



PRELIMINARY DRAINAGE REPORT

**SAND HILL FILING NO. 4
LOT 1**

NEC Marksheffel Rd. & Constitution Ave.
Colorado Springs, CO

PREPARED FOR:

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PREPARED BY:

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DATE:

December 23, 2019



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Certification Statements

This report and plan for the drainage design of Sand Hill Filing No. 4 was prepared by me (of under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the *City of Colorado Springs Drainage Criteria Manual* and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

Scott Brown PE Date
Registered Professional Engineer
State of Colorado No. 45900

Developer's Statement:

Armstrong Capital Development hereby certifies that the drainage facilities for Sand Hill Filing No. 4 shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of Sand Hill Filing No. 4, guarantee that final drainage design review will absolve Armstrong Capital Development and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Name of Developer

Authorized Signature Date

Printed Name

Title

Address:

CITY OF COLORADO SPRINGS:
Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

For City Engineer Date
Conditions:

I. Introduction

This document is the Preliminary Drainage Report for the commercial property known as Sand Hill Filing No. 4. The property is approximately 0.48 acres of vacant land that will be developed into a single lot, Lot 1, with a office/dental building with associated parking and drive aisles. This 0.48 acres is part of a larger 10.3 acre commercial development that has been named "Sand Hill" located at the northeast corner of Marksheffel Road and Constitution Avenue.

The purpose of this report is to identify on and offsite drainage patterns, locate and identify tributary or downstream drainage features and facilities that impact the site, and to identify drainage facility sizing and locations.

An MDDP has been previously prepared and approved for this site by M&S Civil Consultants, Inc. The "Master Development Drainage Plan for The Sands and Preliminary Drainage Report", dated March 2018 identifies basins and detention locations for the Sand Hill Filing No. 1 project site (M&S MDDP). In addition, there has been an amendment to the MDDP titled "Sand Hill MDDP Amendment to 'The MDDP for The Sands'" by Galloway & Company approved April 19, 2019 (MDDP Amendment). A final drainage report titled "Sand Hill Filing No. 1 Final Drainage Report" prepared by Galloway & Company (Filing 1 Report), approved June 5, 2019, includes the design of temporary Pond C and the overall storm drain associated with Sand Hill Filing No. 1. A final drainage report titled "Sand Hill Filing No. 2" prepared by Galloway & Company (Filing 2 FDR) was approved October 8, 2019 and included the drainage design for the Christian Brothers site. The drainge report for Sand Hill Filing No. 3 analyzed the Sand Hill Retail Pads site and how it complies with the MDDP Amendment. This report is currently under review. This report for Sand Hills Filing No. 4, includes a portion of the overall commercial development, which had been included in the design and analysis of Filing No. 3.

II. General Location and Description

Sand Hill Filing No. 4 is located in the west ½ of Section 33, Township 13 South, Range 65 West, of the 6th P.M. City of Colorado Springs, El Paso County, State of Colorado. The project site is bounded to the west by Sand Hill Filing No. 3, to the south by Constitution Avenue, to the east by vacant, unplatted land, and to the north by The Sands Filing No. 1. The site itself is currently undeveloped. A Vicinity Map is located in Appendix A for reference.

Soil data for Sand Hill Filing No. 4 was obtained from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey. Soils within the site are Blendon sandy loam (100%), hydrologic soil group B. A map depicting the soil types on the project site is contained in Appendix A for reference.

The Sand Creek East Tributary is located to the east of the project site. However, Sand Creek is contained outside of the property limits. Improvements to Sand Creek are being designed and constructed as part of the overall development, The Sands. A CLOMR has been approved for the proposed improvements to Sand Creek. The channel improvements are anticipated to be completed in the summer of 2019 at which time a LOMR will be completed. There are no major drainageways or irrigation facilities located on the site.

III. Historic Drainage Patterns and Features

The proposed site is located within the Sand Creek Drainage Basin as described in the Sand Creek Drainage Basin Planning Study (DBPS) prepared by Kiowa Engineering Corporation revised March 1996. The "Master Development Drainage Plan for The Sands and Preliminary Drainage Report", by M&S Civil Consultants dated March 2018 and the "Sand Hill Amendment to 'The MDDP for The Sands'" by Galloway & Company dated April 2019 have been used as the conceptual basis for this report. The MDDP designates basins for the Sand Hill development and requires parking lot and landscape island detention for some basins. Final pond design and parking lot detention was addressed in the Filing No. 3 drainage report. This PDR for Filing 4 is in conformance with the MDDP Amendment and follows the patterns and facilities proposed in that report and the FDR for Filing No. 3.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Panel 756 (FIRM Number 08041C0756 G), effective date December 7, 2018 a portion of the site lies within Shaded Zone X, and is outside of Zone AE. A CLOMR has been approved for the channel improvements associated with The Sands development. A copy of the FIRM map is included for reference in Appendix A.

In existing conditions, the site is comprised of undeveloped land covered mostly by native grasses and weeds. Existing slopes are generally between 1% and 3% although there are a few areas with slopes of up to 25%.

Historic drainage patterns for the proposed site were analyzed in both the M&S MDDP and the MDDP Amendment. The MDDP Amendment proposes new basins for the Sand Hill development and designs the detention facilities to meet the allowable release rates based on historic conditions. The MDDP Amendment also includes parking lot and landscape detention requirements for the Sand Hill Filing No. 3 and No. 4 sites. A copy of the drainage map from the MDDP has been included in Appendix E for reference. The proposed site is analyzed as part of Basin C-3.

Since some of the Sand Hill development is already in construction and will be built by the time the office site begin construction, the Filing 1, Filing 2 and Filing No. 3 FDRs have been used as a basis to calculate the historic/existing drainage patterns. A map has been developed and is included in Appendix E to show what will be existing when construction commences, and show all areas tributary to permanent ponds C and D. Historic calculations are provided in Appendix A. The proposed site lies within the basin described below:

Basin H-C (4.42 AC, Q5 = 3.4 cfs, Q100 = 12.2 cfs): defines a private access drive, Silicon Heights, that is being constructed with Filing 1 and the undeveloped land. Runoff flows in the southwestern direction towards a swale along the south of the site. The flow continues westerly and then flows into temporary Pond C.

Full spectrum detention for Sand Hill Filing No. 4 will be provided in conjunction with parking lot and landscape detention provided on site, as determined in the Filing No. 3 report.

IV. Drainage Design Criteria

The analysis and design of the Stormwater management system for this project was prepared in accordance with the criteria set forth in the City of Colorado Springs Drainage Criteria Manual (DCM) Volumes 1 & 2, dated May 2014.

The rational method was used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has been proven to be accurate for basins of this size and is based on the following formula:

$$Q = CIA$$

Where:

- Q = Peak Discharge (cfs)
- C = Runoff Coefficient
- I = Runoff intensity (inches/hour)
- A = Drainage area (acres)

The runoff coefficients are calculated based on land use, percent imperviousness, and design storm for each basin, as shown in the DCM Table 6-6.

The 100-year event was used as the major storm event and the 5-year event was used as the minor storm event. These storm intervals were used for the sizing of the pipes and inlets.

The rainfall intensity calculations are based on the DCM Figure 6-5 and IDF equations. The one hour point rainfall data for the design are listed in Table 1 below.

Table 1 - Precipitation Data

| Return Period | One Hour Depth (in.) | Intensity (in/hr) |
|---------------|----------------------|-------------------|
| 5-year | 1.50 | 5.17 |
| 100-year | 2.52 | 8.68 |

Time of concentrations have been adapted from the equation 6-7 of The City of Colorado Springs Drainage Criteria Manual, Volume 1 which are as follows:

$$T_c = T_i + T_t$$

Where:

- T_c = time of concentration (min)
- T_i = overland (initial) flow time (min)
- T_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

Overland (Initial) Flow Time: from equations 6-8 from the City of Colorado Springs Drainage Criteria Manual, Volume 1.

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

Where:

- T_i = overland (initial) flow
- C₅ = runoff coefficient for 5-year frequency
- L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)
- S = average basin slope

Travel Time

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

Where:

- V = Velocity (ft/s)
- C_v = conveyance coefficient
- S_w = watercourse slope (ft/ft)

Hydraulic Criteria

Design and analysis for this report were performed through the usage of StormCAD. Methods and parameters conform to those recommended in the UDFCD Manual. A tabular summary from analysis performed by StormCAD can be found in Appendix C - Hydraulic Calculations. Additionally, the table below shows the parameters used for StormCAD Standard Method Coefficients taken from *DCM Vol 1 Chapter 9 Table 9-4*.

| BEND LOSS | | |
|----------------------------------|------------------------|-------------------|
| BEND ANGLE | K COEFFICIENT | |
| 0° | 0.05 | |
| 22.5° | 0.10 | |
| 45° | 0.40 | |
| 60° | 0.64 | |
| 90° | 1.32 | |
| LATERAL LOSS | | |
| ONE LATERAL K COEFFICIENT | | |
| BEND ANGLE | NON -SURCHARGED | SURCHARGES |
| 45° | 0.27 | 0.47 |
| 60° | 0.52 | 0.90 |
| 90° | 1.02 | 1.77 |
| TWO LATERAL K COEFFICIENT | | |
| 45° | 0.96 | |
| 60° | 1.16 | |
| 90° | 1.52 | |

Inlets were sized using the latest UD-Inlet v4.05 spreadsheet. Calculations are provided in Appendix C.

The DCM requires that full spectrum detention (FSD) be utilized for new development. FSD attributes two design volumes; one being the Excess Urban Runoff Volume (EURV) and the other being the 100-year detention volume. The EURV methodology includes the Water Quality Capture Volume (WQCV) within the EURV volume. Therefore, no additional volume for the WQCV is required. The equations contained within the DCM were utilized to calculate the EURV and WQCV values.

The overall Sand Hill development site uses a series of parking lot detention with a downstream extended detention basin to work as a system and provide full spectrum detention for the property. Due to the ponds in series, a SWMM model was developed with the MDDP Amendment to identify the necessary parking lot detention and ensure that the downstream extended detention basins were sized appropriately. The SWMM model has been modified as portions of the Sand Hill Development have developed, and the most recent version, from the Filing 3 FDR, was used in this report for the design of full spectrum detention Pond C. Plots of depth vs. time from the SWMM model has been included to show that the pond drains appropriately in the full spectrum of events, and the model has been run for the WQ, 2, 5, 10, 25, 50, and 100 year events.

While it is preferred that the latest UD-Detention spreadsheet be utilized, it was felt that given the pond in series this spreadsheet was not appropriate. The MDDP uses the SWMM model to produce hydrographs of the site and verify drain times. The UD-Detention v2.35 spreadsheet was utilized for the sizing of various aspects of the extended detention basin. It was utilized to determine the required EURV volume and size the orifice plate for the EURV portion of the pond. The UD-Detention spreadsheet was also utilized to create stage release curves that were utilized in the SWMM model. Detention pond calculations can be found the Filing No. 3 report.

Assumptions made in the SWMM model are as follows:

- Kinematic Wave Method
- Horton's Infiltration Method
- Manning's n for impervious areas – 0.011
- Manning's n for pervious areas – 0.24
- Depression storage for impervious areas – 0.1"
- Depression storage for pervious areas – 0.35"

The detention pond and parking lot detention were designed in the Filing No. 3 report. Calculations are not included here, as there has been no modifications to the design assumptions.

V. Proposed Drainage Plan

A. General Concept

The proposed site is located within portions of basins C-2, C-3 and C-4 from the MDDP Amendment. A copy of the MDDP Amendment Proposed Map is included in Appendix E for reference. Basins denoted with an C designation are proposed to ultimately be routed to full spectrum detention Pond C located to the west, near NEC of Marksheffel and Constitution, and within the Sand Hill Filing No. 3 property limits. The MDDP assumed 90% impervious area for basins C-2, C-3, and C-4. The proposed site plan for the

area results in an impervious area that is less than 90%, therefore decreasing the required detention volumes. As a result, it was determined that the proposed full spectrum detention Pond C will have the capacity to provide detention for all C and D basins, and even a portion of basin E-1. Basin C-2 will still have parking lot detention, to provide a portion of the 100-year detention, but C-4 will not need to provide landscape detention as originally planned in the MDDP Amendment.

B. Four Step Process

The Four Step Process to minimize the adverse impacts of urbanization is a vital component of developing a balanced, sustainable project. Below identifies the approach to the four step process:

1. **Employ Runoff Reduction Practices**

This step uses low impact development (LID) practices to reduce runoff at the source. Generally, rather than creating point discharges that are directly connected to impervious areas runoff is routed through pervious areas to promote infiltration. Grass buffers have been utilized where possible.

2. **Implement BMPs That Provide a Water Quality Capture Volume with Slow Release**

This step utilizes formalized water quality capture volume to slow the release of runoff from the site. Ponds C is designed to provide EURV volume for the new development which incorporates a 72 hour release. Contained within the EURV volume is the WQCV which will release in no less than 40 hours.

3. **Stabilize Drainageways**

This step implements stabilization to channels to accommodate developed flows while protecting infrastructure and controlling sediment loading from erosion in the drainageways. Improvements to Sand Creek are being made as part of the overall development of The Sands project. These improvements have already taken into account developed flows from the site. Therefore, no channel improvements to Sand Creek will be required with the Sand Hill Filing 3 development. The channel improvements are currently under construction and are anticipated to be completed in the summer of 2019.

4. **Implement Site Specific and Other Source Control BMPs**

Trash enclosures will be provided for the lots which will reduce trash from leaving the lots. The biggest source control BMP is public education which can be found on the City of Colorado Springs website and discusses topics such as pet waste, car washing, lawn care, fall leaves, and snow melt and deicer.

C. Specific Details

The basins defined in the MDDP Amendment have been further subdivided based on the site plan and proposed grading of the proposed site. The general location and description of each basin is described below. General routing of the basins is described below. Hydrology calculations are provided in Appendix B. The proposed Drainage Map is located in Appendix E.

Basin C-2 (0.77 AC, $Q_5 = 3.1$ cfs, $Q_{100} = 5.7$ cfs): a basin defining parking lot area and some landscaping. A portion of the proposed parking falls within this larger basin. There are no modifications to this basin, as it was assumed to be fully paved parking in the Filing No. 3 report. Runoff will sheet flow to the proposed single Type 13 inlet at DP 2A. Approximately 2,000 cf of parking lot detention will be provided at DP 2. The inlet here will have a restrictor plate that will control the release rate into the private proposed 18" RCP storm sewer system that will pipe the flow southwest to FSD Pond C. Any emergency overflow at this inlet will flow to the proposed D-10-R inlet at DP 3.

Basin C-3 (0.47 AC, $Q_5 = 1.6$ cfs, $Q_{100} = 3.1$ cfs): a basin defining a future commercial development. Runoff will generally flow to the southwest where it will be captured in a future storm sewer system that will tie into the proposed storm sewer system at the stub that is being provided at DP 7. In existing, undeveloped conditions, the basin generally flows south and then west in a swale. Since this swale will no longer connect to FSD Pond C with the Filing No. 3 development, a flared end section will be provided at DP 7 to collect the runoff and convey it to the pond. This storm sewer will also serve as a stub for this basin when it develops in the future.

Basin C-3.2 (0.20 AC, $Q_5 = 0.6$ cfs, $Q_{100} = 1.1$ cfs): a basin defining the proposed office building, sidewalks and landscaping area. Runoff will generally flow to the southwest where it will be captured in a storm sewer system that will tie into the proposed storm sewer system at the stub that is being provided at DP 7. A flared end section is provided at DP 7 to collect the runoff and convey it to Pond C.

Basin C-4.3 (0.17 AC, $Q_5 = 0.8$ cfs, $Q_{100} = 1.4$ cfs): a basin defining paved area, a sidewalk, and some landscape area. Runoff will be conveyed with curb and gutter south to the proposed 4' sump D-10-R inlet at DP 8a and then will be piped to FSD Pond C via a private proposed 18" RCP storm pipe. Any emergency overflow from this inlet will flow to the flared end section DP 7.

Basin C-4.3a (0.11 AC, $Q_5 = 0.5$ cfs, $Q_{100} = 1.0$ cfs): a basin defining paved area, a sidewalk, and some landscape area. Runoff will be conveyed with curb and gutter south to the proposed 4' sump D-10-R inlet at DP 8 and then will be piped to FSD Pond C via a private proposed 18" RCP storm pipe. Any emergency overflow from this inlet will flow to the proposed D-10-R inlet at DP 10.

Basin OS-3.1 (0.05 AC, $Q_5 = 0.0$ cfs, $Q_{100} = 0.1$ cfs): a basin defining proposed landscape area along the southern edge basin C-3. This area is pervious and follow historic patterns. Runoff will be directed into the existing Constitution Avenue.

With the proposed development in Filing No. 4, there is a one additional design point (DP-8a), and modifications to 2 design points (DP 7 and 8). Below is a table showing the differences between flows calculated as part of the Filing No. 3 report and those as part of this report. With the more accurate designation of impervious areas, with this report, and the addition of a curb inlet at DP-8a, surface flows at DP 7 and DP 8 have decreased.

| DESIGN POINT COMPARISON | | | | |
|--------------------------------|---------------------|-----------------|---------------------|-----------------|
| | Filing No. 3 | | Filing No. 4 | |
| DESIGN POINT | 5-Year | 100-Year | 5-Year | 100-Year |
| DP 7 | 3.7 | 6.7 | 3.5 | 6.5 |
| DP 8a | N/A | N/A | 0.8 | 1.4 |
| DP8 | 4.8 | 8.9 | 4.0 | 7.4 |

D. Detention and Water Quality

A temporary Pond C was constructed with Filing 1 but will be replaced with a permanent full spectrum detention Pond C with the development of Filing No. 3, to the east of the proposed site. Per the MDDP Amendment, permanent Pond C will provide water quality and EURV for all C basins. It will also provide a portion of 100-year detention but requires that some of the tributary basins provide some 100-year detention in the form of parking lot detention. Parking lot detention is required for two of the six C basins, Basins C-1 and C-2. The proposed site lies within a portion of Basin C-2, and therefore is required to provide 2,578 cf of parking lot detention with a release rate of 1.9 cfs.

The SWMM model developed with the MDDP Amendment and modified with Filing 3 was utilized to design the permanent FSD Pond C. The MDDP Amendment assumed a total tributary area to FSD Pond C of 3.96 acres with a percent impervious of 87.9%. The design of the permanent FSD Pond C assumes 90% impervious for Pads G (Basin C-1), C and D (Basin C-3), but takes into account the actual site plan for Filing No. 3, therefore lowering the % impervious. The MDDP Amendment planned for a separate Pond D that would provide full spectrum detention for one D basin. Based on how the site plan and grading for Filing No. 3 it was determined that FSD Pond C has the capacity to also provide full spectrum detention for all of the C-basins, as well as the areas previously draining towards what was identified as Pond D in the MDDP. The total tributary to FSD Pond C is now 5.34 acres with a percent impervious of 79.1%.

Basin C-2 will provide parking lot detention, as required in the MDDP Amendment. It will provide 1,988 cf of detention with a release rate of 2.61 cfs. Basin C-1 will also still be required to provide parking lot detention when it develops and will need to provide 2,421 cf with a release rate of 3.23 cfs. With this parking lot detention, FSD Pond C has a required volume of 0.62 acre-ft and will release at 11.61 cfs in the 100-year event. The total release rate in the 100-year event at the western side of the site will be 11.79 cfs in comparison to the historical 12.35 cfs. The 5-year release rate will be 1.2 cfs in comparison to the historical 1.0 cfs. The SWMM model has been included in Appendix D. When Basins C-1 and C-3 develop, they will need to modify this SWMM model to ensure they are meeting the requirements for FSD Pond C.

An emergency overflow will be provided along the south side of the FSD Pond C. This overflow is a 12' trapezoidal weir lined with Type L riprap embankment protection and concrete cutoff walls on either side. The emergency overflow will discharge into Constitution Avenue.

VI. **Conclusions**

This report for Sand Hill Filing No. 4 has been prepared using the criteria and methods as described in the City of Colorado Springs Drainage Criteria Manual Volumes 1 & 2. Ponds C and parking lot detention will adequately provide water quality and full spectrum detention for the proposed development and will ensure that the 100-year discharge from the site does not exceed the pre-developed conditions in accordance with the DCM. The downstream facilities within Sand Creek are adequate to protect the runoff proposed from the site. The runoff will not adversely affect the downstream and surrounding developments.

VII. References

- 1) *Drainage Criteria Manual Volumes 1 & 2*, City of Colorado Springs, most recent version.
- 2) *Streamside Design Guidelines*, City of Colorado Springs, Revised 2009.
- 3) *Urban Storm Drainage and Criteria Manual*, Urban Drainage and Flood Control District, most recent version.
- 4) *Sand Creek Drainage Basin Planning Study*, March 1996, by Kiowa Engineering.
- 5) *Master Development Drainage Plan (MDDP) for the Sands and Preliminary Drainage Report*, March 2018, M&S Civil Consultants.
- 6) *Sand Hill Filing No. 1 Preliminary Drainage & MDDP Amendment Report (Galloway MDDP)*, 8/15/18, Galloway & Company.
- 7) *Sand Hill Filing No. 1 Final Drainage Report (Filing 1 FDR)*, 1/4/19, Galloway & Company.
- 8) *Final Drainage Report – 7-Eleven – Sand Hill Filing No. 1 Lot 1*, 10/5/18, EES.
- 9) *Final Drainage Report for The Sands Filing No. 1 & Drainage Analysis for the Proposed East Fork Sand Creek Subtributary*, December 2018, M&S Civil Consultants.
- 10) *Sand Hill Filing No. 2 Final Drainage Report (Filing 2 FDR)*, 9/9/19, Galloway & Company.
- 11) *Sand Hill Filing No. 3 Preliminary/Final Drainage Report*, December 2019, Galloway & Company.

APPENDIX A
Figures and Exhibits



VICINITY MAP SAND HILL RETAIL PAD C

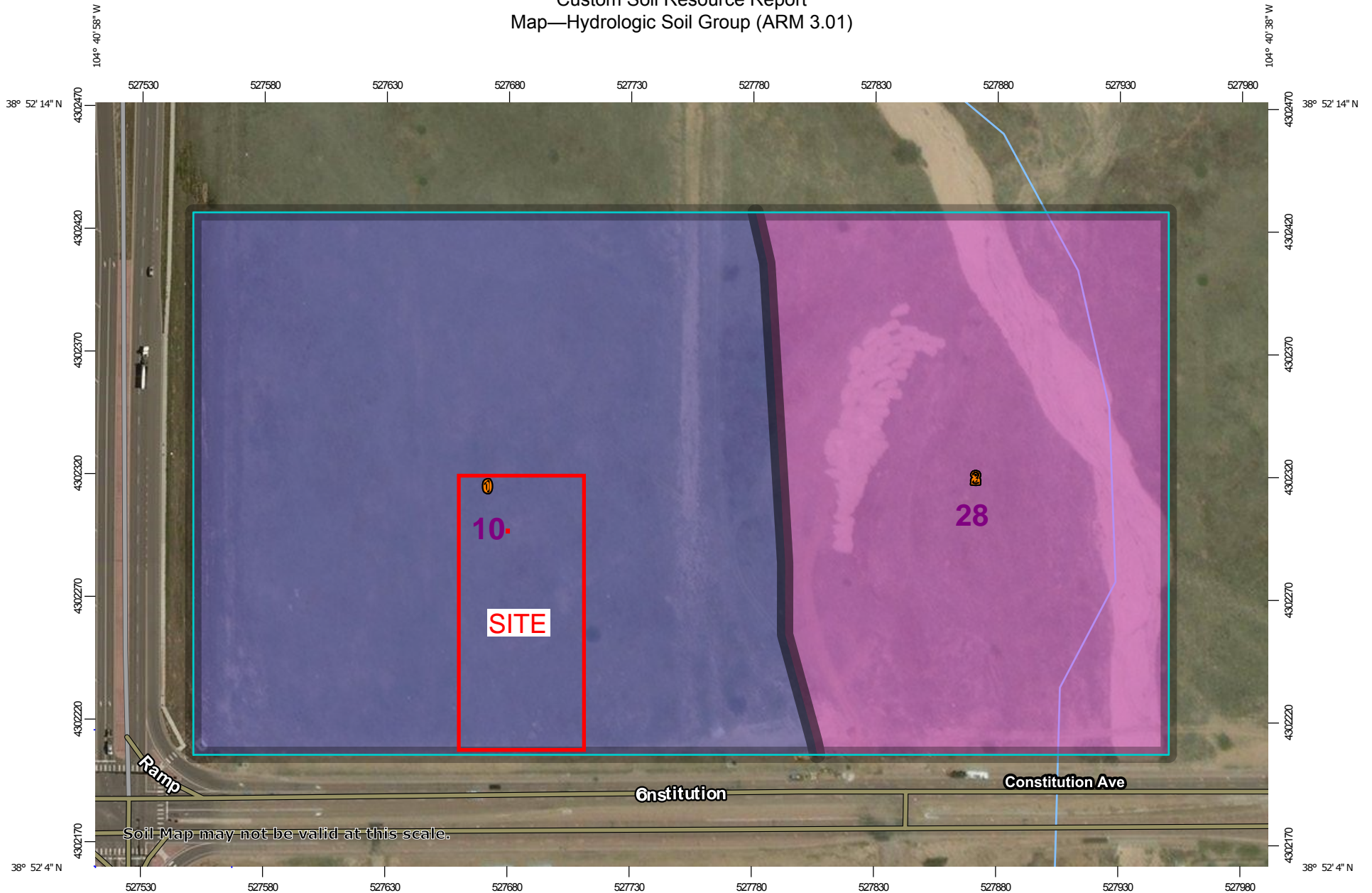


NOT TO SCALE

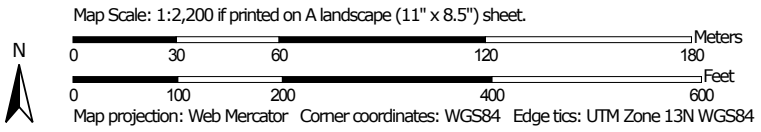


Custom Soil Resource Report


Map—Hydrologic Soil Group (ARM 3.01)



Soil Map may not be valid at this scale.











MAP LEGEND









Area of Interest (AOI)
 Area of Interest (AOI)

Soils





Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available





Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available


Soil Rating Points

-  A
-  A/D
-  B
-  B/D






Soils

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: El Paso County Area, Colorado
 Survey Area Data: Version 14, Sep 23, 2016

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

Date(s) aerial images were photographed: Apr 15, 2011—Mar 9, 2017

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

Table—Hydrologic Soil Group (ARM 3.01)

| Hydrologic Soil Group— Summary by Map Unit — El Paso County Area, Colorado (CO625) | | | | |
|------------------------------------------------------------------------------------|---------------------------------------------------|--------|--------------|----------------|
| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
| 10 | Blendon sandy loam, 0 to 3 percent slopes | B | 13.2 | 60.3% |
| 28 | Ellicott loamy coarse sand, 0 to 5 percent slopes | A | 8.7 | 39.7% |
| Totals for Area of Interest | | | 21.9 | 100.0% |

Rating Options—Hydrologic Soil Group (ARM 3.01)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOTES TO USERS

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

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

Coastal Base Flood Elevations shown on this map apply only to landward of 0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

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

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

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

NGS Information Services
NOAA, NGS512
National Geodetic Survey
SSMC-3, #0202
1315 East-West Highway
Silver Spring, MD 20910-3282

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

Base Map information shown on this FIRM was provided in digital form by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2004.

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

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

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

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

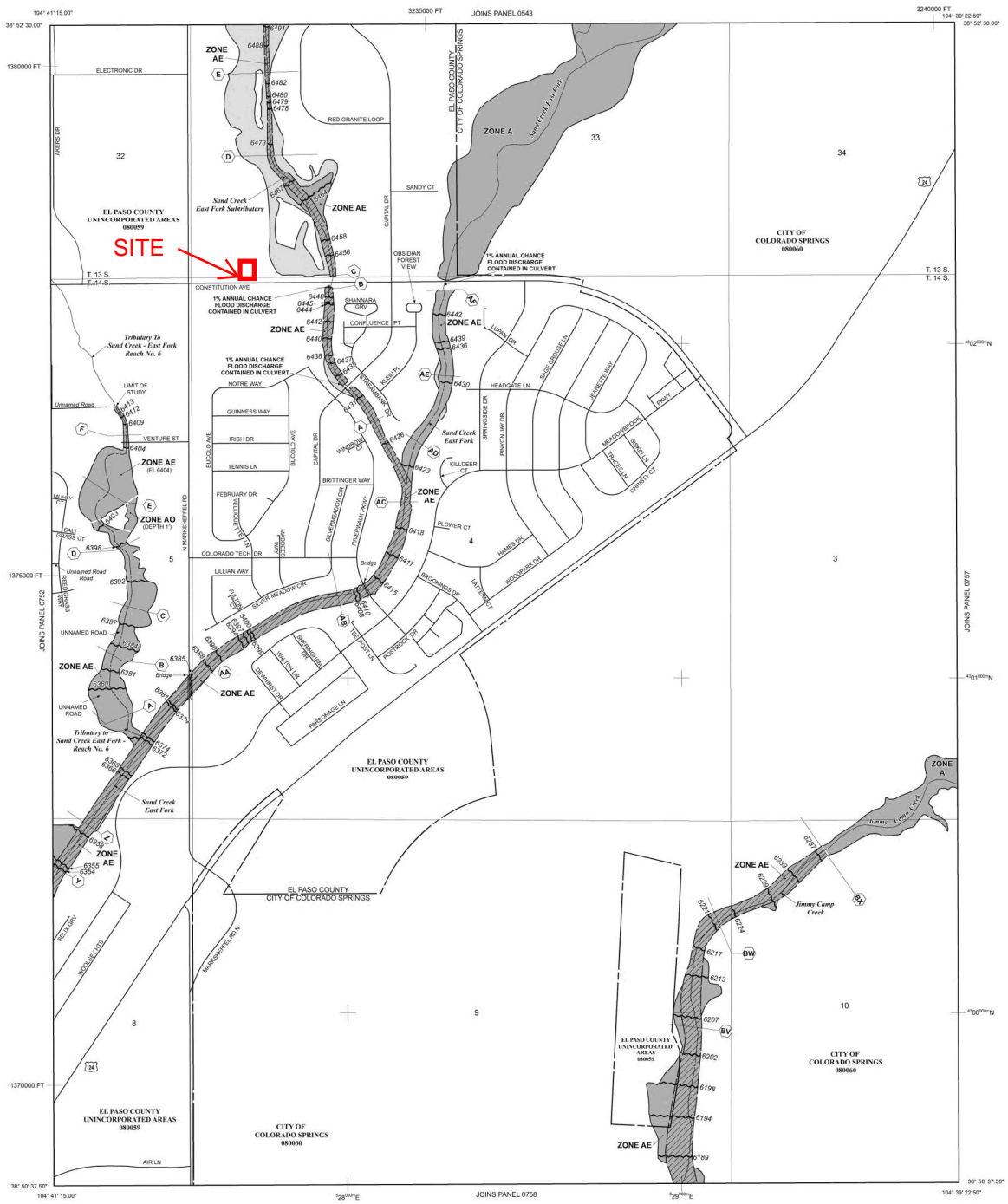
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP (1-877-336-2627)** or visit the FEMA website at <http://www.fema.gov/business/>.

El Paso County Vertical Datum Offset Table

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

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

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



LEGEND

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

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

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decommissioned. Zone AE indicates that the former flood control system is being restored to provide protection from the 1% annual chance flood.

ZONE AR9 Area to be protected from 1% annual chance flood by a Federal Flood protection system under construction; no Base Flood Elevations determined.

ZONE AV Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments or use that would increase the floodway's water surface elevation in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of 1 to 3 feet or less; average areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

— Floodplain boundary
— Floodway boundary
— Zone D boundary
— CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
Base Flood Elevation line and value, elevation in feet*
Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

— Cross section line
— 23 — 23 —
Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
— 49°59'N
1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT
5000-foot grid ticks: Colorado State Plane coordinate system, contour interval 500 feet
Lambert Conformal Conic Projection
DX5510
Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5
River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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

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

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

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

MAP SCALE 1" = 500'

250 0 500 1000
150 0 150 300
FEET METERS

NFIP

PANEL 0756G

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

PANEL 756 OF 1300
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|--------------------------|--------|-------|--------|
| COLORADO SPRINGS CITY OF | 8000 | 0756 | 0 |
| EL PASO COUNTY | 8000 | 0756 | 0 |

Notice to User: The Map Number shown on this map should be used when ordering map products. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0756G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 65 WEST, AND TOWNSHIP 14 SOUTH, RANGE 65 WEST.

APPENDIX B
Hydrologic Calculations



Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/24/19

| Basin ID | Total Area (ac) | Paved Roads | | | Lawns | | | Roofs | | | Basins Total Weighted % Imp. |
|----------|-----------------|-------------|-----------|-----------------|--------|-----------|-----------------|--------|-----------|-----------------|------------------------------|
| | | % Imp. | Area (ac) | Weighted % Imp. | % Imp. | Area (ac) | Weighted % Imp. | % Imp. | Area (ac) | Weighted % Imp. | |
| H-C | 4.42 | 100 | 0.66 | 14.93 | 5 | 3.76 | 4.30 | 90 | 0.00 | 0.00 | 19.23 |
| H-E1 | 1.17 | 100 | 0.17 | 14.53 | 5 | 1.00 | 4.30 | 90 | 0.00 | 0.00 | 18.83 |
| OS-1 | 0.09 | 100 | 0.00 | 0.00 | 5 | 0.09 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| OS-2 | 0.03 | 100 | 0.03 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| OS-3 | 0.24 | 100 | 0.00 | 0.00 | 5 | 0.24 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| OS-3.1 | 0.05 | 100 | 0.00 | 0.00 | 5 | 0.05 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| C-2 | 0.77 | 100 | 0.64 | 83.12 | 5 | 0.13 | 0.80 | 90 | 0.00 | 0.00 | 83.92 |
| C-4.1 | 0.15 | 100 | 0.14 | 90.00 | 5 | 0.02 | 0.50 | 90 | 0.00 | 0.00 | 90.50 |
| C-4.2 | 0.19 | 100 | 0.00 | 0.00 | 5 | 0.00 | 0.00 | 90 | 0.19 | 90.00 | 90.00 |
| C-4.3 | 0.17 | 100 | 0.17 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| C-4.3a | 0.11 | 100 | 0.11 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| C-4.4 | 0.04 | 100 | 0.04 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| C-5.1 | 0.18 | 100 | 0.00 | 0.00 | 5 | 0.00 | 0.00 | 90 | 0.18 | 90.00 | 90.00 |
| C-5.2 | 1.13 | 100 | 0.85 | 74.96 | 5 | 0.28 | 1.30 | 90 | 0.00 | 0.00 | 76.26 |
| C-5.3 | 0.16 | 100 | 0.00 | 0.00 | 5 | 0.16 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| C-7 | 0.57 | 100 | 0.23 | 40.35 | 5 | 0.34 | 3.00 | 90 | 0.00 | 0.00 | 43.35 |
| E-1 | 0.22 | 100 | 0.00 | 0.00 | 5 | 0.22 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| OS-4 | 0.18 | 100 | 0.00 | 0.00 | 5 | 0.18 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |
| C-1 | 0.89 | | | | | | | | | | 90.00 |
| C-3 | 0.47 | | | | | | | | | | 90.00 |
| C-3.2 | 0.20 | 100 | 0.04 | 17.71 | 5 | 0.07 | 1.80 | 90 | 0.09 | 42.00 | 61.51 |
| C-3.1 | 0.24 | 100 | 0.22 | 91.67 | 5 | 0.02 | 0.40 | 90 | 0.00 | 0.00 | 92.07 |
| C-6 | 0.04 | 100 | 0.04 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| C-6.1 | 0.03 | 100 | 0.03 | 100.00 | 5 | 0.00 | 0.00 | 90 | 0.00 | 0.00 | 100.00 |
| OS-3 | 0.14 | 100 | 0.00 | 0.00 | 5 | 0.14 | 5.00 | 90 | 0.00 | 0.00 | 5.00 |

COMPOSITE RUNOFF COEFFICIENT CALCULATIONS

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs

Project Name: Sand Hill Filing 4
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| Basin ID | Total Area (ac) | Paved Roads | | | Lawns/Undeveloped | | | Roofs | | | Composite C ₅ | Composite C ₁₀₀ |
|----------|-----------------|----------------|------------------|-----------|-------------------|------------------|-----------|----------------|------------------|-----------|--------------------------|----------------------------|
| | | C ₅ | C ₁₀₀ | Area (ac) | C ₅ | C ₁₀₀ | Area (ac) | C ₅ | C ₁₀₀ | Area (ac) | | |
| H-C | 4.42 | 0.90 | 0.96 | 0.66 | 0.09 | 0.36 | 3.76 | 0.73 | 0.81 | 0.00 | 0.21 | 0.45 |
| H-E1 | 1.17 | 0.90 | 0.96 | 0.17 | 0.09 | 0.36 | 1.00 | 0.73 | 0.81 | 0.00 | 0.21 | 0.45 |
| OS-1 | 0.09 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.09 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| OS-2 | 0.03 | 0.90 | 0.96 | 0.03 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| OS-3 | 0.24 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.24 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| OS-3.1 | 0.05 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.05 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| | | | | | | | | | | | | |
| C-2 | 0.77 | 0.90 | 0.96 | 0.64 | 0.09 | 0.36 | 0.13 | 0.73 | 0.81 | 0.00 | 0.76 | 0.86 |
| C-4.1 | 0.15 | 0.90 | 0.96 | 0.14 | 0.09 | 0.36 | 0.02 | 0.73 | 0.81 | 0.00 | 0.82 | 0.90 |
| C-4.2 | 0.19 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.19 | 0.73 | 0.81 |
| C-4.3 | 0.17 | 0.90 | 0.96 | 0.17 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| C-4.3a | 0.11 | 0.90 | 0.96 | 0.11 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| C-4.4 | 0.04 | 0.90 | 0.96 | 0.04 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| C-5.1 | 0.18 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.18 | 0.73 | 0.81 |
| C-5.2 | 1.13 | 0.90 | 0.96 | 0.85 | 0.09 | 0.36 | 0.28 | 0.73 | 0.81 | 0.00 | 0.70 | 0.81 |
| C-5.3 | 0.16 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.16 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| C-7 | 0.57 | 0.90 | 0.96 | 0.23 | 0.09 | 0.36 | 0.34 | 0.73 | 0.81 | 0.00 | 0.42 | 0.60 |
| E-1 | 0.22 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.22 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| OS-4 | 0.18 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.18 | 0.73 | 0.81 | 0.00 | 0.09 | 0.36 |
| | | | | | | | | | | | | |
| C-1 | 0.89 | | | | | | | | | | 0.73 | 0.81 |
| C-3 | 0.47 | | | | | | | | | | 0.73 | 0.81 |
| C-3.2 | 0.20 | 0.90 | 0.96 | 0.04 | 0.09 | 0.36 | 0.07 | 0.73 | 0.81 | 0.09 | 0.53 | 0.68 |
| C-3.1 | 0.24 | 0.90 | 0.96 | 0.22 | 0.09 | 0.36 | 0.02 | 0.73 | 0.81 | 0.00 | 0.83 | 0.91 |
| C-6 | 0.04 | 0.90 | 0.96 | 0.04 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| C-6.1 | 0.03 | 0.90 | 0.96 | 0.03 | 0.09 | 0.36 | 0.00 | 0.73 | 0.81 | 0.00 | 0.90 | 0.96 |
| OS-3 | 0.14 | 0.90 | 0.96 | 0.00 | 0.09 | 0.36 | 0.24 | 0.73 | 0.81 | 0.00 | 0.15 | 0.62 |
| | | | | | | | | | | | | |

**STANDARD FORM SF-2
TIME OF CONCENTRATION**

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| SUB-BASIN DATA | | | | | | INITIAL/OVERLAND (T _i) | | | TRAVEL TIME (T _t) | | | | | T _c CHECK (URBANIZED BASINS) | | | FINAL T _c |
|----------------|-----------|------------------------|----------------|------------------|----------------|------------------------------------|-------|----------------------|-------------------------------|-------|----------------|------------|----------------------|-----------------------------------------|-------------------|--------------------------------|----------------------|
| BASIN ID | D.A. (AC) | Hydrologic Soils Group | Impervious (%) | C ₁₀₀ | C ₅ | L (FT) | S (%) | T _i (MIN) | L (FT) | S (%) | C _v | VEL. (FPS) | T _t (MIN) | COMP. T _c (MIN) | TOTAL LENGTH (FT) | Urbanized T _c (MIN) | T _c (MIN) |
| H-C | 4.42 | B | 19.23 | 0.45 | 0.21 | 100 | 1.5 | 14.2 | 565 | 2.0 | 20.0 | 2.8 | 3.3 | 17.5 | 665.0 | 13.7 | 13.7 |
| H-E1 | 1.17 | B | 18.83 | 0.45 | 0.21 | 100 | 2.0 | 13.0 | 385 | 2.0 | 20.0 | 2.8 | 2.3 | 15.2 | 485.0 | 12.7 | 12.7 |
| OS-1 | 0.09 | B | 5.00 | 0.36 | 0.09 | 25 | 16.0 | 3.7 | | | | | | 3.7 | 25.0 | 10.1 | 5.0 |
| OS-2 | 0.03 | B | 100.00 | 0.96 | 0.90 | 10 | 2.0 | 0.9 | | | | | | 0.9 | 10.0 | 10.1 | 5.0 |
| OS-3 | 0.24 | B | 5.00 | 0.36 | 0.09 | 30 | 1.0 | 10.1 | | | | | | 10.1 | 30.0 | 10.2 | 10.1 |
| OS-3.1 | 0.05 | B | 5.00 | 0.36 | 0.09 | 30 | 1.0 | 10.1 | | | | | | 10.1 | 30.0 | 10.2 | 10.1 |
| C-2 | 0.77 | B | 83.92 | 0.86 | 0.76 | 40 | 5.8 | 2.2 | 115 | 2.5 | 20.0 | 3.2 | 0.6 | 2.8 | 155.0 | 10.9 | 5.0 |
| C-4.1 | 0.15 | B | 90.50 | 0.90 | 0.82 | 25 | 1.5 | 2.2 | 80 | 1.9 | 20.0 | 2.8 | 0.5 | 2.7 | 105.0 | 10.6 | 5.0 |
| C-4.2 | 0.19 | B | 90.00 | 0.81 | 0.73 | 60 | 25.0 | 1.8 | 10 | 2.0 | 20.0 | 2.8 | 0.1 | 1.9 | 70.0 | 10.4 | 5.0 |
| C-4.3 | 0.17 | B | 100.00 | 0.96 | 0.90 | 10 | 1.0 | 1.2 | 240 | 1.0 | 20.0 | 2.0 | 2.0 | 3.2 | 250.0 | 11.4 | 5.0 |
| C-4.3a | 0.11 | B | 100.00 | 0.96 | 0.90 | 10 | 1.0 | 1.2 | 160 | 1.0 | 20.0 | 2.0 | 1.3 | 2.5 | 170.0 | 10.9 | 5.0 |
| C-4.4 | 0.04 | B | 100.00 | 0.96 | 0.90 | 10 | 0.5 | 1.5 | 75 | 0.5 | 20.0 | 1.4 | 0.9 | 2.3 | 85.0 | 10.5 | 5.0 |
| C-5.1 | 0.18 | B | 90.00 | 0.81 | 0.73 | 60 | 25.0 | 1.8 | 10 | 1.0 | 20.0 | 2.0 | 0.1 | 1.9 | 70.0 | 10.4 | 5.0 |
| C-5.2 | 1.13 | B | 76.26 | 0.81 | 0.70 | 40 | 3.5 | 3.1 | 255 | 1.5 | 20.0 | 2.4 | 1.7 | 4.8 | 295.0 | 11.6 | 5.0 |
| C-5.3 | 0.16 | B | 5.00 | 0.36 | 0.09 | 10 | 25.0 | 2.0 | 10 | 1.0 | 20.0 | 2.0 | 0.1 | 2.1 | 20.0 | 10.1 | 5.0 |
| C-7 | 0.57 | B | 43.35 | 0.60 | 0.42 | 25 | 0.5 | 7.9 | 260 | 1.5 | 20.0 | 2.4 | 1.8 | 9.6 | 285.0 | 11.6 | 9.6 |
| E-1 | 0.22 | B | 5.00 | 0.36 | 0.09 | 100 | 2.5 | 13.6 | 20 | 2.5 | 20.0 | 3.2 | 0.1 | 13.7 | 120.0 | 10.7 | 10.7 |
| OS-4 | 0.18 | B | 5.00 | 0.36 | 0.09 | 30 | 14.0 | 4.2 | 30 | 1.0 | 20.0 | 2.0 | 0.3 | 4.5 | 60.0 | 10.3 | 5.0 |
| C-1 | 0.89 | B | 90.00 | 0.81 | 0.73 | 100 | 2.0 | 5.4 | 60 | 2.0 | 20.0 | 2.8 | 0.4 | 5.7 | 160.0 | 10.9 | 5.7 |
| C-3 | 0.47 | B | 90.00 | 0.81 | 0.73 | 100 | 1.5 | 5.9 | 50 | 2.0 | 20.0 | 2.8 | 0.3 | 6.2 | 150.0 | 10.8 | 6.2 |
| C-3.2 | 0.20 | B | 61.51 | 0.68 | 0.53 | 10 | 1.0 | 3.3 | 185 | 2.0 | 20.0 | 2.8 | 1.1 | 4.4 | 195.0 | 11.1 | 5.0 |
| C-3.1 | 0.24 | B | 92.07 | 0.91 | 0.83 | 28 | 1.0 | 2.6 | 95 | 0.5 | 20.0 | 1.4 | 1.1 | 3.7 | 123.0 | 10.7 | 5.0 |
| C-6 | 0.04 | B | 100.00 | 0.96 | 0.90 | 10 | 1.0 | 1.2 | 55 | 4.0 | 20.0 | 4.0 | 0.2 | 1.4 | 65.0 | 10.4 | 5.0 |
| C-6.1 | 0.03 | B | 100.00 | 0.96 | 0.90 | 10 | 1.0 | 1.2 | 55 | 4.0 | 20.0 | 4.0 | 0.2 | 1.4 | 65.0 | 10.4 | 5.0 |
| OS-3 | 0.14 | B | 5.00 | 0.36 | 0.09 | 25 | 3.0 | 6.4 | 10 | 1.0 | 20.0 | 2.0 | 0.1 | 6.5 | 35.0 | 10.2 | 6.5 |

NOTES:

$T_i = (0.395 * (1.1 - C_5) * (L)^{0.5}) / ((S)^{0.33})$, S in ft/ft

$T_t = L / 60V$ (Velocity From Fig. 501)

Velocity $V = C_v * S^{0.5}$, S in ft/ft

$T_c \text{ Check} = 10 + L / 180$

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| STREET | Design Point | DIRECT RUNOFF | | | | | | | TOTAL RUNOFF | | | | STREET | | PIPE | | | TRAVEL TIME | | | REMARKS |
|--------|--------------|---------------|-----------|---------------|----------|----------|-----------|---------|--------------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|----------|-----------------------------------------------------------|
| | | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | |
| | H1 | H-C | 4.42 | 0.21 | 13.7 | 0.93 | 3.66 | 3.4 | | | | | | | | | | | | | Sheet flows to temporary Pond C |
| | H2 | H-E1 | 1.17 | 0.21 | 12.7 | 0.24 | 3.77 | 0.9 | | | | | | | | | | | | | Sheet flows south to existing inlet |
| | | OS-1 | 0.09 | 0.09 | 5.0 | 0.01 | 5.17 | 0.1 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-2 | 0.03 | 0.90 | 5.0 | 0.03 | 5.17 | 0.2 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-3 | 0.24 | 0.09 | 10.1 | 0.02 | 4.11 | 0.1 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-3.1 | 0.05 | 0.09 | 10.1 | 0.00 | 4.11 | 0.0 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | 1 | C-1 | 0.89 | 0.73 | 5.7 | 0.65 | 4.96 | 3.2 | | | | | | | | | | | | | Future lot. Stub provided. |
| | 2A | C-2 | 0.77 | 0.76 | 5.0 | 0.59 | 5.17 | 3.1 | | | | | | | | | | | | | Parking lot detention provided. Flows to Type 13 Inlet |
| | 2 | | | | | | | | 5.7 | 1.24 | 4.96 | 6.2 | | | | | | | | | Total flow MH DP 2 (DPs 1 and 2A) |
| | 3 | C-4.1 | 0.15 | 0.82 | 5.0 | 0.12 | 5.17 | 0.6 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 3 | | | | | | | | 5.7 | 1.36 | 4.96 | 6.7 | | | | | | | | | Total Flow DP 3 (DPs 2 and 3) Flows to Pond C |
| | 4 | C-3.1 | 0.24 | 0.83 | 5.0 | 0.20 | 5.17 | 1.0 | | | | | | | | | | | | | Flows into Basin C-6.1 |
| | 5 | C-6.1 | 0.03 | 0.90 | 5.0 | 0.03 | 5.17 | 0.2 | | | | | | | | | | | | | Flows into Basin C-6 |
| | 5 | | | | | | | | 5.0 | 0.23 | 5.17 | 1.2 | | | | | | | | | Flows into Basin C-6 |
| | 6 | C-6 | 0.04 | 0.90 | 5.0 | 0.04 | 5.17 | 0.2 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 6 | | | | | | | | 5.0 | 0.27 | 5.17 | 1.4 | | | | | | | | | Flows to future inlet |
| | 7 | C-3 | 0.47 | 0.73 | 6.2 | 0.34 | 4.84 | 1.6 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 7 | C-3.2 | 0.20 | 0.53 | 5.0 | 0.11 | 5.17 | 0.6 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 7 | | | | | | | | 6.2 | 0.72 | 4.84 | 3.5 | | | | | | | | | Total flow to FES |
| | 8a | C-4.3 | 0.17 | 0.90 | 5.0 | 0.15 | 5.17 | 0.8 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 8 | C-4.3a | 0.11 | 0.90 | 5.0 | 0.10 | 5.17 | 0.5 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 8 | | | | | | | | 6.2 | 0.82 | 4.84 | 4.0 | | | | | | | | | Total Flow DP 5 (DPs 4 and 5) |

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| STREET | Design Point | DIRECT RUNOFF | | | | | | | TOTAL RUNOFF | | | | STREET | | PIPE | | | TRAVEL TIME | | | REMARKS |
|--------|--------------|---------------|-----------|---------------|----------|----------|-----------|---------|--------------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|----------|--------------------------------------------------------|
| | | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | |
| | 9 | C-4.2 | 0.19 | 0.73 | 5.0 | 0.14 | 5.17 | 0.7 | | | | | | | | | | | | | Roof drains tie into storm sewer |
| | 10 | C-4.4 | 0.04 | 0.90 | 5.0 | 0.04 | 5.17 | 0.2 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 10 | | | | | | | | 6.2 | 1.00 | 4.84 | 4.8 | | | | | | | | | Total Flow DP 7 (DP 5, 6, and 7) Flows to Pond C |
| | 11 | C-7 | 0.57 | 0.42 | 9.6 | 0.24 | 4.18 | 1.0 | | | | | | | | | | | | | Sheet flows into basin C-5.2 |
| | 12 | C-5.1 | 0.18 | 0.73 | 5.0 | 0.13 | 5.17 | 0.7 | | | | | | | | | | | | | Roof drains tie into storm sewer |
| | 13 | C-5.2 | 1.13 | 0.70 | 5.0 | 0.79 | 5.17 | 4.1 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 13 | | | | | | | | 9.6 | 1.16 | 4.18 | 4.8 | | | | | | | | | Total flow DP 10 (DPs 8, 9, and 10) Flows to Pond C |
| | 14 | C-5.3 | 0.16 | 0.09 | 5.0 | 0.01 | 5.17 | 0.1 | | | | | | | | | | | | | Flows directly into Pond C |
| | 14 | | | | | | | | 9.6 | 3.53 | 4.18 | 14.8 | | | | | | | | | Total flow to Pond C |
| | 15 | E-1 | 0.22 | 0.09 | 10.7 | 0.02 | 4.03 | 0.1 | | | | | | | | | | | | | Landscape Area Flows to existing inlet |
| | | OS-3 | 0.14 | 0.09 | 10.1 | 0.01 | 4.11 | 0.0 | | | | | | | | | | | | | Landscape Area Follows existing conditions |
| | | OS-4 | 0.18 | 0.09 | 5.0 | 0.02 | 5.17 | 0.1 | | | | | | | | | | | | | Landscape Area Follows existing conditions |

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| STREET | Design Point | DIRECT RUNOFF | | | | | | | TOTAL RUNOFF | | | | STREET | | PIPE | | | TRAVEL TIME | | | REMARKS |
|--------|--------------|---------------|-----------|---------------|----------|----------|-----------|---------|--------------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|----------|-----------------------------------------------------------|
| | | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | |
| | H1 | H-C | 4.42 | 0.45 | 13.7 | 1.99 | 6.14 | 12.2 | | | | | | | | | | | | | Sheet flows to temporary Pond C |
| | H2 | H-E1 | 1.17 | 0.45 | 12.7 | 0.52 | 6.33 | 3.3 | | | | | | | | | | | | | Sheet flows south to existing inlet |
| | | OS-1 | 0.09 | 0.36 | 5.0 | 0.03 | 8.68 | 0.3 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-2 | 0.03 | 0.96 | 5.0 | 0.03 | 8.68 | 0.3 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-3 | 0.24 | 0.36 | 10.1 | 0.09 | 6.90 | 0.6 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | OS-3.1 | 0.05 | 0.36 | 10.1 | 0.02 | 6.90 | 0.1 | | | | | | | | | | | | | Flows offsite into Constitution Ave. |
| | | | | | | | | | | | | | | | | | | | | | |
| | 1 | C-1 | 0.89 | 0.81 | 5.7 | 0.72 | 8.34 | 6.0 | | | | | | | | | | | | | Future lot. Stub provided. |
| | 2A | C-2 | 0.77 | 0.86 | 5.0 | 0.66 | 8.68 | 5.7 | | | | | | | | | | | | | Parking lot detention provided. Flows to Type 13 Inlet |
| | 2 | | | | | | | 5.7 | 1.38 | 8.34 | 11.5 | | | | | | | | | | Total flow MH DP 2 (DPs 1 and 2A) |
| | 3 | C-4.1 | 0.15 | 0.90 | 5.0 | 0.14 | 8.68 | 1.2 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 3 | | | | | | | 5.7 | 1.52 | 8.34 | 12.7 | | | | | | | | | | Total Flow DP 3 (DPs 2 and 3) Flows to Pond C |
| | 4 | C-3.1 | 0.24 | 0.91 | 5.0 | 0.22 | 8.68 | 1.9 | | | | | | | | | | | | | Flows into Basin C-6.1 |
| | 5 | C-6.1 | 0.03 | 0.96 | 5.0 | 0.03 | 8.68 | 0.3 | | | | | | | | | | | | | Flows into Basin C-6 |
| | 5 | | | | | | | 5.0 | 0.25 | 8.68 | 2.2 | | | | | | | | | | Flows into Basin C-6 |
| | 6 | C-6 | 0.04 | 0.96 | 5.0 | 0.04 | 8.68 | 0.3 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 6 | | | | | | | 5.0 | 0.29 | 8.68 | 2.5 | | | | | | | | | | Flows to future inlet |
| | 7 | C-3 | 0.47 | 0.81 | 6.2 | 0.38 | 8.13 | 3.1 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 7 | C-3.2 | 0.20 | 0.68 | 5.0 | 0.13 | 8.68 | 1.1 | | | | | | | | | | | | | Flows to proposed flared end section |
| | 7 | | | | | | | 6.2 | 0.80 | 8.13 | 6.5 | | | | | | | | | | Total flow to FES |
| | 8a | C-4.3 | 0.17 | 0.96 | 5.0 | 0.16 | 8.68 | 1.4 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 8 | C-4.3a | 0.11 | 0.96 | 5.0 | 0.11 | 8.68 | 1.0 | | | | | | | | | | | | | Flows to D-10-R Inlet |
| | 8 | | | | | | | 6.2 | 0.91 | 8.13 | 7.4 | | | | | | | | | | Total Flow DP 5 (DPs 4 and 5) |
| | 9 | C-4.2 | 0.19 | 0.81 | 5.0 | 0.15 | 8.68 | 1.3 | | | | | | | | | | | | | Roof drains tie into storm sewer |
| | 10 | C-4.4 | 0.04 | 0.96 | 5.0 | 0.04 | 8.68 | 0.3 | | | | | | | | | | | | | Flows to D-10-R Inlet |

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: Sand Hill Filing 4
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Sand Hill Retail Pad C
Project No.: ACD0020
Calculated By: CMD
Checked By: SMB
Date: 12/23/19

| STREET | Design Point | DIRECT RUNOFF | | | | | | | TOTAL RUNOFF | | | | STREET | | PIPE | | | TRAVEL TIME | | | REMARKS |
|--------|--------------|---------------|-----------|---------------|----------|----------|-----------|---------|--------------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|--------------------------------------------------------|---------|
| | | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | I (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | |
| | 10 | | | | | | | 6.2 | 1.10 | 8.13 | 8.9 | | | | | | | | | Total Flow DP 7 (DP 5, 6, and 7) Flows to Pond C | |
| | 11 | C-7 | 0.57 | 0.60 | 9.6 | 0.34 | 7.02 | 2.4 | | | | | | | | | | | | Sheet flows into basin C-5.2 | |
| | 12 | C-5.1 | 0.18 | 0.81 | 5.0 | 0.15 | 8.68 | 1.3 | | | | | | | | | | | | Roof drains tie into storm sewer | |
| | 13 | C-5.2 | 1.13 | 0.81 | 5.0 | 0.92 | 8.68 | 8.0 | | | | | | | | | | | | Flows to D-10-R Inlet | |
| | 13 | | | | | | | 9.6 | 1.41 | 7.02 | 9.9 | | | | | | | | | Total flow DP 10 (DPs 8, 9, and 10) Flows to Pond C | |
| | 14 | C-5.3 | 0.16 | 0.36 | 5.0 | 0.06 | 8.68 | 0.5 | | | | | | | | | | | | Flows directly into Pond C | |
| | 14 | | | | | | | 9.6 | 4.09 | 7.02 | 28.7 | | | | | | | | | Total flow to Pond C | |
| | | E-1 | 0.22 | 0.36 | 10.7 | 0.08 | 6.77 | 0.5 | | | | | | | | | | | | Landscape Area Flows to existing inlet | |
| | | OS-3 | 0.14 | 0.36 | 10.1 | 0.05 | 6.90 | 0.3 | | | | | | | | | | | | Landscape Area Follows existing conditions | |
| | | OS-4 | 0.18 | 0.36 | 5.0 | 0.06 | 8.68 | 0.5 | | | | | | | | | | | | Landscape Area Follows existing conditions | |

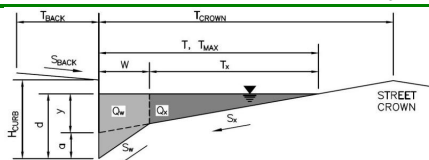
APPENDIX C
Hydraulic Calculations



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

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

Project: Sand Hill Retail Pad C
 Inlet ID: DP 8



Gutter Geometry (Enter data in the blue cells)

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

T_{BACK} = ft
 S_{BACK} = ft/ft
 n_{BACK} =

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

H_{CURB} = inches
 T_{CROWN} = ft
 W = ft
 S_x = ft/ft
 S_w = ft/ft
 S_o = ft/ft
 n_{STREET} =

Max. Allowable Spread for Minor & Major Storm
 Max. Allowable Depth at Gutter Flowline for Minor & Major Storm
 Check boxes are not applicable in SUMP conditions

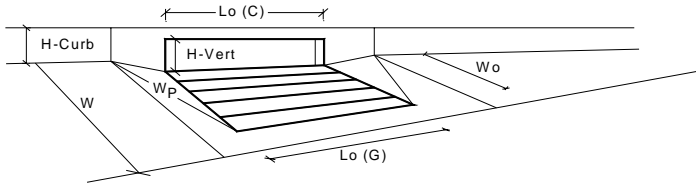
| | Minor Storm | Major Storm | |
|-------------|--------------------------|--------------------------|--------|
| T_{MAX} = | <input type="text"/> | <input type="text"/> | ft |
| d_{MAX} = | <input type="text"/> | <input type="text"/> | inches |
| | <input type="checkbox"/> | <input type="checkbox"/> | |

MINOR STORM Allowable Capacity is based on Depth Criterion
MAJOR STORM Allowable Capacity is based on Depth Criterion

| | Minor Storm | Major Storm | |
|---------------|----------------------|----------------------|-----|
| Q_{allow} = | <input type="text"/> | <input type="text"/> | cfs |

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017

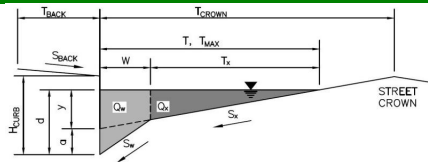


| Design Information (Input) | MINOR | MAJOR | |
|------------------------------------------------------------------------------|-------------------------|-------|-----------------------------------------------------|
| Type of Inlet Colorado Springs D-10-R | Colorado Springs D-10-R | | |
| Local Depression (additional to continuous gutter depression 'a' from above) | 4.00 | 4.00 | inches |
| Number of Unit Inlets (Grate or Curb Opening) | 1 | 1 | |
| Water Depth at Flowline (outside of local depression) | 4.0 | 6.0 | inches |
| Grate Information | MINOR | MAJOR | <input checked="" type="checkbox"/> Override Depths |
| Length of a Unit Grate | N/A | N/A | feet |
| Width of a Unit Grate | N/A | N/A | feet |
| Area Opening Ratio for a Grate (typical values 0.15-0.90) | N/A | N/A | |
| Clogging Factor for a Single Grate (typical value 0.50 - 0.70) | N/A | N/A | |
| Grate Weir Coefficient (typical value 2.15 - 3.60) | N/A | N/A | |
| Grate Orifice Coefficient (typical value 0.60 - 0.80) | N/A | N/A | |
| Curb Opening Information | MINOR | MAJOR | |
| Length of a Unit Curb Opening | 4.00 | 4.00 | feet |
| Height of Vertical Curb Opening in Inches | 8.00 | 8.00 | inches |
| Height of Curb Orifice Throat in Inches | 8.00 | 8.00 | inches |
| Angle of Throat (see USDCM Figure ST-5) | 81.00 | 81.00 | degrees |
| Side Width for Depression Pan (typically the gutter width of 2 feet) | 1.00 | 1.00 | feet |
| Clogging Factor for a Single Curb Opening (typical value 0.10) | 0.10 | 0.10 | |
| Curb Opening Weir Coefficient (typical value 2.3-3.7) | 3.60 | 3.60 | |
| Curb Opening Orifice Coefficient (typical value 0.60 - 0.70) | 0.67 | 0.67 | |
| Low Head Performance Reduction (Calculated) | MINOR | MAJOR | |
| Depth for Grate Midwidth | N/A | N/A | ft |
| Depth for Curb Opening Weir Equation | 0.25 | 0.42 | ft |
| Combination Inlet Performance Reduction Factor for Long Inlets | 0.56 | 0.85 | |
| Curb Opening Performance Reduction Factor for Long Inlets | 1.00 | 1.00 | |
| Grated Inlet Performance Reduction Factor for Long Inlets | N/A | N/A | |
| Total Inlet Interception Capacity (assumes clogged condition) | MINOR | MAJOR | |
| Q_a | 2.3 | 4.9 | cfs |
| Q _{PEAK REQUIRED} | 1.2 | 2.3 | cfs |
| Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK) | | | |

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

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

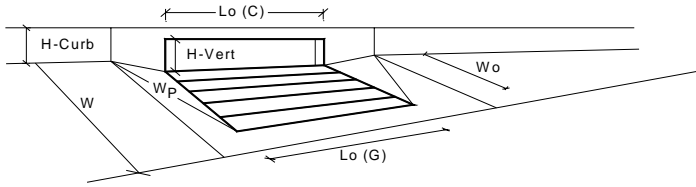
Project: **Sand Hill Retail Pad C**
 Inlet ID: **DP 8a**



| Gutter Geometry (Enter data in the blue cells) | | | | | | | |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--|-----------------|-----------------|--------|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK} =$ <input style="width: 60px;" type="text"/> ft | | | | | | |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK} =$ <input style="width: 60px;" type="text"/> ft/ft | | | | | | |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK} =$ <input style="width: 60px;" type="text"/> | | | | | | |
| Height of Curb at Gutter Flow Line | $H_{CURB} =$ <input style="width: 60px;" type="text"/> 6.00 inches | | | | | | |
| Distance from Curb Face to Street Crown | $T_{CROWN} =$ <input style="width: 60px;" type="text"/> 9.0 ft | | | | | | |
| Gutter Width | $W =$ <input style="width: 60px;" type="text"/> 1.00 ft | | | | | | |
| Street Transverse Slope | $S_X =$ <input style="width: 60px;" type="text"/> 0.010 ft/ft | | | | | | |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W =$ <input style="width: 60px;" type="text"/> 0.083 ft/ft | | | | | | |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_0 =$ <input style="width: 60px;" type="text"/> 0.000 ft/ft | | | | | | |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET} =$ <input style="width: 60px;" type="text"/> 0.016 | | | | | | |
| Max. Allowable Spread for Minor & Major Storm | <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">$T_{MAX} =$ 9.0</td> <td style="border: 1px solid black; text-align: center;">$T_{MAX} =$ 9.0</td> <td style="border: none;">ft</td> </tr> </table> | Minor Storm | Major Storm | | $T_{MAX} =$ 9.0 | $T_{MAX} =$ 9.0 | ft |
| Minor Storm | Major Storm | | | | | | |
| $T_{MAX} =$ 9.0 | $T_{MAX} =$ 9.0 | ft | | | | | |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 1px solid black; text-align: center;">$d_{MAX} =$ 6.0</td> <td style="border: 1px solid black; text-align: center;">$d_{MAX} =$ 6.0</td> <td style="border: none;">inches</td> </tr> </table> | Minor Storm | Major Storm | | $d_{MAX} =$ 6.0 | $d_{MAX} =$ 6.0 | inches |
| Minor Storm | Major Storm | | | | | | |
| $d_{MAX} =$ 6.0 | $d_{MAX} =$ 6.0 | inches | | | | | |
| Check boxes are not applicable in SUMP conditions | <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;"><input type="checkbox"/></td> <td style="text-align: center; border: none;"><input type="checkbox"/></td> <td style="border: none;"></td> </tr> </table> | <input type="checkbox"/> | <input type="checkbox"/> | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | | | | | | |
| MINOR STORM Allowable Capacity is based on Depth Criterion | | | | | | | |
| MAJOR STORM Allowable Capacity is based on Depth Criterion | | | | | | | |
| $Q_{allow} =$ | <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; border: none;">Minor Storm</td> <td style="text-align: center; border: none;">Major Storm</td> <td style="border: none;"></td> </tr> <tr> <td style="border: 2px solid green; text-align: center;">SUMP</td> <td style="border: 2px solid green; text-align: center;">SUMP</td> <td style="border: none;">cfs</td> </tr> </table> | Minor Storm | Major Storm | | SUMP | SUMP | cfs |
| Minor Storm | Major Storm | | | | | | |
| SUMP | SUMP | cfs | | | | | |

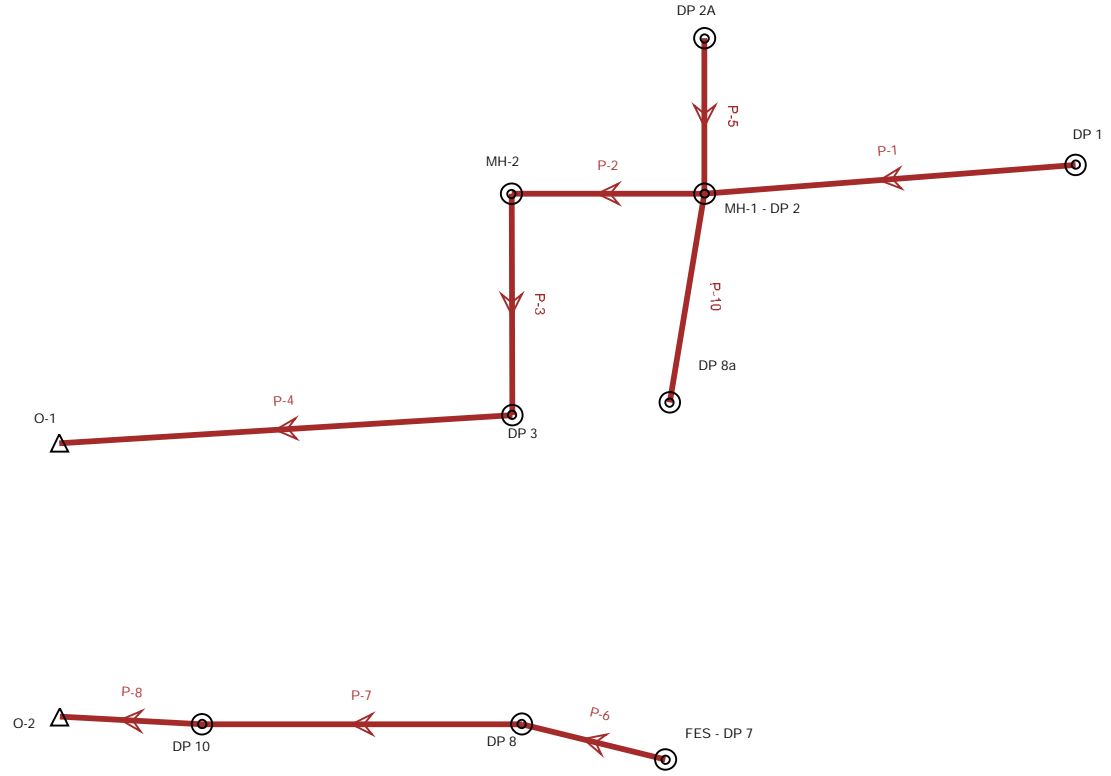
INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



| Design Information (Input) | MINOR | MAJOR | |
|------------------------------------------------------------------------------|-------------------------|-------|-----------------------------------------------------|
| Type of Inlet | Colorado Springs D-10-R | | |
| Local Depression (additional to continuous gutter depression 'a' from above) | 4.00 | 4.00 | inches |
| Number of Unit Inlets (Grate or Curb Opening) | 1 | 1 | |
| Water Depth at Flowline (outside of local depression) | 3.0 | 4.0 | inches |
| Grate Information | MINOR | MAJOR | <input checked="" type="checkbox"/> Override Depths |
| Length of a Unit Grate | N/A | N/A | feet |
| Width of a Unit Grate | N/A | N/A | feet |
| Area Opening Ratio for a Grate (typical values 0.15-0.90) | N/A | N/A | |
| Clogging Factor for a Single Grate (typical value 0.50 - 0.70) | N/A | N/A | |
| Grate Weir Coefficient (typical value 2.15 - 3.60) | N/A | N/A | |
| Grate Orifice Coefficient (typical value 0.60 - 0.80) | N/A | N/A | |
| Curb Opening Information | MINOR | MAJOR | |
| Length of a Unit Curb Opening | 4.00 | 4.00 | feet |
| Height of Vertical Curb Opening in Inches | 8.00 | 8.00 | inches |
| Height of Curb Orifice Throat in Inches | 8.00 | 8.00 | inches |
| Angle of Throat (see USDCM Figure ST-5) | 81.00 | 81.00 | degrees |
| Side Width for Depression Pan (typically the gutter width of 2 feet) | 1.00 | 1.00 | feet |
| Clogging Factor for a Single Curb Opening (typical value 0.10) | 0.10 | 0.10 | |
| Curb Opening Weir Coefficient (typical value 2.3-3.7) | 3.60 | 3.60 | |
| Curb Opening Orifice Coefficient (typical value 0.60 - 0.70) | 0.67 | 0.67 | |
| Low Head Performance Reduction (Calculated) | MINOR | MAJOR | |
| Depth for Grate Midwidth | N/A | N/A | ft |
| Depth for Curb Opening Weir Equation | 0.17 | 0.25 | ft |
| Combination Inlet Performance Reduction Factor for Long Inlets | 0.42 | 0.56 | |
| Curb Opening Performance Reduction Factor for Long Inlets | 1.00 | 1.00 | |
| Grated Inlet Performance Reduction Factor for Long Inlets | N/A | N/A | |
| Total Inlet Interception Capacity (assumes clogged condition) | MINOR | MAJOR | |
| Q_a | 1.2 | 2.3 | cfs |
| Q _{PEAK REQUIRED} | 0.8 | 1.4 | cfs |

Warning 5: The width of unit is greater than the gutter width.



FlexTable: Conduit Table
Active Scenario: 100-year

| Label | Start Node | Stop Node | Invert (Start) (ft) | Invert (Stop) (ft) | Length (User Defined) (ft) | Slope (Calculated) (ft/ft) | Diameter (in) | Manning' s n | Flow (cfs) | Velocity (ft/s) | Capacity (Full Flow) (cfs) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Energy Grade Line (In) (ft) | Energy Grade Line (Out) (ft) |
|-------|-------------|-------------|---------------------|--------------------|----------------------------|----------------------------|---------------|--------------|------------|-----------------|----------------------------|--------------------------------|---------------------------------|-----------------------------|------------------------------|
| P-6 | FES - DP 7 | DP 8 | 6,449.43 | 6,448.80 | 41.6 | 0.015 | 18.0 | 0.013 | 6.50 | 7.30 | 12.86 | 6,450.41 | 6,449.81 | 6,450.85 | 6,450.22 |
| P-1 | DP 1 | MH-1 - DP 2 | 6,451.04 | 6,450.50 | 107.9 | 0.005 | 18.0 | 0.013 | 6.00 | 4.68 | 7.42 | 6,452.15 | 6,451.89 | 6,452.44 | 6,452.08 |
| P-2 | MH-1 - DP 2 | MH-2 | 6,450.00 | 6,449.72 | 56.0 | 0.005 | 24.0 | 0.013 | 11.50 | 5.54 | 16.00 | 6,451.40 | 6,451.30 | 6,451.77 | 6,451.59 |
| P-5 | DP 2A | MH-1 - DP 2 | 6,450.72 | 6,450.50 | 43.3 | 0.005 | 18.0 | 0.013 | 5.70 | 4.64 | 7.43 | 6,451.98 | 6,451.89 | 6,452.18 | 6,452.06 |
| P-3 | MH-2 | DP 3 | 6,449.42 | 6,449.10 | 64.2 | 0.005 | 24.0 | 0.013 | 11.50 | 5.53 | 15.96 | 6,450.68 | 6,450.32 | 6,451.15 | 6,450.83 |
| P-7 | DP 8 | DP 10 | 6,448.70 | 6,447.37 | 88.6 | 0.015 | 18.0 | 0.013 | 7.40 | 7.53 | 12.86 | 6,449.76 | 6,448.91 | 6,450.24 | 6,449.18 |
| P-8 | DP 10 | O-2 | 6,447.27 | 6,446.82 | 39.3 | 0.012 | 18.0 | 0.013 | 8.90 | 5.04 | 11.32 | 6,448.89 | 6,448.61 | 6,449.29 | 6,449.00 |
| P-4 | DP 3 | O-1 | 6,448.15 | 6,447.50 | 129.4 | 0.005 | 24.0 | 0.013 | 12.70 | 5.65 | 15.99 | 6,449.49 | 6,448.78 | 6,449.99 | 6,449.34 |
| P-10 | DP 8a | MH-1 - DP 2 | 6,450.84 | 6,450.20 | 64.0 | 0.010 | 18.0 | 0.013 | 1.40 | 4.13 | 10.50 | 6,451.90 | 6,451.89 | 6,451.91 | 6,451.90 |

FlexTable: Manhole Table

Active Scenario: 100-year

| Label | Elevation (Rim) (ft) | Headloss Coefficient (Standard) | Headloss Method | Headloss (ft) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Energy Grade Line (In) (ft) | Energy Grade Line (Out) (ft) |
|-------------|-------------------------|---------------------------------------|--------------------|------------------|---------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|
| MH-1 - DP 2 | 6,453.56 | 1.320 | Standard | 0.49 | 6,451.40 | 6,451.89 | 6,451.90 | 6,451.77 |
| MH-2 | 6,453.70 | 1.320 | Standard | 0.63 | 6,450.68 | 6,451.30 | 6,451.59 | 6,451.15 |
| DP 2A | 6,453.00 | 0.000 | Standard | 0.00 | 6,451.98 | 6,451.98 | 6,452.18 | 6,452.18 |
| DP 10 | 6,452.95 | 0.050 | Standard | 0.02 | 6,448.89 | 6,448.91 | 6,449.18 | 6,449.29 |
| DP 8 | 6,452.87 | 0.100 | Standard | 0.05 | 6,449.76 | 6,449.81 | 6,450.22 | 6,450.24 |
| DP 3 | 6,452.86 | 1.320 | Standard | 0.65 | 6,449.49 | 6,450.15 | 6,450.66 | 6,449.99 |
| DP 1 | 6,454.49 | 0.000 | Standard | 0.00 | 6,452.15 | 6,452.15 | 6,452.44 | 6,452.44 |
| FES - DP 7 | 6,449.47 | 0.000 | Standard | 0.00 | 6,449.47 | 6,449.47 | 6,449.91 | 6,449.91 |
| DP 8a | 6,453.29 | | Absolute | 0.00 | 6,451.90 | 6,451.90 | 6,451.91 | 6,451.91 |

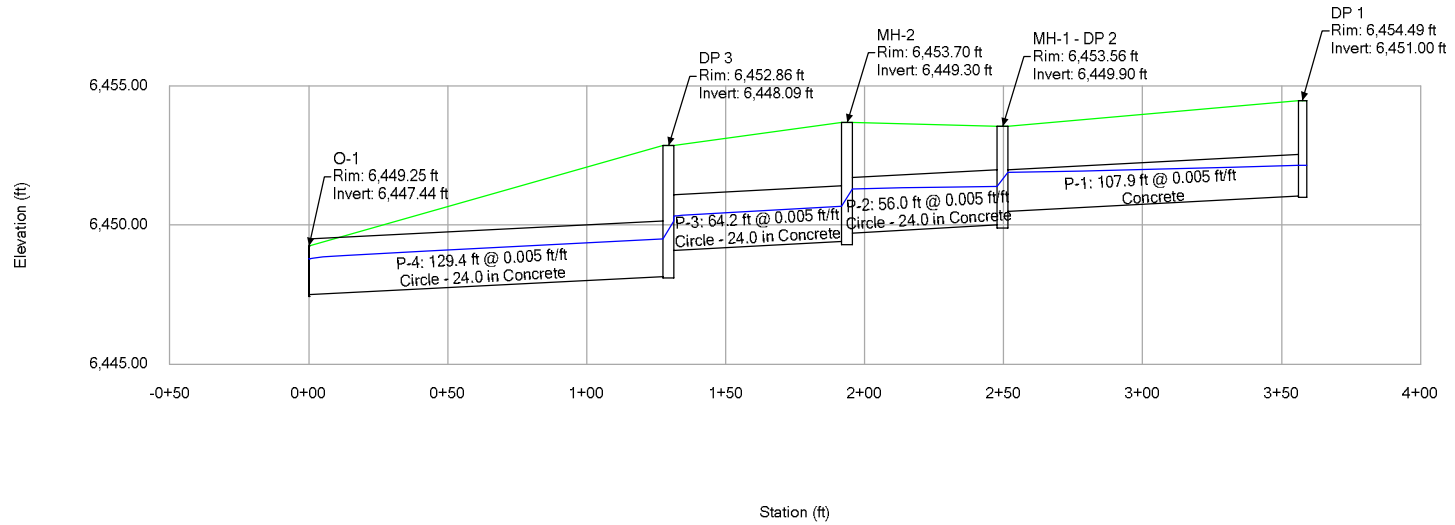
FlexTable: Outfall Table
Active Scenario: 100-year

| Label | Elevation (Ground) (ft) | Elevation (Invert) (ft) | Boundary Condition Type | Elevation (User Defined Tailwater) (ft) | Hydraulic Grade (ft) | Energy Grade Line (ft) | Flow (Total Out) (cfs) |
|-------|-------------------------|-------------------------|-------------------------|-----------------------------------------|----------------------|------------------------|------------------------|
| O-1 | 6,449.25 | 6,447.44 | User Defined Tailwater | 6,448.61 | 6,448.78 | 6,448.78 | 12.70 |
| O-2 | 6,448.62 | 6,446.82 | User Defined Tailwater | 6,448.61 | 6,448.61 | 6,448.61 | 8.90 |

Profile Report

Engineering Profile - O-1 - DP 1 (ACD018_Storm.stsw)

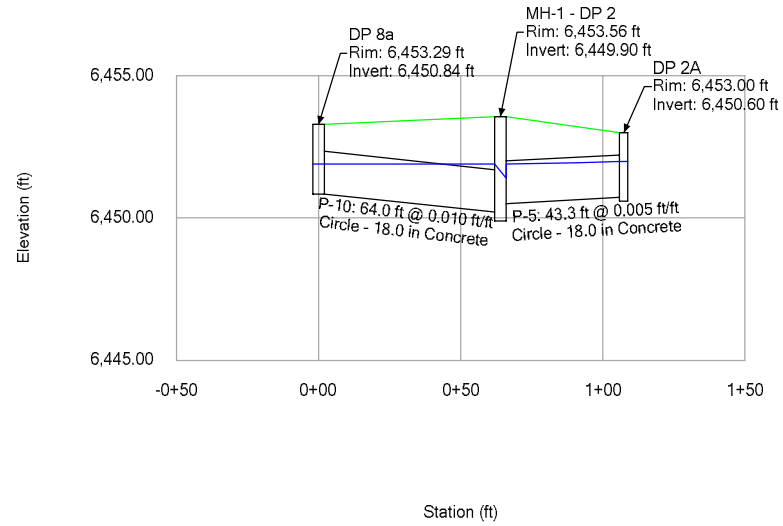
Active Scenario: 100-year



Profile Report

Engineering Profile - DP 8a - MH-1 - DP 2A (ACD018_Storm.stsw)

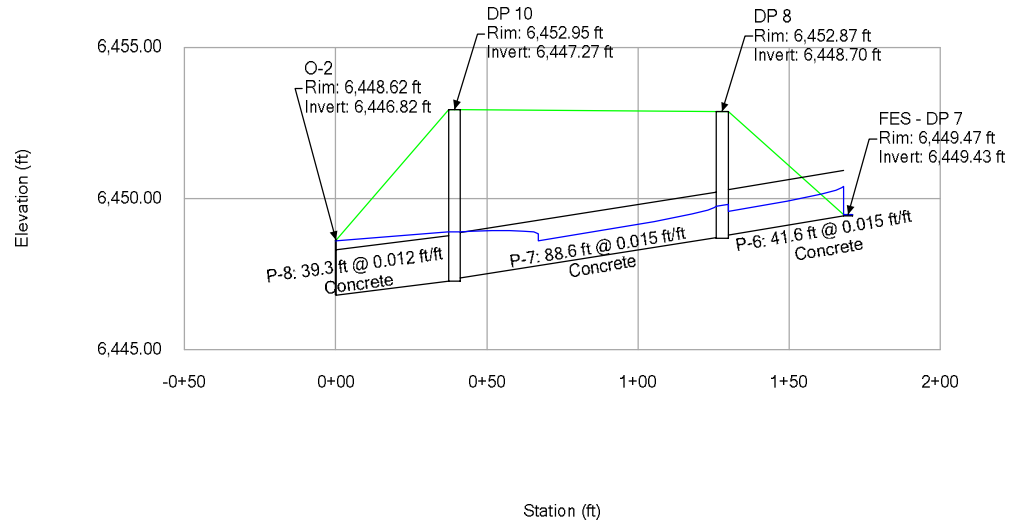
Active Scenario: 100-year



Profile Report

Engineering Profile - O-2 - FES (ACD018_Storm.stsw)

Active Scenario: 100-year



FlexTable: Conduit Table

Active Scenario: 5-year

| Label | Start Node | Stop Node | Invert (Start) (ft) | Invert (Stop) (ft) | Length (User Defined) (ft) | Slope (Calculated) (ft/ft) | Diameter (in) | Manning' s n | Flow (cfs) | Velocity (ft/s) | Capacity (Full Flow) (cfs) | Hydraulic Grade Line (In) (ft) | Hydraulic Grade Line (Out) (ft) | Energy Grade Line (In) (ft) | Energy Grade Line (Out) (ft) |
|-------|-------------|-------------|---------------------|--------------------|----------------------------|----------------------------|---------------|--------------|------------|-----------------|----------------------------|--------------------------------|---------------------------------|-----------------------------|------------------------------|
| P-6 | FES - DP 7 | DP 8 | 6,449.43 | 6,448.80 | 41.6 | 0.015 | 18.0 | 0.013 | 3.50 | 6.19 | 12.86 | 6,450.14 | 6,449.34 | 6,450.42 | 6,449.92 |
| P-1 | DP 1 | MH-1 - DP 2 | 6,451.04 | 6,450.50 | 107.9 | 0.005 | 18.0 | 0.013 | 3.20 | 4.04 | 7.42 | 6,451.73 | 6,451.32 | 6,451.98 | 6,451.49 |
| P-2 | MH-1 - DP 2 | MH-2 | 6,450.00 | 6,449.72 | 56.0 | 0.005 | 24.0 | 0.013 | 6.20 | 4.77 | 16.00 | 6,450.88 | 6,450.74 | 6,451.22 | 6,450.97 |
| P-5 | DP 2A | MH-1 - DP 2 | 6,450.72 | 6,450.50 | 43.3 | 0.005 | 18.0 | 0.013 | 3.10 | 4.01 | 7.43 | 6,451.39 | 6,451.32 | 6,451.64 | 6,451.48 |
| P-3 | MH-2 | DP 3 | 6,449.42 | 6,449.10 | 64.2 | 0.005 | 24.0 | 0.013 | 6.20 | 4.76 | 15.96 | 6,450.30 | 6,449.97 | 6,450.64 | 6,450.32 |
| P-7 | DP 8 | DP 10 | 6,448.70 | 6,447.37 | 88.6 | 0.015 | 18.0 | 0.013 | 4.00 | 6.42 | 12.86 | 6,449.47 | 6,447.95 | 6,449.77 | 6,448.59 |
| P-8 | DP 10 | O-2 | 6,447.27 | 6,446.82 | 39.3 | 0.012 | 18.0 | 0.013 | 4.80 | 6.14 | 11.32 | 6,448.12 | 6,447.51 | 6,448.46 | 6,448.08 |
| P-4 | DP 3 | O-1 | 6,448.15 | 6,447.50 | 129.4 | 0.005 | 24.0 | 0.013 | 6.70 | 4.87 | 15.99 | 6,449.07 | 6,448.40 | 6,449.42 | 6,448.77 |
| P-10 | DP 8a | MH-1 - DP 2 | 6,450.84 | 6,450.20 | 64.0 | 0.010 | 18.0 | 0.013 | 0.80 | 3.51 | 10.50 | 6,451.31 | 6,451.32 | 6,451.35 | 6,451.33 |

FlexTable: Manhole Table

Active Scenario: 5-year

| Label | Elevation (Rim) (ft) | Headloss Coefficient (Standard) | Headloss Method | Headloss (ft) | Hydraulic Grade Line (Out) (ft) | Hydraulic Grade Line (In) (ft) | Energy Grade Line (In) (ft) | Energy Grade Line (Out) (ft) |
|-------------|-------------------------|---------------------------------------|--------------------|------------------|---------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|
| MH-1 - DP 2 | 6,453.56 | 1.320 | Standard | 0.44 | 6,450.88 | 6,451.32 | 6,451.33 | 6,451.22 |
| MH-2 | 6,453.70 | 1.320 | Standard | 0.44 | 6,450.30 | 6,450.74 | 6,450.97 | 6,450.64 |
| DP 2A | 6,453.00 | 0.000 | Standard | 0.00 | 6,451.39 | 6,451.39 | 6,451.64 | 6,451.64 |
| DP 10 | 6,452.95 | 0.050 | Standard | 0.02 | 6,448.12 | 6,448.13 | 6,448.77 | 6,448.46 |
| DP 8 | 6,452.87 | 0.100 | Standard | 0.03 | 6,449.47 | 6,449.50 | 6,450.08 | 6,449.77 |
| DP 3 | 6,452.86 | 1.320 | Standard | 0.47 | 6,449.07 | 6,449.53 | 6,449.88 | 6,449.42 |
| DP 1 | 6,454.49 | 0.000 | Standard | 0.00 | 6,451.73 | 6,451.73 | 6,451.98 | 6,451.98 |
| FES - DP 7 | 6,449.47 | 0.000 | Standard | 0.00 | 6,449.47 | 6,449.47 | 6,449.75 | 6,449.75 |
| DP 8a | 6,453.29 | | Absolute | 0.00 | 6,451.31 | 6,451.31 | 6,451.35 | 6,451.35 |

FlexTable: Outfall Table

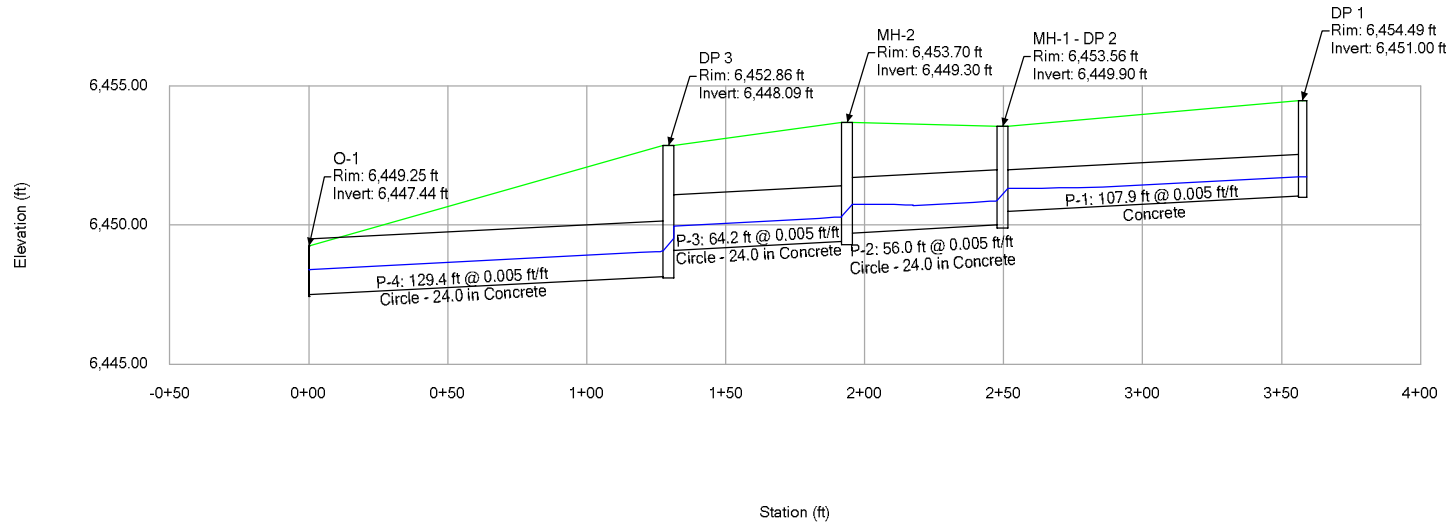
Active Scenario: 5-year

| Label | Elevation (Ground) (ft) | Elevation (Invert) (ft) | Boundary Condition Type | Elevation (User Defined Tailwater) (ft) | Hydraulic Grade (ft) | Energy Grade Line (ft) | Flow (Total Out) (cfs) |
|-------|-------------------------------|-------------------------------|----------------------------|--------------------------------------------------|-------------------------|------------------------------|---------------------------|
| O-1 | 6,449.25 | 6,447.44 | Free Outfall | | 6,448.40 | 6,448.40 | 6.70 |
| O-2 | 6,448.62 | 6,446.82 | Free Outfall | | 6,447.51 | 6,447.51 | 4.80 |

Profile Report

Engineering Profile - O-1 - DP 1 (ACD018_Storm.stsw)

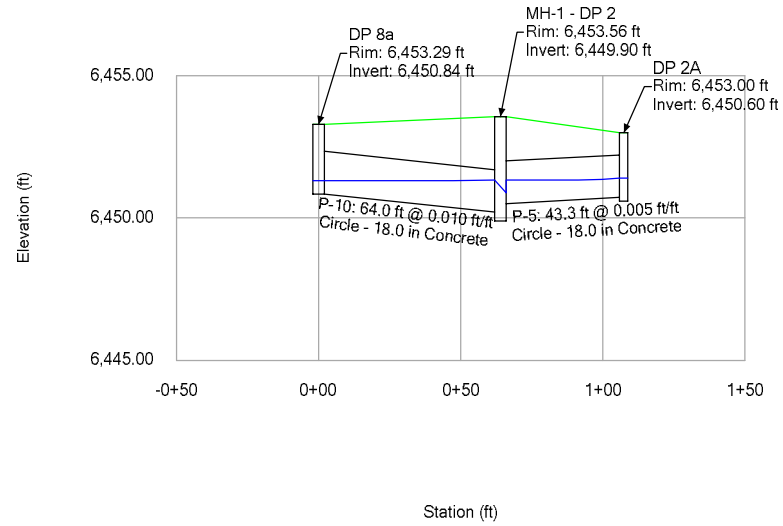
Active Scenario: 5-year



Profile Report

Engineering Profile - DP 8a - MH-1 - DP 2A (ACD018_Storm.stsw)

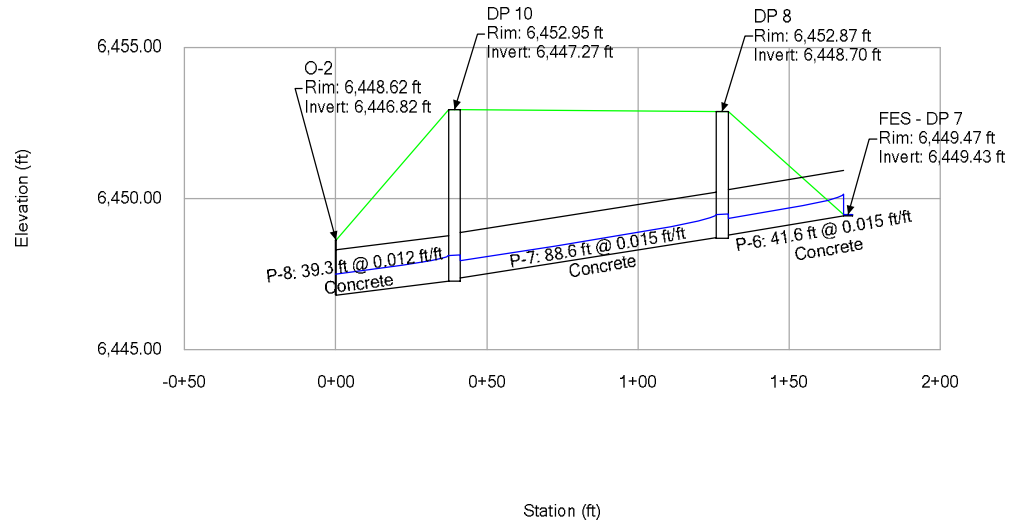
Active Scenario: 5-year



Profile Report

Engineering Profile - O-2 - FES (ACD018_Storm.stsw)

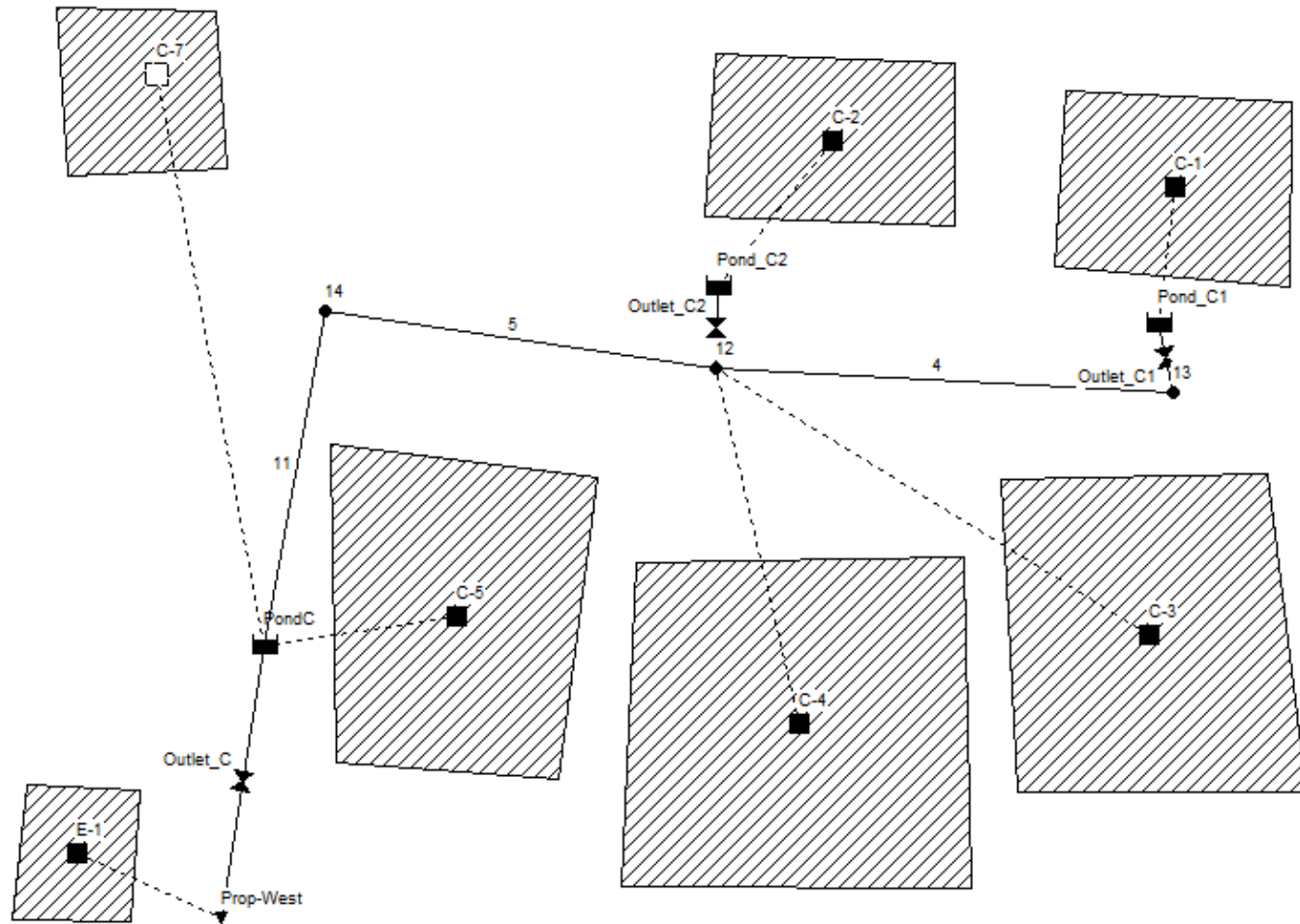
Active Scenario: 5-year



APPENDIX D
SWMM Model



SWMM Model – Final Pond C



SWMM Model - Input

[TITLE]

;; Project Title/Notes

[OPTIONS]

;; Option Value
 FLOW_UNITS CFS
 INFILTRATION HORTON
 FLOW_ROUTING KINWAVE
 LINK_OFFSETS DEPTH
 MIN_SLOPE 0
 ALLOW_PONDING NO
 SKIP_STEADY_STATE NO

START_DATE 02/19/2018
 START_TIME 00:00:00
 REPORT_START_DATE 02/19/2018
 REPORT_START_TIME 00:00:00
 END_DATE 02/22/2018
 END_TIME 00:00:00
 SWEEP_START 01/01
 SWEEP_END 12/31
 DRY_DAYS 0
 REPORT_STEP 00:05:00
 WET_STEP 00:05:00
 DRY_STEP 72:00:00
 ROUTING_STEP 0:00:30
 RULE_STEP 00:00:00

INERTIAL_DAMPING PARTIAL
 NORMAL_FLOW_LIMITED BOTH
 FORCE_MAIN_EQUATION H-W
 VARIABLE_STEP 0.75
 LENGTHENING_STEP 0
 MIN_SURFAREA 12.557
 MAX_TRIALS 8
 HEAD_TOLERANCE 0.005
 SYS_FLOW_TOL 5
 LAT_FLOW_TOL 5
 MINIMUM_STEP 0.5
 THREADS 1

[EVAPORATION]

;; Data Source Parameters
 ;;-----
 CONSTANT 0.0
 DRY_ONLY NO

[RAINGAGES]

;; Name Format Interval SCF Source
 ;;-----
 1 CUMULATIVE 0:05 1.0 TIMESERIES CS_500-yr

[SUBCATCHMENTS]

;; Name Rain Gage Outlet Area %Imperv Width %SI ope
 CurbLen SnowPack

SWMM Model - Input

```

;;-----
A-2          1          Pond_A2          0.57      90      150      1      0
A-1          1          Pond_A1          0.54      90      165      1      0
A-6          1          Pond_A6          0.76      72.1    160      1      0
A-4          1          PondA          0.19      100     190      1      0
A-5. 3, 5. 4  1          Pond_A5. 4    0.22      88.2    75       1      0
C-1          1          Pond_C1          0.89      90      130      1      0
C-2          1          Pond_C2          0.77      83.92   220     2.5    0
C-3          1          12              1.56     90.55   280      1      0
D-1          1          PondC           0.57     43.35   100      0.5    0
A-3          1          PondA           0.32     93.9    250      1      0
A-7          1          PondA           0.42     49      200      1      0
C-4          1          12              .66      88.36   80       1      0
C-5          1          PondC           1.47     70.19   140      1      0
H-2          1          Hi st-East      2.01     2       367     1.5    0
H-1          1          Hi st-East      2.3      2       345     2.5    0
H-4          1          Hi st-West      3.98     2       416     2.5    0
15           1          Hi st-West      2.71     2       343     3      0
A-5. 1, 5. 2  1          Pond_A5. 2    0.16     83.7    60      0.5    0
E-1          1          Prop-West      0.22     5       80      2.5    0

```

[SUBAREAS]

```

;; Subcatchment  N-Imperv  N-Perv   S-Imperv  S-Perv   PctZero  RouteTo
PctRouted
;;-----
A-2          0.011    0.24    0.1       0.35    25       OUTLET
A-1          0.011    0.24    0.1       0.35    25       OUTLET
A-6          0.011    0.24    0.1       0.35    25       OUTLET
A-4          0.011    0.24    0.1       0.35    25       OUTLET
A-5. 3, 5. 4  0.011    0.24    0.1       0.34    25       OUTLET
C-1          0.011    0.24    0.1       0.35    25       OUTLET
C-2          0.011    0.24    0.1       0.35    25       OUTLET
C-3          0.011    0.24    0.1       0.35    25       OUTLET
D-1          0.011    0.24    0.1       0.35    25       OUTLET

```


SWMM Model - Input

| | | | | | | |
|--------------|-------|------|-----|------|----|--------|
| A-3 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |
| A-7 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |
| C-4 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |
| C-5 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |
| H-2 | 0.011 | 0.13 | 0.1 | 0.35 | 25 | OUTLET |
| H-1 | 0.011 | 0.13 | 0.1 | 0.35 | 25 | OUTLET |
| H-4 | 0.011 | 0.13 | 0.1 | 0.35 | 25 | OUTLET |
| 15 | 0.011 | 0.13 | 0.1 | 0.35 | 25 | OUTLET |
| A-5. 1, 5. 2 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |
| E-1 | 0.011 | 0.24 | 0.1 | 0.35 | 25 | OUTLET |

[INFILTRATION]

| Subcatchment | MaxRate | MinRate | Decay | DryTime | MaxInfil |
|--------------|---------|---------|--------|---------|----------|
| A-2 | 5 | 1 | 2.52 | 7 | 0 |
| A-1 | 4.5 | 0.6 | 6.48 | 7 | 0 |
| A-6 | 4.7 | .76 | 4.88 | 7 | 0 |
| A-4 | 5 | 1 | 2.52 | 7 | 0 |
| A-5. 3, 5. 4 | 4.5 | 0.6 | 6.48 | 7 | 0 |
| C-1 | 4.5 | 0.6 | 4.68 | 7 | 0 |
| C-2 | 4.5 | 0.6 | 4.68 | 7 | 0 |
| C-3 | 4.5 | 0.6 | 4.68 | 7 | 0 |
| D-1 | 4.5 | 0.6 | 4.68 | 7 | 0 |
| A-3 | 5 | 1 | 2.52 | 7 | 0 |
| A-7 | 5 | 1 | 2.52 | 7 | 0 |
| C-4 | 4.5 | 0.6 | 6.48 | 7 | 0 |
| C-5 | 4.5 | .6 | 6.48 | 7 | 0 |
| H-2 | 4.8175 | 0.854 | 3.9654 | 7 | 0 |
| H-1 | 5 | 1 | 2.52 | 7 | 0 |
| H-4 | 4.5 | .6 | 6.48 | 7 | 0 |
| 15 | 4.5 | .6 | 6.48 | 7 | 0 |
| A-5. 1, 5. 2 | 3.0 | 0.5 | 4 | 7 | 0 |
| E-1 | 3.0 | 0.5 | 4 | 7 | 0 |

[LID_CONTROLS]

| Name | Type/Layer | Parameters | | | | | |
|---------------------|------------|------------|------|-----|-----|-----|----|
| Parkingsland | BC | | | | | | |
| Parkingsland | SURFACE | 24 | 0.1 | 0.1 | 0 | 5 | |
| Parkingsland 3.5 | SOIL | 18 | 0.5 | 0.2 | 0.1 | 0.5 | 30 |
| Parkingsland | STORAGE | 1 | 0.75 | 0.5 | 0 | | |
| Parkingsland | DRAIN | 0 | 0.5 | 6 | 6 | 0 | 0 |

[LID_USAGE]

| Subcatchment | LID Process | Number | Area | Width | InitSat | FromImp |
|--------------|-------------|---------|------|----------|---------|---------|
| ToPerv | RptFile | DrainTo | | FromPerv | | |
| | | | | | | |

[JUNCTIONS]

| Name | Elevation | MaxDepth | InitDepth | SurDepth | Aponded |
|------|-----------|----------|-----------|----------|---------|
| 9 | 5 | 0 | 0 | 0 | 0 |

SWMM Model - Input

| | | | | | |
|----|---|---|---|---|---|
| 10 | 5 | 0 | 0 | 0 | 0 |
| 11 | 5 | 0 | 0 | 0 | 0 |
| 12 | 2 | 0 | 0 | 0 | 0 |
| 13 | 3 | 0 | 0 | 0 | 0 |
| 14 | 1 | 0 | 0 | 0 | 0 |

[OUTFALLS]

| Name | Elevation | Type | Stage Data | Gated | Route To |
|------------|-----------|------|------------|-------|----------|
| Prop-East | 0 | FREE | | NO | |
| Prop-West | 0 | FREE | | NO | |
| Hi st-East | 0 | FREE | | NO | |
| Hi st-West | 0 | FREE | | NO | |

[STORAGE]

| Name | Fevap | Elev. Psi | MaxDepth Ksat | InitDepth IMD | Shape | Curve Name/Params | |
|-----------|-------|-----------|---------------|---------------|------------|-------------------|---|
| PondA | | 0 | 5.5 | 0 | TABULAR | Pond1_Volume | 0 |
| Pond_A1 | | 6 | 0.75 | 0 | TABULAR | PondA1_Volume | 0 |
| Pond_A2 | | 6 | 0.75 | 0 | TABULAR | PondA2_Volume | 0 |
| Pond_A6 | | 6 | .75 | 0 | TABULAR | PondA5_Volume | 0 |
| Pond_A5.4 | | 6 | 0.75 | 0 | TABULAR | PondA5.4_Volume | 0 |
| Pond_C2 | | 2 | 0.75 | 0 | TABULAR | PondB2_vol | 0 |
| Pond_C1 | | 3 | .75 | 0 | TABULAR | PondB1_vol | 0 |
| Pond_D | | 1 | 3 | 0 | TABULAR | PondD_Vol | 0 |
| PondC | | 0 | 6.5 | 0 | TABULAR | PondC_Vol | 0 |
| Pond_A5.2 | | 6 | 0.75 | 0 | FUNCTIONAL | 1000 0 0 | 0 |

[CONDUITS]

| Name | From Node | To Node | Length | Roughness | InOffset |
|-----------|-----------|---------|--------|-----------|----------|
| OutOffset | InitFlow | MaxFlow | | | |
| 1 | 10 | 11 | 400 | 0.01 | 0 |
| 0 | 0 | | | | |
| 2 | 9 | PondA | 400 | 0.01 | 0 |
| 0 | 0 | | | | |
| 3 | 11 | PondA | 400 | 0.01 | 0 |
| 0 | 0 | | | | |
| 4 | 13 | 12 | 400 | 0.01 | 0 |
| 0 | 0 | | | | |
| 5 | 12 | 14 | 400 | 0.01 | 0 |
| 0 | 0 | | | | |

11 14 SWMM Model - Input
 0 0 PondC 400 0.01 0 0

[ORIFICES]

```
;; Name                      From Node                      To Node                      Type                      Offset                      Qcoeff
Gated      CloseTime
-----
```

| | | | | | | |
|----------------|-----------|----|------|---|------|----|
| Outlet_A1 0 | Pond_A1 | 10 | SIDE | 0 | 0.65 | NO |
| OutletA2 0 | Pond_A2 | 11 | SIDE | 0 | 0.65 | NO |
| Outlet_A5 0 | Pond_A6 | 9 | SIDE | 0 | 0.65 | NO |
| Outlet_A4 0 | Pond_A5.4 | 9 | SIDE | 0 | 0.65 | NO |
| Outlet_C2 0 | Pond_C2 | 12 | SIDE | 0 | 0.65 | NO |
| Outlet_C1 0 | Pond_C1 | 13 | SIDE | 0 | 0.65 | NO |
| Outlet_A6 0 | Pond_A5.2 | 9 | SIDE | 0 | 0.65 | NO |

[OUTLETS]

```
;; Name                      From Node                      To Node                      Offset                      Type
QTable/Qcoeff      Qexpon      Gated
-----
```

| | | | | | |
|----------|--------------|-----------|---|---------------|--------------|
| Outlet_1 | PondA NO | Prop-East | 0 | TABULAR/DEPTH | Pond1_Outlet |
| Outlet_D | Pond_D NO | Prop-West | 0 | TABULAR/DEPTH | Outlet_D |
| Outlet_C | PondC NO | Prop-West | 0 | TABULAR/DEPTH | OutletPondC |

[XSECTIONS]

```
;; Link                      Shape                      Geom1                      Geom2                      Geom3                      Geom4                      Barrels
Culvert
-----
```

| | | | | | | |
|-----------|-------------|------|------|---|---|---|
| 1 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| 2 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| 3 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| 4 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| 5 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| 11 | DUMMY | 0 | 0 | 0 | 0 | 1 |
| Outlet_A1 | RECT_CLOSED | 0.75 | .9 | 0 | 0 | |
| OutletA2 | RECT_CLOSED | .75 | 1 | 0 | 0 | |
| Outlet_A5 | RECT_CLOSED | 0.75 | 2.25 | 0 | 0 | |

SWMM Model - Input

| | | | | | |
|-----------|-------------|-----|-----|---|---|
| Outlet_A4 | RECT_CLOSED | 0.5 | 0.5 | 0 | 0 |
| Outlet_C2 | RECT_CLOSED | 0.5 | 1.5 | 0 | 0 |
| Outlet_C1 | RECT_CLOSED | 1 | 1.5 | 0 | 0 |
| Outlet_A6 | RECT_CLOSED | 0.4 | 0.3 | 0 | 0 |

[CURVES]

| ;; Name | Type | X-Value | Y-Value |
|--------------|--------|---------|---------|
| ; | | | |
| Pond1_Outlet | Rating | 0.00 | 0.00 |
| Pond1_Outlet | | 0.25 | 0.02 |
| Pond1_Outlet | | 0.50 | 0.02 |
| Pond1_Outlet | | 0.75 | 0.03 |
| Pond1_Outlet | | 1.00 | 0.03 |
| Pond1_Outlet | | 1.25 | 0.04 |
| Pond1_Outlet | | 1.50 | 0.05 |
| Pond1_Outlet | | 1.75 | 0.06 |
| Pond1_Outlet | | 2.00 | 0.07 |
| Pond1_Outlet | | 2.25 | 0.08 |
| Pond1_Outlet | | 2.50 | 0.09 |
| Pond1_Outlet | | 2.75 | 0.10 |
| Pond1_Outlet | | 3.00 | 0.12 |
| Pond1_Outlet | | 3.25 | 0.13 |
| Pond1_Outlet | | 3.50 | 0.14 |
| Pond1_Outlet | | 3.75 | 0.15 |
| Pond1_Outlet | | 4.00 | 0.15 |
| Pond1_Outlet | | 4.05 | 0.63 |
| Pond1_Outlet | | 4.25 | 3.50 |
| Pond1_Outlet | | 4.50 | 3.59 |
| Pond1_Outlet | | 4.75 | 3.68 |
| Pond1_Outlet | | 5.00 | 3.77 |
| Pond1_Outlet | | 5.25 | 3.85 |
| Pond1_Outlet | | 5.50 | 3.94 |
| Pond1_Outlet | | 5.75 | 4.02 |
| ; | | | |
| OutletPondC | Rating | 0.00 | 0.00 |
| OutletPondC | | 0.25 | 0.03 |
| OutletPondC | | 0.50 | 0.04 |
| OutletPondC | | 0.75 | 0.05 |
| OutletPondC | | 1.00 | 0.05 |
| OutletPondC | | 1.25 | 0.06 |
| OutletPondC | | 1.50 | 0.07 |
| OutletPondC | | 1.75 | 0.09 |
| OutletPondC | | 2.00 | 0.11 |
| OutletPondC | | 2.25 | 0.13 |
| OutletPondC | | 2.50 | 0.14 |
| OutletPondC | | 2.75 | 0.15 |
| OutletPondC | | 3.00 | 0.16 |
| OutletPondC | | 3.25 | 0.19 |
| OutletPondC | | 3.50 | 0.21 |
| OutletPondC | | 3.75 | 0.23 |
| OutletPondC | | 4.00 | 0.24 |
| OutletPondC | | 4.25 | 0.26 |
| OutletPondC | | 4.50 | 0.27 |
| OutletPondC | | 4.75 | 0.28 |
| OutletPondC | | 5.00 | 0.61 |

SWMM Model - Input

| | | | |
|-----------------|---------|------|-------|
| OutletPondC | | 5.25 | 1.23 |
| OutletPondC | | 5.50 | 5.19 |
| OutletPondC | | 5.75 | 11.03 |
| OutletPondC | | 6.00 | 11.31 |
| OutletPondC | | 6.25 | 11.58 |
| OutletPondC | | 6.50 | 12.11 |
| ; | | | |
| Outlet_D | Rating | 0.00 | 0.00 |
| Outlet_D | | 1.00 | 0.01 |
| Outlet_D | | 2.00 | 0.02 |
| Outlet_D | | 3.00 | 0.45 |
| ; | | | |
| Pond1_Volume | Storage | 0.00 | 0 |
| Pond1_Volume | | 0.75 | 2067 |
| Pond1_Volume | | 1.75 | 5058 |
| Pond1_Volume | | 2.75 | 5579 |
| Pond1_Volume | | 3.75 | 5866 |
| Pond1_Volume | | 4.75 | 6080 |
| Pond1_Volume | | 5.75 | 6290 |
| ; | | | |
| PondA1_Volume | Storage | 0 | 0 |
| PondA1_Volume | | 0.25 | 625 |
| PondA1_Volume | | 0.5 | 2500 |
| PondA1_Volume | | 0.75 | 5625 |
| ; | | | |
| PondA2_Volume | Storage | 0 | 0 |
| PondA2_Volume | | 0.25 | 625 |
| PondA2_Volume | | 0.5 | 2500 |
| PondA2_Volume | | 0.75 | 5625 |
| ; | | | |
| PondA5_Volume | Storage | 0 | 0 |
| PondA5_Volume | | 0.25 | 625 |
| PondA5_Volume | | 0.5 | 2500 |
| PondA5_Volume | | 0.75 | 5625 |
| ; | | | |
| PondA5.4_Volume | Storage | 0.00 | 0 |
| PondA5.4_Volume | | 0.05 | 16 |
| PondA5.4_Volume | | 0.25 | 363 |
| PondA5.4_Volume | | 0.45 | 899 |
| PondA5.4_Volume | | 0.65 | 1501 |
| PondA5.4_Volume | | 0.75 | 1769 |
| ; | | | |
| PondB2_vol | Storage | 0.00 | 0 |
| PondB2_vol | | 0.10 | 189 |
| PondB2_vol | | 0.20 | 757 |
| PondB2_vol | | 0.30 | 1702 |
| PondB2_vol | | 0.40 | 2967 |
| PondB2_vol | | 0.50 | 4431 |
| PondB2_vol | | 0.60 | 6093 |
| PondB2_vol | | 0.70 | 7976 |
| PondB2_vol | | 0.75 | 9024 |
| ; | | | |
| PondB1_vol | Storage | 0 | 0 |
| PondB1_vol | | 0.25 | 1250 |
| PondB1_vol | | 0.50 | 5000 |

SWMM Model - Input

| | | | |
|-------------------|---------|------|---------|
| PondB1_vol | | 0.75 | 11250 |
| ; | | | |
| PondC_Vol | Storage | 0.00 | 313.25 |
| PondC_Vol | | 0.25 | 2260.16 |
| PondC_Vol | | 0.50 | 4033 |
| PondC_Vol | | 0.75 | 4150.83 |
| PondC_Vol | | 1.00 | 4222.6 |
| PondC_Vol | | 1.25 | 4293.5 |
| PondC_Vol | | 1.50 | 4363.36 |
| PondC_Vol | | 2.50 | 4634 |
| PondC_Vol | | 3.50 | 4893.41 |
| PondC_Vol | | 4.50 | 5144.91 |
| PondC_Vol | | 5.50 | 5387.29 |
| PondC_Vol | | 6.50 | 5618.06 |
| ; | | | |
| PondD_Vol | Storage | 0.00 | 0 |
| PondD_Vol | | 1.00 | 1042 |
| PondD_Vol | | 2.00 | 1734 |
| PondD_Vol | | 3.00 | 2525 |
| ; | | | |
| PondB3_vol | Storage | 0 | 3750 |
| PondB3_vol | | 1 | 3750 |
| ; | | | |
| PondA5. 2_Vol ume | Storage | 0.00 | 0 |
| PondA5. 2_Vol ume | | 0.05 | 9 |
| PondA5. 2_Vol ume | | 0.25 | 102 |
| PondA5. 2_Vol ume | | 0.45 | 201 |

[TIMESERIES]

| ;; Name | Date | Time | Value |
|-----------|-------|-------|---------|
| ;; ----- | ----- | ----- | ----- |
| CS_100-yr | | 0 | 0 |
| CS_100-yr | | 0:05 | 0.03528 |
| CS_100-yr | | 0:10 | 0.11592 |
| CS_100-yr | | 0:15 | 0.19908 |
| CS_100-yr | | 0:20 | 0.3024 |
| CS_100-yr | | 0:25 | 0.45108 |
| CS_100-yr | | 0:30 | 0.65016 |
| CS_100-yr | | 0:35 | 1.06092 |
| CS_100-yr | | 0:40 | 1.79424 |
| CS_100-yr | | 0:45 | 2.07648 |
| CS_100-yr | | 0:50 | 2.24784 |
| CS_100-yr | | 0:55 | 2.3562 |
| CS_100-yr | | 1:00 | 2.44944 |
| CS_100-yr | | 1:05 | 2.53008 |
| CS_100-yr | | 1:10 | 2.56536 |
| CS_100-yr | | 1:15 | 2.5956 |
| CS_100-yr | | 1:20 | 2.62332 |
| CS_100-yr | | 1:25 | 2.65104 |
| CS_100-yr | | 1:30 | 2.67876 |
| CS_100-yr | | 1:35 | 2.70144 |
| CS_100-yr | | 1:40 | 2.72664 |
| CS_100-yr | | 1:45 | 2.74932 |
| CS_100-yr | | 1:50 | 2.772 |
| CS_100-yr | | 1:55 | 2.79468 |

SWMM Model - Input

| | | |
|-----------|-------|----------|
| CS_100-yr | 2: 00 | 2. 81988 |
| ; | | |
| CS_WQ | 0 | 0 |
| CS_WQ | 0: 05 | 0. 0084 |
| CS_WQ | 0: 10 | 0. 0276 |
| CS_WQ | 0: 15 | 0. 0474 |
| CS_WQ | 0: 20 | 0. 072 |
| CS_WQ | 0: 25 | 0. 1074 |
| CS_WQ | 0: 30 | 0. 1548 |
| CS_WQ | 0: 35 | 0. 2526 |
| CS_WQ | 0: 40 | 0. 4272 |
| CS_WQ | 0: 45 | 0. 4944 |
| CS_WQ | 0: 50 | 0. 5352 |
| CS_WQ | 0: 55 | 0. 561 |
| CS_WQ | 1: 00 | 0. 5832 |
| CS_WQ | 1: 05 | 0. 6024 |
| CS_WQ | 1: 10 | 0. 6108 |
| CS_WQ | 1: 15 | 0. 618 |
| CS_WQ | 1: 20 | 0. 6246 |
| CS_WQ | 1: 25 | 0. 6312 |
| CS_WQ | 1: 30 | 0. 6378 |
| CS_WQ | 1: 35 | 0. 6432 |
| CS_WQ | 1: 40 | 0. 6492 |
| CS_WQ | 1: 45 | 0. 6546 |
| CS_WQ | 1: 50 | 0. 66 |
| CS_WQ | 1: 55 | 0. 6654 |
| CS_WQ | 2: 00 | 0. 6714 |
| ; | | |
| CS_5-yr | 0 | 0 |
| CS_5-yr | 0: 05 | 0. 021 |
| CS_5-yr | 0: 10 | 0. 069 |
| CS_5-yr | 0: 15 | 0. 1185 |
| CS_5-yr | 0: 20 | 0. 18 |
| CS_5-yr | 0: 25 | 0. 2685 |
| CS_5-yr | 0: 30 | 0. 387 |
| CS_5-yr | 0: 35 | 0. 6315 |
| CS_5-yr | 0: 40 | 1. 068 |
| CS_5-yr | 0: 45 | 1. 236 |
| CS_5-yr | 0: 50 | 1. 338 |
| CS_5-yr | 0: 55 | 1. 4025 |
| CS_5-yr | 1: 00 | 1. 458 |
| CS_5-yr | 1: 05 | 1. 506 |
| CS_5-yr | 1: 10 | 1. 527 |
| CS_5-yr | 1: 15 | 1. 545 |
| CS_5-yr | 1: 20 | 1. 5615 |
| CS_5-yr | 1: 25 | 1. 578 |
| CS_5-yr | 1: 30 | 1. 5945 |
| CS_5-yr | 1: 35 | 1. 608 |
| CS_5-yr | 1: 40 | 1. 623 |
| CS_5-yr | 1: 45 | 1. 6365 |
| CS_5-yr | 1: 50 | 1. 65 |
| CS_5-yr | 1: 55 | 1. 6635 |
| CS_5-yr | 2: 00 | 1. 6785 |
| ; | | |
| CS_2-yr | 0 | 0 |

SWMM Model - Input

| | | |
|----------|-------|----------|
| CS_2-yr | 0: 05 | 0. 01666 |
| CS_2-yr | 0: 10 | 0. 05474 |
| CS_2-yr | 0: 15 | 0. 09401 |
| CS_2-yr | 0: 20 | 0. 1428 |
| CS_2-yr | 0: 25 | 0. 21301 |
| CS_2-yr | 0: 30 | 0. 30702 |
| CS_2-yr | 0: 35 | 0. 50099 |
| CS_2-yr | 0: 40 | 0. 84728 |
| CS_2-yr | 0: 45 | 0. 98056 |
| CS_2-yr | 0: 50 | 1. 06148 |
| CS_2-yr | 0: 55 | 1. 11265 |
| CS_2-yr | 1: 00 | 1. 15668 |
| CS_2-yr | 1: 05 | 1. 19476 |
| CS_2-yr | 1: 10 | 1. 21142 |
| CS_2-yr | 1: 15 | 1. 2257 |
| CS_2-yr | 1: 20 | 1. 23879 |
| CS_2-yr | 1: 25 | 1. 25188 |
| CS_2-yr | 1: 30 | 1. 26497 |
| CS_2-yr | 1: 35 | 1. 27568 |
| CS_2-yr | 1: 40 | 1. 28758 |
| CS_2-yr | 1: 45 | 1. 29829 |
| CS_2-yr | 1: 50 | 1. 309 |
| CS_2-yr | 1: 55 | 1. 31971 |
| CS_2-yr | 2: 00 | 1. 33161 |
| ; | | |
| CS_10-yr | 0 | 0 |
| CS_10-yr | 0: 05 | 0. 0245 |
| CS_10-yr | 0: 10 | 0. 0805 |
| CS_10-yr | 0: 15 | 0. 13825 |
| CS_10-yr | 0: 20 | 0. 21 |
| CS_10-yr | 0: 25 | 0. 31325 |
| CS_10-yr | 0: 30 | 0. 4515 |
| CS_10-yr | 0: 35 | 0. 73675 |
| CS_10-yr | 0: 40 | 1. 246 |
| CS_10-yr | 0: 45 | 1. 442 |
| CS_10-yr | 0: 50 | 1. 561 |
| CS_10-yr | 0: 55 | 1. 63625 |
| CS_10-yr | 1: 00 | 1. 701 |
| CS_10-yr | 1: 05 | 1. 757 |
| CS_10-yr | 1: 10 | 1. 7815 |
| CS_10-yr | 1: 15 | 1. 8025 |
| CS_10-yr | 1: 20 | 1. 82175 |
| CS_10-yr | 1: 25 | 1. 841 |
| CS_10-yr | 1: 30 | 1. 86025 |
| CS_10-yr | 1: 35 | 1. 876 |
| CS_10-yr | 1: 40 | 1. 8935 |
| CS_10-yr | 1: 45 | 1. 90925 |
| CS_10-yr | 1: 50 | 1. 925 |
| CS_10-yr | 1: 55 | 1. 94075 |
| CS_10-yr | 2: 00 | 1. 95825 |
| ; | | |
| CS_25-yr | 0 | 0 |
| CS_25-yr | 0: 05 | 0. 028 |
| CS_25-yr | 0: 10 | 0. 092 |
| CS_25-yr | 0: 15 | 0. 158 |

SWMM Model - Input

| | | |
|-----------|-------|----------|
| CS_25-yr | 0: 20 | 0. 24 |
| CS_25-yr | 0: 25 | 0. 358 |
| CS_25-yr | 0: 30 | 0. 516 |
| CS_25-yr | 0: 35 | 0. 842 |
| CS_25-yr | 0: 40 | 1. 424 |
| CS_25-yr | 0: 45 | 1. 648 |
| CS_25-yr | 0: 50 | 1. 784 |
| CS_25-yr | 0: 55 | 1. 87 |
| CS_25-yr | 1: 00 | 1. 944 |
| CS_25-yr | 1: 05 | 2. 008 |
| CS_25-yr | 1: 10 | 2. 036 |
| CS_25-yr | 1: 15 | 2. 06 |
| CS_25-yr | 1: 20 | 2. 082 |
| CS_25-yr | 1: 25 | 2. 104 |
| CS_25-yr | 1: 30 | 2. 126 |
| CS_25-yr | 1: 35 | 2. 144 |
| CS_25-yr | 1: 40 | 2. 164 |
| CS_25-yr | 1: 45 | 2. 182 |
| CS_25-yr | 1: 50 | 2. 2 |
| CS_25-yr | 1: 55 | 2. 218 |
| CS_25-yr | 2: 00 | 2. 238 |
| ; | | |
| CS_50-yr | 0 | 0 |
| CS_50-yr | 0: 05 | 0. 0315 |
| CS_50-yr | 0: 10 | 0. 1035 |
| CS_50-yr | 0: 15 | 0. 17775 |
| CS_50-yr | 0: 20 | 0. 27 |
| CS_50-yr | 0: 25 | 0. 40275 |
| CS_50-yr | 0: 30 | 0. 5805 |
| CS_50-yr | 0: 35 | 0. 94725 |
| CS_50-yr | 0: 40 | 1. 602 |
| CS_50-yr | 0: 45 | 1. 854 |
| CS_50-yr | 0: 50 | 2. 007 |
| CS_50-yr | 0: 55 | 2. 10375 |
| CS_50-yr | 1: 00 | 2. 187 |
| CS_50-yr | 1: 05 | 2. 259 |
| CS_50-yr | 1: 10 | 2. 2905 |
| CS_50-yr | 1: 15 | 2. 3175 |
| CS_50-yr | 1: 20 | 2. 34225 |
| CS_50-yr | 1: 25 | 2. 367 |
| CS_50-yr | 1: 30 | 2. 39175 |
| CS_50-yr | 1: 35 | 2. 412 |
| CS_50-yr | 1: 40 | 2. 4345 |
| CS_50-yr | 1: 45 | 2. 45475 |
| CS_50-yr | 1: 50 | 2. 475 |
| CS_50-yr | 1: 55 | 2. 49525 |
| CS_50-yr | 2: 00 | 2. 51775 |
| ; | | |
| CS_500-yr | 0: 05 | 0. 05152 |
| CS_500-yr | 0: 10 | 0. 16928 |
| CS_500-yr | 0: 15 | 0. 29072 |
| CS_500-yr | 0: 20 | 0. 4416 |
| CS_500-yr | 0: 25 | 0. 65872 |
| CS_500-yr | 0: 30 | 0. 94944 |
| CS_500-yr | 0: 35 | 1. 54928 |

SWMM Model - Input

| | | |
|-----------|-------|----------|
| CS_500-yr | 0: 40 | 2. 62016 |
| CS_500-yr | 0: 45 | 3. 03232 |
| CS_500-yr | 0: 50 | 3. 28256 |
| CS_500-yr | 0: 55 | 3. 4408 |
| CS_500-yr | 1: 00 | 3. 57696 |
| CS_500-yr | 1: 05 | 3. 69472 |
| CS_500-yr | 1: 10 | 3. 74624 |
| CS_500-yr | 1: 15 | 3. 7904 |
| CS_500-yr | 1: 20 | 3. 83088 |
| CS_500-yr | 1: 25 | 3. 87136 |
| CS_500-yr | 1: 30 | 3. 91184 |
| CS_500-yr | 1: 35 | 3. 94496 |
| CS_500-yr | 1: 40 | 3. 98176 |
| CS_500-yr | 1: 45 | 4. 01488 |
| CS_500-yr | 1: 50 | 4. 048 |
| CS_500-yr | 1: 55 | 4. 08112 |
| CS_500-yr | 2: 00 | 4. 11792 |

[REPORT]

;; Reporting Options
 SUBCATCHMENTS ALL
 NODES ALL
 LINKS ALL

[TAGS]

[MAP]

DIMENSIONS 0.000 0.000 10000.000 10000.000
 Units None

[COORDINATES]

| ;; Node | X-Coord | Y-Coord |
|------------|------------|------------|
| ;; ----- | ----- | ----- |
| 9 | 4148. 695 | 2122. 588 |
| 10 | 2809. 308 | 5856. 981 |
| 11 | 6248. 581 | 5891. 033 |
| 12 | -3788. 694 | 6016. 151 |
| 13 | -868. 102 | 5868. 102 |
| 14 | -6278. 600 | 6393. 001 |
| Prop-East | 8654. 938 | 1282. 633 |
| Prop-West | -6938. 089 | 2516. 824 |
| Hi st-East | 4705. 882 | 10115. 090 |
| Hi st-West | -5511. 509 | 12007. 673 |
| PondA | 8575. 482 | 2360. 953 |
| Pond_A1 | 2593. 644 | 6481. 271 |
| Pond_A2 | 6203. 178 | 6628. 831 |
| Pond_A6 | 4160. 045 | 2724. 177 |
| Pond_A5. 4 | 2626. 919 | 2597. 403 |
| Pond_C2 | -3775. 236 | 6541. 050 |
| Pond_C1 | -962. 315 | 6298. 789 |
| Pond_D | -7485. 066 | 6571. 087 |
| PondC | -6668. 910 | 4253. 028 |
| Pond_A5. 2 | 2733. 176 | 1452. 184 |

[VERTICES]

| SWMM Model - Input | | |
|--------------------|-----------|----------|
| :: Link | X-Coord | Y-Coord |
| ----- | | |
| [Polygons] | | |
| :: Subcatchment | X-Coord | Y-Coord |
| ----- | | |
| A-2 | 5525.588 | 8603.043 |
| A-2 | 5525.588 | 8603.043 |
| A-2 | 6576.763 | 8561.549 |
| A-2 | 6742.739 | 7786.999 |
| A-2 | 5511.757 | 7621.024 |
| A-2 | 5484.094 | 8603.043 |
| A-1 | 2968.218 | 8649.262 |
| A-1 | 3104.427 | 7570.942 |
| A-1 | 1685.585 | 7468.785 |
| A-1 | 1628.831 | 8683.314 |
| A-6 | 5079.455 | 5539.160 |
| A-6 | 5612.940 | 3280.363 |
| A-6 | 3637.911 | 3178.207 |
| A-6 | 3422.247 | 5607.264 |
| A-4 | 8711.691 | 8127.128 |
| A-4 | 8938.706 | 6288.309 |
| A-4 | 8257.662 | 6220.204 |
| A-4 | 8200.908 | 8138.479 |
| A-5.3, 5.4 | 1943.614 | 4279.268 |
| A-5.3, 5.4 | 2220.239 | 2965.298 |
| A-5.3, 5.4 | 878.607 | 2771.661 |
| A-5.3, 5.4 | 837.113 | 4293.099 |
| C-1 | -114.401 | 7725.437 |
| C-1 | -127.860 | 6541.050 |
| C-1 | -1621.803 | 6675.639 |
| C-1 | -1554.509 | 7792.732 |
| C-2 | -2263.367 | 7970.343 |
| C-2 | -2263.367 | 6934.004 |
| C-2 | -3851.523 | 6987.840 |
| C-2 | -3784.228 | 8024.179 |
| C-3 | -265.168 | 5345.091 |
| C-3 | -22.907 | 3312.790 |
| C-3 | -1856.508 | 3315.716 |
| C-3 | -1964.035 | 5310.937 |
| D-1 | -6976.105 | 8303.465 |
| D-1 | -6976.105 | 8303.465 |
| D-1 | -6904.421 | 7299.880 |
| D-1 | -7919.952 | 7252.091 |
| D-1 | -7991.637 | 8327.360 |
| A-3 | 7365.591 | 8040.621 |
| A-3 | 7365.591 | 8040.621 |
| A-3 | 8058.542 | 8064.516 |
| A-3 | 8118.280 | 6332.139 |
| A-3 | 7305.854 | 6212.664 |
| A-3 | 7317.802 | 8004.779 |
| A-7 | 9599.761 | 4934.289 |
| A-7 | 9599.761 | 4934.289 |
| A-7 | 10925.926 | 4958.184 |
| A-7 | 11176.822 | 3082.437 |

SWMM Model - Input

| | | |
|--------------|------------|------------|
| A-7 | 9719. 235 | 2998. 805 |
| A-7 | 9611. 708 | 4994. 026 |
| C-4 | -2201. 212 | 4811. 775 |
| C-4 | -2153. 422 | 2709. 027 |
| C-4 | -4387. 592 | 2720. 974 |
| C-4 | -4292. 012 | 4775. 932 |
| C-5 | -6206. 691 | 3500. 597 |
| C-5 | -4784. 946 | 3405. 018 |
| C-5 | -4534. 050 | 5328. 554 |
| C-5 | -6242. 533 | 5531. 661 |
| H-2 | 3759. 591 | 12391. 304 |
| H-2 | 3759. 591 | 12391. 304 |
| H-2 | 3759. 591 | 12391. 304 |
| H-2 | 3759. 591 | 12391. 304 |
| H-2 | 3900. 256 | 12416. 880 |
| H-2 | 4143. 223 | 11035. 806 |
| H-2 | 3132. 992 | 10882. 353 |
| H-2 | 3081. 841 | 12378. 517 |
| H-1 | 6086. 957 | 12480. 818 |
| H-1 | 6406. 650 | 11189. 258 |
| H-1 | 5242. 967 | 11099. 744 |
| H-1 | 5191. 816 | 12429. 668 |
| H-4 | -5971. 867 | 13554. 987 |
| H-4 | -5971. 867 | 13554. 987 |
| H-4 | -5959. 079 | 12595. 908 |
| H-4 | -7161. 125 | 12531. 969 |
| H-4 | -7161. 125 | 13593. 350 |
| 15 | -4028. 133 | 13554. 987 |
| 15 | -4002. 558 | 12685. 422 |
| 15 | -4974. 425 | 12583. 120 |
| 15 | -4974. 425 | 13554. 987 |
| A-5. 1, 5. 2 | 194. 805 | 2443. 920 |
| A-5. 1, 5. 2 | 253. 837 | 1192. 444 |
| A-5. 1, 5. 2 | 1623. 377 | 1192. 444 |
| A-5. 1, 5. 2 | 1576. 151 | 2443. 920 |
| A-5. 1, 5. 2 | 159. 386 | 2432. 113 |
| E-1 | -8264. 463 | 2502. 952 |
| E-1 | -7508. 855 | 2491. 145 |
| E-1 | -7461. 629 | 3329. 398 |
| E-1 | -8181. 818 | 3364. 817 |

[SYMBOLS]

| ; ; Gage | X-Coord | Y-Coord |
|----------|------------|-----------|
| ----- | | |
| 1 | -2468. 785 | 9012. 486 |

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 2.255 | 1.332 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 1.420 | 0.839 |

SWMM Model - 2-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 0.795 | 0.469 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.314 | |

| ***** | Volume | Volume |
|----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 0.795 | 0.259 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 0.795 | 0.259 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.055 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 2-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 857 | 1. 33 | 0. 00 | 0. 00 | 0. 13 | 1. 14 | 0. 00 | 1. 14 | 0. 02 | 2. 08 |
| A-1 0. 857 | 1. 33 | 0. 00 | 0. 00 | 0. 13 | 1. 14 | 0. 00 | 1. 14 | 0. 02 | 1. 99 |
| A-6 0. 687 | 1. 33 | 0. 00 | 0. 00 | 0. 37 | 0. 91 | 0. 00 | 0. 91 | 0. 02 | 2. 22 |
| A-4 0. 950 | 1. 33 | 0. 00 | 0. 00 | 0. 00 | 1. 27 | 0. 00 | 1. 27 | 0. 01 | 0. 80 |
| A-5. 3, 5. 4 0. 840 | 1. 33 | 0. 00 | 0. 00 | 0. 16 | 1. 12 | 0. 00 | 1. 12 | 0. 01 | 0. 80 |
| C-1 0. 857 | 1. 33 | 0. 00 | 0. 00 | 0. 13 | 1. 14 | 0. 00 | 1. 14 | 0. 03 | 3. 07 |
| C-2 0. 799 | 1. 33 | 0. 00 | 0. 00 | 0. 21 | 1. 06 | 0. 00 | 1. 06 | 0. 02 | 2. 69 |
| C-3 0. 863 | 1. 33 | 0. 00 | 0. 00 | 0. 13 | 1. 15 | 0. 00 | 1. 15 | 0. 05 | 5. 55 |
| D-1 0. 413 | 1. 33 | 0. 00 | 0. 00 | 0. 75 | 0. 55 | 0. 00 | 0. 55 | 0. 01 | 1. 00 |
| A-3 0. 893 | 1. 33 | 0. 00 | 0. 00 | 0. 08 | 1. 19 | 0. 00 | 1. 19 | 0. 01 | 1. 26 |
| A-7 0. 466 | 1. 33 | 0. 00 | 0. 00 | 0. 68 | 0. 62 | 0. 00 | 0. 62 | 0. 01 | 0. 86 |
| C-4 0. 842 | 1. 33 | 0. 00 | 0. 00 | 0. 15 | 1. 12 | 0. 00 | 1. 12 | 0. 02 | 2. 18 |
| C-5 0. 669 | 1. 33 | 0. 00 | 0. 00 | 0. 40 | 0. 89 | 0. 00 | 0. 89 | 0. 04 | 3. 86 |
| H-2 0. 019 | 1. 33 | 0. 00 | 0. 00 | 1. 30 | 0. 03 | 0. 00 | 0. 03 | 0. 00 | 0. 17 |

| SWMM Model - 2-year | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|
| H-1 0.019 | 1.33 | 0.00 | 0.00 | 1.30 | 0.03 | 0.00 | 0.03 | 0.00 | 0.19 |
| H-4 0.019 | 1.33 | 0.00 | 0.00 | 1.30 | 0.03 | 0.00 | 0.03 | 0.00 | 0.33 |
| 15 0.019 | 1.33 | 0.00 | 0.00 | 1.30 | 0.03 | 0.00 | 0.03 | 0.00 | 0.23 |
| A-5. 1, 5. 2 0.797 | 1.33 | 0.00 | 0.00 | 0.22 | 1.06 | 0.00 | 1.06 | 0.00 | 0.55 |
| E-1 0.047 | 1.33 | 0.00 | 0.00 | 1.27 | 0.06 | 0.00 | 0.06 | 0.00 | 0.05 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|--------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.28 | 2.99 | 2.99 | 0 02:16 | 2.99 |
| Pond_A1 | STORAGE | 0.01 | 0.50 | 6.50 | 0 00:49 | 0.50 |
| Pond_A2 | STORAGE | 0.01 | 0.50 | 6.50 | 0 00:49 | 0.50 |
| Pond_A6 | STORAGE | 0.00 | 0.37 | 6.37 | 0 00:47 | 0.34 |
| Pond_A5. 4 | STORAGE | 0.00 | 0.44 | 6.44 | 0 00:49 | 0.43 |
| Pond_C2 | STORAGE | 0.00 | 0.45 | 2.45 | 0 00:49 | 0.45 |
| Pond_C1 | STORAGE | 0.01 | 0.47 | 3.47 | 0 00:50 | 0.47 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.45 | 4.57 | 4.57 | 0 02:15 | 4.57 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.30 | 6.30 | 0 00:54 | 0.30 |

SWMM Model - 2-year

Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 2.53 | 0 00: 48 | 0 | 0.0301 | 0.000 |
| 10 | JUNCTION | 0.00 | 1.18 | 0 00: 49 | 0 | 0.0167 | 0.000 |
| 11 | JUNCTION | 0.00 | 2.47 | 0 00: 49 | 0 | 0.0344 | 0.000 |
| 12 | JUNCTION | 7.73 | 10.71 | 0 00: 45 | 0.0687 | 0.119 | 0.000 |
| 13 | JUNCTION | 0.00 | 1.78 | 0 00: 50 | 0 | 0.0275 | 0.000 |
| 14 | JUNCTION | 0.00 | 10.71 | 0 00: 45 | 0 | 0.119 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 0.12 | 0 02: 16 | 0 | 0.0884 | 0.000 |
| Prop-West | OUTFALL | 0.05 | 0.27 | 0 02: 05 | 0.000377 | 0.163 | 0.000 |
| Hi st-East | OUTFALL | 0.36 | 0.36 | 0 00: 45 | 0.00295 | 0.00295 | 0.000 |
| Hi st-West | OUTFALL | 0.56 | 0.56 | 0 00: 45 | 0.00458 | 0.00458 | 0.000 |
| PondA | STORAGE | 2.91 | 7.40 | 0 00: 46 | 0.0239 | 0.0885 | 0.010 |
| Pond_A1 | STORAGE | 1.99 | 1.99 | 0 00: 45 | 0.0167 | 0.0167 | 0.098 |
| Pond_A2 | STORAGE | 2.08 | 2.08 | 0 00: 45 | 0.0177 | 0.0177 | 0.084 |
| Pond_A6 | STORAGE | 2.22 | 2.22 | 0 00: 45 | 0.0189 | 0.0189 | 0.023 |
| Pond_A5. 4 | STORAGE | 0.80 | 0.80 | 0 00: 45 | 0.00668 | 0.00668 | 0.057 |
| Pond_C2 | STORAGE | 2.69 | 2.69 | 0 00: 45 | 0.0222 | 0.0222 | 0.053 |
| Pond_C1 | STORAGE | 3.07 | 3.07 | 0 00: 45 | 0.0276 | 0.0276 | 0.172 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 4.86 | 15.57 | 0 00: 45 | 0.044 | 0.163 | 0.016 |
| Pond_A5. 2 | STORAGE | 0.55 | 0.55 | 0 00: 45 | 0.00461 | 0.00461 | 0.228 |

Node Flooding Summary

No nodes were flooded.

SWMM Model - 2-year

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 3.357 | 13 | 0 | 0 | 11.029 | 42 | 0 02: 15 | 0.12 |
| Pond_A1 | 0.002 | 0 | 0 | 0 | 0.477 | 32 | 0 00: 49 | 1.18 |
| Pond_A2 | 0.002 | 0 | 0 | 0 | 0.463 | 31 | 0 00: 49 | 1.29 |
| Pond_A6 | 0.001 | 0 | 0 | 0 | 0.207 | 14 | 0 00: 47 | 1.85 |
| Pond_A5.4 | 0.001 | 0 | 0 | 0 | 0.156 | 27 | 0 00: 48 | 0.54 |
| Pond_C2 | 0.002 | 0 | 0 | 0 | 0.577 | 24 | 0 00: 49 | 1.66 |
| Pond_C1 | 0.004 | 0 | 0 | 0 | 0.795 | 27 | 0 00: 50 | 1.78 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00: 00 | 0.00 |
| PondC | 5.493 | 18 | 0 | 0 | 19.990 | 66 | 0 02: 15 | 0.27 |
| Pond_A5.2 | 0.006 | 1 | 0 | 0 | 0.305 | 41 | 0 00: 53 | 0.19 |

Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 82.55 | 0.06 | 0.12 | 0.088 |
| Prop-West | 88.45 | 0.09 | 0.27 | 0.163 |
| Hist-East | 2.86 | 0.05 | 0.36 | 0.003 |
| Hist-West | 2.87 | 0.08 | 0.56 | 0.005 |
| System | 44.18 | 0.29 | 0.56 | 0.259 |

Link Flow Summary

SWMM Model - 2-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 1.18 | 0 00: 49 | | | |
| 2 | DUMMY | 2.53 | 0 00: 48 | | | |
| 3 | DUMMY | 2.47 | 0 00: 49 | | | |
| 4 | DUMMY | 1.78 | 0 00: 50 | | | |
| 5 | DUMMY | 10.71 | 0 00: 45 | | | |
| 11 | DUMMY | 10.71 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 1.18 | 0 00: 49 | | | 0.00 |
| OutletA2 | ORIFICE | 1.29 | 0 00: 49 | | | 0.00 |
| Outlet_A5 | ORIFICE | 1.85 | 0 00: 47 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.54 | 0 00: 49 | | | 0.00 |
| Outlet_C2 | ORIFICE | 1.66 | 0 00: 49 | | | 0.00 |
| Outlet_C1 | ORIFICE | 1.78 | 0 00: 50 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.19 | 0 00: 54 | | | 0.00 |
| Outlet_1 | DUMMY | 0.12 | 0 02: 16 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 0.27 | 0 02: 15 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:56:13 2019
 Analysis ended on: Thu Oct 10 12:56:13 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 2.842 | 1.679 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 1.760 | 1.039 |

SWMM Model - 5-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 1.045 | 0.617 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.343 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 1.045 | 0.340 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 1.044 | 0.340 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.058 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 5-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 867 | 1. 68 | 0. 00 | 0. 00 | 0. 17 | 1. 46 | 0. 00 | 1. 46 | 0. 02 | 2. 65 |
| A-1 0. 874 | 1. 68 | 0. 00 | 0. 00 | 0. 16 | 1. 45 | 0. 01 | 1. 47 | 0. 02 | 2. 53 |
| A-6 0. 695 | 1. 68 | 0. 00 | 0. 00 | 0. 47 | 1. 17 | 0. 00 | 1. 17 | 0. 02 | 2. 83 |
| A-4 0. 961 | 1. 68 | 0. 00 | 0. 00 | 0. 00 | 1. 61 | 0. 00 | 1. 61 | 0. 01 | 1. 00 |
| A-5. 3, 5. 4 0. 859 | 1. 68 | 0. 00 | 0. 00 | 0. 18 | 1. 43 | 0. 02 | 1. 44 | 0. 01 | 1. 02 |
| C-1 0. 867 | 1. 68 | 0. 00 | 0. 00 | 0. 17 | 1. 46 | 0. 00 | 1. 46 | 0. 04 | 3. 95 |
| C-2 0. 807 | 1. 68 | 0. 00 | 0. 00 | 0. 27 | 1. 36 | 0. 00 | 1. 36 | 0. 03 | 3. 39 |
| C-3 0. 873 | 1. 68 | 0. 00 | 0. 00 | 0. 16 | 1. 46 | 0. 00 | 1. 46 | 0. 06 | 7. 10 |
| D-1 0. 418 | 1. 68 | 0. 00 | 0. 00 | 0. 95 | 0. 70 | 0. 00 | 0. 70 | 0. 01 | 1. 27 |
| A-3 0. 903 | 1. 68 | 0. 00 | 0. 00 | 0. 10 | 1. 52 | 0. 00 | 1. 52 | 0. 01 | 1. 58 |
| A-7 0. 472 | 1. 68 | 0. 00 | 0. 00 | 0. 86 | 0. 79 | 0. 00 | 0. 79 | 0. 01 | 1. 09 |
| C-4 0. 858 | 1. 68 | 0. 00 | 0. 00 | 0. 19 | 1. 43 | 0. 01 | 1. 44 | 0. 03 | 2. 82 |
| C-5 0. 684 | 1. 68 | 0. 00 | 0. 00 | 0. 49 | 1. 14 | 0. 01 | 1. 15 | 0. 05 | 4. 98 |
| H-2 0. 019 | 1. 68 | 0. 00 | 0. 00 | 1. 64 | 0. 03 | 0. 00 | 0. 03 | 0. 00 | 0. 21 |

| | SWMM Model - 5-year | | | | | | | | |
|---------------------|---------------------|------|------|------|------|------|------|------|------|
| H-1 0.019 | 1.68 | 0.00 | 0.00 | 1.64 | 0.03 | 0.00 | 0.03 | 0.00 | 0.24 |
| H-4 0.045 | 1.68 | 0.00 | 0.00 | 1.60 | 0.03 | 0.04 | 0.07 | 0.01 | 0.54 |
| 15 0.050 | 1.68 | 0.00 | 0.00 | 1.60 | 0.03 | 0.05 | 0.08 | 0.01 | 0.45 |
| A-5.1, 5.2 0.821 | 1.68 | 0.00 | 0.00 | 0.25 | 1.35 | 0.03 | 1.38 | 0.01 | 0.70 |
| E-1 0.107 | 1.68 | 0.00 | 0.00 | 1.50 | 0.08 | 0.10 | 0.18 | 0.00 | 0.08 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr:mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|-------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.60 | 3.55 | 3.55 | 0 02:16 | 3.54 |
| Pond_A1 | STORAGE | 0.01 | 0.57 | 6.57 | 0 00:50 | 0.57 |
| Pond_A2 | STORAGE | 0.01 | 0.56 | 6.56 | 0 00:49 | 0.56 |
| Pond_A6 | STORAGE | 0.00 | 0.42 | 6.42 | 0 00:47 | 0.39 |
| Pond_A5. 4 | STORAGE | 0.01 | 0.50 | 6.50 | 0 00:49 | 0.50 |
| Pond_C2 | STORAGE | 0.01 | 0.50 | 2.50 | 0 00:49 | 0.50 |
| Pond_C1 | STORAGE | 0.01 | 0.53 | 3.53 | 0 00:50 | 0.53 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.59 | 5.23 | 5.23 | 0 01:27 | 5.23 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.38 | 6.38 | 0 00:53 | 0.38 |

SWMM Model - 5-year

Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 3.15 | 0 00: 48 | 0 | 0.0386 | 0.000 |
| 10 | JUNCTION | 0.00 | 1.42 | 0 00: 50 | 0 | 0.0215 | 0.000 |
| 11 | JUNCTION | 0.00 | 2.96 | 0 00: 49 | 0 | 0.044 | 0.000 |
| 12 | JUNCTION | 9.92 | 13.47 | 0 00: 45 | 0.0879 | 0.151 | 0.000 |
| 13 | JUNCTION | 0.00 | 2.14 | 0 00: 50 | 0 | 0.0351 | 0.000 |
| 14 | JUNCTION | 0.00 | 13.47 | 0 00: 45 | 0 | 0.151 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 0.14 | 0 02: 16 | 0 | 0.113 | 0.000 |
| Prop-West | OUTFALL | 0.08 | 1.19 | 0 01: 27 | 0.00107 | 0.209 | 0.000 |
| Hi st-East | OUTFALL | 0.46 | 0.46 | 0 00: 45 | 0.00381 | 0.00381 | 0.000 |
| Hi st-West | OUTFALL | 0.98 | 0.98 | 0 00: 55 | 0.0143 | 0.0143 | 0.000 |
| PondA | STORAGE | 3.67 | 9.11 | 0 00: 45 | 0.0305 | 0.113 | 0.011 |
| Pond_A1 | STORAGE | 2.53 | 2.53 | 0 00: 45 | 0.0215 | 0.0215 | 0.049 |
| Pond_A2 | STORAGE | 2.65 | 2.65 | 0 00: 45 | 0.0225 | 0.0225 | 0.039 |
| Pond_A6 | STORAGE | 2.83 | 2.83 | 0 00: 45 | 0.0241 | 0.0241 | -0.016 |
| Pond_A5. 4 | STORAGE | 1.02 | 1.02 | 0 00: 45 | 0.00861 | 0.00861 | 0.042 |
| Pond_C2 | STORAGE | 3.39 | 3.39 | 0 00: 45 | 0.0283 | 0.0283 | -0.005 |
| Pond_C1 | STORAGE | 3.95 | 3.95 | 0 00: 45 | 0.0352 | 0.0352 | 0.148 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 6.26 | 19.73 | 0 00: 45 | 0.0567 | 0.208 | 0.047 |
| Pond_A5. 2 | STORAGE | 0.70 | 0.70 | 0 00: 45 | 0.00599 | 0.00599 | 0.259 |

Node Flooding Summary

No nodes were flooded.

SWMM Model - 5-year

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 4.599 | 18 | 0 | 0 | 14.183 | 55 | 0 02:15 | 0.14 |
| Pond_A1 | 0.003 | 0 | 0 | 0 | 0.667 | 45 | 0 00:49 | 1.42 |
| Pond_A2 | 0.003 | 0 | 0 | 0 | 0.647 | 44 | 0 00:49 | 1.55 |
| Pond_A6 | 0.001 | 0 | 0 | 0 | 0.301 | 20 | 0 00:47 | 2.28 |
| Pond_A5.4 | 0.001 | 0 | 0 | 0 | 0.217 | 38 | 0 00:48 | 0.66 |
| Pond_C2 | 0.004 | 0 | 0 | 0 | 0.809 | 33 | 0 00:49 | 1.97 |
| Pond_C1 | 0.006 | 0 | 0 | 0 | 1.113 | 37 | 0 00:50 | 2.14 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00:00 | 0.00 |
| PondC | 6.124 | 20 | 0 | 0 | 23.443 | 77 | 0 01:27 | 1.19 |
| Pond_A5.2 | 0.007 | 1 | 0 | 0 | 0.381 | 51 | 0 00:53 | 0.26 |

Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 91.81 | 0.06 | 0.14 | 0.113 |
| Prop-West | 91.00 | 0.12 | 1.19 | 0.209 |
| Hist-East | 2.87 | 0.07 | 0.46 | 0.004 |
| Hist-West | 2.87 | 0.26 | 0.98 | 0.014 |
| System | 47.14 | 0.51 | 0.98 | 0.340 |

Link Flow Summary

SWMM Model - 5-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 1.42 | 0 00: 50 | | | |
| 2 | DUMMY | 3.15 | 0 00: 48 | | | |
| 3 | DUMMY | 2.96 | 0 00: 49 | | | |
| 4 | DUMMY | 2.14 | 0 00: 50 | | | |
| 5 | DUMMY | 13.47 | 0 00: 45 | | | |
| 11 | DUMMY | 13.47 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 1.42 | 0 00: 50 | | | 0.00 |
| OutletA2 | ORIFICE | 1.55 | 0 00: 49 | | | 0.00 |
| Outlet_A5 | ORIFICE | 2.28 | 0 00: 47 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.66 | 0 00: 49 | | | 0.00 |
| Outlet_C2 | ORIFICE | 1.97 | 0 00: 49 | | | 0.00 |
| Outlet_C1 | ORIFICE | 2.14 | 0 00: 50 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.26 | 0 00: 53 | | | 0.00 |
| Outlet_1 | DUMMY | 0.14 | 0 02: 16 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 1.19 | 0 01: 27 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:54:37 2019
 Analysis ended on: Thu Oct 10 12:54:37 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 3.316 | 1.958 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 1.958 | 1.156 |

SWMM Model - 10-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 1.327 | 0.783 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.461 | |

| ***** | Volume | Volume |
|----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 1.327 | 0.432 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 1.325 | 0.432 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.095 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 10-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 873 | 1. 96 | 0. 00 | 0. 00 | 0. 20 | 1. 71 | 0. 00 | 1. 71 | 0. 03 | 3. 10 |
| A-1 0. 892 | 1. 96 | 0. 00 | 0. 00 | 0. 16 | 1. 71 | 0. 04 | 1. 75 | 0. 03 | 3. 03 |
| A-6 0. 708 | 1. 96 | 0. 00 | 0. 00 | 0. 53 | 1. 37 | 0. 02 | 1. 39 | 0. 03 | 3. 33 |
| A-4 0. 969 | 1. 96 | 0. 00 | 0. 00 | 0. 00 | 1. 90 | 0. 00 | 1. 90 | 0. 01 | 1. 17 |
| A-5. 3, 5. 4 0. 879 | 1. 96 | 0. 00 | 0. 00 | 0. 19 | 1. 67 | 0. 05 | 1. 72 | 0. 01 | 1. 22 |
| C-1 0. 881 | 1. 96 | 0. 00 | 0. 00 | 0. 18 | 1. 71 | 0. 01 | 1. 72 | 0. 04 | 4. 68 |
| C-2 0. 828 | 1. 96 | 0. 00 | 0. 00 | 0. 29 | 1. 59 | 0. 03 | 1. 62 | 0. 03 | 4. 03 |
| C-3 0. 886 | 1. 96 | 0. 00 | 0. 00 | 0. 17 | 1. 72 | 0. 01 | 1. 74 | 0. 07 | 8. 41 |
| D-1 0. 435 | 1. 96 | 0. 00 | 0. 00 | 1. 08 | 0. 82 | 0. 03 | 0. 85 | 0. 01 | 1. 51 |
| A-3 0. 909 | 1. 96 | 0. 00 | 0. 00 | 0. 12 | 1. 78 | 0. 00 | 1. 78 | 0. 02 | 1. 85 |
| A-7 0. 475 | 1. 96 | 0. 00 | 0. 00 | 1. 00 | 0. 93 | 0. 00 | 0. 93 | 0. 01 | 1. 27 |
| C-4 0. 875 | 1. 96 | 0. 00 | 0. 00 | 0. 20 | 1. 68 | 0. 04 | 1. 71 | 0. 03 | 3. 37 |
| C-5 0. 711 | 1. 96 | 0. 00 | 0. 00 | 0. 53 | 1. 33 | 0. 06 | 1. 39 | 0. 06 | 5. 97 |
| H-2 0. 020 | 1. 96 | 0. 00 | 0. 00 | 1. 92 | 0. 04 | 0. 00 | 0. 04 | 0. 00 | 0. 25 |

| SWMM Model - 10-year | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|
| H-1 0.019 | 1.96 | 0.00 | 0.00 | 1.92 | 0.04 | 0.00 | 0.04 | 0.00 | 0.28 |
| H-4 0.116 | 1.96 | 0.00 | 0.00 | 1.74 | 0.04 | 0.19 | 0.23 | 0.02 | 1.67 |
| 15 0.129 | 1.96 | 0.00 | 0.00 | 1.71 | 0.04 | 0.21 | 0.25 | 0.02 | 1.37 |
| A-5. 1, 5. 2 0.844 | 1.96 | 0.00 | 0.00 | 0.26 | 1.59 | 0.06 | 1.65 | 0.01 | 0.84 |
| E-1 0.192 | 1.96 | 0.00 | 0.00 | 1.59 | 0.09 | 0.28 | 0.38 | 0.00 | 0.18 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|--------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.87 | 4.00 | 4.00 | 0 02:15 | 4.00 |
| Pond_A1 | STORAGE | 0.01 | 0.62 | 6.62 | 0 00:50 | 0.62 |
| Pond_A2 | STORAGE | 0.01 | 0.61 | 6.61 | 0 00:49 | 0.61 |
| Pond_A6 | STORAGE | 0.00 | 0.46 | 6.46 | 0 00:47 | 0.44 |
| Pond_A5. 4 | STORAGE | 0.01 | 0.56 | 6.56 | 0 00:49 | 0.56 |
| Pond_C2 | STORAGE | 0.01 | 0.55 | 2.55 | 0 00:50 | 0.55 |
| Pond_C1 | STORAGE | 0.01 | 0.58 | 3.58 | 0 00:51 | 0.58 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.60 | 5.48 | 5.48 | 0 01:10 | 5.48 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.45 | 6.45 | 0 00:53 | 0.45 |

SWMM Model - 10-year

Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 3.63 | 0 00: 48 | 0 | 0.046 | 0.000 |
| 10 | JUNCTION | 0.00 | 1.61 | 0 00: 50 | 0 | 0.0256 | 0.000 |
| 11 | JUNCTION | 0.00 | 3.34 | 0 00: 50 | 0 | 0.0521 | 0.000 |
| 12 | JUNCTION | 11.78 | 15.78 | 0 00: 45 | 0.104 | 0.18 | 0.000 |
| 13 | JUNCTION | 0.00 | 2.42 | 0 00: 51 | 0 | 0.0416 | 0.000 |
| 14 | JUNCTION | 0.00 | 15.78 | 0 00: 45 | 0 | 0.18 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 0.17 | 0 02: 15 | 0 | 0.134 | 0.000 |
| Prop-West | OUTFALL | 0.18 | 4.94 | 0 01: 10 | 0.00224 | 0.25 | 0.000 |
| Hi st-East | OUTFALL | 0.53 | 0.53 | 0 00: 45 | 0.00448 | 0.00448 | 0.000 |
| Hi st-West | OUTFALL | 3.04 | 3.04 | 0 00: 55 | 0.043 | 0.043 | 0.000 |
| PondA | STORAGE | 4.29 | 10.48 | 0 00: 45 | 0.0359 | 0.134 | 0.011 |
| Pond_A1 | STORAGE | 3.03 | 3.03 | 0 00: 45 | 0.0256 | 0.0256 | 0.047 |
| Pond_A2 | STORAGE | 3.10 | 3.10 | 0 00: 45 | 0.0265 | 0.0265 | 0.047 |
| Pond_A6 | STORAGE | 3.33 | 3.33 | 0 00: 45 | 0.0286 | 0.0286 | -0.014 |
| Pond_A5. 4 | STORAGE | 1.22 | 1.22 | 0 00: 45 | 0.0103 | 0.0103 | -0.004 |
| Pond_C2 | STORAGE | 4.03 | 4.03 | 0 00: 45 | 0.0339 | 0.0339 | -0.039 |
| Pond_C1 | STORAGE | 4.68 | 4.68 | 0 00: 45 | 0.0417 | 0.0417 | 0.127 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 7.47 | 23.26 | 0 00: 45 | 0.0687 | 0.248 | 0.127 |
| Pond_A5. 2 | STORAGE | 0.84 | 0.84 | 0 00: 45 | 0.00718 | 0.00718 | 0.289 |

Node Flooding Summary

No nodes were flooded.

SWMM Model - 10-year

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 5.746 | 22 | 0 | 0 | 16.867 | 65 | 0 02: 15 | 0.17 |
| Pond_A1 | 0.005 | 0 | 0 | 0 | 0.847 | 57 | 0 00: 49 | 1.61 |
| Pond_A2 | 0.004 | 0 | 0 | 0 | 0.806 | 54 | 0 00: 49 | 1.74 |
| Pond_A6 | 0.001 | 0 | 0 | 0 | 0.388 | 26 | 0 00: 47 | 2.62 |
| Pond_A5.4 | 0.001 | 0 | 0 | 0 | 0.281 | 49 | 0 00: 49 | 0.72 |
| Pond_C2 | 0.005 | 0 | 0 | 0 | 1.045 | 43 | 0 00: 49 | 2.15 |
| Pond_C1 | 0.008 | 0 | 0 | 0 | 1.399 | 47 | 0 00: 50 | 2.42 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00: 00 | 0.00 |
| PondC | 6.173 | 20 | 0 | 0 | 24.765 | 82 | 0 01: 10 | 4.86 |
| Pond_A5.2 | 0.008 | 1 | 0 | 0 | 0.449 | 60 | 0 00: 53 | 0.31 |

Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 98.80 | 0.07 | 0.17 | 0.134 |
| Prop-West | 91.08 | 0.14 | 4.94 | 0.250 |
| Hist-East | 2.87 | 0.08 | 0.53 | 0.004 |
| Hist-West | 2.87 | 0.77 | 3.04 | 0.043 |
| System | 48.90 | 1.06 | 3.04 | 0.432 |

Link Flow Summary

SWMM Model - 10-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 1.61 | 0 00: 50 | | | |
| 2 | DUMMY | 3.63 | 0 00: 48 | | | |
| 3 | DUMMY | 3.34 | 0 00: 50 | | | |
| 4 | DUMMY | 2.42 | 0 00: 51 | | | |
| 5 | DUMMY | 15.78 | 0 00: 45 | | | |
| 11 | DUMMY | 15.78 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 1.61 | 0 00: 50 | | | 0.00 |
| OutletA2 | ORIFICE | 1.74 | 0 00: 49 | | | 0.00 |
| Outlet_A5 | ORIFICE | 2.62 | 0 00: 47 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.72 | 0 00: 49 | | | 0.00 |
| Outlet_C2 | ORIFICE | 2.15 | 0 00: 50 | | | 0.00 |
| Outlet_C1 | ORIFICE | 2.42 | 0 00: 51 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.31 | 0 00: 53 | | | 0.00 |
| Outlet_1 | DUMMY | 0.17 | 0 02: 15 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 4.86 | 0 01: 10 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:56:24 2019
 Analysis ended on: Thu Oct 10 12:56:24 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 3.790 | 2.238 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 2.115 | 1.249 |

SWMM Model - 25-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 1.649 | 0.974 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.568 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 1.649 | 0.537 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 1.647 | 0.537 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.119 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 25-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 877 | 2. 24 | 0. 00 | 0. 00 | 0. 22 | 1. 96 | 0. 00 | 1. 96 | 0. 03 | 3. 56 |
| A-1 0. 905 | 2. 24 | 0. 00 | 0. 00 | 0. 17 | 1. 96 | 0. 06 | 2. 03 | 0. 03 | 3. 55 |
| A-6 0. 732 | 2. 24 | 0. 00 | 0. 00 | 0. 56 | 1. 57 | 0. 07 | 1. 64 | 0. 03 | 3. 91 |
| A-4 0. 972 | 2. 24 | 0. 00 | 0. 00 | 0. 00 | 2. 17 | 0. 00 | 2. 17 | 0. 01 | 1. 34 |
| A-5. 3, 5. 4 0. 893 | 2. 24 | 0. 00 | 0. 00 | 0. 20 | 1. 92 | 0. 08 | 2. 00 | 0. 01 | 1. 44 |
| C-1 0. 894 | 2. 24 | 0. 00 | 0. 00 | 0. 19 | 1. 96 | 0. 04 | 2. 00 | 0. 05 | 5. 47 |
| C-2 0. 847 | 2. 24 | 0. 00 | 0. 00 | 0. 30 | 1. 83 | 0. 07 | 1. 90 | 0. 04 | 4. 77 |
| C-3 0. 899 | 2. 24 | 0. 00 | 0. 00 | 0. 18 | 1. 98 | 0. 04 | 2. 01 | 0. 09 | 9. 81 |
| D-1 0. 470 | 2. 24 | 0. 00 | 0. 00 | 1. 16 | 0. 95 | 0. 11 | 1. 05 | 0. 02 | 1. 77 |
| A-3 0. 913 | 2. 24 | 0. 00 | 0. 00 | 0. 14 | 2. 04 | 0. 00 | 2. 04 | 0. 02 | 2. 11 |
| A-7 0. 476 | 2. 24 | 0. 00 | 0. 00 | 1. 14 | 1. 07 | 0. 00 | 1. 07 | 0. 01 | 1. 45 |
| C-4 0. 889 | 2. 24 | 0. 00 | 0. 00 | 0. 20 | 1. 93 | 0. 06 | 1. 99 | 0. 04 | 3. 95 |
| C-5 0. 736 | 2. 24 | 0. 00 | 0. 00 | 0. 55 | 1. 53 | 0. 12 | 1. 65 | 0. 07 | 7. 00 |
| H-2 0. 048 | 2. 24 | 0. 00 | 0. 00 | 2. 14 | 0. 04 | 0. 06 | 0. 11 | 0. 01 | 0. 57 |

| SWMM Model - 25-year | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|
| H-1 0.019 | 2.24 | 0.00 | 0.00 | 2.19 | 0.04 | 0.00 | 0.04 | 0.00 | 0.32 |
| H-4 0.188 | 2.24 | 0.00 | 0.00 | 1.83 | 0.04 | 0.38 | 0.42 | 0.05 | 3.05 |
| 15 0.204 | 2.24 | 0.00 | 0.00 | 1.79 | 0.04 | 0.41 | 0.46 | 0.03 | 2.53 |
| A-5. 1, 5. 2 0.861 | 2.24 | 0.00 | 0.00 | 0.27 | 1.82 | 0.10 | 1.93 | 0.01 | 0.99 |
| E-1 0.269 | 2.24 | 0.00 | 0.00 | 1.65 | 0.11 | 0.49 | 0.60 | 0.00 | 0.30 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|--------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.88 | 4.11 | 4.11 | 0 01:19 | 4.11 |
| Pond_A1 | STORAGE | 0.01 | 0.66 | 6.66 | 0 00:50 | 0.66 |
| Pond_A2 | STORAGE | 0.01 | 0.65 | 6.65 | 0 00:50 | 0.65 |
| Pond_A6 | STORAGE | 0.00 | 0.51 | 6.51 | 0 00:48 | 0.49 |
| Pond_A5. 4 | STORAGE | 0.01 | 0.61 | 6.61 | 0 00:50 | 0.61 |
| Pond_C2 | STORAGE | 0.01 | 0.60 | 2.60 | 0 00:50 | 0.60 |
| Pond_C1 | STORAGE | 0.01 | 0.62 | 3.62 | 0 00:51 | 0.62 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.60 | 5.63 | 5.63 | 0 01:03 | 5.62 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.52 | 6.52 | 0 00:53 | 0.52 |

SWMM Model - 25-year

 Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 4.11 | 0 00: 48 | 0 | 0.0541 | 0.000 |
| 10 | JUNCTION | 0.00 | 1.79 | 0 00: 50 | 0 | 0.0297 | 0.000 |
| 11 | JUNCTION | 0.00 | 3.70 | 0 00: 50 | 0 | 0.06 | 0.000 |
| 12 | JUNCTION | 13.76 | 18.13 | 0 00: 45 | 0.121 | 0.209 | 0.000 |
| 13 | JUNCTION | 0.00 | 2.69 | 0 00: 51 | 0 | 0.0483 | 0.000 |
| 14 | JUNCTION | 0.00 | 18.13 | 0 00: 45 | 0 | 0.209 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 1.43 | 0 01: 19 | 0 | 0.155 | 0.000 |
| Prop-West | OUTFALL | 0.30 | 8.36 | 0 01: 03 | 0.00359 | 0.294 | 0.000 |
| Hi st-East | OUTFALL | 0.87 | 0.87 | 0 00: 45 | 0.00853 | 0.00853 | 0.000 |
| Hi st-West | OUTFALL | 5.55 | 5.55 | 0 00: 50 | 0.079 | 0.079 | 0.000 |
| PondA | STORAGE | 4.90 | 11.83 | 0 00: 45 | 0.0411 | 0.155 | 0.053 |
| Pond_A1 | STORAGE | 3.55 | 3.55 | 0 00: 45 | 0.0297 | 0.0297 | 0.046 |
| Pond_A2 | STORAGE | 3.56 | 3.56 | 0 00: 45 | 0.0304 | 0.0304 | 0.051 |
| Pond_A6 | STORAGE | 3.91 | 3.91 | 0 00: 45 | 0.0338 | 0.0338 | -0.038 |
| Pond_A5. 4 | STORAGE | 1.44 | 1.44 | 0 00: 45 | 0.0119 | 0.0119 | -0.007 |
| Pond_C2 | STORAGE | 4.77 | 4.77 | 0 00: 45 | 0.0396 | 0.0396 | -0.026 |
| Pond_C1 | STORAGE | 5.47 | 5.47 | 0 00: 45 | 0.0484 | 0.0484 | 0.115 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 8.77 | 26.91 | 0 00: 45 | 0.082 | 0.291 | 0.162 |
| Pond_A5. 2 | STORAGE | 0.99 | 0.99 | 0 00: 45 | 0.00837 | 0.00837 | 0.312 |

 Node Flooding Summary

No nodes were flooded.

SWMM Model - 25-year

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 5.798 | 22 | 0 | 0 | 17.483 | 67 | 0 01:19 | 1.43 |
| Pond_A1 | 0.006 | 0 | 0 | 0 | 1.040 | 70 | 0 00:50 | 1.79 |
| Pond_A2 | 0.005 | 0 | 0 | 0 | 0.974 | 66 | 0 00:49 | 1.92 |
| Pond_A6 | 0.002 | 0 | 0 | 0 | 0.494 | 33 | 0 00:47 | 3.01 |
| Pond_A5.4 | 0.002 | 0 | 0 | 0 | 0.353 | 62 | 0 00:49 | 0.79 |
| Pond_C2 | 0.007 | 0 | 0 | 0 | 1.332 | 55 | 0 00:50 | 2.32 |
| Pond_C1 | 0.011 | 0 | 0 | 0 | 1.714 | 58 | 0 00:50 | 2.69 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00:00 | 0.00 |
| PondC | 6.206 | 20 | 0 | 0 | 25.569 | 84 | 0 01:02 | 8.18 |
| Pond_A5.2 | 0.009 | 1 | 0 | 0 | 0.522 | 70 | 0 00:53 | 0.35 |

Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 98.94 | 0.08 | 1.43 | 0.155 |
| Prop-West | 91.15 | 0.17 | 8.36 | 0.294 |
| Hist-East | 2.87 | 0.15 | 0.87 | 0.009 |
| Hist-West | 2.89 | 1.41 | 5.55 | 0.079 |
| System | 48.96 | 1.81 | 5.55 | 0.537 |

Link Flow Summary

SWMM Model - 25-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 1.79 | 0 00: 50 | | | |
| 2 | DUMMY | 4.11 | 0 00: 48 | | | |
| 3 | DUMMY | 3.70 | 0 00: 50 | | | |
| 4 | DUMMY | 2.69 | 0 00: 51 | | | |
| 5 | DUMMY | 18.13 | 0 00: 45 | | | |
| 11 | DUMMY | 18.13 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 1.79 | 0 00: 50 | | | 0.00 |
| OutletA2 | ORIFICE | 1.92 | 0 00: 50 | | | 0.00 |
| Outlet_A5 | ORIFICE | 3.01 | 0 00: 48 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.79 | 0 00: 50 | | | 0.00 |
| Outlet_C2 | ORIFICE | 2.32 | 0 00: 50 | | | 0.00 |
| Outlet_C1 | ORIFICE | 2.69 | 0 00: 51 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.35 | 0 00: 53 | | | 0.00 |
| Outlet_1 | DUMMY | 1.43 | 0 01: 19 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 8.18 | 0 01: 03 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:56:34 2019
 Analysis ended on: Thu Oct 10 12:56:34 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 4.263 | 2.518 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 2.239 | 1.322 |

SWMM Model - 50-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 2.005 | 1.184 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.649 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 2.005 | 0.653 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 2.002 | 0.652 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.137 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 50-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 883 | 2. 52 | 0. 00 | 0. 00 | 0. 24 | 2. 21 | 0. 01 | 2. 22 | 0. 03 | 4. 05 |
| A-1 0. 914 | 2. 52 | 0. 00 | 0. 00 | 0. 17 | 2. 21 | 0. 09 | 2. 30 | 0. 03 | 4. 07 |
| A-6 0. 754 | 2. 52 | 0. 00 | 0. 00 | 0. 59 | 1. 77 | 0. 12 | 1. 90 | 0. 04 | 4. 52 |
| A-4 0. 973 | 2. 52 | 0. 00 | 0. 00 | 0. 00 | 2. 45 | 0. 00 | 2. 45 | 0. 01 | 1. 51 |
| A-5. 3, 5. 4 0. 902 | 2. 52 | 0. 00 | 0. 00 | 0. 20 | 2. 17 | 0. 10 | 2. 27 | 0. 01 | 1. 65 |
| C-1 0. 904 | 2. 52 | 0. 00 | 0. 00 | 0. 20 | 2. 22 | 0. 06 | 2. 28 | 0. 06 | 6. 27 |
| C-2 0. 862 | 2. 52 | 0. 00 | 0. 00 | 0. 31 | 2. 06 | 0. 11 | 2. 17 | 0. 05 | 5. 53 |
| C-3 0. 909 | 2. 52 | 0. 00 | 0. 00 | 0. 18 | 2. 23 | 0. 06 | 2. 29 | 0. 10 | 11. 25 |
| D-1 0. 506 | 2. 52 | 0. 00 | 0. 00 | 1. 22 | 1. 07 | 0. 21 | 1. 27 | 0. 02 | 2. 06 |
| A-3 0. 920 | 2. 52 | 0. 00 | 0. 00 | 0. 15 | 2. 30 | 0. 01 | 2. 32 | 0. 02 | 2. 42 |
| A-7 0. 487 | 2. 52 | 0. 00 | 0. 00 | 1. 27 | 1. 20 | 0. 02 | 1. 23 | 0. 01 | 1. 68 |
| C-4 0. 900 | 2. 52 | 0. 00 | 0. 00 | 0. 21 | 2. 18 | 0. 09 | 2. 27 | 0. 04 | 4. 54 |
| C-5 0. 758 | 2. 52 | 0. 00 | 0. 00 | 0. 57 | 1. 73 | 0. 18 | 1. 91 | 0. 08 | 8. 08 |
| H-2 0. 100 | 2. 52 | 0. 00 | 0. 00 | 2. 28 | 0. 05 | 0. 20 | 0. 25 | 0. 01 | 1. 31 |

| | SWMM Model - 50-year | | | | | | | | |
|---------------------|----------------------|------|------|------|------|------|------|------|------|
| H-1 0.030 | 2.52 | 0.00 | 0.00 | 2.45 | 0.05 | 0.03 | 0.08 | 0.00 | 0.63 |
| H-4 0.253 | 2.52 | 0.00 | 0.00 | 1.89 | 0.05 | 0.59 | 0.64 | 0.07 | 4.74 |
| 15 0.270 | 2.52 | 0.00 | 0.00 | 1.85 | 0.05 | 0.63 | 0.68 | 0.05 | 3.89 |
| A-5.1, 5.2 0.873 | 2.52 | 0.00 | 0.00 | 0.28 | 2.06 | 0.14 | 2.20 | 0.01 | 1.14 |
| E-1 0.333 | 2.52 | 0.00 | 0.00 | 1.70 | 0.12 | 0.72 | 0.84 | 0.01 | 0.45 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr:mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|-------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.89 | 4.23 | 4.23 | 0 01:13 | 4.23 |
| Pond_A1 | STORAGE | 0.01 | 0.70 | 6.70 | 0 00:50 | 0.70 |
| Pond_A2 | STORAGE | 0.01 | 0.69 | 6.69 | 0 00:50 | 0.69 |
| Pond_A6 | STORAGE | 0.01 | 0.55 | 6.55 | 0 00:48 | 0.53 |
| Pond_A5. 4 | STORAGE | 0.01 | 0.67 | 6.67 | 0 00:50 | 0.67 |
| Pond_C2 | STORAGE | 0.01 | 0.65 | 2.65 | 0 00:50 | 0.65 |
| Pond_C1 | STORAGE | 0.01 | 0.66 | 3.66 | 0 00:51 | 0.66 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.61 | 5.77 | 5.77 | 0 00:59 | 5.77 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.60 | 6.60 | 0 00:53 | 0.59 |

SWMM Model - 50-year

Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 4.59 | 0 00: 48 | 0 | 0.0623 | 0.000 |
| 10 | JUNCTION | 0.00 | 1.96 | 0 00: 50 | 0 | 0.0337 | 0.000 |
| 11 | JUNCTION | 0.00 | 4.05 | 0 00: 50 | 0 | 0.0681 | 0.000 |
| 12 | JUNCTION | 15.79 | 20.51 | 0 00: 45 | 0.138 | 0.238 | 0.000 |
| 13 | JUNCTION | 0.00 | 2.96 | 0 00: 51 | 0 | 0.055 | 0.000 |
| 14 | JUNCTION | 0.00 | 20.51 | 0 00: 45 | 0 | 0.238 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 3.26 | 0 01: 13 | 0 | 0.177 | 0.000 |
| Prop-West | OUTFALL | 0.45 | 11.35 | 0 00: 57 | 0.00501 | 0.338 | 0.000 |
| Hi st-East | OUTFALL | 1.79 | 1.79 | 0 00: 45 | 0.0184 | 0.0184 | 0.000 |
| Hi st-West | OUTFALL | 8.63 | 8.63 | 0 00: 50 | 0.119 | 0.119 | 0.000 |
| PondA | STORAGE | 5.61 | 13.23 | 0 00: 45 | 0.0467 | 0.177 | 0.142 |
| Pond_A1 | STORAGE | 4.07 | 4.07 | 0 00: 45 | 0.0337 | 0.0337 | 0.061 |
| Pond_A2 | STORAGE | 4.05 | 4.05 | 0 00: 45 | 0.0344 | 0.0344 | 0.036 |
| Pond_A6 | STORAGE | 4.52 | 4.52 | 0 00: 45 | 0.0392 | 0.0392 | 0.005 |
| Pond_A5. 4 | STORAGE | 1.65 | 1.65 | 0 00: 45 | 0.0136 | 0.0136 | 0.022 |
| Pond_C2 | STORAGE | 5.53 | 5.53 | 0 00: 45 | 0.0454 | 0.0454 | -0.015 |
| Pond_C1 | STORAGE | 6.27 | 6.27 | 0 00: 45 | 0.055 | 0.055 | 0.106 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 10.14 | 30.65 | 0 00: 45 | 0.0959 | 0.334 | 0.160 |
| Pond_A5. 2 | STORAGE | 1.14 | 1.14 | 0 00: 45 | 0.00955 | 0.00955 | 0.253 |

Node Flooding Summary

No nodes were flooded.

SWMM Model - 50-year

 Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 5.818 | 22 | 0 | 0 | 18.241 | 70 | 0 01: 12 | 3.26 |
| Pond_A1 | 0.007 | 0 | 0 | 0 | 1.237 | 83 | 0 00: 50 | 1.96 |
| Pond_A2 | 0.006 | 0 | 0 | 0 | 1.160 | 78 | 0 00: 49 | 2.10 |
| Pond_A6 | 0.002 | 0 | 0 | 0 | 0.615 | 41 | 0 00: 48 | 3.39 |
| Pond_A5. 4 | 0.002 | 0 | 0 | 0 | 0.430 | 76 | 0 00: 49 | 0.84 |
| Pond_C2 | 0.009 | 0 | 0 | 0 | 1.640 | 67 | 0 00: 50 | 2.47 |
| Pond_C1 | 0.013 | 0 | 0 | 0 | 2.047 | 69 | 0 00: 51 | 2.96 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00: 00 | 0.00 |
| PondC | 6.232 | 21 | 0 | 0 | 26.329 | 87 | 0 00: 59 | 11.05 |
| Pond_A5. 2 | 0.010 | 1 | 0 | 0 | 0.597 | 80 | 0 00: 53 | 0.39 |

 Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 98.96 | 0.09 | 3.26 | 0.177 |
| Prop-West | 91.20 | 0.19 | 11.35 | 0.338 |
| Hist-East | 2.87 | 0.33 | 1.79 | 0.018 |
| Hist-West | 2.89 | 2.12 | 8.63 | 0.119 |
| System | 48.98 | 2.73 | 8.63 | 0.652 |

 Link Flow Summary

SWMM Model - 50-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 1.96 | 0 00: 50 | | | |
| 2 | DUMMY | 4.59 | 0 00: 48 | | | |
| 3 | DUMMY | 4.05 | 0 00: 50 | | | |
| 4 | DUMMY | 2.96 | 0 00: 51 | | | |
| 5 | DUMMY | 20.51 | 0 00: 45 | | | |
| 11 | DUMMY | 20.51 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 1.96 | 0 00: 50 | | | 0.00 |
| OutletA2 | ORIFICE | 2.10 | 0 00: 50 | | | 0.00 |
| Outlet_A5 | ORIFICE | 3.39 | 0 00: 48 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.84 | 0 00: 50 | | | 0.00 |
| Outlet_C2 | ORIFICE | 2.47 | 0 00: 50 | | | 0.00 |
| Outlet_C1 | ORIFICE | 2.96 | 0 00: 51 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.39 | 0 00: 53 | | | 0.00 |
| Outlet_1 | DUMMY | 3.26 | 0 01: 13 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 11.05 | 0 00: 59 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:56:45 2019
 Analysis ended on: Thu Oct 10 12:56:45 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 4.775 | 2.820 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 2.339 | 1.382 |

SWMM Model - 100-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 2.422 | 1.430 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.695 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 2.422 | 0.789 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 2.419 | 0.788 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.117 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 100-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 892 | 2. 82 | 0. 00 | 0. 00 | 0. 26 | 2. 49 | 0. 03 | 2. 52 | 0. 04 | 4. 62 |
| A-1 0. 921 | 2. 82 | 0. 00 | 0. 00 | 0. 18 | 2. 49 | 0. 11 | 2. 60 | 0. 04 | 4. 62 |
| A-6 0. 774 | 2. 82 | 0. 00 | 0. 00 | 0. 61 | 1. 99 | 0. 19 | 2. 18 | 0. 05 | 5. 22 |
| A-4 0. 977 | 2. 82 | 0. 00 | 0. 00 | 0. 00 | 2. 76 | 0. 00 | 2. 76 | 0. 01 | 1. 69 |
| A-5. 3, 5. 4 0. 910 | 2. 82 | 0. 00 | 0. 00 | 0. 21 | 2. 44 | 0. 13 | 2. 57 | 0. 02 | 1. 87 |
| C-1 0. 914 | 2. 82 | 0. 00 | 0. 00 | 0. 20 | 2. 49 | 0. 09 | 2. 58 | 0. 06 | 7. 15 |
| C-2 0. 874 | 2. 82 | 0. 00 | 0. 00 | 0. 32 | 2. 32 | 0. 15 | 2. 46 | 0. 05 | 6. 34 |
| C-3 0. 918 | 2. 82 | 0. 00 | 0. 00 | 0. 19 | 2. 50 | 0. 08 | 2. 59 | 0. 11 | 12. 81 |
| D-1 0. 544 | 2. 82 | 0. 00 | 0. 00 | 1. 27 | 1. 20 | 0. 33 | 1. 53 | 0. 02 | 2. 39 |
| A-3 0. 928 | 2. 82 | 0. 00 | 0. 00 | 0. 15 | 2. 59 | 0. 03 | 2. 62 | 0. 02 | 2. 76 |
| A-7 0. 513 | 2. 82 | 0. 00 | 0. 00 | 1. 36 | 1. 35 | 0. 09 | 1. 45 | 0. 02 | 2. 01 |
| C-4 0. 909 | 2. 82 | 0. 00 | 0. 00 | 0. 21 | 2. 45 | 0. 12 | 2. 56 | 0. 05 | 5. 19 |
| C-5 0. 779 | 2. 82 | 0. 00 | 0. 00 | 0. 59 | 1. 94 | 0. 25 | 2. 20 | 0. 09 | 9. 29 |
| H-2 0. 159 | 2. 82 | 0. 00 | 0. 00 | 2. 39 | 0. 06 | 0. 39 | 0. 45 | 0. 02 | 2. 28 |

SWMM Model - 100-year

| | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|
| H-1 0.062 | 2.82 | 0.00 | 0.00 | 2.66 | 0.06 | 0.12 | 0.17 | 0.01 | 1.38 |
| H-4 0.315 | 2.82 | 0.00 | 0.00 | 1.95 | 0.06 | 0.83 | 0.89 | 0.10 | 6.83 |
| 15 0.331 | 2.82 | 0.00 | 0.00 | 1.90 | 0.06 | 0.88 | 0.93 | 0.07 | 5.52 |
| A-5. 1, 5. 2 0.884 | 2.82 | 0.00 | 0.00 | 0.29 | 2.31 | 0.18 | 2.49 | 0.01 | 1.31 |
| E-1 0.390 | 2.82 | 0.00 | 0.00 | 1.74 | 0.14 | 0.96 | 1.10 | 0.01 | 0.63 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|-----------------------|-----------------------|---------------------|-----------------------------------------|----------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 1.89 | 4.44 | 4.44 | 0 01:14 | 4.44 |
| Pond_A1 | STORAGE | 0.01 | 0.74 | 6.74 | 0 00:50 | 0.74 |
| Pond_A2 | STORAGE | 0.01 | 0.73 | 6.73 | 0 00:50 | 0.73 |
| Pond_A6 | STORAGE | 0.01 | 0.59 | 6.59 | 0 00:48 | 0.58 |
| Pond_A5. 4 | STORAGE | 0.01 | 0.72 | 6.72 | 0 00:50 | 0.72 |
| Pond_C2 | STORAGE | 0.01 | 0.70 | 2.70 | 0 00:51 | 0.69 |
| Pond_C1 | STORAGE | 0.01 | 0.70 | 3.70 | 0 00:51 | 0.69 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 1.62 | 6.11 | 6.11 | 0 01:01 | 6.11 |
| Pond_A5. 2 | STORAGE | 0.01 | 0.68 | 6.68 | 0 00:54 | 0.68 |

SWMM Model - 100-year

 Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 5.08 | 0 00: 48 | 0 | 0.0712 | 0.000 |
| 10 | JUNCTION | 0.00 | 2.13 | 0 00: 50 | 0 | 0.0381 | 0.000 |
| 11 | JUNCTION | 0.00 | 4.43 | 0 00: 50 | 0 | 0.077 | 0.000 |
| 12 | JUNCTION | 18.00 | 23.07 | 0 00: 45 | 0.156 | 0.269 | 0.000 |
| 13 | JUNCTION | 0.00 | 3.23 | 0 00: 51 | 0 | 0.0622 | 0.000 |
| 14 | JUNCTION | 0.00 | 23.07 | 0 00: 45 | 0 | 0.269 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 3.57 | 0 01: 14 | 0 | 0.201 | 0.000 |
| Prop-West | OUTFALL | 0.63 | 11.79 | 0 00: 57 | 0.00657 | 0.387 | 0.000 |
| Hi st-East | OUTFALL | 3.58 | 3.58 | 0 00: 50 | 0.0354 | 0.0354 | 0.000 |
| Hi st-West | OUTFALL | 12.35 | 12.35 | 0 00: 50 | 0.165 | 0.165 | 0.000 |
| PondA | STORAGE | 6.46 | 14.82 | 0 00: 45 | 0.0535 | 0.202 | 0.120 |
| Pond_A1 | STORAGE | 4.62 | 4.62 | 0 00: 45 | 0.0381 | 0.0381 | 0.067 |
| Pond_A2 | STORAGE | 4.62 | 4.62 | 0 00: 45 | 0.039 | 0.039 | 0.053 |
| Pond_A6 | STORAGE | 5.22 | 5.22 | 0 00: 45 | 0.045 | 0.045 | 0.036 |
| Pond_A5. 4 | STORAGE | 1.87 | 1.87 | 0 00: 45 | 0.0153 | 0.0153 | 0.018 |
| Pond_C2 | STORAGE | 6.34 | 6.34 | 0 00: 45 | 0.0515 | 0.0515 | 0.001 |
| Pond_C1 | STORAGE | 7.15 | 7.15 | 0 00: 45 | 0.0623 | 0.0623 | 0.102 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 11.68 | 34.75 | 0 00: 45 | 0.111 | 0.381 | 0.138 |
| Pond_A5. 2 | STORAGE | 1.31 | 1.31 | 0 00: 45 | 0.0108 | 0.0108 | 0.220 |

 Node Flooding Summary

No nodes were flooded.

SWMM Model - 100-year

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 5.840 | 22 | 0 | 0 | 19.487 | 75 | 0 01: 13 | 3.57 |
| Pond_A1 | 0.009 | 1 | 0 | 0 | 1.457 | 98 | 0 00: 50 | 2.13 |
| Pond_A2 | 0.008 | 1 | 0 | 0 | 1.377 | 93 | 0 00: 50 | 2.30 |
| Pond_A6 | 0.003 | 0 | 0 | 0 | 0.757 | 51 | 0 00: 48 | 3.78 |
| Pond_A5. 4 | 0.003 | 0 | 0 | 0 | 0.518 | 91 | 0 00: 50 | 0.89 |
| Pond_C2 | 0.012 | 0 | 0 | 0 | 1.988 | 82 | 0 00: 50 | 2.61 |
| Pond_C1 | 0.016 | 1 | 0 | 0 | 2.421 | 82 | 0 00: 51 | 3.23 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00: 00 | 0.00 |
| PondC | 6.259 | 21 | 0 | 0 | 28.216 | 93 | 0 01: 00 | 11.43 |
| Pond_A5. 2 | 0.011 | 1 | 0 | 0 | 0.680 | 91 | 0 00: 53 | 0.43 |

Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 98.99 | 0.10 | 3.57 | 0.201 |
| Prop-West | 91.23 | 0.22 | 11.79 | 0.387 |
| Hist-East | 2.87 | 0.64 | 3.58 | 0.035 |
| Hist-West | 2.91 | 2.92 | 12.35 | 0.165 |
| System | 49.00 | 3.88 | 12.35 | 0.788 |

Link Flow Summary

SWMM Model - 100-year

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 2.13 | 0 00: 50 | | | |
| 2 | DUMMY | 5.08 | 0 00: 48 | | | |
| 3 | DUMMY | 4.43 | 0 00: 50 | | | |
| 4 | DUMMY | 3.23 | 0 00: 51 | | | |
| 5 | DUMMY | 23.07 | 0 00: 45 | | | |
| 11 | DUMMY | 23.07 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 2.13 | 0 00: 50 | | | 0.00 |
| OutletA2 | ORIFICE | 2.30 | 0 00: 50 | | | 0.00 |
| Outlet_A5 | ORIFICE | 3.78 | 0 00: 48 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.89 | 0 00: 50 | | | 0.00 |
| Outlet_C2 | ORIFICE | 2.61 | 0 00: 51 | | | 0.00 |
| Outlet_C1 | ORIFICE | 3.23 | 0 00: 51 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.43 | 0 00: 54 | | | 0.00 |
| Outlet_1 | DUMMY | 3.57 | 0 01: 14 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 11.43 | 0 01: 01 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:57:01 2019
 Analysis ended on: Thu Oct 10 12:57:01 2019
 Total elapsed time: < 1 sec

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

 WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 6.973 | 4.118 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 2.604 | 1.538 |

SWMM Model - 500-year

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 4.382 | 2.588 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.848 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 4.382 | 1.428 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 3.960 | 1.291 |
| Flooding Loss | 0.418 | 0.136 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.078 | |

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

Subcatchment Runoff Summary

SWMM Model - 500-year

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 919 | 4. 12 | 0. 00 | 0. 00 | 0. 30 | 3. 66 | 0. 12 | 3. 78 | 0. 06 | 7. 08 |
| A-1 0. 945 | 4. 12 | 0. 00 | 0. 00 | 0. 19 | 3. 66 | 0. 23 | 3. 89 | 0. 06 | 6. 89 |
| A-6 0. 834 | 4. 12 | 0. 00 | 0. 00 | 0. 67 | 2. 94 | 0. 50 | 3. 43 | 0. 07 | 8. 41 |
| A-4 0. 989 | 4. 12 | 0. 00 | 0. 00 | 0. 00 | 4. 07 | 0. 00 | 4. 07 | 0. 02 | 2. 46 |
| A-5. 3, 5. 4 0. 937 | 4. 12 | 0. 00 | 0. 00 | 0. 23 | 3. 59 | 0. 27 | 3. 86 | 0. 02 | 2. 80 |
| C-1 0. 940 | 4. 12 | 0. 00 | 0. 00 | 0. 22 | 3. 67 | 0. 20 | 3. 87 | 0. 09 | 10. 95 |
| C-2 0. 910 | 4. 12 | 0. 00 | 0. 00 | 0. 35 | 3. 42 | 0. 33 | 3. 75 | 0. 08 | 9. 71 |
| C-3 0. 943 | 4. 12 | 0. 00 | 0. 00 | 0. 21 | 3. 69 | 0. 19 | 3. 88 | 0. 16 | 19. 49 |
| D-1 0. 664 | 4. 12 | 0. 00 | 0. 00 | 1. 38 | 1. 77 | 0. 97 | 2. 73 | 0. 04 | 4. 05 |
| A-3 0. 946 | 4. 12 | 0. 00 | 0. 00 | 0. 18 | 3. 82 | 0. 07 | 3. 90 | 0. 03 | 4. 09 |
| A-7 0. 617 | 4. 12 | 0. 00 | 0. 00 | 1. 59 | 2. 00 | 0. 54 | 2. 54 | 0. 03 | 3. 71 |
| C-4 0. 937 | 4. 12 | 0. 00 | 0. 00 | 0. 23 | 3. 60 | 0. 26 | 3. 86 | 0. 07 | 7. 98 |
| C-5 0. 841 | 4. 12 | 0. 00 | 0. 00 | 0. 64 | 2. 86 | 0. 60 | 3. 46 | 0. 14 | 14. 80 |
| H-2 0. 358 | 4. 12 | 0. 00 | 0. 00 | 2. 67 | 0. 08 | 1. 39 | 1. 48 | 0. 08 | 7. 88 |

SWMM Model - 500-year

| | | | | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| H-1 0. 238 | 4. 12 | 0. 00 | 0. 00 | 3. 17 | 0. 08 | 0. 90 | 0. 98 | 0. 06 | 6. 92 |
| H-4 0. 498 | 4. 12 | 0. 00 | 0. 00 | 2. 10 | 0. 08 | 1. 97 | 2. 05 | 0. 22 | 17. 36 |
| 15 0. 511 | 4. 12 | 0. 00 | 0. 00 | 2. 05 | 0. 08 | 2. 02 | 2. 10 | 0. 15 | 14. 35 |
| A-5. 1, 5. 2 0. 919 | 4. 12 | 0. 00 | 0. 00 | 0. 31 | 3. 41 | 0. 37 | 3. 78 | 0. 02 | 1. 99 |
| E-1 0. 559 | 4. 12 | 0. 00 | 0. 00 | 1. 86 | 0. 20 | 2. 10 | 2. 30 | 0. 01 | 1. 55 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|--------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0. 00 | 0. 00 | 5. 00 | 0 00: 00 | 0. 00 |
| 10 | JUNCTI ON | 0. 00 | 0. 00 | 5. 00 | 0 00: 00 | 0. 00 |
| 11 | JUNCTI ON | 0. 00 | 0. 00 | 5. 00 | 0 00: 00 | 0. 00 |
| 12 | JUNCTI ON | 0. 00 | 0. 00 | 2. 00 | 0 00: 00 | 0. 00 |
| 13 | JUNCTI ON | 0. 00 | 0. 00 | 3. 00 | 0 00: 00 | 0. 00 |
| 14 | JUNCTI ON | 0. 00 | 0. 00 | 1. 00 | 0 00: 00 | 0. 00 |
| Prop-East | OUTFALL | 0. 00 | 0. 00 | 0. 00 | 0 00: 00 | 0. 00 |
| Prop-West | OUTFALL | 0. 00 | 0. 00 | 0. 00 | 0 00: 00 | 0. 00 |
| Hi st-East | OUTFALL | 0. 00 | 0. 00 | 0. 00 | 0 00: 00 | 0. 00 |
| Hi st-West | OUTFALL | 0. 00 | 0. 00 | 0. 00 | 0 00: 00 | 0. 00 |
| PondA | STORAGE | 1. 92 | 5. 50 | 5. 50 | 0 01: 17 | 5. 50 |
| Pond_A1 | STORAGE | 0. 01 | 0. 75 | 6. 75 | 0 00: 53 | 0. 75 |
| Pond_A2 | STORAGE | 0. 01 | 0. 75 | 6. 75 | 0 00: 52 | 0. 75 |
| Pond_A6 | STORAGE | 0. 01 | 0. 75 | 6. 75 | 0 00: 49 | 0. 75 |
| Pond_A5. 4 | STORAGE | 0. 01 | 0. 75 | 6. 75 | 0 00: 52 | 0. 75 |
| Pond_C2 | STORAGE | 0. 01 | 0. 75 | 2. 75 | 0 00: 54 | 0. 75 |
| Pond_C1 | STORAGE | 0. 01 | 0. 75 | 3. 75 | 0 00: 54 | 0. 75 |
| Pond_D | STORAGE | 0. 00 | 0. 00 | 1. 00 | 0 00: 00 | 0. 00 |
| PondC | STORAGE | 1. 63 | 6. 50 | 6. 50 | 0 01: 06 | 6. 50 |
| Pond_A5. 2 | STORAGE | 0. 01 | 0. 75 | 6. 75 | 0 00: 56 | 0. 75 |

SWMM Model - 500-year

 Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 6.77 | 0 00: 49 | 0 | 0.104 | 0.000 |
| 10 | JUNCTION | 0.00 | 2.16 | 0 00: 53 | 0 | 0.048 | 0.000 |
| 11 | JUNCTION | 0.00 | 4.55 | 0 00: 52 | 0 | 0.0983 | 0.000 |
| 12 | JUNCTION | 27.47 | 33.80 | 0 00: 45 | 0.234 | 0.384 | 0.000 |
| 13 | JUNCTION | 0.00 | 3.59 | 0 00: 54 | 0 | 0.0827 | 0.000 |
| 14 | JUNCTION | 0.00 | 33.80 | 0 00: 45 | 0 | 0.384 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 3.94 | 0 01: 17 | 0 | 0.282 | 0.000 |
| Prop-West | OUTFALL | 1.55 | 13.54 | 0 00: 47 | 0.0138 | 0.491 | 0.000 |
| Hi st-East | OUTFALL | 14.80 | 14.80 | 0 00: 45 | 0.142 | 0.142 | 0.000 |
| Hi st-West | OUTFALL | 31.71 | 31.71 | 0 00: 45 | 0.376 | 0.376 | 0.000 |
| PondA | STORAGE | 10.26 | 20.97 | 0 00: 45 | 0.0838 | 0.286 | 0.076 |
| Pond_A1 | STORAGE | 6.89 | 6.89 | 0 00: 45 | 0.0571 | 0.0571 | 0.088 |
| Pond_A2 | STORAGE | 7.08 | 7.08 | 0 00: 45 | 0.0586 | 0.0586 | 0.082 |
| Pond_A6 | STORAGE | 8.41 | 8.41 | 0 00: 45 | 0.0709 | 0.0709 | 0.071 |
| Pond_A5. 4 | STORAGE | 2.80 | 2.80 | 0 00: 45 | 0.0231 | 0.0231 | 0.029 |
| Pond_C2 | STORAGE | 9.71 | 9.71 | 0 00: 45 | 0.0783 | 0.0783 | 0.020 |
| Pond_C1 | STORAGE | 10.95 | 10.95 | 0 00: 45 | 0.0935 | 0.0935 | 0.130 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 18.86 | 52.66 | 0 00: 45 | 0.18 | 0.565 | 0.103 |
| Pond_A5. 2 | STORAGE | 1.99 | 1.99 | 0 00: 45 | 0.0164 | 0.0164 | 0.166 |

 Node Flooding Summary

Flooding refers to all water that overflows a node, whether it ponds or not.

SWMM Model - 500-year

| Node | Hours Flooded | Maximum Rate CFS | Time of Max Occurrence days hr: min | Flood Volume 10^6 gal | Ponded Volume 1000 ft3 |
|-----------|---------------|------------------|-------------------------------------|-----------------------|------------------------|
| PondA | 0.13 | 2.48 | 0 01:10 | 0.004 | 0.000 |
| Pond_A1 | 0.16 | 4.58 | 0 00:45 | 0.009 | 0.000 |
| Pond_A2 | 0.14 | 4.52 | 0 00:45 | 0.008 | 0.000 |
| Pond_A6 | 0.03 | 0.79 | 0 00:48 | 0.000 | 0.000 |
| Pond_A5.4 | 0.14 | 1.82 | 0 00:45 | 0.003 | 0.000 |
| Pond_C2 | 0.15 | 6.66 | 0 00:46 | 0.010 | 0.000 |
| Pond_C1 | 0.14 | 6.68 | 0 00:46 | 0.011 | 0.000 |
| PondC | 0.38 | 32.14 | 0 00:47 | 0.087 | 0.000 |
| Pond_A5.2 | 0.19 | 1.47 | 0 00:46 | 0.003 | 0.000 |

Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|-------------------------|---------------|----------------|-----------------|-------------------------|---------------|-------------------------------------|---------------------|
| PondA | 5.992 | 23 | 0 | 0 | 25.971 | 100 | 0 01:10 | 3.94 |
| Pond_A1 | 0.012 | 1 | 0 | 0 | 1.484 | 100 | 0 00:44 | 2.16 |
| Pond_A2 | 0.011 | 1 | 0 | 0 | 1.484 | 100 | 0 00:44 | 2.40 |
| Pond_A6 | 0.006 | 0 | 0 | 0 | 1.484 | 100 | 0 00:48 | 5.39 |
| Pond_A5.4 | 0.004 | 1 | 0 | 0 | 0.568 | 100 | 0 00:44 | 0.92 |
| Pond_C2 | 0.019 | 1 | 0 | 0 | 2.438 | 100 | 0 00:45 | 2.77 |
| Pond_C1 | 0.025 | 1 | 0 | 0 | 2.969 | 100 | 0 00:46 | 3.59 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00:00 | 0.00 |
| PondC | 6.337 | 21 | 0 | 0 | 30.375 | 100 | 0 00:47 | 12.11 |
| Pond_A5.2 | 0.013 | 2 | 0 | 0 | 0.750 | 100 | 0 00:45 | 0.46 |

Outfall Loading Summary

SWMM Model - 500-year

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|----------------|--------------|--------------|-----------------------|
| Prop-East | 99.18 | 0.15 | 3.94 | 0.282 |
| Prop-West | 91.32 | 0.28 | 13.54 | 0.491 |
| Hi st-East | 2.88 | 2.54 | 14.80 | 0.142 |
| Hi st-West | 3.06 | 6.35 | 31.71 | 0.376 |
| System | 49.11 | 9.32 | 31.71 | 1.290 |

Link Flow Summary

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/Ful l Flow | Max/Ful l Depth |
|-----------|---------|--------------------|-------------------------------------|---------------------------|----------------|-----------------|
| 1 | DUMMY | 2.16 | 0 00: 53 | | | |
| 2 | DUMMY | 6.77 | 0 00: 49 | | | |
| 3 | DUMMY | 4.55 | 0 00: 52 | | | |
| 4 | DUMMY | 3.59 | 0 00: 54 | | | |
| 5 | DUMMY | 33.80 | 0 00: 45 | | | |
| 11 | DUMMY | 33.80 | 0 00: 45 | | | |
| Outlet_A1 | ORIFICE | 2.16 | 0 00: 53 | | | 0.00 |
| OutletA2 | ORIFICE | 2.40 | 0 00: 52 | | | 0.00 |
| Outlet_A5 | ORIFICE | 5.39 | 0 00: 49 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.92 | 0 00: 52 | | | 0.00 |
| Outlet_C2 | ORIFICE | 2.77 | 0 00: 54 | | | 0.00 |
| Outlet_C1 | ORIFICE | 3.59 | 0 00: 54 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.46 | 0 00: 56 | | | 0.00 |
| Outlet_1 | DUMMY | 3.94 | 0 01: 17 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00: 00 | | | |
| Outlet_C | DUMMY | 12.11 | 0 01: 06 | | | |

Conduit Surchage Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 12:57:12 2019

Analysis ended on: Thu Oct 10 12:57:13 2019

Total elapsed time: 00:00:01

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit 1

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

Flow Units CFS
 Process Models:
 Rainfall/Runoff YES
 RDI NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method KINWAVE
 Starting Date 02/19/2018 00:00:00
 Ending Date 02/22/2018 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:05:00
 Wet Time Step 00:05:00
 Dry Time Step 00:00:00
 Routing Time Step 30.00 sec

| ***** | Volume | Depth |
|----------------------------|-----------|--------|
| Runoff Quantity Continuity | acre-feet | inches |
| ***** | ----- | ----- |
| Total Precipitation | 1.137 | 0.671 |
| Evaporation Loss | 0.000 | 0.000 |
| Infiltration Loss | 0.716 | 0.423 |

SWMM Model - WQ

| | | |
|----------------------------|--------|-------|
| Surface Runoff | 0.378 | 0.223 |
| Final Storage | 0.047 | 0.028 |
| Continuity Error (%) | -0.380 | |

| ***** | Volume | Volume |
|-----------------------------|-----------|----------|
| Flow Routing Continuity | acre-feet | 10^6 gal |
| ***** | ----- | ----- |
| Dry Weather Inflow | 0.000 | 0.000 |
| Wet Weather Inflow | 0.378 | 0.123 |
| Groundwater Inflow | 0.000 | 0.000 |
| RDII Inflow | 0.000 | 0.000 |
| External Inflow | 0.000 | 0.000 |
| External Outflow | 0.378 | 0.123 |
| Flooding Loss | 0.000 | 0.000 |
| Evaporation Loss | 0.000 | 0.000 |
| Exfiltration Loss | 0.000 | 0.000 |
| Initial Stored Volume | 0.000 | 0.000 |
| Final Stored Volume | 0.000 | 0.000 |
| Continuity Error (%) | 0.112 | |

 Highest Flow Instability Indexes

All links are stable.

 Routing Time Step Summary

| | | |
|-----------------------------|---|-----------|
| Minimum Time Step | : | 30.00 sec |
| Average Time Step | : | 30.00 sec |
| Maximum Time Step | : | 30.00 sec |
| Percent in Steady State | : | 0.00 |
| Average Iterations per Step | : | 1.00 |
| Percent Not Converging | : | 0.00 |

 Subcatchment Runoff Summary

SWMM Model - WQ

| Runoff Coeff Subcatchment | Total Precip in | Total Runon in | Total Evap in | Total Infil in | Imperv Runoff in | Perv Runoff in | Total Runoff in | Total Runoff 10^6 gal | Peak Runoff CFS |
|---------------------------------|-----------------------|----------------------|---------------------|----------------------|------------------------|----------------------|-----------------------|-----------------------------|-----------------------|
| A-2 0. 809 | 0. 67 | 0. 00 | 0. 00 | 0. 07 | 0. 54 | 0. 00 | 0. 54 | 0. 01 | 1. 00 |
| A-1 0. 809 | 0. 67 | 0. 00 | 0. 00 | 0. 07 | 0. 54 | 0. 00 | 0. 54 | 0. 01 | 0. 97 |
| A-6 0. 648 | 0. 67 | 0. 00 | 0. 00 | 0. 19 | 0. 44 | 0. 00 | 0. 44 | 0. 01 | 1. 07 |
| A-4 0. 897 | 0. 67 | 0. 00 | 0. 00 | 0. 00 | 0. 60 | 0. 00 | 0. 60 | 0. 00 | 0. 40 |
| A-5. 3, 5. 4 0. 793 | 0. 67 | 0. 00 | 0. 00 | 0. 08 | 0. 53 | 0. 00 | 0. 53 | 0. 00 | 0. 39 |
| C-1 0. 808 | 0. 67 | 0. 00 | 0. 00 | 0. 07 | 0. 54 | 0. 00 | 0. 54 | 0. 01 | 1. 41 |
| C-2 0. 754 | 0. 67 | 0. 00 | 0. 00 | 0. 11 | 0. 51 | 0. 00 | 0. 51 | 0. 01 | 1. 33 |
| C-3 0. 814 | 0. 67 | 0. 00 | 0. 00 | 0. 06 | 0. 55 | 0. 00 | 0. 55 | 0. 02 | 2. 60 |
| D-1 0. 390 | 0. 67 | 0. 00 | 0. 00 | 0. 38 | 0. 26 | 0. 00 | 0. 26 | 0. 00 | 0. 48 |
| A-3 0. 842 | 0. 67 | 0. 00 | 0. 00 | 0. 04 | 0. 57 | 0. 00 | 0. 57 | 0. 00 | 0. 63 |
| A-7 0. 439 | 0. 67 | 0. 00 | 0. 00 | 0. 34 | 0. 30 | 0. 00 | 0. 30 | 0. 00 | 0. 43 |
| C-4 0. 793 | 0. 67 | 0. 00 | 0. 00 | 0. 08 | 0. 53 | 0. 00 | 0. 53 | 0. 01 | 0. 98 |
| C-5 0. 630 | 0. 67 | 0. 00 | 0. 00 | 0. 20 | 0. 42 | 0. 00 | 0. 42 | 0. 02 | 1. 73 |
| H-2 0. 018 | 0. 67 | 0. 00 | 0. 00 | 0. 66 | 0. 01 | 0. 00 | 0. 01 | 0. 00 | 0. 08 |

SWMM Model - WQ

| | | | | | | | | | |
|-----------------------|------|------|------|------|------|------|------|------|------|
| H-1 0.018 | 0.67 | 0.00 | 0.00 | 0.66 | 0.01 | 0.00 | 0.01 | 0.00 | 0.10 |
| H-4 0.018 | 0.67 | 0.00 | 0.00 | 0.66 | 0.01 | 0.00 | 0.01 | 0.00 | 0.17 |
| 15 0.018 | 0.67 | 0.00 | 0.00 | 0.66 | 0.01 | 0.00 | 0.01 | 0.00 | 0.11 |
| A-5. 1, 5. 2 0.752 | 0.67 | 0.00 | 0.00 | 0.11 | 0.51 | 0.00 | 0.51 | 0.00 | 0.26 |
| E-1 0.046 | 0.67 | 0.00 | 0.00 | 0.64 | 0.03 | 0.00 | 0.03 | 0.00 | 0.02 |

Node Depth Summary

| Node | Type | Average Depth Feet | Maximum Depth Feet | Maximum HGL Feet | Time of Max Occurrence days hr: mi n | Reported Max Depth Feet |
|------------|-----------|--------------------------|--------------------------|------------------------|--------------------------------------------|-------------------------------|
| 9 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 10 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 11 | JUNCTI ON | 0.00 | 0.00 | 5.00 | 0 00:00 | 0.00 |
| 12 | JUNCTI ON | 0.00 | 0.00 | 2.00 | 0 00:00 | 0.00 |
| 13 | JUNCTI ON | 0.00 | 0.00 | 3.00 | 0 00:00 | 0.00 |
| 14 | JUNCTI ON | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| Prop-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Prop-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-East | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| Hi st-West | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| PondA | STORAGE | 0.62 | 1.90 | 1.90 | 0 02:18 | 1.90 |
| Pond_A1 | STORAGE | 0.00 | 0.35 | 6.35 | 0 00:49 | 0.34 |
| Pond_A2 | STORAGE | 0.00 | 0.34 | 6.34 | 0 00:49 | 0.34 |
| Pond_A6 | STORAGE | 0.00 | 0.24 | 6.24 | 0 00:47 | 0.22 |
| Pond_A5. 4 | STORAGE | 0.00 | 0.29 | 6.29 | 0 00:48 | 0.29 |
| Pond_C2 | STORAGE | 0.00 | 0.31 | 2.31 | 0 00:48 | 0.30 |
| Pond_C1 | STORAGE | 0.00 | 0.32 | 3.32 | 0 00:50 | 0.32 |
| Pond_D | STORAGE | 0.00 | 0.00 | 1.00 | 0 00:00 | 0.00 |
| PondC | STORAGE | 0.70 | 2.41 | 2.41 | 0 02:18 | 2.41 |
| Pond_A5. 2 | STORAGE | 0.00 | 0.16 | 6.16 | 0 00:58 | 0.16 |

Node Inflow Summary

| Node | Type | Maximum Lateral Inflow CFS | Maximum Total Inflow CFS | Time of Max Occurrence days hr: min | Lateral Inflow Volume 10^6 gal | Total Inflow Volume 10^6 gal | Flow Balance Error Percent |
|------------|----------|----------------------------|--------------------------|-------------------------------------|--------------------------------|------------------------------|----------------------------|
| 9 | JUNCTION | 0.00 | 1.30 | 0 00: 47 | 0 | 0.0143 | 0.000 |
| 10 | JUNCTION | 0.00 | 0.67 | 0 00: 49 | 0 | 0.00795 | 0.000 |
| 11 | JUNCTION | 0.00 | 1.40 | 0 00: 49 | 0 | 0.0163 | 0.000 |
| 12 | JUNCTION | 3.58 | 5.27 | 0 00: 45 | 0.0327 | 0.0563 | 0.000 |
| 13 | JUNCTION | 0.00 | 0.98 | 0 00: 50 | 0 | 0.0131 | 0.000 |
| 14 | JUNCTION | 0.00 | 5.27 | 0 00: 45 | 0 | 0.0563 | 0.000 |
| Prop-East | OUTFALL | 0.00 | 0.07 | 0 02: 18 | 0 | 0.042 | 0.000 |
| Prop-West | OUTFALL | 0.02 | 0.14 | 0 02: 05 | 0.000183 | 0.0774 | 0.000 |
| Hi st-East | OUTFALL | 0.18 | 0.18 | 0 00: 45 | 0.00143 | 0.00143 | 0.000 |
| Hi st-West | OUTFALL | 0.28 | 0.28 | 0 00: 45 | 0.00221 | 0.00221 | 0.000 |
| PondA | STORAGE | 1.46 | 3.92 | 0 00: 46 | 0.0114 | 0.042 | 0.010 |
| Pond_A1 | STORAGE | 0.97 | 0.97 | 0 00: 45 | 0.00796 | 0.00796 | 0.224 |
| Pond_A2 | STORAGE | 1.00 | 1.00 | 0 00: 45 | 0.00841 | 0.00841 | 0.202 |
| Pond_A6 | STORAGE | 1.07 | 1.07 | 0 00: 45 | 0.00898 | 0.00898 | 0.227 |
| Pond_A5. 4 | STORAGE | 0.39 | 0.39 | 0 00: 45 | 0.00318 | 0.00318 | 0.255 |
| Pond_C2 | STORAGE | 1.33 | 1.33 | 0 00: 45 | 0.0106 | 0.0106 | 0.177 |
| Pond_C1 | STORAGE | 1.41 | 1.41 | 0 00: 45 | 0.0131 | 0.0131 | 0.315 |
| Pond_D | STORAGE | 0.00 | 0.00 | 0 00: 00 | 0 | 0 | 0.000 gal |
| PondC | STORAGE | 2.22 | 7.49 | 0 00: 45 | 0.0209 | 0.0773 | 0.012 |
| Pond_A5. 2 | STORAGE | 0.26 | 0.26 | 0 00: 45 | 0.00219 | 0.00219 | 0.067 |

Node Flooding Summary

No nodes were flooded.

 Storage Volume Summary

| Storage Unit | Average Volume 1000 ft3 | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 ft3 | Max Pcnt Full | Time of Max Occurrence days hr: min | Maximum Outflow CFS |
|--------------|----------------------------|---------------|----------------|-----------------|----------------------------|---------------|----------------------------------------|------------------------|
| PondA | 1.180 | 5 | 0 | 0 | 5.124 | 20 | 0 02:17 | 0.07 |
| Pond_A1 | 0.001 | 0 | 0 | 0 | 0.173 | 12 | 0 00:48 | 0.67 |
| Pond_A2 | 0.001 | 0 | 0 | 0 | 0.164 | 11 | 0 00:48 | 0.73 |
| Pond_A6 | 0.000 | 0 | 0 | 0 | 0.073 | 5 | 0 00:46 | 0.97 |
| Pond_A5.4 | 0.000 | 0 | 0 | 0 | 0.057 | 10 | 0 00:48 | 0.29 |
| Pond_C2 | 0.001 | 0 | 0 | 0 | 0.201 | 8 | 0 00:48 | 0.96 |
| Pond_C1 | 0.001 | 0 | 0 | 0 | 0.272 | 9 | 0 00:49 | 0.98 |
| Pond_D | 0.000 | 0 | 0 | 0 | 0.000 | 0 | 0 00:00 | 0.00 |
| PondC | 2.342 | 8 | 0 | 0 | 9.390 | 31 | 0 02:18 | 0.14 |
| Pond_A5.2 | 0.004 | 1 | 0 | 0 | 0.157 | 21 | 0 00:57 | 0.07 |

 Outfall Loading Summary

| Outfall Node | Flow Freq Pcnt | Avg Flow CFS | Max Flow CFS | Total Volume 10^6 gal |
|--------------|-------------------|-----------------|-----------------|--------------------------|
| Prop-East | 56.61 | 0.04 | 0.07 | 0.042 |
| Prop-West | 67.84 | 0.06 | 0.14 | 0.077 |
| Hist-East | 2.82 | 0.03 | 0.18 | 0.001 |
| Hist-West | 2.86 | 0.04 | 0.28 | 0.002 |
| System | 32.53 | 0.16 | 0.28 | 0.123 |

 Link Flow Summary

SWMM Model - WQ

| Link | Type | Maximum Flow CFS | Time of Max Occurrence days hr: min | Maximum Velocity ft/sec | Max/ Full Flow | Max/ Full Depth |
|-----------|---------|--------------------------|-------------------------------------------|---------------------------------|----------------------|-----------------------|
| 1 | DUMMY | 0.67 | 0 00:49 | | | |
| 2 | DUMMY | 1.30 | 0 00:47 | | | |
| 3 | DUMMY | 1.40 | 0 00:49 | | | |
| 4 | DUMMY | 0.98 | 0 00:50 | | | |
| 5 | DUMMY | 5.27 | 0 00:45 | | | |
| 11 | DUMMY | 5.27 | 0 00:45 | | | |
| Outlet_A1 | ORIFICE | 0.67 | 0 00:49 | | | 0.00 |
| OutletA2 | ORIFICE | 0.73 | 0 00:49 | | | 0.00 |
| Outlet_A5 | ORIFICE | 0.97 | 0 00:47 | | | 0.00 |
| Outlet_A4 | ORIFICE | 0.29 | 0 00:48 | | | 0.00 |
| Outlet_C2 | ORIFICE | 0.96 | 0 00:48 | | | 0.00 |
| Outlet_C1 | ORIFICE | 0.98 | 0 00:50 | | | 0.00 |
| Outlet_A6 | ORIFICE | 0.07 | 0 00:58 | | | 0.00 |
| Outlet_1 | DUMMY | 0.07 | 0 02:18 | | | |
| Outlet_D | DUMMY | 0.00 | 0 00:00 | | | |
| Outlet_C | DUMMY | 0.14 | 0 02:18 | | | |

 Conduit Surcharge Summary

No conduits were surcharged.

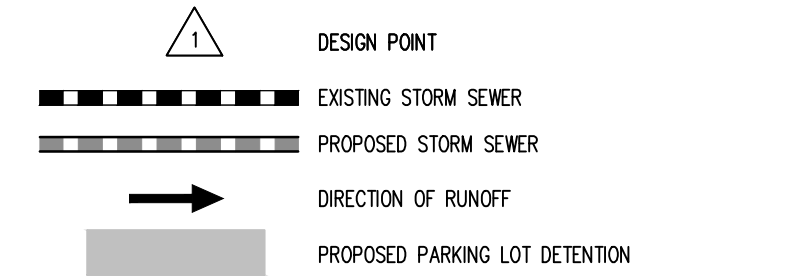
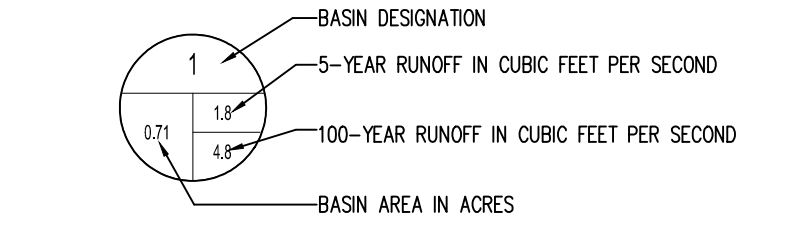
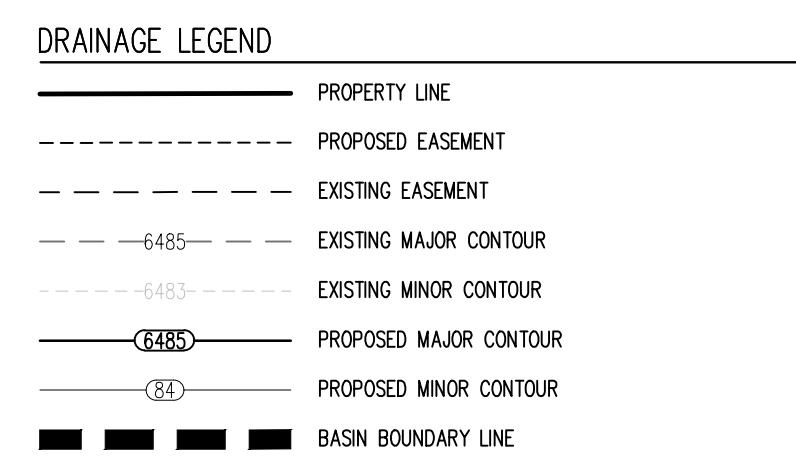
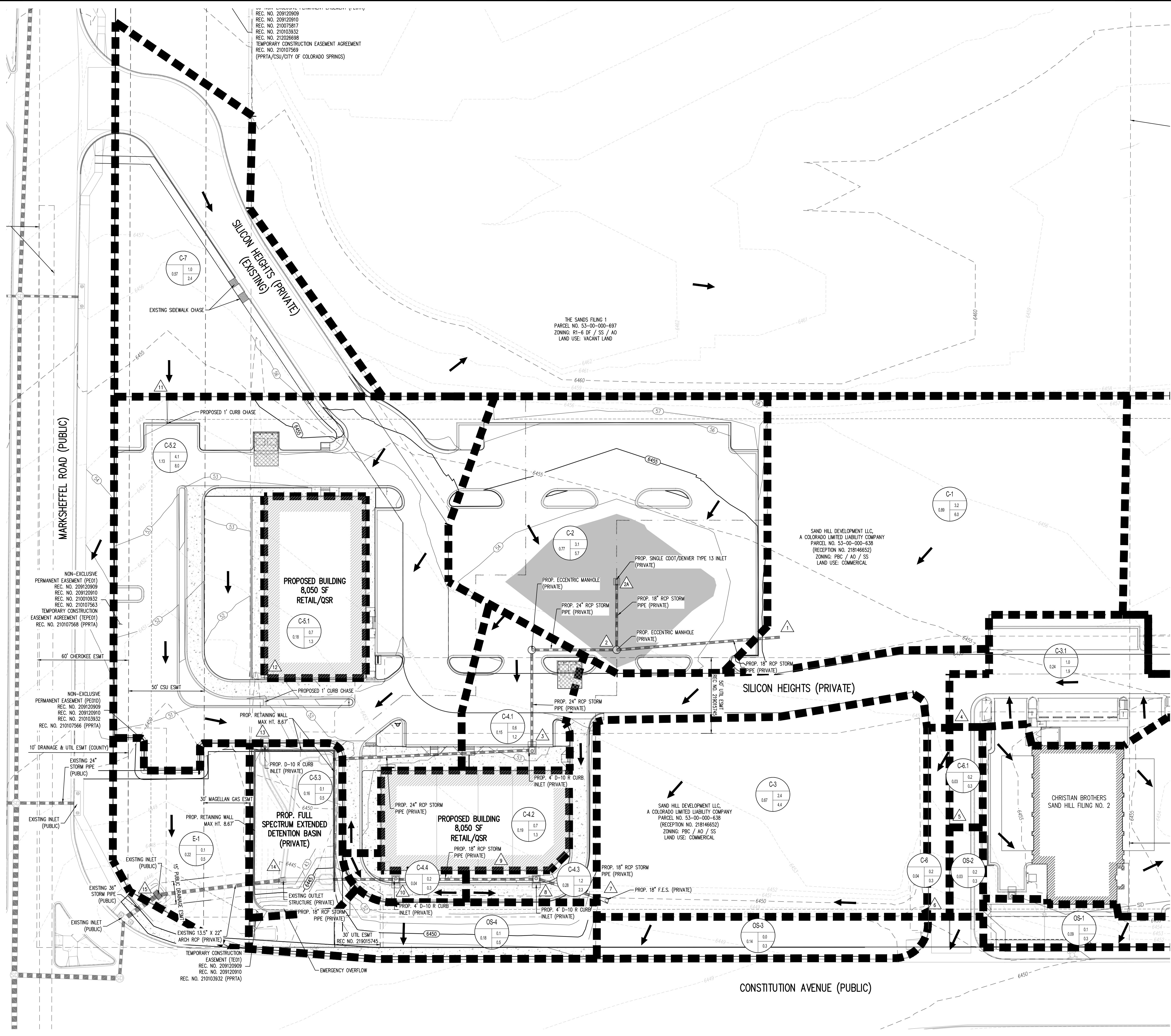
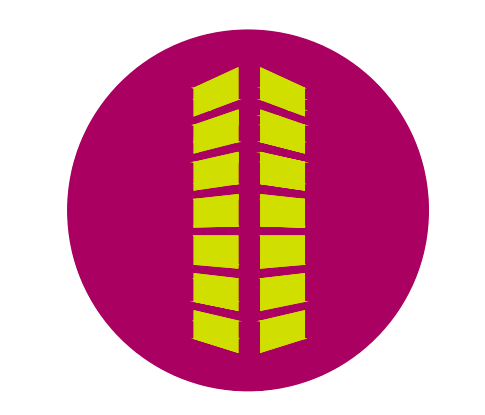
Analysis begun on: Thu Oct 10 12:54:19 2019
 Analysis ended on: Thu Oct 10 12:54:19 2019
 Total elapsed time: < 1 sec

APPENDIX E
Drainage Maps



NOT FOR
CONSTRUCTION

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RUNOFF SUMMARY TABLE

| Basin ID | Area (acres) | Q _s (cfs) | Q ₁₀₀ (cfs) |
|----------|--------------|----------------------|------------------------|
| C-1 | 0.89 | 3.2 | 6.0 |
| C-2 | 0.77 | 3.1 | 5.7 |
| C-3.1 | 0.24 | 1.0 | 1.9 |
| C-3 | 0.67 | 2.4 | 4.4 |
| C-4.1 | 0.15 | 0.6 | 1.2 |
| C-4.2 | 0.19 | 0.7 | 1.3 |
| C-4.3 | 0.28 | 1.2 | 2.3 |
| C-4.4 | 0.04 | 0.2 | 0.3 |
| C-5.1 | 0.18 | 0.7 | 1.3 |
| C-5.2 | 1.13 | 4.1 | 8.0 |
| C-5.3 | 0.16 | 0.1 | 0.5 |
| C-6.1 | 0.03 | 0.2 | 0.3 |
| C-6 | 0.04 | 0.2 | 0.3 |
| C-7 | 0.57 | 1.0 | 2.4 |
| OS-1 | 0.22 | 0.1 | 0.5 |
| OS-3 | 0.14 | 0.0 | 0.3 |
| OS-4 | 0.18 | 0.1 | 0.5 |

DESIGN POINT SUMMARY TABLE

| Design Point | Q _s (cfs) | Q ₁₀₀ (cfs) |
|--------------|----------------------|------------------------|
| 1 | 3.2 | 6.0 |
| 2A | 3.1 | 5.7 |
| 2 | 6.2 | 11.5 |
| 3 | 6.7 | 12.7 |
| 4 | 1.0 | 1.9 |
| 5 | 1.2 | 2.2 |
| 6 | 1.4 | 2.5 |
| 7 | 3.7 | 6.7 |
| 8 | 4.8 | 8.9 |
| 9 | 0.7 | 1.3 |
| 10 | 5.7 | 10.4 |
| 11 | 1.0 | 2.4 |
| 12 | 0.7 | 1.3 |
| 13 | 4.8 | 9.9 |
| 14 | 15.5 | 30.0 |
| 15 | 0.1 | 0.5 |

SAND HILL RETAIL PADS
SAND HILL FILING NO. 3

MARKSHEFFEL RD & CONSTITUTION AVE
COLORADO SPRINGS, CO

Date Issue / Description Init.

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PROPOSED DRAINAGE MAP

