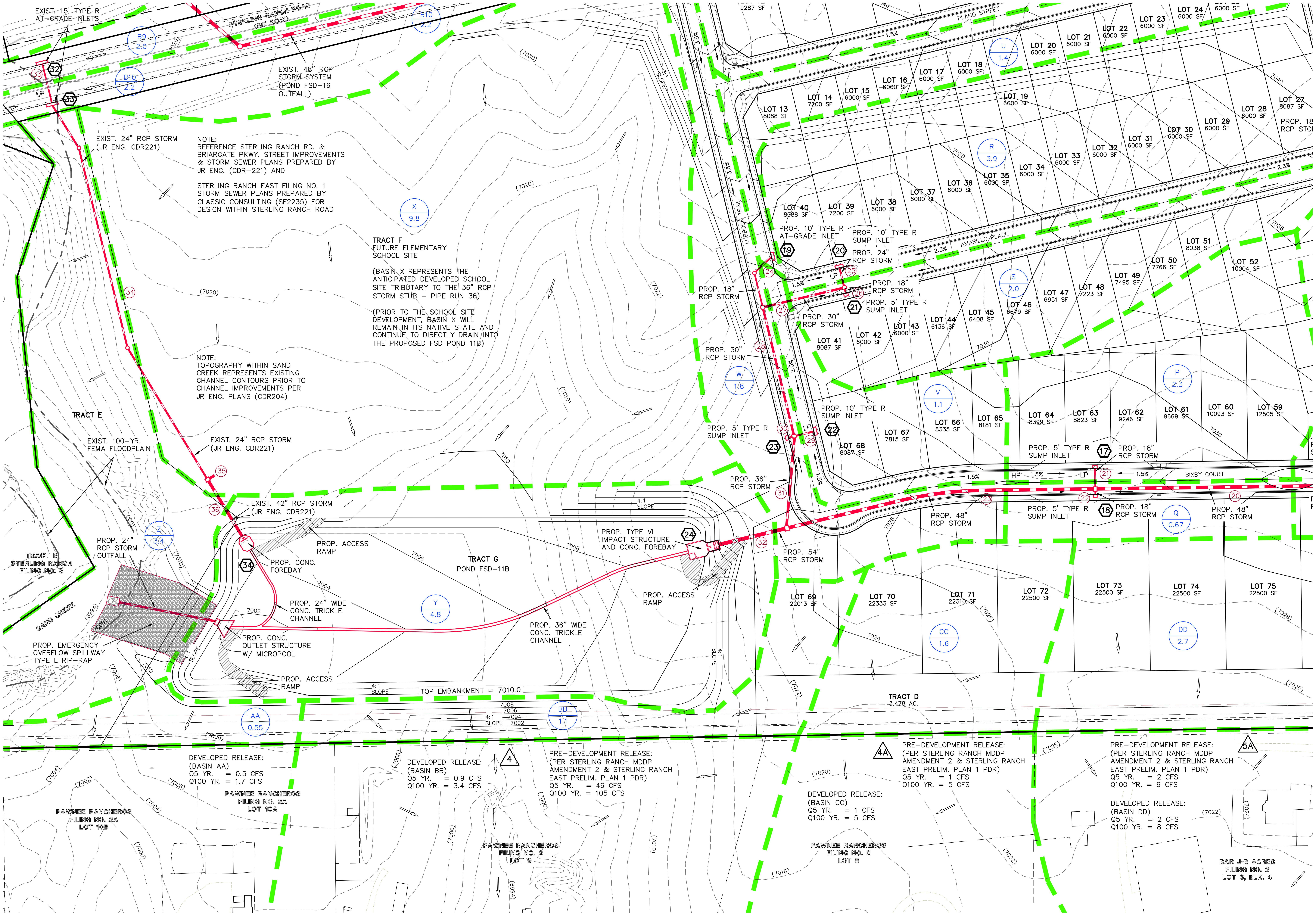
MARC A. WHORTON, COLORADO P.E. #37155 DATE

CLASSIC CONSULTING
619 N. Cascade Avenue, Suite 200
Colorado Springs, Colorado 80903
(719)785-0790
(719)785-0799(Fax)

STERLING RANCH EAST FILING NO. 3

FINAL DRAINAGE REPORT
DEVELOPED DRAINAGE MAP

DESIGNED BY	MAW	SCALE		DATE	6/1/23
DRAWN BY	MAW	(H) 1"= 60'		SHEET 4	OF 5
CHECKED BY		(V) 1"= N/A		JOB NO.	1183.33



LEGEND

EXISTING GROUND CONTOUR	5910
PROPOSED FINISHED CONTOUR	5910
SUBDIVISION BOUNDARY	
LOT LINE	
PROPOSED BASIN BOUNDARY	
FUTURE/OFFSITE BASIN BOUNDARY	
OVERFLOW ROUTE	
DIRECTION OF DRAINAGE	
EXISTING STORM SEWER	
EXISTING STORM INLET	
PROPOSED STORM SEWER	
PROPOSED STORM INLET	
BASIN IDENTIFIER / AREA IN ACRES	D / 1.41
DESIGN POINT	2
PIPE RUN	2

60 30 0 60 120

SCALE: 1" = 60'

48 HOURS BEFORE YOU DIG, CALL UTILITY LOCATORS
811
UTILITY NOTIFICATION CENTER OF COLORADO
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