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# PRELIMINARY DRAINAGE REPORT GENESEE PROPERTIES, INC. SOCIETY TURN PARCEL SAN MIGUEL COUNTY, COLORADO

AUGUST 21, 2020

**Prepared for:** 

Genesee Properties, Inc P.O. Box 63 Berthoud, CO 80513



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### 1. INTRODUCTION

This drainage study was prepared as part of the sketch plan Site Development application for the Society Turn Parcel in San Miguel County, Colorado. This report generally follows the requirements of the San Miguel County Land Use Code, Section 4-302G and Section 5-502AA.

Section 2 of this report discusses the historic hydrologic conditions on the site. Section 3 addresses the developed hydrologic analysis used in sizing detention structures within the project area. Section 4 provides conclusions about the potential impacts of development to the site. The remaining sections provide certification and references employed in the report preparation.

**A. Site Location** - The Society Turn Parcel is in the San Miguel River valley, approximately 3 miles west of the Town of Telluride (see Figure 1 below). It is southwest of the Society Turn intersection (round-about), with Highway 145 on the north and east sides, and Society Drive to the south. The Society Turn Parcel is on mostly gently-sloping terrain that sits on the north side of the San Miguel Valley at the base of a steep slope, which is the toe of Deep Creek Mesa.



Figure1. Google© image of the Society Turn Parcel (outlined in red)

- **B. Site Vegetation** The site is generally cleared but remaining vegetation consists of native grasses, shrubs and scattered elm and cottonwood trees. The areas near the San Miguel River and Remine Creek that are intended to remain as open spaces have concentrations of willows and other wetland plants adjacent to the waterways.
- **C. Adjacent Development** The site is bounded to the south by developed commercial sites and undeveloped land. To the north and east, the parcel is bounded by State Highway 145. The western boundary of the property is bounded by vacant land
- **D. Site Description** The site generally slopes at an average of 1.0% from north to south at elevations from 8712 to 8650 feet above MSL. It is on an elevated terrace of the San Miguel River and has two man-made irrigation ditches crossing the property that are currently in use. The San Miguel River bisects the parcel and flows from east to west at a low gradient. Remine Creek is located on the western portion of the parcel and flows from north to south to its confluence with the San Miguel River. No other water courses are located within 500 feet of the property.
- E. Site Soils The project area has been mapped by the NRCS on their Web Soil Survey (WSS) online site to contain two soil units. They are the Cryaquolls-Borohemists complex which covers approximately 19% of the parcel along the San Miguel River corridor and the Cryoborolls-Cryaquolls association which covers the remaining 81% of the project site. Both of these units are classified as Hydrologic Soil Group (HSG) type B soils, which indicates moderately well drained soil with a moderate infiltration rate and low runoff potential. The site is characterized by storm water sheet flows across the entire portion of the site from north to south towards the San Miguel River. Drainage plans for the site are presented in Appendix E of this report. Detailed soil information is presented in Appendix B of this report.
- **F. Existing Drainage Facilities** There are two existing irrigation ditches which generally run from north to south in the western portions of the site. The ditches convey water from the north side of Highway 145 through corrugated metal pipe (CMP) culverts to the elevated portion of the site to provide irrigation for pasture grass. The upper portion of the project site is used seasonally for cattle grazing.
- **G. Project Description** The proposed development of the Society Turn Parcel is a mixed-use phased development of commercial and residential buildings with associated infrastructure improvements including roads, sanitary sewer, water, dry utilities and storm drain systems. Approximately 5.63 acres of the site will be dedicated to open space parks and recreation areas and will remain undeveloped. Domestic water will be supplied by the Town of Telluride under an existing "will serve" agreement with the developer, Genesee Properties, Inc. Sanitary sewer services will also be provided by the Town of Telluride under a service connection agreement.

**H. Relevant Flood Hazard and Drainage Studies** – The project area is contained on FEMA FIRM panel 08113C0286-C and the San Miguel River channel is located in a FEMA flood Zone A, which indicates that detailed hydraulic analyses have not been performed and that no base flood elevations or depths are shown on the FEMA floodplain maps for this area. The Flood Insurance Study (FIS) for San Miguel County, issued on September 30, 1992, includes the project area. A FIRMette of the project site is included in Appendix C.

### 2. HISTORIC DRAINAGE SYSTEM

This section of the report reviews the historic or pre-developed conditions on the project site. Historic flows for the site are limited to the 17.61-acre extent of the Society Turn property and are characterized by sheet flows over the vegetated, low sloping terrain from north and south towards the San Miguel River drainage. The pre-developed flows for 10 and 100-year storm events were calculated using the Modified FAA-Rational Method spreadsheet from the USDCM Volume 2 Storage Chapter. The UDFCM Rational Method spreadsheet was used to calculate historic flows for the site. These flows were estimated to be 1.7 cfs for the 10-year storm and 18.96 cfs for the 100-year event assuming 2% impervious cover for undeveloped land. Historic flow patterns for the site are shown on Sheet DR-1 in Appendix E of this report.

### **3. PROPOSED DRAINAGE SYSTEM**

**A. Criteria** - In order to calculate the required detention storage for the proposed Society Turn development, the following design criteria and assumptions were used:

- Average basin slope = 1.0%
- 12-hour drain time was used due to low runoff type soils (HSG B) as reported by the NRCS-WSS
- Rational Method was used for hydrologic analysis
- Design storms of 10-year, 1-hour (0.773 inches) and 100-year, 1-hour (1.44 inches) were used for analysis using information from the NOAA Atlas Volume 14
- Developed weighted runoff coefficients for 10-yr. and 100-yr return periods were calculated using the UD-Rational workbook
- Infiltration rate of 10 minutes per inch for site soils HSG = B

**B. Hydrologic Data** The current NOAA Atlas 14 was consulted for calculations of rainfall depth, intensity, and frequency-duration for the interval storms. The NOAA 14 IDF data for Telluride, Colorado (Station ID 05-8204) with a 90% confidence interval was used for our analysis and is presented in Appendix B.

| RETURN PERIOD | 1-HR TOTAL PRECIPITATION (IN) |
|---------------|-------------------------------|
| 2-year        | 0.517                         |
| 5-year        | 0.641                         |
| 10-year       | 0.773                         |
| 25-year       | 0.998                         |
| 50-year       | 1.21                          |
| 100-year      | 1.44                          |

Table 1. Summary of NOAA Atlas 14 precipitation data for 60-minute duration precipitation events varying recurrence periods in Telluride, CO. Shaded values were used for design and drainage analyses in this report.

| Return<br>Period | 5-min. | 10-min. | 15-min. | 30-min. | 1-hr. | 2-hr. | 3-hr. | 6-hr. | 24-hr. |
|------------------|--------|---------|---------|---------|-------|-------|-------|-------|--------|
| 2-yr             | 0.185  | 0.271   | 0.330   | 0.424   | 0.517 | 0.609 | 0.685 | 0.883 | 1.55   |
| 5-yr             | 0.234  | 0.342   | 0.418   | 0.535   | 0.641 | 0.747 | 0.832 | 1.07  | 1.87   |
| 10-yr            | 0.286  | 0.419   | 0.511   | 0.653   | 0.773 | 0.893 | 0.983 | 1.24  | 2.15   |
| 25-yr            | 0.375  | 0.549   | 0.670   | 0.855   | 0.998 | 1.14  | 1.23  | 1.52  | 2.57   |
| 50-yr            | 0.457  | 0.670   | 0.817   | 1.04    | 1.21  | 1.37  | 1.46  | 1.75  | 2.91   |
| 100-yr           | 0.552  | 0.808   | 0.985   | 1.26    | 1.44  | 1.63  | 1.71  | 2.02  | 3.26   |

Table 2. Summary of NOAA 14 Intensity-Duration-Frequency values for the project site. Rainfall intensity is given in inches per hour

### C. Runoff

The developed flow rates for the project area were calculated using the Rational Method as described in Volume 1 of the USDCM. Peak developed runoff flows for the 10-year and 100-year design storms are 9.10 cfs and 19.34 cfs respectively for the portion of the development (Basin #3). Detailed calculation results for pre-developed and developed conditions are presented in Appendices D.1 and D.2 of this report. Developed flow patterns are presented on Sheet DR-2 in Appendix E of this report. Historically, storm drainage has been intercepted by permeable site soils and transmitted in shallow sheet flow across the site from north to south towards the San Miguel River. Developed flows will be drained into storm drains on the side of project roads and designated detention basins and underground detention structures and allowed to percolate naturally into the soils. Field percolation tests performed by DOWL staff during the geotechnical investigation for the project indicate rates of approximately 10 minutes per inch. Storm flows will percolate into the underlying alluvial soil within the prescribed time per Colorado Revised Statutes (CRS) section 37-92-602(8).

The Society Turn parcel was divided into seven (7) drainage basins labeled Basins #1 through Basin #7. Table 3 details those basins' runoff and detention

calculations. These basins are presented in exhibit DR-2 in Appendix E of this report. Detailed calculation worksheets for each basin are presented in Appendices D.1 and D.2 of this report.

| Phase 2<br>Basin ID | Drainage<br>Area<br>(Acres)       | 10-yr.<br>1-hr.<br>Runoff<br>(cfs) | 100-yr.<br>1- hr.<br>Runoff<br>(cfs) | Required<br>10-yr.<br>Detention<br>Volume<br>(cu. ft.) | Required<br>100-yr.<br>Detention<br>Volume<br>(cu. ft.) |
|---------------------|-----------------------------------|------------------------------------|--------------------------------------|--|---|
| Basin #1            | 2.06                              | 0.20                               | 2.22                                 | None   | None  |
| Basin #2            | 4.18                              | 5.60                               | 11.89                                | 5,880  | 6,969   |
| Basin #3            | 4.18     5.80       6.80     9.10 |                                    | 19.34                                | 6,640  | 7,455   |
| Basin #4            | 0.52                              | 0.70                               | 1.48                                 | 740  | 830   |
| Basin #5            | 0.48                              | 0.64                               | 1.37                                 | 873  | 1045  |
| Basin #6            | 1.80                              | 0.17                               | 1.94                                 | None   | None  |
| Basin #7            | 1.77                              | 0.19                               | 2.15                                 | None   | None  |
| Totals              | 17.61                             | -                                  | -                                    | 16,421   | 16,654  |

Table 3. Phased Runoff and Retention Values. Weighted c (10-yr) = 0.44, weighted c (100-yr) = 0.55), i (10-yr) = 0.994, i (100-yr) = 1.71. Basins 1, 6 and 7, with no required detention, are to remain as open space and will drain as they have historically towards the San Miguel River.

| Phase 2<br>Basin ID | Drainage<br>Basin Area<br>(Acres) | Required 100-yr.<br>Detention<br>Volume<br>(cu. ft.) | Provided 100-yr.<br>Detention Volume<br>(cu. ft.) |
|---------------------|-----------------------------------|--|---|
| Basin #1            | 2.06                              | None   | None  |
| Basin #2            | 4.18                              | 6,969  | 7,088   |
| Basin #3            | 6.80                              | 7,455  | 7,623   |
| Basin #4            | 0.52                              | 830  | 856   |
| Basin #5            | 0.48                              | 1,045  | 1,087   |
| Basin #6            | 1.80                              | None   | None  |
| Bain #7             | 1.77                              | None   | None  |
| Totals              | 17.61                             | 16,299   | 16,654  |

Table 4. Summary of proposed 100-year retention volume per sub-basin. Provided retention volume is a combination of infiltration trenches and retention ponds.

# **B.** Roads

The majority of rooftop flows will be contained in landscaping at or near the building. The majority of surface storm flows will be from sidewalks, driveways, parking lots and roadways. Those flows will be conveyed in strom drains to detention basins and underground detention structures as described in Section C above. Storm flows will sheet flow from the crown of roads curbs and gutters on both sides of Road B and to distributed detention areas that double as snow storage sites in the winter.

### C. Open Channel Flow

Open channel flows through landscaped drainage swales are proposed for the site development to convey flows to designated detention basins and/or underground detention structures. All storm runoff will be routed on the surface to detention facilities as outlined in Section C above. The existing drainage ditches, located in the western portion of the project site, will be graded over in Phase 1 of the proposed development. Vertical curbs with gutters are proposed for project roads. Gutter capacity and curb opening capacity calculations are as follows:

| Eq. 1        | Q = {0.56/n] $S_x^{5/3}S^{1/2}T^{8/3}$ | Where: Manning's n = $0.013$<br>Road/Gutter Cross-slope (S <sub>x</sub> ) = 2%<br>Road Longitudinal slope (S) = $0.5\%$<br>Flow width (T) = 18 inches |
|--------------|--|---|
| Therefore: 0 | = 0.013 cfs for autter flow rate       | .,  |

Therefore: Q = 0.013 cfs for gutter flow rate

Eq. 2
$$Q_i = 2.3(L+1.8W_o)d^{1.5}$$
Where: Opening length (L) = 1.5 feet  
Curb opening width ( $W_o$ ) = 0.5 feetDepth of Flow (d) = 0.5 feet

Therefore: Q<sub>i</sub> =1.95 cfs

Drainage swales are proposed to convey storm flow from curb openings to adjacent roadway inlets or detention facilities. Calculations for the triangular drainage swales using Manning's equation are:

| Eq. 3 | Q = V/A                     | Where: n = 0.025                    |
|-------|-----------------------------|-------------------------------------|
|       |                             | Side slopes = $2H:1V$               |
|       | $V = k/n[A/P]^{2/3}S^{1/2}$ | Longitudinal Slope (S) = 0.01 ft/ft |
|       |                             | Flow depth = $1$ foot               |

Solving for velocity and discharge (Q)

Q - 9.51 cfs, v = 3.48 ft/sec.

### D. Storm Sewers and Culverts

Storm drain inlets along Road B will convey storm flows in 18-inch diameter ADS storm drain pipe to designated outlets at the detention basin and underground detention structures as outlined on Sheet DR-2 in Appendix E. Storm drain systems will be constructed during the initial phase of development to provide storm drainage for the entire project site.

### E. Detention Basins and Structures

As shown on Sheet DR-2 in Appendix E, a combination of one above grade detention basin and four (4) underground ADS storm detention structures are proposed to detain storm flows and release them at historic drainage rates. Use of the below grade ADS detention structures will allow parking areas and roadways to be constructed on grade and still provide adequate detention storage. Figure 2. below presents a typical ADS detention structure.

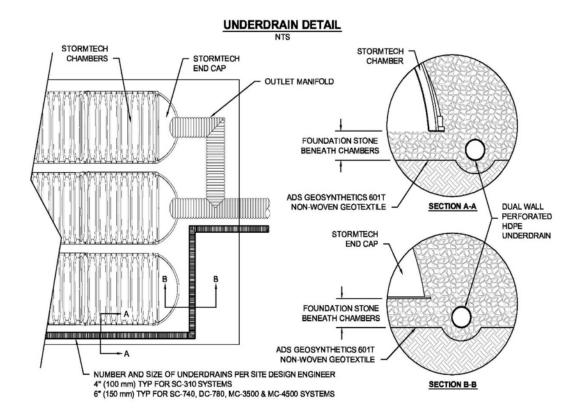


Figure 2. Typical underdrain detail of ADS Stormtech<sup>©</sup> detention structure

# 4. CONCLUSION

The proposed development of the Society Turn parcel has been designed in consideration of retaining storm flows on site as required by San Miguel County Land Use Code, Section 4-302G and Section 5-502AA. Drainage will be conveyed by both subsurface storm drains and surface means across the roadways, parking areas and impervious areas to subsurface detention structures or detention basins.

#### **5. REPORT CERTIFICATION**

I, Daniel C. Quigley, a duly registered professional engineer in the State of Colorado, (registration #38334), have prepared this report, related documents, and supervised the preparation of the drawings enclosed. The information included is, to the best of my knowledge, accurate and conforming to the requirements of the San Miguel County Land Use Code and current practices for the preparation of drainage reports.

August 21, 2020

Daniel C. Quigley, P.E. Project Engineer



## 6. REFERENCES

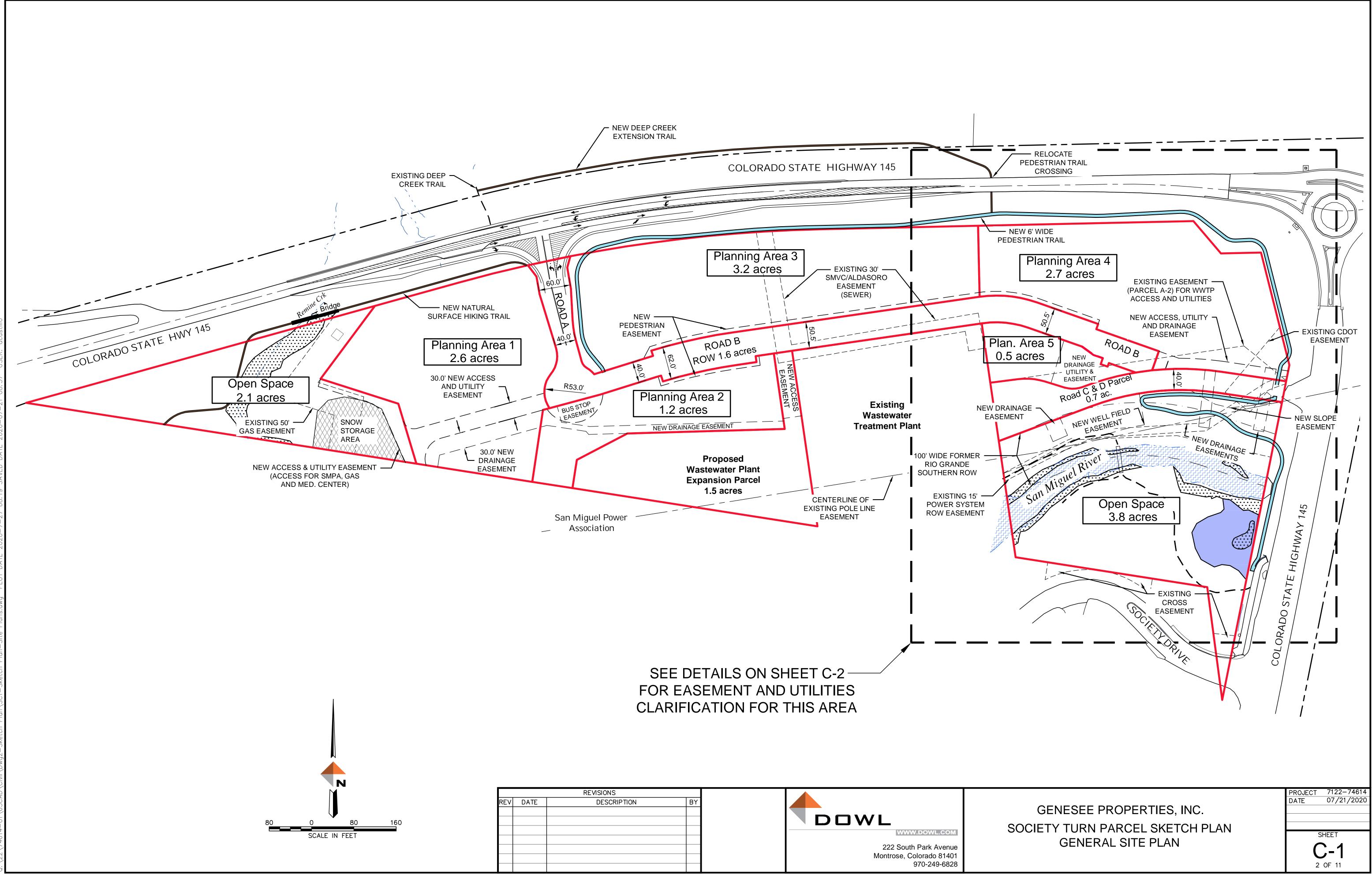
- Urban Drainage and Flood Control District (UDFCD) Criteria Manual, Volumes 1-3, March 2017
- Flood Insurance Study, San Miguel County, September 30, 1992
- NOAA Atlas 14, Volume 8, 2013
- Mays, Larry W., Stormwater Collections Systems Design Handbook, McGraw-Hill, 2001

### 7. SOFTWARE

- UDFCD Detention calculator, v. 3.07, February 2017
- UDFCD Rational calculator, V 2.00, May 2017



APPENDIX A SITE PLAN

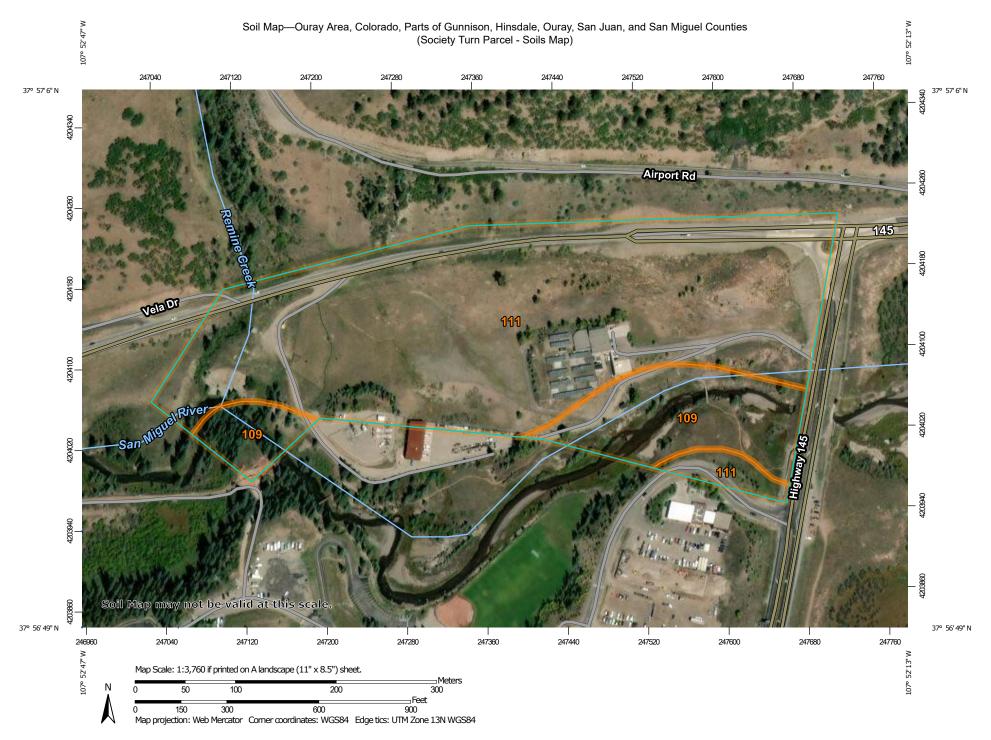


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# APPENDIX B

# NRCS SOILS AND NOAA 14 RAINFALL DATA



USDA Natural Resources Conservation Service Web Soil Survey National Cooperative Soil Survey

|  | MAP LI  | EGEND |   | MAP INFORMATION  |
|--|---|-------|---|--|
| Soils<br>Soil<br>Soil<br>Special Point<br>© Blov<br>⊠ Borr<br>¥ Clay<br>Clas<br>Grav<br>∴ Grav<br>∴ Grav<br>∴ Grav<br>∴ Grav<br>∴ Grav<br>∴ Grav | a of Interest (AOI)<br>Map Unit Polygons<br>Map Unit Lines<br>Map Unit Points<br>Features<br>wout<br>row Pit<br>y Spot<br>sed Depression<br>vel Pit<br>velly Spot | EGEND | Spoil Area<br>Stony Spot<br>Very Stony Spot<br>Wet Spot<br>Other<br>Special Line Features<br>Streams and Canals<br>ation<br>Rails<br>Interstate Highways<br>US Routes<br>Major Roads<br>Local Roads | 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 a of the version date(s) listed below. |
| <ul> <li>Misc</li> <li>Pere</li> <li>Roc</li> <li>+ Salii</li> <li>San</li> <li>⇒ Sev</li> <li>Sink</li> <li>Slide</li> </ul>                    | e or Quarry<br>cellaneous Water<br>ennial Water<br>ck Outcrop<br>ine Spot<br>ndy Spot<br>rerely Eroded Spot<br>khole<br>e or Slip<br>lic Spot                     |       |   | of the Version date(s) listed below.<br>Soil Survey Area: Ouray Area, Colorado, Parts of Gunnison,<br>Hinsdale, Ouray, San Juan, and San Miguel Counties<br>Survey Area Data: Version 12, Jun 10, 2020<br>Soil map units are labeled (as space allows) for map scales<br>1:50,000 or larger.<br>Date(s) aerial images were photographed: Nov 26, 2010—Oc<br>13, 2017<br>The orthophoto or other base map on which the soil lines were<br>compiled and digitized probably differs from the background<br>imagery displayed on these maps. As a result, some minor<br>shifting of map unit boundaries may be evident.  |

# Map Unit Legend

| Map Unit Symbol             | Map Unit Name  | Acres in AOI | Percent of AOI |
|-----------------------------|--|--------------|----------------|
| 109                         | Cryaquolls-Borohemists<br>complex, 0 to 5 percent<br>slopes      | 6.2          | 18.9%          |
| 111                         | Cryoborolls-Cryaquolls<br>association, 0 to 15 percent<br>slopes | 26.8         | 81.1%          |
| Totals for Area of Interest |  | 33.0         | 100.0%         |





NOAA Atlas 14, Volume 8, Version 2 TELLURIDE 4WNW Station ID: 05-8204 Location name: Telluride, Colorado, USA\* Latitude: 37.9492°, Longitude: -107.8733° Elevation: Elevation (station metadata): 8672 ft\*\*



\* source: ESRI Maps \*\* source: USGS

#### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

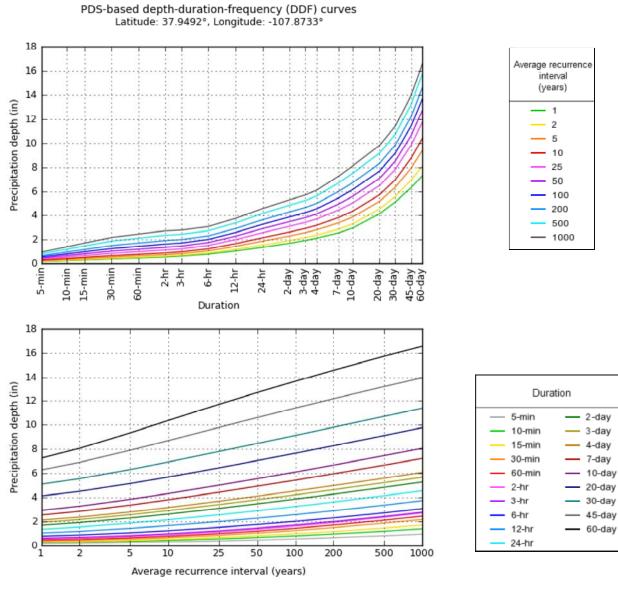
#### **PF** tabular

|          |                               |                               |   |                               |                               | e interval (y                 | confidenc                    | e milervai                  | s (in inci                  | (15)                       |  |
|----------|-------------------------------|-------------------------------|---|-------------------------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------|--|
| Duration | 1                             | 2                             | 5   | Averaç<br>10                  | 25                            | 50                            | 100                          | 200                         | 500                         | 1000                       |  |
|          | 0.162                         | 0.185                         | 0.234   | 0.286                         | 0.375                         | 0.457                         | 0.552                        | 0.659                       | 0.820                       | 0.956                      |  |
| 5-min    |                               |                               | (0.204-0.282)   |                               |                               |                               |                              | (0.466-0.905)               |                             |                            |  |
| 10-min   | <b>0.238</b><br>(0.209–0.286) | <b>0.271</b><br>(0.237-0.326) | <b>0.342</b><br>(0.298-0.413)                           | <b>0.419</b><br>(0.362-0.508) | <b>0.549</b><br>(0.461-0.719) | <b>0.670</b><br>(0.536-0.879) | <b>0.808</b><br>(0.610-1.08) |                             |                             | <b>1.40</b><br>(0.886-1.96 |  |
| 15-min   | <b>0.290</b><br>(0.255-0.349) | <b>0.330</b><br>(0.289–0.398) | <b>0.418</b><br>(0.364-0.504)                           | <b>0.511</b><br>(0.441-0.619) | <b>0.670</b><br>(0.562–0.877) | <b>0.817</b><br>(0.654-1.07)  | <b>0.985</b><br>(0.744-1.32) | <b>1.18</b><br>(0.832–1.62) | <b>1.46</b><br>(0.973–2.06) | <b>1.71</b> (1.08–2.39)    |  |
| 30-min   | <b>0.374</b><br>(0.328-0.450) | <b>0.424</b><br>(0.372-0.511) | <b>0.535</b><br>(0.466-0.646)                           | <b>0.653</b><br>(0.564-0.792) | <b>0.855</b><br>(0.717-1.12)  | <b>1.04</b><br>(0.834–1.37)   | <b>1.26</b><br>(0.949–1.69)  | <b>1.50</b><br>(1.06-2.06)  | <b>1.87</b><br>(1.24–2.63)  | <b>2.18</b><br>(1.38-3.05) |  |
| 60-min   | <b>0.459</b><br>(0.403-0.553) | <b>0.517</b><br>(0.452-0.622) | <b>0.641</b><br>(0.558-0.774)                           | <b>0.773</b><br>(0.667–0.938) | <b>0.998</b><br>(0.836-1.30)  | <b>1.21</b><br>(0.963-1.58)   | <b>1.44</b><br>(1.09–1.93)   | <b>1.71</b><br>(1.21–2.35)  | <b>2.12</b><br>(1.41-2.97)  | <b>2.46</b><br>(1.55-3.44) |  |
| 2-hr     | <b>0.544</b><br>(0.480-0.649) | <b>0.609</b><br>(0.536-0.727) | 0.727) (0.655–0.894) (0.776–1.<br><b>35 0.832 0.983</b> |                               | <b>1.14</b><br>(0.962-1.47)   | <b>1.37</b><br>(1.10-1.77)    | <b>1.63</b><br>(1.24-2.16)   | <b>1.92</b><br>(1.37–2.61)  | <b>2.36</b><br>(1.59-3.29)  | <b>2.73</b> (1.75-3.80)    |  |
| 3-hr     | <b>0.613</b><br>(0.543-0.727) | <b>0.685</b><br>(0.605-0.813) |   |                               | <b>1.23</b><br>(1.04–1.57)    | <b>1.46</b><br>(1.18-1.87)    | <b>1.71</b><br>(1.31–2.25)   | <b>2.00</b><br>(1.44-2.70)  | <b>2.43</b><br>(1.65-3.36)  | <b>2.79</b><br>(1.80-3.86) |  |
| 6-hr     | <b>0.787</b><br>(0.701–0.926) | <b>0.883</b><br>(0.786-1.04)  | <b>1.07</b><br>(0.942–1.26)                             | <b>1.24</b><br>(1.09–1.47)    | <b>1.52</b><br>(1.28-1.90)    | <b>1.75</b><br>(1.43-2.22)    | <b>2.02</b><br>(1.56-2.61)   | <b>2.31</b><br>(1.67-3.07)  | <b>2.73</b><br>(1.87-3.73)  | <b>3.08</b><br>(2.02-4.23) |  |
| 12-hr    | <b>1.05</b><br>(0.940-1.22)   | <b>1.19</b><br>(1.06–1.39)    | <b>1.44</b><br>(1.28–1.68)                              | <b>1.66</b><br>(1.47–1.95)    | <b>2.00</b><br>(1.69–2.46)    | <b>2.28</b><br>(1.86-2.84)    | <b>2.58</b><br>(2.01–3.30)   | <b>2.91</b><br>(2.13–3.82)  | <b>3.37</b><br>(2.33–4.55)  | <b>3.75</b><br>(2.49–5.10) |  |
| 24-hr    | <b>1.36</b><br>(1.22-1.57)    | <b>1.55</b><br>(1.39–1.79)    | <b>1.87</b><br>(1.68–2.17)                              | <b>2.15</b><br>(1.91–2.51)    | <b>2.57</b><br>(2.18–3.11)    | <b>2.91</b><br>(2.39-3.57)    | <b>3.26</b><br>(2.55-4.11)   | <b>3.63</b><br>(2.68–4.71)  | <b>4.15</b><br>(2.90-5.54)  | <b>4.57</b> (3.07–6.17)    |  |
| 2-day    | <b>1.69</b><br>(1.53–1.94)    | <b>1.92</b><br>(1.74–2.20)    | <b>2.30</b><br>(2.07–2.64)                              | <b>2.63</b><br>(2.35–3.04)    | <b>3.10</b><br>(2.65–3.72)    | <b>3.48</b><br>(2.88-4.23)    | <b>3.87</b><br>(3.06-4.83)   | <b>4.28</b><br>(3.19–5.49)  | <b>4.85</b><br>(3.43-6.40)  | <b>5.29</b> (3.60-7.08)    |  |
| 3-day    | <b>1.93</b><br>(1.76–2.20)    | <b>2.17</b><br>(1.97–2.48)    | <b>2.58</b><br>(2.33–2.95)                              | <b>2.93</b><br>(2.62–3.36)    | <b>3.42</b><br>(2.94–4.07)    | <b>3.82</b><br>(3.18-4.61)    | <b>4.22</b><br>(3.36–5.24)   | <b>4.65</b><br>(3.49–5.93)  | <b>5.23</b><br>(3.73–6.87)  | <b>5.69</b><br>(3.91–7.59) |  |
| 4-day    | <b>2.12</b><br>(1.93–2.40)    | <b>2.38</b><br>(2.16-2.70)    | <b>2.81</b><br>(2.54–3.20)                              | <b>3.17</b><br>(2.86–3.63)    | <b>3.70</b><br>(3.19–4.38)    | <b>4.12</b> (3.44–4.95)       | <b>4.55</b><br>(3.63–5.61)   | <b>4.99</b><br>(3.76–6.34)  | <b>5.60</b><br>(4.01-7.33)  | <b>6.08</b> (4.20-8.08)    |  |
| 7-day    | <b>2.55</b><br>(2.34–2.88)    | <b>2.86</b><br>(2.62-3.23)    | <b>3.38</b><br>(3.08-3.82)                              | <b>3.82</b><br>(3.45-4.34)    | <b>4.44</b><br>(3.85-5.22)    | <b>4.93</b><br>(4.15-5.89)    | <b>5.44</b><br>(4.37–6.66)   | <b>5.97</b><br>(4.54-7.52)  | <b>6.68</b><br>(4.84-8.68)  | <b>7.23</b> (5.06–9.55)    |  |
| 10-day   | <b>2.94</b><br>(2.71-3.30)    | <b>3.28</b><br>(3.02–3.68)    | <b>3.85</b><br>(3.52-4.33)                              | <b>4.34</b><br>(3.93–4.90)    | <b>5.02</b><br>(4.37–5.87)    | <b>5.56</b><br>(4.70-6.60)    | <b>6.11</b><br>(4.94-7.45)   | <b>6.69</b><br>(5.12-8.39)  | <b>7.46</b><br>(5.44-9.65)  | <b>8.07</b><br>(5.68–10.6) |  |
| 20-day   | <b>4.13</b><br>(3.82–4.59)    | <b>4.52</b><br>(4.17–5.02)    | <b>5.16</b><br>(4.74–5.75)                              | <b>5.70</b><br>(5.20-6.38)    | <b>6.46</b><br>(5.67-7.46)    | <b>7.05</b><br>(6.01-8.28)    | <b>7.66</b><br>(6.26-9.24)   | <b>8.28</b><br>(6.42-10.3)  | <b>9.13</b><br>(6.74–11.7)  | <b>9.78</b> (6.99–12.7)    |  |
| 30-day   | <b>5.10</b><br>(4.74–5.64)    | <b>5.56</b><br>(5.16-6.15)    | <b>6.32</b><br>(5.83-7.00)                              | <b>6.94</b><br>(6.37-7.73)    | <b>7.80</b><br>(6.87-8.95)    | <b>8.47</b><br>(7.26-9.88)    | <b>9.14</b><br>(7.50–10.9)   | <b>9.81</b><br>(7.66–12.1)  | <b>10.7</b> (7.97–13.6)     | <b>11.4</b> (8.21–14.8)    |  |
| 45-day   | <b>6.29</b><br>(5.86-6.91)    | <b>6.91</b><br>(6.43-7.60)    | <b>7.90</b><br>(7.33-8.71)                              | <b>8.71</b><br>(8.02-9.65)    | <b>9.79</b><br>(8.65–11.1)    | <b>10.6</b><br>(9.12-12.3)    | <b>11.4</b> (9.41–13.6)      | <b>12.2</b><br>(9.56–14.9)  | <b>13.2</b><br>(9.89–16.7)  | <b>13.9</b><br>(10.1–18.0) |  |
| 60-day   | <b>7.26</b><br>(6.78–7.94)    | <b>8.07</b><br>(7.53-8.84)    | <b>9.35</b> (8.69–10.3)                                 | <b>10.4</b> (9.57–11.4)       | <b>11.7</b> (10.4–13.3)       | <b>12.7</b><br>(10.9–14.6)    | <b>13.6</b><br>(11.3–16.1)   | <b>14.6</b><br>(11.5–17.7)  | <b>15.7</b><br>(11.8–19.7)  | <b>16.5</b> (12.1–21.3)    |  |

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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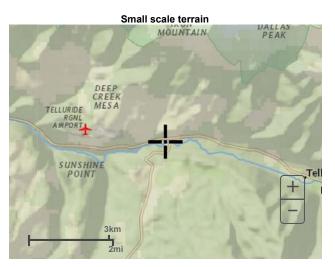
PF graphical

NOAA Atlas 14, Volume 8, Version 2

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#### Maps & aerials

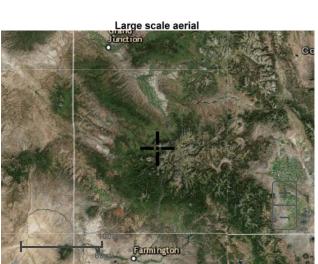


Large scale terrain



TORME Southern Ute Reservation Forest Buttern Ute Reservation Formington Forming





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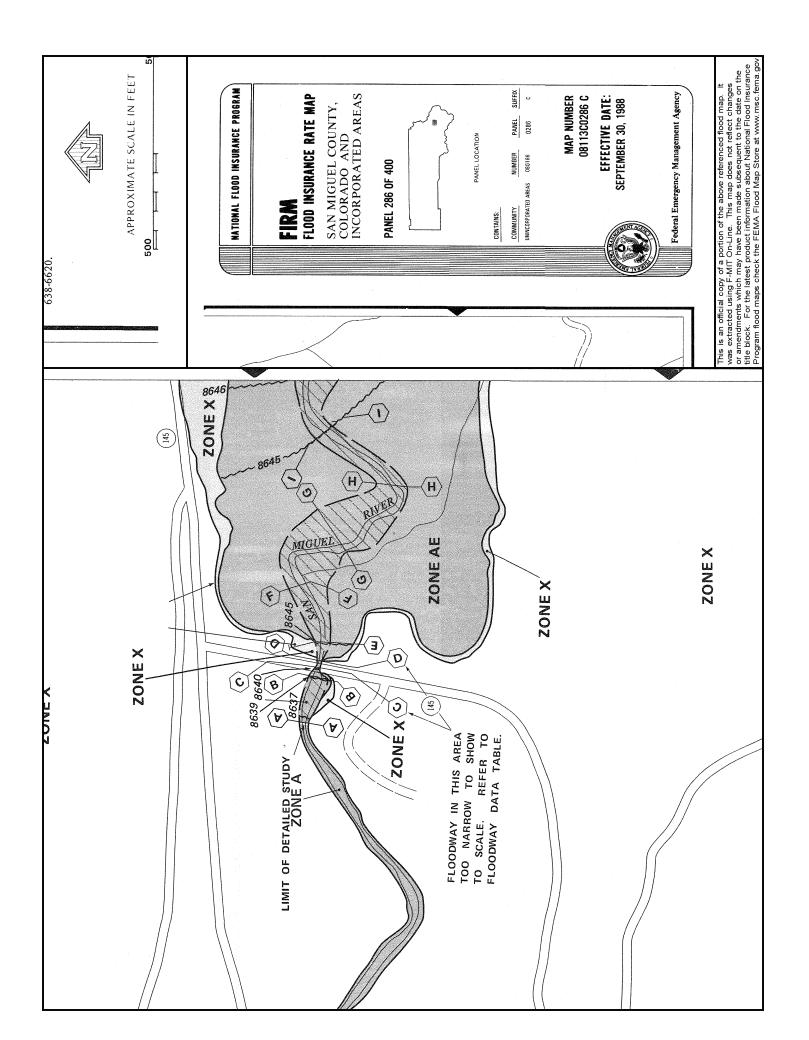
US Department of Commerce National Oceanic and Atmospheric Administration National Weather Service National Water Center 1325 East West Highway Silver Spring, MD 20910 Questions?: <u>HDSC.Questions@noaa.gov</u>

Disclaimer



APPENDIX C

FEMA Firmette





# APPENDIX D.1 PRE-DEVELOPED CONDITIONS CALCULATIONS

|  | ck this link)   |   |                                | 50-yr 100-yr 500-yr   | 12.41 18.96 34.83 |             |   |   |   |   |   |   |   |   |   |   | ╞ |   |  |   |
|--|---|---|--------------------------------|---|-------------------|-------------|---|---|---|---|---|---|---|---|---|---|---|---|--|---|
|  | A website (clic   | Q(cfs) = CIA  | Peak Flow, Q (cfs)             | 25-yr 5i  | 1 162             |             | H |   |   |   |   | H |   |   | L |   | H |   |  |   |
|  | rom the NOA   | ď   | Pea                            | 10-yr   | 1.70              |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | hs obtained fi  |   |                                | r 5-yr  | 4 0.24            |             |   |   | _ |   |   |   |   |   |   |   |   |   |  |   |
|  | E your own dept   | 7   | -                              | 500-yr 2-yr   | 3.64 0.14         |             |   |   |   |   |   | H | ł |   |   |   |   |   |  |   |
|  | at OR enter y   | ŧ   |                                | 100-yr 50   | 2.47 3            |             |   |   |   | ľ |   |   | t |   |   |   |   |   |  |   |
|  | 50-yr   | 22  | .1 (in/hr)                     | 50-yr   | 2.08              |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | 25-yr   |   | Rainfall Intensity, I (in/hr)  | 25-yr   | 1.72              |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | 4 Rainfall De<br>r 10-yr  |   | Rainfa                         | r 10-yr   | 0 1.32            |             |   |   | _ |   |   |   |   |   |   |   |   |   |  |   |
|  | NOAA Allas 14<br>2-yr 5-yr  |   |                                | 2-yr 5-yr   | 0.89 1.10         |             |   |   |   | - |   |   |   |   |   |   |   | _ |  |   |
|  | Select UPE CD location for NOAA Alles 1.4 Rentral Depths from the publickent less OR enter your own depths datained from the NOAA website (stock this link)<br><u>241 241 241 1044 1054 1054 1054 1054 1054 1050 1050</u> | Rainfall Intensity Equation Coefficients = 2850   | tion                           | Selected<br>t <sub>o</sub> (min)  | 25,66             |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | Select  | ity Equation  | Time of Concentration          | Regional<br>t <sub>6</sub> (min)  | 00.00             | 00'07       |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  |   | Rainfall Intens   | Time                           | Computed t <sub>o</sub> (min)   | 34.02             |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  |   | $\operatorname{onalt_c})$   |                                | zed Channelized<br>Y t <sub>i</sub> (min)   | 000               |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
| Method   |   | outed t <sub>c</sub> , Regi   |                                | C hannelized<br>Flow<br>Velocity<br>V, (ft/sec)   | 001               | 2           |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
| g Rational                                       | (ue   | $ \frac{t_{minimum} = S \left( w t_{min} \right) }{t_{minimum} = 10 \ \text{post-w trans}} $ Selected $t_{\rm c} = \max(t_{minimum}, \min(\text{computed } t_{\rm c}, \text{Regional } t_{\rm c}))$ | Channelized (Travel) Flow Time | zed NRCS<br>spe Conveyance<br>) Factor K  |                   |             | _ |   |   |   |   |   |   |   |   |   |   |   |  |   |
| off using  | t <sub>minimum</sub> = 5 (urban)<br>t <sub>minimum</sub> = 10 (non-urban)   | : = max{t <sub>min</sub>  | elized (Traw                   | n Channelized<br>Flow Slope<br>S, (ft/ft)   | 0.010             |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
| Peak Run   | tminimum <sup>1</sup><br>tminimum <sup>2</sup>  | Selected t  | Chanr                          | U/S Elevation D/S Elevation<br>(ft) (ft) (ft)<br>(Optional)                             |                   |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
| Calculation of Peak Runoff using Rational Method |   | $\frac{l_t}{60(14i+9)\sqrt{S_t}}$   |                                |   |                   | 2           |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
| Cal  |   | 171) + 60(1   | -                              | _   | 000               | 5           |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | $Computed \ t_c \ = t_i + t_e$  | Regional $t_c = (26 - 17i) +$   |                                | and Overland<br>Slope Flow Time<br>Mt) t (min)  | 34.02             | 2           |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | Comp  | Regi  | Overland (Initial) Flow Time   | U/S Elevation D/S Elevation Overland (ft) (ft) (ft) (ft) Flow Slope (Optional) S (fult) | 0.040             | 3           |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | $\frac{0.395(1.1-C_3)\sqrt{L_1}}{S^{0.33}}$   | $\overline{S_{t}} = \frac{L_{t}}{60V_{t}}$  | Overland (Init:                | J/S Elevation D/S Elevation<br>(f) (f)<br>(Optional) (Optional)                         |                   |             |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  | $t_1 = \frac{0.395(1)}{2}$  | $t_t = \frac{L_t}{60K_{\gamma}/\overline{S_t}} = \frac{L_t}{60V_t}$   |                                | Overland U/S El-<br>L, (ft) (Opti   | 00000             | 00.000      |   |   |   |   |   |   |   |   |   |   |   |   |  |   |
|  |   | werrides  | F                              | 500-yr Fk   | 0.54              |             | h |   |   |   |   | h | l |   | ŀ |   |   |   |  |   |
|  |   | le values<br>Is based on c  | l                              | 100-yr  | 0.44              |             |   | Í |   |   |   | Ц | Į |   |   |   |   |   |  | ļ |
|  | 2017  | venis or in inscortion and rou or required user import<br>Cells of this color are for optional override values<br>Cells of this color are for calculated results based on overrides.                | fficient, C                    | yr 50-yr  | 6 0.34            |             |   |   |   | L |   | Ц |   |   |   |   | Ц |   |  |   |
|  | eleased May   | Nor are for op  | Runoff Coefficient, C          | 10-yr 25-yr   | 0.07 0.26         |             | H |   |   |   |   | H |   |   | L |   |   | 1 |  |   |
|  | Version 2.00 released May 2017  | ells of this co<br>ells of this co  | ſ                              | 5-yr 10   | 0.01 0.0          |             |   |   |   |   |   | Ӈ | ł |   | ┞ |   | H | 1 |  | + |
|  | °   | <u>় ব ব</u>  | L                              | 2-yr  | 0.01              |             |   |   |   | L |   |   |   |   | L |   |   |   |  |   |
|  |   | Deter: 0.241/00/00<br>Project: Society Turn - Pre-Developed Conditions<br>  |                                | NRCS Percent<br>Hydrologic Imperviousnes<br>Soil Group s                                | 00                | ~~          |   |   | _ |   | _ |   |   | _ |   | _ |   |   |  | _ |
|  |   | rn - Pre-Deve   | 1                              | NRCS<br>Hydrologic<br>Soil Group  |                   |             |   |   |   |   |   |   |   | _ |   | - |   |   |  | - |
|  | Designer: D. Quigley<br>Company: DOV/L  | Project: Society Tun<br>Location: Teluride  |                                | Area<br>(ac)  |                   |             |   |   |   |   |   |   | I |   |   |   |   |   |  |   |
|  | Company: DOWL   | Project<br>Location   | l                              | Subcatchment<br>Name  |                   | ty run rat. |   |   |   |   |   |   | I |   |   |   |   |   |  |   |

# **Area-Weighted Runoff Coefficient Calculations**

Version 2.00 released May 2017

| Designer:          | D. Quigley | /                        |                  |           |              |             |             |                               |               |             |
|--------------------|------------|--------------------------|------------------|-----------|--------------|-------------|-------------|-------------------------------|---------------|-------------|
| Company:           |            |                          |                  |           |              |             |             |                               |               |             |
|                    | 8/24/2020  |                          |                  |           |              |             |             |                               |               |             |
|                    |            | urn - Pre-Devel          | oped Conditions  |           |              |             |             |                               |               |             |
| Location:          | Telluride  |                          |                  |           |              |             |             |                               |               |             |
|                    | r de       | Subar                    | ea 3 5'          | ubarea 2  | Suberes      | s color are |             | nt<br><u>-</u><br>d user-inpu |               |             |
| Subcatchment       |            |                          |                  |           | Cells of thi |             |             |                               |               |             |
| Name               |            |                          |                  |           |              |             |             |                               | based on o    | overrides   |
| Society Turn       |            |                          |                  | ļ         |              |             |             |                               |               |             |
|                    |            |                          |                  | See sheet | "Design Inf  |             |             |                               | off coefficie | ent values. |
| Sub-Area           | Area       | NRCS                     | Percent          |           |              | Runo        | ff Coeffici | ent, C                        |               |             |
| ID                 | (ac)       | Hydrologic<br>Soil Group | Imperviousness   | 2-yr      | 5-yr         | 10-yr       | 25-yr       | 50-yr                         | 100-yr        | 500-yr      |
| Society Trun Parce | 17.61      | В                        | 2.0              | 0.01      | 0.01         | 0.07        | 0.26        | 0.34                          | 0.44          | 0.54        |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             | [           | [                             |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             | <u> </u>    |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          |                  |           |              |             |             |                               |               |             |
|                    |            |                          | Area-Weighted C  | 0.01      | 0.01         | 0.07        | 0.26        | 0.34                          | 0.44          | 0.54        |
| Total Area (ac)    | 17.61      |                          | ghted Override C | 0.01      | 0.01         | 0.07        | 0.26        | 0.34                          | 0.44          | 0.54        |

# **Length-Weighted Slope Calculations**

Version 2.00 released May 2017

Designer: D. Quigley Company: DOWL Date: 8/24/2020 Project: Society Turn - Pre-Developed Conditions Location: Telluride overland LEGEND Reach 1 flow 🔵 Beginning Reach 2 Flow Direction Catchment Reach 3 Boundary Percent Imperviousness Subcatchment Name (%) Society Turn Pre 2 OVERLAND FLOW **Overland Flow** U/S Elevation D/S Elevation **Overland Flow** Reach Length Slope (ft) (ft) ID L<sub>i</sub> (ft) (Optional) (Optional) S<sub>i</sub> (ft/ft) Society Turn 300.00 0.100 Total Overland Length (ft) Length-Weighted Slope (ft/ft) 300.00 0.100 CHANNELIZED FLOW Channelized Flow Channelized Flow U/S Elevation D/S Elevation Reach Length Slope (ft) (ft) ID St (ft/ft) L<sub>t</sub> (ft) (Optional) (Optional) Length-Weighted Slope (ft/ft)

Total Channelized Length (ft)

# **Reach-Weighted Time of Concentration Calculations**

Version 2.00 released May 2017

Designer: D. Quigley Company: DOWL Date: 8/24/2020 Project: Society Turn - Pre-Developed Conditions Location: Telluride overland LEGEND Reach 1 flow ) Beginning Reach 2 Flow Direction Catchment Reach 3 Boundary Percent Imperviousness Subcatchment Name (%) Society Turn Pre 2 **OVERLAND FLOW Overland Flow Overland Flow** 5-yr **Overland Flow** Reach Runoff Slope Length Time ID L<sub>i</sub> (ft) S<sub>i</sub> (ft/ft) Coefficient, C<sub>5</sub> t<sub>i</sub> (min) Society Turn Pre 300.00 0.010 0.58 16.26 Total t<sub>i</sub> (min) Weighted Totals 300.00 0.010 16.26 CHANNELIZED FLOW Channelized Flow Channelized Flow Channelized Flow NRCS Reach Length Slope Time Conveyance ID St (ft/ft) L<sub>t</sub> (ft) Factor K t<sub>t</sub> (min) Weighted Totals Total t<sub>t</sub> (min)

| Computed $t_c$ (min)          | 0.00 |
|-------------------------------|------|
| Regional t <sub>c</sub> (min) |      |
| Selected t <sub>c</sub> (min) |      |



APPENDIX D.2 DEVELOPED CONDITION CALCULATIONS

|  |  |          |                  |                                |                       |   |             |            |  |   |  |                  |   | Calculati                                   | OT OF LE                            | eak kunoi   | IT USING R                              | сающатот от Реак килотт изпів катіопаї іметнов | vietnoa  |  |                                    |   |   |                 |                    |                               |  |                                      |               |                |            |                    |              |           |
|--|--|----------|------------------|--------------------------------|-----------------------|---|-------------|------------|--|---|--|------------------|---|---|-------------------------------------|---|---|--|--|--|------------------------------------|---|---|-----------------|--------------------|-------------------------------|--|--------------------------------------|---------------|----------------|------------|--------------------|--------------|-----------|
| Designer: D. Quigley<br>Company: DOWL        |  |          | Vei              | Version 2.00 released May 2017 | eased May.            | 2017  |             |            | + - 0.39                               | $0.395(1.1-C_5)\sqrt{L_1}$                                | اتيا   | Computed t.      | 4 + 4<br>+ 4                            |   |                                     | $t_{minimum} = 5 (urban)$   | (urban)                                 |  |  |  |                                    | Select  | Select UDFCD location for NOAA. Altas 14 Ranfail Deptis from the pulldown list. OR enter your own deptils obtained from the NOAA websile (click this link)<br>2-w 5-w 5-w 10-w 25-w 50-w 100-w 5500-w | 1 for NOAA Alba | as 14 Rainfall De  | Depths from the               | 50-vr 1                                  | st OR enter your ov<br>100-vr 500-vr | ur own depthe | s obtained fro | m the NOAA | website (click     | this link)   |           |
| Date: 8/24/2020                              |  |          | J                | ils of this colo.              | v arefor req          | Cells of this color are for required user-input   | n           |            | -                                      | S <sup>0.33</sup>   |  |                  | 7                                       |   |                                     | $t_{minimum} = 1$   | t <sub>minimum</sub> = 10 (non-urban)   | _  |  |  | ÷                                  | 1-hour rainfall depth, P1 (in) = 0.52                 | tepth, P1 (in) =,   | ⊢               | H                  | ⊢                             |  | -                                    | 2.12          |                |            |                    |              |           |
| Project: Society Turn<br>Location: Telluride | Project: Society Turn - Developed Conditions<br>ocation: Telluride | nditions | <mark>ð</mark> ð | ills of this cold              | or are for op         | Cells of this color are for optional override values<br>Cells of this color are for calculated results based on overrides | based on ov | errides    | $t_i = \frac{L}{60K}$                  | $t = \frac{L_{t}}{60K_{s}/S_{t}} = \frac{L_{t}}{60V_{t}}$ |  | Regional $t_c =$ | = (26 - 17i) + -                        | $\frac{L_{t}}{60(14i + 9)\sqrt{S_{t}}}$     |                                     | Selected t <sub>c</sub> =   | = max{t <sub>minimun</sub>              | n , min(Compu                                  | Selected $t_c = \max\{t_{\min mum}, \min(Computed\ t_c$ , Region al $t_c)\}$ | al t_c)}   | Rainfall Inter                     | a<br>Rainfall Intensity Equation Coefficients = 28.50 | Coefficients =  |                 | b c<br>10.00 0.786 |                               | $l(in/hr) = \frac{a * P_1}{(b + t_c)^c}$ |                                      |               |                | Q(c        | Q(cfs) = CIA       |              |           |
|  | -  | F        |                  | R                              | Runoff Coefficient, C | ficient, C  |             | F          |  | Overland  | Overland (Initial) Flow Time   | ime.             | F                                       |   |                                     | Channeli  | Channelized (Travel) Flow Time          | low Time                                       |  |  | Tim                                | Time of Concentration                                 | tion  |                 | Rain               | Rainfall Intensity, I (in/hr) | .1 (in/hr)                               |                                      | _             |                | PeakF      | Peak Flow, Q (cfs) |              |           |
| Subcatchment Area H<br>Name (ac) S           | NRCS Percent<br>Hydrologic Imperviousnes<br>Soil Group s           |          | 2-yr             | 5-yr 10-yr                     | -yr 25-yr             | r S0-yr   | 100-yr      | 500-yr Flo | Overland U/S<br>Flow Length L, (ft) (C | J/S Elevation D.<br>(ft)<br>(Optional)                    | US Elevation D/S Elevation Overland (#) (*) (*) Flow Slop (Optional) (Optional) S, (ft/ft) | •                | Overland Ci<br>Flow Time FI<br>\$ (min) | Channelized U/:<br>Flow Length<br>L, (ft) ( | (SElevation E<br>(ft)<br>(Optional) | U/S Elevation D/S Elevation<br>(ft) (ft)<br>(Optional) (Optional) | Channelized<br>Flow Slope<br>S, (ft/ft) | NRCS<br>Conveyance<br>Factor K                 | Channelized<br>Flow<br>Velocity<br>V <sub>i</sub> (ft/sec)                   | Channelized<br>Flow Time<br>t <sub>i</sub> (min) | d Computed<br>t <sub>c</sub> (min) | Regional<br>t <sub>6</sub> (min)                      | Selected t <sub>c</sub> (min)   | 2-yr 5          | 5-yr 10-yr         | п 25-уг                       | 50-yr 1                                  | 100-yr 500-yr                        | -yr 2-yr      | 5-yr           | 10-yr      | 25-yr 50           | 50-yr 100-yr | yr 500-yr |
| 2.06   | 8  | 2.0      | 0.01             | 0.01 0.07                      | 07 0.26               | 3 0.34  | 0.44        | 0.54       | 500.00                                 |   |  | 0.010            | 43.92                                   | 000   |                                     |   | 0.010                                   | 2  | 0.70   | 00'0   | 43.92                              | 25.66   | 25.66   | 0.89 1          | 1.10 1.32          | 2 1.72                        | 2.08                                     | 2.47 3)                              | 3.64 0.02     | 0.03           | 0.20       | 0.93 1.            | 1.45 2.22    | 2 4.07    |
| 4.18   | в  | 80.0     | 0.64             | 0.67 0.70                      | 70 0.75               | 5 0.77  | 0.90        | 0.83       | 300.00                                 |   |  | 0.010            | 13.38                                   | 0.00  |                                     |   | 0.010                                   | 50   | 2.00   | 00.0   | 13.38                              | 12.40   | 12.40   | 1.29            | 1.58 1.91          | 1 2.47                        | 2.99                                     | 3.56 5.                              | 525 3.46      | 4.45           | 5.60       | 7.77 9.            | 9.69 11.89   | 39 18.18  |
| 6.80   | в  | 80.0     | 0.64             | 0.67 0.70                      | 70 0.75               | 5 0.77  | 0.80        | 0.83       | 300.00                                 |   |  | 0.010            | 13.38                                   | 000   |                                     |   | 0.010                                   | 50   | 2.00   | 00'0   | 13.38                              | 12.40   | 12.40   | 1.29 1          | 1.58 1.91          | 1 2.47                        | 2.99                                     | 3.56 5.                              | 525 5.63      | 724            | 9.10       | 12.65 15           | 15.77 19.34  | M 29.57   |
| 0.52   | 8  | 80.0     | 0.64             | 0.67 0.70                      | 70 0.75               | 5 0.77  | 0.80        | 0.83       | 300.00                                 |   |  | 0.010            | 13.38                                   | 000   |                                     |   | 0.010                                   | 50   | 2.00   | 00'0   | 13.38                              | 12.40   | 12.40   | 1.29 1          | 1.58 1.91          | 1 2.47                        | 2.99                                     | 3.56 5.                              | 525 0.43      | 0.55           | 0.70       | 0.97 1.            | 121 1.48     | 8 2.26    |
| 0.48   | в  | 80.0     | 0.64             | 0.67 0.70                      | 70 0.75               | 5 0.77  | 0.90        | 0.83       | 300.00                                 |   |  | 0.010            | 13.38                                   | 0.00  |                                     |   | 0.010                                   | 50   | 2.00   | 00.0   | 13.38                              | 12.40   | 12.40   | 1.29            | 1.58 1.91          | 1 2.47                        | 2.99                                     | 3.56 5.                              | 525 0.40      | 0.51           | 0.64       | 0.89 1.            | 1.11 1.37    | 7 2.09    |
| 1.80   | 8  | 2.0      | 0.01             | 0.01 0.07                      | 07 0.26               | 3 0.34  | 0.44        | 0.54       | 500.00                                 |   |  | 0.010            | 43.92                                   | 000   |                                     |   | 0.010                                   | 2  | 0.70   | 00'0   | 43.92                              | 25.66   | 25.66   | 0.89 1          | 1.10 1.32          | 2 1.72                        | 2.08                                     | 2.47 3)                              | 3.64 0.01     | 0.02           | 0.17       | 0.81 1.            | 1.27 1.94    | 4 3.56    |
| 1.77   | в  | 2.0      | 0.01             | 0.01 0.07                      | 07 026                | 3 0.34  | 0.44        | 0.54       | 500.00                                 |   |  | 0.100            | 20.64                                   | 000   |                                     |   | 0.010                                   | 2  | 0.70   | 00'0   | 20.54                              | 25.66   | 20.54   | 1.01            | 1.24 1.49          | 9 1.94                        | 2.35                                     | 2.79 4.                              | 4.11 0.02     | 0.03           | 0.19       | 0.90 1.            | 1.41 2.15    | 5 3.95    |
|  |  |          |                  | ╞                              | $\parallel$           |   |             |            |  |   |  |                  |   |   |                                     |   |   |  |  |  |                                    |   |   |                 | ╞                  |                               |  |                                      |               |                |            |                    |              |           |
|  |  |          | Ħ                | ╞                              | $\parallel$           |   |             |            |  |   |  |                  |   |   |                                     |   |   |  |  |  |                                    |   |   |                 | 4                  |                               |  |                                      |               |                |            |                    |              | -         |
|  |  |          | H                | H                              |                       |   |             |            |  |   |  |                  |   |   |                                     |   |   |  |  |  |                                    |   |   |                 |                    |                               |  |                                      |               |                |            |                    |              |           |

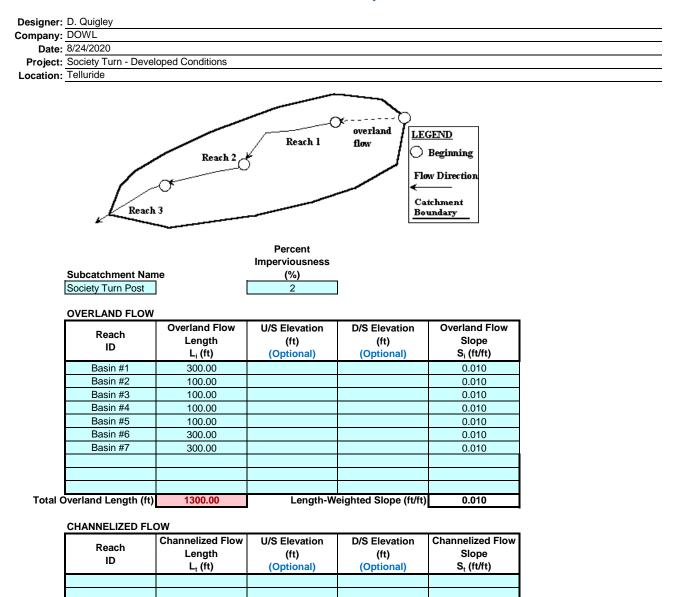
# **Area-Weighted Runoff Coefficient Calculations**

Version 2.00 released May 2017

| Designer:       |           | /                        |                  |           |             |              |             |                        |              |            |
|-----------------|-----------|--------------------------|------------------|-----------|-------------|--------------|-------------|------------------------|--------------|------------|
| Company:        |           |                          |                  |           |             |              |             |                        |              |            |
|                 | 8/24/2020 |                          |                  |           |             |              |             |                        |              |            |
|                 |           | ırn - Developeo          | Conditions       |           |             |              |             |                        |              |            |
| Location:       | lelluride |                          |                  |           |             |              |             |                        |              |            |
|                 | L.        | Subar                    | ea.3 5           | aborea 2  |             | is color are |             | nt<br>r<br>d user-inpu |              |            |
| Subcatchment    |           |                          |                  |           | Cells of th | is color are | for optiona | al override v          | /alues       |            |
| Name            |           |                          |                  |           | Cells of th | is color are | for calcula | ted results            | based on o   | overrides  |
| Developed       |           |                          |                  |           |             |              |             |                        |              |            |
|                 |           | 1                        |                  | See sheet | "Design In  | fo" for impe |             |                        | off coeffici | ent values |
| Sub-Area        | Area      | NRCS                     | Percent          |           | 1           | Runo         | ff Coeffici | ent, C                 | 1            | 1          |
| ID              | (ac)      | Hydrologic<br>Soil Group | Imperviousness   | 2-yr      | 5-yr        | 10-yr        | 25-yr       | 50-yr                  | 100-yr       | 500-yr     |
| Basin #1        | 2.06      | В                        | 2.0              | 0.01      | 0.01        | 0.07         | 0.26        | 0.34                   | 0.44         | 0.54       |
| Basin #2        | 4.18      | В                        | 80.0             | 0.64      | 0.67        | 0.70         | 0.75        | 0.77                   | 0.80         | 0.83       |
| Basin #3        | 6.80      | В                        | 80.0             | 0.64      | 0.67        | 0.70         | 0.75        | 0.77                   | 0.80         | 0.83       |
| Basin #4        | 0.52      | В                        | 80.0             | 0.64      | 0.67        | 0.70         | 0.75        | 0.77                   | 0.80         | 0.83       |
| Basin #5        | 0.48      | В                        | 80.0             | 0.64      | 0.67        | 0.70         | 0.75        | 0.77                   | 0.80         | 0.83       |
| Basin #6        | 1.80      | В                        | 2.0              | 0.01      | 0.01        | 0.07         | 0.26        | 0.34                   | 0.44         | 0.54       |
| Basin #7        | 1.77      | В                        | 2.0              | 0.01      | 0.01        | 0.07         | 0.26        | 0.34                   | 0.44         | 0.54       |
|                 |           |                          |                  |           |             |              |             |                        |              |            |
|                 |           |                          |                  |           |             |              |             |                        |              |            |
|                 |           |                          |                  |           |             |              |             |                        |              |            |
| Total Area (ac) | 17.61     |                          | Area-Weighted C  | 0.44      | 0.46        | 0.50         | 0.59        | 0.64                   | 0.68         | 0.74       |
|                 | 17.01     | Area-Wei                 | ghted Override C | 0.44      | 0.46        | 0.50         | 0.59        | 0.64                   | 0.68         | 0.74       |

# **Length-Weighted Slope Calculations**

Version 2.00 released May 2017



Length-Weighted Slope (ft/ft)

Total Channelized Length (ft)

# **Reach-Weighted Time of Concentration Calculations**

Version 2.00 released May 2017

Designer: D. Quigley Company: DOWL Date: 8/24/2020 Project: Society Turn - Developed Conditions Location: Telluride overland LEGEND Reach 1 flow ) Beginning Reach 2 Flow Direction Catchment Reach 3 Boundary Percent Imperviousness Subcatchment Name (%) Society Turn Pre 2 **OVERLAND FLOW Overland Flow Overland Flow** 5-yr **Overland Flow** Reach Length Runoff Slope Time ID L<sub>i</sub> (ft) S<sub>i</sub> (ft/ft) Coefficient, C<sub>5</sub> t<sub>i</sub> (min) Basin #1 300.00 0.010 0.01 34.09 Basin #2 100.00 0.010 0.67 7.76 Basin #3 100.00 0.010 0.67 7.76 Basin #4 100.00 0.010 0.67 7.76 Basin #5 0.010 7.76 100.00 0.67 Basin #6 300.00 0.010 0.01 34.09 Basin #7 300.00 0.010 0.01 34.09 Weighted Totals 1300.00 0.010 Total t<sub>i</sub> (min) 133.31 CHANNELIZED FLOW Channelized Flow **Channelized Flow** Channelized Flow NRCS Reach Length Slope Time Conveyance ID St (ft/ft) L<sub>t</sub> (ft) t<sub>t</sub> (min) Factor K Weighted Totals Total t<sub>t</sub> (min)

| Computed t <sub>c</sub> (min) | 0.00 |
|-------------------------------|------|
| Regional t <sub>c</sub> (min) |      |
| Selected t <sub>c</sub> (min) |      |

| Basin ID: [<br>20ME 3<br>20ME 3   |                    | sin #2                 |                        | UD-D             | etention, Version 3             | .07 (Febru | iary 2017)     |        |       |        |             |        |                  |          |
|---|--------------------|------------------------|------------------------|------------------|---------------------------------|------------|----------------|--------|-------|--------|-------------|--------|------------------|----------|
| Basin 0:12<br>welling and the second se                          | EDB<br>4.18<br>100 | sin #2                 |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Required Volume Calculation<br>Selected BMP Type =<br>Watershed Length<br>Watershed Length<br>Watershed Length<br>Watershed Stope<br>Watershed Imperviousness<br>Percentage Hydrologic Soil Group A -<br>Percentage Hydrologic Soil Group A -<br>Percentage Hydrologic Soil Group A -<br>Percentage Hydrologic Soil Group B -<br>Decide Water Volume (Clarvi)<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (Clarvi)<br>Excess Uthan Rundt Volume (Clarvi)   | EDB<br>4.18<br>100 |                        |                        | _                |                                 |            |                |        |       |        |             |        |                  |          |
| Required Volume Calculation<br>Selected BMP Type =<br>Watershed Length<br>Watershed Length<br>Watershed Length<br>Watershed Imperiousness =<br>Percentage Hydrologic Soil Group & D<br>Percentage Hydrologic Soil Group & D<br>Percentage Hydrologic Soil Group & D<br>Desired WCAC Volume (CIRV)<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (CIRV)   | EDB<br>4.18<br>100 |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Excess Under Judice State Stat                            | EDB<br>4.18        |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Example Zono of<br>Required Volume Calculation<br>Selected BMP Type =<br>Watershed Area =<br>Watershed Length =<br>Watershed Imperiouaness =<br>Percentage Hydrologic Soll Group & D<br>Percentage Hydrologic Soll Group & D<br>Percentage Hydrologic Soll Group R D<br>Everset Work Provint Time =<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (VQCV) =   | EDB<br>4.18        |                        |                        |                  |                                 |            | _              |        |       |        |             |        |                  |          |
| Example Zono of<br>Required Volume Calculation<br>Selected BMP Type =<br>Watershed Area =<br>Watershed Length =<br>Watershed Imperiouaness =<br>Percentage Hydrologic Soll Group & D<br>Percentage Hydrologic Soll Group & D<br>Percentage Hydrologic Soll Group R D<br>Everset Water Anna The State Stat | EDB<br>4.18        | on (Retent             | ion Pond)              |                  | Depth Increment =               |            | ft<br>Optional |        |       |        | Optional    |        | 1                |          |
| Selected BMP Type =<br>Watershed Area =<br>Watershed Length =<br>Watershed Length =<br>Watershed Imperviourness =<br>Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group S =<br>Desired WGCV Drain Time =<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Rundt Volume (EURV) =  | 4.18<br>100        | 1                      |                        |                  | Stage - Storage                 | Stage      | Override       | Length | Width | Area   | Override    | Area   | Volume<br>(ft^3) | Volume   |
| Selected BMP Type =<br>Watershed Area =<br>Watershed Length =<br>Watershed Length =<br>Watershed Imperviourness =<br>Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group S =<br>Desired WGCV Drain Time =<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Rundt Volume (EURV) =  | 4.18<br>100        | 1                      |                        |                  | Description<br>Top of Micropool | (ft)       | Stage (ft)     | (ft)   | (ft)  | (ft^2) | Area (ft^2) | (acre) | (tt^3)           | (ac-ft)  |
| Watenhed Length -<br>Watenhed Imperviouness -<br>Percentage Hydrologic Soil Group A -<br>Percentage Hydrologic Soil Group R -<br>Percentage Hydrologic Soil Groups CD -<br>earied WGCV profin Time -<br>Location for 1-hr Rainfall Depths - L<br>Water Quality Capture Volume (WCCV) -<br>Excess Uthan Rundt Volume (EURV) -  | 100                |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Watershed Mope -<br>Watershed Imperviouness -<br>Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group D =<br>Desired WGCV Drain Time =<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Rundf Volume (EURV) =  |                    | acres                  | Note: L / W            | Ratio < 1        |                                 |            |                |        |       |        |             |        |                  |          |
| Watershed Imperviourness –<br>Percentage Hydrologic Soli Group A –<br>Percentage Hydrologic Soli Group B –<br>Percentage Hydrologic Soli Groups CD –<br>Berierd WCAC Urani Time –<br>Location for 1-hr Rainfall Deghts –<br>Water Quality Capture Volume (WQCV) –<br>Excess Urban Rundf Volume (EURV) –   |                    | ft<br>ft/ft            | L / W Ratio :          | = 0.1            | -                               |            |                |        |       |        |             |        |                  |          |
| Percentage Hydrologic Soil Group A =<br>Percentage Hydrologic Soil Group B =<br>Percentage Hydrologic Soil Group B =<br>Desired WQCV Drain Time =<br>Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Rundf Volume (EURV) =   | 50.00%             | percent                |                        |                  | -                               |            |                |        |       |        |             |        |                  |          |
| Percentage Hydrologic Soil Groups C/D =<br>Desired WQCV Drain Time =<br>Location for 1-hr Rainfall Depths = U<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Runoff Volume (EURV) =   | 0.0%               | percent                |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Desired WQCV Drain Time =<br>Location for 1-hr Rainfall Depths = U<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Runoff Volume (EURV) =  | 100.0%             | percent                |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Location for 1-hr Rainfall Depths = U<br>Water Quality Capture Volume (WQCV) =<br>Excess Urban Runoff Volume (EURV) =   | 0.0%<br>40.0       | percent<br>hours       |                        |                  | -                               |            |                |        |       |        |             |        |                  |          |
| Excess Urban Runoff Volume (EURV) =   |                    |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
|   | 0.072              | acre-feet              | Optional Use           | er Override      |                                 |            |                |        |       |        |             |        |                  |          |
|   | 0.223              | acre-feet<br>acre-feet | 1-hr Precipita<br>0.52 | linches          |                                 |            |                |        |       |        |             |        |                  |          |
| 5-yr Runoff Volume (P1 = 0.64 in.) =  | 0.105              | acre-feet              | 0.64                   | inches           |                                 |            |                |        |       |        |             |        |                  |          |
| 10-yr Runoff Volume (P1 = 0.77 in.) =   | 0.146              | acre-feet              | 0.77                   | inches           | -                               |            |                |        |       |        |             |        |                  |          |
| 25-yr Runoff Volume (P1 = 0.99 in.) =<br>50-yr Runoff Volume (P1 = 1.21 in.) =  | 0.230              | acre-feet<br>acre-feet | 0.99                   | inches<br>inches |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
| 50-yr Runoff Volume (P1 = 1.21 in.) =<br>100-yr Runoff Volume (P1 = 1.44 in.) =   | 0.298              | acre-feet              | 1.21                   | inches           |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
| 500-yr Runoff Volume (P1 = 2.12 in.) =  | 0.620              | acre-feet              | 2.12                   | inches           |                                 |            |                |        |       |        |             |        |                  |          |
| Approximate 2-yr Detention Volume =   | 0.073              | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Approximate 5-yr Detention Volume =<br>Approximate 10-yr Detention Volume =   | 0.099              | acre-feet<br>acre-feet |                        |                  |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
| Approximate 25-yr Detention Volume =  | 0.166              | acre-feet              |                        |                  | L                               |            |                |        |       |        |             |        |                  |          |
| Approximate 50-yr Detention Volume =  | 0.188              | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        | -                |          |
| Approximate 100-yr Detention Volume =   | 0.223              | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Stage-Storage Calculation   |                    |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Zone 1 Volume (100-year) =  |                    | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Select Zone 2 Storage Volume (Optional) =   |                    | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Select Zone 3 Storage Volume (Optional) =<br>Total Detention Basin Volume =   |                    | acre-feet<br>acre-feet |                        |                  |                                 |            |                |        |       |        |             |        |                  | -        |
| Initial Surcharge Volume (ISV) =  | 9                  | ft^3                   |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Initial Surcharge Depth (ISD) =   | 0.50               | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Total Available Detention Depth (H <sub>total</sub> ) =   | 1.00               | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Depth of Trickle Channel $(H_{TC}) =$<br>Slope of Trickle Channel $(S_{TC}) =$  | 0.50               | ft<br>ft/ft            |                        |                  | -                               |            |                |        |       |        |             |        |                  |          |
| Slopes of Main Basin Sides (S <sub>main</sub> ) =   | 3                  | H:V                    |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Basin Length-to-Width Ratio $(R_{t,W}) =$   | 1200               |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Initial Surcharge Area (A <sub>6v</sub> ) =   |                    | <b>]</b>               |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Surcharge Volume Length (L <sub>ISV</sub> ) =   |                    | ft^2<br>ft             |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Surcharge Volume Width (W <sub>ISV</sub> ) =  |                    | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Depth of Basin Floor (H <sub>FLOOR</sub> ) =  |                    | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Length of Basin Floor (L <sub>FLOOR</sub> ) =<br>Width of Basin Floor (W <sub>FLOOR</sub> ) =   |                    | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Area of Basin Floor (A <sub>FLOOR</sub> ) =   |                    | π<br>ft^2              |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Volume of Basin Floor (V <sub>FLOOR</sub> ) =   |                    | ft^3                   |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Depth of Main Basin (H <sub>MAN</sub> ) =   |                    | ft                     |                        |                  |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
| Length of Main Basin (L <sub>MAIN</sub> ) =<br>Width of Main Basin (W <sub>MAIN</sub> ) =   |                    | ft                     |                        |                  | l                               |            |                |        |       |        |             |        |                  |          |
| Area of Main Basin (A <sub>MAIN</sub> ) =   |                    | ft^2                   |                        |                  |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
| Volume of Main Basin (V <sub>MAN</sub> ) =  |                    | ft^3                   |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
| Calculated Total Basin Volume (V <sub>total</sub> ) =   |                    | acre-feet              |                        |                  |                                 |            |                |        |       |        |             |        |                  | <u> </u> |
|   |                    |                        |                        |                  |                                 |            |                |        |       |        |             |        |                  |          |
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|   |                    |                        |                        |                  | -                               |            |                |        |       |        |             |        |                  |          |
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|   |                    |                        |                        |                  | <u> </u>                        |            |                |        |       |        |             |        |                  | <u> </u> |
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|   |                    |                        |                        |                  | <u> </u>                        |            |                |        |       |        |             |        |                  |          |

|  |                             |                        |                            | there b          | ASIN STAGE-S                   | IONAG         |                        | BUILDEI        | n.            |                |                         |                |                  |                   |
|--|-----------------------------|------------------------|----------------------------|------------------|--------------------------------|---------------|------------------------|----------------|---------------|----------------|-------------------------|----------------|------------------|-------------------|
| Designed   | Conjuta Tar                 | _                      |                            | UD-D             | etention, Version 3            | .07 (Febru    | ary 2017)              |                |               |                |                         |                |                  |                   |
|  | Society Turr<br>Drainage Ba |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| 20NE 3   | 2<br>TONE 1                 |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
|  |                             | I                      |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| 2014   | 1 AND 2                     | -100-YI<br>ORIFI       | CE                         |                  | Depth Increment =              |               | ft<br>Optional         | 1              | 1             | -              | Optional                |                |                  |                   |
| POOL Example Zone  |                             | ion (Retent            | tion Pond)                 |                  | Stage - Storage<br>Description | Stage<br>(ft) | Override<br>Stage (ft) | Length<br>(ft) | Width<br>(ft) | Area<br>(ft^2) | Override<br>Area (ft^2) | Area<br>(acre) | Volume<br>(ft^3) | Volume<br>(ac-ft) |
| Required Volume Calculation  |                             | _                      |                            |                  | Top of Micropool               | (1)           | Chuge (h)              | (1)            | (17)          | (11.2)         | 7100 (N 2)              | (uore)         | (11 0)           | (do it)           |
| Selected BMP Type =<br>Watershed Area =  | EDB<br>6.80                 | acres                  |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Watershed Length =   | 100                         | ft                     | Note: L / W<br>L / W Ratio |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Watershed Slope =<br>Watershed Imperviousness =  | 0.010                       | ft/ft<br>percent       |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Percentage Hydrologic Soil Group A =   | 0.0%                        | percent                |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Percentage Hydrologic Soil Group B =<br>Percentage Hydrologic Soil Groups C/D =                    | 100.0%                      | percent<br>percent     |                            |                  | -                              |               |                        |                |               |                |                         |                |                  |                   |
| Desired WQCV Drain Time =  | 40.0                        | hours                  |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Location for 1-hr Rainfall Depths =<br>Water Quality Capture Volume (WQCV) =                       |                             | acre-feet              | Optional Us                | or Ouprrido      |                                |               |                        |                |               |                |                         |                |                  |                   |
| Excess Urban Runoff Volume (EURV) =  | 0.363                       | acre-feet              | 1-hr Precipi               | tation           |                                |               |                        |                |               |                |                         |                |                  |                   |
| 2-yr Runoff Volume (P1 = 0.52 in.) =<br>5-yr Runoff Volume (P1 = 0.64 in.) =                       | 0.127                       | acre-feet<br>acre-feet | 0.52                       | inches           |                                |               |                        |                |               |                |                         |                |                  |                   |
| 10-yr Runoff Volume (P1 = 0.77 in.) =  | 0.238                       | acre-feet              | 0.77                       | inches           |                                |               |                        |                |               |                |                         |                |                  |                   |
| 25-yr Runoff Volume (P1 = 0.99 in.) =<br>50-yr Runoff Volume (P1 = 1.21 in.) =                     | 0.374                       | acre-feet<br>acre-feet | 0.99                       | inches<br>inches |                                |               |                        |                |               |                |                         |                |                  |                   |
| 100-yr Runoff Volume (P1 = 1.44 in.) =<br>500-yr Runoff Volume (P1 = 2.12 in.) =                   | 0.627                       | acre-feet              | 1.44                       | inches           |                                |               |                        |                |               |                |                         |                |                  |                   |
| 500-yr Runoff Volume (P1 = 2.12 in.) =<br>Approximate 2-yr Detention Volume =                      | 0.119                       | acre-feet<br>acre-feet | 2.12                       | incnes           | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
| Approximate 5-yr Detention Volume =  | 0.161                       | acre-feet<br>acre-feet |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Approximate 10-yr Detention Volume =<br>Approximate 25-yr Detention Volume =                       | 0.270                       | acre-feet<br>acre-feet |                            |                  | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
| Approximate 50-yr Detention Volume =<br>Approximate 100-yr Detention Volume =                      | 0.306                       | acre-feet              |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
|  | 0.363                       | acre-teet              |                            |                  | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
| Stage-Storage Calculation  | -                           | ٦.                     |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Zone 1 Volume (100-year) =<br>Select Zone 2 Storage Volume (Optional) =                            | -                           | acre-feet<br>acre-feet |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Select Zone 3 Storage Volume (Optional) =<br>Total Detention Basin Volume =                        |                             | acre-feet              |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Initial Surcharge Volume (ISV) =   | 15                          | acre-feet<br>ft^3      |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Initial Surcharge Depth (ISD) =<br>Total Available Detention Depth (H <sub>total</sub> ) =         | 0.50                        | ft                     |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Depth of Trickle Channel (H <sub>TC</sub> ) =  | 0.50                        | ft ft                  |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Slope of Trickle Channel (S <sub>rc</sub> ) =<br>Slopes of Main Basin Sides (S <sub>main</sub> ) = | 0.001                       | ft/ft<br>H:V           |                            |                  | -                              |               |                        |                |               |                |                         |                |                  |                   |
| Basin Length-to-Width Ratio (R <sub>L/W</sub> ) =  | 1200                        | n.v                    |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Initial Surcharge Area (A <sub>ssy</sub> )   |                             | ft^2                   |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Surcharge Volume Length (L <sub>ISV</sub> ) =  |                             | ft                     |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Surcharge Volume Width (W <sub>ISV</sub> ) =<br>Depth of Basin Floor (H <sub>FLOOR</sub> ) =       |                             | ft<br>ft               |                            |                  | -                              |               |                        |                |               |                |                         |                |                  |                   |
| Length of Basin Floor (L <sub>FLOOR</sub> ) =<br>Width of Basin Floor (W <sub>FLOOR</sub> ) =      |                             | ft                     |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Area of Basin Floor (A <sub>FLOOR</sub> ) =  |                             | ft<br>ft^2             |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Volume of Basin Floor (V <sub>FLOOR</sub> ) =<br>Depth of Main Basin (H <sub>MAIN</sub> ) =        |                             | ft^3                   |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Length of Main Basin (L <sub>MAN</sub> ) =   |                             | ft                     |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
| Width of Main Basin (W <sub>MAIN</sub> ) =<br>Area of Main Basin (A <sub>MAIN</sub> ) =            |                             | ft                     |                            |                  |                                | -             |                        |                |               |                |                         |                | -                |                   |
| Volume of Main Basin (V <sub>MAN</sub> ) =   |                             | ft^2<br>ft^3           |                            |                  | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
| Calculated Total Basin Volume (V <sub>total</sub> ) =  |                             | acre-feet              |                            |                  | -                              |               |                        |                |               |                |                         | -              |                  | <u> </u>          |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
|  |                             |                        |                            |                  | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                | -                | <u> </u>          |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                | <b> </b>         |                   |
|  |                             |                        |                            |                  | <u> </u>                       |               |                        |                |               |                |                         |                |                  |                   |
|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
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|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                |                  |                   |
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|  |                             |                        |                            |                  |                                |               |                        |                |               |                |                         |                | E                | E                 |
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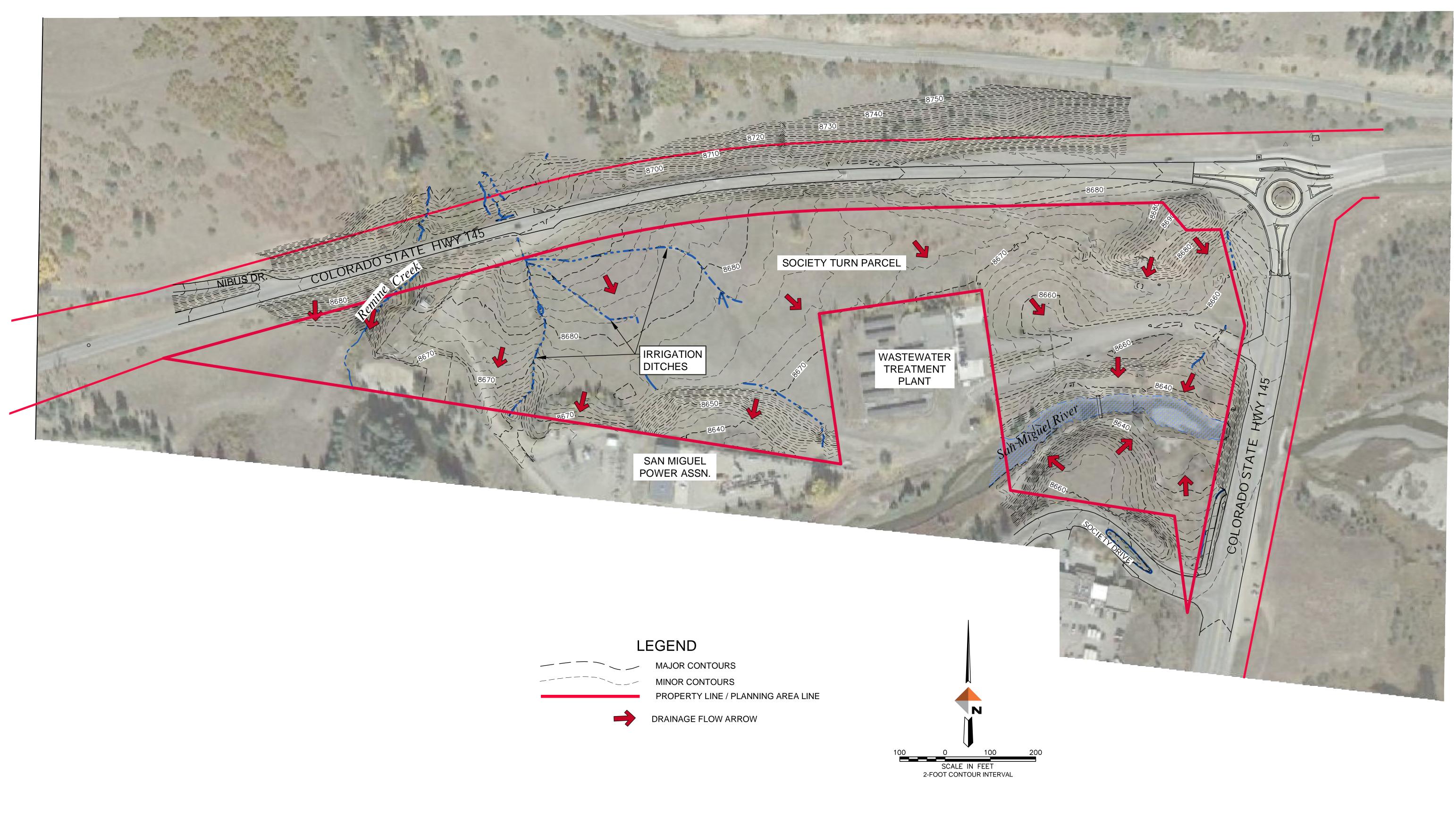
|  |                        | DETEN                         | ITION B          | ASIN STAGE-S                    | TORAG      | E TABLE              | BUILDE | R     |        |                      |        |          |          |
|--|------------------------|-------------------------------|------------------|---------------------------------|------------|----------------------|--------|-------|--------|----------------------|--------|----------|----------|
|  |                        |                               | UD-D             | etention, Version 3             | .07 (Febru | ary 2017)            |        |       |        |                      |        |          |          |
| Project: <u>Society Tur</u><br>Basin ID: <u>Drainage Ba</u>  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| ZONE 3   |                        | 1                             |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  | T                      |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| ZONE 1 AND 2   | 100-YE                 | AAN<br>3C                     |                  | Depth Increment =               |            | ft                   |        |       |        |                      |        |          |          |
| PERMANENT ORIFICES   | ion (Retent            | ion Pond)                     |                  | Stage - Storage                 | Stage      | Optional<br>Override | Length | Width | Area   | Optional<br>Override | Area   | Volume   | Volum    |
| Required Volume Calculation  |                        |                               |                  | Description<br>Top of Micropool | (ft)       | Stage (ft)           | (ft)   | (ft)  | (ft^2) | Area (ft^2)          | (acre) | (ft^3)   | (ac-ft   |
| Selected BMP Type = EDB  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Watershed Area = 0.52<br>Watershed Length = 100  | acres                  | Note: L / W<br>L / W Ratio    |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Watershed Slope = 0.010  | ft/ft                  | L / W Ratio                   | = 0.4            |                                 |            |                      |        |       |        |                      |        |          |          |
| Watershed Imperviousness = 50.00%<br>Percentage Hydrologic Soil Group A = 0.0%                             | percent<br>percent     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Percentage Hydrologic Soil Group B = 100.0%  | percent                |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Percentage Hydrologic Soil Groups C/D = 0.0%<br>Desired WQCV Drain Time = 40.0                             | percent<br>hours       |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Location for 1-hr Rainfall Depths = User Input   | nouro                  |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Water Quality Capture Volume (WQCV) = 0.009<br>Excess Urban Runoff Volume (EURV) = 0.028                   | acre-feet<br>acre-feet | Optional Use<br>1-hr Precipit |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| 2-yr Runoff Volume (P1 = 0.52 in.) = 0.010   | acre-feet              | 0.52                          | inches           |                                 |            |                      |        |       |        |                      |        |          |          |
| 5-yr Runoff Volume (P1 = 0.64 in.) = 0.013<br>10-yr Runoff Volume (P1 = 0.77 in.) = 0.018                  | acre-feet<br>acre-feet | 0.64                          | inches<br>inches |                                 |            |                      |        |       |        |                      |        | <u> </u> | <u> </u> |
| 25-yr Runoff Volume (P1 = 0.99 in.) = 0.029  | acre-feet              | 0.99                          | inches           |                                 |            |                      |        |       |        |                      |        |          |          |
| 50-yr Runoff Volume (P1 = 1.21 in.) = 0.037<br>100-yr Runoff Volume (P1 = 1.44 in.) = 0.048                | acre-feet<br>acre-feet | 1.21                          | inches<br>inches |                                 |            |                      |        |       |        |                      |        |          |          |
| 500-yr Runoff Volume (P1 = 2.12 in.) = 0.077   | acre-feet              | 2.12                          | inches           |                                 |            |                      |        |       |        |                      |        |          |          |
| Approximate 2-yr Detention Volume = 0.009<br>Approximate 5-yr Detention Volume = 0.012                     | acre-feet<br>acre-feet |                               |                  |                                 |            |                      |        |       |        |                      |        | <u> </u> | <u> </u> |
| Approximate 10-yr Detention Volume = 0.017   | acre-feet              |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Approximate 25-yr Detention Volume = 0.021<br>Approximate 50-yr Detention Volume = 0.023                   | acre-feet<br>acre-feet |                               |                  |                                 |            |                      |        |       |        |                      |        | <u> </u> |          |
| Approximate 100-yr Detention Volume = 0.028  | acre-feet              |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Stage-Storage Calculation  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Zone 1 Volume (100-year) =   | acre-feet              |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Select Zone 2 Storage Volume (Optional) =<br>Select Zone 3 Storage Volume (Optional) =                     | acre-feet              |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Total Detention Basin Volume =   | acre-feet<br>acre-feet |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Initial Surcharge Volume (ISV) = 1   | ft^3                   |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Initial Surcharge Depth (ISD) = 0.50<br>Total Available Detention Depth (H <sub>total</sub> ) = 1.00       | ft                     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Depth of Trickle Channel (H <sub>TC</sub> ) = 0.50   | ft                     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Slope of Trickle Channel (S <sub>TC</sub> ) = 0.001<br>Slopes of Main Basin Sides (S <sub>main</sub> ) = 3 | ft/ft<br>H:V           |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Basin Length-to-Width Ratio (R <sub>L/W</sub> ) = 1200   |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Initial Surcharge Area (A <sub>SV</sub> ) =  | ft^2                   |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Surcharge Volume Length (L <sub>ISV</sub> ) =  | ft                     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Surcharge Volume Width (W <sub>ISV</sub> ) =<br>Depth of Basin Floor (H <sub>FLOOR</sub> ) =               | ft<br>ft               |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Length of Basin Floor (L <sub>FLOOR</sub> ) =  | ft                     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Width of Basin Floor (W <sub>FLOOR</sub> ) =<br>Area of Basin Floor (A <sub>FLOOR</sub> ) =                | ft<br>ft^2             |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Volume of Basin Floor (V <sub>FLOOR</sub> ) =  | ft^3                   |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Depth of Main Basin (H <sub>MAIN</sub> ) =<br>Length of Main Basin (L <sub>MAIN</sub> ) =                  | ft                     |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Width of Main Basin (W <sub>MAIN</sub> ) =   | ft<br>ft               |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Area of Main Basin (A <sub>MAIN</sub> ) =  | ft^2                   |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
| Volume of Main Basin (V <sub>MAIN</sub> ) =<br>Calculated Total Basin Volume (V <sub>total</sub> ) =       | ft^3<br>acre-feet      |                               |                  |                                 |            |                      |        |       |        |                      |        |          | -        |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        | E        | E        |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        | E        | E        |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        | E        | E        |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        | -        |          |
|  |                        |                               |                  |                                 |            |                      |        |       |        |                      |        |          |          |
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|  |                        | DETENTION                         | BASIN STAGE-S                   | TORAG     | ETABLE               | BUILDE   | ĸ        |        |                      |        |          |          |
|--|------------------------|-----------------------------------|---------------------------------|-----------|----------------------|----------|----------|--------|----------------------|--------|----------|----------|
| Project: Society Tu  |                        | U                                 | D-Detention, Version 3          | .07 (Febr | uary 2017)           |          |          |        |                      |        |          | -        |
| Basin ID: Drainage B   |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| 20NE 3<br>20NE 2<br>20NE 1   |                        | -                                 |                                 |           |                      |          |          |        |                      |        |          |          |
|  | T                      |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| 20ME 1 AND 2   | 108-Y                  | EAN<br>CE                         | Depth Increment =               |           | ft                   |          |          |        |                      |        |          |          |
| POOL Example Zone Configura  | tion (Reten            | tion Pond)                        | Stage - Storage                 | Stage     | Optional<br>Override | Length   | Width    | Area   | Optional<br>Override | Area   | Volume   | Volum    |
| equired Volume Calculation   |                        |                                   | Description<br>Top of Micropool | (ft)      | Stage (ft)           | (ft)     | (ft)     | (ft^2) | Area (ft^2)          | (acre) | (ft^3)   | (ac-ft   |
| Selected BMP Type = EDB  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Watershed Area = 0.48  | acres                  | Note: L / W Ratio < 1             |                                 |           |                      |          |          |        |                      |        |          |          |
| Watershed Length = 100<br>Watershed Slope = 0.010  | ft/ft                  | L / W Ratio = 0.5                 |                                 |           |                      |          |          |        |                      |        |          |          |
| Watershed Imperviousness = 50.00%  | percent                |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Percentage Hydrologic Soil Group A = 0.0%<br>Percentage Hydrologic Soil Group B = 100.0%           | percent<br>percent     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Percentage Hydrologic Soil Groups C/D = 0.0%   | percent                |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Desired WQCV Drain Time = 40.0<br>Location for 1-hr Rainfall Depths = User Input                   | hours                  |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Water Quality Capture Volume (WQCV) = 0.008  | acre-feet              | Optional User Overric             | e                               |           |                      |          |          |        |                      |        |          |          |
| Excess Urban Runoff Volume (EURV) = 0.026<br>2-yr Runoff Volume (P1 = 0.52 in.) = 0.009            | acre-feet<br>acre-feet | 1-hr Precipitation<br>0.52 inches |                                 |           |                      |          |          |        |                      |        |          |          |
| 5-yr Runoff Volume (P1 = 0.64 in.) = 0.012   | acre-feet              | 0.64 inches                       |                                 |           |                      |          |          |        |                      |        |          | <u> </u> |
| 10-yr Runoff Volume (P1 = 0.77 in.) = 0.017<br>25-yr Runoff Volume (P1 = 0.99 in.) = 0.026         | acre-feet<br>acre-feet | 0.77 inches<br>0.99 inches        |                                 |           |                      | <u> </u> | <u> </u> |        |                      |        | <u> </u> | <u> </u> |
| 50-yr Runoff Volume (P1 = 1.21 in.) = 0.034  | acre-feet              | 1.21 inches                       |                                 |           |                      |          |          |        |                      |        |          |          |
| 100-yr Runoff Volume (P1 = 1.44 in.) = 0.044<br>500-yr Runoff Volume (P1 = 2.12 in.) = 0.071       | acre-feet<br>acre-feet | 1.44 inches<br>2.12 inches        |                                 |           |                      | <u> </u> | <u> </u> |        |                      |        | <u> </u> | <u> </u> |
| Approximate 2-yr Detention Volume = 0.008  | acre-feet              | 2.12 Inches                       |                                 |           |                      |          |          |        |                      |        |          |          |
| Approximate 5-yr Detention Volume = 0.011<br>Approximate 10-yr Detention Volume = 0.015            | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          | -        |
| Approximate 10-yr Detention Volume = 0.015<br>Approximate 25-yr Detention Volume = 0.019           | acre-feet<br>acre-feet |                                   |                                 |           |                      |          |          |        |                      |        |          | +        |
| Approximate 50-yr Detention Volume = 0.022   | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Approximate 100-yr Detention Volume = 0.026  | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| tage-Storage Calculation   | _                      |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Zone 1 Volume (100-year) =<br>Select Zone 2 Storage Volume (Optional) =                            | acre-feet<br>acre-feet |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Select Zone 3 Storage Volume (Optional) =  | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Total Detention Basin Volume =<br>Initial Surcharge Volume (ISV) = 1                               | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Initial Surcharge Depth (ISD) = 0.50   | ft^3<br>ft             |                                   |                                 |           |                      |          |          |        |                      |        |          | -        |
| Total Available Detention Depth $(H_{total}) = 1.00$<br>Depth of Trickle Channel $(H_{TC}) = 0.50$ | ft                     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Slope of Trickle Channel $(R_{TC}) = 0.50$<br>Slope of Trickle Channel $(S_{TC}) = 0.001$          | ft<br>ft/ft            |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Slopes of Main Basin Sides (S <sub>main</sub> ) = 3  | H:V                    |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Basin Length-to-Width Ratio (R <sub>L/W</sub> ) = 1200   |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Initial Surcharge Area (A <sub>SV</sub> ) =  | ft^2                   |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Surcharge Volume Length (L <sub>SV</sub> ) =<br>Surcharge Volume Width (W <sub>SV</sub> ) =        | ft                     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Depth of Basin Floor (H <sub>FLOOR</sub> ) =   | ft                     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Length of Basin Floor (L <sub>FLOOR</sub> ) =<br>Width of Basin Floor (W <sub>FLOOR</sub> ) =      | ft                     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Area of Basin Floor (A <sub>FLOOR</sub> ) =  | ft^2                   |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Volume of Basin Floor (V <sub>FLOOR</sub> ) =<br>Depth of Main Basin (H <sub>MAN</sub> ) =         | ft^3                   |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Length of Main Basin (L <sub>MAIN</sub> ) =  | ft                     |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Width of Main Basin (W <sub>MAIN</sub> ) =<br>Area of Main Basin (A <sub>MAIN</sub> ) =            | ft<br>ft^2             |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Volume of Main Basin (V <sub>MAIN</sub> ) =  | ft^3                   |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
| Calculated Total Basin Volume (V <sub>total</sub> ) =  | acre-feet              |                                   |                                 |           |                      |          |          |        |                      |        |          | +        |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          | <u> </u> |
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|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          | <u> </u> |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          |          |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          | <u> </u> |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          | E        |
|  |                        |                                   |                                 |           |                      |          | E        |        |                      |        | E        | E        |
|  |                        |                                   |                                 |           |                      |          |          |        |                      |        |          | -        |
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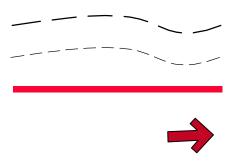


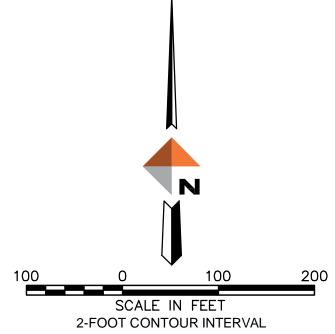
# APPENDIX E

# DRAINAGE PLANS AND DETAILS



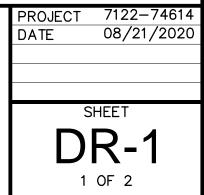


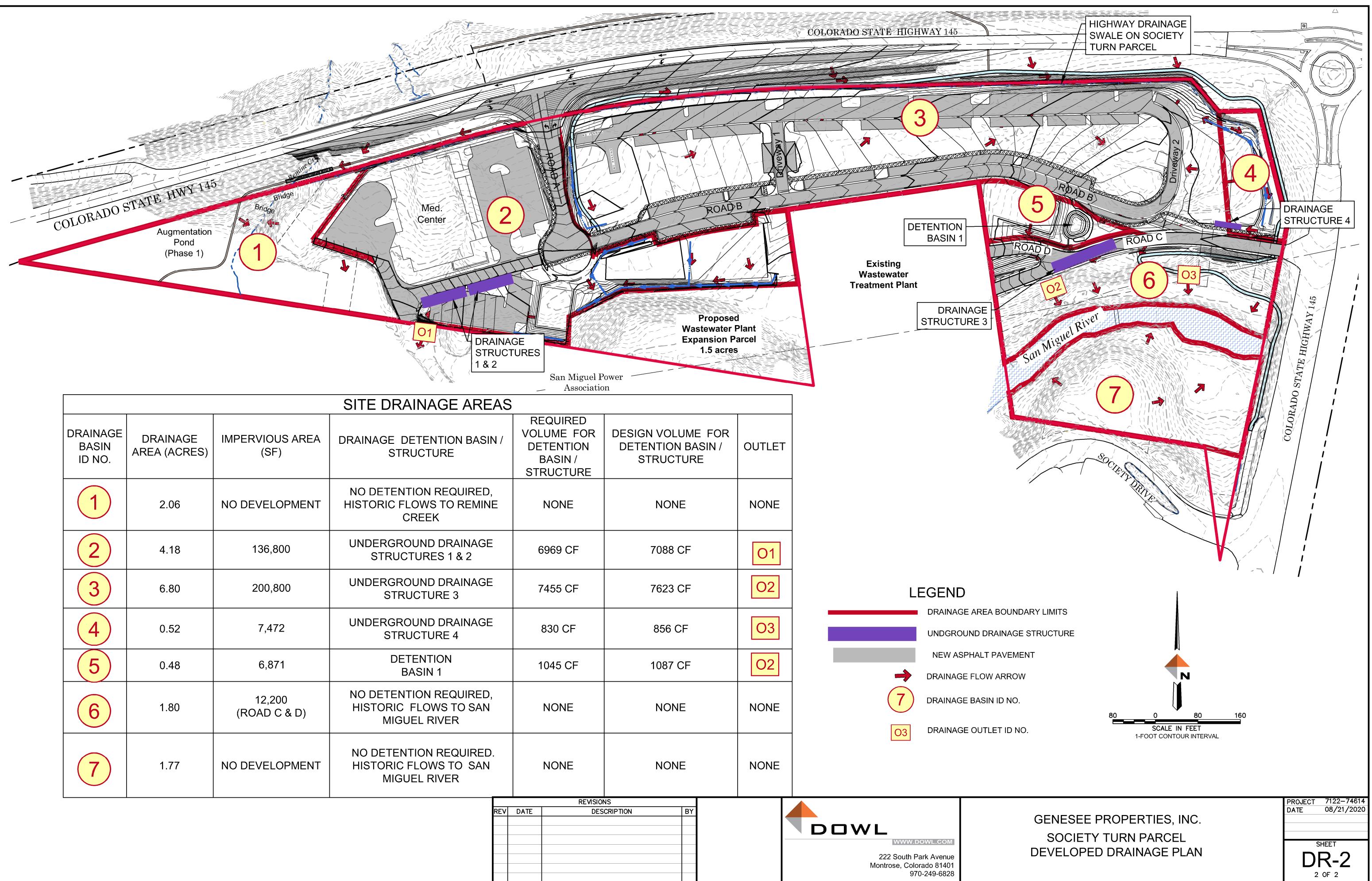




|    |      | REVISIONS   |    |  |
|----|------|-------------|----|--|
| EV | DATE | DESCRIPTION | BY |  |
|    |      |             |    | DOWL                                     |
|    |      |             |    | WWW.DOWL.COM<br>222 South Park Avenue    |
|    |      |             |    | Montrose, Colorado 81401<br>970-249-6828 |

GENESEE PROPERTIES, INC. SOCIETY TURN PARCEL PRE-DEVELOPED DRAINAGE





|                             |                          |                         | SITE DRAINAGE AF  |
|-----------------------------|--------------------------|-------------------------|---|
| DRAINAGE<br>BASIN<br>ID NO. | DRAINAGE<br>AREA (ACRES) | IMPERVIOUS AREA<br>(SF) | DRAINAGE DETENTION BA<br>STRUCTURE                          |
| 1                           | 2.06                     | NO DEVELOPMENT          | NO DETENTION REQUIR<br>HISTORIC FLOWS TO REN<br>CREEK       |
| 2                           | 4.18                     | 136,800                 | UNDERGROUND DRAINA<br>STRUCTURES 1 & 2                      |
| 3                           | 6.80                     | 200,800                 | UNDERGROUND DRAINA<br>STRUCTURE 3                           |
| 4                           | 0.52                     | 7,472                   | UNDERGROUND DRAINA<br>STRUCTURE 4                           |
| 5                           | 0.48                     | 6,871                   | DETENTION<br>BASIN 1  |
| 6                           | 1.80                     | 12,200<br>(ROAD C & D)  | NO DETENTION REQUIR<br>HISTORIC FLOWS TO SA<br>MIGUEL RIVER |
| 7                           | 1.77                     | NO DEVELOPMENT          | NO DETENTION REQUIR<br>HISTORIC FLOWS TO SA<br>MIGUEL RIVER |