

**FINAL DRAINAGE REPORT**  
**For**  
**Revel at Wolf Ranch Phase IIA**  
**Revel at Wolf Ranch Filing No. 6 and 7**

**January 2021**

Prepared for:

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Project# 20-017

**FINAL DRAINAGE REPORT**  
**Revel at Wolf Ranch Phase II A**  
**Revel at Wolf Ranch Filing No. 6 and 7**  
**January 2021**

**DRAINAGE PLAN STATEMENTS**

ENGINEER'S STATEMENT

This Drainage Report and Plan for the drainage design of Revel at Wolf Ranch Filing No. 6 and 7 were prepared under my direct supervision and are correct to the best of my knowledge and belief. Said drainage report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

\_\_\_\_\_  
Kent D. Rockwell, P.E.

DEVELOPER'S STATEMENT

David D. Jenkins hereby certifies that the drainage facilities for Revel at Wolf Ranch Filing No. 6 and 7 shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to Section 7.7.906 of the City Code.; and cannot on behalf of Revel at Wolf Ranch Filing No. 6 and 7, guarantee that final drainage design review will absolve David D. Jenkins and/or his successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

\_\_\_\_\_  
Name of Developer

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Address

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7-7-906 of the code of the City of Colorado Springs, 2001, as amended.

\_\_\_\_\_  
CITY ENGINEER

\_\_\_\_\_  
DATE

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**FINAL DRAINAGE REPORT**  
**For**  
**Revel at Wolf Ranch Phase II A**  
**Revel at Wolf Ranch Filing No. 6 and 7**  
**January 2021**

**PURPOSE**

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for the proposed Revel at Wolf Ranch Filing No. 6 and 7. The Revel at Wolf Ranch Filing No. 6 Development consists of 55 proposed single family residential lots on 16.638 acres and Revel at Wolf Ranch Filing No. 7 consists of 48 proposed single family residential lots on 15.317 acres. The two filings are located directly west of Black Forest Road approximately 2,800 feet north of the existing Black Forest Road and Research Parkway intersection. (See Figure 1-Vicinity Map).

**SUMMARY OF DATA**

The sources of information used in the development of this study are listed below:

1. City of Colorado Spring "Drainage Criteria Manual", May 2014.
2. Soil Survey for El Paso County, Colorado, U.S. Department of Agriculture, Soil Conservation Service, June 1980.
3. "Flood Insurance Studies for Colorado Springs and El Paso County, Colorado", prepared by the Federal Emergency Management Agency (FEMA), 2018.
4. "Cottonwood Creek Drainage Basin Planning Study" by Ayers and Associates, 1996.
5. "Cottonwood Creek Prudent Line Study" by Ayres & Associates, 1996.
6. "Master Development Drainage Plan for Wolf Ranch, Colorado Springs, Colorado," prepared by Kiowa Engineering, June, 2018.
7. "Final Drainage Report for Wolf Ranch East Filing No. 1, 2, 3, 4 and 5", prepared by Rockwell Consulting, Inc., dated February, 2018.
8. "Design Report – Detention Basin F14-Wolf Ranch Development, Addendum to Wolf Ranch Master Development Drainage Plan Update, Colorado Springs, Colorado, by Kiowa Engineering, April, 2020, (approval pending).
9. "Addendum for Filing 1, 2 & 3 to the Final Drainage Report for Wolf Ranch East Filing No. 1, 2, 3, 4 and 5", prepared by JR Engineering, LLC, dated August, 2018.

## **GENERAL LOCATION AND DESCRIPTION**

The Revel at Wolf Ranch Filings No. 6 and 7 developments are located within the northeastern portion of the City of Colorado Springs, El Paso County, Colorado. (see Vicinity Map - Figure 1). The site is within a portion of the North Half of Section 31, Township 12 South, Range 65 West of the 6th P.M. The site is bound on the west by future Revel at Wolf Ranch Filings 8 and 9 and Wolf Valley Drive, on the south by Enclave at Wolf Ranch Filing No. 1 and Wolf Ranch East Filing No. 5, on the east by Black Forest Road and on the north by vacant land within the overall Wolf Ranch Development.

Well-established native grasses exist throughout the proposed development. The topography generally slopes from northeast to southwest. An existing natural drainage way is located directly west of Revel at Wolf Ranch Filing No. 7. This development is not located within the streamside overlay area.

## **SOILS**

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils underlying the Revel at Wolf Ranch Filings No. 6 and 7 development fall under the Pring (course sandy loam), Series (Soil Type 71) The soils are classified as a Hydrologic Group "B" soil. (See Figure 2).

## **CLIMATE**

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

## **FLOODPLAIN STATEMENT**

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) #08041C0529G dated December 7, 2018, no portion of the Elan at Wolf Ranch Filing No. 1 developments lie within a designated 100-year floodplain.

## **DRAINAGE CRITERIA**

The current City of Colorado Springs/El Paso County Drainage Criteria was utilized in this report. Peak runoff quantities were determined using the Rational Method for both the 5 year and 100 year storms, as required for drainage basins less than 130 acres. Hydraulic Grade Line (HGL) calculations will be provided in conjunction with Section 7.0 of the City of Colorado Springs Drainage Criteria Manual, Volume 1. The HGL calculations will be submitted with the construction documents and the HGL's for the 5 year and 100 year storms will be depicted on the storm sewer construction documents.

## **FOUR STEP PROCESS TO MINIMIZE ADVERSE IMPACTS OF URBANIZATION**

**Step 1:** Runoff from the Revel at Wolf Ranch Filings 6 and 7 development is conveyed to existing Pond F28. Pond F28 is located along the north side of Research Parkway approximately 1,500 feet south of the proposed Revel at Wolf Ranch Filings 6 and 7 Development. Throughout this development roof drains will be directed into landscaped areas and yards wherever possible. The Impervious Reduction Factor (IRF) spreadsheet is included in the Appendix of this report. An additional water quality area will be provided just upstream of existing Pond F28.

**Step 2:** The runoff collected from this filing will be captured within inlets and conveyed to an additional water quality area just upstream of existing Pond F28 via proposed storm sewer systems and within streets. An energy dissipater will be installed at the downstream end of the proposed 54" RCP as it discharges into the additional water quality area. The additional water quality area will be graded at a relatively flat slope to minimize velocities and erosion.

**Step 3:** The Pond F28 existing outfall storm system discharge across Research Parkway to the south and then directly to Tributary 4 of Cottonwood Creek. Existing downstream drop structures have been constructed along Cottonwood Creek south of Research Parkway providing a stable downstream Cottonwood Creek. The release rates from Pond F28 are consistent with the Wolf Ranch Master Development Drainage Plan and the Cottonwood Creek Drainage Basin Planning Study.

**Step 4:** Site specific BMP's will be utilized during construction and up to stabilization of the site to minimize off-site contaminants and to protect the downstream receiving waters.

## **WATER QUALITY**

Water quality capture volume is being provided in Pond F-28 located south of the proposed development. Pond F-28 an existing pond, previously approved by the City of Colorado Springs. The proposed land use densities being proposed now are consistent with those anticipated when Pond F-28 was designed and constructed.

## **HISTORIC DRAINAGE BASIN DESCRIPTIONS**

A brief description of historic drainage basin for the site is provided in this section of the report. A summary of peak historic runoff for the basins is depicted on the Historic Drainage Plan (Exhibit 1). The historic drainage patterns and runoff rates are described by 6 historic drainage basins.

Historic Basin A comprises approximately 2.09 acres along the west side Black Forest Road at the southern end of Revel at Wolf Ranch Filing No. 6. Runoff rates of 0.5 cubic feet per second (cfs) and 4.0 cfs are generated from this basin during the 5 and 100 year storms, respectively. These flows sheet flows from northeast to southwest into Wolf Ranch East Filing No. 5.

The 3.70 acre Historic Basin B, located just north of Historic Basin A, generates additional flows of 0.9 cfs during the 5 year storm and 6.5 cfs during the 100 year storm. These flows currently sheet flows into the Enclave III at Wolf Ranch development.

Historic Basin C is located along Black Forest Road comprising 34.02 acres. Runoff rates of 4.2 cfs and 30.5 cfs during the 5 and 100 year storms, respectively, generated from this basin, flow from northeast to southwest as sheet flows toward the proposed Enclave III at Wolf Ranch development.

Historic Basin D comprises 39.08 acres generating runoff rates of 4.3 cfs generated during the 5 year storm and 31.3 cfs during the 100 year storm. These flows historically reach an existing natural swale that drains to the south eventually crossing under proposed Wolf Valley Drive at the south end of Basin D.

Runoff rates of  $Q_5 = 1.8$  cfs and  $Q_{100} = 13.2$  cfs are generated from the 12.41 acre Historic Basin E. These flows are also directed to the existing natural drainage way and cross under the future extension of Wolf Valley Drive.

Basin F comprises 23.63 just east of the natural drainage way. This 23.63 acre basin generates runoff rates of 2.6 cfs during the 5 year storm and 18.9 cfs during the 100 year storm. These flows reach a secondary natural drainage way combining with flows from Basins C, D, and E at a convergence just north of Revel at Wolf Ranch Filing No. 6.

Flows from Historic Basins C through F reach Historic Design Point #H-1. Total historic flow rates of  $Q_5 = 11.9$  cfs and  $Q_{100} = 87.2$  cfs reach this point from Historic Basins C through F.

### **DEVELOPED DRAINAGE BASIN**

A brief description of developed drainage basins for the site is provided in this section of the report. A summary of peak developed runoff for the developed basins is depicted on the Developed Drainage Plan (Exhibit 2) provided in the appendix. The proposed drainage facilities sizes presented in this report may possibly vary slightly once more detailed final construction documents are prepared. The proposed facility sizes may vary with final construction documents. An addendum to this report with final Hydraulic Grade Line (HGL) calculations will be provided with the individual storm sewer construction documents.

Within the single-family residential development, side lot line swales will be created on the downstream lots to convey flows from the upstream lots and into the street. Swales will be constructed by the homebuilders and maintained by the homeowner to limit concentrated flows and to disperse the flows as much as possible. Individual lot drainage is the responsibility of the lot owner/builder.

The area directly north of Revel at Wolf Ranch Filing No. 6 and 7 consists of vacant land that will be development mainly as single family residential lots. Future Briargate Parkway is located approximately 1,500 feet north of Filings 6 and 7. Future Pond F14 is located just north of Briargate Parkway with anticipated release rates of 5 cfs during the 5 year storm and 80 cfs during the 100 year storm.

Offsite Basin OS-1, located along the west side of Black Forest Road, comprises approximately 13.27 acres of future single family residential lots. It is anticipated this area will drain to the Warrick Street and Forestgate Drive intersection. Anticipated flows reaching this south end of Basin OS-2 are 22.1 cfs during the 5 year storm and 45.4 cfs during the 100 year storm. A proposed 36" RCP will be installed within Warrick Street just north of Forestgate Road to convey these future flows through Filing 6.

Basin OS-2 is located just northeast of the Warrick Street and Forestgate Drive intersection comprising 1.16 acres of future single family residential lots. The runoff rates of 3.7 cfs during the 5 year storm and 7.2 cfs during the 100 year storm generated from this basin approach a proposed public 15' on-grade Type R inlet. It is anticipated flow rates of 3.0 cfs and 7.0 cfs will enter this basin from upstream future development as street flows during the 5 and 100 year storms, respectively. The proposed 15' inlet collects 6.7 cfs during the 5 year storm and 11.5 cfs during the 100 year storm. Flows of 2.7 cfs will bypass this inlet during the 100 year storm and enter Basin 2 as street flows. A proposed 18" RCP will convey the collected flows from this inlet to the 36" storm sewer pipe within Warrick Street.

Basin OS-3 comprises approximately 1.00 acres just northwest of the Black Forest Road and Forestgate Drive intersection. Flow rates of 1.6 cfs during the 5 year storm and 4.0 cfs during the 100 year storm will flow southerly along the west side of Black Forest Road and enter Basin 1A.

Runoff from offsite Basins OS-1 and OS-2 reach Design Point #1 as pipe flows. Total flow rates of 25.7 cfs during the 5 year storm and 52.7 cfs during the 100 year storm will be conveyed southerly within a proposed 36" RCP.

Future Pond F-14 is located just upstream of Briargate Parkway and is tributary to Basin OS-5. The proposed release rates from Pond F-14 are flow rates of  $Q_5 = 5.0$  cfs and  $Q_{100} = 80.0$  cfs will be released into this drainage way from future Pond F-14. A future proposed public 36" RCP will convey the flows from Pond F-14.

Basin OS-4 consisting of approximately 17.43 acres of future open space and single family residential development tributary to the existing natural drainage way located north and west of Revel at Wolf Ranch Filings 6 and 7. This area is anticipated to generate flow rates of 20.2 cfs during the 5 year storm and 51.4 cfs during the 100 year storm.. It is anticipated these flows will enter Basin OS-5 in the future at the south end of Basin OS-5

Basin OS-5 comprises the natural drainage way and some adjacent single family residential development. It is anticipated runoff rates of 5.3 cfs and 18.0 cfs will be generated from this area in the future. These flows will combine with flows generated from Basin OS-4 and the flows being released from Pond F-14. Total flow of  $Q_5 = 27.3$  cfs and  $Q_{100} = 140.1$  cfs are anticipated to reach Design Point #OS-1 from these 3 sources of runoff. These flows will be conveyed to the northerly side of Revel at Wolf Ranch Filing No. 6 within a proposed 42" RCP.

Basin 1A is located just northwest of Black Forest Road and Forestgate Drive intersection. This 0.67 acre basin generates runoff rates of  $Q_5 = 1.1$  cfs and  $Q_{100} = 2.5$  cfs which reach a proposed public 10' sump Type R inlet along the north side of Forestgate Drive. The flows collected at this inlet, including the flows generated from Basin OS-1, will be conveyed southwesterly within a proposed public 18" RCP.

Basin 1B is located at the southwest corner of Black Forest Road and Forestgate Drive. Runoff rates of 0.4 cfs during the 5 year storm and 0.9 cfs during the 100 year storm are generated from this basin. A proposed public 10' sump Type R inlet will collect these flows. A proposed public 18" RCP will convey these collected flows from this inlet to Design Point #2. Total flow rates of  $Q_5 = 2.8$  cfs and  $Q_{100} = 6.8$  cfs reach Design Point #2 from Basins OS-1, 1A and 1B. These flows are piped westerly within a proposed 18" RCP.

The combined flows from Design Point #1 and #2 reach Design Point #3 where total pipe flows of 28.1 cfs and 58.4 cfs are piped southerly within a proposed 36" RCP.

Basin 2 comprises 2.01 acres at east of Warrick Street and Forestgate Drive intersection. Runoff rates of  $Q_5 = 4.0$  cfs and  $Q_{100} = 9.1$  cfs are generated from this basin. Including bypass flows of  $Q_{100} = 2.7$  cfs from the north, total runoff rates of 4.0 cfs and 11.8 cfs will reach a proposed on-grade public 15' Type R inlet at the south end of Basin 2. This inlet will collect runoff rates of 4.0 cfs during the 5 year storm and 10.3 cfs during the 100 year storm. During the 100 year storm, flows of 1.5 cfs will bypass this inlet and enter Basin 5 as street flows. A proposed 18" will convey the collected flows from this inlet to the proposed 36" RCP within Warrick Street.

The 3.09 acre Basin 3, located along the west side of Warrick Street generates additional flows of 5.9 cfs during the 5 year storm and 13.3 cfs during the 100 year storm. These flows approach a proposed 15' on-grade public Type R inlet along the west side of Warrick. It is anticipated runoff rates of 1.0 and 2.0 cfs will enter this basin from the north from the future developments to the north. This inlet collects runoff rates of 6.9 cfs during the 5 year storm and 12.0 cfs during the 100 year storm. Bypass flows of 3.3 cfs will enter Basin 4 during the 100 year storm.

Total flow rates of  $Q_5 = 35.4$  cfs and  $Q_{100} = 75.1$  cfs generated from Basins OS-1, OS-2, OS-3, 1A, 1B, 2 and 3 reach Design Point #4 as pipe flows. A proposed 36" RCP will convey these flows southeasterly.

Runoff rates of 5.5 cfs during the 5 year storm and 11.4 cfs during the 100 year storm are generated from the 2.55 acre Basin 4 located along the west side of Warrick Street. Including bypass flows from Basin 3, total street flows of 5.5 cfs and 14.7 cfs reach the south end of Basin 4 where a proposed 15' on-grade public Type R inlet will be installed. This inlet will collect flows of 5.5 cfs during the 5 year storm and 11.7 cfs during the 100 year storm. During the 100 year storm, flows of 3.0 cfs will enter Basin 8 as street flows.

Basin 5, located along the east side of Warrick Street, comprises 2.82 acres and generates runoff rates of 6.1 cfs during the 5 year storm and 12.6 cfs during the 100 year storm. Including the bypass flow of 1.5 cfs entering this basin from Basin 2 during the 100 year storm results in total street flows of  $Q_5 = 6.1$  cfs and  $Q_{100} = 14.1$  cfs reaching the south end of Basin 5. A proposed public on-grade 15' Type R inlet to be constructed at the south end of this basin will collect runoff rates of 6.1 cfs and 11.5 cfs during the 5 and 100 year storms, respectively. A runoff rate of 2.6 cfs will bypass this inlet during the 100 year storm and enter Basin 7 as street flows.

Total runoff rates of 44.4 cfs and 93.9 cfs during the 5 and 100 year storms, respectively, reach Design Point #5.

Basin 6 consists of 1.92 acres along the west side of Black Forest Road just south of Forestgate Drive consisting of the rear yards of the single family residential lots and open space. Runoff rates of 3.8 cfs and 8.7 cfs are generated from this basin during the 5 and 100 year storms, respectively. These flows reach a proposed public CDOT Type C area inlet. A proposed 18" RCP will convey these flows southerly to a proposed pipe conveying flows from the east side of Black Forest Road.

Offsite Basin F41 is located along the east side of Black Forest Road. Per the Wolf Ranch MDDP, historic flow rates of 13.0 cfs during the 5 year storm and 69.0 cfs during the 100 year storm are generated from this off-site area historically. An existing 24" CMP located under Black Forest Road conveys these flows into Revel at Wolf Ranch Filing No. 6. It is understood with any revised development of this area, detention will be required limiting flows entering Basin 6 to historic flow rates.

Runoff rates of 13.4 cfs during the 5 year storm and 87.0 cfs during the 100 year storm reach Design Point #6 from Basin 6 and offsite Basin F41. A proposed 36" RCP will be constructed at this location to convey the historic flows generated from Basin F41 and developed flows from Basin 6 to the west.

The runoff rates from DP#5 and DP#6 are conveyed to DP#7. The combined flow rates at this point are 47.8 cfs during the 5 year storm and 157.5 during the 100 year storm. A proposed 42" RCP will convey these flows southerly within Warrick Street.

Basin 7 comprises an additional 3.29 acres along the north side of Bugaboo Drive and generates runoff rates of 6.8 cfs and 14.3 cfs during the 5 and 100 year storms, respectively. These flows continue westerly in Bugaboo to Warrick Street as street flows. These flows along with the bypass flows from Basin 5 reach a proposed public on-grade 15' Type R inlet along the east side of Warrick Street just south of Bugaboo Drive.

This inlet collects runoff rates of 6.8 cfs and 12.7 cfs during the 5 and 100 year storms, respectively. During the 100 year storm, 4.2 cfs will bypass this inlet and enter Basin 10 as street flows.

A proposed 18" RCP will convey the collected flows from the inlet within Basin 7 to the proposed 42" RCP in Warrick Street.

Basin 8 consists of 3.21 acres along the westerly side of Warrick Street. This basin generates runoff rates of 5.0 cfs during the 5 year storm and 12.0 cfs during the 100 year storm. These flows along with the bypass flows from Basin 4 continue southwesterly as street flows, approaching a proposed 15' on-grade Type R inlet at the south end of Basin 8. This inlet will collect runoff rates of 5.0 cfs during the 5 year storm and 11.9 cfs during the 100 year storm. A flow rate of 3.1 cfs will bypass this inlet and enter Basin 9 during the 100 year storm. A proposed 18" RCP will convey these flows to the proposed 42" RCP in Warrick Street.

Total runoff rates of 55.5 cfs during the 5 year storm and 174.4 cfs during the 100 year storm reach Design Point #8. These flows will be piped southerly within a proposed 42" RCP within Warrick Street.

Basin 9 is located at the southwest corner of Bugaboo Drive and Warrick Street comprising 2.16 acres. Runoff rates of  $Q_5 = 4.5$  cfs and  $Q_{100} = 9.6$  cfs are generated from this basin. These flows reach a proposed public 15' sump Type R inlet within the Warrick Street cul-de-sac. Including the bypass flows from Basin 8, total runoff rates of 4.5 cfs and 12.7 cfs will approach this inlet from Basin 9.

Additional flows generated from Basin 10 will reach this same 15' public sump Type R inlet. The 1.50 acre Basin 10 is located along the east side of Warrick Street. Runoff rates of 3.6 cfs and 7.2 cfs are generated from this basin during the 5 and 100 year storms, respectively. Including the bypass flows from Basin 7, total street flows of 3.6 cfs and 11.3 cfs reach the proposed 15' sump from Basin 10. This inlet collects total runoff rates of 8.1 cfs during the 5 year storm and 24.1 cfs during the 100 year storm.

The total flows reaching Design Point #9 are 59.4 cfs during the 5 year storm and 181.2 cfs during the 100 year storm. These flows will be piped southwesterly within a proposed 42" RCP.

Basin 11 consists of 5.18 acres, including the adjacent Elan III at Wolf Ranch residential lots to the south. This basin consists of rear yards of several single family lots along the southerly portion of Filing No. 6 and the proposed lots within the Enclave III development. Runoff rates of 8.6 cfs and 18.9 cfs generated from this basin sheet flows into the Enclave III at Wolf Ranch development. Similar flows ( $Q_5 = 8.7$  cfs and  $Q_{100} = 19.1$  cfs) were anticipated in the Enclave III at Wolf Ranch Final Drainage Report for a similar area. These flows are collected within existing inlets within the Enclave III at Wolf Ranch development.

Likewise, Basin 12 comprises 1.20 acres rear lots along the east side of Enclave III at Wolf Ranch. Runoff rates of 2.7 cfs and 5.8 cfs are generated from this basin during the 5 and 100 year storms, respectively. These flows sheet flow into the Enclave III development as well and were also anticipated in the Enclave at Wolf Ranch development. These flows are collected within existing inlets within the Enclave III at Wolf Ranch development.

Basin 13 is located along the east side of Bugaboo Drive, west of Black Forest Road. This 2.20 acre basin generates runoff rates of 3.7 cfs during the 5 year storm and 8.0 cfs during the 100 year storm. These flows approach a proposed public 15' on-grade Type R inlet. This inlet collects runoff rates of 3.7 cfs during the 5 year storm and 7.8 cfs during the 100 year storm. During the 100 year storm, 0.2 cfs will bypass this inlet and enter Basin 14 as street flows. A proposed 18" RCP will convey these flows southerly within Bugaboo Drive.

Basin 14 consists of 1.17 acres also along the east side of Bugaboo Drive generating runoff rates of 2.2 cfs during the 5 year storm and 4.9 cfs during the 100 year storm. Including the bypass flows from Basin 13, total street flows of  $Q_5 = 2.2$  cfs and  $Q_{100} = 5.1$  cfs reach the south end of Basin 14. A proposed 5' public on-grade Type R inlet will collect flow rates of 1.9 cfs during the 5 year storm and 2.9 cfs during the 100 year storm. Bypass flows of  $Q_5 = 0.3$  cfs and  $Q_{100} = 2.2$  cfs enter Revel at Wolf Ranch Filing No. 5 as street flows. These flows were anticipated in the Wolf Ranch East Filing No. 5 drainage report.

Basin 15 is located along the west side of Bugaboo Drive and consist of 1.0 acres. Runoff rates of  $Q_5 = 2.6$  cfs and  $Q_{100} = 5.1$  cfs are generated from the basin which flow southerly as street flows within the west side of Bugaboo Drive. A proposed 5' on-grade public Type R inlet will collect runoff rates of 2.0 cfs during the 5 year storm and 2.9 cfs during the 100 year storm. The bypass flows of  $Q_5 = 0.6$  cfs and  $Q_{100} = 2.2$  cfs will enter Wolf Ranch East Filing No. 5 as street flows. The total collected flow rates of 7.6 cfs during the 5 year storm and 13.6 cfs during the 100 year storm will be conveyed southerly within an 18" RCP at Design Point #10. Of the flow rates of  $Q_5 = 7.6$  cfs and  $Q_{100} = 16.0$  cfs reaching Design Point #10, flows of 7.6 fs and 13.6 cfs will be piped and the remaining flow rate of 2.4 cfs will enter Wolf Ranch East Filing No. 5 as street flows.

Basin 16 consists of a 0.27 acre area of residential lots along the east side of Bugaboo that surface drains into Revel at Wolf Ranch Filing No. 5 generating runoff rates of 0.4 cfs during the 5 year storm and 1.0 cfs during the 100 year storm. These flows were anticipated in the Wolf Ranch East Filing No. 5 drainage report.

Basin 17 also consists of an additional 0.13 acres of single family lots along the west side of Bugaboo that generates runoff rates of  $Q_5 = 0.2$  cfs and  $Q_{100} = 0.5$  cfs. These flows also enter future Wolf Ranch East Filing No. 5 as sheet flows.

Basin 18 consists of 0.86 acres along the west side of Black Forest Road. Runoff rates 1.0 cfs and 2.7 cfs are generated from this basin during the 5 and 100 year storms, respectively. These flows were anticipated in the Wolf Ranch East Filing No. 5 drainage report.

Basin 19A is located just north of Forsestgate Drive within the natural drainage way. Runoff rates of 1.8 cfs and 9.2 cfs are generated from this 3.99 acre basin during the 5 and 100 year storms, respectively. These flows reach the north side of Forestgate Drive. A proposed 10' public sump Type R inlet to be constructed along the north side of Forestgate Drive will collect these flows.

Basin 19B consists of 0.43 acres along the south side of Forestgate Drive generating runoff rates of 1.0 cfs and 2.1 cfs during the 5 and 100 year storm respectively. A proposed pubic 10' sump Type R inlet will collect these flows along the south side of Forestgate Drive.

Total flow reates of 29.1 cfs during the 5 year storm and 147.4 cfs during the 100 year storm reach Design Point #11. A proposed public 42" pipe will convey these flows southerly.

Basin 20 comprises the open space and rear yards of the adjacent lots. This 3.05 acre basin generates runoff rates of 2.7 cfs and 8.3 cfs during the 5 and 100 year storms, respectively. This flows continue southerly as channel flows within the open space. A proposed 18" RCP will be constructed under the proposed sidewalk to convey the localized flows from Basin 20. This open space area will have a proposed channel section to convey any overflows from upstream areas.

Design Point #12 is located at the downstream end of Basin 20 where flows rates of  $Q_5 = 31.0$  cfs and  $Q_{100} = 152.6$  cfs will be conveyed southerly within a proposed public 42" RCP.

Basin 21 consists of an additional 5.30 of rear yards and open space generating runoff rates of 4.4 cfs during the 5 year storm and 13.6 cfs during the 100 year storm. Total flow rates of 34.4 cfs and 162.4 cfs will reach Design Pont #13 during the 5 and 100 year storms, respectively.

A proposed CDOT Type C area inlet will be constructed at the south end of Basin 28 to collect the localized flows reaching that point from Basins 27 and 28. This inlet will collect flow rates of  $Q_5 = 7.1$  cfs and  $Q_{100} = 21.9$  cfs.

**DRAINAGE, BRIDGE AND POND FEES**

The Revel at Wolf Ranch Filing No. 6 and 7 developments are within the Cottonwood Creek Drainage Basin. The area within Wolf Ranch is now a closed basin. Only the current Cottonwood Creek Drainage Basin Bridge Fee and the Surcharge Fee is now being paid for the Wolf Ranch Developments. The 2021 Drainage and Bridge are listed below.

Revel at Wolf Ranch Filing No. 6 Drainage Fee

	Area	\$/Acre	Total Fee
Cash Portion(Surcharge)	16.638	\$ 778.00	\$ 12,944.36
BRIDGE FEES	16.638	\$1,216.00	<u>\$ 20,231.81</u>
			<u>\$ 33,176.17</u>

Revel at Wolf Ranch Filing No. 7 Drainage Fee

	Area	\$/Acre	Total Fee
Cash Portion(Surcharge)	15.317	\$ 778.00	\$ 11,916.63
BRIDGE FEES	15.317	\$1,216.00	<u>\$ 18,625.47</u>
			<u>\$ 30,542.10</u>

## DRAINAGE FACILTIES

The following drainage facilities will be required for Revel at Wolf Ranch Filings 6 and 7. Drainage facilities within this development is part of the overall Wolf Ranch Drainage system presented in the Wolf Ranch Master Development Drainage Plan. The Wolf Ranch Development is now considered at closed basin, therefore, none of these drainage facilities are reimbursable items.

### Revel at Wolf Ranch Filing No. 6 - (Public-Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
42" RCP	25	L.F.	\$ 175.00	\$ 4,375.00
36" RCP	1,556	L.F.	\$ 120.00	\$ 186,720.00
24" RCP	0	L.F.	\$ 95.00	\$ 0.00
18" RCP	738	L.F.	\$ 70.00	\$ 51,660.00
Type I Manhole	8	Ea.	\$ 9,000.00	\$ 72,000.00
Type II Manholes	2	Ea.	\$ 4,000.00	\$ 8,000.00
15' Type R Inlet	3	Ea.	\$ 0,000.00	\$ 30,000.00
10' Type R Inlet	2	Ea.	\$ 8,000.00	\$ 16,000.00
5' Type R Inlet	2	Ea.	\$ 6,000.00	\$ 6,000.00
10% Eng. and Contingency			Sub-Total	\$ 374,755.00
				<u>\$ 37,475.50</u>
			Grand Total	\$412,230.50

### Revel at Wolf Ranch Filing No. 7 - (Public-Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
42" RCP	978	L.F.	\$ 175.00	\$ 171,150.00
36" RCP	0	L.F.	\$ 120.00	\$ 0.00
24" RCP	0	L.F.	\$ 95.00	\$ 0.00
18" RCP	67	L.F.	\$ 70.00	\$ 4,690.00
Type C Inlet	1	Ea.	\$ 10,000.00	\$ 10,000.00
Type I Manhole	2	Ea.	\$ 9,000.00	\$ 18,000.00
Type II Manhole	0	Ea.	\$ 4,000.00	\$ 0.00
15' Type R Inlet	3	Ea.	\$ 10,000.00	\$ 30,000.00
10' Type R Inlet	0	Ea.	\$ 8,000.00	\$ 0.00
			Sub-Total	\$ 233,840.00
10% Eng. and Contingency				<u>\$ 23,384.00</u>
			Grand Total	\$257,224.00

## **FUTURE CONSTRUCTION DOCUMENTS, HYDRAULIC GRADE LINES (HGL) AND FUTURE VARIANCE**

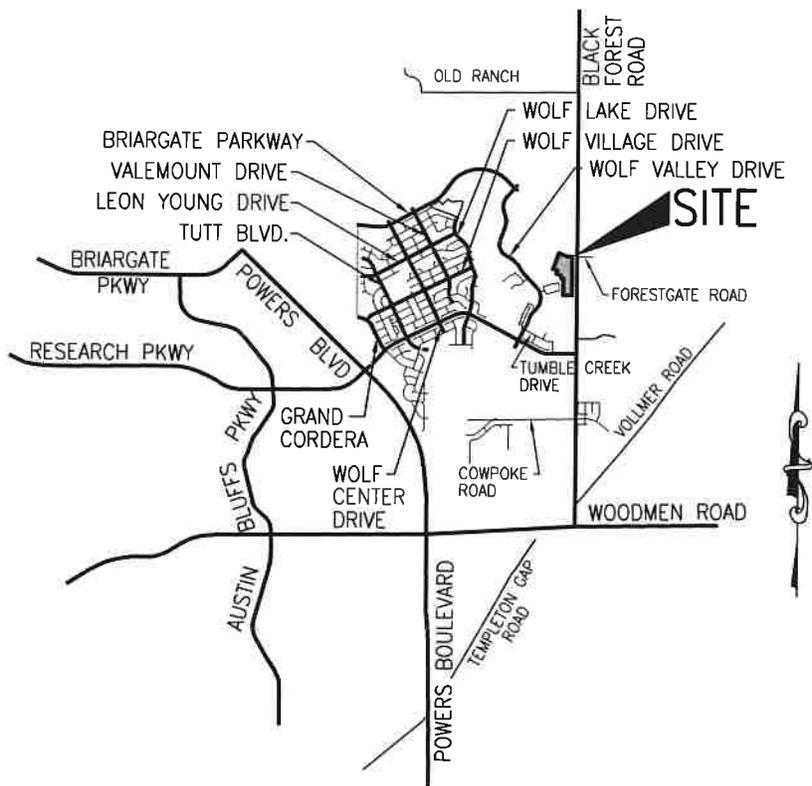
At this time, pipe velocities are provided based only on Manning's Equation. A table listing the velocities of each pipe segment is provided in the Appendix of this report.

Once more detailed Construction Documents for the proposed storm sewers are prepared for this development, hydraulic grade line (hgl) calculations will be provided as an addendum to this report. A variance will also be submitted with the addendum for those items requiring a variance.

### **SUMMARY**

Runoff generated from The Revel at Wolf Ranch Filing No. 6 and 7 will be collected within streets, inlets and drainage pipes and conveyed to the Pond F28 Detention Basin. The conveyance of these flows to Pond F28 is consistent with the overall Wolf Ranch Master Plan and Master Development Drainage Plan and with the Cottonwood Creek Drainage Basin Planning Study. The development of these subdivisions will not adversely affect the downstream and surrounding developments if these facilities are properly installed and properly maintained.

## APPENDIX



# Vicinity Map

NOT TO SCALE

**FIGURE 1**

JOB NO. 21-002

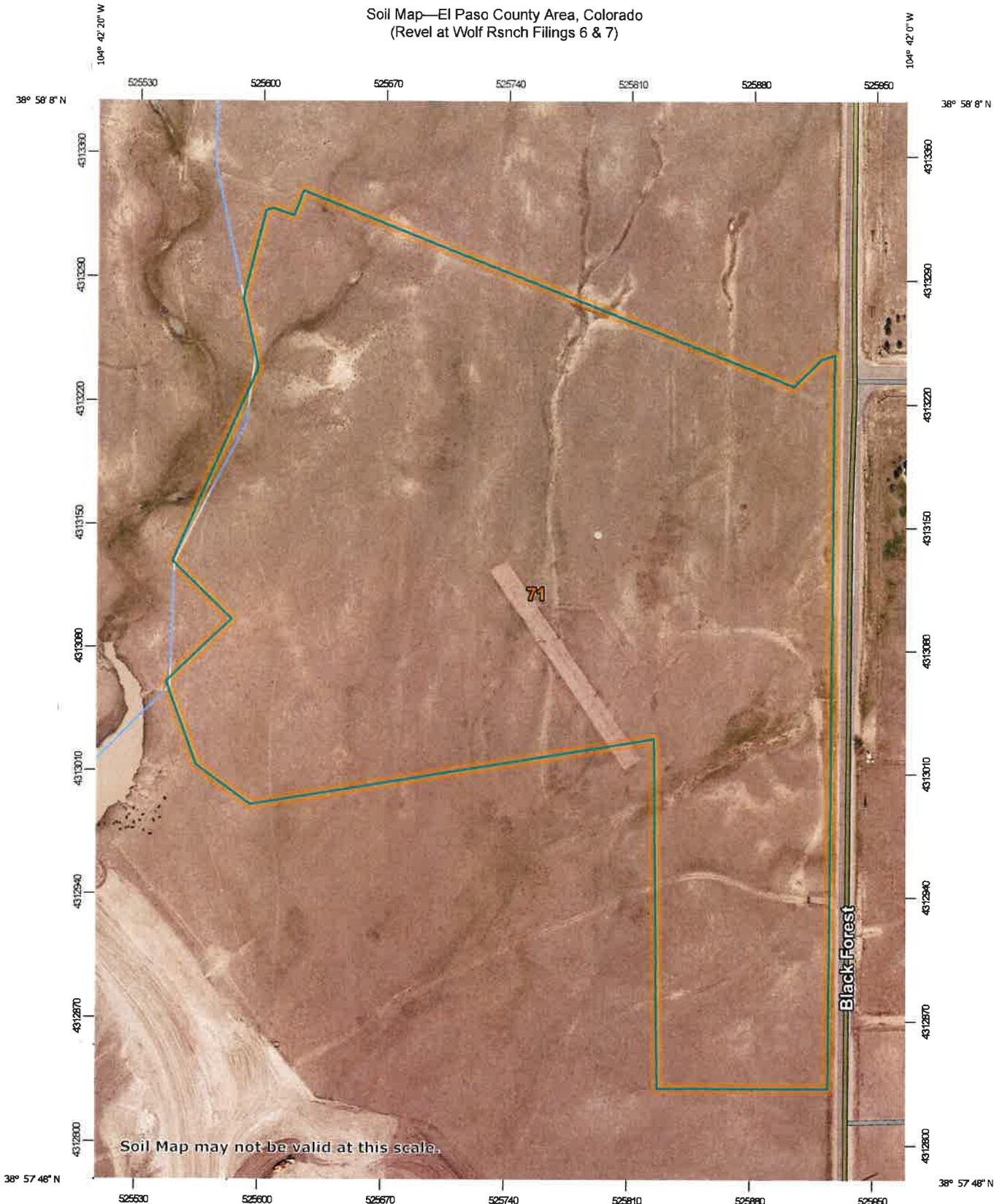
FILE: 21002FP.DWG  
DATE: 01/29/21



**ROCKWELL  
CONSULTING, Inc.**

ENGINEERING • SURVEYING  
1955 N. UNION BLVD., SUITE 200  
COLORADO SPRINGS, CO 80909  
(719) 475-2575 • FAX (719) 475-9223

Soil Map—El Paso County Area, Colorado  
(Revel at Wolf Rsnch Filings 6 & 7)



Soil Map may not be valid at this scale.

Map Scale: 1:2,980 if printed on A portrait (8.5" x 11") sheet.



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



Soil Map—El Paso County Area, Colorado  
(Revel at Wolf Rsnch Filings 6 & 7)

**MAP LEGEND**

- |                               |                      |                        |                       |                 |
|-------------------------------|----------------------|------------------------|-----------------------|-----------------|
| <b>Area of Interest (AOI)</b> |                      | Area of Interest (AOI) |                       | Spoil Area      |
| <b>Soils</b>                  |                      | Soil Map Unit Polygons |                       | Stony Spot      |
|                               |                      | Soil Map Unit Lines    |                       | Very Stony Spot |
|                               |                      | Soil Map Unit Points   |                       | Wet Spot        |
| <b>Special Point Features</b> |                      |                        |                       | Other           |
|                               | Blowout              |                        | Special Line Features |                 |
|                               | Borrow Pit           | <b>Water Features</b>  |                       |                 |
|                               | Clay Spot            |                        | Streams and Canals    |                 |
|                               | Closed Depression    | <b>Transportation</b>  |                       |                 |
|                               | Gravel Pit           |                        | Rails                 |                 |
|                               | Gravelly Spot        |                        | Interstate Highways   |                 |
|                               | Landfill             |                        | US Routes             |                 |
|                               | Lava Flow            |                        | Major Roads           |                 |
|                               | Marsh or swamp       |                        | Local Roads           |                 |
|                               | Mine or Quarry       | <b>Background</b>      |                       |                 |
|                               | Miscellaneous Water  |                        | Aerial Photography    |                 |
|                               | Perennial Water      |                        |                       |                 |
|                               | Rock Outcrop         |                        |                       |                 |
|                               | Saline Spot          |                        |                       |                 |
|                               | Sandy Spot           |                        |                       |                 |
|                               | Severely Eroded Spot |                        |                       |                 |
|                               | Sinkhole             |                        |                       |                 |
|                               | Slide or Slip        |                        |                       |                 |
|                               | Sodic Spot           |                        |                       |                 |

**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 18, Jun 5, 2020

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—Sep 23, 2018

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
71	Pring coarse sandy loam, 3 to 8 percent slopes	28.6	100.0%
<b>Totals for Area of Interest</b>		<b>28.6</b>	<b>100.0%</b>

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
Manvel: 50-----	C	None-----	---	---	<u>In</u> >60	---	High.
Manzanola: 51, 52, 53-----	C	None to rare	---	---	>60	---	Moderate.
Midway: 54-----	D	None-----	---	---	10-20	Rippable	Moderate.
Nederland: 55-----	B	None-----	---	---	>60	---	Moderate.
Nelson: 156: Nelson part-----	B	None-----	---	---	20-40	Rippable	Low.
Tassel part-----	D	None-----	---	---	10-20	Rippable	Low.
Neville: 57-----	B	None-----	---	---	>60	---	High.
158: Neville part-----	B	None-----	---	---	>60	---	High.
Rednun part-----	C	None-----	---	---	>60	---	Moderate.
Nunn: 59-----	C	None-----	---	---	>60	---	Moderate.
Olney: 60, 61-----	B	None-----	---	---	>60	---	Moderate.
162: Olney part-----	B	None-----	---	---	>60	---	Moderate.
Vona part-----	B	None-----	---	---	>60	---	Moderate.
Paunsaugunt: 163: Paunsaugunt part-----	D	None-----	---	---	10-20	Hard	Moderate.
Rock outcrop part-----	D	---	---	---	---	---	---
Penrose: 164: Penrose part-----	D	None-----	---	---	10-20	Rippable	Low.
Manvel part-----	C	None-----	---	---	>60	---	High.
Perrypark: 65-----	B	None-----	---	---	>60	---	Moderate.
Peyton: 66, 67-----	B	None-----	---	---	>60	---	Moderate.
168, 169: Peyton part-----	B	None-----	---	---	>60	---	Moderate.
Pring part-----	B	None-----	---	---	>60	---	Moderate.
Pits, gravel: 70-----	A	---	---	---	---	---	---
Pring: 71, 72-----	B	None-----	---	---	>60	---	Moderate.
Razor: 73, 74-----	C	None-----	---	---	20-40	Rippable	Moderate.

See footnote at end of table.

**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 to 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, NGS12  
National Geodetic Survey  
SSMHC-3, #5202  
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.

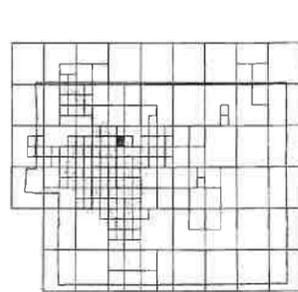
Contact FEMA Map Service Center (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. 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/nfp>.

**El Paso County Vertical Datum Offset Table**

Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 2.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

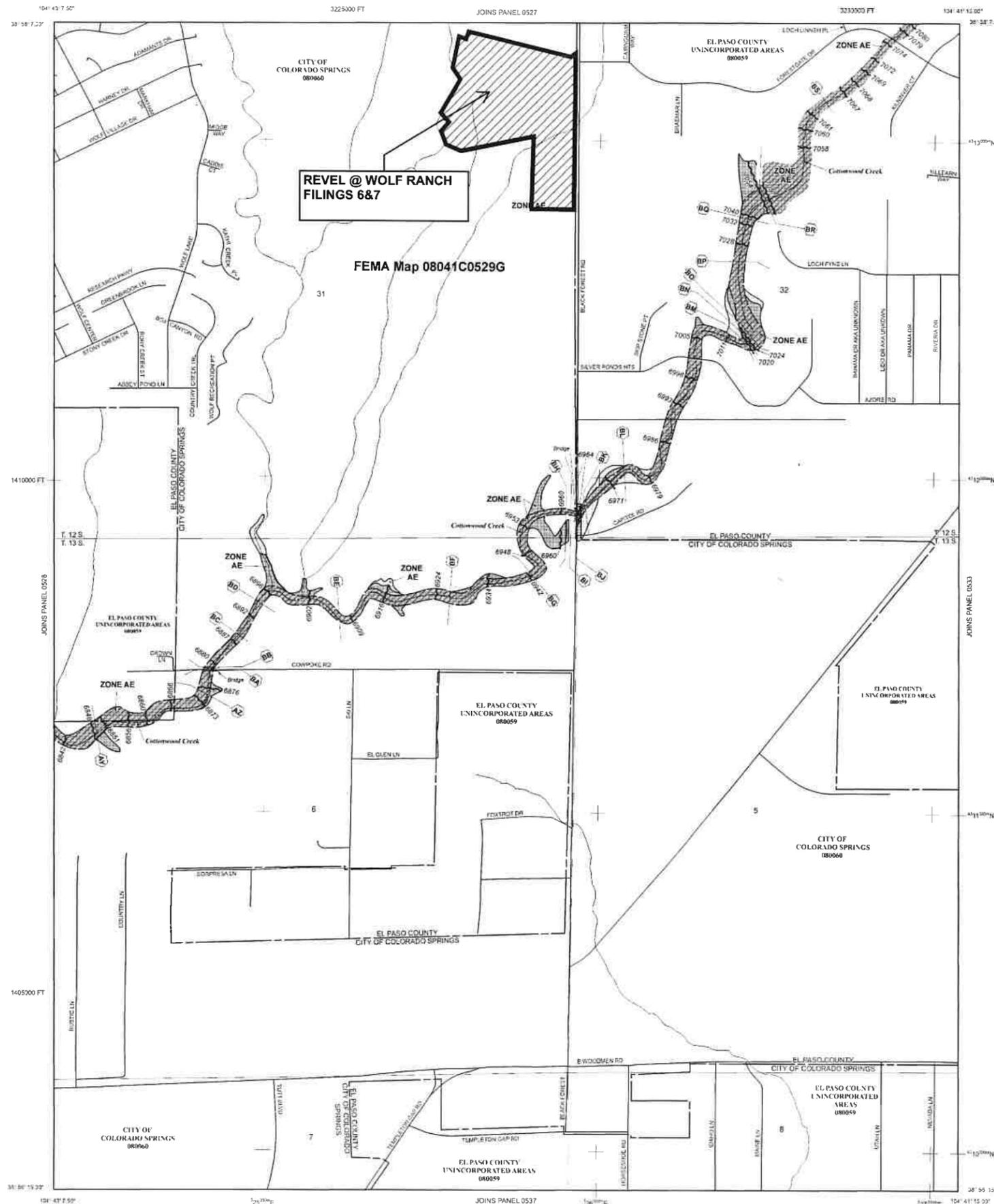
**Panel Location Map**



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



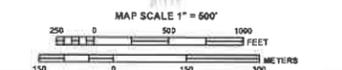
Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



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, AP, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A** No Base Flood Elevation determined.
  - ZONE AE** Base Flood Elevation determined.
  - ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevation determined.
  - ZONE AO** Flood depths of 1 to 3 feet (usually street flow on sloping terrain); average depths determined. For areas of atypical fast 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 substantially decayed. Zone AR indicates that the former flood control system is being required to provide protection from the 1% annual chance or greater flood.
  - ZONE AP** Areas to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevation determined.
  - ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevation determined.
  - ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevation 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 encroachments 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; a set 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 suitable for 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 situated within or adjacent to Special Flood Hazard Areas.
- Floodplain boundary
  - Floodway boundary
  - Zone D boundary
  - CBRS and OPA boundary
  - Boundary of Special Flood Hazard Areas of different Base Flood Elevation, Flood Depths or Flood Velocities
  - Base Flood Elevation line and value, elevation in feet\* (EL 987)
  - Base Flood Elevation value where uniform within river; elevation in feet\*
  - Cross section line
  - Transsect line
  - Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
  - 1000-meter Universal Transverse Mercator grid ticks, zone 13
  - 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 092), Lambert Conformal Conic Projection
  - Bench mark (see explanation in Notes to Users section of this FIRM panel)
  - M1.5 River Mile
- MAP REPOSITORIES**  
Refer to Map Repositories on Map Index
- EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**  
MARCH 11, 1997
- EFFECTIVE DATES OF REVISIONS 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 mail 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 1-800-538-6620.



**NFP**

**PANEL 0529G**

**FIRM**

**FLOOD INSURANCE RATE MAP**

**EL PASO COUNTY, COLORADO AND INCORPORATED AREAS**

PANEL 529 OF 1300  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTACTS

COMMUNITY	NUMBER	PANEL	SUBPANELS
COLORADO SPRINGS, CITY OF	5000	025	3
EL PASO COUNTY	16,000	025	3

Not to Scale: The Map Repository version number should be used when placing orders. The Community number shown is the required map repository version number for the subject community.

**MAP NUMBER**  
08041C0529G

**MAP REVISED**  
DECEMBER 7, 2018

Federal Emergency Management Agency

## Site-Level Low Impact Development (LID) Design Effective Impervious Calculator LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

	User Input																
	Calculated cells																
***Design Storm: 1-Hour Rain Depth ***Minor Storm: 1-Hour Rain Depth ***Major Storm: 1-Hour Rain Depth Optional User Defined Storm (CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	<table border="1" style="width: 100%;"> <tr><td>WQCV Event</td><td style="text-align: center;">0.60</td><td>inches</td></tr> <tr><td>10-Year Event</td><td style="text-align: center;">1.75</td><td>inches</td></tr> <tr><td>100-Year Event</td><td style="text-align: center;">2.50</td><td>inches</td></tr> <tr><td>CUHP</td><td></td><td></td></tr> <tr><td>100-Year Event</td><td></td><td></td></tr> </table>	WQCV Event	0.60	inches	10-Year Event	1.75	inches	100-Year Event	2.50	inches	CUHP			100-Year Event			Designer: <u>Kent Rockwell</u> Company: <u>Rockwell Consulting</u> Date: <u>January 30, 2021</u> Project: <u>Revel at Wolf Ranch Filings 6 and 7</u> Location: _____
WQCV Event	0.60	inches															
10-Year Event	1.75	inches															
100-Year Event	2.50	inches															
CUHP																	
100-Year Event																	
Max Intensity for Optional User Defined Storm	0																

Sub-basin Identifier	Bsns 1-12	Bsns 13-18	Bsns 19-22																
Receiving Pervious Area Soil Type	Sandy Loam	Sandy Loam	Sandy Loam																
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	29.760	5.630	15.730																
Directly Connected Impervious Area (DCIA, acres)	11.900	2.240	0.520																
Unconnected Impervious Area (UIA, acres)	7.030	1.130	2.530																
Receiving Pervious Area (RPA, acres)	5.570	0.870	2.000																
Separate Pervious Area (SPA, acres)	5.260	1.390	10.680																
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	c	C	C																

CALCULATED RESULTS (OUTPUT)	Bsns 1-12	Bsns 13-18	Bsns 19-22																
Total Calculated Area (ac, check against input)	29.760	5.630	15.730																
Directly Connected Impervious Area (DCIA, %)	40.0%	39.8%	3.3%																
Unconnected Impervious Area (UIA, %)	23.6%	20.1%	16.1%																
Receiving Pervious Area (RPA, %)	18.7%	15.5%	12.7%																
Separate Pervious Area (SPA, %)	17.7%	24.7%	67.9%																
$A_p$ (RPA / UIA)	0.792	0.770	0.791																
$I_p$ Check	0.560	0.570	0.560																
f / I for WQCV Event:	1.7	1.7	1.7																
f / I for 10-Year Event:	0.5	0.5	0.5																
f / I for 100-Year Event:	0.3	0.3	0.3																
f / I for Optional User Defined Storm CUHP:																			
IRF for WQCV Event:	0.69	0.69	0.69																
IRF for 10-Year Event:	0.90	0.91	0.90																
IRF for 100-Year Event:	0.94	0.94	0.94																
IRF for Optional User Defined Storm CUHP:																			
Total Site Imperviousness: $I_{total}$	63.6%	59.9%	19.4%																
Effective Imperviousness for WQCV Event:	56.2%	53.6%	14.3%																
Effective Imperviousness for 10-Year Event:	61.4%	58.0%	17.9%																
Effective Imperviousness for 100-Year Event:	62.2%	58.7%	18.4%																
Effective Imperviousness for Optional User Defined Storm CUHP:																			

LID / EFFECTIVE IMPERVIOUSNESS CREDITS	Bsns 1-12	Bsns 13-18	Bsns 19-22																
WQCV Event CREDIT: Reduce Detention By:	10.0%	8.2%	20.4%	N/A															
10-Year Event CREDIT**: Reduce Detention By:	3.6%	3.2%	8.8%	N/A															
100-Year Event CREDIT**: Reduce Detention By:	2.1%	1.9%	5.5%	N/A															
User Defined CUHP CREDIT: Reduce Detention By:																			

<b>Total Site Imperviousness:</b>	<b>49.6%</b>
<b>Total Site Effective Imperviousness for WQCV Event:</b>	<b>43.0%</b>
<b>Total Site Effective Imperviousness for 10-Year Event:</b>	<b>47.6%</b>
<b>Total Site Effective Imperviousness for 100-Year Event:</b>	<b>48.3%</b>
<b>Total Site Effective Imperviousness for Optional User Defined Storm CUHP:</b>	

Notes:  
 \* Use Green-Ampt average infiltration rate values from Table 3-3.  
 \*\* Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.  
 \*\*\* Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposes

**HYDROLOGY**  
**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN:           A            
 AREA:           2.09            
 SOIL TYPE:           B          

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	2.09	0.08	0.35	100.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.09			100%

COMPOSITE:                   C5=       0.08       C100=       0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	6.7%		17.03
Swale	50	2.0%	1.0	0.84
				<u>          </u>
Tc Total:				17.87

**Intensity, I (inches/hr)**

**I5**                                   **I100**  
          3.3 in/hr                           5.5 in/hr          

**PEAK FLOW: Q-CIA in cfs**

**Q5**                                   **Q100**  
          0.5 cfs                           4.0 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: B  
AREA: 3.70  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	3.70	0.08	0.35	100.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.70			100%

COMPOSITE: C5= 0.08 C100= 0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	3.3%		21.51
Swale	0	7.3%	1.9	0.00
				<u>21.51</u>
Tc Total:				21.51

**Intensity, I (inches/hr)**

I5 3.0 in/hr I100 5.0 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 0.9 cfs Q100 6.5 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: C  
AREA: 34.02  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	34.02	0.08	0.35	100.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	34.02			100%

COMPOSITE: C5= 0.08 C100= 0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	4.0%		20.19
Swale	2520	2.7%	1.2	36.51
				<u>56.70</u>
Tc Total:				56.70

**Intensity, I (inches/hr)**

I5 1.5 in/hr  
I100 2.6 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 4.2 cfs  
Q100 30.5 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN:           D            
 AREA:           39.08            
 SOIL TYPE:           B          

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	39.08	0.08	0.35	100.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	39.08			100%

COMPOSITE:                   C5=       0.08    C100=    0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	3.3%		21.51
Swale	2925	2.8%	1.2	41.62
				<u>          </u>
Tc Total:				63.13

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>          1.4 in/hr          </u>	<u>          2.3 in/hr          </u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>          4.3 cfs          </u>	<u>          31.3 cfs          </u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: E  
 AREA: 12.41  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	12.41	0.08	0.35	100.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	12.41			100%

COMPOSITE: C5= 0.08 C100= 0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	5.3%		18.40
Swale	2060	3.0%	1.2	28.32
				<u>46.71</u>
Tc Total:				46.71

**Intensity, I (inches/hr)**

**I5**                      **I100**  
1.8 in/hr                      3.0 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**                                      **Q100**  
1.8 cfs                                      13.2 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: F  
AREA: 23.63  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Ac Residential	0	0.30	0.50	0.00%
Streets	0	0.90	0.95	0.00%
Open Space	23.63	0.08	0.35	100.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	23.63			100%

COMPOSITE: C5= 0.08 C100= 0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	2.7%		22.98
Swale	2930	3.0%	1.2	40.28
				<u>63.26</u>
Tc Total:				63.26

**Intensity, I (inches/hr)**

I5 1.4 in/hr I100 2.3 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 2.6 cfs Q100 18.9 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP#H-1  
AREA: 109.14  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Historic Basin C	34.02	0.08	0.35	31.17%
Historic Basin D	39.08	0.08	0.35	35.81%
Historic Basin E	12.41	0.08	0.35	11.37%
Historic Basin F	<u>23.63</u>	0.08	0.35	<u>21.65%</u>
	109.14			100%

COMPOSITE: C5= 0.08 C100= 0.35

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	300	2.7%		22.98
Swale	2930	3.0%	1.2	40.28
				<u>63.26</u>

Tc Total: 63.26

**Intensity, I (inches/hr)**

I5 1.4 in/hr I100 2.3 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 11.9 cfs Q100 87.2 cfs



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: OS-2  
 AREA: 1.16  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.76	0.45	0.59	65.52%
Streets	0.40	0.90	0.95	34.48%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.16			100%

COMPOSITE: C5= 0.61 C100= 0.71

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	10.0%		3.01
Lot Drainage	0	8.0%	4.2	0.00
Street	250	3.0%	3.5	<u>1.20</u>
Tc Total:				4.21

**Intensity, I (inches/hr)**

**I5** **I100**  
5.2 in/hr 8.7 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** **Q100**  
3.7 cfs 7.2 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: OS-3  
 AREA: 1.00  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.11	0.45	0.59	11.00%
Streets	0.32	0.90	0.95	32.00%
Open Space	0.57	0.08	0.35	57.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.00			100%

COMPOSITE: C5= 0.38 C100= 0.57

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	30	3.0%		7.02
Lot Drainage	0	8.0%	4.2	0.00
Street	500	3.0%	3.5	<u>2.41</u>
Tc Total:				9.43

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>4.2 in/hr</u>	<u>7.1 in/hr</u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>1.6 cfs</u>	<u>4.0 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: OS-4  
AREA: 17.43  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	12.43	0.45	0.59	71.31%
Streets	0.00	0.90	0.95	0.00%
Open Space	5.00	0.08	0.35	28.69%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	17.43			100%

COMPOSITE: C5= 0.34 C100= 0.52

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Lot Drainage	300	3.0%	2.6	1.92
Street	1100	3.0%	10.0	<u>1.83</u>
Tc Total:				16.57

**Intensity, I (inches/hr)**

**I5** 3.4 in/hr      **I100** 5.7 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5** 20.2 cfs      **Q100** 51.4 cfs

## HYDROLOGY

### RATIONAL METHODOLOGY

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: OS-5  
 AREA: 7.18  
 SOIL TYPE: B

#### RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	2.68	0.45	0.59	37.33%
Streets	0.00	0.90	0.95	0.00%
Open Space	4.5	0.08	0.35	62.67%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	7.18			100%

COMPOSITE: C5= 0.22 C100= 0.44

#### TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	65	3.0%		6.58
Lot Drainage	1500	3.0%	2.6	9.62
Street	0	3.0%	3.5	<u>0.00</u>
Tc Total:				16.21

#### Intensity, I (inches/hr)

<b>I5</b>	<b>I100</b>
<u>3.4 in/hr</u>	<u>5.7 in/hr</u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>5.3 cfs</u>	<u>18.0 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP#1-OS  
 AREA: 49.61  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
OS-4	17.43	0.34	0.52	35.13%
OS-5	7.18	0.22	0.44	14.47%
Pond Release	25	0.07	0.65	50.39%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	49.61			100%

COMPOSITE: C5= 0.19 C100= 0.57

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	2.0%		14.65
Lot Drainage	300	3.0%	2.6	1.92
Pipe	3400	2.0%	10.0	<u>5.67</u>
Tc Total:				22.24

**Intensity, I (inches/hr)**

**I5**

**I100**

2.9 in/hr

4.9 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**

**Q100**

27.3 cfs

140.1 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 1A  
 AREA: 0.67  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.23	0.45	0.59	34.33%
Streets	0.20	0.90	0.96	29.85%
Open Space	0.24	0.08	0.35	35.82%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	0.67			100%

COMPOSITE: C5= 0.45 C100= 0.61

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Lot Drainage	0	8.0%	4.2	0.00
Street	250	3.0%	3.5	<u>1.20</u>
Tc Total:				14.02

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>3.6 in/hr</u>	<u>6.1 in/hr</u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>1.1 cfs</u>	<u>2.5 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 1B  
 AREA: 0.16  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.00	0.45	0.59	0.00%
Streets	0.08	0.90	0.96	50.00%
Open Space	0.08	0.08	0.35	50.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	0.16			100%

COMPOSITE: C5= 0.49 C100= 0.66

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	50	3.0%		5.77
Lot Drainage	0	8.0%	4.2	0.00
Street	0	3.0%	3.5	<u>0.00</u>
Tc Total:				5.77

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>5.0 in/hr</u>	<u>8.3 in/hr</u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>0.4 cfs</u>	<u>0.9 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 2  
AREA: 2.01  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Ac Residential	0.89	0.45	0.59	44.28%
Streets	0.48	0.90	0.96	23.88%
Open Space	0.64	0.08	0.35	31.84%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.01			100%

COMPOSITE: C5= 0.44 C100= 0.60

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	8.0%		5.91
Lot Drainage	70	4.0%	3.0	0.39
Street	280	2.0%	2.8	<u>1.65</u>
Tc Total:				7.95

**Intensity, I (inches/hr)**

**I5** 4.5 in/hr      **I100** 7.5 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** 4.0 cfs      **Q100** 9.1 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 3  
AREA: 3.09  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	2.03	0.45	0.59	65.70%
Streets	0.46	0.90	0.96	14.89%
Open Space	0.6	0.08	0.35	19.42%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.09			100%

COMPOSITE: C5= 0.45 C100= 0.60

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	10.0%		5.49
Lot Drainage	125	5.0%	3.4	0.62
Street	475	1.8%	2.7	<u>2.95</u>
Tc Total:				9.06

**Intensity, I (inches/hr)**

I5 4.3 in/hr I100 7.2 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 5.9 cfs Q100 13.3 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 4  
AREA: 2.55  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	2.14	0.45	0.59	83.92%
Streets	0.41	0.90	0.96	16.08%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.55			100%

COMPOSITE: C5= 0.52 C100= 0.65

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	4.0%		7.43
Lot Drainage	0	3.0%	2.6	0.00
Street	400	1.5%	2.4	<u>2.72</u>
Tc Total:				10.15

**Intensity, I (inches/hr)**

I5 4.1 in/hr I100 6.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 5.5 cfs Q100 11.4 cfs





**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 7  
 AREA: 3.29  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	2.75	0.45	0.59	83.59%
Streets	0.54	0.90	0.96	16.41%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.29			100%

COMPOSITE: C5= 0.52 C100= 0.65

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.5%		7.76
Lot Drainage	100	3.0%	2.6	0.64
Street	400	1.5%	2.4	<u>2.72</u>
Tc Total:				11.13

**Intensity, I (inches/hr)**

**I5** **I100**  
4.0 in/hr 6.7 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** **Q100**  
6.8 cfs 14.3 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 8  
AREA: 3.21  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	2.65	0.45	0.59	82.55%
Streets	0	0.90	0.96	0.00%
Open Space	0.56	0.08	0.35	17.45%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.21			100%

COMPOSITE: C5= 0.39 C100= 0.55

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.5%		7.76
Lot Drainage	150	3.0%	2.6	0.96
Street	250	1.5%	2.4	<u>1.70</u>
Tc Total:				10.43

**Intensity, I (inches/hr)**

I5 4.1 in/hr I100 6.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 5.0 cfs Q100 12.0 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 9  
 AREA: 2.16  
 SOIL TYPE: C & D

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	1.89	0.45	0.59	87.50%
Streets	0.27	0.90	0.96	12.50%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.16			100%

COMPOSITE: C5= 0.51 C100= 0.64

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	4.0%		7.43
Lot Drainage	140	3.0%	2.6	0.90
Street	240	1.7%	2.6	<u>1.53</u>
Tc Total:				9.86

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>4.2 in/hr</u>	<u>7.0 in/hr</u>

PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>4.5 cfs</u>	<u>9.6 cfs</u>



## HYDROLOGY

### RATIONAL METHODOLOGY

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN:	11
AREA:	5.18
SOIL TYPE:	B

#### RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	5.18	0.45	0.59	100.00%
Streets	0	0.90	0.96	0.00%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	5.18			100%

COMPOSITE: C5= 0.45 C100= 0.59

#### TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	4.0%		7.43
Lot Drainage	250	3.0%	2.6	1.60
Street	660	1.5%	2.4	<u>4.49</u>
Tc Total:				13.52

#### Intensity, I (inches/hr)

<b>I5</b>	<b>I100</b>
<u>3.7 in/hr</u>	<u>6.2 in/hr</u>

#### PEAK FLOW: Q-CIA in cfs

<b>Q5</b>	<b>Q100</b>
<u>8.6 cfs</u>	<u>18.9 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN:	<u>12</u>
AREA:	<u>1.20</u>
SOIL TYPE:	<u>B</u>

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	1.20	0.45	0.59	100.00%
Streets	0	0.90	0.96	0.00%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	0.00	<u>0.00</u>	<u>0.00%</u>
	1.20			100%

COMPOSITE: C5= 0.45 C100= 0.59

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	8.0%		5.91
Lot Drainage	0	4.0%	4.0	0.00
Street	0	3.0%	3.5	<u>0.00</u>
Tc Total:				5.91

**Intensity, I (inches/hr)**

**I5**

**I100**

4.9 in/hr

8.3 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**

**Q100**

2.7 cfs

5.8 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 13  
AREA: 2.20  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	1.15	0.45	0.59	52.27%
Streets	0.64	0.90	0.96	29.09%
Open Space	0.41	0.08	0.35	18.64%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.20			100%

COMPOSITE: C5= 0.51 C100= 0.65

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	2.0%		14.65
Lot Drainage	150	4.0%	3.0	0.83
Street	350	3.0%	3.5	<u>1.68</u>
Tc Total:				17.17

**Intensity, I (inches/hr)**

I5 3.3 in/hr I100 5.6 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 3.7 cfs Q100 8.0 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 14  
 AREA: 1.17  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.84	0.45	0.59	71.79%
Streets	0.15	0.90	0.96	12.82%
Open Space	0.18	0.08	0.35	15.38%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	1.17			100%

COMPOSITE: C5= 0.45 C100= 0.60

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3.0%		8.17		
Lot Drainage	0	3.5%	2.8	0.00		
Street	300	3.0%	3.5	<u>1.44</u>		
Tc Total:				9.61		

**Intensity, I (inches/hr)**

**I5**

**I100**

4.2 in/hr

7.0 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**

**Q100**

2.2 cfs

4.9 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 15  
 AREA: 1.00  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.61	0.45	0.59	61.00%
Streets	0.39	0.90	0.96	39.00%
Open Space	0	0.08	0.35	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.00			100%

COMPOSITE: C5= 0.63 C100= 0.73

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	60	3.0%		6.33		
Lot Drainage	0	3.5%	2.8	0.00		
Street	750	3.0%	3.5	<u>3.61</u>		
Tc Total:				9.93		

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>4.1 in/hr</u>	<u>6.9 in/hr</u>

**PEAK FLOW: Q-CIA in cfs**

<b>Q5</b>	<b>Q100</b>
<u>2.6 cfs</u>	<u>5.1 cfs</u>





**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 18  
 AREA: 0.86  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.00	0.45	0.59	0.00%
Streets	0.29	0.90	0.96	33.72%
Open Space	0.57	0.08	0.35	66.28%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	0.86			100%

COMPOSITE: C5= 0.36 C100= 0.56

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	65	2.0%		11.81		
Lot Drainage	165	3.5%	2.8	0.98		
Street	700	3.0%	3.5	<u>3.37</u>		
Tc Total:				16.16		

**Intensity, I (inches/hr)**

**I5**

**I100**

3.4 in/hr

5.7 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**

**Q100**

1.0 cfs

2.7 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 19A  
AREA: 3.99  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.00	0.45	0.59	0.00%
Streets	0.23	0.90	0.96	5.76%
Open Space	3.76	0.08	0.35	94.24%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	3.99			100%

COMPOSITE: C5= 0.13 C100= 0.39

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3.0%		12.82		
Swale	300	3.5%	2.8	<u>1.78</u>		
Tc Total:				14.60		

**Intensity, I (inches/hr)**

I5 3.6 in/hr I100 6.0 in/hr

**PEAK FLOW: Q-CIA in cfs**

Q5 1.8 cfs Q100 9.2 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 19B  
AREA: 0.43  
SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.00	0.45	0.59	0.00%
Streets	0.23	0.90	0.96	53.49%
Open Space	0.20	0.08	0.35	46.51%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	0.43			100%

COMPOSITE: C5= 0.52 C100= 0.68

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	2.0%		8.02		
Lot Drainage	0	1.5%	1.8	0.00		
Street	150	1.5%	2.4	<u>1.02</u>		
Tc Total:				9.05		

**Intensity, I (inches/hr)**

**I5**

**I100**

4.3 in/hr

7.2 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5**

**Q100**

1.0 cfs

2.1 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 20  
 AREA: 3.05  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	1.46	0.45	0.59	47.87%
Streets	0	0.90	0.96	0.00%
Open Space	1.59	0.08	0.35	52.13%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.05			100%

COMPOSITE: C5= 0.26 C100= 0.46

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3.0%		12.82		
Swale	340	2.0%	2.1	2.67		
Street	0	3.0%	3.5	<u>0.00</u>		
Tc Total:				15.49		

**Intensity, I (inches/hr)**

**I5**                      **I100**  
3.5 in/hr                      5.8 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**                                      **Q100**  
2.7 cfs                                      8.3 cfs



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: 22  
 AREA: 2.96  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential Lots	0.09	0.45	0.59	3.04%
Streets	0	0.90	0.96	0.00%
Open Space	2.87	0.08	0.35	96.96%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	2.96			100%

COMPOSITE: C5= 0.09 C100= 0.36

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3.0%		12.82		
Swale	250	2.0%	2.1	1.96		
Street	0	3.0%	3.5	<u>0.00</u>		
Tc Total:				14.78		

**Intensity, I (inches/hr)**

**I5**

**I100**

3.5 in/hr

5.9 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5**

**Q100**

1.0 cfs

6.3 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #1  
 AREA: 8.34  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
Basin OS-1	7.18	0.30	0.51	86.09%
Basin OS-2	1.16	0.61	0.71	13.91%
	<u>8.34</u>			<u>100%</u>

COMPOSITE: C5= 0.34 C100= 0.54

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Street	300	3.5%	2.8	1.78
Pipe	2300	3.0%	15	<u>2.56</u>
Tc Total:				17.15

**Intensity, I (inches/hr)**

**I5** **I100**  
3.3 in/hr 5.6 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** **Q100**  
9.5 cfs 24.9 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #2  
 AREA: 1.83  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin OS-1	1.00	0.38	0.57	54.64%
	0.00	0.00	0.00	0.00%
Basin 1A	0.67	0.45	0.61	36.61%
Basin 1B	0.16	0.49	0.66	8.74%
	0.00	0.51	0.64	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.83			100%

COMPOSITE: C5= 0.42 C100= 0.59

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Street	0	8.0%	4.2	0.00
Pipe	100	1.5%	7.0	<u>0.24</u>
Tc Total:				13.05

**Intensity, I (inches/hr)**

**I5** **I100**  
3.7 in/hr 6.3 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5** **Q100**  
2.8 cfs 6.8 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #3  
 AREA: 10.17  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#1	8.34	0.34	0.54	82.01%
DP#2	1.83	0.42	0.59	17.99%
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
				0.00%
	<u>10.17</u>			<u>100%</u>

COMPOSITE: C5= 0.36 C100= 0.55

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Street	300	3.5%	2.8	1.78
Pipe	2500	3.0%	15	<u>2.78</u>
Tc Total:				17.38

**Intensity, I (inches/hr)**

**I5** **I100**  
3.3 in/hr 5.5 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** **Q100**  
12.0 cfs 30.8 cfs



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #5  
 AREA: 20.64  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#4	15.27	0.39	0.56	73.98%
Basin 4	2.55	0.52	0.65	12.35%
Basin 5	2.82	0.53	0.65	13.66%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	20.64			100%

COMPOSITE: C5= 0.42 C100= 0.59

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	3.0%		12.82
Street	300	3.5%	2.8	1.78
Pipe	2800	3.0%	15	<u>3.11</u>
Tc Total:				17.71

**Intensity, I (inches/hr)**

**I5** **I100**  
3.3 in/hr 5.5 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5** **Q100**  
28.5 cfs 66.5 cfs



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #7  
 AREA: 74.56  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#5	20.64	0.42	0.59	27.68%
DP#6	53.92	0.09	0.36	72.32%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	74.56			100%

COMPOSITE: C5= 0.18 C100= 0.42

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	1.0%		18.42
Swale	1000	2.0%	2.1	7.86
Pipe	800	1.5%	7	1.90
Tc Total:				28.18

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>2.6 in/hr</u>	<u>4.3 in/hr</u>

**PEAK FLOW: Q-CIA in cfs**

<b>Q5</b>	<b>Q100</b>
<u>35.2 cfs</u>	<u>135.9 cfs</u>

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN:	<u>DP #8</u>
AREA:	<u>81.06</u>
SOIL TYPE:	<u>B</u>

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#7	74.56	0.18	0.42	91.98%
Basin 7	3.29	0.52	0.65	4.06%
Basin 8	3.21	0.39	0.55	3.96%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	81.06			100%

COMPOSITE: C5= 0.21 C100= 0.44

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	1.0%		18.42
Swale	1000	2.0%	2.1	7.86
Pipe	900	1.5%	8	<u>1.88</u>
Tc Total:				28.15

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>2.6 in/hr</u>	<u>4.3 in/hr</u>

**PEAK FLOW: Q-CIA in cfs**

<b>Q5</b>	<b>Q100</b>
<u>42.9 cfs</u>	<u>152.9 cfs</u>



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #10  
 AREA: 4.37  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 13	2.20	0.51	0.65	50.34%
Basin 14	1.17	0.45	0.60	26.77%
Basin 15	1.00	0.63	0.73	22.88%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	4.37			100%

COMPOSITE: C5= 0.52 C100= 0.66

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	2.0%		14.65
Lot Drainage	150	4.0%	3.0	0.83
Street	350	3.0%	3.5	<u>1.68</u>
Tc Total:				17.17

**Intensity, I (inches/hr)**

**I5**                      **I100**  
3.3 in/hr                      5.6 in/hr

**PEAK FLOW: Q-CIA in cfs**

**Q5**                                      **Q100**  
7.6 cfs                                      16.0 cfs

**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #11  
 AREA: 54.03  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#OS-1	49.61	0.19	0.57	91.82%
Basin 19A	3.99	0.13	0.39	7.38%
Basin 19B	0.43	0.52	0.68	0.80%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	54.03			100%

COMPOSITE: C5= 0.19 C100= 0.56

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	2.0%		14.65
Lot Drainage	300	3.0%	2.6	1.92
Street	3700	2.0%	10.0	<u>6.17</u>
Tc Total:				22.74

**Intensity, I (inches/hr)**

<b>I5</b>	<b>I100</b>
<u>2.9 in/hr</u>	<u>4.9 in/hr</u>

**PEAK FLOW: Q-CIA in cfs**

<b>Q5</b>	<b>Q100</b>
<u>29.1 cfs</u>	<u>147.4 cfs</u>



**HYDROLOGY**

**RATIONAL METHODOLOGY**

PROJECT: REVEL AT WOLF RANCH - PHASE II A

BASIN: DP #13  
 AREA: 62.38  
 SOIL TYPE: B

**RUNOFF COEFFICIENT, C**

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP #12	57.08	0.19	0.56	91.50%
Basin 21	5.30	0.25	0.46	8.50%
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
	0.00	0.00	0.00	0.00%
	<u>0</u>	0.00	0.00	<u>0.00%</u>
	62.38			100%

COMPOSITE: C5= 0.19 C100= 0.55

**TIME OF CONCENTRATION: Tc In Minutes:**

Travel Type	L	s %	v5 (fps)	Tc (5 year)
Overland	100	2.0%		14.65
Lot Drainage	300	3.0%	2.6	1.92
Pipe	4300	2.0%	10.0	<u>7.17</u>
Tc Total:				23.74

**Intensity, I (inches/hr)**

**I5** **I100**  
2.8 in/hr 4.8 in/hr

PEAK FLOW: Q-CIA in cfs

**Q5** **Q100**  
34.4 cfs 162.4 cfs

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

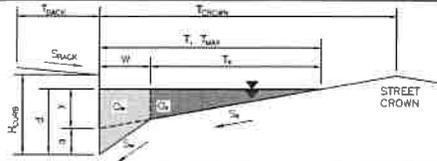
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Revel at Wolf Ranch Phase II A

Inlet ID:

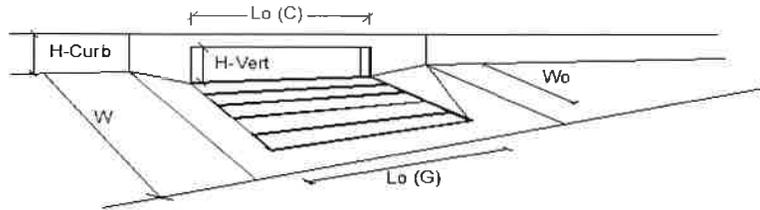
Inlet OS-2



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$				
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	$S_o = 0.020$ ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 14.0</math></td> <td><math>17.0</math></td> </tr> </tbody> </table> ft	Minor Storm	Major Storm	$T_{MAX} = 14.0$	$17.0$
Minor Storm	Major Storm				
$T_{MAX} = 14.0$	$17.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>12.0</math></td> </tr> </tbody> </table> inches	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$12.0$				
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table> check = yes	Minor Storm	Major Storm	<input type="checkbox"/>	<input type="checkbox"/>
Minor Storm	Major Storm				
<input type="checkbox"/>	<input type="checkbox"/>				
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>					
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'					
	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>Q_{ALLOW} = 9.6</math></td> <td><math>15.4</math></td> </tr> </tbody> </table> cfs	Minor Storm	Major Storm	$Q_{ALLOW} = 9.6$	$15.4$
Minor Storm	Major Storm				
$Q_{ALLOW} = 9.6$	$15.4$				

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	MINOR		MAJOR	
Type of Inlet	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)	$N_u =$	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_u =$	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_u =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - <math>Q &lt; Q_{allowable}</math> Street Capacity</b>				
Total Inlet Interception Capacity	$Q =$	6.7	11.5	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	2.7	cfs
Capture Percentage = $Q/Q_b =$	$C\% =$	100	81	%

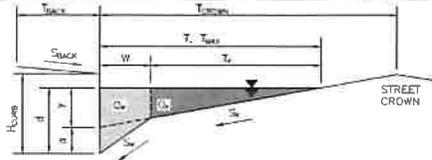
**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

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

Project:  
Inlet ID:

Revel at Wolf Ranch Phase II A

Inlet 2



**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb  
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)  
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)  
 Height of Curb at Gutter Flow Line  
 Distance from Curb Face to Street Crown  
 Gutter Width  
 Street Transverse Slope  
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)  
 Street Longitudinal Slope - Enter 0 for sump condition  
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T <sub>BACK</sub> =	10.0	ft
S <sub>BACK</sub> =	0.020	ft/ft
n <sub>BACK</sub> =	0.020	
H <sub>CURB</sub> =	6.00	inches
T <sub>CROWN</sub> =	17.0	ft
W =	2.00	ft
S <sub>X</sub> =	0.020	ft/ft
S <sub>W</sub> =	0.083	ft/ft
S <sub>D</sub> =	0.020	ft/ft
n <sub>STREET</sub> =	0.016	

Max. Allowable Spread for Minor & Major Storm  
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm  
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
T <sub>MAX</sub> =	14.0	17.0	ft
d <sub>MAX</sub> =	6.0	12.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

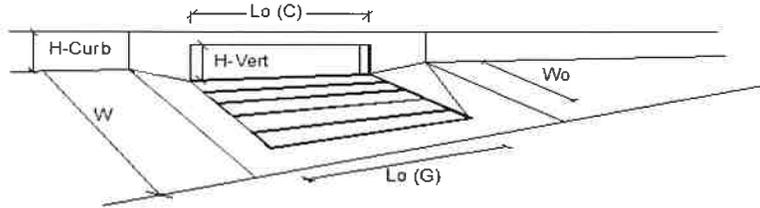
**MINOR STORM Allowable Capacity is based on Spread Criterion**  
**MAJOR STORM Allowable Capacity is based on Spread Criterion**

	Minor Storm	Major Storm	
Q <sub>ALLOW</sub> =	9.6	15.4	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			
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)	$N_u =$	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_u =$	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_g =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>				
Total Inlet Interception Capacity	$Q =$	4.0	10.3	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	1.5	cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	100	87	%

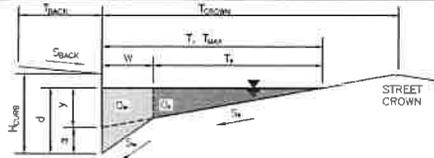
**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

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

Project:  
Inlet ID:

Revel at Wolf Ranch Phase II A

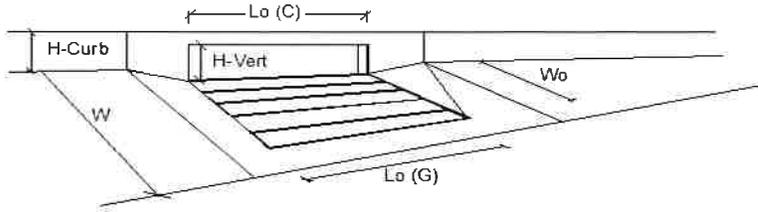
Inlet 3



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	T <sub>BACK</sub> = 10.0 ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S <sub>BACK</sub> = 0.020 ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n <sub>BACK</sub> = 0.020				
Height of Curb at Gutter Flow Line	H <sub>CURB</sub> = 6.00 inches				
Distance from Curb Face to Street Crown	T <sub>CROWN</sub> = 17.0 ft				
Gutter Width	W = 2.00 ft				
Street Transverse Slope	S <sub>X</sub> = 0.020 ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S <sub>W</sub> = 0.083 ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	S <sub>Y</sub> = 0.020 ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n <sub>STREET</sub> = 0.016				
Max. Allowable Spread for Minor & Major Storm	T <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>14.0</td><td>17.0</td></tr></table> ft	Minor Storm	Major Storm	14.0	17.0
Minor Storm	Major Storm				
14.0	17.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>6.0</td><td>12.0</td></tr></table> inches	Minor Storm	Major Storm	6.0	12.0
Minor Storm	Major Storm				
6.0	12.0				
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input type="checkbox"/> check = yes				
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>					
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'					
	Q <sub>ALLOW</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>9.6</td><td>15.4</td></tr></table> cfs	Minor Storm	Major Storm	9.6	15.4
Minor Storm	Major Storm				
9.6	15.4				

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



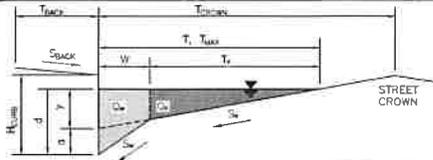
Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_u =$	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_u =$	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_u =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_{-G} =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_{-C} =$	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>				
Total Inlet Interception Capacity	$Q =$	6.9	12.0	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	3.3	cfs
Capture Percentage = $Q_i/Q_o =$	$C\% =$	100	79	%

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

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

Project:  
Inlet ID:

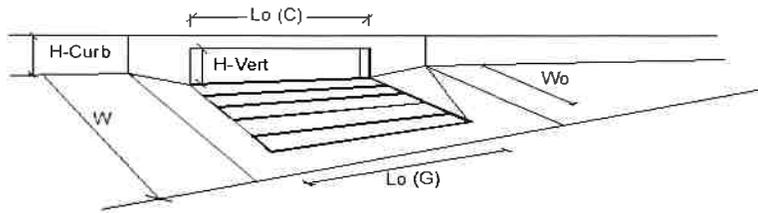
Revel at Wolf Ranch Phase II A  
Inlet 4



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$						
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	$S_D = 0.020$ ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$						
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>ft</th> </tr> <tr> <td><math>T_{MAX} = 14.0</math></td> <td><math>T_{MAX} = 17.0</math></td> <td></td> </tr> </table>	Minor Storm	Major Storm	ft	$T_{MAX} = 14.0$	$T_{MAX} = 17.0$	
Minor Storm	Major Storm	ft					
$T_{MAX} = 14.0$	$T_{MAX} = 17.0$						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>inches</th> </tr> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>d_{MAX} = 12.0</math></td> <td></td> </tr> </table>	Minor Storm	Major Storm	inches	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$	
Minor Storm	Major Storm	inches					
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$						
Allow Flow Depth at Street Crown (leave blank for no)	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>check = yes</th> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> </table>	Minor Storm	Major Storm	check = yes	<input type="checkbox"/>	<input type="checkbox"/>	
Minor Storm	Major Storm	check = yes					
<input type="checkbox"/>	<input type="checkbox"/>						
MINOR STORM Allowable Capacity is based on Spread Criterion							
MAJOR STORM Allowable Capacity is based on Spread Criterion							
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'							
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>cfs</th> </tr> <tr> <td><math>Q_{ALLOW} = 9.6</math></td> <td><math>Q_{ALLOW} = 15.4</math></td> <td></td> </tr> </table>	Minor Storm	Major Storm	cfs	$Q_{ALLOW} = 9.6$	$Q_{ALLOW} = 15.4$	
Minor Storm	Major Storm	cfs					
$Q_{ALLOW} = 9.6$	$Q_{ALLOW} = 15.4$						

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	3.0	3.0	inches	
Total Number of Units in the Inlet (Grate or Curb Opening)	1	1		
Length of a Single Unit Inlet (Grate or Curb Opening)	15.00	15.00	ft	
Width of a Unit Grate (cannot be greater than W, Gutter Width)	N/A	N/A	ft	
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A		
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10		
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>				
Total Inlet Interception Capacity	Q = 5.5	11.7	cfs	
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q <sub>b</sub> = 0.0	3.0	cfs	
Capture Percentage = Q <sub>i</sub> /Q <sub>s</sub> =	C% = 100	80	%	

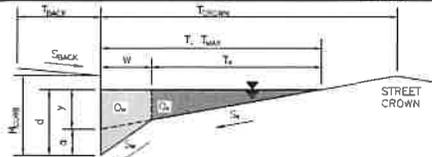
**ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)**

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

Project:  
Inlet ID:

Revel at Wolf Ranch Phase II A

Inlet 5



**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb  
 Side Slope Behind Curb (leave blank for no conveyance credit behind curb)  
 Manning's Roughness Behind Curb (typically between 0.012 and 0.020)  
 Height of Curb at Gutter Flow Line  
 Distance from Curb Face to Street Crown  
 Gutter Width  
 Street Transverse Slope  
 Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)  
 Street Longitudinal Slope - Enter 0 for sump condition  
 Manning's Roughness for Street Section (typically between 0.012 and 0.020)

T <sub>BACK</sub> =	10.0	ft
S <sub>BACK</sub> =	0.020	ft/ft
n <sub>BACK</sub> =	0.020	
H <sub>CURB</sub> =	6.00	inches
T <sub>CROWN</sub> =	17.0	ft
W =	2.00	ft
S <sub>X</sub> =	0.020	ft/ft
S <sub>W</sub> =	0.083	ft/ft
S <sub>L</sub> =	0.020	ft/ft
n <sub>STREET</sub> =	0.016	

Max. Allowable Spread for Minor & Major Storm  
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm  
 Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
T <sub>MAX</sub> =	14.0	17.0	ft
Q <sub>MAX</sub> =	6.0	12.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

**MINOR STORM Allowable Capacity is based on Spread Criterion**

**MAJOR STORM Allowable Capacity is based on Spread Criterion**

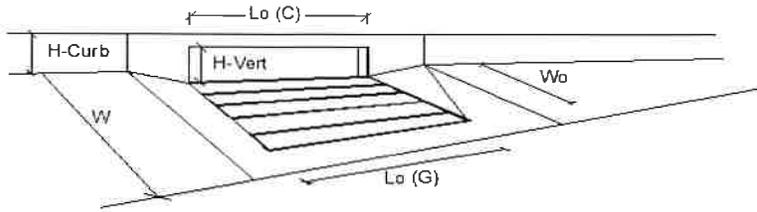
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

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

	Minor Storm	Major Storm	
Q <sub>FLOW</sub> =	9.6	15.4	cfs

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017

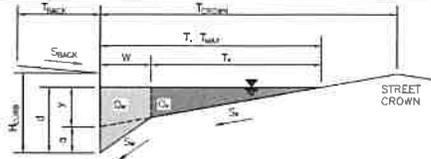


Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_{u} =$	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_{g} =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_{r-G} =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_{r-C} =$	0.10	0.10	
<b>Street Hydraulics: OK - <math>Q &lt; \text{Allowable Street Capacity}</math></b>				
Total Inlet Interception Capacity	$Q =$	6.1	11.5	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	2.6	cfs
Capture Percentage = $Q/Q_b =$	$C\% =$	100	81	%

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

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

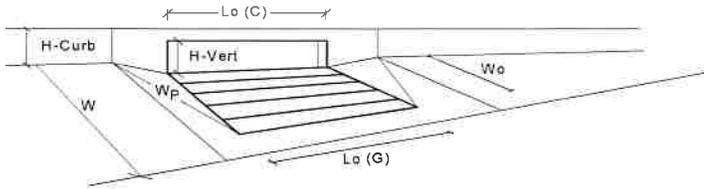
Project: Revel at Wolf Ranch Phase II A  
 Inlet ID: Inlet 6



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	T <sub>BACK</sub> = 10.0 ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S <sub>BACK</sub> = 0.020 ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n <sub>BACK</sub> = 0.020				
Height of Curb at Gutter Flow Line	H <sub>CURB</sub> = 6.00 inches				
Distance from Curb Face to Street Crown	T <sub>CROWN</sub> = 18.0 ft				
Gutter Width	W = 3.00 ft				
Street Transverse Slope	S <sub>X</sub> = 0.020 ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S <sub>W</sub> = 0.083 ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	S <sub>O</sub> = 0.000 ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n <sub>STREET</sub> = 0.016				
Max. Allowable Spread for Minor & Major Storm	T <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>14.0</td><td>18.0</td></tr></table> ft	Minor Storm	Major Storm	14.0	18.0
Minor Storm	Major Storm				
14.0	18.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>6.0</td><td>12.0</td></tr></table> inches	Minor Storm	Major Storm	6.0	12.0
Minor Storm	Major Storm				
6.0	12.0				
Check boxes are not applicable in SUMP conditions					
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
Q <sub>ALLOW</sub> =	<table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>SUMP</td><td>SUMP</td></tr></table> cfs	Minor Storm	Major Storm	SUMP	SUMP
Minor Storm	Major Storm				
SUMP	SUMP				

## INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	CDOT Type C Grate	
Type of Inlet	CDOT Type C Grate	
Local Depression (additional to continuous gutter depression 'a' from above)		
Number of Unit Inlets (Grate or Curb Opening)		
Water Depth at Flowline (outside of local depression)		
<b>Grate Information</b>		
Length of a Unit Grate		
Width of a Unit Grate		
Area Opening Ratio for a Grate (typical values 0.15-0.90)		
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		
Grate Weir Coefficient (typical value 2.15 - 3.60)		
Grate Orifice Coefficient (typical value 0.60 - 0.80)		
<b>Curb Opening Information</b>		
Length of a Unit Curb Opening		
Height of Vertical Curb Opening in Inches		
Height of Curb Orifice Throat in Inches		
Angle of Throat (see USDCM Figure ST-5)		
Side Width for Depression Pan (typically the gutter width of 2 feet)		
Clogging Factor for a Single Curb Opening (typical value 0.10)		
Curb Opening Weir Coefficient (typical value 2.3-3.7)		
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		
<b>Low Head Performance Reduction (Calculated)</b>		
Depth for Grate Midwidth		
Depth for Curb Opening Weir Equation		
Combination Inlet Performance Reduction Factor for Long Inlets		
Curb Opening Performance Reduction Factor for Long Inlets		
Grated Inlet Performance Reduction Factor for Long Inlets		
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>		
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		

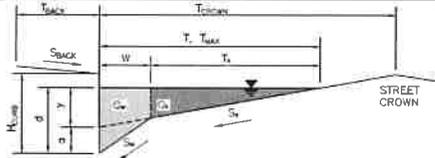
	MINOR	MAJOR	
Type =	CDOT Type C Grate		
$d_{local}$ =	6.00	6.00	inches
No =	1	1	
Ponding Depth =	5.7	10.1	inches
	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
$L_o$ (G) =	3.00	3.00	feet
$W_o$ =	3.00	3.00	feet
$A_{ratio}$ =	0.70	0.70	
$C_r$ (G) =	0.50	0.50	
$C_w$ (G) =	2.41	2.41	
$C_o$ (G) =	0.67	0.67	
	MINOR	MAJOR	
$L_o$ (C) =	N/A	N/A	feet
$H_{vert}$ =	N/A	N/A	inches
$H_{throat}$ =	N/A	N/A	inches
Theta =	N/A	N/A	degrees
$W_p$ =	N/A	N/A	feet
$C_r$ (C) =	N/A	N/A	
$C_w$ (C) =	N/A	N/A	
$C_o$ (C) =	N/A	N/A	
	MINOR	MAJOR	
$d_{grate}$ =	0.604	0.971	ft
$d_{curb}$ =	N/A	N/A	ft
$RF_{combination}$ =	N/A	N/A	
$RF_{curb}$ =	N/A	N/A	
$RF_{grate}$ =	0.90	1.00	
	MINOR	MAJOR	
$Q_a$ =	3.8	8.7	cfs
$Q_{PEAK REQUIRED}$ =	3.8	8.7	cfs

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

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

Project:  
Inlet ID:

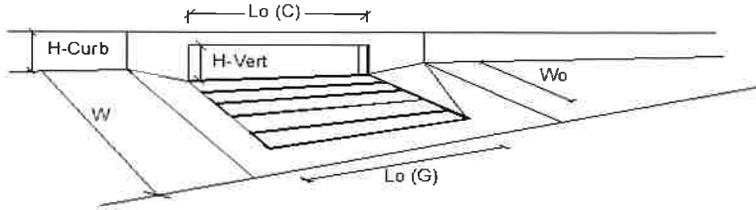
Revel at Wolf Ranch Phase II A  
Inlet 7



Gutter Geometry (Enter data in the blue cells)													
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$												
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	$S_o = 0.025$ ft/ft												
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$												
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} =</math></td> <td>14.0</td> <td>17.0</td> <td>ft</td> </tr> <tr> <td><math>d_{MAX} =</math></td> <td>6.0</td> <td>12.0</td> <td>inches</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} =$	14.0	17.0	ft	$d_{MAX} =$	6.0	12.0	inches
	Minor Storm	Major Storm											
$T_{MAX} =$	14.0	17.0	ft										
$d_{MAX} =$	6.0	12.0	inches										
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm													
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input type="checkbox"/> check = yes												
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>													
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>													
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'													
	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>Q_{allow} =</math></td> <td>10.7</td> <td>17.2</td> <td>cfs</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$Q_{allow} =$	10.7	17.2	cfs				
	Minor Storm	Major Storm											
$Q_{allow} =$	10.7	17.2	cfs										

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



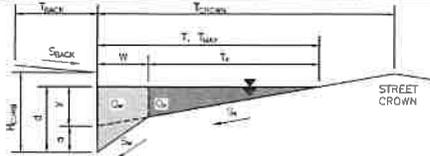
Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_u =$	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_u =$	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>				
Total Inlet Interception Capacity	Q =	6.8	12.7	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	4.2	cfs
Capture Percentage = $Q_i/Q_s =$	C% =	100	75	%

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

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

Project:  
Inlet ID:

Revel at Wolf Ranch Phase II A  
Inlet 8



**Gutter Geometry (Enter data in the blue cells)**

Maximum Allowable Width for Spread Behind Curb  
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)  
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)

T <sub>BACK</sub> =	10.0	ft
S <sub>BACK</sub> =	0.020	ft/ft
n <sub>BACK</sub> =	0.020	

Height of Curb at Gutter Flow Line  
Distance from Curb Face to Street Crown  
Gutter Width  
Street Transverse Slope  
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)  
Street Longitudinal Slope - Enter 0 for sump condition  
Manning's Roughness for Street Section (typically between 0.012 and 0.020)

H <sub>CURB</sub> =	6.00	inches
T <sub>CROWN</sub> =	17.0	ft
W =	2.00	ft
S <sub>X</sub> =	0.020	ft/ft
S <sub>W</sub> =	0.083	ft/ft
S <sub>O</sub> =	0.020	ft/ft
n <sub>STREET</sub> =	0.016	

Max. Allowable Spread for Minor & Major Storm  
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm  
Allow Flow Depth at Street Crown (leave blank for no)

	Minor Storm	Major Storm	
T <sub>MAX</sub> =	14.0	17.0	ft
d <sub>MAX</sub> =	6.0	12.0	inches
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes

MINOR STORM Allowable Capacity is based on Spread Criterion

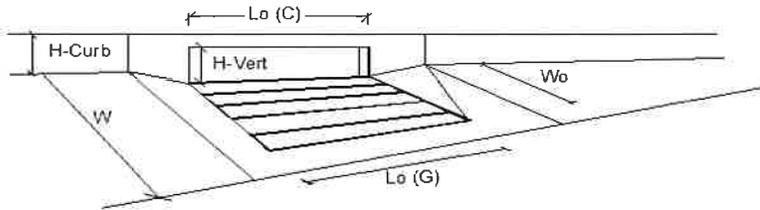
MAJOR STORM Allowable Capacity is based on Spread Criterion

	Minor Storm	Major Storm	
Q <sub>ALLOW</sub> =	9.6	15.4	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		
Local Depression (additional to continuous gutter depression 'a')	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	15.00	15.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>			
Total Inlet Interception Capacity	5.0	11.9	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	0.0	3.1	cfs
Capture Percentage = $Q_i/Q_s$ =	100	79	%

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

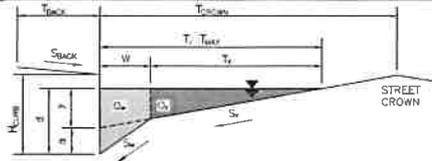
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Revel at Wolf Ranch Phase II A

Inlet ID:

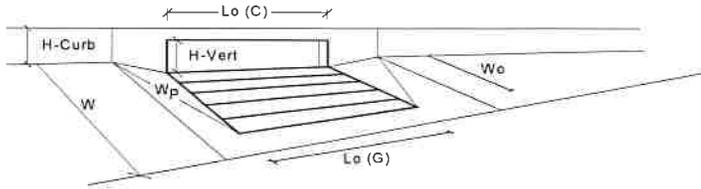
Inlet 9-10



<b>Gutter Geometry (Enter data in the blue cells)</b>					
Maximum Allowable Width for Spread Behind Curb	T <sub>BACK</sub> = 10.0 ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S <sub>BACK</sub> = 0.020 ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n <sub>BACK</sub> = 0.020				
Height of Curb at Gutter Flow Line	H <sub>CURB</sub> = 6.00 inches				
Distance from Curb Face to Street Crown	T <sub>CROWN</sub> = 17.0 ft				
Gutter Width	W = 2.00 ft				
Street Transverse Slope	S <sub>X</sub> = 0.020 ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S <sub>W</sub> = 0.083 ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	S <sub>L</sub> = 0.000 ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n <sub>STREET</sub> = 0.016				
Max. Allowable Spread for Minor & Major Storm	T <sub>MAX</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>14.0</td><td>17.0</td></tr></table> ft	Minor Storm	Major Storm	14.0	17.0
Minor Storm	Major Storm				
14.0	17.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	C <sub>MAX</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>6.0</td><td>12.0</td></tr></table> inches	Minor Storm	Major Storm	6.0	12.0
Minor Storm	Major Storm				
6.0	12.0				
Check boxes are not applicable in SUMP conditions	<input type="checkbox"/> <input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	Q <sub>ALLOW</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>SUMP</td><td>SUMP</td></tr></table> cfs	Minor Storm	Major Storm	SUMP	SUMP
Minor Storm	Major Storm				
SUMP	SUMP				

## INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



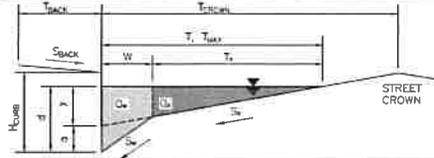
Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)			
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)			
<b>Grate Information</b>			
Length of a Unit Grate			
Width of a Unit Grate			
Area Opening Ratio for a Grate (typical values 0.15-0.90)			
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)			
Grate Weir Coefficient (typical value 2.15 - 3.60)			
Grate Orifice Coefficient (typical value 0.60 - 0.80)			
<b>Curb Opening Information</b>			
Length of a Unit Curb Opening			
Height of Vertical Curb Opening in Inches			
Height of Curb Orifice Throat in Inches			
Angle of Throat (see USDCM Figure ST-5)			
Side Width for Depression Pan (typically the gutter width of 2 feet)			
Clogging Factor for a Single Curb Opening (typical value 0.10)			
Curb Opening Weir Coefficient (typical value 2.3-3.7)			
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)			
<b>Low Head Performance Reduction (Calculated)</b>			
Depth for Grate Midwidth			
Depth for Curb Opening Weir Equation			
Combination Inlet Performance Reduction Factor for Long Inlets			
Curb Opening Performance Reduction Factor for Long Inlets			
Grated Inlet Performance Reduction Factor for Long Inlets			
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>			
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)			
	MINOR	MAJOR	
Type =	CDOT Type R Curb Opening		
$d_{local}$ =	3.00	3.00	inches
$N_o$ =	1		
Ponding Depth =	5.6	8.6	inches
	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
$L_o$ (G) =	N/A	N/A	feet
$W_o$ =	N/A	N/A	feet
$A_{ratio}$ =	N/A	N/A	
$C_f$ (G) =	N/A	N/A	
$C_w$ (G) =	N/A	N/A	
$C_o$ (G) =	N/A	N/A	
	MINOR	MAJOR	
$L_o$ (C) =	15.00	15.00	feet
$H_{vert}$ =	6.00	6.00	inches
$H_{throat}$ =	6.00	6.00	inches
Theta =	63.40	63.40	degrees
$W_p$ =	2.00	2.00	feet
$C_f$ (C) =	0.10	0.10	
$C_w$ (C) =	3.60	3.60	
$C_o$ (C) =	0.67	0.67	
	MINOR	MAJOR	
$d_{Grate}$ =	N/A	N/A	ft
$d_{Curb}$ =	0.30	0.55	ft
$RF_{Combination}$ =	0.53	0.81	
$RF_{Curb}$ =	0.76	0.92	
$RF_{Grate}$ =	N/A	N/A	
	MINOR	MAJOR	
$Q_a$ =	8.1	24.1	cfs
$Q_{PEAK REQUIRED}$ =	8.1	24.1	cfs

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

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

Project:  
Inlet ID:

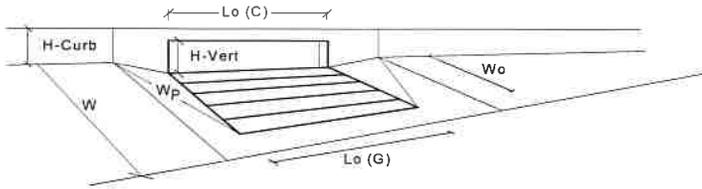
Revel at Wolf Ranch Phase II A  
Inlet 1A



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	T <sub>BACK</sub> = 10.0 ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S <sub>BACK</sub> = 0.020 ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n <sub>BACK</sub> = 0.020				
Height of Curb at Gutter Flow Line	H <sub>CURB</sub> = 8.00 inches				
Distance from Curb Face to Street Crown	T <sub>CROWN</sub> = 17.0 ft				
Gutter Width	W = 2.00 ft				
Street Transverse Slope	S <sub>X</sub> = 0.020 ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S <sub>W</sub> = 0.083 ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	S <sub>O</sub> = 0.000 ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n <sub>STREET</sub> = 0.016				
Max. Allowable Spread for Minor & Major Storm	T <sub>MAX</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>14.0</td><td>17.0</td></tr></table> ft	Minor Storm	Major Storm	14.0	17.0
Minor Storm	Major Storm				
14.0	17.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d <sub>MAX</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>6.0</td><td>12.0</td></tr></table> inches	Minor Storm	Major Storm	6.0	12.0
Minor Storm	Major Storm				
6.0	12.0				
Check boxes are not applicable in SUMP conditions	<input type="checkbox"/> <input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion	Q <sub>ALLOW</sub> = <table border="1"><tr><td>Minor Storm</td><td>Major Storm</td></tr><tr><td>SUMP</td><td>SUMP</td></tr></table> cfs	Minor Storm	Major Storm	SUMP	SUMP
Minor Storm	Major Storm				
SUMP	SUMP				
MAJOR STORM Allowable Capacity is based on Depth Criterion					

## 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		
Local Depression (additional to continuous gutter depression 'a' from above)			
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)			
<b>Grate Information</b>	MINOR		MAJOR
Length of a Unit Grate	N/A		N/A
Width of a Unit Grate	N/A		N/A
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A		N/A
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A		N/A
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A		N/A
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A		N/A
<b>Curb Opening Information</b>	MINOR		MAJOR
Length of a Unit Curb Opening	10.00		10.00
Height of Vertical Curb Opening in Inches	6.00		6.00
Height of Curb Orifice Throat in Inches	6.00		6.00
Angle of Throat (see USDCM Figure ST-5)	63.40		63.40
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00		2.00
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10		0.10
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60		3.60
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67		0.67
<b>Low Head Performance Reduction (Calculated)</b>	MINOR		MAJOR
Depth for Grate Midwidth	N/A		N/A
Depth for Curb Opening Weir Equation	0.18		0.29
Combination Inlet Performance Reduction Factor for Long Inlets	0.39		0.52
Curb Opening Performance Reduction Factor for Long Inlets	0.80		0.90
Grated Inlet Performance Reduction Factor for Long Inlets	N/A		N/A
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>	MINOR		MAJOR
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	2.7		6.5
Q PEAK REQUIRED =	2.7		6.5

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

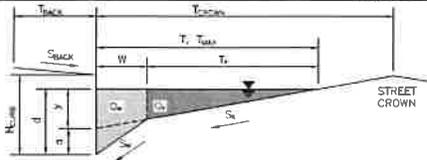
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Revel at Wolf Ranch Phase II A

Inlet ID:

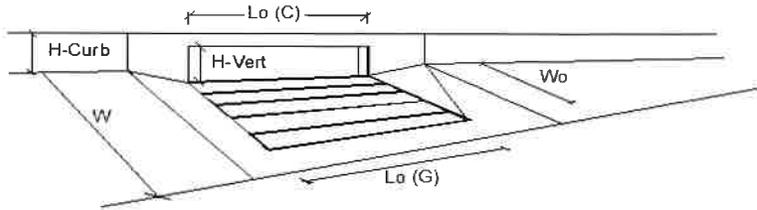
Inlet 13



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	T <sub>BACK</sub> = 10.0 ft				
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S <sub>BACK</sub> = 0.020 ft/ft				
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n <sub>BACK</sub> = 0.020				
Height of Curb at Gutter Flow Line	H <sub>CURB</sub> = 6.00 inches				
Distance from Curb Face to Street Crown	T <sub>CROWN</sub> = 17.0 ft				
Gutter Width	W = 2.00 ft				
Street Transverse Slope	S <sub>X</sub> = 0.020 ft/ft				
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S <sub>W</sub> = 0.083 ft/ft				
Street Longitudinal Slope - Enter 0 for sump condition	S <sub>G</sub> = 0.030 ft/ft				
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n <sub>STREET</sub> = 0.016				
Max. Allowable Spread for Minor & Major Storm	T <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>14.0</td><td>17.0</td></tr></table> ft	Minor Storm	Major Storm	14.0	17.0
Minor Storm	Major Storm				
14.0	17.0				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	Q <sub>MAX</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>6.0</td><td>12.0</td></tr></table> inches	Minor Storm	Major Storm	6.0	12.0
Minor Storm	Major Storm				
6.0	12.0				
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input type="checkbox"/> check = yes				
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>					
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'					
	Q <sub>ALLOW</sub> = <table border="1"><tr><th>Minor Storm</th><th>Major Storm</th></tr><tr><td>11.7</td><td>18.8</td></tr></table> cfs	Minor Storm	Major Storm	11.7	18.8
Minor Storm	Major Storm				
11.7	18.8				

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



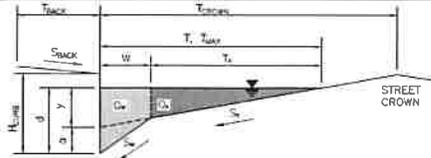
Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	$a_{LOCAL} =$	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_o =$	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)	$C_r-G =$	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C =$	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity</b>				
Total Inlet Interception Capacity	Q =	3.7	7.8	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_b =$	0.0	0.2	cfs
Capture Percentage = $Q/Q_o =$	C% =	100	98	%

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

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

Project:  
Inlet ID:

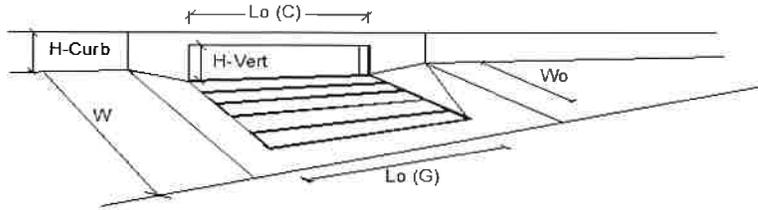
Revel at Wolf Ranch Phase II A  
Inlet 14



Gutter Geometry (Enter data in the blue cells)																	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$																
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	$S_O = 0.030$ ft/ft																
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$																
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} =</math></td> <td>14.0</td> <td>17.0</td> <td>ft</td> </tr> <tr> <td><math>D_{MAX} =</math></td> <td>6.0</td> <td>12.0</td> <td>inches</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>check = yes</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$T_{MAX} =$	14.0	17.0	ft	$D_{MAX} =$	6.0	12.0	inches		<input type="checkbox"/>	<input type="checkbox"/>	check = yes
	Minor Storm	Major Storm															
$T_{MAX} =$	14.0	17.0	ft														
$D_{MAX} =$	6.0	12.0	inches														
	<input type="checkbox"/>	<input type="checkbox"/>	check = yes														
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm																	
Allow Flow Depth at Street Crown (leave blank for no)																	
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>																	
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>																	
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'																	
	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> <th></th> </tr> </thead> <tbody> <tr> <td><math>Q_{ALLOW} =</math></td> <td>11.7</td> <td>18.8</td> <td>cfs</td> </tr> </tbody> </table>		Minor Storm	Major Storm		$Q_{ALLOW} =$	11.7	18.8	cfs								
	Minor Storm	Major Storm															
$Q_{ALLOW} =$	11.7	18.8	cfs														

## INLET ON A CONTINUOUS GRADE

Version 4.05 Released March 2017



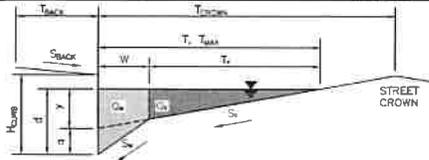
Design Information (Input)	MINOR		MAJOR	
Type of Inlet	CDOT Type R Curb Opening			
Local Depression (additional to continuous gutter depression 'a')	a <sub>LOCAL</sub> =	3.0	3.0	inches
Total Number of Units in the Inlet (Grate or Curb Opening)	No =	1	1	
Length of a Single Unit Inlet (Grate or Curb Opening)	L <sub>o</sub> =	5.00	5.00	ft
Width of a Unit Grate (cannot be greater than W, Gutter Width)	W <sub>g</sub> =	N/A	N/A	ft
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	C <sub>r-G</sub> =	N/A	N/A	
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	C <sub>r-C</sub> =	0.10	0.10	
<b>Street Hydraulics: OK - Q &lt; Allowable Street Capacity*</b>				
Total Inlet Interception Capacity	Q =	1.9	2.9	cfs
Total Inlet Carry-Over Flow (flow bypassing inlet)	Q <sub>o</sub> =	0.3	2.2	cfs
Capture Percentage = Q <sub>i</sub> /Q <sub>o</sub> =	C% =	84	57	%

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

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

Project:  
Inlet ID:

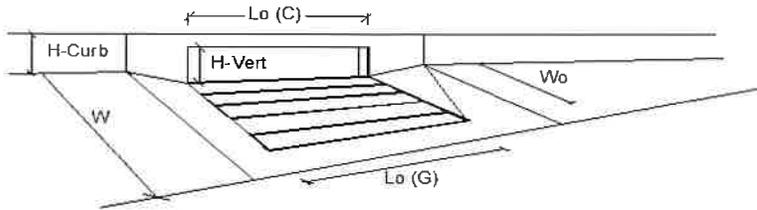
Revel at Wolf Ranch Phase II A  
Inlet 15



Gutter Geometry (Enter data in the blue cells)	
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$
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	$S_0 = 0.030$ ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	$n_{STREET} = 0.016$
Max. Allowable Spread for Minor & Major Storm	$T_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 14.0 & 17.0 \end{matrix}$ ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	$d_{MAX} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 6.0 & 12.0 \end{matrix}$ inches
Allow Flow Depth at Street Crown (leave blank for no)	<input type="checkbox"/> <input type="checkbox"/> check = yes
<b>MINOR STORM Allowable Capacity is based on Spread Criterion</b>	
<b>MAJOR STORM Allowable Capacity is based on Spread Criterion</b>	
Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'	$Q_{allow} = \begin{matrix} \text{Minor Storm} & \text{Major Storm} \\ 11.7 & 18.8 \end{matrix}$ cfs
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)	<div style="display: flex; align-items: center; gap: 10px;"> <span>CDOT Type R Curb Opening</span> <span style="font-size: 0.8em;">▼</span> </div>	
	MINOR	MAJOR
Type of Inlet	CDOT Type R Curb Opening	
Local Depression (additional to continuous gutter depression 'a')	$a_{LOCAL} = 3.0$	$3.0$
Total Number of Units in the Inlet (Grate or Curb Opening)	$N_u = 1$	$1$
Length of a Single Unit Inlet (Grate or Curb Opening)	$L_u = 5.00$	$5.00$
Width of a Unit Grate (cannot be greater than W, Gutter Width)	$W_u = N/A$	$N/A$
Clogging Factor for a Single Unit Grate (typical min. value = 0.5)	$C_r-G = N/A$	$N/A$
Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1)	$C_r-C = 0.10$	$0.10$
<b>Street Hydraulics: OK - <math>Q &lt; Q_{allowable}</math> Street Capacity</b>	MINOR	MAJOR
Total Inlet Interception Capacity	$Q = 2.0$	$2.9$
Total Inlet Carry-Over Flow (flow bypassing inlet)	$Q_o = 0.6$	$2.2$
Capture Percentage = $Q/Q_o =$	$79$	$57$

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

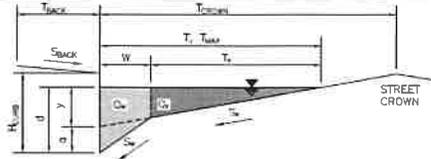
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Revel at Wolf Ranch Phase II A

Inlet ID:

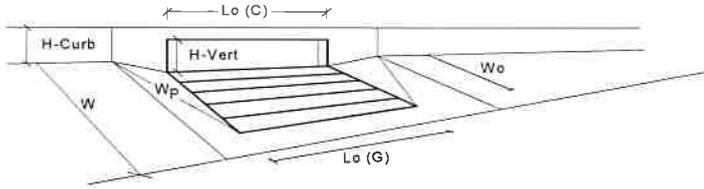
Inlet 19A



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 8.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ 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)	$n_{STREET} = 0.016$						
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} =</math></td> <td>14.0</td> <td>18.0</td> </tr> </tbody> </table> ft		Minor Storm	Major Storm	$T_{MAX} =$	14.0	18.0
	Minor Storm	Major Storm					
$T_{MAX} =$	14.0	18.0					
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>d_{MAX} =</math></td> <td>6.0</td> <td>12.0</td> </tr> </tbody> </table> inches		Minor Storm	Major Storm	$d_{MAX} =$	6.0	12.0
	Minor Storm	Major Storm					
$d_{MAX} =$	6.0	12.0					
Check boxes are not applicable in SUMP conditions							
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>							
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>							
$Q_{ALLOW} =$	<table border="1"> <thead> <tr> <th></th> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td></td> <td>SUMP</td> <td>SUMP</td> </tr> </tbody> </table> cfs		Minor Storm	Major Storm		SUMP	SUMP
	Minor Storm	Major Storm					
	SUMP	SUMP					

## INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



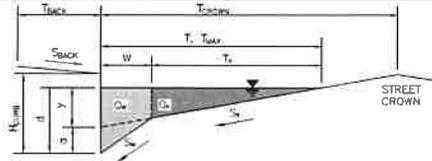
<b>Design Information (Input)</b>		<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">MINOR</th> <th style="text-align: center;">MAJOR</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">Type = CDOT Type R Curb Opening</td> </tr> <tr> <td><math>d_{local}</math> = 1.00</td> <td>1.00</td> <td style="text-align: right;">inches</td> </tr> <tr> <td>No = 1</td> <td>1</td> <td></td> </tr> <tr> <td>Ponding Depth = 3.7</td> <td>6.3</td> <td style="text-align: right;">inches</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: right;"><input checked="" type="checkbox"/> Override Depths</td> </tr> <tr> <td><math>L_o</math> (G) = N/A</td> <td>N/A</td> <td style="text-align: right;">feet</td> </tr> <tr> <td><math>W_o</math> = N/A</td> <td>N/A</td> <td style="text-align: right;">feet</td> </tr> <tr> <td><math>A_{ratio}</math> = N/A</td> <td>N/A</td> <td></td> </tr> <tr> <td><math>C_i</math> (G) = N/A</td> <td>N/A</td> <td></td> </tr> <tr> <td><math>C_w</math> (G) = N/A</td> <td>N/A</td> <td></td> </tr> <tr> <td><math>C_o</math> (G) = N/A</td> <td>N/A</td> <td></td> </tr> <tr> <td colspan="2"></td> <td style="text-align: right;">feet</td> </tr> <tr> <td><math>L_o</math> (C) = 10.00</td> <td>10.00</td> <td style="text-align: right;">feet</td> </tr> <tr> <td><math>H_{vert}</math> = 6.00</td> <td>6.00</td> <td style="text-align: right;">inches</td> </tr> <tr> <td><math>H_{throat}</math> = 6.00</td> <td>6.00</td> <td style="text-align: right;">inches</td> </tr> <tr> <td>Theta = 63.40</td> <td>63.40</td> <td style="text-align: right;">degrees</td> </tr> <tr> <td><math>W_p</math> = 2.00</td> <td>2.00</td> <td style="text-align: right;">feet</td> </tr> <tr> <td><math>C_i</math> (C) = 0.10</td> <td>0.10</td> <td></td> </tr> <tr> <td><math>C_w</math> (C) = 3.60</td> <td>3.60</td> <td></td> </tr> <tr> <td><math>C_o</math> (C) = 0.67</td> <td>0.67</td> <td></td> </tr> <tr> <td colspan="2"></td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{grate}</math> = N/A</td> <td>N/A</td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>d_{curb}</math> = 0.14</td> <td>0.36</td> <td style="text-align: right;">ft</td> </tr> <tr> <td><math>RF_{combination}</math> = 0.35</td> <td>0.59</td> <td></td> </tr> <tr> <td><math>RF_{curb}</math> = 0.76</td> <td>0.95</td> <td></td> </tr> <tr> <td><math>RF_{grate}</math> = N/A</td> <td>N/A</td> <td></td> </tr> <tr> <td colspan="2"></td> <td style="text-align: right;">cfs</td> </tr> <tr> <td><math>Q_a</math> = 1.8</td> <td>9.2</td> <td style="text-align: right;">cfs</td> </tr> <tr> <td><math>Q_{PEAK REQUIRED}</math> = 1.8</td> <td>9.2</td> <td style="text-align: right;">cfs</td> </tr> </tbody> </table>		MINOR	MAJOR	Type = CDOT Type R Curb Opening		$d_{local}$ = 1.00	1.00	inches	No = 1	1		Ponding Depth = 3.7	6.3	inches			<input checked="" type="checkbox"/> Override Depths	$L_o$ (G) = N/A	N/A	feet	$W_o$ = N/A	N/A	feet	$A_{ratio}$ = N/A	N/A		$C_i$ (G) = N/A	N/A		$C_w$ (G) = N/A	N/A		$C_o$ (G) = N/A	N/A				feet	$L_o$ (C) = 10.00	10.00	feet	$H_{vert}$ = 6.00	6.00	inches	$H_{throat}$ = 6.00	6.00	inches	Theta = 63.40	63.40	degrees	$W_p$ = 2.00	2.00	feet	$C_i$ (C) = 0.10	0.10		$C_w$ (C) = 3.60	3.60		$C_o$ (C) = 0.67	0.67				ft	$d_{grate}$ = N/A	N/A	ft	$d_{curb}$ = 0.14	0.36	ft	$RF_{combination}$ = 0.35	0.59		$RF_{curb}$ = 0.76	0.95		$RF_{grate}$ = N/A	N/A				cfs	$Q_a$ = 1.8	9.2	cfs	$Q_{PEAK REQUIRED}$ = 1.8	9.2	cfs
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Type of Inlet	CDOT Type R Curb Opening																																																																																										
Local Depression (additional to continuous gutter depression 'a' from above)																																																																																											
Number of Unit Inlets (Grate or Curb Opening)																																																																																											
Water Depth at Flowline (outside of local depression)																																																																																											
<b>Grate Information</b>																																																																																											
Length of a Unit Grate																																																																																											
Width of a Unit Grate																																																																																											
Area Opening Ratio for a Grate (typical values 0.15-0.90)																																																																																											
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)																																																																																											
Grate Weir Coefficient (typical value 2.15 - 3.60)																																																																																											
Grate Orifice Coefficient (typical value 0.60 - 0.80)																																																																																											
<b>Curb Opening Information</b>																																																																																											
Length of a Unit Curb Opening																																																																																											
Height of Vertical Curb Opening in Inches																																																																																											
Height of Curb Orifice Throat in Inches																																																																																											
Angle of Throat (see USDCM Figure ST-5)																																																																																											
Side Width for Depression Pan (typically the gutter width of 2 feet)																																																																																											
Clogging Factor for a Single Curb Opening (typical value 0.10)																																																																																											
Curb Opening Weir Coefficient (typical value 2.3-3.7)																																																																																											
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)																																																																																											
<b>Low Head Performance Reduction (Calculated)</b>																																																																																											
Depth for Grate Midwidth																																																																																											
Depth for Curb Opening Weir Equation																																																																																											
Combination Inlet Performance Reduction Factor for Long Inlets																																																																																											
Curb Opening Performance Reduction Factor for Long Inlets																																																																																											
Grated Inlet Performance Reduction Factor for Long Inlets																																																																																											
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>																																																																																											
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)																																																																																											

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

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

Project:  
Inlet ID:

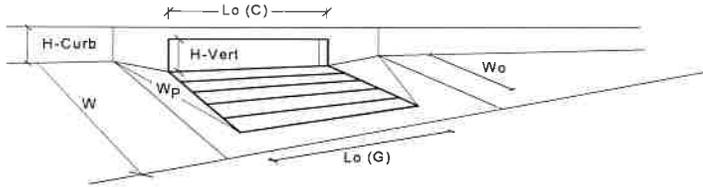
Revel at Wolf Ranch Phase II A  
Inlet 19B



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$				
Height of Curb at Gutter Flow Line	$H_{CURB} = 8.00$ inches				
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ 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)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td><math>T_{MAX} = 14.0</math></td> <td><math>T_{MAX} = 18.0</math></td> </tr> </table>	Minor Storm	Major Storm	$T_{MAX} = 14.0$	$T_{MAX} = 18.0$
Minor Storm	Major Storm				
$T_{MAX} = 14.0$	$T_{MAX} = 18.0$				
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td><math>d_{MAX} = 6.0</math></td> <td><math>d_{MAX} = 12.0</math></td> </tr> </table>	Minor Storm	Major Storm	$d_{MAX} = 6.0$	$d_{MAX} = 12.0$
Minor Storm	Major Storm				
$d_{MAX} = 6.0$	$d_{MAX} = 12.0$				
Check boxes are not applicable in SUMP conditions	<table border="1"> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>				
MINOR STORM Allowable Capacity is based on Depth Criterion					
MAJOR STORM Allowable Capacity is based on Depth Criterion					
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> <tr> <td><math>Q_{ALLOW} = SUMP</math></td> <td><math>Q_{ALLOW} = SUMP</math></td> </tr> </table>	Minor Storm	Major Storm	$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$
Minor Storm	Major Storm				
$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$				

## 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		
Local Depression (additional to continuous gutter depression 'a' from above)			
Number of Unit Inlets (Grate or Curb Opening)	1		
Water Depth at Flowline (outside of local depression)			
<b>Grate Information</b>			
Length of a Unit Grate			
Width of a Unit Grate			
Area Opening Ratio for a Grate (typical values 0.15-0.90)			
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)			
Grate Weir Coefficient (typical value 2.15 - 3.60)			
Grate Orifice Coefficient (typical value 0.60 - 0.80)			
<b>Curb Opening Information</b>			
Length of a Unit Curb Opening			
Height of Vertical Curb Opening in Inches			
Height of Curb Orifice Throat in Inches			
Angle of Throat (see USDCM Figure ST-5)			
Side Width for Depression Pan (typically the gutter width of 2 feet)			
Clogging Factor for a Single Curb Opening (typical value 0.10)			
Curb Opening Weir Coefficient (typical value 2.3-3.7)			
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)			
<b>Low Head Performance Reduction (Calculated)</b>			
Depth for Grate Midwidth			
Depth for Curb Opening Weir Equation			
Combination Inlet Performance Reduction Factor for Long Inlets			
Curb Opening Performance Reduction Factor for Long Inlets			
Grated Inlet Performance Reduction Factor for Long Inlets			
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>			
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)			
	MINOR		MAJOR
Type =	CDOT Type R Curb Opening		
$d_{local}$ =	1.00	1.00	inches
No =	1		
Ponding Depth =	3.2	3.8	inches
	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
$L_o$ (G) =	N/A	N/A	feet
$W_o$ =	N/A	N/A	feet
$A_{ratio}$ =	N/A	N/A	
$C_r$ (G) =	N/A	N/A	
$C_w$ (G) =	N/A	N/A	
$C_o$ (G) =	N/A	N/A	
	MINOR		MAJOR
$L_o$ (C) =	10.00	10.00	feet
$H_{vert}$ =	6.00	6.00	inches
$H_{throat}$ =	6.00	6.00	inches
Theta =	63.40	63.40	degrees
$W_p$ =	2.00	2.00	feet
$C_r$ (C) =	0.10	0.10	
$C_w$ (C) =	3.60	3.60	
$C_o$ (C) =	0.67	0.67	
	MINOR		MAJOR
$d_{Grate}$ =	N/A	N/A	ft
$d_{Curb}$ =	0.10	0.15	ft
$RF_{Combination}$ =	0.30	0.36	
$RF_{Curb}$ =	0.71	0.77	
$RF_{Grate}$ =	N/A	N/A	
	MINOR		MAJOR
$Q_a$ =	1.0	2.1	cfs
$Q_{PEAK REQUIRED}$ =	1.0	2.1	cfs

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

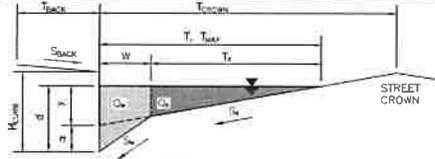
(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project:

Revel at Wolf Ranch Phase II A

Inlet ID:

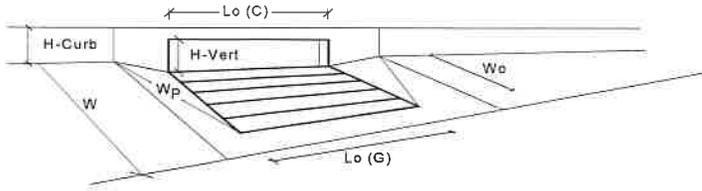
Inlet 1B



Gutter Geometry (Enter data in the blue cells)					
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 10.0$ 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)	$n_{BACK} = 0.020$				
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)	$n_{STREET} = 0.016$				
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>T_{MAX} = 14.0</math></td> <td><math>T_{MAX} = 17.0</math></td> </tr> </tbody> </table>	Minor Storm	Major Storm	$T_{MAX} = 14.0$	$T_{MAX} = 17.0$
Minor Storm	Major Storm				
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Minor Storm	Major Storm				
<input type="checkbox"/>	<input type="checkbox"/>				
<b>MINOR STORM Allowable Capacity is based on Depth Criterion</b>					
<b>MAJOR STORM Allowable Capacity is based on Depth Criterion</b>					
	<table border="1"> <thead> <tr> <th>Minor Storm</th> <th>Major Storm</th> </tr> </thead> <tbody> <tr> <td><math>Q_{ALLOW} = SUMP</math></td> <td><math>Q_{ALLOW} = SUMP</math></td> </tr> </tbody> </table>	Minor Storm	Major Storm	$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$
Minor Storm	Major Storm				
$Q_{ALLOW} = SUMP$	$Q_{ALLOW} = SUMP$				

## INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



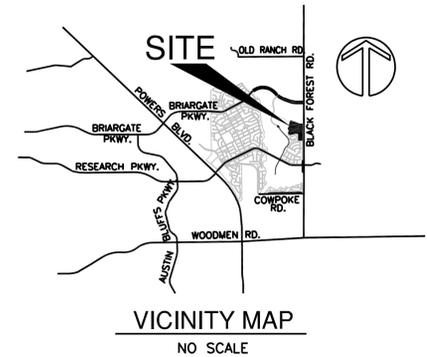
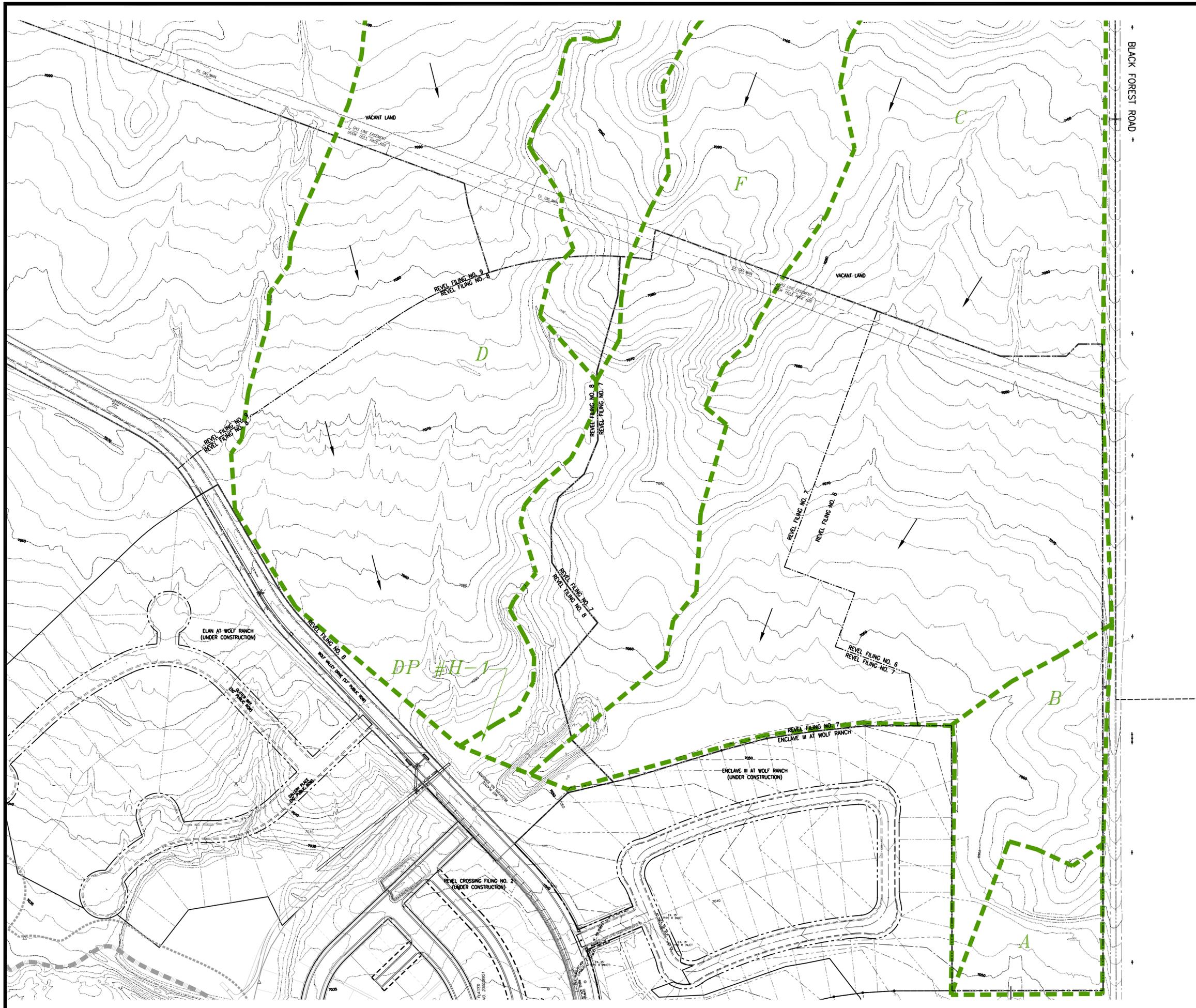
Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)	2.7	3.1	inches
<b>Grate Information</b>	MINOR	MAJOR	<input checked="" type="checkbox"/> Override Depths
Length of a Unit Grate	N/A	N/A	feet
Width of a Unit Grate	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	N/A	N/A	
<b>Curb Opening Information</b>	MINOR	MAJOR	
Length of a Unit Curb Opening	10.00	10.00	feet
Height of Vertical Curb Opening in Inches	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.67	0.67	
<b>Low Head Performance Reduction (Calculated)</b>	MINOR	MAJOR	
Depth for Grate Midwidth	N/A	N/A	ft
Depth for Curb Opening Weir Equation	0.06	0.10	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.25	0.30	
Curb Opening Performance Reduction Factor for Long Inlets	0.64	0.70	
Grated Inlet Performance Reduction Factor for Long Inlets	N/A	N/A	
<b>Total Inlet Interception Capacity (assumes clogged condition)</b>	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	0.4	0.9	cfs
Q PEAK REQUIRED =	0.4	0.9	cfs

Revel at Wolf Ranch Filings 6 and 7  
Feb. 1, 2021  
Mannings' Equation n= 0.013

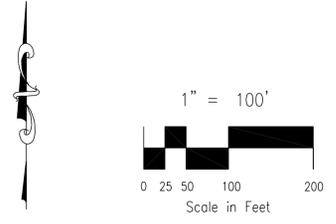
Pipe No.	Slope	PIPE SIZE (Inches)	Q5	5 YEAR STORM		Q100	100 YEAR STORM			
				FLOW DEPTH (Ft)	VELOCITY (fps)		FLOW DEPTH (Ft)	VELOCITY (fps)		
1	3.0%	36"	22.1	0.89	12.50	45.4	1.31	15.28		OS-1
2	1.5%	18"	6.7	0.77	7.31	11.5	1.11	8.18		OS-2
3	3.0%	36"	25.7	0.96	13.11	52.7	1.42	15.94		DP#1
4	1.5%	18"	2.7	0.47	5.68	6.5	0.76	7.23		1A + OS-3
5	1.5%	18"	0.4	0.19	3.05	0.9	0.27	4.11		1B
6	1.5%	18"	2.8	0.48	5.72	6.8	0.78	7.29		DP#2
7	1.5%	18"	2.8	0.48	5.72	6.8	0.78	7.29		DP#2
8	3.0%	36"	28.1	1.01	13.39	58.4	1.51	16.33		DP#3
9	1.5%	18"	4.0	0.58	6.31	10.3	1.02	8.04		2
10	1.5%	18"	6.9	0.78	7.39	12.0	1.15	8.25		3
11	3.0%	36"	35.4	1.14	14.32	75.1	1.76	17.34		DP#4
12	1.5%	18"	5.5	0.69	6.89	11.7	1.13	8.18		4
13	1.5%	18"	6.1	0.73	7.14	11.5	1.11	8.18		5
14	3.0%	36"	44.4	1.29	15.17	93.9	2.05	18.19		DP#5
15	1.5%	18"	4.6	0.62	6.64	7.7	0.84	7.53		6
16	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98		Dp#6
17	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98		Dp#6
18	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98		DP#6
19	2.2%	42"	47.8	1.36	13.74	157.5	3.09	17.51		DP#7
20	1.5%	18"	6.8	0.78	7.29	12.7	1.22	8.24		7
21	1.5%	18"	5.0	0.65	6.78	11.9	1.14	8.25		8
22	2.2%	42"	55.5	1.55	12.31	174.4	3.25	15.92		DP#8
23	1.5%	42"	55.5	1.55	12.31	174.4	3.25	15.92		DP#8
24	1.5%	42"	59.4	1.61	12.54	181.2	3.40	15.89		DP#9
25	3.0%	18"	3.7	0.55	6.26	7.8	0.85	7.55		13
26	3.0%	18"	3.7	0.55	6.26	7.8	0.85	7.55		13
27	1.5%	18"	1.9	0.39	5.14	2.9	0.49	5.75		14
28	1.5%	18"	2.0	0.40	5.23	2.9	0.49	5.75		15
29	3.2%	18"	7.6	0.67	9.93	13.6	0.95	11.98		DP#10 Collected
30	2.5%	42"	29.1	1.02	12.36	147.4	2.66	18.76		Dp#11
31	2.5%	42"	31.0	1.05	12.75	152.6	2.75	18.81		DP#12
32	2.5%	42"	34.4	1.10	13.16	148.4	2.94	18.81		DP#13

**Revel at Wolf Ranch Filings 6 and 7**  
**Feb. 1, 2021**  
**Impervious vs Pervious Areas**

Basin	Total Area (Acres)	Impervious Area (Acres)	% Imp	Pervious Area	% Pervious (fps)
1A	0.67	0.35	52%	0.32	48%
1B	0.16	0.08	50%	0.08	50%
2	2.01	1.06	53%	0.95	47%
3	3.09	1.78	58%	1.31	42%
4	2.55	1.80	71%	0.75	29%
5	2.82	2.00	71%	0.82	29%
6	1.92	1.00	52%	0.93	48%
7	3.29	2.33	71%	0.96	29%
8	3.21	1.72	54%	1.49	46%
9	2.16	1.50	69%	0.66	31%
10	1.50	1.17	78%	0.33	22%
11	5.18	3.37	65%	1.81	35%
12	1.20	0.78	65%	0.42	35%
13	2.20	1.39	63%	0.81	37%
14	1.17	0.70	59%	0.47	41%
15	1.00	0.79	79%	0.21	21%
16	0.27	0.13	48%	0.14	52%
17	0.13	0.08	65%	0.05	35%
18	0.86	0.29	34%	0.57	66%
19A	3.99	0.23	6%	3.76	94%
19B	0.43	0.23	53%	0.20	47%
20	3.05	0.95	31%	2.10	69%
21	5.30	1.58	30%	3.72	70%
22	2.96	0.06	2%	2.90	98%
	51.12	25.35	50%	25.77	50%



- LEGEND**
- EXISTING CONTOURS
  - HISTORIC BASIN BOUNDARIES
  - A** HISTORIC BASIN DESIGNATOR
  - DP #H-1** HISTORIC DESIGN POINT
  - PROPOSED 2' CONTOURS
  - DIRECTION OF FLOW
  - FILING BOUNDARIES



HISTORIC DRAINAGE BASINS

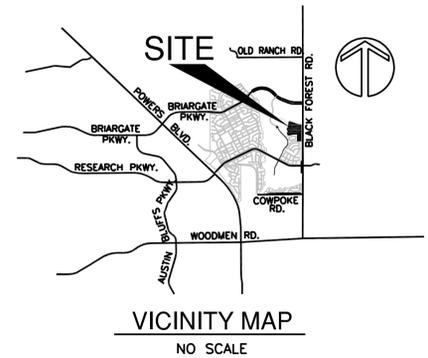
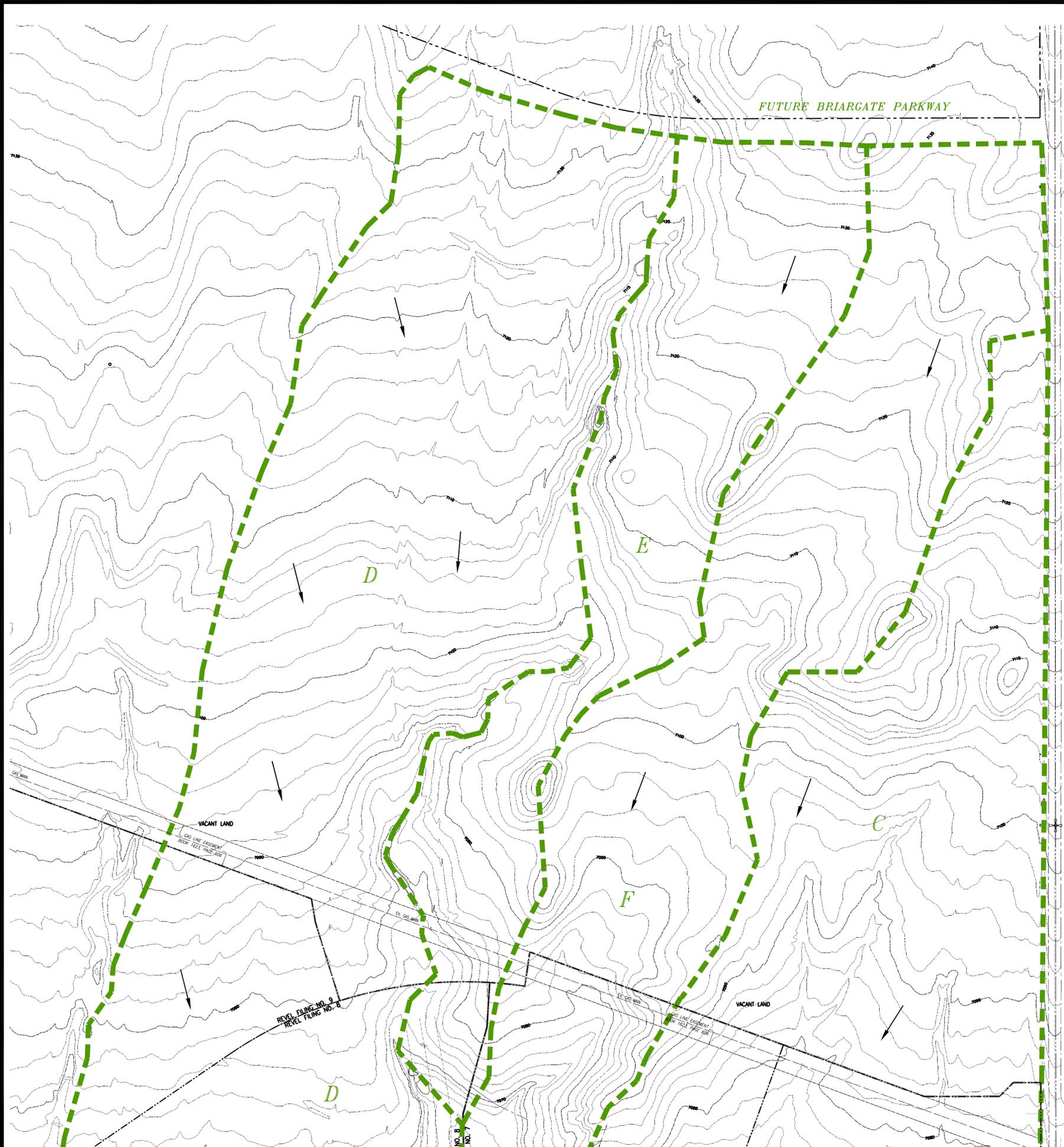
BASIN	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
A	2.09	0.5	4.0
B	3.70	0.9	6.5
C	34.02	4.2	30.5
D	39.08	4.3	31.3
E	12.41	1.8	13.2
F	23.63	2.6	18.9
DP#H-1	109.14	11.9	87.2

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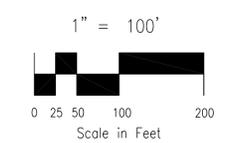
**REVEL AT WOLF RANCH PHASE II A (REVEL FILINGS 6 AND 7)  
HISTORIC DRAINAGE MAP**

SCALE : 1"=100' DRAWN BY : KDR  
DATE : 2/1/21 CHECKED BY : KDR

**20-017**  
JOB NO.



- LEGEND**
- 6100 EXISTING CONTOURS
  - HISTORIC BASIN BOUNDARIES
  - A** HISTORIC BASIN DESIGNATOR
  - DP #H-1** HISTORIC DESIGN POINT
  - PROPOSED 2' CONTOURS
  - DIRECTION OF FLOW
  - FILING BOUNDARIES



HISTORIC DRAINAGE BASINS

BASIN	Area (Acres)	Q <sub>0</sub> (cfs)	Q <sub>100</sub> (cfs)
<b>A</b>	2.09	0.5	4.0
<b>B</b>	3.70	0.9	6.5
<b>C</b>	34.02	4.2	30.5
<b>D</b>	39.05	4.3	31.3
<b>E</b>	12.41	1.8	13.2
<b>F</b>	23.63	2.6	18.9
<b>DP#H-1</b>	109.14	11.9	87.2

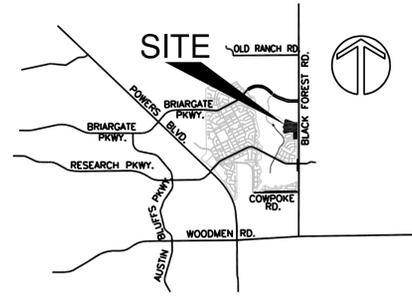
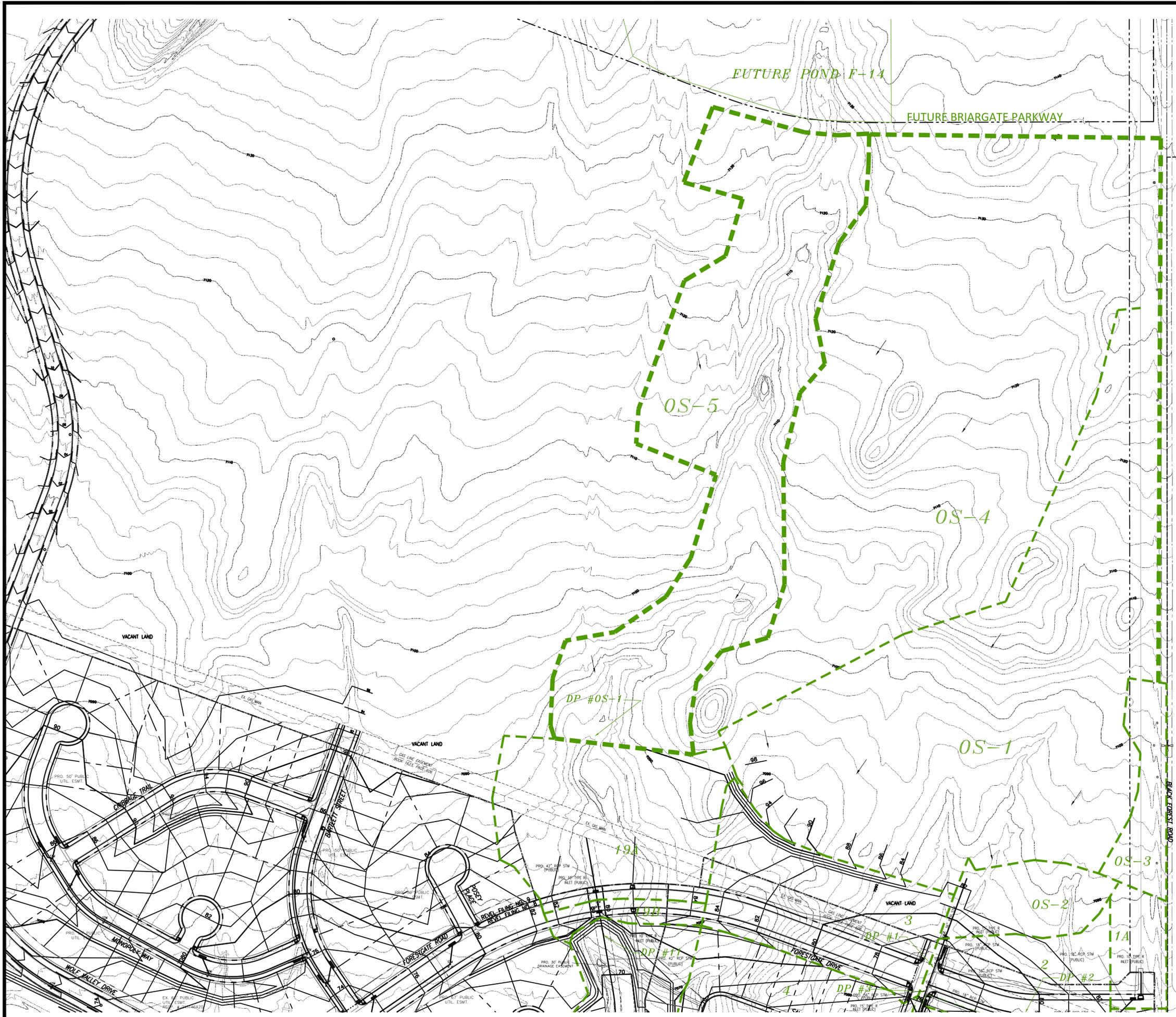
EXHIBIT 1 - SHEET 2 OF 2

FILE: 20017\20017BAS3.DWG 2/1/21

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**REVEL AT WOLF RANCH PHASE II A (REVEL FILINGS 6 AND 7)**  
**HISTORIC DRAINAGE MAP**

SCALE : 1"=100'	DRAWN BY : KDR	<b>20-017</b>
DATE : 2/1/21	CHECKED BY : KDR	JOB NO.



VICINITY MAP  
NO SCALE

LEGEND

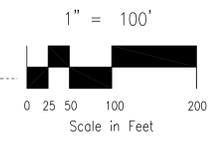
- 6100 EXISTING CONTOURS
- DEVELOPED BASIN BOUNDARIES
- DEVELOPED BASIN DESIGNATOR
- DESIGN POINT
- PROPOSED 2' CONTOURS
- PROPOSED 10' CONTOURS
- DIRECTION OF FLOW
- FILING BOUNDARIES

DEVELOPED DRAINAGE BASINS

BASIN	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
1A	0.67	1.1	2.5
1B	0.16	0.4	0.9
2	2.01	4.0	9.1
3	3.09	5.9	13.3
4	2.55	5.5	11.4
5	2.82	6.1	12.6
6	1.92	3.8	8.7
7	3.29	6.8	14.3
8	3.21	5.0	12.0
9	2.16	4.5	9.6
10	1.50	3.6	7.2
11	5.18	8.6	18.9
12	1.20	2.7	5.8
13	2.20	3.7	8.0
14	1.17	2.2	4.9
15	1.00	2.6	5.1
16	0.27	0.4	1.0
17	0.13	0.2	0.5
18	0.86	1.0	2.7
19A	3.99	1.8	9.2
19B	0.43	1.0	2.1
20	3.05	2.7	8.3
21	5.30	4.4	13.8
22	2.96	1.0	6.3

BASIN	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
OS-1	13.27	22.1	45.4
OS-2	1.16	3.7	7.2
OS-3	1.00	1.6	4.0
OS-4	17.43	20.2	51.4
OS-5	7.18	5.3	18.0

DESIGN POINT	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
DP#1	14.43	25.7	52.7
DP#2	1.83	2.8	6.8
DP#3	16.26	28.1	58.4
DP#4	21.36	35.4	75.1
DP#5	26.73	44.4	93.9
DP#6	53.92	13.4	87.0
DP#7	80.65	47.8	157.5
DP#8	87.15	55.5	174.4
DP#9	90.81	59.4	181.6
DP#10	4.37	7.6	16.0
DP#11	54.03	29.1	147.4
DP#12	57.08	31.0	152.6
DP#13	62.38	34.4	162.4



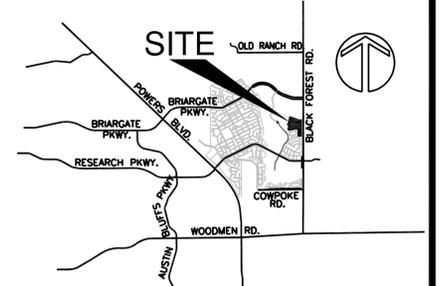
ENGINEERING - SURVEYING  
1935 N. UNION BLVD., SUITE 200  
COLORADO SPRINGS, CO 80909  
(719) 475-2575 • FAX (719) 475-9223

**REVEL AT WOLF RANCH PHASE II A (REVEL FILINGS 6 AND 7)  
DEVELOPED DRAINAGE MAP**

TITLE :  
SCALE : 1"=100'  
DATE : 2/1/21

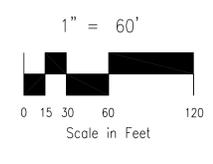
DRAWN BY : KDR  
CHECKED BY : KDR

20-017  
JOB NO.



VICINITY MAP  
NO SCALE

- LEGEND**
- EXISTING CONTOURS
  - DEVELOPED BASIN BOUNDARIES
  - DEVELOPED BASIN DESIGNATOR
  - DP #1 DESIGN POINT
  - PROPOSED 2' CONTOURS
  - PROPOSED 10' CONTOURS
  - DIRECTION OF FLOW
  - FILING BOUNDARIES



DEVELOPED DRAINAGE BASINS

BASIN	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
1A	0.67	1.1	2.5
1B	0.16	0.4	0.9
2	2.01	4.0	9.1
3	3.09	5.9	13.3
4	2.55	5.5	11.4
5	2.82	6.1	12.6
6	1.92	3.8	8.7
7	3.29	6.8	14.3
8	3.21	5.0	12.0
9	2.16	4.5	9.6
10	1.50	3.6	7.7
11	5.18	8.6	18.9
12	2.20	2.7	5.8
13	2.20	3.7	8.0
14	1.17	2.2	4.9
15	1.00	2.6	5.1
16	0.27	0.4	1.0
17	0.13	0.2	0.5
18	0.66	1.0	2.7
19A	3.99	1.8	9.2
19B	0.43	1.0	2.1
20	3.05	2.7	8.3
21	5.30	4.4	13.6
22	2.96	1.0	6.3

BASIN	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
OS-1	13.27	22.1	45.4
OS-2	1.16	3.7	7.2
OS-3	1.00	1.6	4.0
OS-4	17.43	20.2	51.4
OS-5	7.18	5.3	18.0

**DESIGN POINTS**

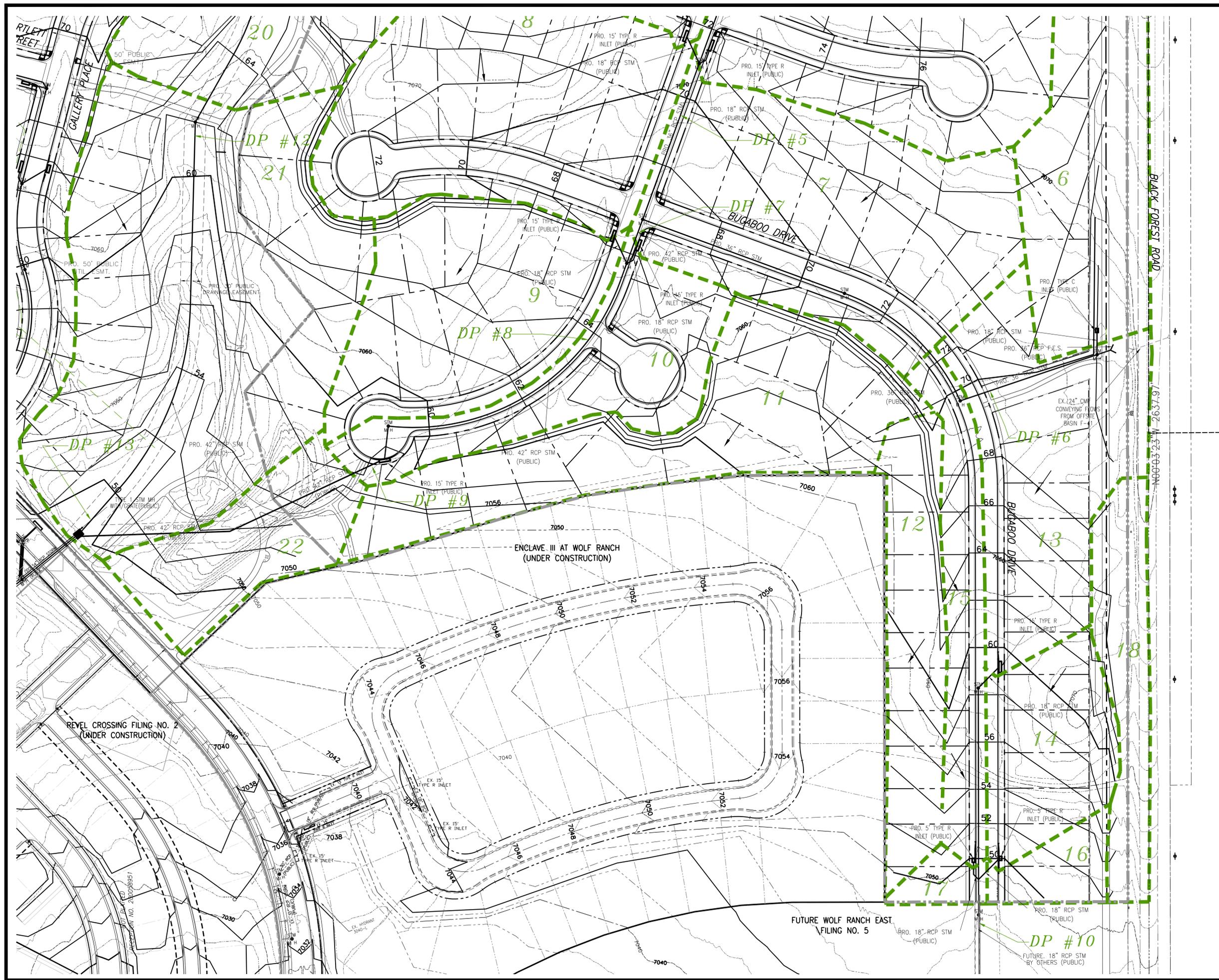
Design Point	Area (Acres)	Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)
DP#1	14.43	25.7	52.7
DP#2	1.83	2.8	6.8
DP#3	16.26	28.1	58.4
DP#4	21.36	35.4	75.1
DP#5	26.73	44.4	93.9
DP#6	53.92	13.4	87.0
DP#7	80.65	47.8	157.5
DP#8	87.15	55.5	174.4
DP#9	90.81	59.4	181.6
DP#10	4.37	7.6	16.0
DP#11	54.03	29.1	147.4
DP#12	57.08	31.0	152.6
DP#13	62.38	34.4	162.4

FILE: 20017A20017BAS3.DWG 2/1/21

**ROCKWELL CONSULTING, Inc.**  
ENGINEERING - SURVEYING  
1955 N. UNION BLVD., SUITE 200  
COLORADO SPRINGS, CO 80909  
(719) 475-2575 • FAX (719) 475-9223

**REVEL AT WOLF RANCH PHASE II A (REVEL FILINGS 6 AND 7) DEVELOPED DRAINAGE MAP**

SCALE: 1"=60' DRAWN BY: KDR 20-017  
DATE: 2/1/21 CHECKED BY: KDR JOB NO.



VICINITY MAP  
NO SCALE

LEGEND

- 6100 EXISTING CONTOURS
- DEVELOPED BASIN BOUNDARIES
- DEVELOPED BASIN DESIGNATOR
- DP #1 DESIGN POINT
- PROPOSED 2' CONTOURS
- PROPOSED 10' CONTOURS
- DIRECTION OF FLOW
- FILING BOUNDARIES

DEVELOPED DRAINAGE BASINS

BASIN	Area (Acres)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
1A	0.67	1.1	2.5
1B	0.16	0.4	0.9
2	2.01	4.0	9.1
3	3.09	5.9	13.3
4	2.55	5.5	11.4
5	2.82	6.1	12.6
6	1.92	3.8	8.7
7	3.29	6.8	14.3
8	3.21	5.0	12.0
9	2.16	4.5	9.6
10	1.50	3.6	7.2
11	5.18	8.6	18.9
12	1.20	2.7	5.8
13	2.20	3.7	8.0
14	1.17	2.2	4.9
15	1.00	2.6	5.1
16	0.27	0.4	1.0
17	0.13	0.2	0.5
18	0.86	1.0	2.7
19A	3.99	1.8	9.2
19B	0.43	1.0	2.1
20	3.05	2.7	8.3
21	5.30	4.4	13.6
22	2.96	1.0	6.3

BASIN	Area (Acres)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
OS-1	13.27	22.1	45.4
OS-2	1.16	3.7	7.2
OS-3	1.00	1.6	4.0
OS-4	17.43	20.2	51.4
OS-5	7.18	5.3	18.0

DESIGN POINTS

Design Point	Area (Acres)	Q <sub>s</sub> (cfs)	Q <sub>100</sub> (cfs)
DP#1	14.43	25.7	52.7
DP#2	1.83	2.8	6.8
DP#3	16.26	28.1	58.4
DP#4	21.36	35.4	75.1
DP#5	26.73	44.4	93.9
DP#6	53.92	13.4	87.0
DP#7	80.65	47.8	157.5
DP#8	87.15	56.5	174.4
DP#9	90.81	59.4	181.6
DP#10	4.57	7.6	16.0
DP#11	54.03	29.1	147.4
DP#12	57.08	31.0	152.6
DP#13	62.38	34.4	162.4

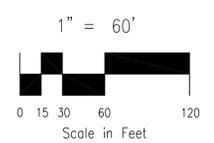


EXHIBIT 2 - SHEET 3 OF 3 FILE: 20017.20017BAS3.DWG 2/1/21

ENGINEERING - SURVEYING  
1955 N. UNION BLVD., SUITE 200  
COLORADO SPRINGS, CO 80909  
(719) 435-2515 • FAX (719) 435-9223

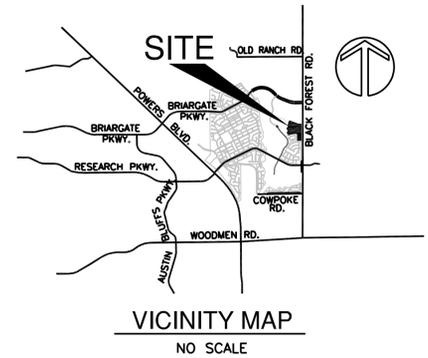
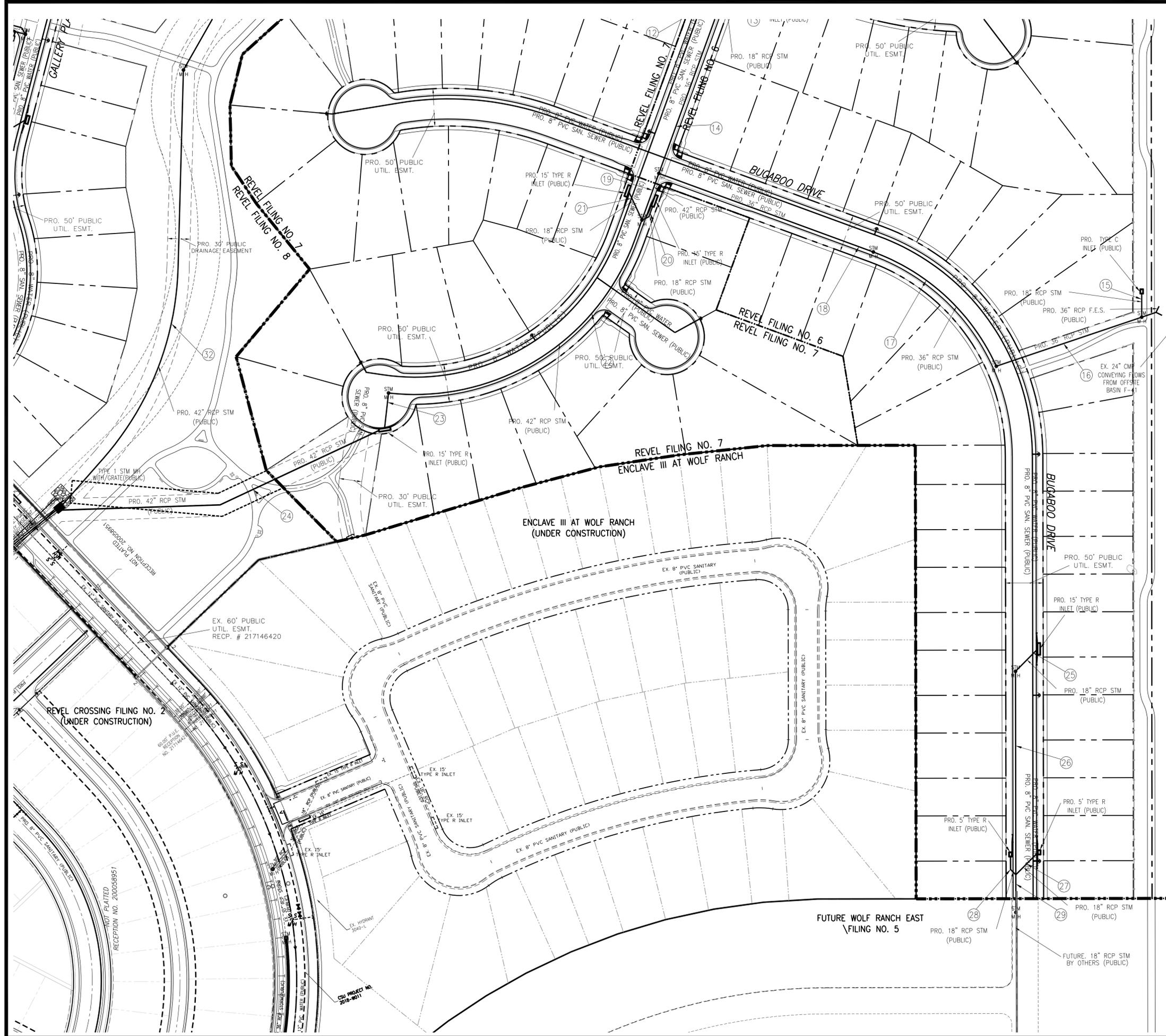
REVEL AT WOLF RANCH PHASE II A (REVEL FILINGS 6 AND 7)  
DEVELOPED DRAINAGE MAP

TITLE :  
SCALE : 1"=60'  
DATE : 2/1/21

DRAWN BY : KDR  
CHECKED BY : KDR

20-017  
JOB NO.





Revel at Wolf Ranch Filings 6 and 7  
Feb. 1, 2021

Manning's Equation  $n = 0.013$

Pipe No.	Block	PIPE SIZE (Inches)	DS	5 YEAR STORM		100 YEAR ST		
				FLOW DEPTH (Ft)	VELOCITY (Ft/s)	FLOW DEPTH (Ft)	VELOCITY (Ft/s)	
1	3.0%	36"	22.1	0.89	12.60	45.4	1.31	16.28
2	1.5%	18"	4.7	0.77	7.21	11.5	1.11	8.18
3	3.0%	36"	25.7	0.96	13.11	52.7	1.42	15.94
4	1.5%	18"	2.7	0.47	5.68	6.5	0.78	7.23
5	1.5%	18"	0.4	0.19	3.05	0.9	0.27	4.11
6	1.5%	18"	2.8	0.48	5.72	6.8	0.78	7.29
7	1.5%	18"	2.8	0.48	5.72	6.8	0.78	7.29
8	3.0%	36"	28.1	1.01	13.39	58.4	1.51	16.33
9	1.5%	18"	4.0	0.58	6.31	10.3	1.02	8.04
10	1.5%	18"	6.9	0.78	7.39	12.0	1.15	8.25
11	3.0%	36"	35.4	1.14	14.32	75.1	1.76	17.34
12	1.5%	18"	5.5	0.69	6.89	11.7	1.13	8.18
13	1.5%	18"	6.1	0.73	7.14	11.5	1.11	8.18
14	3.0%	36"	44.4	1.29	15.17	93.9	2.05	18.19
15	1.5%	18"	4.0	0.52	6.04	7.7	0.84	7.53
16	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98
17	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98
18	1.5%	36"	13.4	0.82	8.46	87.0	2.70	12.98
19	2.2%	42"	47.8	1.36	13.74	157.5	3.09	17.51
20	1.5%	18"	6.8	0.78	7.29	12.7	1.22	8.24
21	1.5%	18"	5.0	0.69	6.78	11.9	1.14	8.25
22	2.2%	42"	55.5	1.55	12.31	174.4	3.25	15.92
23	1.5%	42"	55.5	1.55	12.31	174.4	3.25	15.92
24	1.5%	42"	59.4	1.61	12.54	181.2	3.40	15.89
25	3.0%	18"	3.7	0.55	6.26	7.8	0.85	7.55
26	3.0%	18"	3.7	0.55	6.26	7.8	0.85	7.55
27	1.5%	18"	1.9	0.39	5.14	2.9	0.49	5.75
28	1.5%	18"	2.0	0.40	5.23	2.9	0.49	5.75
29	3.2%	18"	7.8	0.67	6.93	13.6	0.95	11.98
30	2.5%	42"	29.1	1.02	12.36	147.4	2.66	16.76
31	2.5%	42"	31.0	1.05	12.75	152.6	2.75	16.81
32	2.5%	42"	34.4	1.10	13.16	148.4	2.94	16.81

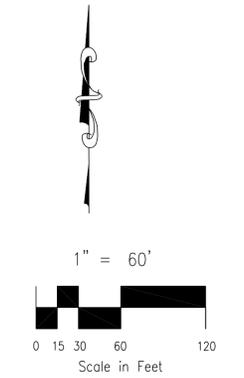


EXHIBIT 3 SHEET 2 OF 2  
FILE: 20017\20017BAS3.DWG 2/1/21

ENGINEERING - SURVEYING  
1955 N. UNION BLVD., SUITE 200  
COLORADO SPRINGS, CO 80909  
(719) 475-2575 • FAX (719) 475-9223

**REVEL AT WOLF RANCH II A (REVEL FILINGS 6 & 7)**  
TITLE: PRELIMINARY STORM SEWER PIPE SIZES  
SCALE: 1"=60' DRAWN BY: KDR  
DATE: 2/1/21 CHECKED BY: KDR 20-017  
JOB NO.