Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan

Baseline Hydrology Report

January 2020

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ICON ENGINEERING

In cooperation with:

WRIGHT WATER ENGINEERS, INC.

Southeast Metro Stormwater Authority

MHFD MILE HIGH FLOOD DISTRICT

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January 29, 2020

Ms. Barbara Chongtoua, P.E., CFM
Mile High Flood District
Project Manager
2480 West 26th Avenue, Suite 156-B
Denver, CO 80211

RE: Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan – Baseline Hydrology Report

Dear Ms. Chongtoua:

ICON Engineering, Inc. is pleased to submit the Baseline Hydrology chapter of the Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan.

These chapters incorporate comments provided by the project sponsors on the DRAFT Baseline Hydrology Report.

The hydrologic analysis has been revised to also incorporate survey information on the Panorama Pond Detention Basin. Storage and rating curves have been updated accordingly. A description of the rainfall event of September 6th has been added to the flood history section as well as some of the flood documentation completed by ICON. We look forward to incorporating any further documentation on the event from Bob Jarrett.

We would like to acknowledge the projects team's assistance in the preparation of this study. This report could not have been prepared without input from yourself, and other stakeholders.

We believe this report will provide a solid framework for the continuing phases of this project.

Sincerely,

ICON ENGINEERING, Inc.

Craig D. Jacobson, P.E., CFM
Principal

Jeremy K. Deischer, P.E.
Project Manager

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1.0 INTRODUCTION

1.1 AUTHORIZATION

This report was authorized by the Urban Drainage and Flood Control District (UDFCD) now operating as the Mile High Flood District (MHFD) under joint sponsorship with Southeast Metro Stormwater Authority (SEMSWA) under the January 2018 agreement regarding "Major Drainageway Plan and Flood Hazard Area Delineation for Willow Creek Tributaries Upstream of Englewood Dam", Agreement No. 18-12.35.

1.2 PURPOSE AND SCOPE

The purpose of this study is to provide updated hydrologic information for the Willow Creek tributaries that discharge to the main stem, upstream of Englewood Dam and downstream of County Line Road. The main stem of Willow Creek through the study area is not included in the analysis. Through discussions with sponsors and stakeholders, main goals and objectives for the study include:

- Engagement with residents of the active neighborhoods
- Provide hydrologic flood frequency analysis for tributaries to Willow Creek, including identification of the annual and water quality storm events.
- Evaluation of the existing drainage inventory.
- Identification of maintenance and capital improvement projects throughout the watershed to reduce the impact of the 100-year floodplain.
- Analysis of the water quality and annual storm events to help identify needs of the study area and to convey the more frequent discharges.

The tributaries of Willow Creek have most recently been studied by the MHFD in the *Willow Creek, Little Dry Creek, and Greenwood Gulch Outfall Systems Planning Study*, completed in 2010. The main goal of this current study was to evaluate the tributaries to Willow Creek in more detail than in 2010. More specifically, the following is a summary of the scope of work for the hydrologic portion of this study:

- Collect existing information, including previous Major Drainageway Plans, Outfall System Plans, and Flood Hazard Area Delineations for the study area.
- Delineate subwatershed boundaries and develop basin runoff hydrographs for each subwatershed using CUHP v 2.0. Watersheds will be discretized to a size of approximately 30 acres per basin.
- Develop routing for runoff hydrographs using EPA SWMM V5.1.013 for the 2-, 5-, 10-, 25-, 50-, 100-, and 500-year design storms for historic and future watershed conditions. Simulations representing the water quality and annual storm event for the basin will also be analyzed.
- Justification for differences between existing 100-yr floodplain hydrology and the hydrology developed under this project.

1.3 PLANNING PROCESS

Progress meetings were held at various stages throughout the project. A summary of these meetings can be found below. Minutes from the progress meetings can be found in Appendix A.

- January 24, 2019: Kickoff Meeting
- March 12, 2019: Baseline Hydrology Progress Meeting
- April 03, 2019: Baseline Hydrology Progress Meeting
- October 10, 2019: Baseline Hydrology Comment Review Progress Meeting
- December 18, 2019: Preliminary 2D Analysis Review Meeting

1.4 MAPPING AND SURVEYS

Project mapping was based on Federal Emergency Management Agency (FEMA) 2013 Post-flood LiDAR. The Lidar data was converted into one-foot interval contours for the study area.

The LiDAR mapping has the following attributes.

- Name: 2013 South Platte River Flood Area 1
- Collection Date: Fall 2013 – Spring 2014
- Vertical Accuracy: 9.25 cm RMSE
- Point Spacing: 0.7 m
- Vertical Datum: NAVD88
- Horizontal Datum: NAD83

1.5 DATA COLLECTION

Numerous previous reports were collected and reviewed as part of this study. A summary of these reports can be found below:

Table 1-1: Data Collected

Title	Date	Author
General Motors Auto Mall Underground Detention Plans	1997	JR Engineering
Panorma Park Regional Pond Improvements Plans	2007	Muller Engineering
Sam's Club Detention Pond Retrofit Drainage Report	2010	CEI Engineering Associates
Basin Improvement Plans for 7817 Park Meadows Drive	2010	CEI Engineering Associates
Flood Hazard Delineation Willow Creek	2010	CH2M Hill
Willow Creek, Little Dry Creek, and Greenwood Gulch Outfall Systems Planning Study	2010	CH2M Hill
Century Highland Park Subdivision Filing No. 2 Plans	2015	Peak Civil Consultants
West Spring Creek Hydrology Update	2018	Olsson Associates
SEMSWA Panorama Pond Improvements	2018	SEMSWA
The Jones District - Phase I Master Drainage Report	2019	Martin / Martin

1.6 ACKNOWLEDGEMENTS

This report was prepared with cooperation with the MHFD and SEMSWA. The representatives who were involved with this study are listed in Table 1-2, below.

Table 1-2: Project Team

Name	Organization	Title
Barbara Chongtoua, P.E., CFM	MHFD	Project Manager
Jon Villines, P.E., CFM	MHFD	Project Manager
Brik Zivkovich, EI	MHFD	Engineering Technologist
Stacey Thompson, CFM	SEMSWA	Group Manager, Floodplain and Master Planning
Lanae Raymond, CFM	SEMSWA	Director, Environmental Resources Division
Craig Jacobson, P.E., CFM	ICON	Principal-in-Charge
Jeremy Deischer, P.E.	ICON	Project Manager
Andrew Earles, Ph.D, P.E., D.WRE	Wright Water	Vice President

2.0 STUDY AREA DESCRIPTION

2.1 PROJECT AREA

The study area originates at Englewood Dam and extends upstream along Willow Creek to approximately County Line Road. The basin, generally bounded by Holly Street to the west, Englewood Dam to the north, I-25 to the east, and Park Meadows Drive to the south, has a drainage area of approximately 4.9 square miles and includes tributaries spanning multiple jurisdictions.

The following tributaries outfall into Willow Creek within the study area: Acres Green Tributary, Fox Hill Park Tributary, Homestead Tributary, Homestead Farms Tributary, Jamison Tributary, Kettle Tributary, Phillips Tributary, Spring Creek, Trenton Outfall Tributary, West Spring Creek, and Willow Creek East Tributary. Areas directly tributary to the main stem of Willow Creek were also included in the analysis. The study area includes the communities of the City of Centennial, City of Lone Tree, and areas of unincorporated Arapahoe and Douglas County.

Drainageways within the basin resemble a variety of hydraulic infrastructure originating from development circa the 1980's. Drainageways include a myriad of sections emphasizing open space and native vegetation, manicured blue grass stream systems, boulder revetment, large concrete and grouted drop structures, deep culverts, retaining walls, landscape design features, and even concrete baffled dissipation structures. Many, if not most, of the stream systems follow trail segments owned by a combination of South Suburban Parks and Recreation District (SSPRD), neighborhood HOA's, and local business districts.

Currently, the basin is nearly fully developed and includes residential neighborhoods, open space, parks, and commercial business areas. The commercial areas are predominately located along the eastern edge of the basin, with some areas located south of E-470. Elevations within the study area range between 5,572 feet at the Englewood Dam to 5,970 feet in Acres Green Tributary at Wiltshire Drive. The basin is approximately 2.5 miles long along Willow Creek and spans 3 miles at its widest.

The basin is comprised of multiple hydrologic soil types as defined by the Natural Resources Conservation Service (NRCS) (Reference 1). The study area primarily consists of hydrologic soil groups C and D type soil, which possess a lower infiltration capacity than other soil types. HSG Type A and B soils are also present within the basin. The latest soil information was retrieved from the NRCS Soil Survey Geographic (SSURGO) Database in April 2019. More information about the HSG can be found in Section 3.3.2. The distribution of soil through the study area can be found on the interactive map in Appendix B.

Although there are numerous detention facilities within the basin, only four met the criteria to be considered for flood reduction purposes in this study. The numerous other detention basins will be further evaluated during the alternative analysis phase. The five detention facilities included in the baseline hydrology are: Panorama Park, located along Willow Creek East Tributary upstream of South Yosemite Street, Yosemite Pond, located along Phillips Tributary east of Yosemite, Akron Pond, east of South Akron Street on Phillips Tributary, Sam's Club Detention Basin located on Acres Green Tributary just south of C-470, and the detention basin on Spring Creek just upstream of County Line Road.

A study area map, highlighting key features throughout the study area, can be found on Figure 2-2. A watershed map detailing the location of each tributary included in this study can be found on Figure 2-3.

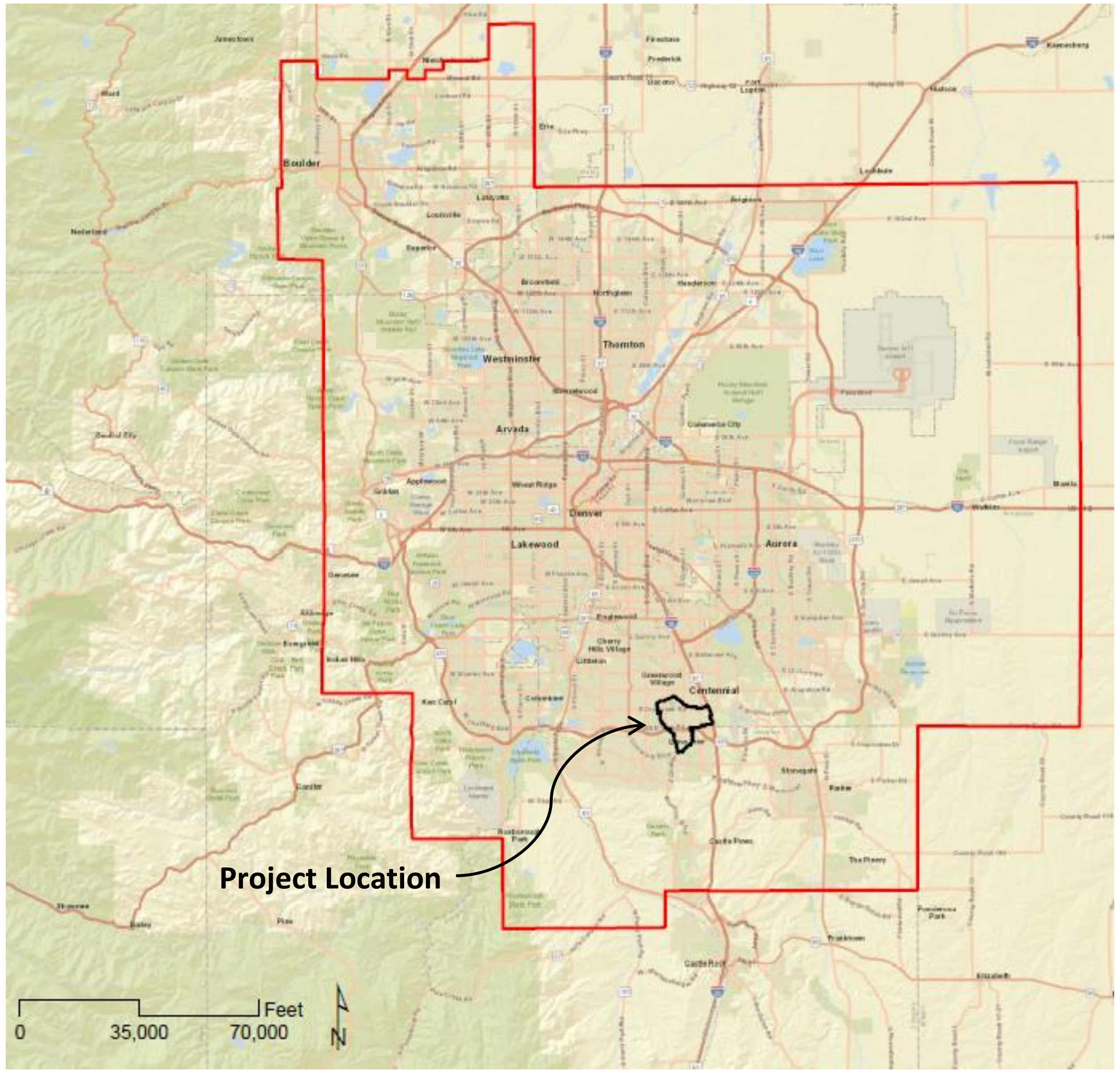


Figure 2-1: Vicinity Map

2.2 LAND USE

Future conditions land use was determined by Comprehensive Plans and zoning data obtained from each jurisdiction. Electronic data was obtained in shapefile format from City of Centennial and City of Lone Tree. Information for unincorporated areas of Arapahoe and Douglas County were digitized from land use maps. After discussion with project sponsors, the future land use projections for the E-470 corridor were set at 95 percent impervious.

Percent impervious values were selected for each zoning classifications using Table 6-3 of the Urban Storm Drainage Criteria Manual (USDCM), and can be found in Table 3-4. Future land use for the entire basin can be found in the interactive map, located in Appendix B.

The basin is predominately developed with no significant changes in land use anticipated in the future. After discussion with project sponsors, an existing conditions land use scenario was not deemed necessary given the similarities between existing and future land use projections.

The entire basin has a future impervious value of approximately 51 percent. Impervious values for the entire study area can be found on the interactive map, found in Appendix B.

2.3 WATERSHED DESCRIPTIONS

The study area was separated into twelve separate watersheds. Eleven of the watersheds are tributary to a drainageway before their outfalls into Willow Creek, with the twelfth watershed containing areas directly tributary to the main stem of Willow Creek.

An inventory of all major storm drainage structures for each watershed can be found in Table 2-1 through Table 2-11. Each drainageway and tributary watershed can be found in Figure 2-3.

2.3.1 ACRES GREEN TRIBUTARY

Acres Green Tributary Watershed, located in the southwest portion of the study area, is bounded by the Trent Tributary Watershed to the west. The watershed, approximately 274 acres in size, extends from the outfall in Willow Creek Park, in Centennial, south into the City of Lone Tree and unincorporated Douglas County. The watershed, originating near the Acres Green Drive and Mercury Drive intersection, drains south to north within the Acres Green subdivision. Street conveyance carries flow downstream to Altair Drive where flow is intercepted in a concrete pan located in the street median. Flow continues north along the median in Acres Green Drive approximately 2,100 feet to Apollo Court, where a storm drain system intercepts flow and conveys flow to a manhole east of Acres Green Drive just south of C-470.

The western portion of the watershed drains by surface conveyance and storm drain systems into the Sam's Club Detention Basin located at the northwest corner of Park Meadows Drive and Acres Green Drive. Stormwater runoff is conveyed through the outlet structure, east, to the confluence with the storm drain system in Acres Green Drive.

The combined storm drain system conveys flow north; underneath C-470 into the AutoNation Buick GMC Park Meadows underground detention. The underground detention, which consists of sixteen 10 foot diameter corrugated metal pipe (CMP) does not meet the requirements for publicly owned and maintained facilities and was therefore not considered in this study. Downstream of East County Line Road, the storm drain system continues north to East Phillips Circle where an open channel, consisting of riprap and a concrete low flow channel, conveys runoff through the Willow Creek and Willow Creek Townhouses subdivisions. Just north of the south crossing of East Phillips Circle an 18 inch RCP conveys low flow in the same direction as the overflow path. A 72-inch RCP conveys flow underneath East Phillips Circle to the north, where Acres Green Tributary outfalls into Willow Creek after a small pedestrian trail crossing.

Table 2-1: Major Crossing Structure - Acres Green Tributary

Acres Green Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
E Phillips Cir.	Secondary Collector	Culvert	72" RCP

2.3.2 FOX HILL PARK TRIBUTARY

Fox Hill Park Tributary Watershed, approximately 373 acres in size, is located within City of Centennial and unincorporated Douglas County. The watershed borders the western edge of the basin, and is bounded by the Spring Creek Tributary to the east and the Homestead Farms Tributary to the northwest. Land use upstream of County Line Road primarily consists of commercial and industrial properties. Runoff is conveyed underneath East County Line Road in an 18 inch storm drain. Flows in excess of the 18 inch storm drain are conveyed east along East County Line Road into the West Spring Creek Basin. North of East County Line Road, in the City of Centennial, runoff is conveyed in an open channel bordered by the Foxridge West subdivision to the east and Foxridge Plaza to the west. The open channel continues to northwest after crossing East Otero Avenue in two (2) 36-inch RCP culverts. As the channel enters Foxhill Park, a pedestrian trail parallels the drainageway to East Dry Creek Road. Approximately 500 feet downstream of East Otero Avenue, a pedestrian trail bridge crosses the drainageway to provide access to Foxhill Park.

Several amenities are present along Fox Hill Park Tributary, including tennis courts north of East Kettle

At East Kettle Avenue, two (2) 45-inch HDPE culverts convey flow underneath the roadway where a 42-inch storm drain outfalls into the drainageway. The storm drain intercepts flow from the west, from the South Holly Street and East Kettle Avenue intersection. The storm drain system extends upstream to the south along South Holly Street, intercepting flow from the private detention basin in the Heritage Greens subdivision.

Downstream of East Kettle Avenue the channel overbanks consist of maintained turf grass near the community pool and tennis courts. A series of drop structures provides grade control for the stream. The channel is confined by residential properties on both sides. Approximately 870 feet downstream of East Kettle Avenue, a pedestrian bridge trail crosses the drainageway, connecting the Homestead Farm 3rd and 6th Filing subdivisions. The tributary continues north to East Dry Creek Road where a series of drop structures lower the channel elevation for the 8 foot by 6 foot RCBC. North of East Dry Creek Road, within the Willow Creek Open Space, the tributary crosses a pedestrian trail before discharging into Willow Creek.

Table 2-2: Major Crossing Structures - Fox Hill Park Tributary

Fox Hill Park Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
E Otero Ave.	Secondary Collector	Culvert	(2) 36" RCPs
Pedestrian Bridge	--	Bridge	
E Kettle Ave.	Minor	Culvert	(2) 45" HDPEs
E Dry Creek Rd.	Arterial	Culvert	8' x 6' RCBC

2.3.3 HOMESTEAD TRIBUTARY

The Homestead Tributary Watershed, approximately a 100 acre watershed, is an right bank tributary of Willow Creek, north of East Dry Creek Road. The headwaters of the basin extend east of South Quebec Street near Dry Creek Elementary School in the Hallcrafts Walnut Hills subdivision. Surface conveyance carries flow to a storm drain system at South Quebec Street and East Hinsdale Avenue intersection. The storm drain system conveys flow west into the Homestead in the Willows subdivision, gradually increasing in size to a 48-inch RCP at South Homestead Parkway and East Geddes Place. West of the intersection the storm drain outfalls into an open channel that crosses a pedestrian trail just north of Homestead Elementary School. The open channel is bordered by residential properties to the north and the school property to the south outfall into Willow Creek.

Table 2-3: Major Crossing Structures - Homestead Tributary

Homestead Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
Pedestrian Bridge	--	Bridge	

2.3.4 HOMESTEAD FARMS TRIBUTARY

The Homestead Farms Tributary Watershed is located in the northwestern portion of the basin. The watershed, approximately 170 acres in size, drains from west to east. The north tributary in the Homestead Farms Tributary watershed collects surface runoff from Medema Park and crosses South Grape Street through a 36-inch RCP. Downstream of the roadway crossing, flow is conveyed in an open channel bordered by residential properties within the Homestead Farms 1st and 2nd Filing subdivisions. The stormwater runoff is conveyed underneath South Holly Street in a 42-inch RCP where the flow confluences with the southern tributary before the outfall into Willow Creek.

The southern tributary of Homestead Farms intercepts runoff from the Lifetime Fitness facility. A 30-inch storm drain at the East Dry Creek Road and South Glencoe Street intersection intercepts and conveys flow east along East Dry Creek Road. Additional inflow from local subwatersheds are intercepted at the East Dry Creek Road and South Holly Street intersection before the storm drain turns north along South Holly Street. The storm drain intercepts a lateral from the west that collects flow draining South Hudson Way. Ponding in the cul-de-sac near South Hudson Way has been observed during rain events. The 30-inch storm drain outfalls into an open channel, approximately 200 feet south of East Fremont Avenue. The open channel confluences with the northern tributary of Homestead Farms, continuing downstream to the outfall into Willow Creek.

Table 2-4: Major Crossing Structures - Homestead Farms Tributary

Homestead Farms Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
North Trib at S Grape St.	Minor	Culvert	36" RCP
North Trib at S Holly St.	Arterial	Culvert	42" RCP

2.3.5 JAMISON TRIBUTARY

Jamison Tributary conveys flow through open space upstream of the confluence with the Willow Creek East Tributary

Jamison Tributary, a right bank tributary to Willow Creek East, has a tributary area of approximately 53 acres. The basin extends north of East Dry Creek Road into the Hunters Hill 3rd Filing and Saddle Ridge Condominiums subdivisions. Runoff collects at the East Dry Creek Road and East Hunters Hill Drive intersection and is conveyed south in two 24-inch storm drains. The two systems converge just south of East Dry Creek Road in a 48 inch RCP pipe before discharging into the open channel. Flows in excess of the storm drain follow a similar alignment to the storm drain, heading south into the open channel in the Willow Creek 1st and 2nd Filing subdivisions. Localized drainage issues are known to occur within the watershed. Several pedestrian crossings exist along Jamison Tributary until the outfall with Willow Creek East, located approximately 490 feet upstream of South Rosemary Way.

Table 2-5: Major Crossing Structures - Jamison Tributary

Jamison Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
Pedestrian Bridge	--	Bridge	
Pedestrian Bridge	--	Bridge	

2.3.6 KETTLE TRIBUTARY

The Kettle Tributary is a left bank tributary to of Willow Creek East. The watershed is approximately 36 acres in size and spans across the Willow Creek 6th Filing subdivision, and the Highland Park and Panorama Park business districts. At the upstream end of the watershed, east of South Yosemite Street, flow collects in the business districts and is intercepted by a minor storm drain system. Flows converge at the intersection of South Yosemite Street and South Willow Way, where a 24-inch RCP crosses beneath the road. Flows in excess of the storm drain capacity overtop the roadway, and discharge into an open channel west of the roadway. A pedestrian trail parallels the open channel following the northwest flow path, where the tributary crosses East Kettle Circle, and continues in an open channel bounded by residential properties. The drainageway crosses East Kettle Circle a second time, conveyed by a

30-inch RCP which transitions to a 24-inch high by 48-inch wide horizontal elliptical RCP at East Kettle Circle to the outfall into Willow Creek East.

Table 2-6: Major Crossing Structures - Kettle Tributary

Kettle Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
E Kettle Cir.	Minor	Culvert	36" RCP
E Kettle Cir.	Minor	Culvert	30" RCP

2.3.7 PHILLIPS TRIBUTARY

Phillips Tributary is the southeastern most tributary in the basin, with approximately 170 acres in tributary area. Runoff is conveyed generally in a southwestern flow path through the Panorama Office Park 2, Highlands Park, and Willow Creek 10th Filing subdivisions. Bisecting the watershed is an open channel that conveys stormwater runoff through two detention basins and numerous retention ponds not used for flood control.

Yosemite Pond provides stormwater detention as well as a water feature

Upstream of South Akron Street, a network of storm drain pipes convey runoff to a series of retention ponds that outfall into the Akron Pond. Flow continues downstream to the Yosemite Pond, just east of South Yosemite Street. This detention basin was retrofitted as part of the Century Highland Park subdivision development. At the time of this study, SEMSWA has a planned cured in place pipe (CIPP) lining project at Yosemite Street. Downstream of Yosemite Pond, the open channel continues through the Willow Creek 10th Filing subdivision crossing East Phillips Place through an 11 foot by 6.5 foot horizontal elliptical reinforced concrete pipe (HERCP) and a 24-inch corrugated metal pipe (CMP). An open channel conveys flow downstream of East Phillips Place to the outfall into Willow Creek.

Table 2-7: Major Crossing Structures: Phillips Tributary

Phillips Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
S Yosemite St.	Arterial	Culvert	11' x 7' HECMP
E Phillips Pl	Minor	Culvert	11' x 6.5' HECMP

2.3.8 SPRING CREEK TRIBUTARY

Spring Creek Tributary is bounded between the Fox Hill Park Tributary and West Spring Creek to the west, and the Trenton Outfall Tributary to the east. The 680 acre watershed spans the City of Centennial at the downstream end, to City of Lone Tree and unincorporated Douglas County at the upstream end. Flow is conveyed from the upstream end of the watershed through the Highlands Ranch subdivisions. Flow is conveyed under South Quebec Street through three distinct flow paths in unincorporated Douglas County.

The eastern most tributary conveys flow from the Acres Green subdivision through Altair Park to South Quebec Street. A 54-inch storm drain system intercepts the runoff at South Quebec Street and conveys flows underneath the King Soopers parking lot, where the storm drain outfalls into the central tributary storm drain.

The central tributary collects runoff from the Prominence Point Open Space and Acres Green subdivision. The storm water is conveyed in an open channel behind the Highlands Ranch 89 C subdivision to South Quebec Street. The runoff enters a 54-inch storm drain system that conveys the flow through the King Soopers parking lot, intercepting the eastern tributary. The combined flows continue north to Business Center Drive where the storm drain system turns west, increasing in size to a 78-inch RCP storm drain, ultimately discharging into the western tributary storm drain system.

The western tributary of Spring Creek collects stormwater runoff throughout the Highlands Ranch 89 subdivision. A 60-inch RCP conveys flow underneath Chestnut Hill Street to the west, and a 48-inch storm drain system to the east. These two flow paths converge upstream of South Quebec Street before a 60-inch storm drain intercepts the flow. The storm drain system continues within the Highlands Ranch 126A subdivision to the north and to Business Center Drive where flow from the central and eastern flow paths is also intercepted. The combined flow continues north to E-470 in a 108-inch RCP storm drain. After crossing E-470, the runoff is conveyed to the Spring Creek detention basin which detains flow before passing underneath East County Line Road into the City of Centennial. Several drop structures provide grade control as the heavily vegetated channel continues downstream to East Otero Avenue. At East Otero Avenue the channel is conveyed through a 10 foot by 8 foot RCBC crossing structure. Further downstream, the heavily vegetated channel is bounded by residential properties on both sides, including the Ridge at Foxridge subdivision to the west, and The Hillside at Foxridge subdivision to the east. The Spring Creek Tributary confluences with West Spring Creek just upstream of East Mineral Avenue before flow is conveyed through a 10 foot by 10 foot RCBC. Two pedestrian trail bridges provide access to the trail system in the area as the drainageway continues to the outfall into Willow Creek just upstream of East Dry Creek Road.

Residential development bounds the creek on both sides downstream of East County

Table 2-8: Major Crossing Structures: Spring Creek Tributary

Spring Creek Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
E Otero Ave	Secondary Collector	Culvert	10' x 8' RCBC
E Mineral Ave	Secondary Collector	Culvert	10' x 10' RCBC
Pedestrian Bridge	--	Bridge	
Pedestrian Bridge	--	Bridge	

2.3.9 TRENTON OUTFALL TRIBUTARY

The Trenton Outfall Tributary extends from the outfall with Willow Creek in Willow Creek Park, upstream, to just south of East County Line Road. The 87 acre watershed spans the City of Centennial and City of Lone Tree. Stormwater runoff at the upstream end of the watershed collects along East County Line Road, east of Parkway Drive. The runoff is conveyed to the north in a 42-inch storm drain system. Flow is conveyed in an open channel to East Phillips Circle, where a 36-inch RCP conveys flow underneath the roadway. Just downstream of the south crossing of East Phillips Circle, an 18-inch storm drain conveys low flow in a similar flow direction as the overflow path. The Trenton Outfall Tributary conveys the flow in an open channel through the Willow Creek 11th Filing subdivision to a pedestrian bridge crossing before continuing to a second crossing of East Phillips Circle. The 42-inch storm drain system intercepts flow at the roadway crossing and conveys flow to the outfall into Willow Creek, through Willow Creek Park in a 48-inch RCP outfall.

Table 2-9: Major Crossing Structures - Trenton Outfall Tributary

Trenton Outfall Tributary			
Street Name	Street Classification	Structure Description	Existing Structure
E Phillips Cir.	Secondary Collector	Culvert	36" RCP
Pedestrian Bridge	--	Bridge	
E Phillips Cir.	Secondary Collector	Culvert	42" RCP

2.3.10 WEST SPRING CREEK

The West Spring Creek Tributary Watershed, approximately 117 acres in size, is bounded by Fox Hill Park Tributary to the west, and Spring Creek Tributary to the east. Runoff south of East County Line in the business parks is collected along the roadway and is conveyed north through a series of storm drain pipes. North of East County Line Road, in the City of Centennial, a heavily vegetated open channel conveys flow north through the Foxridge West and Foxridge 4th Filing subdivisions to East Phillips Avenue. A 60-inch RCP culvert carries flow through the roadway crossing. Downstream of the crossing, an open channel is bounded by residential properties on both sides within the Foxridge 5th Filing and The Ridge at Foxridge subdivisions. A pedestrian trail crossing along West Spring Creek is located just upstream of the confluence with Spring Creek at East Mineral Avenue. At the time of this study, stream improvements are being designed upstream of East Mineral Avenue. Stabilization of approximately 900 feet of stream is proposed through drop structures and includes a retaining wall of the right bank.

A pedestrian crossing is located on West Spring Creek just upstream of the confluence

Table 2-10: Major Crossing Structures - West Spring Creek

West Spring Creek			
Street Name	Street Classification	Structure Description	Existing Structure
E Phillips Ave.	Secondary Collector	Culvert	60" RCP
Pedestrian Bridge	--	Bridge	

2.3.11 WILLOW CREEK EAST TRIBUTARY

Willow Creek East meanders through open space west of S. Yosemite St.

The Willow Creek East Tributary Watershed, located in the northeast portion of the basin, has a tributary area of approximately 406 acres. Stormwater runoff is conveyed from east to west, to the outfall with Willow Creek upstream of South Quebec Street.

At the upstream end of the watershed, east of South Chester Street, proposed development is imminent within the Jones District. Current development plans propose to convey stormwater runoff along the historic drainage paths.

East of South Yosemite Street, runoff within the Panorama Corporate Center and Panorama development is collected in a storm drain network in Chester Street and Panorama Drive. The 72-inch storm drain conveys flow west within the Panorama development before discharging flow into Panorama Pond, located at the southeast corner of East Panorama Drive and South Yosemite Street. Flow exiting the flood control facility is conveyed through an open channel as the land use transitions to residential west of South Yosemite Street in the Willow Creek 4th and 6th Filing subdivisions. Two pedestrian crossings occur throughout the maintained turf open space, before the confluence with the Kettle Tributary, a left bank tributary of Willow Creek East. Flow continues downstream to South Willow Way where a 90-inch CMP crossing conveys flow through the roadway crossing. Downstream of South Willow Way, two pedestrian crossings are present before the confluence with the Jamison Tributary, a right bank tributary of Willow Creek East. Two additional pedestrian crossings span Willow Creek East before the roadway crossing of South Rosemary Way, a

16 foot by 8 foot RCBC. Further downstream, the open channel becomes heavily vegetated as flow is conveyed west before turning south and discharging into Willow Creek.

Table 2-11: Major Crossing Structures - Willow Creek East Tributary

Willow Creek East			
Street Name	Street Classification	Structure Description	Existing Structure
Pedestrian Bridge	--	Bridge	
Pedestrian Bridge	--	Bridge	
S Willow Way	Secondary Collector	Culvert	90" CMP
Pedestrian Bridge	--	Bridge	
Pedestrian Trail	--	Bridge	
S Rosemary Way	Secondary Collector	Culvert	16' x 8' RCBC
S Yosemite Way	Arterial	Culvert	60" RCP
S Chester St.	Secondary Collector	Culvert	66" RCP

2.3.12 WILLOW CREEK DIRECT FLOW AREAS

Subwatersheds conveying runoff directly to the main stem of Willow Creek, not through one of the eleven watersheds described above, was assigned to the direct flow area watershed. These subwatersheds, encompassing nearly 660 acres throughout the study area were modeled but stormwater runoff was not routed in the hydrologic modeling.

2.4 FLOOD HISTORY

No stream gages are present along the tributaries to Willow Creek. ALERT station 1600 is within the basin, located along the main stem of Willow Creek at the Englewood Dam.

On the afternoon of September 6th, 2019, a storm event, causing localized flooding including damages to infrastructure and property, occurred throughout the watershed. Between 3:30 pm and 6:00 pm a total of 2.8 inches of rainfall was recorded at ALERT station 1600. The storm was indicative of a typical Front Range ‘flashy’ storm with the majority (1.92 inches) of the rainfall occurring within the first thirty minutes. The point precipitation within the peak thirty-minute interval exceeded the 100-year design storm point precipitation.

On the evening of September 6th and following morning, flood documentation, including photos and high-water marks, were gathered along the tributaries. The Mile High Flood District also is gathering more data surrounding this event. Those findings, if available, will be included in subsequent reports.

Homestead Farms Tributary escaped the left bank eroding the pedestrian trail near Homestead Elementary

Fox Hill Park Tributary overtopped East Kettle Drive and eroded turf along the drainageway

Pedestrian trails were inundated along Spring Creek downstream of East Mineral Avenue

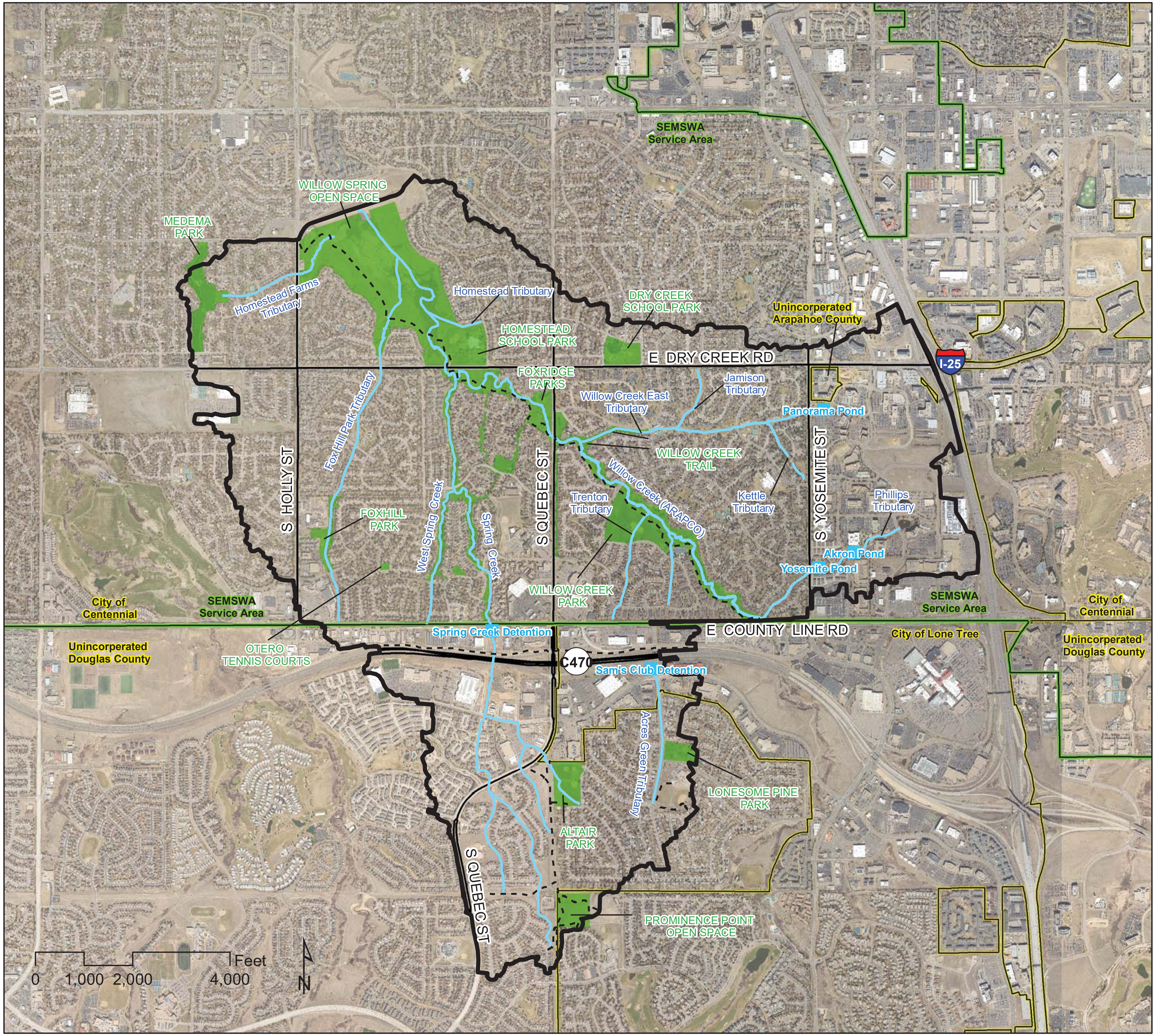
Significant debris collected at Spring Creek Detention Basin but the facility did not overtop County Line Road

The culvert crossing of Westerly Spring Creek at East Phillips Avenue clogged, resulting in flows overtopping the road damaging private property and an electric transformer in the area

Localized flooding caused damage to landscaping rock on South Holly Street near East Kettle Avenue

Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan

Figure 2-2 - Study Area Map



- Detention Basin
- Drainageway
- Trails
- Major Roads
- Parks / Open Space
- Study Area
- Political Boundary
- SEMSWA Service Area

Southeast Metro Stormwater Authority

MHFD MILE HIGH FLOOD DISTRICT

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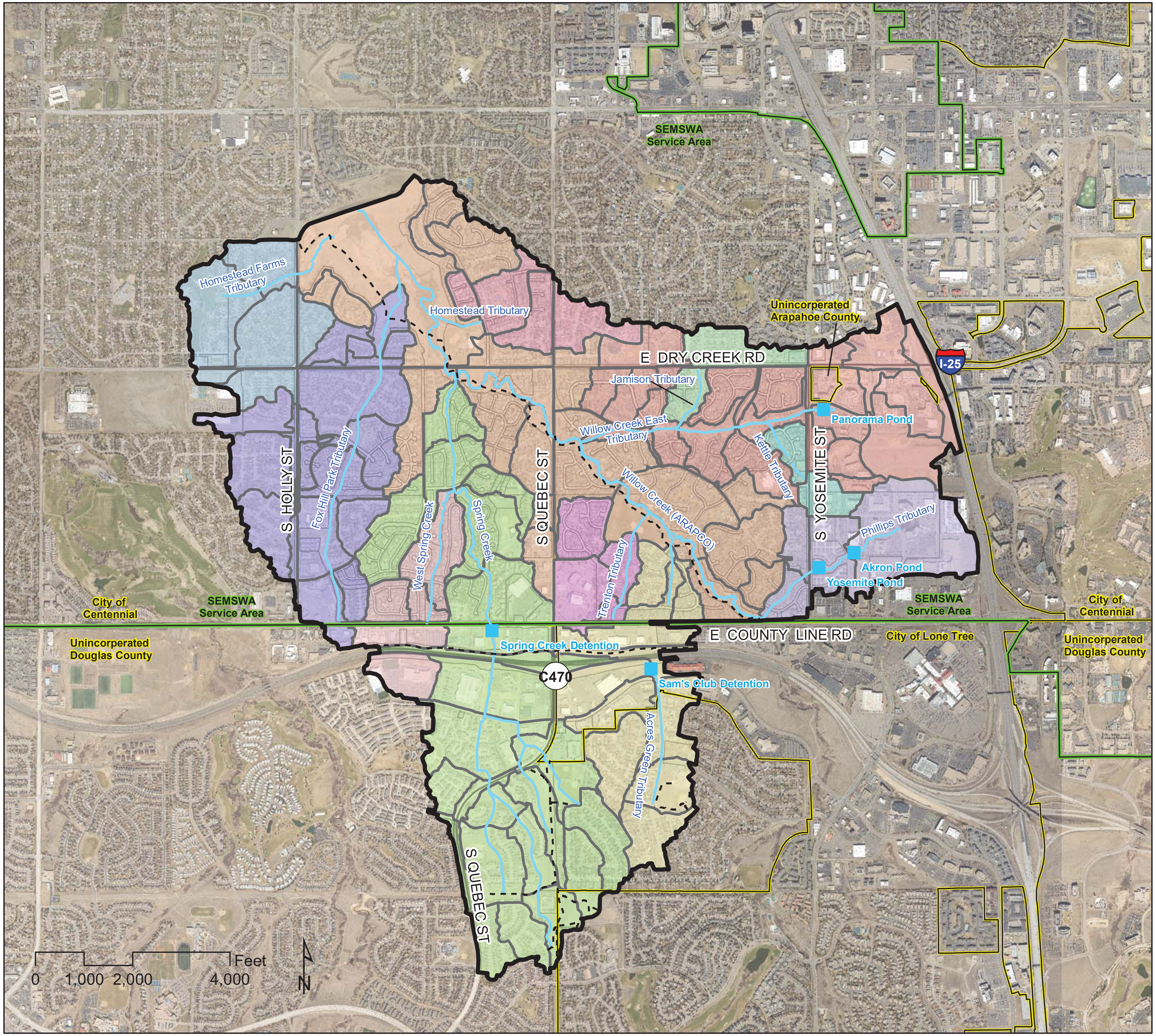
Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan

Figure 2-3 - Watershed Map



Detention Basin
Drainageway
Trails
Major Roads
Subwatershed
Study Area
Political Boundary
SEMSWA Service Area

Watersheds

- Acres Green Tributary
- DFA
- Foxhill Park
- Homestead Farms Tributary
- Homestead Tributary
- Jamison Tributary
- Kettle Tributary
- Phillips Tributary
- Spring Creek Tributary
- Trenton Tributary
- West Spring Creek Tributary
- Willow Creek East Tributary

Southeast Metro Stormwater Authority

MHFD MILE HIGH FLOOD DISTRICT

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3.0 HYDROLOGIC ANALYSIS

3.1 OVERVIEW

A new hydrologic model was prepared for the tributaries of Willow Creek upstream of Englewood Dam. The model establishes hydrology for the 2-, 5-, 10-, 25-, 50-, 100-, and 500-year design storm frequencies. The Colorado Urban Hydrograph Procedure 2005 version 2.0.0 (CUHP) was used to develop runoff hydrographs for each subwatershed. Subwatershed hydrographs were then routed using the EPA Stormwater Management Model version 5.1.013 (SWMM) to determine discharges at each design point.

The study area was divided into 129 subwatersheds encompassing the 4.9 square mile study area. Subwatersheds were discretized to a more refined level than typical studies to assist the team in quantifying discharge into each tributary and to evaluate more frequent events, such as the annual and water quality events. Subwatersheds ranged in size from 3 acres to 160 acres, with an average size of 24 acres. Percent imperviousness ranged from 14.5 percent to 95.0 percent impervious.

Due to the level of subwatershed discretization, one minute time step between computations was utilized in CUHP.

In general, the hydrologic model included storm drain systems 30-inches, or greater, in diameter; however, exceptions for pipes smaller than 30-inches were made when the flow in the storm drain system diverted flow into a different flow path than the topographic street conveyance.

In addition to the flood frequency analysis to establish baseline conditions flows, historic, water quality, and annual event design flows were established with this study. The process used to calibrate the soil infiltration parameters and the results for the historic, water quality, and annual event can be found in Section 3.7.

3.2 DESIGN RAINFALL

One- and six-hour rainfall depths were obtained from the NOAA Atlas 14 Point Precipitation Frequency Data Server for each study and location within the project area. The point precipitation values for each design storm can be found in Table 3-1.

Storm duration and Depth Reduction Factors (DRFs) were chosen using Table 5-1 of the USCDM. A two-hour storm duration was applied with no reduced factor given that no contiguous watershed exceeded the threshold of two square miles.

Complete rainfall distributions are provided in Appendix B.

Table 3-1: NOAA 14 1- and 6-hour Rainfall Depth

Design Storm Return Period	NOAA 14 1-hr	NOAA 14 6-hr
2	0.84	1.35
5	1.10	1.72
10	1.34	2.06
25	1.69	2.59
50	1.99	3.03
100	2.30	3.51
500	3.10	4.09

3.3 SUBWATERSHED CHARACTERISTICS

Subwatershed characteristics for each basin delineated as part of this study are further described below and can be found in Appendix B.

3.3.1 SUBWATERSHED DELINEATION

The overall study area was divided into 12 watersheds encompassing the 4.9 square mile basin. Each watershed was further discretized, totaling 129 subwatersheds. Each subwatershed was delineated using the project mapping as described in Section 1.4. Subwatersheds ranged in size from 3 acres to 160 acres, with an average size of 24 acres.

3.3.2 WATERSHED IMPERVIOUSNESS

Characterizations of subwatershed imperviousness were determined for future land use conditions. Given the extent of development already present in the basin, an existing conditions land use characterization was not included in this study.

Future conditions land use projections were determined from zoning data obtained from each jurisdiction. Impervious values for each Zoning classifications were selected from Table 6-3 of USDCM. These values can be found in Table 3-4.

Imperviousness for each watershed was computed using the area weighted average of each land use type through GIS software. During review of the zoning data obtained from the local jurisdictions, it was observed the right-of-way was not included in a zoning designation. After discussion with project sponsors, increases in imperviousness were not made for the right-of-way areas and the adjacent zoning designation was used for the calculations.

Subwatersheds varied from 14.5 percent to 95.0 percent impervious.

Impervious values are shown for the watersheds on the impervious map in Appendix B.

3.3.3 LENGTH, CENTROID DISTANCE, SLOPE

CUHP parameters such as subwatershed length, distance to centroid, and slopes were derived for each subwatershed using the project mapping described in Section 1.4. Slopes were computed using the length-weighted, corrected average slope from Equation 6-7 and Figure 6-4 (USDCM). These equations can be found in Figure 3-1 and Figure 3-2.

$$S = \left[\frac{L_1 S_1^{\ 0.24} + L_2 S_2^{\ 0.24} + \ldots + L_n S_n^{\ 0.24}}{L_1 + L_2 + L_3 \ldots L_n} \right]^{4.17} \qquad \text{Equation 6-7}$$

Where:

S = weighted basin waterway slopes in ft/ft

$S_1, S_2, \ldots S_n$ = slopes of individual reaches in ft/ft (after adjustments using Figure 6-4)

$L_1, L_2, \ldots L_n$ = lengths of corresponding reaches in ft.

Figure 3-1: Length Weighted, Corrected Average Slope Equation USDCM Equation 6-7 (Reference 2)

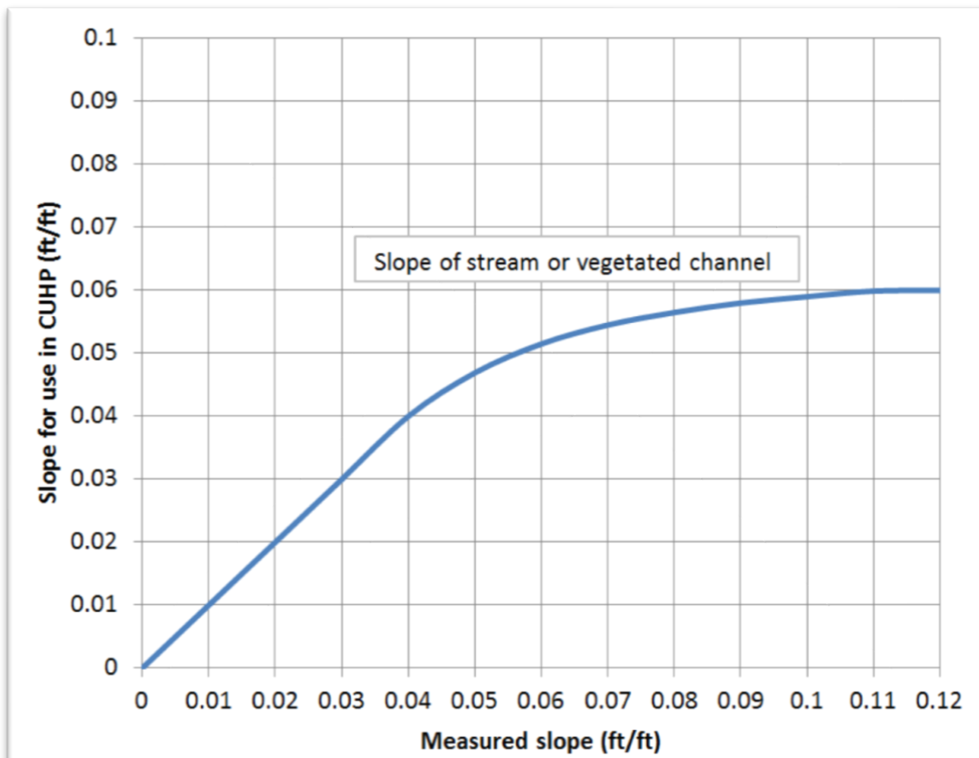


Figure 3-2: Slope correction for streams and vegetated channels USDCM Figure 6-4 (Reference 2)

3.3.1 DEPRESSION LOSSES

Depression storage loss was determined based on Table 6-6 from the USDCM. Aerial imagery was used to examine each subwatershed and apply the appropriate depression losses given the land use of the watershed. These values can be found in Table 3-2, below.

Table 3-2: Typical depression losses for various land covers - Table 6-6 of USDCM (Reference 2)

Land Cover	Range in Depression Losses	Recommended
Impervious: Large paved areas	0.05 - 0.15	0.1
Impervious: Roofs - flat	0.1 - 3	0.1
Impervious: Roofs - sloped	0.05 - 0.1	0.05
Pervious: Lawn grass	0.2 - 0.5	0.35
Pervious: Wooded areas and open fields	0.2 - 0.6	0.4

3.3.2 INFILTRATION

Soil data was obtained from Natural Resources Conservation Service (NRCS) web soil survey (Reference 1). Each soil classification is assigned a map unit symbol based on the soil characteristics. Map unit symbols categorization is then summarized into one of the four major soil types ranging from Type A representing well-draining soils, to Type D representing poorly-draining soils. These soil types are each assigned parameters for use in Horton's infiltration equation. Horton's infiltration equation initially infiltrates a high amount of runoff early in the storm, eventually decaying to a steady state constant value. Horton's infiltration method was found to provide a balance between simplicity and a reasonable physical description of the infiltration process for CUHP (USDCM, Reference 2).

The basin predominately contains Type C and D soil, but areas of Type A and Type B soils are also present. USDCM Table 6-7 provides Horton's infiltration parameters for each soil type. Soil parameters were averaged on an area weighted basis for subwatersheds that contained multiple soil types. Recommended Horton's equation parameters can be found in Table 3-3, below. The distribution of soil through the study area can be found on the interactive map in Appendix B.

Table 3-3: Recommended Horton's equation parameters - Table 6-7 of USDCM (Reference 2)

NRCS Hydrologic Soil Group	Infiltration (inches per hour) Initial	Final	Decay Coefficient (1/sec)
A	5.0	1.0	0.0007
B	4.5	0.6	0.0018
C	3.0	0.5	0.0018
D	3.0	0.5	0.0018

Table 3-4: Future Land Use

Jurisdiction	Zoning Classification	Zoning Description	UDFCD Zoning Classification	Percent Impervious
Arapahoe County	MU	Mixed Use	Business - Suburban Areas	75
Centennial	BP100	Business Park - 100 ft. height	Business - Downtown Areas	95
	BP35	Business Park - 35 ft. height	Business - Downtown Areas	95
	BP50	Business Park - 50 ft. height	Business - Downtown Areas	95
	BP75	Business Park - 75 ft. height	Business - Downtown Areas	95
	CG	Commericial - General	Business - Suburban Areas	75
	ED	Education	Schools	55
	NC12	Neighborhood Conservation, 12,000 sf min.	Residential 0.25 - 0.75 Acres	30
	NC5	Neighborhood Conservation, 5,000 sf min.	Residential < 0.25 Acres	45
	NC6	Neighborhood Conservation, 6,000 sf min.	Residential < 0.25 Acres	45
	NC9	Neighborhood Conservation, 9,000 sf min.	Residential < 0.25 Acres	45
	NCMF	Neighborhood Conservation, Multifamily	Apartments	75
	NCSFA	Neighborhood Conservation, (Existing)	Townhomes	60 [1]
	NCSFA	Neighborhood Conservation, (Existing)	Apartments	75
	OSR	Open Space and Recreation	Parks	10
	PUD	Planned Unit Development	Business - Downtown Areas	95
	UC	Urban Center	Business - Suburban Areas	75
Douglas County	SR	Suburban Residential	Residential < 0.25 Acres	45
Lone Tree	C1	Commercial Subzone C1	Business - Suburban Areas	75
	C2	Commercial Subzone C2	Business - Suburban Areas	75
	C3	Commercial Subzone C3	Business - Suburban Areas	75
	C4	Commercial Subzone C4	Business - Suburban Areas	75
	Institutional / Civic	Insititutional District	Schools	55
	Lone Tree Town Center PD	Planned Development District	Mix	75
	Open Space	Open Space	Open Space	2
	SRM	Suburban Residential	Residential < 0.25 Acres	45

1 - Interpolated Value between Highest Density Residential and Apartments

3.4 HYDROGRAPH ROUTING

3.4.1 ROUGHNESS COEFFICIENT

Roughness coefficients (Manning's n) for pipes were increased by 25% to better represent modeling conditions per USDCM criteria when using EPA SWMM.

3.4.2 CONVEYANCE ELEMENTS

Various conduit types were utilized to convey subwatershed hydrographs to each design point. Closed circular conduits were assigned to storm drain information based on GIS data from each jurisdiction. Typical street cross sections were developed for various right-of-way widths.

Irregular trapezoidal channel elements with varying side slopes and base widths were used to represent open channel conveyance. Outlet offsets were used to adjust the channel slope to better represent the conveyance channel slope, removing the elevation change associated with drop structures from each conduit. Elevation change from drop structures were estimated from project mapping.

A SWMM routing schematic can be found on the interactive map, located in Appendix B.

3.4.3 DETENTION FACILITIES

Detention basins were accounted for peak flow reduction in the baseline hydrology model only if they were deemed hydrologically significant in size and met requirements of being publically-owned or had a drainage easement and maintenance agreement in place. Numerous detention basins are present throughout the basin, but only four facilities met these requirements to be included in the baseline hydrology model. Stage versus storage curves were developed using project mapping. Stage outlet curves were developed using as-built plans, where available, and supplemented by field inspection.

3.5 PREVIOUS STUDIES

The effective hydrology for the study area from the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), effective February 17 2017, was most recently updated with the completion of the 2010 OSP and FHAD. The study which encompassed the Willow Creek, Little Dry Creek, and Greenwood Gulch basins provided the 100-year discharges for the study area, including the only FEMA regulated floodplain along Spring Creek.

In 2018, to evaluate alternatives for repairing channel banks along West Spring Creek, Olsson Associates updated the hydrology developed as part of the 2010 OSP and FHAD. Although the improvements were limited to only West Spring Creek, the entire hydrologic model was updated to CUHP v.2.0. The 2018 study updated the rainfall to NOAA 14 point precipitation values and removed the Manning's 'n' calibration factors applied to the 2010 study to correlate back to the previous 1974 study. No subwatershed boundaries, or routing, was changed between 2010 and the 2018 update.

3.6 RESULTS OF ANALYSIS

A comparison of effective discharges, 2018 CUHP v.2.0 discharges, and the flows developed with this current study, at various design points throughout the basin can be found in Table 3-5.

Differences in hydrologic modeling methods can be observed comparing the 2018 update to the 2010 study. No changes were made to basin parameters or routing characteristics other than the update to CUHP v.2.0 in the 2018 update. In general, unit runoff compares favorable between the 2018 update and the current study. Differences in peak flows can be attributed to more refined subwatershed routing, differences in land use assumptions, and changes to subwatershed delineations. Notable differences were observed specifically along Phillips Tributary, at Yosemite Street and Willow Creek, along Homestead Tributary, and just downstream of Panorama Pond along Willow Creek East near Yosemite Street.

On Phillips Tributary, differences in peak flow are influenced by two detention facilities, the Yosemite and Akron Ponds, not included in the original study. In addition, the level of discretization in the current study, compared to the basins developed in the 2010 study, found portions of the watershed routed to Phillips Tributary in the original study not to actually be part of the watershed.

Basin discretization provided a higher level of detail on Homestead Tributary, where approximately 35% of the 2010 basin delineation was determined to be non-tributary to Homestead Tributary. These areas were included in the analysis as direct flow areas to Willow Creek.

At Panorama Pond, updated basin delineations and hydrologic routing determined portions of the subwatershed previously routed to the detention facility contributed flow directly downstream of the detention basin. Some areas previously contributing to Panorama Pond were also determined to be tributary to the Kettle Tributary, which confluences with Willow Creek East downstream of the Panorama Pond. At Yosemite Street, additional subwatersheds were determined to be tributary to Willow Creek East, but contributed flow to the tributary downstream of the basin that were previously routed to Panorama Pond.

A summary of peak flows at design points throughout each watershed can be found in Table 3-6 through Table 3-16. The locations of all key design points can be seen on Figure 3-3. Peak discharge and inflow volumes for each design point during all design storm frequencies for both existing and future land use conditions can be found in Appendix B.

Table 3-5: 100-yr Hydrology Reconciliation

		2010 OSP			2018 CUHP 2.0 Update			2019 MDP			Flow Comparison	
Location	SWMM Junction	Drainage Area (Ac.)	Discharge (cfs)	Unit Runoff (cfs / acre)	Drainage Area (Ac.)	Discharge (cfs)	Unit Runoff (cfs / acre)	Drainage Area (Ac.)	Discharge (cfs)	Unit Runoff (cfs / acre)	Effective vs. 2019 MDP	2018 CUHP 2.0 vs. 2019 MDP
Fox Hill at Willow Creek	FHP_O005	390	1140	2.92	390	820	2.10	373	794	2.13	-30%	-3%
Fox Hill at Kettle Dr.	FHP_J030	268	866	3.23	268	626	2.34	231	524	2.26	-40%	-16%
Spring Creek at Willow Creek [1]	SPC_O005	801	1603	2.00	801	1411	1.76	681	1211	1.78	-24%	-14%
Spring Creek at Confluence with West Spring Creek [1]	SPC_J020	711	1600	2.25	711	1333	1.87	570	1009	1.77	-37%	-24%
Spring Creek at County Line	SPC_S100	455	1260	2.77	455	900	1.98	475	1035	2.18	-18%	15%
Acres Green U/S of C-470	ACR_J055	115	404	3.51	115	305	2.65	186	237	1.27	-41%	-22%
Acres Green at Willow Creek	ACR_O005	313	1059	3.38	313	594	1.90	274	439	1.61	-59%	-26%
Phillips Tributary at Yosemite St. [1]	PHI_J015	154	730	4.74	154	488	3.17	136	273	2.01	-63%	-44%
Phillips Tributary at Willow Creek [1]	PHI_O005	256	730	2.85	256	488	1.91	169	302	1.79	-59%	-38%
Homestead Tributary	HOM_J005	122	387	3.17	122	282	2.31	98	158	1.62	-59%	-44%
Willow Creek East at Willow Creek [1]	WCE_O005	613	1454	2.37	613	920	1.50	495	818	1.65	-44%	-11%
Willow Creek East at Rosemary [1]	WCE_J015	409	1080	2.64	410	765	1.87	413	672	1.63	-38%	-12%
Willow Creek East at S Yosemite St [1]	WCE_J045	217	764	3.52	217	484	2.23	180	329	1.83	-57%	-32%

1- Unit runoff affected by upstream detention

Table 3-6: Hydrologic Results – Acres Green Tributary

Acres Green Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
ACR 01	Outfall into Willow Creek	ACR_O005	98	142	189	289	358	439	648
ACR 02	Upstream of E Phillips Cir	ACR_J010	84	121	162	246	305	375	557
ACR 03	Downstream E Phillips Cir	ACR_J035	76	110	148	226	281	345	517
ACR 04	Upstream of E County Line Rd	ACR_J045	76	110	148	226	281	345	522
ACR 05	Upstream of C-470	ACR_J055	45	68	95	151	190	237	346
ACR 06	Sam's Club Detention Basin	ACR_S100	54	76	100	148	182	222	315
ACR 07	Upstream of Apollo Ct	ACR_J075	44	67	94	149	188	234	341
ACR 08	Upstream of Maximus Dr	ACR_J080	26	40	55	87	110	136	198

Table 3-7: Hydrologic Results - Fox Hill Park Tributary

Fox Hill Park Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
FHP 01	Outfall into Willow Creek	FHP_O005	149	225	310	503	637	794	1220
FHP 02	Upstream of E Dry Creek Rd	FHP_J015	135	203	280	452	572	711	1033
FHP 03	Downstream of E Kettle Ave	FHP_J020	112	167	229	369	463	572	828
FHP 04	Upstream of E Kettle Ave	FHP_J035	60	89	120	189	235	289	416
FHP 05	Downstream of Fox Hill Park	FHP_J040	50	73	98	150	186	227	325
FHP 06	Upstream of E Otero Ave	FHP_J050	20	27	33	45	53	63	86
FHP 07	Downstream of E County Line Rd	FHP_J055	6	7	7	7	7	7	7
FHP 08	Storm Drain Flow in E Kettle Ave	FHP_J115	38	55	73	73	73	73	73
FHP 08	Street Flow in E Kettle Ave	FHP_J215	0	1	6	55	89	128	219

Table 3-8: Hydrologic Results - Homestead Tributary

Homestead Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HOM 01	Outfall into Willow Creek	HOM_J005	38	61	81	128	147	158	204
HOM 02	Downstream of S Homestead Pkwy	HOM_J015	34	56	73	114	128	135	170
HOM 03	Storm Drain Flow at E Geddes Pl	HOM_L090	11	16	16	16	16	16	16
HOM 03	Surface Flow at E Geddes Pl	HOM_L090_OF	0	2	9	24	34	46	73
HOM 04	Storm Drain Flow North on S Newport Way	HOM_L045	20	31	42	62	62	62	62
HOM 04	Surface Flow South on S Newport Way	HOM_L045_OF	0	0	0	11	29	49	99
HOM 05	Storm Drain Flow at S Quebec St.	HOM_L090	11	16	16	16	16	16	16
HOM 05	Surface Flow at S Quebec St.	HOM_L090_OF	0	2	9	24	34	46	73

Table 3-9: Hydrologic Results - Homestead Farms Tributary

Homestead Farms Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HFT 01	North Tributary Outfall	HFT_O010	28	48	85	170	222	285	433
HFT 02	North Tributary at S Holly St	HFT_J005	28	44	64	108	137	172	253
HFT 03	North Tributary at S Grape St	HFT_J010	16	27	39	68	87	109	161
HFT 04	South Tributary Outfall (Storm Drain)	HFT_O005	32	46	47	47	47	47	47
HFT 05	South Tributary Storm Drain Flow North on S Holly St	HFT_L145	12	17	23	35	43	51	51
HFT 05	South Tributary Surface Flow North on S Holly St	HFT_L145_OF	0	0	0	0	0	1	22

Table 3-10: Hydrologic Results - Jamison Tributary

Jamison Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
JAM 01	Outfall into Willow Creek	JAM_B005 & JAM_J005	24	36	50	78	97	120	173
JAM 02	Downstream of E Dry Creek Rd	JAM_J005	20	28	38	57	70	86	123

Table 3-11: Hydrologic Results - Kettle Tributary

Kettle Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
KET 01	Outfall into Willow Creek	KET_J005	31	43	56	76	93	112	157
KET 02	Upstream of E Kettle Cir	KET_J035	24	31	38	51	61	72	98

Table 3-12: Hydrologic Results - Phillips Tributary

Phillips Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
PHI 01	Outfall in Willow Creek	PHI_O005	83	126	155	211	243	302	574
PHI 02	Upstream of E Phillips Pl	PHI_J010	83	126	155	211	243	302	574
PHI 03	Downstream of S Yosemite St	PHI_J015	78	118	142	192	219	273	528
PHI 04	S Yosemite St Pond	PHI_S100	149	200	249	345	417	478	603
PHI 05	S Akron St Pond	PHI_S200	114	152	189	264	320	378	524

Table 3-13: Hydrologic Results - Spring Creek Tributary

Spring Creek Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
SPC 01	Outfall into Willow Creek	SPC_O005	275	363	459	810	1013	1211	1621
SPC 02	Drop Structure near E Jamison Ave	SPC_J005	275	364	459	810	1013	1212	1623
SPC 03	Downstream of E Mineral Ave	SPC_J010	266	351	441	788	982	1169	1554
SPC 04	Confluence with West Spring Creek	SPC_J020	238	306	377	707	866	1009	1284
SPC 05	Upstream of E Otero Ave	SPC_J030	165	200	232	539	625	687	802
SPC 06	Downstream of County Line Road	SPC_J035	146	179	209	494	561	614	692
SPC 07	Spring Creek Detention Basin	SPC_S100	199	290	400	656	830	1035	1495
SPC 08	Upstream of E-470	SPC_J040	147	225	321	545	695	869	1246
SPC 09	Business Center Dr	SPC_J055	108	172	252	438	561	707	1029
SPC 10	Upstream of S Quebec St	SPC_J115	26	45	70	129	168	214	321
SPC 11	Western crossing of Chestnut Hill St	SPC_J135	15	26	39	69	89	113	168
SPC 12	Eastern crossing of Chestnut Hill St	SPC_J125	7	14	22	42	55	71	107
SPC 13	Eastern Spring Creek Storm Drain	SPC_J220	42	67	96	163	207	259	378
SPC 14	Eastern Spring Creek at Quebec	SPC_J265	13	21	31	55	70	89	132
SPC 15	Eastern Spring Creek at Quebec	SPC_J250	13	21	29	47	60	74	108

Table 3-14: Hydrologic Results - Trenton Outfall Tributary

Trenton Outfall Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
TRE 01	Western Tributary Outfall	TRE_O010	33	47	63	93	116	142	201
TRE 02	Western Tributary Storm Drain at E Mineral Pl	TRE_L205	33	47	63	93	116	142	145
TRE 02	Western Tributary Surface Flow at E Mineral Pl	TRE_L205_OF	0	0	0	0	0	0	56
TRE 03	Western Tributary Storm Drain at E Phillips Cir	TRE_L225	24	34	44	63	77	93	105
TRE 03	Western Tributary Surface Flow at E Philips Cir	TRE_L225_OF	0	0	0	0	0	0	23
TRE 04	Eastern TributaryOutfall	TRE_O005	11	18	25	41	52	65	94
TRE 05	Upstream of E Phillips Cir	TRE_J030	11	18	25	41	52	65	94
TRE 06	Upstream of E Phillips Cir	TRE_J035	6	9	12	17	20	25	35
TRE 07	Upstream of E County Line Rd	TRE_J045	2	3	4	5	7	8	11

Table 3-15: Hydrologic Results - West Spring Creek

West Spring Creek Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WSC 01	Outfall into Spring Creek	WSC_J005	66	96	129	196	244	296	392
WSC 02	Downstream of E Phillips Ave	WSC_J010	56	79	104	152	187	223	286
WSC 03	Upstream of E Phillips Ave	WSC_J020	49	68	89	128	157	186	232
WSC 04	Upstream of E County Line Rd	WSC_J030	25	35	44	61	73	82	82
WSC 05	Upstream of C-470	WSC_J050	26	35	44	61	74	89	123

Table 3-16: Hydrologic Results - Willow Creek East Tributary

Willow Creek East Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE 01	Outfall into Willow Creek	WCE_O005	169	237	312	511	660	818	1312
WCE 02	Upstream S Rosemary Way	WCE_J015	144	197	255	430	549	672	1124
WCE 03	Confluence with Jamison Tributary	WCE_J020	141	192	247	418	534	651	1096
WCE 04	Downstream of S Willow Way	WCE_J025	107	139	174	316	394	476	858
WCE 05	Upstream of S Willow Way	WCE_J030	95	121	159	283	349	430	783
WCE 06	Confluence with Kettle Tributary	WCE_J040	86	106	146	252	315	386	708
WCE 07	Downstream of S Yosemite St	WCE_J045	56	79	128	207	234	329	605
WCE 08	Panorama Pond	WCE_S100	168	224	275	370	453	520	692
WCE 09	Downstream of E Panorama Dr	WCE_J064	140	186	228	307	381	440	596

3.7 WATER QUALITY, ANNUAL EVENT AND HISTORIC CONDITIONS MODELING

As development occurs, a watershed can undergo rapid changes of flow, sediment transport, geometry and vegetation. The largest increases in volume and peak discharge occur in the more frequent events that comprise the critical stream-forming flows (Reference 2).

To help mitigate these impacts, MHFD recommends incorporating a bankfull channel into stream restoration design. The bankfull channel is the transition point where flow spills into the floodplain terraces, transitioning between the processes of channel and floodplain formation. The discharge that correlates to the bankfull channel, known as the bankfull discharge, can be determined through several different methods.

To establish a bank full discharge several different approaches can be used, which can involve basing the design on a reference reach, an effective design, or based on a return period design storm. The bank full channel is not formed by a specific return period but rather a design flow corresponding to between a 1.5- to 2-year flow. With no gage records available in the project area to assist in evaluating the bank full discharge, hydrologic modeling was conducted as part of the study to develop a water quality, annual, and 2-year design storm scenario. A calibration process for these hydrologic scenarios refined the soil infiltration parameters from the soil parameters used in the typical flood frequency analysis. The calibration process calibrated the soil parameters such that runoff for each watershed began during the threshold event during historic land use conditions. Future conditions land use parameters were then applied to subwatersheds to produce the water quality, annual, and 2-year models.

Wright Water Engineers conducted a literature review of threshold events to determine an appropriate design storm recurrence interval. A summary of their findings can be found in Section 3.7.3, with the entirety of their literature review found in Appendix B.

3.7.1 HISTORIC CONDITIONS MODELING

Several basin parameters were adjusted from the baseline model to represent an undeveloped watershed in the historic conditions modeling. A percent imperviousness value of two percent, representing an undeveloped watershed, was assigned to all watersheds. Depression storage losses for pervious areas in wooden or open fields were assigned to all subwatersheds based on Table 3-2. Horton's Infiltration Parameters were calibrated, further described in Section 3.7, to produce runoff during the threshold event. All routing elements were adjusted to open channel conveyance elements.

Subwatershed delineations and design point locations were not modified as part of this hydrologic scenario. Boundaries and design points were held constant to provide consistent comparisons to the flood frequency analysis. All storage elements were removed from the SWMM model for the historic conditions modeling.

3.7.2 SOIL INFILTRATION PARAMETERS

Saturated hydraulic conductivity, the amount of water that will move through saturated soil, was obtained from the Web Soil Survey (Reference 1) for each soil group. Various soil depths, ranging from 0 to 24-inches in depth, were sampled from the Web Soil Survey to determine the most restrictive saturated hydraulic conductivity. The area weighted average of the most restrictive saturated hydraulic conductivity for each soil group was computed for each sub watershed using GIS software. Initial infiltration was assigned a starting value 25 percent higher than the final saturated conductivity. A decay coefficient corresponding to Type A soils was assigned to all subwatersheds. Soil infiltration parameters were calibrated on a subwatershed by subwatershed basis to produce runoff during the threshold event, described in Section 3.7.3, during the historic land use scenario. Future conditions land use was applied to each subwatershed with the calibrated soil parameters in the Water Quality and Annual Event modeling, as described in Section 3.7.5.

3.7.3 THRESHOLD RUNOFF

Threshold runoff is defined as "the amount of *effective* rainfall of a given duration falling over a watershed that is just enough to cause *bankfull* conditions at the outlet of the draining stream." (References 5, 6).

Initial soil moisture content (or soil moisture deficit) is the most critical factor relating the precipitation to threshold runoff because threshold runoff quantifies the saturated and unsaturated soil condition relationship to direct runoff during varying precipitation events. Several research papers and experiments studies address these hydrologic-hydraulic through experimental studies and modeling applications.

To summarize, threshold runoff is a one-time, physically-based calculation relating watershed characteristics (area, length, slope) to channel properties (bankfull channel width and depth) of a given drainage area. The influence of antecedent soil water content to flow frequency is significant when compared to other hydrologic and hydraulic parameters on threshold runoff estimates. A complete summary of these papers and study can be found in Appendix B.

The literature indicates much variability for threshold runoff based on watershed conditions, and unfortunately, a detailed study of this phenomena has not been conducted in the Denver region. Such a study could potentially be conducted for small watersheds in the metropolitan area using MHFD rainfall and stream gauges.

Absent a detailed study in Colorado, Wright Water Engineers (WWE) supplemented the literature review with some Curve Number calculations to determine typical initial abstractions for different types of land cover. Table 2 presents these results, found in Appendix B. For herbaceous cover in good condition, typical of what would be expected in the Willow Creek Basin, the initial abstraction for Hydrologic Soil Group C is approximately 0.7 inches. The initial abstraction is very similar to the 1-hour, 1-year depth from NOAA Atlas 14 in the study area, which is 0.68 inches. If more woody vegetation is present, the initial abstraction was somewhat higher.

This literature review and supplemental calculations, further described in Appendix B, indicate that threshold runoff is very sensitive to site-specific conditions, including vegetative cover, hydrologic conditions, soils, antecedent moisture, and other watershed characteristics. Detailed data is not available for Colorado, but based on studies in western states and calculations, it seems reasonable to assume a threshold for runoff around the 1-year event for short duration (1- to 3- hour storms) for native grasslands. WWE found similar results in their continuous simulation modeling of the Oak Gulch watershed in Parker, for MHFD. MHFD hopes to collect baseline data in the Oak Gulch watershed before the development is constructed to help verify a range of threshold runoff values for different antecedent conditions.

3.7.4 HISTORIC CONDITIONS RESULTS

Peak flows for the historic conditions modeling for the 2-, 5-, 10-, 25-, 50-, 100-, and 500-yr events can be found in Table 3-17 through Table 3-27, below.

Table 3-17: Historic Conditions Results - Acres Green Tributary

Acres Green Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
ACR 01	Outfall into Willow Creek	ACR_O005	2	14	45	131	196	273	446
ACR 02	Upstream of E Phillips Cir	ACR_J010	2	11	38	114	173	242	398
ACR 03	Downstream E Phillips Cir	ACR_J035	1	10	35	107	163	229	378
ACR 04	Upstream of E County Line Rd	ACR_J045	1	10	35	107	163	229	378
ACR 05	Upstream of C-470	ACR_J055	1	7	27	87	135	192	319
ACR 06	Sam's Club Detention Basin	ACR_S100	1	4	15	42	63	88	143
ACR 07	Upstream of Apollo Ct	ACR_J075	1	3	12	46	74	106	179
ACR 08	Upstream of Maximus Dr	ACR_J080	0	3	9	29	45	63	105

Table 3-18: Historic Conditions Results - Fox Hill Park Tributary

Fox Hill Park Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
FHP 01	Outfall into Willow Creek	FHP_O005	3	20	63	184	277	387	638
FHP 02	Upstream of E Dry Creek Rd	FHP_J015	2	14	50	156	237	336	558
FHP 03	Downstream of E Kettle Ave	FHP_J020	2	14	49	138	204	282	458
FHP 04	Upstream of E Kettle Ave	FHP_J035	1	6	24	68	102	141	229
FHP 05	Downstream of Fox Hill Park	FHP_J040	1	6	20	54	80	110	177
FHP 06	Upstream of E Otero Ave	FHP_J050	0	3	7	17	24	32	51
FHP 07	Downstream of E County Line Rd	FHP_J055	0	1	3	6	8	10	15
FHP 08	Flow at E Kettle Ave	FHP_J115	1	3	14	44	67	94	155

Table 3-19: Historic Conditions Results - Homestead Tributary

Homestead Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HOM 01	Outfall into Willow Creek	HOM_J005	1	4	15	45	69	96	160
HOM 02	Downstream of S Homestead Pkwy	HOM_J015	0	2	12	38	59	83	139
HOM 03	Flow at E Geddes Pl	HOM_L090	0	0	4	13	20	28	47
HOM 04	Flow North on S Newport Way	HOM_L045	0	2	9	26	38	52	85
HOM 05	Flow at S Quebec St.	HOM_L090	0	0	4	13	20	28	47

Table 3-20: Historic Conditions Results - Homestead Farms Tributary

Homestead Farms Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HFT 01	North Tributary Outfall	HFT_O010	1	1	7	34	56	83	143
HFT 02	North Tributary at S Holly St	HFT_J005	1	1	7	34	56	83	143
HFT 03	North Tributary at S Grape St	HFT_J010	0	1	3	21	35	53	94
HFT 04	South Tributary Outfall	HFT_O005	0	4	12	34	51	71	116
HFT 05	South Tributary Flow North on S Holly St	HFT_L145	0	3	6	13	18	24	38

Table 3-21: Historic Condition Results - Jamison Tributary

Jamison Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
JAM 01	Outfall into Willow Creek	JAM_B005 & JAM_J005	0	2	9	26	39	55	90
JAM 02	Downstream of E Dry Creek Rd	JAM_J005	0	1	4	14	23	33	56

Table 3-22: Historic Conditions Results - Kettle Tributary

Kettle Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
KET 01	Outfall into Willow Creek	KET_J005	0	4	11	25	36	48	76
KET 02	Upstream of E Kettle Cir	KET_J035	0	3	6	14	20	27	42

Table 3-23: Historic Conditions Results - Phillips Tributary

Phillips Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
PHI 01	Outfall in Willow Creek	PHI_O005	2	8	16	78	128	186	323
PHI 02	Upstream of E Phillips Pl	PHI_J010	2	8	16	78	128	186	323
PHI 03	Downstream of S Yosemite St	PHI_J015	2	5	10	66	111	164	289
PHI 04	S Yosemite St Pond	PHI_S100	1	2	6	58	101	151	269
PHI 05	S Akron St Pond	PHI_S200	1	2	3	41	74	111	201

Table 3-24: Historic Condition Results - Spring Creek Tributary

Spring Creek Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
SPC 01	Outfall into Willow Creek	SPC_O005	4	27	98	350	556	810	1379
SPC 02	Drop Structure near E Jamison Ave	SPC_J005	4	27	98	350	557	810	1379
SPC 03	Downstream of E Mineral Ave	SPC_J010	4	27	96	342	543	789	1343
SPC 04	Confluence with West Spring Creek	SPC_J020	4	26	87	307	488	708	1207
SPC 05	Upstream of E Otero Ave	SPC_J030	3	23	70	242	383	558	952
SPC 06	Downstream of County Line Road	SPC_J035	3	23	69	225	352	505	852
SPC 07	Spring Creek Detention Basin	SPC_S100	3	23	69	225	352	505	852
SPC 08	Upstream of E-470	SPC_J040	3	22	66	211	328	469	790
SPC 09	Business Center Dr	SPC_J055	3	22	61	185	281	397	663
SPC 10	Upstream of S Quebec St	SPC_J115	1	8	22	67	101	141	232
SPC 11	Western crossing of Chestnut Hill St	SPC_J135	0	1	4	24	40	59	103
SPC 12	Eastern crossing of Chestnut Hill St	SPC_J125	0	4	12	29	42	56	90
SPC 13	Eastern Spring Creek Storm Drain	SPC_J220	1	9	26	70	103	142	231
SPC 14	Eastern Spring Creek at Quebec	SPC_J265	0	7	15	34	47	62	97
SPC 15	Eastern Spring Creek at Quebec	SPC_J250	0	1	7	19	27	38	61

Table 3-25: Historic Condition Results - Trenton Outfall Tributary

Trenton Outfall Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
TRE 01	Western Tributary Outfall	TRE_O010	1	4	12	31	45	62	99
TRE 02	Western Tributary Flow at E Mineral Pl	TRE_L205	1	4	12	31	45	62	99
TRE 03	Western Tributary Flow at E Phillips Cir	TRE_L225	0	1	5	15	23	33	54
TRE 04	Eastern TributaryOutfall	TRE_O005	1	4	9	21	30	39	61
TRE 05	Upstream of E Phillips Cir	TRE_J030	1	4	9	21	30	39	61
TRE 06	Upstream of E Phillips Cir	TRE_J035	1	3	4	8	10	13	19
TRE 07	Upstream of E County Line Rd	TRE_J045	0	1	1	2	3	3	5

Table 3-26: Historic Conditions Results - West Spring Creek

West Spring Creek Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WSC 01	Outfall into Spring Creek	WSC_J005	1	4	18	56	86	122	201
WSC 02	Downstream of E Phillips Ave	WSC_J010	1	3	14	41	61	85	139
WSC 03	Upstream of E Phillips Ave	WSC_J020	0	2	10	30	46	65	107
WSC 04	Upstream of E County Line Rd	WSC_J030	0	0	4	14	22	31	51
WSC 05	Upstream of C-470	WSC_J050	0	0	4	14	22	31	51

Table 3-27: Historic Conditions Results - Willow Creek East Tributary

Willow Creek East Tributary Watershed Peak Flow Results (cfs)									
Figure ID	Location	SWMM Node	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE 01	Outfall into Willow Creek	WCE_O005	3	29	89	251	371	511	828
WCE 02	Upstream S Rosemary Way	WCE_J015	3	24	75	210	310	427	693
WCE 03	Confluence with Jamison Tributary	WCE_J020	3	23	72	203	300	413	671
WCE 04	Downstream of S Willow Way	WCE_J025	2	19	57	157	230	316	511
WCE 05	Upstream of S Willow Way	WCE_J030	2	17	52	142	209	287	464
WCE 06	Confluence with Kettle Tributary	WCE_J040	2	14	44	123	181	250	405
WCE 07	Downstream of S Yosemite St	WCE_J045	2	10	35	99	146	203	331
WCE 08	Panorama Pond	WCE_S001	1	6	26	79	120	169	278
WCE 09	Downstream of E Panorama Dr	WCE_J064	1	6	23	67	101	142	232

3.7.5 WQ AND ANNUAL EVENT MODEL

The Water Quality Capture Volume (WQCV) event, the 80th percentile storm event, is an event with a total rainfall depth of 0.6 inches in the Denver region (Reference 2). To produce a CUHP 2-hr rainfall distribution equating to 0.6 inches of rainfall, a modified 1-hour point rainfall depth of 0.519 inches was developed to represent the WQCV storm. NOAA 14 point precipitation for the 1-hour and 6-hour storms were obtained for annual and 2-year event with no adjustments. Rainfall values used for each return occurrence interval can be found in Table 3-28, below.

Table 3-28: WQ, Annual, 2-yr NOAA 14 Rainfall

Design Storm Return Period	NOAA 14 1-hr	NOAA 14 6-hr
WQ	0.519 [1]	--
Annual	0.693	1.140
2-yr	0.842	1.350

1 - 1-hr point rainfall to equate to CUHP distribution of 0.6 in event

Future land use projections were applied to the historic condition model with the soil infiltration parameters calibrated to the threshold event. Depression storage losses were spatially assigned to reflect future land use similar to the flood frequency analys using Table 3-2.

The baseline hydrology model, a combination of storm drain and surface routing elements was used for the water quality and annual event modeling. No adjustments to subwatershed delineations or location of SWMM design points and routing element were made to the baseline model.

3.7.6 WQ AND ANNUAL EVENT MODEL RESULTS

Peak flows for the water quality, annual event, and 2-year design storm for each design point are presented in Table 3-29 through Table 3-39, below.

Table 3-29: WQ & Annual Results - Acres Green Tributary

Acres Green Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
ACR 01	Outfall into Willow Creek	ACR_O005	51	75	98
ACR 02	Upstream of E Phillips Cir	ACR_J010	43	63	83
ACR 03	Downstream E Phillips Cir	ACR_J035	39	56	74
ACR 04	Upstream of E County Line Rd	ACR_J045	39	56	74
ACR 05	Upstream of C-470	ACR_J055	22	31	43
ACR 06	Sam's Club Detention Basin	ACR_S100	28	42	54
ACR 07	Upstream of Apollo Ct	ACR_J075	21	30	42
ACR 08	Upstream of Maximus Dr	ACR_J080	13	19	25

Table 3-30: WQ & Annual Results - Fox Hill Park Tributary

Fox Hill Park Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
FHP 01	Outfall into Willow Creek	FHP_O005	71	113	148
FHP 02	Upstream of E Dry Creek Rd	FHP_J015	64	101	133
FHP 03	Downstream of E Kettle Ave	FHP_J020	54	84	112
FHP 04	Upstream of E Kettle Ave	FHP_J035	28	45	59
FHP 05	Downstream of Fox Hill Park	FHP_J040	24	38	49
FHP 06	Upstream of E Otero Ave	FHP_J050	10	15	20
FHP 07	Downstream of E County Line Rd	FHP_J055	3	5	6
FHP 08	Storm Drain Flow in E Kettle Ave	FHP_J115	19	28	37
FHP 08	Street Flow in E Kettle Ave	FHP_J215	0	0	0

Table 3-31: WQ & Annual Results - Homestead Tributary

Homestead Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
HOM 01	Outfall into Willow Creek	HOM_J005	19	28	38
HOM 02	Downstream of S Homestead Pkwy	HOM_J015	17	25	34
HOM 03	Storm Drain Flow at E Geddes Pl	HOM_L090	6	8	11
HOM 03	Surface Flow at E Geddes Pl	HOM_L090_OF	0	0	0
HOM 04	Storm Drain Flow North on S Newport Way	HOM_L045	10	15	20
HOM 04	Surface Flow South on S Newport Way	HOM_L045_OF	0	0	0
HOM 05	Storm Drain Flow at S Quebec St.	HOM_L090	6	8	11
HOM 05	Surface Flow at S Quebec St.	HOM_L090_OF	0	0	0

Table 3-32: WQ & Annual Results - Homestead Farms Tributary

Homestead Farms Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
HFT 01	North Tributary Outfall	HFT_O010	12	19	25
HFT 02	North Tributary at S Holly St	HFT_J005	12	19	25
HFT 03	North Tributary at S Grape St	HFT_J010	7	10	14
HFT 04	South Tributary Outfall (Storm Drain)	HFT_O005	16	24	32
HFT 05	South Tributary Storm Drain Flow North on S Holly St	HFT_L145	7	10	13
HFT 05	South Tributary Surface Flow North on S Holly St	HFT_L145_OF	0	0	0

Table 3-33: WQ & Annual Results - Jamison Tributary

Jamison Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
JAM 01	Outfall into Willow Creek	JAM_J005 & JAM_B005	13	18	24
JAM 02	Downstream of E Dry Creek Rd	JAM_J005	11	14	19

Table 3-34: WQ & Annual Results - Kettle Tributary

Kettle Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
KET 01	Outfall into Willow Creek	KET_J005	16	24	31
KET 02	Upstream of E Kettle Cir	KET_J035	13	18	23

Table 3-35: WQ & Annual Results - Phillips Tributary

Phillips Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
PHI 01	Outfall in Willow Creek	PHI_O005	33	63	82
PHI 02	Upstream of E Phillips Pl	PHI_J010	33	63	82
PHI 03	Downstream of S Yosemite St	PHI_J015	31	58	76
PHI 04	S Yosemite St Pond	PHI_S100	81	114	147
PHI 05	S Akron St Pond	PHI_S200	63	88	113

Table 3-36: WQ & Annual Results - Spring Creek Tributary

Spring Creek Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
SPC 01	Outfall into Willow Creek	SPC_O005	159	225	267
SPC 02	Drop Structure near E Jamison Ave	SPC_J005	159	225	267
SPC 03	Downstream of E Mineral Ave	SPC_J010	155	219	259
SPC 04	Confluence with West Spring Creek	SPC_J020	143	198	232
SPC 05	Upstream of E Otero Ave	SPC_J030	106	143	161
SPC 06	Downstream of County Line Road	SPC_J035	93	126	144
SPC 07	Spring Creek Detention Basin	SPC_S100	100	147	195
SPC 08	Upstream of E-470	SPC_J040	69	108	143
SPC 09	Business Center Dr	SPC_J055	49	79	107
SPC 10	Upstream of S Quebec St	SPC_J115	10	19	26
SPC 11	Western crossing of Chestnut Hill St	SPC_J135	6	10	14
SPC 12	Eastern crossing of Chestnut Hill St	SPC_J125	3	6	8
SPC 13	Eastern Spring Creek Storm Drain	SPC_J220	20	32	43
SPC 14	Eastern Spring Creek at Quebec	SPC_J265	6	10	14
SPC 15	Eastern Spring Creek at Quebec	SPC_J250	6	10	13

Table 3-37: WQ & Annual Results - Trenton Outfall Tributary

Trenton Outfall Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
TRE 01	Western Tributary Outfall	TRE_O010	17	25	34
TRE 02	Western Tributary Storm Drain at E Mineral Pl	TRE_L205	17	25	34
TRE 02	Western Tributary Surface Flow at E Mineral Pl	TRE_L205_OF	0	0	0
TRE 03	Western Tributary Storm Drain at E Phillips Cir	TRE_L225	13	19	24
TRE 03	Western Tributary Surface Flow at E Philips Cir	TRE_L225_OF	0	0	0
TRE 04	Eastern TributaryOutfall	TRE_O005	5	9	12
TRE 05	Upstream of E Phillips Cir	TRE_J030	5	9	12
TRE 06	Upstream of E Phillips Cir	TRE_J035	3	5	7
TRE 07	Upstream of E County Line Rd	TRE_J045	1	2	2

Table 3-38: WQ & Annual Results - West Spring Creek

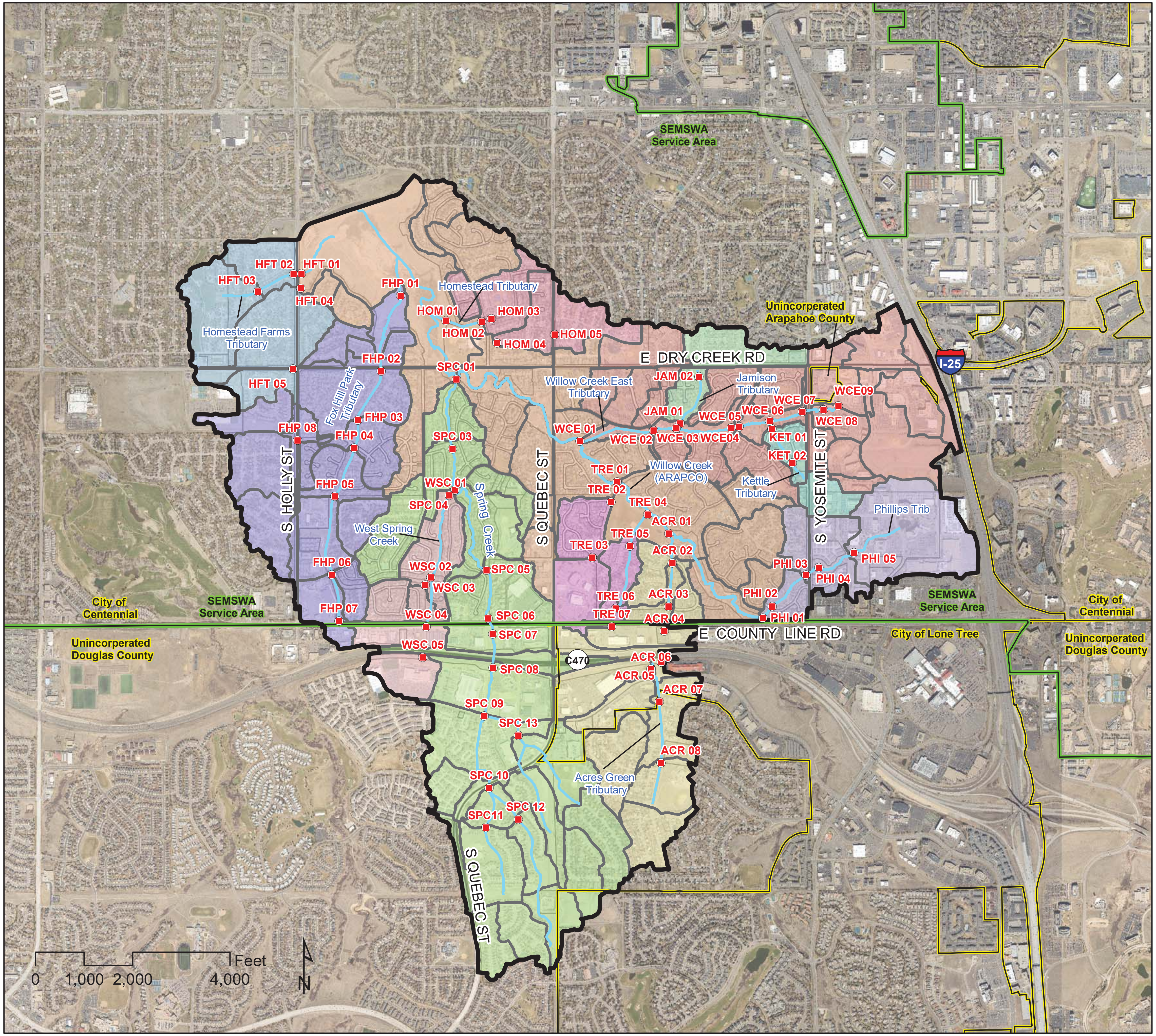
West Spring Creek Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
WSC 01	Outfall into Spring Creek	WSC_J005	33	49	65
WSC 02	Downstream of E Phillips Ave	WSC_J010	29	42	55
WSC 03	Upstream of E Phillips Ave	WSC_J020	25	37	48
WSC 04	Upstream of E County Line Rd	WSC_J030	13	19	25
WSC 05	Upstream of C-470	WSC_J050	13	19	25

Table 3-39: WQ & Annual Results - Willow Creek East Tributary

Willow Creek East Tributary Watershed Peak Flow Results (cfs)					
Figure ID	Location	SWMM Node	WQ	Annual	2-yr
WCE 01	Outfall into Willow Creek	WCE_O005	96	138	170
WCE 02	Upstream S Rosemary Way	WCE_J015	84	118	144
WCE 03	Confluence with Jamison Tributary	WCE_J020	83	115	141
WCE 04	Downstream of S Willow Way	WCE_J025	67	89	107
WCE 05	Upstream of S Willow Way	WCE_J030	62	80	95
WCE 06	Confluence with Kettle Tributary	WCE_J040	57	73	85
WCE 07	Downstream of S Yosemite St	WCE_J045	42	50	56
WCE 08	Panorama Pond	WCE_S100	92	132	168
WCE 09	Downstream of E Panorama Dr	WCE_J064	76	110	140

Willow Creek Tributaries Upstream of Englewood Dam Major Drainageway Plan

Figure 3-3 - Peak Flow Results



Hydro Design Point	Subwatershed
Drainageway	Study Area
Major Roads	Political Boundary
	SEMSWA Service Area

Watersheds

- Acres Green Tributary
- DFA
- Foxhill Park
- Homestead Farms Tributary
- Homestead Tributary
- Jamison Tributary
- Kettle Tributary
- Phillips Tributary
- Spring Creek Tributary
- Trenton Tributary
- West Spring Creek Tributary
- Willow Creek East Tributary

Southeast Metro Stormwater Authority

MHFD MILE HIGH FLOOD DISTRICT

ICON ENGINEERING

4.0 REFERENCES

1. United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
2. Urban Drainage and Flood Control District (2016) Urban Storm Drainage Criteria Manual Volume 1 and 2
3. CH2M Hill (2010) Willow Creek FHAD 2010
4. CH2M Hill (2010) Willow Creek, Little Dry Creek, and Greenwood Gulch Outfall Systems Planning Study
5. Modrick, T. (2015). CARFFG System Design and Theoretical Background. National Weather Service, Hydrologic Research Center. Presentation. September 15, 2015.
6. Shamir, E. (2018). CARFFG System Design and Theoretical Background: GIS and Threshold Runoff. National Weather Service, Hydrologic Research Center, San Diego, CA. Presentation. Last modified August 30, 2018.

APPENDIX A - PROJECT CORRESPONDENCE

Willow Creek Tributaries Major Drainageway Plan & FHAD
Kickoff Meeting

January 22, 2019 1:30 PM
SEMSWA Office
Meeting Minutes

Attendees:	*Barbara Chongtoua*,	UDFCD
	Dana Morris,	UDFCD
	Stacey Thompson,	*SEMSWA*
	Lanae Raymond,	*SEMSWA*
	Craig Jacobson,	*ICON Engineering*
	Jeremy Deischer,	*ICON Engineering*
	James Duvall,	*ICON Engineering*

1. Project Sponsors
    a. The team discussed additional stakeholders that will be contacted to determine their level of interest in the study. The stakeholders include: Lone Tree, Douglas County, South Suburban Parks and Recreation, Arapahoe County, South Gate Water Sanitation Districts
2. Meetings
    a. Four meetings will be held during the hydrologic analysis portion of the project. In addition to the kick-off meeting the other three meetings are:
        i. February 21, 2019 at 9:00 AM. This meeting will discuss the development of the hydrologic model. Andrew Earles from Wright Water Engineers will be present at the meeting to provide guidance on the parameters in the hydrologic model to adjust for the water quality event modeling.
        ii. Late March – Discuss preliminary model results
        iii. After Draft Baseline Hydrology submittal – Review comments on the draft baseline hydrology study.
3. Key Components of Study to Stakeholders
    a. This study will provide analysis of unstudied tributaries to Willow Creek where other projects focused on the main branch.
    b. Identify maintenance needs throughout the watershed.
    c. Water quality and analysis of annual flows.
    d. Engage with active neighborhood
    e. Identify potential capital improvement projects to reduce the impact of the 100-year floodplain on development.
        i. The team agreed on coordination with South Suburban Parks and Rec. and the West Spring Creek Master Plan during the alternatives phase of the Willow Creek Tributaries study.
4. Land Use Approach
    a. The team agreed with the watershed already predominately developed no future conditions land use scenario would be required. In addition to existing conditions, a historical land use scenario, representing pre-development conditions will be analyzed.
    b. The Jones District, a planned mixed use development on the eastern portion of the basin will be considered fully built in the existing conditions analysis.

5. Ponds
    a. The team agreed that only hydraulically significant ponds with maintenance agreements will be analyzed as part of the Baseline Hydrology submittal with the remaining ponds being addressed in the Alternatives Analysis.
    b. ICON will engage with Douglas County to get more information about the Lone Tree detention pond located near C-470.

ACTION ITEMS

1. SEMSWA
    a. Send ICON the most recent impervious, land use, and SEMSWA boundary GIS layers.
    b. Provide plans for Jones District Redevelopment
2. ICON Engineering
    a. Send email to all stakeholders detailing project schedule and general kickoff information.
    b. Publish project website. Website to be hosted by ICON Engineering.
    c. Add Dana to all future meeting invites.
    d. Coordinate with Douglas County Water & Sanitary Districts to obtain impervious surface and storm drain infrastructure GIS layers.

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by:

James Duvall, EIT — January 25, 2019
ICON Engineering, Inc.

Willow Creek Tributaries Major Drainageway Plan & FHAD
Progress Meeting

March 12, 2019 1:00 PM
UDFCD Office
Meeting Minutes

Attendees:		
	Barbara Chongtoua,	UDFCD
	Dana Morris,	UDFCD
	Stacey Thompson,	*SEMSWA*
	Lanae Raymond,	*SEMSWA*
	Andrew Earles,	*Wright Water Engineering*
	Craig Jacobson,	*ICON Engineering*
	Jeremy Deischer,	*ICON Engineering*
	James Duvall,	*ICON Engineering*

1. Zoning
    a. The team reviewed the percent impervious values assigned for each zoning classifications for Arapahoe County, Douglas County, Centennial, and Lone Tree. Standard values from UDFCD criteria were used except an additional classification of 60% impervious for townhomes.
    b. A question concerning gaps in zoning within the right of way (ROW) and the percent impervious for residential areas. UDFCD criteria states the percent impervious for residential areas is for lot area only with the maximum impervious for a quarter acre lot 45 percent. Preferred solution was to leave the residential areas at 45% impervious, assign 80% impervious for ROW that does not have a zoning designation. Barbara will follow up with Shea Thomas to confirm the methodology.
    c. The group agreed to use an impervious value of 10% for the Centennial zoning class, Open Space and Recreation (OSR). The OSR classification does not differentiate between parks and community centers.
    d. No zoning class/impervious assumption has been provided for the CDOT ROW. Preference is to assume a percent impervious based on CDOT expected build-out values. ICON will follow up with CDOT to determine the correct impervious value.
2. Direct Flow Areas
    a. Although the focus of this study is the tributaries of Willow Creek, ICON will add direct flow subcatchments to Willow Creek to the study. The subcatchments will extend to the centerline of Willow Creek.
    b. CUHP hydrographs will be computed; however, these basins will not be routed in the SWMM model.
3. Overflow diversions
    a. As the SWMM routing is being developed, ICON will review any areas where overflows could divert from the primary overflow path and cause property damage.
4. Land use should be called “future” conditions, not “existing”, in order to remain consistent with other master plans.
5. Detention Ponds
    a. Agreed that the Panorama Pond and the Phillips Tributary ponds will be modeled for the FHAD. SEMSWA to look for relevant as-built plans.
    b. Additional ponds will be analyzed in the alternatives analysis.
6. Water Quality, Annual and Historic Models
    a. For the water quality, annual event and historic modeling, new basin delineations and routing elements will not be created to allow the team to compare to the same design points for each event. For the historic models, storm drains will be removed from the model and replaced with conveyance elements representing pre-development routing conditions.
    b. Andrew Earles provided an overview of the methodology the team would take when modeling the water quality and annual events. Several adjustments will be made to reflect a more realistic event than the flood frequency scenarios typically modeled within a master plan. These parameters include:
        i. Rainfall
            1. The annual event will utilize the standard UDFCD 2-hour distribution with the 1-hour rainfall depth from NOAA 14.
            2. The water quality (WQ) event will use a rainfall depth of 0.52 inches with the standard CUHP 2-hour distribution. A modified 1-hr depth of 0.52 inches will model the 0.6 inch water quality rainfall depth over the 2-hr distribution.
        ii. Infiltration
            1. The WQ and annual event as well as the historic conditions, WQ and 1-year events will use modified soil parameters
                a. Soil parameters will be calibrated such that runoff begins between the 1 and 2-year rainfall event for the historic conditions model. These parameters will be carried forward to the water quality and annual event with current land use.
            2. Methodology of Modifying Soil Parameters
                a. Soil parameters were obtained from the NRCS Web Soil Survey. The study area contains portions of three different soil surveys.
                b. Final Infiltration Rate. The Web Soil Survey contains information about the saturated hydraulic conductivity for the soil at different depths. The team reviewed the differences in the typical infiltration rates used for flood frequency analysis and how the saturated hydraulic conductivity varied at different depths. For each soil group classification several depths were obtained to compare, including surface depth, 0-6”, 0-12” and 0-24”. Andrew advised the group to use the controlling saturated hydraulic conductivity layer between the surface, 0-6”, and 0-12” groupings as a starting infiltration rate. This rate will be calibrated to produce runoff for the historic conditions model between the 1 and 2-year design storm.
                c. Decay Coefficient. The decay coefficient for Type A soil will be used. The final infiltration rate will be the controlling factor
                d. Initial Infiltration Rate. In many cases the final infiltration rate (saturated hydraulic conductivity) was observed to be greater than the initial Horton’s infiltration. Andrew Earles

recommend using an initial infiltration rate 20% higher than the final.

iii. Conveyance Permeability. The final saturated hydraulic conductivity will be used within the SWMM modeling as a constant loss to model the conveyance permeability in the historic conditions model.

7. Schedule
    a. Meeting to discuss preliminary model results on April 3, 2019 from 2:00pm to 3:30pm at the UDFCD office.

ACTION ITEMS

1. UDFCD
    a. Confirm the impervious assumption to be applied to the ROW and residential areas.
2. SEMSWA
    a. Look for as-built plans for the Panorama Pond and the Phillips Tributary ponds/weirs.
    b. Confirm the scope of direct flow area modeling.
3. ICON Engineering
    a. Contact CDOT to confirm expected impervious percentage within CDOT ROW.

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by:

James Duvall, EIT — March 21, 2019
ICON Engineering, Inc.

Willow Creek Tributaries Major Drainageway Plan & FHAD
Progress Meeting

April 03, 2019 2:00 PM
UDFCD Office

Meeting Minutes

Attendees:	*Barbara Chongtoua,*	UDFCD
	Dana Morris,	UDFCD
	Stacey Thompson,	*SEMSWA*
	Lanae Raymond,	*SEMSWA (via phone)*
	Andrew Earles,	*Wright Water Engineering*
	Craig Jacobson,	*ICON Engineering*
	Jeremy Deischer,	*ICON Engineering*
	James Duvall,	*ICON Engineering*

1. Land Use
    a. During the previous progress meeting the team reviewed areas within the right-of-way the City of Centennial zoning shapefile had no zoning designation. Following the meeting, after discussion with other UDFCD staff, ICON was directed to treat the entire zone, including the right-of-way as residential classification. This approach would maintain consistency between other master plans and was deemed sufficient for master plan level analysis.
    b. The imperviousness value of 10% for Open Space and Recreation, which includes a combination of playgrounds, trails, and greenbelt open space was validated by UDFCD.
    c. The team agreed that 95% impervious could be assigned to the CDOT right-of-way under future land use conditions for the C-470 area. ICON had tried through several means to obtain CDOT plans for the proposed improvements. Stephen Ellis at the City of Lone Tree informed the team he would be able to provide the information in a drainage report expected to be submitted sometime next week. The team will review the 95% impervious assumption after receiving the drainage study for “Pond H” from the City of Lone Tree. Stephen also expressed interest in becoming a stakeholder for the study and will be included on project correspondence going forward.
2. Direct Flow Areas
    a. UDFCD and SEMSWA agreed that delineation and production of CUHP hydrographs should be provided for direct flow areas to the main stem of Willow Creek but these areas will not be routed in the SWMM model.
    b. The baseline hydrology report shall also include a brief discussion of the direct flow areas as well as a separate runoff table for the associated subwatersheds.
3. Detention Basins
    a. Discussion among the group concluded that detention ponds must have an existing easement and maintenance agreement from the responsible jurisdiction in order to be included in the baseline hydrology model.
    b. SEMSWA has adequate assurances on the Highlands, and Panorama ponds. Stacey provided information following the previous progress meeting that the Highlands Pond is owned by Highlands Park Metro District and SEMSWA has an Easement Deed and Revocable Storm Drainage License Agreement in place.

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The Panorama pond is owned by Panorama Metro District and is maintained by SEMSWA

c. The team discussed three detention basins within Douglas County and whether to include them in the baseline hydrology model. Two of the facilities, near Sam's Club and along Spring Creek were surface detention while the third is underground detention underneath the AutoNation lot.
   i. Per discussions with Stephen Ellis at the City of Lone Tree, both the ponds are not directly maintained by the City; however, contracts exist which detail that the City has the right to access the facilities and perform maintenance activities if regular maintenance is neglected.
   ii. Underground detention would likely not be included in the model due to concerns over maintenance and potential failure. UDFCD to check with Shea Thomas to confirm stance on the removal of underground detention as well as the necessity of maintenance agreements for a pond to be included in the model.
   iii. ICON will continue to coordinate with Stephen Ellis to determine the existence of City of Lone Tree easements and maintenance agreements on all facilities.

4. Water Quality / Annual Event / Historic Model - Soils Adjustment
   a. Reviewed methodology for applying soil adjustment to the historic conditions and water quality models. Andrew Earles approved of the approach used by ICON on the example watershed (Willow Creek East).
      i. Saturated hydraulic conductivity for multiple depth ranges for each soil group present within the watershed was obtained from the USDA NRCS Web Soil Survey.
      ii. Each depth range was reviewed and the most restrictive depth range was selected for each soil group
      iii. The area weighted average of each soil group was calculated for each subwatershed.
      iv. The area weighted saturated hydraulic conductivity was utilized as the final infiltration value in CUHP. The initial rate was 25% higher than the final rate with a decay coefficient of Type A soil.
      v. CUHP results for each subwatershed were reviewed with the adjusted soil parameters and land use typical of an undeveloped watershed (2% impervious). Infiltration parameters were adjusted until subwatershed runoff began between a 1 and 2-year design storm event.
   b. Discussion addressed the need for documentation in support of calibrating the runoff threshold to between a 1 and 2-year event under historic conditions.
      i. Andrew suggested investigating an undeveloped watershed of similar size and characteristics with a stream gage. Unfortunately there are minimal undeveloped watersheds of similar size with a stream gage. The need for additional gages on undeveloped watersheds was identified.
      ii. The group reviewed the spatial variation of soils within the watershed. Given the pronounced presence of clay soils the group agreed the threshold event would be closer to a 1-yr design storm rather than between a 1- and 2-yr design storm.
      iii. Andrew Earles will provide additional resources and discussion supporting the 1-yr runoff threshold. Potential references include continuous simulation models, Oak Gulch, and scientific literature, if available.

   c. Results of Soil Infiltration Adjustment
      i. Peak Flow
         1. Under future land use conditions, USDA Web Soil Survey infiltration values were calibrated, using saturated hydraulic conductivity as the final infiltration rate to the 1-yr runoff threshold. The modification in soil parameters reduced peak flow at the Willow Creek East outfall by approximately 10 cfs for the 2-year event when compared to flood frequency soils.
         2. Under historic conditions, accounting for conveyance loss in open channel conduits reduced peak flow at the Willow Creek East outfall by approximately 3 cfs for the 10, 50, and 100-year events.
         3. The clay soils within the project area have saturated hydraulic conductivity values from the USDA Web Soil Survey that are similar to the CUHP Type A-D infiltration rates used in the flood frequency analysis.
      ii. Discussion of differences in total volume resulting from the inclusion of conveyance loss and calibrated infiltration rates are to be included in the baseline hydrology report.
5. Preliminary Model Results
   a. Similar peak flow values were observed between the current study and the 2018 hydrology update for Spring Creek that included the entire Willow Creek Basin
      i. The 2018 study updated hydrology for the entire watershed using CUHP 2.0 hydrology with NOAA Atlas14 rainfall.
   b. Peak flow values in the 2010 FHAD tended to be higher than those in the current study.
      i. The 2010 FHAD used CUHP 1.3.1 hydrology with NOAA Atlas 2 rainfall.
   c. Differences in peak flows can be attributed to:
      i. Refined delineation leading to differences in tributary area
      ii. Increased detail in the routing network, such as additional pipes, open channels, and detention facilities, contributing to altered hydrograph timing.

ACTION ITEMS

1. UDFCD
   a. Confirm stance on the removal of underground detention as well as the necessity of maintenance agreements for a pond to be included in the model.
2. Wright Water Engineers
   a. Provide references for documentation of the historic runoff threshold event.
3. ICON Engineering
   a. Contact City of Lone Tree regarding easements and maintenance agreements for the detention facilities within Douglas County.

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: James Duvall, EIT — April 4, 2019
ICON Engineering, Inc.

Willow Creek Tributaries Major Drainageway Plan & FHAD
Hydrology Comment Review Progress Meeting

October 9, 2019 3:00 PM
MHFD Office
Meeting Minutes

Attendees:	*Barbara Chongtoua,*	*MHFD*
	Brik Zivkovich,	*MHFD*
	Stacey Thompson,	*SEMSWA*
	Craig Jacobson,	*ICON Engineering*
	Jeremy Deischer,	*ICON Engineering*

I. Review of Comments

The group discussed significant comments received on the DRAFT Hydrology Report from SEMSWA and MHFD. Other editorial comments were received and will be addressed but were not discussed.

- Jones District Basin Boundary: Stacey noted that the basin boundary from the Jones District did not match the master plan basins on the eastern side. Although the Jones District boundary does extend further east to I-25, that subbasin is routed to the east, outside of the master plan study area. Minor revisions will be made to ensure master plan basins match the proposed Jones District basins.
- Sam's Club Detention: The Sam's Club Detention Basin met the criteria to be included in the study. Additional text will be added to the report to clarify
- SSPRD Project Reference: The report will be revised to include reference to the ongoing stream stabilization on West Spring Creek (designed by Olsson).
- East / West bank vs. Left / Right bank: The team decided all references to tributaries within the report would use nomenclature of left / right bank instead of east / west bank.
- Basin Characteristics: MHFD provided several comments regarding land use parameters and basin characteristics. ICON will review the comments but will maintain the modeling approach of only modeling future land use. The study has several basins less than the recommended minimum area for CUHP of five acres, but the team agreed the basins were acceptable to improve the precision of routing in the SWMM model.
- Historic Conditions Modeling Approach: The comment on the modeling approach to historic conditions was reviewed. Although developing different watershed boundaries for the historic conditions modeling might have some impact on the modeling results, the team agreed it would not have a significant impact and was not within the scope of the master plan. No changes will be made to the modeling approach to the historic conditions scenario.
- Interactive Map: A description of how to print the interactive map to scale will be added. The team agreed not to separate any of the information presented on the interactive map.
- Detention Basin Table: The detention basin rating tables in the appendices will be modified to include both stage and depth information.
- Styling of Output Hydrographs: MHFD provided a comment to differentiate the styling of the hydrographs in the appendices in case the page was printed in black and white. The team agreed because only future land use information was presented in the graphs the user would be able to determine which frequency corresponded to the hydrograph. The order of the legend will be revised to reflect 100-yr on top and 2-yr on the bottom.

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II. Recent Flood Event – September 6, 2019

On September 6, a severe rain event occurred throughout the basin leading to significant flooding along most of the tributaries. Barb informed the team that Brik and Jason Stawski from MHFD will be working with Bob Jarrett to further examine the event. Photo documentation conducted by ICON, previously provided to the team, was reviewed.

Along West Spring Creek at East Phillips Avenue, the roadway was overtopped to the north inundating Phillips Avenue and South Monaco Court. The flows compromised a transformer on the north side of Phillips Avenue and flooding was experienced in some of the basements. SEMSWA is currently pursuing a project to formalize the overflow on the north side of the roadway. The group discussed to what extent the roadway crossing would be analyzed as part of the masterplan. Barb explained the level of detail of the masterplan was not intended to include each roadway crossing to the extent needed to fully understand the right solution for the crossing. A small maintenance project should be pursued in the area, but not be reliant on the masterplan to determine the solution to mitigate the flooding experienced during the rain event.

III. Next Steps

ICON will begin addressing comments received on the report. ICON will wait on the Panorama Pond survey being conducted by SEMSWA before finalizing the modeling. Survey information will be used to developed updated stage/storage/discharge relationships for the detention basin.

The initial steps for the FHAD were discussed. Barb informed the team Wilson and Company had conducted the crossing structure survey for the project and would provide that information to the team. The FHAD will be developed for any drainageway with a tributary area in excess of 130 acres. Further discussions will be held as the project progresses on which of the models developed for the FHAD are submitted to FEMA to develop regulatory floodplains along the drainageways.

An initial two-dimensional model will be developed for all the drainageways to help the team identify preliminary floodplain widths and possible areas for detailed two-dimensional analysis. After preliminary widths have been identified the team will model drainageways using one dimensional regulatory techniques. Brik will have internal discussions within MHFD to investigate the feasibility of completing the entire study using two-dimensional modeling.

IV. Anticipated Schedule

After receiving the survey from SEMSWA on Panorama, ICON will incorporate the revised stage / storage / discharge information. ICON will then address all comments received on the report and submit the final report within three weeks of receiving the survey.

ACTION ITEMS

1. MHFD
   a. Provide the crossing structure survey to the team
   b. Provide updates on the flood documentation efforts
   c. Investigate the feasibility of completing the FHAD with two-dimensional modeling

2. SEMSWA
    a. Provide Panorama Pond survey information when available

3. ICON Engineering
    a. Revise DRAFT Hydrology Report and resubmit addressing comments
    b. Prepare scope and fees for FHAD

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer

Jeremy Deischer — October 10, 2019
ICON Engineering, Inc.

ICON Comment Response

Review Document: DRAFT Baseline Hydrology Report

Review Agency: MHFD and SEMSWA

Date of Comments: September 30th, 2019

No.	Agency	Author	PDF Page No.	Reviewer Comment	Response Code	Response Comment
2	MHFD	--	Comment Letter	Please address comments provided as redlines in the attached draft report.	A	The report has been revised based on the comments received. Minor revisions have been addressed, additional response to substantive comments is provided below.
3	MHFD	--	Comment Letter	Please review comments provided on the basins characteristics provided in Table 1 (below).	A	The basins have been reviewed and revised where applicable. Further comment is provided below
4	MHFD	--	Comment Letter	Table 1 - Basin Imperviousness	C	This comment was discussed at the comment review meeting. The land use for the study reflected zoning and comprehensive plan data and did not utilize GIS planimetric information.
5	MHFD	--	Comment Letter	Table 1 - Basin Area	C	This comment was discussed at the comment review meeting. Basins were discretized on a smaller scale to more accurate represent routing characteristics for the more frequent and annual storms
6	MHFD	--	Comment Letter	Table 1 - Length to Centroid	A	The length to centroid for Basin SPC_B050 and FHP_B055 have been revised
7	MHFD	--	Comment Letter	Table 1 - Length (review/revise)	A	The basin lengths for each of the subwatersheds in Table 1 have been reviewed. The urbanized nature of the watershed led to some subwatersheds with long slender shape.
8	MHFD	--	Comment Letter	Table 1 - Length (checks)	A	The basin lengths for each of the subwatersheds in Table 1 have been reviewed. The urbanized nature of the watershed led to some subwatersheds with long slender shape.
9	MHFD	--	Comment Letter	In CUHP, please feel free to use the “Check Subcatchment Inputs” tool in the Subcatchments worksheet. This check can be used to check relationships between basin characteristics.	A	This tool has been run and no parameters found to be in the unacceptable range
10	MHFD	--	Comment Letter	The report describes four detention ponds; however, the map shows five detention ponds. Please clarify (Sam’s Club Detention).	A	The report has been revised to include a description of the Sam's Club Detention Basin
11	MHFD	--	Comment Letter	With respect to the depression storage, please discuss how these values were modified for the water quality and annual events (i.e. 0.4-inches stored of 0.6-inches total rainfall).	A	The report was revised to include a statement in the WQ and annual events to note that the depression loss were not modified for the analysis.
12	MHFD	--	Comment Letter	The junction ID in the SWMM model does not correlate with the figure ID in the report. Please clarify why figure IDs were selected and used in the tables compared to design points from the SWMM model (see pages 19-21). Alternatively, add a note to the tables that references the Appendix B tables with peak flows at all design points.	A	All tables for flood frequency, annual / WQ and historic conditions have been revised to include the SWMM Node Name
13	MHFD	--	Comment Letter	For the impervious surfaces based on NLCD, please confirm that water bodies and undeveloped areas were represented as 100% IA and 2% IA, respectively.	C	This comment was discussed at the progress meeting. Given the extent of development in the watershed only future conditions hydrology was development.
14	MHFD	--	Comment Letter	Please check detention rating curves (remove excess rating curves from SWMM model; format report tables using stage in feet; see comments provided in report).	A	Excess rating and storage curves have been removed from the model. The detention cuves in the appendices have been revised to include elevation and depth.
15	SEMSWA	Stacey Thompson	6	Add: Jones Regulating Plan Phase I Drainage Report	A	Reference to the Jones District Drainage Report has been added
16	MHFD	Brik Zivkovich	8	Sam's Club Detention Facility	A	Reference to the Sam's Club Detention Facility has been added to the report
17	SEMSWA	Stacey Thompson	9	SEMSWA GIS indicates 2 45" HDPE (previously 48" CMP)	A	A site visit confirmed the lined CMP with an open area of 45" diameter

ICON Comment Response

Review Document: DRAFT Baseline Hydrology Report

Review Agency: MHFD and SEMSWA

Date of Comments: September 30th, 2019

No.	Agency	Author	PDF Page No.	Reviewer Comment	Response Code	Response Comment
18	SEMSWA	Stacey Thompson	9	I don't know if it is important to note at this time, but there appears to a parallel storm sewer for a portion of the open channel between E Phillips Cir S and E Phillips Cir N.	A	The text was revised to include a description of the parallel storm / surface flow conveyance
19	SEMSWA	Stacey Thompson	10	Consider similar descriptions, as used above -- east/west bank for consistency?	A	The report was revised to maintain conistent description of the tributary. Discussed at the progress meeting the group agreed to use the left / right bank nominclature
20	SEMSWA	Stacey Thompson	11	There have been localized drainage problems in this area in the past. The south tributary outfall didn't drain, which caused water to pond in the cul-de-sac above the outfall affecting adjacent properties.	A	Text was added to note the known drainage issues in the area
21	SEMSWA	Stacey Thompson	11	SEMSWA has a planned cured-in-place pipe (CIPP) lining project at Yosemite.	A	The report was revised to include a note about the future project
22	SEMSWA	Stacey Thompson	11	add Yosemite crossing?	A	The Yosemite crossing was added to the table
23	SEMSWA	Stacey Thompson	12	Similar to the Acres Green Tributary, I don't know if it's worth noting, but there is a section of pipe that runs parallel to the open channel just downstream of the E Phillips Cir S crossing.	A	The text was revised to describte the routing characterisitics
24	SEMSWA	Stacey Thompson	12	Should we mention SSPRD project in this area?	A	A description of the West Spring Creek project was added to the report
25	SEMSWA	Stacey Thompson		Add: Yosemite & Chester	A	Yosemite and Chester infrastructure was added to the table
26	SEMSWA	Stacey Thompson	14	Is this detention basin included in the hydrology? If so, need to add to previous discussion	A	A description of the Sam's Club Detetnion has been added to the report
27	SEMSWA	Stacey Thompson		effective February 17, 2017	A	The effective date of the FIS study has been added
28	MHFD	Brik Zivkovich	24	Should historic hydrology be modeled using the same basin characteristics, specifically basin areas, lengths, and Lc? The historic hydrology would represent pre-development flow paths and basins would often be modeled at a larger scale than in this master plan (with a 2% IA). Design points at major confluences (not a previously determined locations such as the Figure ID locations) would provide a better metric for comparison.	C	This comment was discussed at the progress meeting. The scope of the study limited the historic conditions analysis to maintain the basins and general routing characteristics.
29	SEMSWA	Stacey Thompson	29	It appears that more area is shown to drain to Cottonwood Creek, than Jones District Phase I Drainage Study assumed.	C	This comment was discussed at the progress meeting. Although the Jones report included this tributary area in their study, the basins were routed to Cottonwood Creek
30	MHFD	Brik Zivkovich	37	Good figure. With respect to the SWMM routing map, would it be possible to remove this from the map and put the SWMM routing on it's own separate map page (or two if needed)? The labels are hard to read and do not print well. Maybe a 2000-ft scale?	C	This comment was discussed at the progress meeting. An inset will be created for the areas in which labels and routing characteristics are hard to distinguish
31	MHFD	Brik Zivkovich	37	For the SWMM routing map, can you represent symbology to show geometry as open channel/surface (green) and piped/closed (yellow)?	A	The interactive map has been revised to distinguish between surface and storm drain routing
32	MHFD	Brik Zivkovich	37	How does the interactive map print?	A	Instructions on how to print the interactive map at scale have been added to the map
33	MHFD	Brik Zivkovich	45	Remove excess rating curves in the SWMM model. - ACR_S037	A	Excess rating and storage curves have been removed from the model
34	MHFD	Brik Zivkovich	45	Flow rate starts at 101.8 cfs. Please include full rating curve from SWMM model in the tables.	A	Storage and Routing curves have been updated

ICON Comment Response

Review Document: DRAFT Baseline Hydrology Report

Review Agency: MHFD and SEMSWA

Date of Comments: September 30th, 2019

No.	Agency	Author	PDF Page No.	Reviewer Comment	Response Code	Response Comment
35	MHFD	Brik Zivkovich	45	Check stage-storage curve in SWMM model. Also, check elevation in SWMM model (differs from elevation in this table).	A	Storage and Routing curves have been updated
36	MHFD	Brik Zivkovich	45	Check invert elevation. SWMM model shows invert at 5705.17 ft.	A	Storage and Routing curves have been updated
37	MHFD	Brik Zivkovich	45	Stage-discharge curve is different in SWMM model. See PHI_S100_OUTLET.	A	Storage and Routing curves have been updated
38	MHFD	Brik Zivkovich	45	Rating curve differs from SWMM model. SWMM model in increments of 0.5-ft compared to 1.0-ft in table. Were flow rates linearly interpolated or was a curve equation developed as a function of depth (Q=f(z))?	A	The tables in the appendices were revised to incoporate all of the elevations used in the SWMM model
39	MHFD	Brik Zivkovich	45	The SWMM model shows two different rating curves? - ACR_S100_Outlet - ACR_UNDERGROUND_OUTLET Please clarify.	A	Excess rating and storage curves have been removed from the model
40	MHFD	Brik Zivkovich	45	To prevent confusion down the road, would it be possible to present the detention pond rating information as a stage (not elevation)? The data in these tables should be the same data that would come out of the SWMM model. An example is the SPC_S100... invert it shown at 5705.17 ft, but does not correspond to elevations in the tables on this page.	A	Stage will be added to the appendix table summarizing the stage storage detention basins
41	MHFD	Brik Zivkovich	56	Include plot with line type as well (solid, dash, dot) for clarity when printing in black-and-white.	C	This comment was discussed at the meeting. Given that only one hydrologic scenario was developed no variation in line type is needed.
42	MHFD	Brik Zivkovich	57	Add note for existing/future	A	Notation will be added to figures

Willow Creek Tributaries Major Drainageway Plan & FHAD
Preliminary 2D Analysis Review Progress Meeting

December 18, 2019 3:00 PM
Conference Call
Meeting Minutes

Attendees:		
	Barbara Chongtoua,	*MHFD*
	Brik Zivkovich,	*MHFD*
	Stacey Thompson,	*SEMSWA*
	Craig Jacobson,	*ICON Engineering*
	Jeremy Deischer,	*ICON Engineering*

I. Review of Preliminary 2D Analysis

Preliminary two-dimensional modeling has been developed for each of the drainageways. Steady state inflow hydrographs were placed on the grid to identify flooding hazards and help the team identify the drainageways to include in the FHAD portion of the study. No changes were made to the default manning 'n' value of 0.06 for this analysis. Additionally, no roadway crossing structures were considered. Each tributary was discussed in more detail:

- Acres Green Tributary

At the upstream end of the watershed, flow is generally contained in the median of Acres Green Drive. Flow spilling out of the median in the RAS-2D model is conveyed in the right-of-way, with no structures being inundated. North of the intersection of Park Meadows Drive and Acres Green Drive, discharge is conveyed into the Sam's Club Detention Basin and a storm drain system in Acres Green Drive. The flow continues north of County Line Road where the storm drain system discharges into an open channel on property owned by the Willow Creek Homeowners Association No. 3. The 2D analysis indicates a few feet of freeboard within the open channel before flood would inundate additional properties.

- Fox Hill Park Tributary

The preliminary RAS2D analysis indicates several structures along the east side of Fox Hill Park tributary are inundated after the overtopping of East Otero Avenue if the crossing structure was fully blocked. The model will be refined in this location to approximate the culvert crossing to see if the structures remain inundated. Further downstream, the flooding limits encroach on private property but do not inundate any structures.

- Homestead Tributary

The 100-yr RAS2D model for Homestead Tributary indicates flow escaping the banks to the west onto school property, witnessed in the September event.

- Homestead Farms Tributary

The Homestead Farms RAS2D model indicates flows overtopping South Grape Street are conveyed in Fremont Avenue and do not re-enter the channel. All flow is contained in the right-of-way and do not inundate any structures.

- Kettle Tributary

Runoff from the business park east of Yosemite Street collects in a storm drain discharging to the west. This flow continues in a northwest direction to the crossing at East Kettle Circle. If flow overtops the crossing onto the roadway, the preliminary analysis indicates structures are at risk, specifically west of the intersection of East Kettle Circle and East Kettle Avenue. This area will be refined to include the crossing structures to more accurately assess the risk to structures.

- Phillips Tributary

The flooding limits upstream of Yosemite Street is generally contained on Highland Park Metro District property. The preliminary analysis does not consider the large crossing structure at South Akron Street, leading to overtopping and inundation of a new apartment complex to the south. This area of the two-dimensional analysis will be revised to account for the crossing structure. The 2D analysis indicates flow overtopping Yosemite Street splits west to return to the open channel and south where the flow continues within the right-of-way on East Phillips Place. The flooding encroaches on private property, but structures are not inundated as the flow returns to the creek at the crossing with East Phillips Place.

- Spring Creek Tributary

Upstream of Quebec Street, within Douglas County, several north tributaries of Willow Creek convey flow through the Highlands Ranch subdivision. The 100-yr discharge is contained within the channel with no structures at risk. At Quebec Street, flow is intercepted into a storm drain system which continues north to the Spring Creek Detention Basin south of County Line Road. Downstream of the detention basin to the confluence of Willow Creek, a regulatory FEMA floodplain exists. The RAS 2D analysis indicates no structures at risk during the 100-year design storm. Upstream of Otero Avenue, the flood inundation spreads to property owned by RRE Fox Ridge Holdings LLC., VRG Dev Partnership, and South Suburban Recreation District. Downstream of Otero Avenue to East Mineral Avenue, the RAS 2D 100-yr flood extents stay within South Suburban Recreation property, several feet away from structures. Overtopping of East Mineral Avenue inundates one structure to the west of the stream but it is believed modeling the culvert crossing would remove this inundation. Further downstream, flooding limits begin to encroach on private property but does not inundate any structures.

- West Spring Creek Tributary

Downstream of County Line Road a small channel located on private property conveys flow north towards East Phillips Avenue. The RAS2D model shows flow escaping the channel banks inundating structures on the east side of the creek. This area will be refined in the RAS2D model to determine if this location is a flooding hazard that should be studied in detail with the FHAD. At East Phillips Avenue, the modeling inundation limits were very similar to the flooding limits experienced in the September storm. Downstream of East Phillips Avenue to East Mineral Avenue, flooding limits are contained on South Suburban Recreation District property.

- Willow Creek East

The 100-yr detained flow from Panorama Pond was placed upstream of Yosemite Street to observe if overtopping onto Yosemite Street would pose any flooding hazards. Flow overtops the roadway returning to the channel to the west. The drainageway continues west, past the confluence with Kettle Tributary, just upstream of South Willow Way where flow encroaches onto private property. Further west at South Rosemary Way the overtopping flows inundate one structure to the south of the drainageway. This area will be refined to reflect the crossing structure to determine whether this structure is at risk. Flooding encroaches private property but does not inundate structures downstream of South Rosemary Way to the confluence with Willow Creek.

II. FHAD Scope

The scoping of the FHAD will begin shortly after the new year. MHFD will first review the results of the preliminary two-dimensional analysis internally. MFHD will then coordinate with SEMSWA to determine the limits of the FHAD. The group discussed refining the two-dimensional models, anticipated to be completed during the alternative analysis phase, to gather more refined information before finalizing the scope of the FHAD. Specifically, these areas are: Fox Hill Park at East Otero Avenue, West Spring Creek upstream of Phillips Avenue, Kettle Tributary at East Kettle Circle, Willow Creek East at South Rosemary Way, and Phillips Tributary at South Akron Street.

III. Address Hydrology Comments

Now the preliminary two-dimensional analysis is complete, ICON will revise the DRAFT Baseline Hydrology Report. ICON will provide the team a final Baseline Hydrology Report by late January when the scoping of the FHAD begins.

ACTION ITEMS

1. MHFD
   a. After discussing internally and with SEMSWA, provide the drainageways to be included in the FHAD.

2. SEMSWA
   a. Coordinate with MHFD to determine the drainageways to be included in the FHAD.

3. ICON Engineering
   a. Revise the PDF exhibits to include parcel boundaries
   b. Develop a webmap to display the flooding results presented at the meeting. As an alternative, provide the digital information to MFHD to host the webmap.
   c. Revise the DRAFT Baseline Hydrology Report and provide updated submittal by late January.

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer

Jeremy Deischer
ICON Engineering, Inc.

December 23, 2019

Jeremy Deischer

From: Jeremy Deischer
Sent: Sunday, January 19, 2020 5:14 PM
To: Stacey Thompson (sthompson@semswa.org)
Cc: Barbara Chongtoua; Jon Villines (jvilline@auroragov.org); Brik Zivkovich; Craig Jacobson
Subject: Panorama Pond Updated Results
Attachments: Willow Creek Tribs - Panorama Pond.pdf

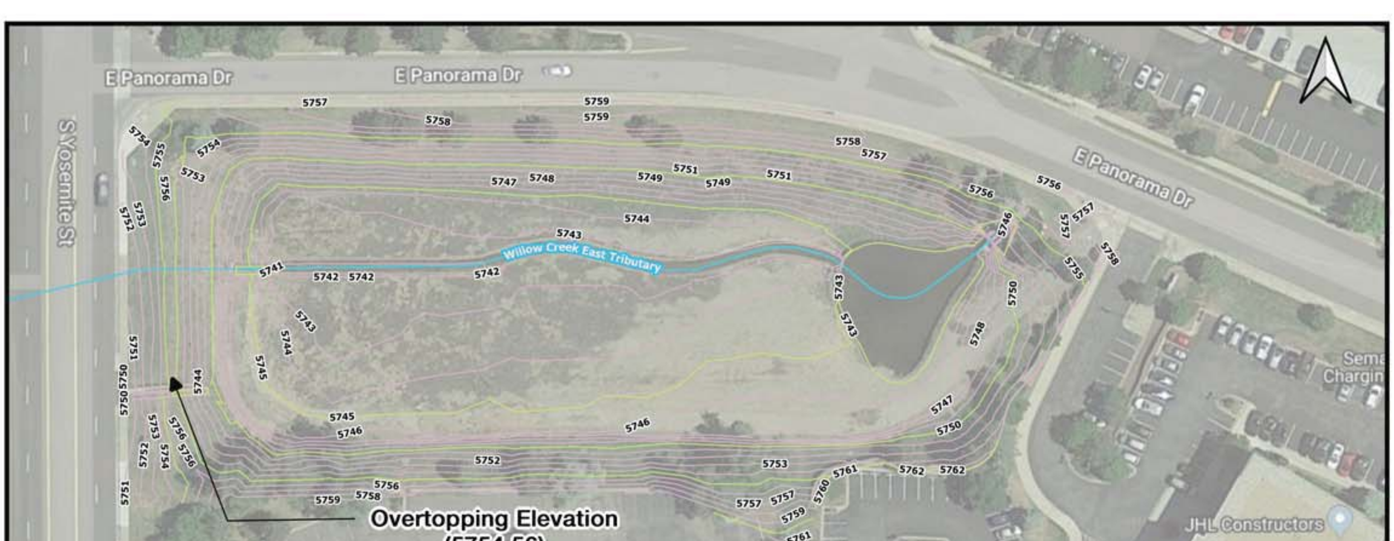
Stacey,

Attached is an exhibit showing the revised results for Panorama Pond. Updating the storage and rating curve using the survey information still shows the facility overtopping during the 100-year design storm. To meet the 100-year design storm capacity the berm would need to be raised approximate 6 inches.

Let me know if there are any other questions from the developer or your development group we can help with before we finish revising the hydrology report.

ICON ENGINEERING
Jeremy Deischer, P.E.
Project Engineer
7000 S. Yosemite St, Suite 120, Centennial, CO 80112
(303) 221-0802 x 215 | www.iconeng.com | jdeischer@iconeng.com

Tributaries of Willow Creek
MDP & FHAD
Panorama Pond



Primary Outlet Structure

Overflow Structure

Panorama Pond Survey Storage Curve					
Elevation ft.	Surveyed Surface Area ft.^2	Depth ft.	Surface Area Acres	Incremental Volume Ac-ft.	Cumulative Volume Ac-ft.
5741	111	0	WQCV modeled as dead storage during design storm		
5742	1,050	1			
5743	13,112	2			
5744	33,024	3			
5745	45,406	4			
5746	56,427	5			
5747	63,137	6	1.45	0.48	0.00
5748	67,009	7	1.54	1.49	1.49
5749	70,679	8	1.62	1.58	3.07
5750	74,633	9	1.71	1.67	4.74
5751	78,986	10	1.81	1.76	6.50
5752	83,855	11	1.93	1.87	8.37
5753	89,051	12	2.04	1.98	10.36
5754	93,985	13	2.16	2.10	12.46
5754.5	96,323	13.5	2.21	1.09	13.55
5755	98,661	14	2.26	2.21	14.67
5756	98,661	15	2.26	3.36	16.91

Panorama Pond SWMM Results	
100-yr inflow (cfs)	519.6
100-yr outflow (cfs)	276.2
Overtopping Elevation (ft.)	5754.56
Overtopping Storage (Ac-ft.)	13.55
100-yr Max Storage (Ac-ft.)	14.53
100-yr WSEL (ft.)	5754.97
Approximate Capacity	< 100-yr

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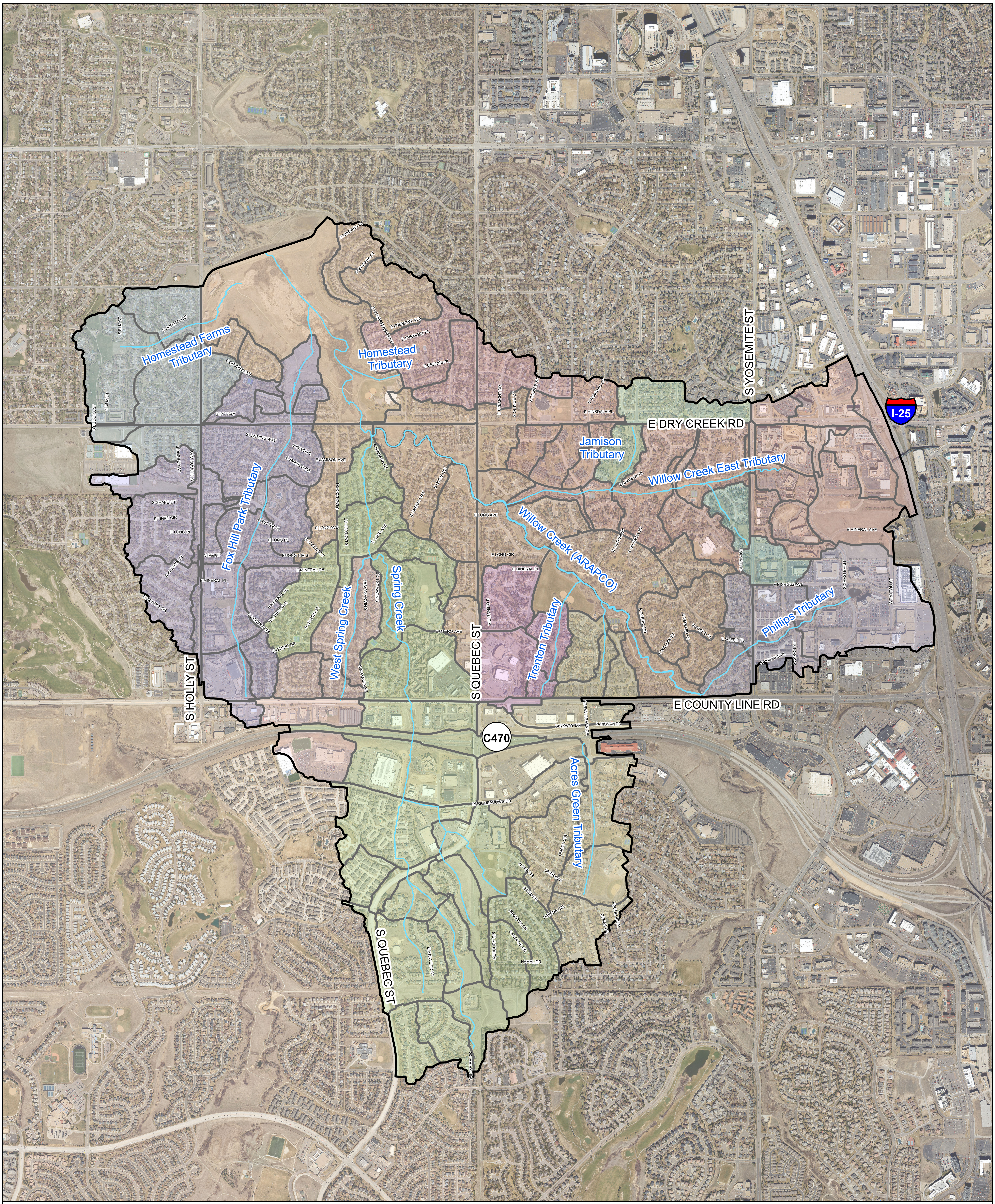
APPENDIX B - HYDROLOGIC ANALYSIS



Tributaries of Willow Creek MDP - Interactive Map

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MHFD MILE HIGH FLOOD DISTRICT

Southeast Metro Stormwater Authority

0 0.25 0.5 1 Miles

N S E W

Interactive Figures (Select Below)

Subbasin Name | Area (Ac.) | Imperv. Ex % Fut %

Subwatershed Label

Study Area Map	Major Roads	ON	OFF
Existing Soils Map	Local Roads	ON	OFF
Existing Land Use	1-ft Contours	ON	OFF
Existing SWMM Routing	10-ft Contours & Labels	ON	OFF
	Subwatershed & Labels	ON	OFF

- SWMM Junctions
- SWMM Dividers
- SWMM Outfalls
- SWMM Storage
- SWMM Conduits
- Study Area
- Drainageway
- Subwatershed

Soil Type

- A
- B
- C
- D
- Water

Land Use

- 5 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 -70%
- 70 - 80%
- 80 - 90%
- 90 - 100%

To Export the Hydrology Map to PDF:

1. Select Export Map... from the File menu.
2. In the Export Map dialog box, name the file and navigate to desired directory to save the file.
3. Set the save as type: to "PDF (*.pdf)."
4. In the Options group, on the General tab, set the Resolution and Output Image Quality. It is recommended that the Resolution = 300 dpi and the Output Image Quality = Normal to preserve the print quality.
5. On the Format tab, check Compress Vector Graphics.
6. Set Picture Symbol: to "Vectorize layers with bitmap markers/fills"
7.Check Embed All Document Fonts.
8. On the Advanced tab, set Layers and Attributes: to Export PDF Layers Only.
Important: "Export to PDF Layers Only" or "Export PDF Layers and Feature Attributes" must be selected in order to provide Map Controls.
9. Click Save

CUHP Rainfall Distribution

2-Year 1-hr Point Rainfall = 0.84	
Time (min)	Depth (in)
0:05	0.02
0:10	0.03
0:15	0.07
0:20	0.13
0:25	0.21
0:30	0.12
0:35	0.05
0:40	0.04
0:45	0.03
0:50	0.03
0:55	0.03
1:00	0.03
1:05	0.03
1:10	0.02
1:15	0.02
1:20	0.02
1:25	0.02
1:30	0.02
1:35	0.02
1:40	0.02
1:45	0.02
1:50	0.02
1:55	0.01
2:00	0.01

5-Year 1-hr Point Rainfall = 1.10	
Time (min)	Depth (in)
0:05	0.02
0:10	0.04
0:15	0.10
0:20	0.17
0:25	0.28
0:30	0.14
0:35	0.06
0:40	0.05
0:45	0.04
0:50	0.04
0:55	0.03
1:00	0.03
1:05	0.03
1:10	0.03
1:15	0.03
1:20	0.02
1:25	0.02
1:30	0.02
1:35	0.02
1:40	0.02
1:45	0.02
1:50	0.02
1:55	0.02
2:00	0.01

10-Year 1-hr Point Rainfall = 1.34	
Time (min)	Depth (in)
0:05	0.03
0:10	0.05
0:15	0.11
0:20	0.20
0:25	0.34
0:30	0.16
0:35	0.08
0:40	0.06
0:45	0.05
0:50	0.04
0:55	0.04
1:00	0.04
1:05	0.04
1:10	0.04
1:15	0.04
1:20	0.03
1:25	0.03
1:30	0.03
1:35	0.03
1:40	0.03
1:45	0.03
1:50	0.03
1:55	0.02
2:00	0.02

25-Year 1-hr Point Rainfall = 1.69	
Time (min)	Depth (in)
0:05	0.02
0:10	0.06
0:15	0.08
0:20	0.14
0:25	0.25
0:30	0.42
0:35	0.20
0:40	0.14
0:45	0.08
0:50	0.08
0:55	0.05
1:00	0.05
1:05	0.05
1:10	0.04
1:15	0.04
1:20	0.03
1:25	0.03
1:30	0.02
1:35	0.02
1:40	0.02
1:45	0.02
1:50	0.02
1:55	0.02
2:00	0.02

50-Year 1-hr Point Rainfall = 1.99	
Time (min)	Depth (in)
0:05	0.03
0:10	0.07
0:15	0.10
0:20	0.16
0:25	0.30
0:30	0.50
0:35	0.24
0:40	0.16
0:45	0.10
0:50	0.10
0:55	0.06
1:00	0.06
1:05	0.06
1:10	0.05
1:15	0.05
1:20	0.04
1:25	0.04
1:30	0.03
1:35	0.03
1:40	0.03
1:45	0.03
1:50	0.03
1:55	0.03
2:00	0.03

100-Year 1-hr Point Rainfall = 2.30	
Time (min)	Depth (in)
0:05	0.02
0:10	0.07
0:15	0.11
0:20	0.18
0:25	0.32
0:30	0.57
0:35	0.32
0:40	0.18
0:45	0.14
0:50	0.11
0:55	0.09
1:00	0.09
1:05	0.09
1:10	0.05
1:15	0.05
1:20	0.03
1:25	0.03
1:30	0.03
1:35	0.03
1:40	0.03
1:45	0.03
1:50	0.03
1:55	0.03
2:00	0.03

500-Year 1-hr Point Rainfall = 3.10	
Time (min)	Depth (in)
0:05	0.03
0:10	0.09
0:15	0.14
0:20	0.25
0:25	0.43
0:30	0.77
0:35	0.43
0:40	0.25
0:45	0.19
0:50	0.15
0:55	0.12
1:00	0.12
1:05	0.12
1:10	0.06
1:15	0.06
1:20	0.04
1:25	0.04
1:30	0.04
1:35	0.04
1:40	0.04
1:45	0.04
1:50	0.04
1:55	0.04
2:00	0.04

Future CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Hortons's Infiltration Parameters Decay Coefficient (1/seconds)	Hortons's Infiltration Parameters Final Rate (in/hr)
ACR_B005	ACR_B005	WCT	19.71	1040.30	1835.85	0.034	45.5	0.35	0.05	3.00	0.0018	0.50
ACR_B010	ACR_B010	WCT	11.49	873.82	1766.62	0.0223	75.0	0.35	0.05	3.00	0.0018	0.50
ACR_B015	ACR_B015	WCT	12.45	818.21	2019.28	0.0317	71.2	0.35	0.05	3.00	0.0018	0.50
ACR_B020	ACR_B020	WCT	22.57	1030.32	2130.69	0.0083	75.0	0.35	0.10	3.00	0.0018	0.50
ACR_B025	ACR_B025	WCT	21.37	842.54	2108.17	0.0186	87.3	0.35	0.10	3.00	0.0018	0.50
ACR_B030	ACR_B030	WCT	33.29	1654.26	2571.18	0.0237	79.3	0.35	0.10	3.00	0.0018	0.50
ACR_B035	ACR_B035	WCT	25.04	1044.31	1993.94	0.0329	69.5	0.35	0.10	3.00	0.0018	0.50
ACR_B040	ACR_B040	WCT	36.29	1078.40	2515.83	0.0342	45.1	0.35	0.05	3.00	0.0018	0.50
ACR_B045	ACR_B045	WCT	33.96	441.76	1669.35	0.0338	45.7	0.35	0.05	3.00	0.0018	0.50
ACR_B050	ACR_B050	WCT	28.09	484.85	1551.54	0.0415	49.5	0.35	0.05	3.00	0.0018	0.50
ACR_B055	ACR_B055	WCT	29.27	1258.49	2132.53	0.0298	45.0	0.35	0.05	3.00	0.0018	0.50
DFA_B005	DFA_B005	WCT	156.12	1458.94	4214.57	0.0125	18.5	0.40	0.05	3.00	0.0018	0.50
DFA_B010	DFA_B010	WCT	21.01	1009.84	1806.20	0.0361	44.7	0.35	0.05	3.00	0.0018	0.50
DFA_B015	DFA_B015	WCT	37.20	732.37	1537.48	0.0396	44.6	0.35	0.05	3.00	0.0018	0.50
DFA_B020	DFA_B020	WCT	17.33	1247.83	2407.41	0.0263	47.8	0.35	0.05	3.00	0.0018	0.50
DFA_B021	DFA_B021	WCT	35.15	1450.20	3444.57	0.0292	50.9	0.35	0.05	3.00	0.0018	0.50
DFA_B025	DFA_B025	WCT	22.95	365.76	1131.05	0.0408	49.0	0.35	0.05	3.00	0.0018	0.50
DFA_B030	DFA_B030	WCT	23.74	1503.44	2360.94	0.0353	45.0	0.35	0.05	3.00	0.0018	0.50
DFA_B035	DFA_B035	WCT	12.59	367.06	988.25	0.0361	33.8	0.35	0.05	3.00	0.0018	0.50
DFA_B040	DFA_B040	WCT	35.58	961.10	2268.03	0.0385	33.4	0.35	0.05	3.00	0.0018	0.50
DFA_B041	DFA_B041	WCT	28.38	937.28	1542.59	0.0431	35.6	0.35	0.05	3.00	0.0018	0.50
DFA_B042	DFA_B042	WCT	6.80	501.54	1027.01	0.0356	48.8	0.35	0.05	3.00	0.0018	0.50
DFA_B043	DFA_B043	WCT	17.43	394.91	1212.12	0.0286	86.6	0.35	0.05	3.02	0.0018	0.51
DFA_B045	DFA_B045	WCT	27.16	1002.61	2196.83	0.0414	36.0	0.35	0.05	3.00	0.0018	0.50
DFA_B046	DFA_B046	WCT	22.97	1002.48	2085.31	0.0372	40.2	0.35	0.05	3.00	0.0018	0.50
DFA_B050	DFA_B050	WCT	53.60	764.83	1721.38	0.0343	31.0	0.35	0.05	3.00	0.0018	0.50
DFA_B051	DFA_B051	WCT	15.46	416.65	1433.85	0.0434	45.2	0.35	0.05	3.00	0.0018	0.50
DFA_B055	DFA_B055	WCT	42.40	794.77	2015.27	0.0417	45.0	0.35	0.05	3.00	0.0018	0.50
DFA_B060	DFA_B060	WCT	25.68	1191.68	1486.25	0.0285	14.5	0.40	0.05	3.00	0.0018	0.50
DFA_B061	DFA_B061	WCT	14.17	957.57	1788.31	0.0243	45.0	0.35	0.05	3.00	0.0018	0.50
DFA_B065	DFA_B065	WCT	22.63	1021.93	1792.02	0.0148	40.1	0.40	0.05	3.03	0.0018	0.50
DFA_B100	DFA_B100	WCT	6.81	588.91	961.11	0.0262	45.0	0.35	0.05	3.00	0.0018	0.50
DFA_B105	DFA_B105	WCT	11.01	318.78	1047.95	0.0421	45.0	0.35	0.05	3.00	0.0018	0.50
FHP_B005	FHP_B005	WCT	15.72	753.01	1581.61	0.0117	15.5	0.35	0.05	3.00	0.0018	0.50
FHP_B010	FHP_B010	WCT	13.75	805.39	1960.13	0.0326	48.0	0.35	0.05	3.00	0.0018	0.50
FHP_B015	FHP_B015	WCT	4.50	345.12	618.19	0.0358	75.0	0.35	0.05	3.00	0.0018	0.50
FHP_B020	FHP_B020	WCT	6.18	189.50	957.24	0.0103	75.0	0.35	0.05	3.00	0.0018	0.50
FHP_B025	FHP_B025	WCT	8.02	596.05	1836.48	0.033	67.5	0.35	0.05	3.00	0.0018	0.50
FHP_B030	FHP_B030	WCT	59.11	926.57	2438.39	0.0354	51.1	0.35	0.05	3.00	0.0018	0.50
FHP_B035	FHP_B035	WCT	5.19	623.02	1281.11	0.0308	29.3	0.35	0.05	3.00	0.0018	0.50
FHP_B040	FHP_B040	WCT	23.73	1028.75	1741.84	0.0335	37.6	0.35	0.05	3.00	0.0018	0.50
FHP_B045	FHP_B045	WCT	8.14	548.47	1338.72	0.0254	71.2	0.35	0.05	3.00	0.0018	0.50
FHP_B050	FHP_B050	WCT	6.82	414.56	1020.51	0.0291	45.0	0.35	0.05	3.00	0.0018	0.50

Future CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)
FHP_B055	FHP_B055	WCT	6.27	548.06	1127.76	0.0267	44.2	0.35	0.05	3.00	0.0018	0.50
FHP_B060	FHP_B060	WCT	23.16	787.42	1657.97	0.0223	46.5	0.35	0.05	3.00	0.0018	0.50
FHP_B065	FHP_B065	WCT	35.94	1039.23	2191.53	0.0176	44.7	0.35	0.05	3.00	0.0018	0.50
FHP_B070	FHP_B070	WCT	31.77	935.94	2188.38	0.0184	45.0	0.35	0.05	3.00	0.0018	0.50
FHP_B075	FHP_B075	WCT	6.63	1303.78	2563.03	0.0277	45.6	0.35	0.05	3.00	0.0018	0.50
FHP_B080	FHP_B080	WCT	27.51	618.66	1938.22	0.0304	42.8	0.35	0.05	3.00	0.0018	0.50
FHP_B085	FHP_B085	WCT	33.29	893.84	2253.34	0.0345	60.4	0.35	0.10	3.00	0.0018	0.50
FHP_B090	FHP_B090	WCT	18.25	443.41	1135.72	0.0377	44.9	0.35	0.05	3.00	0.0018	0.50
FHP_B095	FHP_B095	WCT	19.45	791.78	1444.90	0.0265	69.6	0.35	0.10	3.00	0.0018	0.50
FHP_B100	FHP_B100	WCT	14.09	627.67	1354.66	0.0364	45.0	0.35	0.05	3.00	0.0018	0.50
FHP_B105	FHP_B105	WCT	5.62	163.19	534.96	0.0176	75.2	0.35	0.10	3.00	0.0018	0.50
HFT_B005	HFT_B005	WCT	29.98	1078.57	2032.77	0.0354	45.0	0.35	0.05	3.00	0.0018	0.50
HFT_B010	HFT_B010	WCT	55.63	999.96	2454.72	0.0269	35.0	0.35	0.05	3.00	0.0018	0.50
HFT_B015	HFT_B015	WCT	42.19	1231.35	3069.17	0.0331	45.0	0.35	0.05	3.00	0.0018	0.50
HFT_B020	HFT_B020	WCT	16.18	1430.26	2332.60	0.0279	45.0	0.35	0.05	3.00	0.0018	0.50
HFT_B025	HFT_B025	WCT	20.38	1372.38	1940.15	0.0238	52.9	0.35	0.05	3.00	0.0018	0.50
HFT_B030	HFT_B030	WCT	5.40	544.79	863.18	0.024	75.0	0.35	0.05	3.00	0.0018	0.50
HOM_B005	HOM_B005	WCT	10.33	372.42	1055.53	0.0167	45.0	0.35	0.05	3.00	0.0018	0.50
HOM_B010	HOM_B010	WCT	32.38	857.69	2064.91	0.0428	45.6	0.35	0.05	3.00	0.0018	0.50
HOM_B015	HOM_B015	WCT	24.49	1134.31	2253.69	0.034	45.0	0.35	0.05	3.00	0.0018	0.50
HOM_B020	HOM_B020	WCT	30.34	958.53	2454.06	0.0284	45.0	0.35	0.05	3.00	0.0018	0.50
JAM_B005	JAM_B005	WCT	17.62	685.10	1401.25	0.0355	34.2	0.35	0.05	3.00	0.0018	0.50
JAM_B010	JAM_B010	WCT	35.35	813.48	2510.97	0.0209	56.0	0.35	0.05	3.00	0.0018	0.50
KET_B005	KET_B005	WCT	16.55	551.11	1396.05	0.035	44.9	0.35	0.05	3.00	0.0018	0.50
KET_B010	KET_B010	WCT	19.32	566.80	1431.86	0.0348	91.0	0.35	0.10	3.00	0.0018	0.50
PHI_B100	PHI_B100	WCT	16.90	695.90	1367.05	0.036	44.7	0.35	0.05	3.00	0.0018	0.50
PHI_B105	PHI_B105	WCT	16.19	1252.41	2135.63	0.0252	45.0	0.35	0.05	3.00	0.0018	0.50
PHI_B110	PHI_B110	WCT	35.24	684.79	1773.59	0.0301	78.8	0.35	0.10	3.06	0.0018	0.52
PHI_B115	PHI_B115	WCT	100.88	1180.72	2655.81	0.0405	81.5	0.35	0.10	3.54	0.0015	0.64
SPC_B005	SPC_B005	WCT	24.29	910.02	1952.26	0.0258	50.1	0.35	0.05	3.00	0.0018	0.50
SPC_B010	SPC_B010	WCT	28.37	550.51	2074.85	0.0329	40.4	0.35	0.05	3.00	0.0018	0.50
SPC_B015	SPC_B015	WCT	40.17	1302.16	2538.54	0.0357	43.9	0.35	0.05	3.00	0.0018	0.50
SPC_B020	SPC_B020	WCT	18.19	1118.43	2638.39	0.0329	46.9	0.35	0.05	3.00	0.0018	0.50
SPC_B025	SPC_B025	WCT	41.11	1243.12	2911.96	0.0246	51.4	0.35	0.05	3.45	0.0016	0.61
SPC_B030	SPC_B030	WCT	54.04	643.22	2125.36	0.036	63.4	0.35	0.10	3.05	0.0018	0.51
SPC_B035	SPC_B035	WCT	29.05	430.47	1597.35	0.0332	78.1	0.35	0.10	3.00	0.0018	0.50
SPC_B036	SPC_B036	WCT	24.57	560.40	2510.84	0.013	95.0	0.35	0.05	3.00	0.0018	0.50
SPC_B040	SPC_B040	WCT	58.63	478.52	2204.12	0.04	77.4	0.35	0.10	3.00	0.0018	0.50
SPC_B045	SPC_B045	WCT	56.97	600.07	1837.86	0.0311	50.7	0.35	0.05	3.00	0.0018	0.50
SPC_B046	SPC_B046	WCT	15.68	450.23	1139.63	0.0316	45.0	0.35	0.05	3.00	0.0018	0.50
SPC_B050	SPC_B050	WCT	8.07	601.60	1060.53	0.0336	34.6	0.35	0.05	3.00	0.0018	0.50
SPC_B055	SPC_B055	WCT	16.75	423.33	1359.15	0.0355	28.7	0.35	0.05	3.00	0.0018	0.50
SPC_B060	SPC_B060	WCT	22.31	754.58	1871.86	0.0431	27.8	0.35	0.05	3.00	0.0018	0.50

Future CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Decay Coefficient (1/seconds)	Final Rate (in/hr)
SPC_B065	SPC_B065	WCT	23.15	712.30	1792.42	0.0471	23.8	0.35	0.05	3.00	0.0018	0.50
SPC_B070	SPC_B070	WCT	40.23	847.46	1975.59	0.0415	28.1	0.35	0.05	3.00	0.0018	0.50
SPC_B080	SPC_B080	WCT	22.07	1049.42	2098.49	0.0318	44.6	0.35	0.05	3.00	0.0018	0.50
SPC_B085	SPC_B085	WCT	19.54	907.32	1653.03	0.0303	44.8	0.35	0.05	3.00	0.0018	0.50
SPC_B090	SPC_B090	WCT	9.89	938.65	2025.67	0.0252	29.8	0.35	0.05	3.00	0.0018	0.50
SPC_B095	SPC_B095	WCT	42.42	915.60	2173.88	0.0289	47.0	0.35	0.10	3.00	0.0018	0.50
SPC_B100	SPC_B100	WCT	32.62	831.55	2295.28	0.0394	45.0	0.35	0.05	3.00	0.0018	0.50
SPC_B105	SPC_B105	WCT	27.26	926.15	2677.45	0.0382	25.5	0.35	0.05	3.00	0.0018	0.50
SPC_B110	SPC_B110	WCT	25.65	750.06	2060.35	0.0356	41.4	0.35	0.05	3.00	0.0018	0.50
TRE_B005	TRE_B005	WCT	28.56	1342.01	2011.51	0.0251	42.3	0.35	0.05	3.00	0.0018	0.50
TRE_B010	TRE_B010	WCT	31.97	1068.85	1893.51	0.033	70.2	0.35	0.10	3.00	0.0018	0.50
TRE_B015	TRE_B015	WCT	18.00	446.98	1242.82	0.0382	33.5	0.35	0.05	3.00	0.0018	0.50
TRE_B020	TRE_B020	WCT	5.41	198.88	737.58	0.0254	57.6	0.35	0.05	3.00	0.0018	0.50
TRE_B025	TRE_B025	WCT	3.32	485.88	917.10	0.0214	75.0	0.35	0.05	3.00	0.0018	0.50
WCE_B005	WCE_B005	WCT	8.42	947.17	2268.78	0.0324	28.4	0.35	0.05	3.00	0.0018	0.50
WCE_B010	WCE_B010	WCT	13.60	523.70	1334.00	0.0339	45.0	0.35	0.05	3.00	0.0018	0.50
WCE_B015	WCE_B015	WCT	28.51	1253.78	1845.39	0.0267	43.9	0.35	0.05	3.00	0.0018	0.50
WCE_B020	WCE_B020	WCT	18.47	638.61	1541.51	0.0375	45.0	0.35	0.05	3.00	0.0018	0.50
WCE_B025	WCE_B025	WCT	12.46	693.21	1500.27	0.0365	43.7	0.35	0.05	3.00	0.0018	0.50
WCE_B029	WCE_B029	WCT	13.23	726.13	1657.71	0.039	34.0	0.35	0.05	3.00	0.0018	0.50
WCE_B030	WCE_B030	WCT	25.55	1139.94	2135.03	0.025	36.7	0.35	0.05	3.00	0.0018	0.50
WCE_B035	WCE_B035	WCT	22.11	908.99	2346.05	0.0265	44.8	0.35	0.05	3.00	0.0018	0.50
WCE_B040	WCE_B040	WCT	3.23	530.18	1337.74	0.0343	43.7	0.35	0.05	3.00	0.0018	0.50
WCE_B045	WCE_B045	WCT	26.98	1068.45	2276.54	0.0359	48.0	0.35	0.05	3.00	0.0018	0.50
WCE_B050	WCE_B050	WCT	14.39	733.60	2147.58	0.0253	26.8	0.35	0.05	3.00	0.0018	0.50
WCE_B055	WCE_B055	WCT	20.04	682.11	1779.82	0.0343	43.0	0.35	0.05	3.00	0.0018	0.50
WCE_B056	WCE_B056	WCT	3.19	402.50	1017.00	0.0406	56.0	0.35	0.05	3.00	0.0018	0.50
WCE_B060	WCE_B060	WCT	9.28	507.12	989.40	0.0285	88.1	0.35	0.10	3.00	0.0018	0.50
WCE_B065	WCE_B065	WCT	19.32	454.11	1048.37	0.0459	85.9	0.35	0.10	3.00	0.0018	0.50
WCE_B070	WCE_B070	WCT	14.54	714.39	1554.31	0.0337	80.6	0.35	0.10	3.49	0.0015	0.62
WCE_B075	WCE_B075	WCT	10.93	693.22	1566.95	0.0348	94.8	0.35	0.10	3.00	0.0018	0.50
WCE_B080	WCE_B080	WCT	13.06	473.04	1316.78	0.0348	94.9	0.35	0.10	3.56	0.0015	0.64
WCE_B085	WCE_B085	WCT	6.06	571.76	1183.99	0.0386	94.9	0.35	0.10	3.00	0.0018	0.50
WCE_B090	WCE_B090	WCT	44.84	1270.90	2861.97	0.0281	83.3	0.35	0.10	3.44	0.0016	0.61
WCE_B095	WCE_B095	WCT	6.78	545.26	1266.48	0.0216	95.0	0.35	0.10	3.00	0.0018	0.50
WCE_B100	WCE_B100	WCT	27.07	921.83	2466.81	0.0191	90.7	0.35	0.10	3.00	0.0018	0.50
WCE_B105	WCE_B105	WCT	25.44	823.17	1763.10	0.0331	92.2	0.35	0.10	3.00	0.0018	0.50
WCE_B110	WCE_B110	WCT	18.53	631.64	2022.95	0.0168	91.1	0.35	0.05	3.00	0.0018	0.50
WSC_B005	WSC_B005	WCT	42.28	1392.22	2808.54	0.0361	38.0	0.35	0.05	3.00	0.0018	0.50
WSC_B010	WSC_B010	WCT	9.63	452.69	1156.85	0.0325	44.8	0.35	0.05	3.00	0.0018	0.50
WSC_B015	WSC_B015	WCT	16.57	514.85	1569.92	0.0229	45.0	0.35	0.05	3.00	0.0018	0.50
WSC_B020	WSC_B020	WCT	22.62	823.69	1516.79	0.0235	76.9	0.35	0.10	3.00	0.0018	0.50
WSC_B025	WSC_B025	WCT	25.44	722.30	1192.27	0.0246	77.6	0.35	0.10	3.00	0.0018	0.50

Annual / WQ CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Hortons's Infiltration Parameters Decay Coefficient (1/seconds)	Hortons's Infiltration Parameters Final Rate (in/hr)
ACR_B005	ACR_B005	WCT	19.71	1040.30	1835.85	0.034	45.5	0.35	0.05	0.75	0.0007	0.60
ACR_B010	ACR_B010	WCT	11.49	873.82	1766.62	0.0223	75.0	0.35	0.05	0.40	0.0007	0.32
ACR_B015	ACR_B015	WCT	12.45	818.21	2019.28	0.0317	71.2	0.35	0.05	0.48	0.0007	0.38
ACR_B020	ACR_B020	WCT	22.57	1030.32	2130.69	0.0083	75.0	0.35	0.10	0.71	0.0007	0.56
ACR_B025	ACR_B025	WCT	21.37	842.54	2108.17	0.0186	87.3	0.35	0.10	0.74	0.0007	0.59
ACR_B030	ACR_B030	WCT	33.29	1654.26	2571.18	0.0237	79.3	0.35	0.10	0.79	0.0007	0.63
ACR_B035	ACR_B035	WCT	24.91	1044.31	1993.94	0.0329	69.5	0.35	0.10	0.77	0.0007	0.62
ACR_B040	ACR_B040	WCT	36.29	1078.40	2515.83	0.0342	45.1	0.35	0.05	1.05	0.0007	0.84
ACR_B045	ACR_B045	WCT	34.10	441.76	1669.35	0.0338	45.7	0.35	0.05	1.17	0.0007	0.94
ACR_B050	ACR_B050	WCT	28.09	484.85	1551.54	0.0415	49.5	0.35	0.05	1.19	0.0007	0.95
ACR_B055	ACR_B055	WCT	29.27	1258.49	2132.53	0.0298	45.0	0.35	0.05	0.76	0.0007	0.61
DFA_B005	DFA_B005	WCT	156.12	1458.94	4214.57	0.0125	18.5	0.40	0.05	1.51	0.0007	1.20
DFA_B010	DFA_B010	WCT	21.01	1009.84	1806.20	0.0361	44.7	0.35	0.05	0.85	0.0007	0.68
DFA_B015	DFA_B015	WCT	37.20	732.37	1537.48	0.0396	44.6	0.35	0.05	1.22	0.0007	0.98
DFA_B020	DFA_B020	WCT	17.33	1247.83	2407.41	0.0263	47.8	0.35	0.05	0.73	0.0007	0.58
DFA_B021	DFA_B021	WCT	35.15	1450.20	3444.57	0.0292	50.9	0.35	0.05	0.94	0.0007	0.75
DFA_B025	DFA_B025	WCT	22.95	365.76	1131.05	0.0408	49.0	0.35	0.05	1.02	0.0007	0.82
DFA_B030	DFA_B030	WCT	23.74	1503.44	2360.94	0.0353	45.0	0.35	0.05	0.84	0.0007	0.67
DFA_B035	DFA_B035	WCT	12.59	367.06	988.25	0.0361	33.8	0.35	0.05	0.89	0.0007	0.71
DFA_B040	DFA_B040	WCT	35.58	961.10	2268.03	0.0385	33.4	0.35	0.05	1.06	0.0007	0.84
DFA_B041	DFA_B041	WCT	28.38	937.28	1542.59	0.0431	35.6	0.35	0.05	1.09	0.0007	0.87
DFA_B042	DFA_B042	WCT	6.80	501.54	1027.01	0.0356	48.8	0.35	0.05	0.42	0.0007	0.34
DFA_B043	DFA_B043	WCT	17.43	394.91	1212.12	0.0286	86.6	0.35	0.05	0.89	0.0007	0.71
DFA_B045	DFA_B045	WCT	27.16	1002.61	2196.83	0.0414	36.0	0.35	0.05	0.83	0.0007	0.67
DFA_B046	DFA_B046	WCT	22.97	1002.48	2085.31	0.0372	40.2	0.35	0.05	0.82	0.0007	0.66
DFA_B050	DFA_B050	WCT	53.60	764.83	1721.38	0.0343	31.0	0.35	0.05	1.32	0.0007	1.05
DFA_B051	DFA_B051	WCT	15.46	416.65	1433.85	0.0434	45.2	0.35	0.05	0.51	0.0007	0.41
DFA_B055	DFA_B055	WCT	42.40	794.77	2015.27	0.0417	45.0	0.35	0.05	1.19	0.0007	0.95
DFA_B060	DFA_B060	WCT	25.68	1191.68	1486.25	0.0285	14.5	0.40	0.05	0.85	0.0007	0.68
DFA_B061	DFA_B061	WCT	14.17	957.57	1788.31	0.0243	45.0	0.35	0.05	0.65	0.0007	0.52
DFA_B065	DFA_B065	WCT	22.63	1021.93	1792.02	0.0148	40.1	0.40	0.05	0.90	0.0007	0.72
DFA_B100	DFA_B100	WCT	6.81	588.91	961.11	0.0262	45.0	0.35	0.05	0.33	0.0007	0.26
DFA_B105	DFA_B105	WCT	11.01	318.78	1047.95	0.0421	45.0	0.35	0.05	0.60	0.0007	0.48
FHP_B005	FHP_B005	WCT	15.72	753.01	1581.61	0.0117	15.5	0.35	0.05	0.60	0.0007	0.48
FHP_B010	FHP_B010	WCT	13.75	805.39	1960.13	0.0326	48.0	0.35	0.05	0.60	0.0007	0.48
FHP_B015	FHP_B015	WCT	4.50	345.12	618.19	0.0358	75.0	0.35	0.05	0.38	0.0007	0.30
FHP_B020	FHP_B020	WCT	6.18	189.50	957.24	0.0103	75.0	0.35	0.05	0.48	0.0007	0.39
FHP_B025	FHP_B025	WCT	8.02	596.05	1836.48	0.033	67.5	0.35	0.05	0.47	0.0007	0.37
FHP_B030	FHP_B030	WCT	59.11	926.57	2438.39	0.0354	51.1	0.35	0.05	1.33	0.0007	1.06
FHP_B035	FHP_B035	WCT	5.19	623.02	1281.11	0.0308	29.3	0.35	0.05	0.48	0.0007	0.39
FHP_B040	FHP_B040	WCT	23.73	1028.75	1741.84	0.0335	37.6	0.35	0.05	0.80	0.0007	0.64
FHP_B045	FHP_B045	WCT	8.14	548.47	1338.72	0.0254	71.2	0.35	0.05	0.52	0.0007	0.41
FHP_B050	FHP_B050	WCT	6.82	414.56	1020.51	0.0291	45.0	0.35	0.05	0.47	0.007	0.38

Annual / WQ CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Hortons's Infiltration Parameters Decay Coefficient (1/seconds)	Hortons's Infiltration Parameters Final Rate (in/hr)
FHP_B055	FHP_B055	WCT	6.27	175.04	1127.76	0.0267	44.2	0.35	0.05	0.53	0.007	0.42
FHP_B060	FHP_B060	WCT	23.16	787.42	1657.97	0.0223	46.5	0.35	0.05	0.88	0.0007	0.70
FHP_B065	FHP_B065	WCT	35.94	1039.23	2191.53	0.0176	44.7	0.35	0.05	1.09	0.0007	0.87
FHP_B070	FHP_B070	WCT	31.77	935.94	2188.38	0.0184	45.0	0.35	0.05	1.07	0.0007	0.86
FHP_B075	FHP_B075	WCT	6.63	1303.78	2563.03	0.0277	45.6	0.35	0.05	0.46	0.0007	0.37
FHP_B080	FHP_B080	WCT	27.51	618.66	1938.22	0.0304	42.8	0.35	0.05	0.97	0.0007	0.77
FHP_B085	FHP_B085	WCT	33.29	893.84	2253.34	0.0345	60.4	0.35	0.10	1.01	0.0007	0.80
FHP_B090	FHP_B090	WCT	18.25	443.41	1135.72	0.0377	44.9	0.35	0.05	0.90	0.0007	0.72
FHP_B095	FHP_B095	WCT	19.45	791.78	1444.90	0.0265	69.6	0.35	0.10	0.69	0.0007	0.64
FHP_B100	FHP_B100	WCT	14.09	627.67	1354.66	0.0364	45.0	0.35	0.05	0.67	0.0007	0.54
FHP_B105	FHP_B105	WCT	5.62	163.19	534.96	0.0176	75.2	0.35	0.10	0.64	0.0007	0.51
HFT_B005	HFT_B005	WCT	29.98	1078.57	2032.77	0.0354	45.0	0.35	0.05	1.00	0.0007	0.80
HFT_B010	HFT_B010	WCT	55.63	999.96	2454.72	0.0269	35.0	0.35	0.05	1.29	0.0007	1.04
HFT_B015	HFT_B015	WCT	42.19	1231.35	3069.17	0.0331	45.0	0.35	0.05	1.14	0.0007	0.91
HFT_B020	HFT_B020	WCT	16.18	1430.26	2332.60	0.0279	45.0	0.35	0.05	0.60	0.0007	0.48
HFT_B025	HFT_B025	WCT	20.38	1372.38	1940.15	0.0238	52.9	0.35	0.05	0.67	0.0007	0.54
HFT_B030	HFT_B030	WCT	5.40	544.79	863.18	0.024	75.0	0.35	0.05	0.50	0.0007	0.40
HOM_B005	HOM_B005	WCT	10.33	372.42	1055.53	0.0167	45.0	0.35	0.05	0.61	0.0007	0.49
HOM_B010	HOM_B010	WCT	32.38	857.69	2064.91	0.0428	45.6	0.35	0.05	1.16	0.0007	0.93
HOM_B015	HOM_B015	WCT	24.49	1134.31	2253.69	0.034	45.0	0.35	0.05	0.74	0.0007	0.60
HOM_B020	HOM_B020	WCT	30.34	958.53	2454.06	0.0284	45.0	0.35	0.05	0.99	0.0007	0.79
JAM_B005	JAM_B005	WCT	17.62	685.10	1401.25	0.0355	34.2	0.35	0.05	0.78	0.0007	0.62
JAM_B010	JAM_B010	WCT	35.35	813.48	2510.97	0.0209	56.0	0.35	0.05	1.09	0.0007	0.87
KET_B005	KET_B005	WCT	16.55	551.11	1396.05	0.035	44.9	0.35	0.05	0.77	0.0007	0.62
KET_B010	KET_B010	WCT	19.32	566.80	1431.86	0.0348	91.0	0.35	0.10	0.71	0.0007	0.57
PHI_B100	PHI_B100	WCT	16.90	695.90	1367.05	0.036	44.7	0.35	0.05	0.59	0.0007	0.47
PHI_B105	PHI_B105	WCT	16.19	1252.41	2135.63	0.0252	45.0	0.35	0.05	0.45	0.0007	0.36
PHI_B110	PHI_B110	WCT	35.24	684.79	1773.59	0.0301	78.8	0.35	0.10	1.17	0.0007	0.94
PHI_B115	PHI_B115	WCT	100.88	1180.72	2655.81	0.0405	81.5	0.35	0.10	1.41	0.0007	1.13
SPC_B005	SPC_B005	WCT	24.29	910.02	1952.26	0.0258	50.1	0.35	0.05	0.97	0.0007	0.78
SPC_B010	SPC_B010	WCT	28.37	550.51	2074.85	0.0329	40.4	0.35	0.05	0.98	0.0007	0.78
SPC_B015	SPC_B015	WCT	40.17	1302.16	2538.54	0.0357	43.9	0.35	0.05	1.08	0.0007	0.86
SPC_B020	SPC_B020	WCT	18.19	1118.43	2638.39	0.0329	46.9	0.35	0.05	0.67	0.0007	0.54
SPC_B025	SPC_B025	WCT	41.11	1243.12	2911.96	0.0246	51.4	0.35	0.05	1.08	0.0007	0.88
SPC_B030	SPC_B030	WCT	54.04	643.22	2125.36	0.036	63.4	0.35	0.10	1.34	0.0007	1.07
SPC_B035	SPC_B035	WCT	29.05	430.47	1597.35	0.0332	78.1	0.35	0.10	1.07	0.0007	0.85
SPC_B036	SPC_B036	WCT	24.57	560.40	2510.84	0.013	95.0	0.35	0.05	0.93	0.0007	0.74
SPC_B040	SPC_B040	WCT	58.63	478.52	2204.12	0.04	77.4	0.35	0.10	1.15	0.0007	0.92
SPC_B045	SPC_B045	WCT	56.97	600.07	1837.86	0.0311	50.7	0.35	0.05	1.37	0.0007	1.09
SPC_B046	SPC_B046	WCT	15.68	450.23	1139.63	0.0316	45.0	0.35	0.05	0.76	0.0007	0.61
SPC_B050	SPC_B050	WCT	8.07	1060.53	1060.53	0.0336	34.6	0.35	0.05	0.36	0.0007	0.29
SPC_B055	SPC_B055	WCT	16.75	423.33	1359.15	0.0355	28.7	0.35	0.05	0.61	0.0007	0.49
SPC_B060	SPC_B060	WCT	22.31	754.58	1871.86	0.0431	27.8	0.35	0.05	0.80	0.0007	0.64

Annual / WQ CUHP Input

Subcatchment Name	EPA SWMM Target Node	Raingage	Area (Ac.)	Length to Centroid (ft.)	Length (ft.)	Slope (ft/ft)	Percent Imperviousness	Depression Storage (in) Pervious	Depression Storage (in) Impervious	Hortons's Infiltration Parameters Initial Rate (in/hr)	Hortons's Infiltration Parameters Decay Coefficient (1/seconds)	Hortons's Infiltration Parameters Final Rate (in/hr)
SPC_B065	SPC_B065	WCT	23.15	712.30	1792.42	0.0471	23.8	0.35	0.05	0.75	0.0007	0.60
SPC_B070	SPC_B070	WCT	40.23	847.46	1975.59	0.0415	28.1	0.35	0.05	1.26	0.0007	1.01
SPC_B080	SPC_B080	WCT	22.07	1049.42	2098.49	0.0318	44.6	0.35	0.05	1.08	0.0007	0.86
SPC_B085	SPC_B085	WCT	19.54	907.32	1653.03	0.0303	44.8	0.35	0.05	0.74	0.0007	0.59
SPC_B090	SPC_B090	WCT	9.89	938.65	2025.67	0.0252	29.8	0.35	0.05	0.58	0.0007	0.46
SPC_B095	SPC_B095	WCT	42.42	915.60	2173.88	0.0289	47.0	0.35	0.10	1.10	0.0007	0.88
SPC_B100	SPC_B100	WCT	32.62	831.55	2295.28	0.0394	45.0	0.35	0.05	0.87	0.0007	0.70
SPC_B105	SPC_B105	WCT	27.26	926.15	2677.45	0.0382	25.5	0.35	0.05	0.55	0.0007	0.44
SPC_B110	SPC_B110	WCT	25.65	750.06	2060.35	0.0356	41.4	0.35	0.05	0.75	0.0007	0.60
TRE_B005	TRE_B005	WCT	28.56	1342.01	2011.51	0.0251	42.3	0.35	0.05	0.62	0.0007	0.49
TRE_B010	TRE_B010	WCT	31.97	1068.85	1893.51	0.033	70.2	0.35	0.10	1.02	0.0007	0.82
TRE_B015	TRE_B015	WCT	18.00	446.98	1242.82	0.0382	33.5	0.35	0.05	0.77	0.0007	0.61
TRE_B020	TRE_B020	WCT	5.41	198.88	737.58	0.0254	57.6	0.35	0.05	0.40	0.0007	0.32
TRE_B025	TRE_B025	WCT	3.32	485.88	917.10	0.0214	75.0	0.35	0.05	0.36	0.0007	0.29
WCE_B005	WCE_B005	WCT	8.42	947.17	2268.78	0.0324	28.4	0.35	0.05	0.71	0.0007	0.57
WCE_B010	WCE_B010	WCT	13.60	523.70	1334.00	0.0339	45.0	0.35	0.05	0.61	0.0007	0.49
WCE_B015	WCE_B015	WCT	28.51	1253.78	1845.39	0.0267	43.9	0.35	0.05	0.85	0.0007	0.68
WCE_B020	WCE_B020	WCT	18.47	638.61	1541.51	0.0375	45.0	0.35	0.05	0.95	0.0007	0.76
WCE_B025	WCE_B025	WCT	12.46	693.21	1500.27	0.0365	43.7	0.35	0.05	0.61	0.0007	0.49
WCE_B029	WCE_B029	WCT	13.23	726.13	1657.71	0.039	34.0	0.35	0.05	0.70	0.0007	0.56
WCE_B030	WCE_B030	WCT	25.55	1139.94	2135.03	0.025	36.7	0.35	0.05	0.70	0.0007	0.56
WCE_B035	WCE_B035	WCT	22.11	908.99	2346.05	0.0265	44.8	0.35	0.05	0.77	0.0007	0.61
WCE_B040	WCE_B040	WCT	3.23	530.18	1337.74	0.0343	43.7	0.35	0.05	0.39	0.0007	0.31
WCE_B045	WCE_B045	WCT	26.98	1068.45	2276.54	0.0359	48.0	0.35	0.05	0.87	0.0007	0.70
WCE_B050	WCE_B050	WCT	14.39	733.60	2147.58	0.0253	26.8	0.35	0.05	0.59	0.0007	0.47
WCE_B055	WCE_B055	WCT	20.04	682.11	1779.82	0.0343	43.0	0.35	0.05	0.75	0.0007	0.60
WCE_B056	WCE_B056	WCT	3.19	402.50	1017.00	0.0406	56.0	0.35	0.05	0.40	0.0007	0.32
WCE_B060	WCE_B060	WCT	9.28	507.12	989.40	0.0285	88.1	0.35	0.10	0.59	0.0007	0.47
WCE_B065	WCE_B065	WCT	19.32	454.11	1048.37	0.0459	85.9	0.35	0.10	0.73	0.0007	0.58
WCE_B070	WCE_B070	WCT	14.54	714.39	1554.31	0.0337	80.6	0.35	0.10	1.08	0.0007	0.86
WCE_B075	WCE_B075	WCT	10.93	693.22	1566.95	0.0348	94.8	0.35	0.10	0.55	0.0007	0.44
WCE_B080	WCE_B080	WCT	13.06	473.04	1316.78	0.0348	94.9	0.35	0.10	1.05	0.0007	0.84
WCE_B085	WCE_B085	WCT	6.06	571.76	1183.99	0.0386	94.9	0.35	0.10	0.57	0.0007	0.46
WCE_B090	WCE_B090	WCT	44.84	1270.90	2861.97	0.0281	83.3	0.35	0.10	1.15	0.0007	0.92
WCE_B095	WCE_B095	WCT	6.78	545.26	1266.48	0.0216	95.0	0.35	0.10	0.47	0.0007	0.38
WCE_B100	WCE_B100	WCT	27.07	921.83	2466.81	0.0191	90.7	0.35	0.10	0.92	0.0007	0.74
WCE_B105	WCE_B105	WCT	25.44	823.17	1763.10	0.0331	92.2	0.35	0.10	0.99	0.0007	0.79
WCE_B110	WCE_B110	WCT	18.53	631.64	2022.95	0.0168	91.1	0.35	0.05	0.72	0.0007	0.57
WSC_B005	WSC_B005	WCT	42.28	1392.22	2808.54	0.0361	38.0	0.35	0.05	1.03	0.0007	0.83
WSC_B010	WSC_B010	WCT	9.63	452.69	1156.85	0.0325	44.8	0.35	0.05	0.65	0.0007	0.52
WSC_B015	WSC_B015	WCT	16.57	514.85	1569.92	0.0229	45.0	0.35	0.05	0.75	0.0007	0.60
WSC_B020	WSC_B020	WCT	22.62	823.69	1516.79	0.0235	76.9	0.35	0.10	1.09	0.0007	0.87
WSC_B025	WSC_B025	WCT	25.44	722.30	1192.27	0.0246	77.6	0.35	0.10	1.03	0.0007	0.83

Detention Basin Rating Curves

Sam's Club Detention Basin (ACR_S100)				
Elevation (ft)	Depth (ft)	Surface Area (ft^2)	Storage (Ac-ft.)	Discharge (cfs.)
5739.00	0.0	0	0.00	0.0
5739.50	0.5	--	--	0.0
5740.00	1.0	3,736	0.03	0.1
5740.50	1.5	--	--	0.3
5741.00	2.0	14,506	0.22	0.4
5741.50	2.5	--	--	0.6
5742.00	3.0	25,105	0.67	0.9
5742.50	3.5	--	--	1.1
5743.00	4.0	39,455	1.41	1.4
5743.50	4.5	--	--	1.7
5744.00	5.0	50,060	2.43	2.0
5744.50	5.5	--	--	2.3
5745.00	6.0	57,979	3.67	2.6
5745.50	6.5	--	--	3.0
5746.00	7.0	64,800	5.08	3.4
5746.50	7.5	--	--	3.8
5747.00	8.0	71,971	6.65	4.1
5747.50	8.5	--	--	4.6
5747.87	8.9	--	--	4.8
5748.00	9.0	78,052	8.37	7.4
5748.50	9.5	--	--	31.2
5749.00	10.0	78,052	10.16	67.0
5749.50	10.5	--	--	79.6
5750.00	11.0	78,052	11.96	90.4
5750.50	11.5	--	--	191.9
5751.00	12.0	78,052	13.75	368.8
5751.50	12.5	--	--	594.5
5752.00	13.0	78,052	15.54	859.8

-- Values interpolated by SWMM

Spring Creek Detention Basin (SPC_S100)				
Elevation (ft)	Depth (ft)	Surface Area (ft^2)	Storage (Ac-ft.)	Discharge (cfs.)
5705.17	0.0	0	0.00	0.0
5705.50	0.3	--	--	1.4
5706.00	0.8	--	--	7.1
5706.50	1.3	--	--	16.7
5707.00	1.8	--	--	29.6
5707.50	2.3	--	--	34.8
5708.00	2.8	--	--	55.1
5708.50	3.3	--	--	69.8
5709.00	3.8	--	--	81.9
5709.50	4.3	--	--	92.4
5710.00	4.8	7,386	0.00	101.8
5710.50	5.3	--	--	110.4
5711.00	5.8	18,869	0.29	118.4
5711.50	6.3	--	--	125.9
5712.00	6.8	26,607	0.81	133.0
5712.50	7.3	--	--	139.7
5713.00	7.8	31,986	1.48	146.1
5713.50	8.3	--	--	152.2
5714.00	8.8	35,764	2.26	158.1
5714.50	9.3	--	--	163.8
5715.00	9.8	38,981	3.12	169.3
5715.50	10.3	--	--	174.6
5716.00	10.8	42,001	4.05	179.8
5716.50	11.3	--	--	184.8
5717.00	11.8	45,120	5.05	189.7
5717.50	12.3	--	--	194.5
5718.00	12.8	48,163	6.12	199.1
5718.50	13.3	--	--	203.7
5719.00	13.8	51,098	7.26	208.1
5719.50	14.3	--	--	212.5
5720.00	14.8	53,951	8.46	216.7
5720.50	15.3	--	--	257.7
5721.00	15.8	56,725	9.73	329.0
5721.50	16.3	--	--	420.1
5722.00	16.8	59,546	11.07	488.4
5722.50	17.3	--	--	522.4
5723.00	17.8	62,566	12.47	541.7
5723.50	18.3	--	--	550.1
5724.00	18.8	66,070	13.94	558.5
5724.50	19.3	--	--	566.7
5725.00	19.8	70,632	15.51	574.9
5725.50	20.3	--	--	582.9
5726.00	20.8	76,494	17.20	590.8
5726.50	21.3	--	--	598.6
5727.00	21.8	90,522	19.12	606.2
5727.50	22.3	--	--	613.8
5728.00	22.8	102,624	21.33	621.3
5728.50	23.3	--	--	628.8
5729.00	23.8	112,373	23.80	636.1
5729.50	24.3	--	--	643.3
5730.00	24.8	121,115	26.48	650.5
5730.50	25.3	--	--	657.6
5731.00	25.8	129,600	29.36	664.6
5731.50	26.3	--	--	671.5
5732.00	26.8	139,312	32.44	678.4
5732.50	27.3	--	--	685.2
5733.00	27.8	155,128	35.82	691.9

-- Values interpolated by SWMM

-- Values interpolated by SWMM

Detention Basin Rating Curves

Yosemite Pond (PHI_S100)				
Elevation (ft)	Depth (ft)	Surface Area (ft^2)	Storage (Ac-ft.)	Discharge (cfs.)
5754.00	0.0	29,962	0.00	0.0
5754.83	0.8	--	--	0.1
5755.00	1.0	35,438	0.75	0.9
5755.50	1.5	--	--	7.5
5756.00	2.0	39,056	1.60	19.6
5756.50	2.5	--	--	36.5
5757.00	3.0	42,247	2.54	58.0
5757.50	3.5	--	--	83.8
5758.00	4.0	45,338	3.54	117.1
5758.50	4.5	--	--	131.4
5759.00	5.0	48,540	4.62	144.3
5759.50	5.5	--	--	156.2
5760.00	6.0	52,081	5.77	167.2
5760.50	6.5	--	--	177.6
5761.00	7.0	56,096	7.02	187.3
5761.50	7.5	--	--	196.6
5762.00	8.0	56,096	8.30	205.5
5762.30	8.3	--	--	205.5
5762.50	8.5	--	--	223.3
5763.00	9.0	56,096	9.59	283.1
5763.50	9.5	--	--	366.8
5764.00	10.0	56,096	10.88	468.2
5764.50	10.5	--	--	584.4
5765.00	11.0	56,097	12.17	713.6

-- Values interpolated by SWMM

Akron Pond (PHI_S200)				
Elevation (ft)	Depth (ft)	Surface Area (ft^2)	Storage (Ac-ft.)	Discharge (cfs.)
5778.0	0.0	17,058	0.00	0.0
5778.5	0.5	--	--	30.3
5779.0	1.0	22,803	0.46	171.6
5779.5	1.5	--	--	315.2
5780.0	2.0	26,142	1.02	360.0
5780.5	2.5	--	--	384.0
5781.0	3.0	29,483	1.66	408.0
5781.5	3.5	--	--	432.0
5782.0	4.0	29,483	2.33	456.0

-- Values interpolated by SWMM

Panorama Pond (WCE_S100)				
Elevation (ft)	Depth (ft)	Surface Area (ft^2)	Storage (Ac-ft.)	Discharge (cfs.)
5741.00	0.0	111	0.00	0.0
5741.60	0.6	--	--	0.0
5742.00	1.0	1,050	0.00	0.7
5742.50	1.5	--	--	1.6
5743.00	2.0	13,112	0.00	2.9
5743.50	2.5	--	--	4.3
5744.00	3.0	33,024	0.00	6.1
5744.50	3.5	--	--	7.9
5745.00	4.0	45,406	0.00	9.9
5745.50	4.5	--	--	12.0
5746.00	5.0	56,427	0.00	14.3
5746.50	5.5	--	--	16.7
5747.00	6.0	63,137	0.48	19.3
5747.11	6.1	--	--	19.8
5747.50	6.5	--	--	27.3
5748.00	7.0	67,009	1.49	28.0
5748.50	7.5	--	--	28.0
5749.00	8.0	70,679	1.58	28.0
5749.50	8.5	--	--	28.0
5750.00	9.0	74,633	1.67	28.0
5750.50	9.5	--	--	28.0
5751.00	10.0	78,986	1.76	28.0
5751.14	10.1	--	--	29.0
5751.50	10.5	--	--	51.4
5752.00	11.0	83,855	1.87	114.4
5752.50	11.5	--	--	149.2
5753.00	12.0	89,051	1.98	169.6
5753.50	12.5	--	--	173.3
5754.00	13.0	93,985	2.10	177.0
5754.48	13.5	--	--	180.4
5754.50	13.5	96,323	1.09	182.3
5755.00	14.0	98,661	2.21	281.5
5755.50	14.5	--	--	455.2
5756.00	15.0	98,661	3.36	678.0

-- Values interpolated by SWMM

Future Conditions Peak Flow (cfs)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
ACR_B005	JUNCTION	7.2	10.9	15.2	24.7	31.0	38.4	55.7
ACR_B010	JUNCTION	7.7	10.4	13.1	18.5	22.4	26.9	37.5
ACR_B015	JUNCTION	8.2	11.3	14.3	20.3	24.7	29.8	41.8
ACR_B020	JUNCTION	13.3	18.3	23.2	33.7	40.9	49.1	68.7
ACR_B025	JUNCTION	18.7	25.1	30.9	42.3	50.8	60.5	83.3
ACR_B030	JUNCTION	23.0	31.4	39.4	55.8	67.5	80.9	112.5
ACR_B035	JUNCTION	17.2	24.2	31.2	45.0	55.0	66.7	93.8
ACR_B040	JUNCTION	14.2	21.6	30.2	48.6	61.1	75.7	110.0
ACR_B045	JUNCTION	19.8	30.1	42.3	65.6	82.7	103.1	149.0
ACR_B050	JUNCTION	17.9	26.6	36.7	55.8	69.9	86.8	124.7
ACR_B055	JUNCTION	10.4	15.9	22.1	36.0	45.3	56.1	81.5
ACR_J005	JUNCTION	98.6	142.0	189.6	289.1	358.5	439.6	649.7
ACR_J010	JUNCTION	84.0	121.0	161.7	246.0	305.2	374.5	557.0
ACR_J035	JUNCTION	76.1	110.3	148.0	226.0	280.8	345.1	516.5
ACR_J045	DIVIDER	76.1	110.3	148.1	226.0	280.8	345.2	521.9
ACR_J050	JUNCTION	76.1	110.3	148.1	226.0	280.8	345.2	521.9
ACR_J055	DIVIDER	44.9	68.0	95.1	151.0	190.2	236.6	345.9
ACR_J060	JUNCTION	0.0	0.0	0.0	0.0	0.0	0.0	10.0
ACR_J065	JUNCTION	44.0	66.9	93.9	149.2	188.2	234.4	354.9
ACR_J070	JUNCTION	0.0	0.0	0.0	0.0	0.0	0.0	11.6
ACR_J075	DIVIDER	44.0	66.9	93.9	149.2	188.2	234.4	341.1
ACR_J080	JUNCTION	26.2	39.6	55.1	87.3	109.7	136.4	198.0
ACR_J085	JUNCTION	10.4	15.9	22.1	36.0	45.3	56.1	81.5
ACR_J200	DIVIDER	2.6	3.4	4.2	22.0	50.2	75.8	172.9
ACR_J204	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J205	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J210	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J215	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J220	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J225	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J230	DIVIDER	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J235	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J240	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J245	JUNCTION	14.2	21.6	30.2	48.5	61.1	75.7	110.0
ACR_J250	JUNCTION	14.2	21.6	30.2	48.6	61.1	75.7	110.0
ACR_O005	OUTFALL	98.5	141.8	189.4	289.0	358.4	439.5	647.8
ACR_O010	OUTFALL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ACR_S100	STORAGE	54.0	76.4	99.8	148.2	182.4	222.0	314.7
DFA_B005	OUTFALL	15.5	25.8	49.9	107.9	144.8	190.8	292.7
DFA_B010	OUTFALL	7.8	11.9	16.7	27.0	34.0	42.1	61.2
DFA_B015	OUTFALL	19.4	29.7	42.0	65.7	82.8	103.5	149.9
DFA_B020	OUTFALL	5.4	8.1	11.0	18.0	22.5	27.9	40.3
DFA_B021	OUTFALL	13.1	19.3	26.1	41.6	51.9	63.9	91.9
DFA_B025	OUTFALL	15.9	23.7	32.9	49.7	62.4	77.6	111.1
DFA_B030	OUTFALL	7.4	11.2	15.6	25.7	32.3	40.0	58.2

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
DFA_B035	OUTFALL	4.3	7.1	10.7	18.0	23.2	29.3	43.5
DFA_B040	OUTFALL	9.1	15.2	22.7	39.9	51.3	64.5	95.7
DFA_B041	OUTFALL	8.9	14.4	21.4	36.3	46.3	58.3	86.1
DFA_B042	JUNCTION	3.1	4.6	6.4	9.9	12.4	15.4	22.2
DFA_B043	JUNCTION	22.4	29.5	36.6	49.1	58.8	68.2	93.5
DFA_B045	OUTFALL	7.3	11.9	17.5	30.2	38.6	48.3	71.3
DFA_B046	OUTFALL	7.1	11.1	15.9	26.7	33.9	42.2	61.8
DFA_B050	OUTFALL	16.2	27.4	42.3	73.0	94.5	119.9	178.7
DFA_B051	OUTFALL	7.9	12.0	16.8	26.3	33.2	41.4	60.0
DFA_B055	OUTFALL	21.2	32.2	45.4	71.3	89.9	112.0	162.5
DFA_B060	OUTFALL	1.9	3.4	7.3	16.7	22.7	30.1	46.6
DFA_B061	OUTFALL	4.5	6.8	9.5	15.6	19.6	24.3	35.3
DFA_B065	OUTFALL	6.0	8.7	12.9	22.6	29.0	36.3	53.7
DFA_B100	OUTFALL	2.5	3.8	5.3	8.6	10.8	13.4	19.5
DFA_B105	OUTFALL	6.0	9.1	12.9	20.0	25.2	31.5	45.6
DFA_J005	JUNCTION	25.5	34.0	42.3	57.8	69.7	83.4	115.2
DFA_J010	JUNCTION	22.4	29.5	36.6	49.1	58.8	68.2	93.5
DFA_O005	OUTFALL	25.1	33.6	41.9	57.2	69.1	82.9	115.0
FHP_B005	JUNCTION	1.1	2.4	4.4	9.2	12.2	16.1	24.5
FHP_B010	JUNCTION	5.2	7.7	10.6	17.0	21.3	26.3	38.0
FHP_B015	JUNCTION	4.4	6.0	7.5	10.4	12.5	15.2	21.1
FHP_B020	JUNCTION	5.9	8.0	10.0	13.8	16.6	20.2	28.0
FHP_B025	JUNCTION	4.9	6.8	8.7	12.6	15.4	18.6	26.2
FHP_B030	JUNCTION	34.7	51.1	70.1	106.7	133.3	164.7	236.7
FHP_B035	JUNCTION	0.8	1.3	2.0	3.7	4.8	6.2	9.3
FHP_B040	JUNCTION	6.8	10.9	15.9	27.2	34.6	43.2	63.6
FHP_B045	JUNCTION	5.9	8.1	10.3	14.5	17.7	21.4	29.9
FHP_B050	JUNCTION	2.8	4.3	6.0	9.6	12.0	15.0	21.8
FHP_B055	JUNCTION	2.1	3.2	4.5	7.5	9.4	11.6	16.9
FHP_B060	JUNCTION	9.8	14.8	20.6	32.5	40.9	50.7	73.5
FHP_B065	JUNCTION	13.1	20.0	27.9	45.4	57.1	70.8	102.9
FHP_B070	JUNCTION	11.7	17.9	24.9	40.4	50.9	63.0	91.5
FHP_B075	JUNCTION	1.3	2.0	2.7	4.6	5.8	7.3	10.7
FHP_B080	JUNCTION	11.6	17.9	25.5	40.8	51.7	64.5	94.0
FHP_B085	JUNCTION	20.8	30.0	40.0	59.5	73.6	90.1	128.2
FHP_B090	JUNCTION	9.9	15.1	21.3	33.2	41.9	52.3	75.8
FHP_B095	JUNCTION	14.6	20.4	26.3	37.8	46.2	56.1	78.8
FHP_B100	JUNCTION	6.0	9.2	12.9	20.4	25.8	32.0	46.6
FHP_B105	JUNCTION	6.3	8.5	11.0	15.5	18.9	22.1	30.9
FHP_J005	JUNCTION	148.7	223.5	306.7	495.6	626.9	780.3	1200.0
FHP_J010	JUNCTION	139.4	209.2	287.4	463.9	586.5	728.9	1126.6
FHP_J015	DIVIDER	135.2	203.4	279.9	452.5	572.2	711.3	1032.8
FHP_J020	JUNCTION	112.0	167.2	229.5	368.6	462.7	571.7	827.6
FHP_J030	JUNCTION	105.0	155.8	212.8	339.0	424.6	523.5	755.8
FHP_J035	JUNCTION	59.9	88.7	120.2	189.1	235.2	288.9	415.9

Future Conditions Peak Flow (cfs)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
FHP_J040	JUNCTION	50.3	73.2	97.8	150.5	185.9	227.3	325.4
FHP_J045	JUNCTION	26.1	35.9	45.7	64.9	78.7	95.0	132.3
FHP_J050	JUNCTION	20.1	26.8	32.8	44.6	53.0	63.0	85.7
FHP_J055	JUNCTION	6.3	7.5	7.5	7.5	7.5	7.5	7.5
FHP_J060	JUNCTION	6.3	7.5	7.5	7.5	7.5	7.5	7.5
FHP_J065	DIVIDER	6.3	8.5	11.0	15.5	18.9	22.1	30.9
FHP_J100	JUNCTION	46.0	67.1	85.7	90.6	93.1	96.0	99.1
FHP_J105	JUNCTION	43.3	62.2	80.9	85.6	88.0	91.0	93.6
FHP_J110	JUNCTION	40.6	58.3	75.3	76.1	76.1	76.1	76.1
FHP_J115	JUNCTION	37.6	55.3	72.6	73.0	73.0	73.0	73.0
FHP_J120	DIVIDER	37.6	55.3	72.1	92.9	106.6	122.4	159.8
FHP_J125	DIVIDER	28.0	41.3	58.1	78.9	92.6	108.4	145.8
FHP_J130	DIVIDER	12.9	19.2	27.0	44.4	56.0	69.4	101.0
FHP_J135	DIVIDER	12.9	19.7	27.5	44.7	56.3	69.7	101.3
FHP_J140	JUNCTION	4.0	4.0	4.0	4.0	4.0	4.0	4.0
FHP_J145	DIVIDER	13.0	19.7	27.5	44.8	56.3	69.7	101.3
FHP_J150	DIVIDER	13.1	20.0	27.9	45.4	57.1	70.8	102.9
FHP_J160	JUNCTION	9.8	14.0	14.0	14.0	14.0	14.0	14.0
FHP_J165	DIVIDER	9.8	14.8	20.6	32.5	40.9	50.7	73.5
FHP_J200	DIVIDER	2.9	5.0	12.8	65.8	102.6	145.0	244.7
FHP_J205	DIVIDER	5.9	8.1	15.8	68.8	105.6	148.1	247.8
FHP_J210	DIVIDER	2.8	4.3	6.0	9.6	12.0	15.0	21.8
FHP_J215	JUNCTION	0.0	0.7	6.4	55.4	89.0	127.9	219.3
FHP_O005	OUTFALL	148.9	224.6	309.8	503.4	637.0	794.3	1220.1
HFT_B005	JUNCTION	11.9	18.1	25.3	40.6	51.0	63.3	92.1
HFT_B010	JUNCTION	16.2	26.5	39.4	67.8	86.8	109.0	161.2
HFT_B015	JUNCTION	15.3	23.4	32.6	53.0	66.7	82.6	120.0
HFT_B020	JUNCTION	4.3	6.6	9.1	15.1	19.0	23.7	34.5
HFT_B025	JUNCTION	8.1	11.8	15.8	24.9	31.1	38.0	54.6
HFT_B030	JUNCTION	4.3	5.8	7.2	10.1	12.2	14.7	20.5
HFT_J005	JUNCTION	27.7	44.1	64.0	107.9	137.4	171.8	252.6
HFT_J010	JUNCTION	16.2	26.5	39.4	67.8	86.8	109.0	161.2
HFT_J100	DIVIDER	31.8	47.3	64.5	100.8	110.3	123.0	133.8
HFT_J101	JUNCTION	0.0	4.0	21.2	62.1	85.1	114.0	182.8
HFT_J105	JUNCTION	27.6	40.8	55.6	85.9	91.3	99.3	99.3
HFT_J110	DIVIDER	15.3	23.4	32.6	53.0	66.7	82.9	140.7
HFT_J115	DIVIDER	15.3	23.4	32.6	53.0	66.7	82.6	120.0
HFT_J120	JUNCTION	12.3	17.5	23.0	34.8	43.0	51.0	51.0
HFT_J125	JUNCTION	12.3	17.5	23.0	34.8	43.0	51.0	51.0
HFT_J130	JUNCTION	12.3	17.5	23.0	34.8	43.0	51.0	51.0
HFT_J135	JUNCTION	12.3	17.5	23.0	34.8	43.0	51.0	51.0
HFT_J140	JUNCTION	12.3	17.5	23.0	34.8	43.0	51.0	51.0
HFT_J145	DIVIDER	12.3	17.5	23.0	34.8	43.0	52.4	74.6
HFT_J150	JUNCTION	4.2	5.7	7.2	10.1	12.2	14.7	20.5
HFT_J155	JUNCTION	4.2	5.8	7.2	10.1	12.2	14.7	20.5

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HFT_J160	JUNCTION	4.2	5.8	7.2	10.1	12.2	14.7	20.5
HFT_J165	JUNCTION	4.3	5.8	7.2	10.1	12.2	14.7	20.5
HFT_J170	JUNCTION	4.3	5.8	7.2	10.1	12.2	14.7	20.5
HFT_O005	OUTFALL	31.8	46.3	46.9	46.9	46.9	46.9	46.9
HFT_O010	OUTFALL	27.7	47.9	85.1	169.9	222.3	285.5	433.0
HOM_B005	JUNCTION	4.6	6.9	9.7	15.4	19.4	24.1	35.1
HOM_B010	JUNCTION	14.8	22.5	31.5	49.7	62.6	77.9	113.0
HOM_B015	JUNCTION	8.5	13.0	18.1	29.6	37.2	46.1	66.9
HOM_B020	JUNCTION	11.3	17.2	24.1	39.0	49.1	60.8	88.3
HOM_J005	JUNCTION	38.0	61.2	80.8	128.2	146.6	158.5	204.1
HOM_J010	JUNCTION	34.0	55.0	72.1	114.2	127.6	134.9	169.8
HOM_J015	JUNCTION	34.1	56.1	72.5	114.4	128.0	135.2	170.3
HOM_J020	JUNCTION	34.1	50.1	50.2	50.2	50.2	50.2	50.2
HOM_J025	DIVIDER	34.1	52.6	72.5	115.6	128.0	135.2	170.3
HOM_J030	DIVIDER	34.1	52.6	72.5	112.7	120.0	135.3	170.3
HOM_J035	JUNCTION	19.8	30.5	42.2	63.9	63.2	62.6	61.8
HOM_J040	JUNCTION	19.9	30.7	42.2	62.1	62.1	62.1	62.1
HOM_J045	DIVIDER	19.9	30.7	42.2	68.5	86.3	106.9	156.8
HOM_J050	JUNCTION	11.3	17.7	24.1	39.0	49.1	60.8	80.0
HOM_J055	JUNCTION	11.3	17.8	24.1	39.0	49.1	60.8	80.0
HOM_J060	JUNCTION	11.3	17.8	24.1	39.0	49.1	60.8	80.1
HOM_J065	DIVIDER	11.3	17.8	24.1	39.0	49.1	60.8	91.2
HOM_J070	DIVIDER	11.3	18.0	24.1	39.0	49.1	60.8	92.2
HOM_J075	DIVIDER	11.3	18.1	24.1	39.0	49.1	60.8	88.3
HOM_J080	JUNCTION	11.3	16.6	16.5	16.1	16.2	16.1	16.1
HOM_J085	JUNCTION	11.3	16.1	16.1	16.1	16.1	16.1	16.1
HOM_J090	DIVIDER	11.3	17.2	24.1	39.0	49.1	60.8	88.3
HOM_O005	OUTFALL	37.7	60.3	79.7	122.3	145.1	157.5	203.3
HOM_O010	OUTFALL	0.0	0.0	0.0	11.1	28.9	49.5	99.4
JAM_B005	JUNCTION	4.9	8.0	12.0	20.8	26.7	33.5	49.6
JAM_B010	JUNCTION	19.6	28.2	37.7	56.7	70.4	86.3	123.3
JAM_J005	JUNCTION	19.5	28.2	37.7	56.7	70.4	86.3	123.3
JAM_J010	JUNCTION	19.6	28.2	37.7	56.7	70.4	86.3	123.3
JAM_J015	JUNCTION	19.6	28.2	37.7	56.7	70.4	86.3	123.3
KET_B005	JUNCTION	7.6	11.6	16.3	25.7	32.5	40.4	58.8
KET_B010	JUNCTION	23.6	31.1	38.0	51.0	60.9	71.8	98.0
KET_J005	DIVIDER	31.0	42.6	55.6	76.4	93.0	112.0	156.5
KET_J010	DIVIDER	23.5	31.1	39.7	50.8	60.7	71.7	97.9
KET_J011	JUNCTION	23.5	31.1	35.7	35.7	35.7	35.7	35.7
KET_J015	DIVIDER	23.5	31.1	38.0	50.8	60.7	71.7	98.0
KET_J020	JUNCTION	23.5	31.1	38.0	50.9	60.8	71.7	98.0
KET_J025	JUNCTION	23.5	31.1	38.0	50.9	60.8	71.7	98.0
KET_J030	JUNCTION	23.5	31.1	38.0	50.9	60.8	71.7	98.0
KET_J035	DIVIDER	23.5	31.1	38.0	50.9	60.8	71.8	98.0
KET_J040	JUNCTION	23.6	31.1	38.0	51.0	60.9	71.8	98.0

Future Conditions Peak Flow (cfs)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
PHI_B100	JUNCTION	7.3	11.1	15.6	24.8	31.3	38.9	56.6
PHI_B105	JUNCTION	4.6	7.0	9.7	16.0	20.2	25.1	36.5
PHI_B110	JUNCTION	36.7	49.6	62.4	86.4	104.5	125.3	173.5
PHI_B115	JUNCTION	113.8	152.5	189.3	263.6	319.5	378.1	524.4
PHI_J010	JUNCTION	82.9	126.3	154.6	211.4	243.5	302.4	574.4
PHI_J015	JUNCTION	77.6	117.7	142.4	191.6	219.0	272.9	527.7
PHI_J020	JUNCTION	112.6	150.8	187.1	259.1	313.6	357.3	445.8
PHI_O005	OUTFALL	82.9	126.3	154.5	211.4	243.5	302.4	574.3
PHI_S100	STORAGE	149.0	200.3	249.4	344.9	417.3	478.2	603.1
PHI_S200	STORAGE	113.8	152.5	189.3	263.6	319.5	378.1	524.4
SPC_B005	JUNCTION	10.9	16.1	22.0	34.3	42.8	52.8	76.2
SPC_B010	JUNCTION	11.3	17.8	25.6	41.6	52.8	66.2	96.8
SPC_B015	JUNCTION	14.6	22.4	31.5	51.3	64.7	80.3	116.8
SPC_B020	JUNCTION	5.8	8.8	12.1	19.7	24.7	30.6	44.3
SPC_B025	JUNCTION	17.0	23.6	32.5	52.6	66.2	82.0	118.9
SPC_B030	JUNCTION	46.0	65.0	86.1	125.1	154.6	188.2	265.3
SPC_B035	JUNCTION	32.9	44.4	56.7	79.2	96.1	112.7	156.4
SPC_B036	JUNCTION	26.9	34.9	42.0	55.3	65.5	77.6	105.4
SPC_B040	JUNCTION	70.7	96.2	123.8	173.4	210.6	245.9	341.0
SPC_B045	JUNCTION	38.9	57.5	79.2	119.8	149.6	185.5	265.6
SPC_B046	JUNCTION	7.9	12.1	17.1	26.7	33.6	42.0	60.8
SPC_B050	JUNCTION	2.0	3.3	4.9	8.6	11.0	13.8	20.4
SPC_B055	JUNCTION	4.0	7.0	11.0	19.7	25.6	32.4	48.5
SPC_B060	JUNCTION	4.2	7.5	11.7	21.5	28.0	35.6	53.4
SPC_B065	JUNCTION	3.9	7.2	11.6	21.9	28.6	36.4	54.7
SPC_B070	JUNCTION	8.8	15.6	24.3	44.4	57.6	73.1	109.6
SPC_B080	JUNCTION	7.6	11.6	16.3	26.6	33.5	41.5	60.3
SPC_B085	JUNCTION	7.4	11.3	15.8	25.5	32.0	39.7	57.7
SPC_B090	JUNCTION	1.3	2.2	3.4	6.3	8.2	10.6	15.8
SPC_B095	JUNCTION	18.9	29.0	40.9	65.0	81.9	101.8	147.8
SPC_B100	JUNCTION	14.1	21.5	30.2	47.9	60.4	75.1	109.2
SPC_B105	JUNCTION	4.0	7.1	11.3	21.2	27.7	35.7	53.5
SPC_B110	JUNCTION	9.5	14.7	21.1	34.4	43.5	54.3	79.4
SPC_J005	JUNCTION	274.8	363.6	459.5	809.9	1013.3	1211.8	1622.9
SPC_J010	JUNCTION	266.4	350.6	441.1	788.4	982.5	1169.1	1554.4
SPC_J015	JUNCTION	257.6	335.9	419.4	763.2	944.5	1115.7	1529.0
SPC_J020	DIVIDER	238.2	305.6	376.8	706.6	865.8	1009.1	1284.2
SPC_J025	JUNCTION	179.0	218.1	257.2	575.7	677.6	756.7	912.2
SPC_J030	JUNCTION	165.1	200.3	232.4	539.3	625.2	686.8	802.3
SPC_J035	JUNCTION	146.4	179.0	209.2	493.8	560.7	614.1	691.9
SPC_J040	DIVIDER	147.1	225.4	321.0	544.9	695.1	869.4	1245.8
SPC_J045	JUNCTION	107.6	172.0	251.9	438.2	561.4	707.0	1029.1
SPC_J050	JUNCTION	107.6	172.0	251.9	438.2	561.4	707.0	1029.1
SPC_J055	JUNCTION	107.6	172.0	251.9	438.2	561.4	707.0	1029.1
SPC_J060	JUNCTION	41.0	68.5	103.6	187.1	242.0	308.1	458.7

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
SPC_J065	JUNCTION	41.0	68.5	103.6	187.1	242.0	300.1	300.2
SPC_J070	JUNCTION	41.0	68.5	103.6	187.1	242.0	300.1	300.2
SPC_J075	JUNCTION	41.0	68.5	103.6	187.1	242.0	300.1	300.2
SPC_J080	JUNCTION	41.0	68.5	103.6	187.1	242.0	300.1	300.3
SPC_J085	JUNCTION	41.0	68.5	103.6	187.1	242.0	300.1	300.3
SPC_J090	DIVIDER	41.0	68.5	103.6	187.1	242.0	308.5	459.4
SPC_J095	JUNCTION	35.7	60.0	91.2	165.7	214.7	274.0	300.0
SPC_J100	JUNCTION	35.7	60.0	91.2	165.7	214.7	274.0	300.0
SPC_J105	JUNCTION	35.7	60.0	91.2	165.7	214.7	274.0	300.0
SPC_J110	DIVIDER	35.7	60.0	91.2	165.7	214.7	274.0	408.8
SPC_J115	DIVIDER	26.2	45.3	70.1	129.1	167.6	213.9	320.7
SPC_J120	JUNCTION	26.2	45.3	70.2	129.1	167.8	214.0	320.8
SPC_J125	JUNCTION	7.5	13.6	22.0	42.0	55.0	70.8	106.8
SPC_J130	JUNCTION	3.9	7.2	11.6	21.9	28.6	36.4	54.7
SPC_J135	JUNCTION	15.5	25.8	38.9	69.2	89.3	112.8	168.0
SPC_J140	JUNCTION	7.6	11.6	16.3	26.6	33.5	41.5	60.3
SPC_J150	JUNCTION	9.7	15.2	21.9	38.0	48.6	61.5	90.6
SPC_J155	JUNCTION	9.7	15.2	21.9	38.0	48.6	61.5	90.6
SPC_J160	JUNCTION	9.7	15.2	21.9	38.0	48.6	61.5	90.6
SPC_J165	JUNCTION	8.0	12.5	17.7	30.3	38.6	48.7	71.5
SPC_J170	JUNCTION	7.4	11.3	15.8	25.5	32.0	39.7	57.7
SPC_J200	JUNCTION	42.1	66.6	96.1	162.5	206.9	258.7	377.9
SPC_J205	JUNCTION	42.1	66.6	96.1	162.5	206.9	258.7	377.9
SPC_J210	JUNCTION	42.1	66.6	96.1	162.5	206.9	258.7	377.9
SPC_J215	JUNCTION	42.1	66.6	96.1	162.5	206.9	258.7	377.9
SPC_J220	JUNCTION	42.1	66.6	96.1	162.5	206.9	258.7	377.9
SPC_J225	JUNCTION	25.7	41.1	59.7	101.9	129.9	162.6	212.6
SPC_J230	JUNCTION	25.7	41.1	59.7	101.9	129.9	162.6	213.3
SPC_J235	JUNCTION	13.3	20.6	29.0	47.2	59.6	73.9	88.6
SPC_J240	DIVIDER	13.3	20.6	29.0	47.2	59.6	73.9	108.7
SPC_J245	JUNCTION	13.3	20.6	29.0	47.2	59.6	73.9	84.0
SPC_J250	DIVIDER	13.3	20.6	29.0	47.2	59.6	73.9	107.7
SPC_J255	JUNCTION	14.1	21.5	30.2	47.9	60.4	75.1	109.2
SPC_J260	JUNCTION	12.6	20.8	31.0	54.8	70.5	88.9	136.6
SPC_J265	DIVIDER	12.6	20.8	31.0	54.8	70.5	88.9	131.6
SPC_J270	JUNCTION	9.5	14.7	21.1	34.4	43.5	54.3	79.4
SPC_J275	JUNCTION	9.5	14.7	21.1	34.4	43.5	54.3	79.4
SPC_J300	JUNCTION	14.6	22.4	31.5	51.3	64.7	74.0	74.1
SPC_J305	JUNCTION	14.6	22.4	31.5	51.3	64.7	74.0	74.1
SPC_J310	DIVIDER	14.6	22.4	31.5	51.3	64.7	80.3	116.8
SPC_J400	JUNCTION	7.9	12.1	17.1	26.7	33.6	42.0	60.8
SPC_J405	JUNCTION	7.9	12.1	17.1	26.7	33.6	42.0	60.8
SPC_J410	JUNCTION	7.9	12.1	17.1	26.7	33.6	42.0	60.8
SPC_O005	OUTFALL	274.7	363.4	459.3	809.5	1012.9	1211.4	1621.0
SPC_S100	STORAGE	199.5	290.1	399.5	656.3	830.4	1034.9	1494.7

Future Conditions Peak Flow (cfs)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
TRE_B005	JUNCTION	8.8	13.7	19.3	32.1	40.6	50.4	73.6
TRE_B010	JUNCTION	24.4	34.1	43.9	62.9	76.8	93.2	130.8
TRE_B015	JUNCTION	5.9	9.8	14.9	25.1	32.3	40.9	60.7
TRE_B020	JUNCTION	4.1	5.9	7.8	11.4	14.1	17.4	24.7
TRE_B025	JUNCTION	2.3	3.1	3.8	5.4	6.5	7.9	11.0
TRE_J005	JUNCTION	11.2	17.6	24.9	40.9	51.7	64.6	94.4
TRE_J010	DIVIDER	11.2	17.6	24.9	40.9	51.7	64.6	94.5
TRE_J015	JUNCTION	11.2	17.6	24.9	40.9	51.7	64.6	94.5
TRE_J020	DIVIDER	11.2	17.6	24.9	40.9	51.7	64.6	94.5
TRE_J025	JUNCTION	11.2	17.6	24.9	30.0	30.0	30.0	30.0
TRE_J030	DIVIDER	11.2	17.6	24.9	40.9	51.7	64.6	94.5
TRE_J035	JUNCTION	6.2	8.8	11.5	16.6	20.4	25.0	35.3
TRE_J040	JUNCTION	2.3	3.1	3.8	5.4	6.5	7.9	11.0
TRE_J045	DIVIDER	2.3	3.1	3.8	5.4	6.5	7.9	11.0
TRE_J200	JUNCTION	33.0	47.3	62.6	93.5	115.7	141.8	145.1
TRE_J205	DIVIDER	33.0	47.3	62.6	93.5	115.7	141.8	201.3
TRE_J210	JUNCTION	24.4	34.0	43.8	62.8	76.8	93.1	105.1
TRE_J215	JUNCTION	24.4	34.1	43.9	62.9	76.8	93.2	105.0
TRE_J220	JUNCTION	24.4	34.1	43.9	62.9	76.8	93.2	105.0
TRE_J225	DIVIDER	24.4	34.1	43.9	62.9	76.8	93.2	130.8
TRE_O005	OUTFALL	11.2	17.6	24.9	40.9	51.7	64.6	94.4
TRE_O010	OUTFALL	33.0	47.3	62.6	93.5	115.7	141.8	201.2
WCE_B005	JUNCTION	0.9	1.6	2.6	4.9	6.4	8.2	12.3
WCE_B010	JUNCTION	6.1	9.3	13.0	20.5	25.9	32.2	46.8
WCE_B015	JUNCTION	10.0	15.3	21.4	35.1	44.2	54.8	79.8
WCE_B020	JUNCTION	8.2	12.5	17.6	27.8	35.1	43.7	63.5
WCE_B025	JUNCTION	4.6	7.0	9.9	16.0	20.2	25.1	36.5
WCE_B029	JUNCTION	3.1	5.1	7.6	13.4	17.3	21.7	32.2
WCE_B030	JUNCTION	6.2	9.9	14.5	25.2	32.2	40.4	59.5
WCE_B035	JUNCTION	7.5	11.5	16.0	26.3	33.1	40.9	59.5
WCE_B040	JUNCTION	0.9	1.3	1.8	3.1	3.9	4.8	7.0
WCE_B045	JUNCTION	11.1	16.6	22.9	36.3	45.4	56.1	81.1
WCE_B050	JUNCTION	2.0	3.4	5.3	10.1	13.2	17.1	25.7
WCE_B055	JUNCTION	7.8	12.1	17.1	27.6	34.9	43.4	63.4
WCE_B056	JUNCTION	1.6	2.3	3.0	4.6	5.7	6.9	9.9
WCE_B060	JUNCTION	10.1	13.4	16.4	22.1	26.4	31.7	43.4
WCE_B065	JUNCTION	25.4	34.2	43.0	58.3	69.9	81.0	111.3
WCE_B070	JUNCTION	12.7	17.0	21.2	29.7	35.9	43.3	60.2
WCE_B075	JUNCTION	11.2	14.8	17.9	24.0	28.5	33.8	46.1
WCE_B080	JUNCTION	16.3	21.2	25.7	34.3	40.8	48.1	65.4
WCE_B085	JUNCTION	6.2	8.1	9.8	13.2	15.7	18.6	25.3
WCE_B090	JUNCTION	38.8	51.9	64.5	89.8	108.4	129.8	179.8
WCE_B095	JUNCTION	6.5	8.5	10.4	13.9	16.5	19.6	26.8
WCE_B100	JUNCTION	24.9	33.1	40.6	55.0	65.8	78.1	107.1
WCE_B105	JUNCTION	28.9	38.2	46.6	62.2	74.1	88.1	120.3

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE_B110	JUNCTION	19.0	24.8	30.0	40.0	47.6	56.6	77.2
WCE_J005	JUNCTION	161.8	221.8	287.4	472.4	605.6	745.4	1215.7
WCE_J010	JUNCTION	153.8	213.2	277.9	460.6	592.3	730.2	1196.5
WCE_J015	JUNCTION	143.6	197.0	254.6	429.7	549.2	672.1	1123.9
WCE_J020	JUNCTION	140.7	192.1	247.3	418.3	533.5	651.5	1095.8
WCE_J025	JUNCTION	106.6	138.9	173.6	315.7	393.6	475.9	857.7
WCE_J030	JUNCTION	94.9	121.3	159.2	282.9	349.2	430.3	783.4
WCE_J035	JUNCTION	93.2	118.1	154.9	273.3	337.6	414.9	758.8
WCE_J040	JUNCTION	85.7	106.4	146.1	251.6	315.0	385.6	708.0
WCE_J045	JUNCTION	55.9	78.5	127.6	206.6	233.9	328.6	605.3
WCE_J064	JUNCTION	139.9	185.8	228.4	307.3	381.0	440.1	596.1
WCE_J065	JUNCTION	117.4	155.5	190.9	258.5	265.1	265.1	265.1
WCE_J070	JUNCTION	117.4	155.5	190.9	258.5	265.1	265.1	265.1
WCE_J075	JUNCTION	117.4	155.5	190.9	258.5	265.1	265.2	265.1
WCE_J080	JUNCTION	117.4	155.5	190.9	258.5	265.1	265.5	265.7
WCE_J085	DIVIDER	117.4	155.6	190.9	258.5	324.8	371.3	502.0
WCE_J090	JUNCTION	117.4	155.6	190.9	258.6	300.3	302.3	302.3
WCE_J095	DIVIDER	117.4	155.6	190.9	258.6	308.0	371.5	502.0
WCE_J100	JUNCTION	78.6	103.8	126.5	169.2	200.1	241.9	323.6
WCE_J105	JUNCTION	72.2	95.3	116.2	140.1	140.1	140.1	140.1
WCE_J110	JUNCTION	72.2	95.3	116.2	140.1	140.1	140.1	140.1
WCE_J115	DIVIDER	72.2	95.3	116.2	156.0	184.1	223.5	297.6
WCE_J120	JUNCTION	43.9	57.8	70.4	94.9	112.0	132.3	182.1
WCE_J125	DIVIDER	43.9	57.8	70.4	94.9	112.0	132.3	182.1
WCE_J130	JUNCTION	43.9	57.8	70.4	94.9	112.0	130.0	130.0
WCE_J135	DIVIDER	43.9	57.8	70.5	94.9	112.0	132.6	182.4
WCE_J140	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J145	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J150	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J155	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J160	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J165	JUNCTION	19.0	24.8	30.0	40.0	42.0	42.0	42.0
WCE_J170	DIVIDER	19.0	24.8	30.0	40.0	47.6	56.6	77.2
WCE_J180	DIVIDER	28.9	38.2	46.6	62.2	74.1	88.1	120.3
WCE_J200	JUNCTION	7.3	7.2	7.2	7.3	7.2	7.2	7.3
WCE_J205	JUNCTION	7.6	7.6	7.5	7.6	7.6	7.5	7.6
WCE_J210	JUNCTION	7.8	7.8	7.8	7.9	7.8	7.8	7.8
WCE_J215	JUNCTION	7.7	7.7	7.7	7.7	7.7	7.7	7.7
WCE_J220	DIVIDER	15.5	23.8	33.5	54.6	69.0	85.7	124.6
WCE_J225	DIVIDER	15.5	23.8	33.5	54.7	69.0	85.7	124.6
WCE_J230	JUNCTION	10.0	15.3	21.4	35.1	44.2	54.8	79.8
WCE_J300	JUNCTION	10.1	13.4	16.4	22.1	26.4	31.7	43.4
WCE_J400	JUNCTION	16.3	21.2	25.7	34.2	37.0	37.0	37.1
WCE_J405	JUNCTION	16.3	21.3	25.7	34.2	37.0	37.0	37.0
WCE_J410	DIVIDER	16.3	21.2	25.7	34.3	40.8	48.1	65.4

Future Conditions Peak Flow (cfs)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE_J415	JUNCTION	16.6	21.9	26.7	36.2	46.5	61.9	98.1
WCE_J420	JUNCTION	6.2	8.1	9.8	13.2	15.7	18.6	25.3
WCE_O005	OUTFALL	169.3	237.4	312.4	511.0	659.8	818.5	1312.3
WCE_S100	STORAGE	168.4	223.7	274.9	369.7	453.0	519.6	692.1
WSC_B005	JUNCTION	11.6	18.6	26.9	46.0	58.6	73.3	107.7
WSC_B010	JUNCTION	4.2	6.4	9.0	14.2	17.9	22.3	32.4
WSC_B015	JUNCTION	7.0	10.7	15.0	23.8	30.0	37.4	54.3
WSC_B020	JUNCTION	19.5	26.7	33.7	47.2	57.2	69.1	96.0
WSC_B025	JUNCTION	25.5	34.8	43.8	60.6	73.5	88.5	122.8
WSC_J005	JUNCTION	66.0	96.2	128.9	195.9	244.1	295.6	391.8
WSC_J010	JUNCTION	55.7	78.9	103.5	151.7	187.4	223.3	286.0
WSC_J015	JUNCTION	48.8	68.3	88.6	128.0	157.5	186.0	231.7
WSC_J020	JUNCTION	48.8	68.3	88.6	128.0	157.5	186.0	231.7
WSC_J025	JUNCTION	45.0	62.4	80.1	114.1	139.9	164.1	199.9
WSC_J030	JUNCTION	25.5	34.7	43.8	60.6	73.5	82.1	82.1
WSC_J035	JUNCTION	25.5	34.7	43.8	60.6	73.5	82.1	82.1
WSC_J040	JUNCTION	25.5	34.7	43.8	60.7	73.5	82.1	82.1
WSC_J045	JUNCTION	25.5	34.7	43.8	60.7	73.5	82.1	82.1
WSC_J050	DIVIDER	25.5	34.8	43.8	60.6	73.5	88.5	122.8
WSC_J100	JUNCTION	7.0	10.7	15.0	23.8	30.0	37.4	54.3

Future Conditions Total Node Inflow (Ac-ft.)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
ACR_B005	JUNCTION	0.6	0.9	1.2	1.9	2.4	3.0	4.4
ACR_B010	JUNCTION	0.6	0.8	1.1	1.4	1.7	2.1	2.9
ACR_B015	JUNCTION	0.6	0.9	1.1	1.5	1.8	2.2	3.1
ACR_B020	JUNCTION	1.1	1.6	2.0	2.8	3.4	4.0	5.6
ACR_B025	JUNCTION	1.3	1.7	2.2	2.9	3.4	4.1	5.6
ACR_B030	JUNCTION	1.8	2.5	3.1	4.2	5.1	6.1	8.5
ACR_B035	JUNCTION	1.2	1.6	2.1	2.9	3.6	4.3	6.1
ACR_B040	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_B045	JUNCTION	1.0	1.6	2.1	3.3	4.1	5.2	7.6
ACR_B050	JUNCTION	0.9	1.4	1.9	2.8	3.5	4.4	6.4
ACR_B055	JUNCTION	0.9	1.3	1.8	2.8	3.5	4.4	6.5
ACR_J005	JUNCTION	7.7	11.0	14.5	22.0	29.0	37.1	57.4
ACR_J010	JUNCTION	6.5	9.3	12.2	18.6	24.9	31.9	50.0
ACR_J035	JUNCTION	5.9	8.4	11.1	17.2	23.0	29.8	47.0
ACR_J045	DIVIDER	5.9	8.4	11.1	17.2	23.1	29.8	47.0
ACR_J050	JUNCTION	5.9	8.4	11.1	17.2	23.1	29.8	47.0
ACR_J055	DIVIDER	3.5	5.2	6.9	11.5	16.3	21.8	35.0
ACR_J060	JUNCTION	0.0	0.0	0.0	0.0	0.0	0.0	0.1
ACR_J065	JUNCTION	2.9	4.3	5.9	8.9	11.2	13.9	20.4
ACR_J070	JUNCTION	0.0	0.0	0.0	0.0	0.0	0.0	0.1
ACR_J075	DIVIDER	2.9	4.3	5.9	8.9	11.2	13.9	20.4
ACR_J080	JUNCTION	1.8	2.7	3.7	5.6	7.1	8.8	12.8
ACR_J085	JUNCTION	0.9	1.3	1.8	2.8	3.5	4.4	6.5
ACR_J200	DIVIDER	0.7	0.9	1.1	2.7	5.1	7.9	14.5
ACR_J204	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J205	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J210	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J215	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J220	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J225	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J230	DIVIDER	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J235	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J240	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J245	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_J250	JUNCTION	1.1	1.6	2.3	3.5	4.4	5.5	8.0
ACR_O005	OUTFALL	7.7	11.0	14.5	21.9	29.0	37.1	57.4
ACR_O010	OUTFALL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ACR_S100	STORAGE	4.0	5.7	7.5	10.6	13.1	15.8	22.6
DFA_B005	OUTFALL	1.6	2.7	5.1	10.3	14.1	19.0	29.7
DFA_B010	OUTFALL	0.6	0.9	1.3	2.0	2.5	3.2	4.6
DFA_B015	OUTFALL	1.1	1.7	2.3	3.5	4.5	5.6	8.2
DFA_B020	OUTFALL	0.6	0.8	1.1	1.7	2.1	2.7	3.9
DFA_B021	OUTFALL	1.2	1.8	2.4	3.6	4.4	5.5	8.0
DFA_B025	OUTFALL	0.8	1.1	1.5	2.3	2.9	3.6	5.2
DFA_B030	OUTFALL	0.7	1.1	1.5	2.3	2.9	3.6	5.2

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
DFA_B035	OUTFALL	0.3	0.4	0.6	1.1	1.4	1.8	2.6
DFA_B040	OUTFALL	0.8	1.2	1.8	3.0	3.9	5.0	7.5
DFA_B041	OUTFALL	0.6	1.0	1.5	2.4	3.2	4.0	6.0
DFA_B042	JUNCTION	0.2	0.3	0.5	0.7	0.9	1.1	1.5
DFA_B043	JUNCTION	1.1	1.5	1.8	2.4	2.9	3.3	4.6
DFA_B045	OUTFALL	0.6	1.0	1.4	2.3	3.0	3.9	5.8
DFA_B046	OUTFALL	0.6	0.9	1.3	2.1	2.7	3.3	5.0
DFA_B050	OUTFALL	1.0	1.7	2.6	4.4	5.7	7.3	11.1
DFA_B051	OUTFALL	0.5	0.7	1.0	1.5	1.9	2.3	3.4
DFA_B055	OUTFALL	1.3	1.9	2.6	4.1	5.1	6.4	9.4
DFA_B060	OUTFALL	0.2	0.4	0.7	1.6	2.2	3.0	4.8
DFA_B061	OUTFALL	0.4	0.6	0.9	1.4	1.7	2.1	3.1
DFA_B065	OUTFALL	0.6	0.9	1.2	2.0	2.6	3.3	4.8
DFA_B100	OUTFALL	0.2	0.3	0.4	0.7	0.8	1.0	1.5
DFA_B105	OUTFALL	0.3	0.5	0.7	1.0	1.3	1.7	2.4
DFA_J005	JUNCTION	1.3	1.8	2.3	3.1	3.7	4.4	6.2
DFA_J010	JUNCTION	1.1	1.5	1.8	2.4	2.9	3.3	4.6
DFA_O005	OUTFALL	1.3	1.8	2.3	3.1	3.7	4.4	6.2
FHP_B005	JUNCTION	0.1	0.3	0.5	1.0	1.4	1.9	3.0
FHP_B010	JUNCTION	0.4	0.7	0.9	1.4	1.7	2.1	3.1
FHP_B015	JUNCTION	0.2	0.3	0.4	0.6	0.7	0.8	1.1
FHP_B020	JUNCTION	0.3	0.5	0.6	0.8	0.9	1.1	1.6
FHP_B025	JUNCTION	0.4	0.5	0.7	0.9	1.2	1.4	2.0
FHP_B030	JUNCTION	2.1	3.0	4.1	6.0	7.5	9.3	13.5
FHP_B035	JUNCTION	0.1	0.2	0.2	0.4	0.5	0.7	1.1
FHP_B040	JUNCTION	0.6	0.9	1.3	2.1	2.7	3.4	5.1
FHP_B045	JUNCTION	0.4	0.6	0.7	1.0	1.2	1.4	2.0
FHP_B050	JUNCTION	0.2	0.3	0.4	0.7	0.8	1.0	1.5
FHP_B055	JUNCTION	0.2	0.3	0.4	0.6	0.8	0.9	1.4
FHP_B060	JUNCTION	0.7	1.1	1.5	2.2	2.8	3.5	5.2
FHP_B065	JUNCTION	1.1	1.6	2.2	3.4	4.3	5.4	7.9
FHP_B070	JUNCTION	1.0	1.4	2.0	3.0	3.8	4.8	7.0
FHP_B075	JUNCTION	0.2	0.3	0.4	0.6	0.8	1.0	1.5
FHP_B080	JUNCTION	0.8	1.2	1.7	2.6	3.3	4.1	6.0
FHP_B085	JUNCTION	1.3	1.9	2.5	3.6	4.5	5.5	7.8
FHP_B090	JUNCTION	0.5	0.8	1.1	1.7	2.2	2.8	4.1
FHP_B095	JUNCTION	0.9	1.3	1.6	2.3	2.8	3.4	4.8
FHP_B100	JUNCTION	0.4	0.6	0.9	1.3	1.7	2.1	3.1
FHP_B105	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
FHP_J005	JUNCTION	12.2	17.8	24.1	35.9	44.8	55.2	81.3
FHP_J010	JUNCTION	11.2	16.4	22.2	33.1	41.4	51.3	75.8
FHP_J015	DIVIDER	10.8	15.9	21.6	32.2	40.5	50.0	72.7
FHP_J020	JUNCTION	8.7	12.9	17.5	26.2	32.8	40.8	59.2
FHP_J030	JUNCTION	8.0	11.8	16.0	23.7	29.6	36.5	53.1
FHP_J035	JUNCTION	4.3	6.2	8.3	12.1	15.0	18.4	26.5

Future Conditions Total Node Inflow (Ac-ft.)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
FHP_J040	JUNCTION	3.5	5.0	6.7	9.5	11.8	14.3	20.5
FHP_J045	JUNCTION	1.6	2.3	3.0	4.1	5.1	6.1	8.6
FHP_J050	JUNCTION	1.2	1.7	2.1	2.8	3.4	4.0	5.5
FHP_J055	JUNCTION	0.3	0.4	0.5	0.5	0.6	0.6	0.7
FHP_J060	JUNCTION	0.3	0.4	0.5	0.5	0.6	0.6	0.7
FHP_J065	DIVIDER	0.3	0.4	0.5	0.7	0.8	1.0	1.4
FHP_J100	JUNCTION	3.7	5.6	7.5	9.5	10.7	11.5	13.3
FHP_J105	JUNCTION	3.7	5.4	7.2	9.1	10.2	11.0	12.6
FHP_J110	JUNCTION	3.5	5.1	6.8	8.5	9.4	9.9	11.2
FHP_J115	JUNCTION	3.1	4.7	6.4	8.0	8.9	9.5	10.7
FHP_J120	DIVIDER	3.1	4.7	6.4	8.6	10.2	11.8	15.4
FHP_J125	DIVIDER	2.4	3.6	5.0	7.1	8.5	10.0	13.5
FHP_J130	DIVIDER	1.2	1.7	2.4	3.7	4.7	5.8	8.5
FHP_J135	DIVIDER	1.2	1.7	2.4	3.7	4.6	5.8	8.5
FHP_J140	JUNCTION	0.7	0.8	0.8	0.9	0.9	0.9	1.0
FHP_J145	DIVIDER	1.2	1.7	2.4	3.7	4.6	5.8	8.5
FHP_J150	DIVIDER	1.1	1.6	2.2	3.4	4.3	5.4	7.9
FHP_J160	JUNCTION	0.7	1.1	1.3	1.6	1.7	1.8	2.0
FHP_J165	DIVIDER	0.7	1.1	1.5	2.2	2.8	3.5	5.2
FHP_J200	DIVIDER	0.1	0.2	0.4	2.5	4.4	7.2	13.8
FHP_J205	DIVIDER	0.4	0.6	0.9	2.9	4.8	7.7	14.3
FHP_J210	DIVIDER	0.2	0.3	0.4	0.7	0.8	1.0	1.5
FHP_J215	JUNCTION	0.0	0.0	0.1	1.9	3.7	6.2	12.3
FHP_O005	OUTFALL	12.3	18.1	24.6	36.8	46.3	57.4	84.4
HFT_B005	JUNCTION	0.9	1.4	1.9	2.9	3.6	4.5	6.6
HFT_B010	JUNCTION	1.2	2.0	2.9	4.8	6.1	7.8	11.8
HFT_B015	JUNCTION	1.3	1.9	2.6	4.0	5.1	6.4	9.4
HFT_B020	JUNCTION	0.5	0.7	1.0	1.5	2.0	2.4	3.6
HFT_B025	JUNCTION	0.7	1.1	1.4	2.1	2.6	3.2	4.7
HFT_B030	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
HFT_J005	JUNCTION	2.2	3.3	4.8	7.6	9.8	12.4	18.4
HFT_J010	JUNCTION	1.2	2.0	2.9	4.8	6.1	7.8	11.8
HFT_J100	DIVIDER	2.8	4.1	5.6	8.3	10.0	11.8	14.9
HFT_J101	JUNCTION	0.0	0.0	0.6	2.7	4.3	6.5	11.8
HFT_J105	JUNCTION	2.3	3.4	4.6	6.8	8.1	9.3	11.3
HFT_J110	DIVIDER	1.3	1.9	2.6	4.0	5.1	6.4	10.1
HFT_J115	DIVIDER	1.3	1.9	2.6	4.0	5.1	6.4	9.4
HFT_J120	JUNCTION	1.0	1.5	1.9	2.8	3.4	4.2	5.3
HFT_J125	JUNCTION	1.0	1.5	1.9	2.8	3.4	4.2	5.3
HFT_J130	JUNCTION	1.0	1.5	1.9	2.8	3.4	4.2	5.3
HFT_J135	JUNCTION	1.0	1.5	1.9	2.8	3.4	4.2	5.3
HFT_J140	JUNCTION	1.0	1.5	1.9	2.8	3.4	4.2	5.3
HFT_J145	DIVIDER	1.0	1.5	1.9	2.8	3.4	4.2	6.0
HFT_J150	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
HFT_J155	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
HFT_J160	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
HFT_J165	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
HFT_J170	JUNCTION	0.3	0.4	0.5	0.7	0.8	1.0	1.4
HFT_O005	OUTFALL	2.8	4.1	5.0	5.7	6.2	6.5	7.2
HFT_O010	OUTFALL	2.2	3.4	5.3	10.3	14.1	18.9	30.2
HOM_B005	JUNCTION	0.3	0.5	0.6	1.0	1.2	1.6	2.3
HOM_B010	JUNCTION	1.0	1.5	2.0	3.1	3.9	4.9	7.2
HOM_B015	JUNCTION	0.7	1.1	1.5	2.3	3.0	3.7	5.4
HOM_B020	JUNCTION	0.9	1.4	1.9	2.9	3.7	4.6	6.7
HOM_J005	JUNCTION	3.0	4.4	6.1	9.1	11.1	12.8	16.8
HOM_J010	JUNCTION	2.6	4.0	5.5	8.2	9.9	11.2	14.5
HOM_J015	JUNCTION	2.6	4.0	5.5	8.2	9.9	11.2	14.5
HOM_J020	JUNCTION	2.6	3.9	4.8	5.5	6.0	6.3	7.0
HOM_J025	DIVIDER	2.6	4.0	5.5	8.2	9.9	11.2	14.5
HOM_J030	DIVIDER	2.6	4.0	5.5	8.2	9.7	11.2	14.5
HOM_J035	JUNCTION	1.7	2.5	3.4	5.0	5.8	6.3	7.4
HOM_J040	JUNCTION	1.7	2.5	3.4	5.0	5.8	6.3	7.4
HOM_J045	DIVIDER	1.7	2.5	3.4	5.2	6.6	8.3	12.2
HOM_J050	JUNCTION	0.9	1.4	1.9	2.9	3.7	4.6	6.6
HOM_J055	JUNCTION	0.9	1.4	1.9	2.9	3.7	4.6	6.6
HOM_J060	JUNCTION	0.9	1.4	1.9	2.9	3.7	4.6	6.6
HOM_J065	DIVIDER	0.9	1.4	1.9	2.9	3.7	4.6	6.8
HOM_J070	DIVIDER	0.9	1.4	1.9	2.9	3.7	4.6	6.8
HOM_J075	DIVIDER	0.9	1.4	1.9	2.9	3.7	4.6	6.7
HOM_J080	JUNCTION	0.9	1.3	1.6	1.9	2.0	2.1	2.3
HOM_J085	JUNCTION	0.9	1.3	1.6	1.9	2.0	2.1	2.3
HOM_J090	DIVIDER	0.9	1.4	1.9	2.9	3.7	4.6	6.7
HOM_O005	OUTFALL	3.0	4.4	6.1	9.1	11.1	12.8	16.8
HOM_O010	OUTFALL	0.0	0.0	0.0	0.2	0.8	1.9	4.8
JAM_B005	JUNCTION	0.4	0.6	0.9	1.5	1.9	2.5	3.7
JAM_B010	JUNCTION	1.4	2.0	2.6	3.8	4.7	5.7	8.2
JAM_J005	JUNCTION	1.4	2.0	2.6	3.8	4.7	5.7	8.2
JAM_J010	JUNCTION	1.4	2.0	2.6	3.8	4.7	5.7	8.2
JAM_J015	JUNCTION	1.4	2.0	2.6	3.8	4.7	5.7	8.2
KET_B005	JUNCTION	0.5	0.7	1.0	1.6	2.0	2.5	3.7
KET_B010	JUNCTION	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J005	DIVIDER	1.7	2.4	3.1	4.3	5.2	6.3	8.8
KET_J010	DIVIDER	1.2	1.6	2.1	2.7	3.2	3.7	5.2
KET_J011	JUNCTION	1.2	1.6	2.0	2.4	2.6	2.8	3.3
KET_J015	DIVIDER	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J020	JUNCTION	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J025	JUNCTION	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J030	JUNCTION	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J035	DIVIDER	1.2	1.6	2.0	2.7	3.2	3.7	5.2
KET_J040	JUNCTION	1.2	1.6	2.0	2.7	3.2	3.7	5.2

Future Conditions Total Node Inflow (Ac-ft.)

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
PHI_B100	JUNCTION	0.5	0.8	1.0	1.6	2.0	2.5	3.7
PHI_B105	JUNCTION	0.5	0.7	1.0	1.5	2.0	2.4	3.6
PHI_B110	JUNCTION	1.9	2.6	3.3	4.4	5.4	6.4	8.9
PHI_B115	JUNCTION	5.5	7.5	9.5	12.7	15.3	18.3	25.5
PHI_J010	JUNCTION	7.5	10.7	14.0	19.4	23.9	28.8	40.8
PHI_J015	JUNCTION	7.1	10.0	13.0	17.8	21.9	26.3	37.1
PHI_J020	JUNCTION	5.5	7.5	9.5	12.7	15.3	18.3	25.5
PHI_O005	OUTFALL	7.5	10.7	14.0	19.4	23.9	28.8	40.8
PHI_S100	STORAGE	7.3	10.0	12.7	17.1	20.7	24.6	34.4
PHI_S200	STORAGE	5.5	7.5	9.5	12.7	15.3	18.3	25.5
SPC_B005	JUNCTION	0.8	1.2	1.6	2.4	3.1	3.8	5.5
SPC_B010	JUNCTION	0.8	1.2	1.6	2.6	3.3	4.1	6.1
SPC_B015	JUNCTION	1.2	1.8	2.5	3.8	4.8	6.0	8.8
SPC_B020	JUNCTION	0.6	0.9	1.2	1.8	2.2	2.8	4.1
SPC_B025	JUNCTION	1.4	1.9	2.6	3.9	5.0	6.2	9.1
SPC_B030	JUNCTION	2.3	3.2	4.2	6.0	7.4	9.0	12.9
SPC_B035	JUNCTION	1.5	2.1	2.7	3.7	4.4	5.2	7.4
SPC_B036	JUNCTION	1.7	2.3	2.8	3.6	4.2	4.9	6.8
SPC_B040	JUNCTION	3.0	4.2	5.4	7.3	8.9	10.6	14.8
SPC_B045	JUNCTION	2.0	2.9	3.9	5.8	7.2	8.9	13.0
SPC_B046	JUNCTION	0.5	0.7	1.0	1.5	1.9	2.4	3.5
SPC_B050	JUNCTION	0.2	0.3	0.4	0.7	0.9	1.1	1.7
SPC_B055	JUNCTION	0.3	0.5	0.8	1.3	1.7	2.3	3.4
SPC_B060	JUNCTION	0.4	0.6	1.0	1.7	2.3	3.0	4.5
SPC_B065	JUNCTION	0.3	0.6	0.9	1.7	2.3	3.0	4.6
SPC_B070	JUNCTION	0.7	1.2	1.8	3.2	4.2	5.4	8.2
SPC_B080	JUNCTION	0.7	1.0	1.4	2.1	2.7	3.3	4.9
SPC_B085	JUNCTION	0.6	0.9	1.2	1.9	2.4	2.9	4.3
SPC_B090	JUNCTION	0.2	0.3	0.5	0.8	1.0	1.3	2.0
SPC_B095	JUNCTION	1.3	1.9	2.7	4.1	5.2	6.4	9.4
SPC_B100	JUNCTION	1.0	1.5	2.0	3.1	3.9	4.9	7.2
SPC_B105	JUNCTION	0.4	0.7	1.2	2.1	2.8	3.6	5.5
SPC_B110	JUNCTION	0.7	1.1	1.5	2.4	3.0	3.8	5.6
SPC_J005	JUNCTION	26.7	39.3	53.4	79.8	100.0	124.0	181.1
SPC_J010	JUNCTION	25.9	38.1	51.6	77.3	97.0	120.3	175.8
SPC_J015	JUNCTION	25.1	36.8	50.0	74.6	93.9	116.3	169.7
SPC_J020	DIVIDER	23.4	34.4	46.3	69.0	86.8	107.4	156.5
SPC_J025	JUNCTION	19.1	27.9	38.1	56.8	71.2	88.4	129.5
SPC_J030	JUNCTION	17.7	26.0	35.3	52.8	66.3	82.2	120.3
SPC_J035	JUNCTION	15.4	22.7	31.0	46.6	58.9	73.0	107.4
SPC_J040	DIVIDER	12.2	18.4	25.6	39.6	50.3	62.9	92.7
SPC_J045	JUNCTION	9.1	14.1	20.2	32.2	41.4	52.5	77.9
SPC_J050	JUNCTION	9.1	14.1	20.2	32.2	41.4	52.5	77.9
SPC_J055	JUNCTION	9.1	14.1	20.2	32.2	41.4	52.5	77.9
SPC_J060	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.7	37.1

Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
SPC_J065	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.6	31.9
SPC_J070	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.6	31.9
SPC_J075	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.6	31.9
SPC_J080	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.6	31.9
SPC_J085	JUNCTION	3.8	6.1	9.0	14.9	19.4	24.7	31.9
SPC_J090	DIVIDER	3.8	6.1	9.0	14.9	19.4	24.7	37.1
SPC_J095	JUNCTION	3.3	5.4	8.0	13.4	17.5	22.4	30.5
SPC_J100	JUNCTION	3.3	5.4	8.0	13.4	17.5	22.4	30.5
SPC_J105	JUNCTION	3.3	5.4	8.0	13.4	17.5	22.4	30.5
SPC_J110	DIVIDER	3.3	5.4	8.0	13.4	17.5	22.4	33.8
SPC_J115	DIVIDER	2.3	3.9	5.9	10.1	13.2	17.0	25.7
SPC_J120	JUNCTION	2.4	3.9	5.9	10.1	13.2	17.0	25.7
SPC_J125	JUNCTION	0.7	1.2	2.0	3.5	4.6	6.0	9.1
SPC_J130	JUNCTION	0.3	0.6	0.9	1.7	2.3	3.0	4.6
SPC_J135	JUNCTION	1.4	2.2	3.2	5.3	6.8	8.7	13.1
SPC_J140	JUNCTION	0.7	1.0	1.4	2.1	2.7	3.3	4.9
SPC_J150	JUNCTION	0.9	1.5	2.1	3.3	4.3	5.4	8.0
SPC_J155	JUNCTION	0.9	1.5	2.1	3.3	4.3	5.4	8.0
SPC_J160	JUNCTION	0.9	1.5	2.1	3.3	4.3	5.4	8.0
SPC_J165	JUNCTION	0.8	1.2	1.7	2.7	3.4	4.3	6.4
SPC_J170	JUNCTION	0.6	0.9	1.2	1.9	2.4	2.9	4.3
SPC_J200	JUNCTION	3.4	5.2	7.4	11.6	14.9	18.7	27.7
SPC_J205	JUNCTION	3.4	5.2	7.4	11.6	14.9	18.7	27.7
SPC_J210	JUNCTION	3.4	5.2	7.4	11.6	14.9	18.7	27.7
SPC_J215	JUNCTION	3.4	5.2	7.4	11.6	14.9	18.7	27.7
SPC_J220	JUNCTION	3.4	5.2	7.4	11.6	14.9	18.7	27.7
SPC_J225	JUNCTION	2.1	3.3	4.7	7.5	9.7	12.3	17.7
SPC_J230	JUNCTION	2.1	3.3	4.7	7.5	9.7	12.3	17.7
SPC_J235	JUNCTION	1.0	1.5	2.0	3.1	4.0	4.9	6.7
SPC_J240	DIVIDER	1.0	1.5	2.0	3.1	4.0	4.9	7.3
SPC_J245	JUNCTION	1.0	1.5	2.0	3.1	4.0	4.9	6.8
SPC_J250	DIVIDER	1.0	1.5	2.0	3.1	4.0	4.9	7.2
SPC_J255	JUNCTION	1.0	1.5	2.0	3.1	3.9	4.9	7.2
SPC_J260	JUNCTION	1.1	1.8	2.7	4.4	5.8	7.4	11.0
SPC_J265	DIVIDER	1.1	1.8	2.7	4.4	5.8	7.4	11.1
SPC_J270	JUNCTION	0.7	1.1	1.5	2.4	3.0	3.8	5.6
SPC_J275	JUNCTION	0.7	1.1	1.5	2.4	3.0	3.8	5.6
SPC_J300	JUNCTION	1.2	1.8	2.5	3.8	4.8	5.9	7.5
SPC_J305	JUNCTION	1.2	1.8	2.5	3.8	4.8	5.9	7.5
SPC_J310	DIVIDER	1.2	1.8	2.5	3.8	4.8	6.0	8.8
SPC_J400	JUNCTION	0.5	0.7	1.0	1.5	1.9	2.4	3.5
SPC_J405	JUNCTION	0.5	0.7	1.0	1.5	1.9	2.4	3.5
SPC_J410	JUNCTION	0.5	0.7	1.0	1.5	1.9	2.4	3.5
SPC_O005	OUTFALL	26.7	39.3	53.4	79.5	100.0	124.0	181.1
SPC_S100	STORAGE	15.4	22.8	31.0	47.0	58.9	73.0	107.4

Future Conditions Total Node Inflow (Ac-ft.)

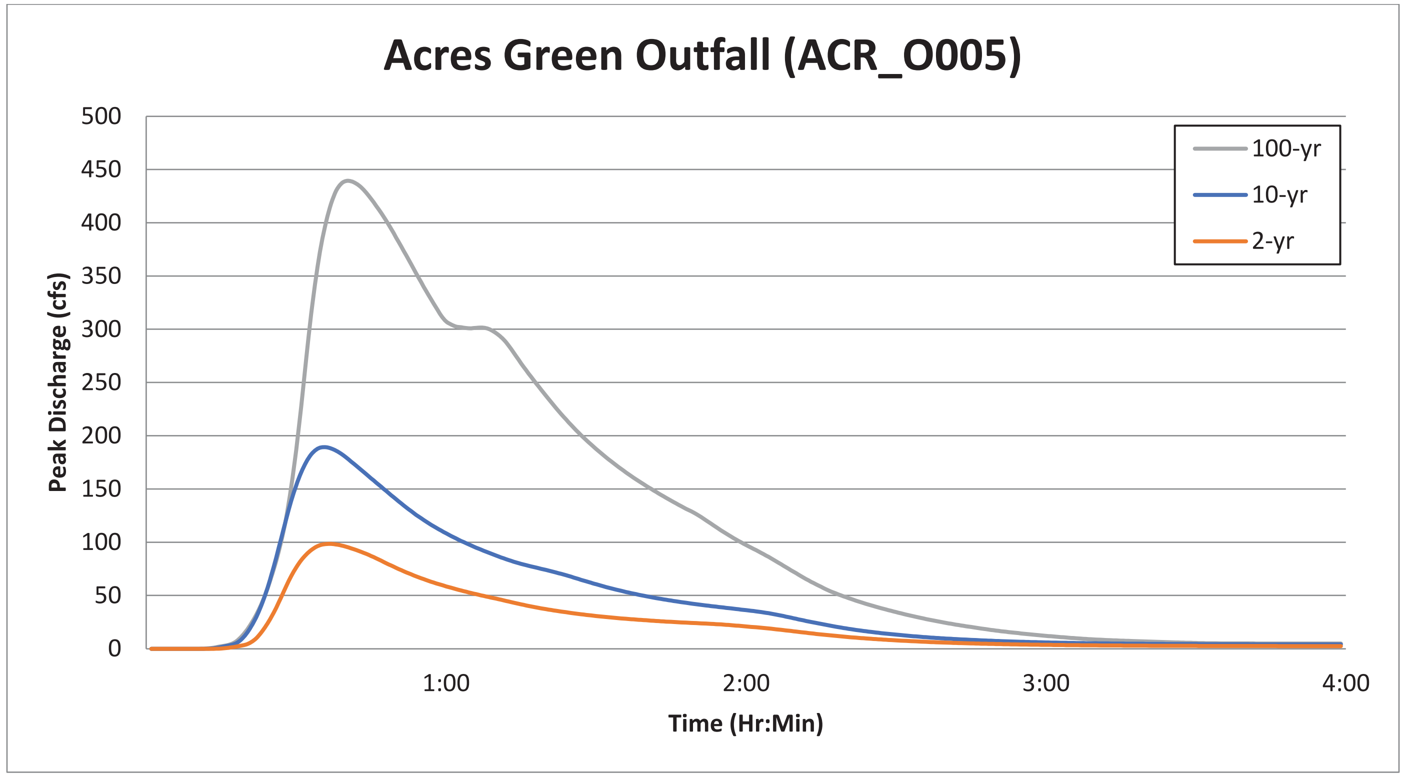
Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
TRE_B005	JUNCTION	0.8	1.2	1.7	2.7	3.4	4.2	6.3
TRE_B010	JUNCTION	1.5	2.1	2.7	3.8	4.6	5.6	7.9
TRE_B015	JUNCTION	0.4	0.6	0.9	1.5	2.0	2.5	3.8
TRE_B020	JUNCTION	0.2	0.3	0.4	0.6	0.7	0.9	1.3
TRE_B025	JUNCTION	0.2	0.2	0.3	0.4	0.5	0.6	0.8
TRE_J005	JUNCTION	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_J010	DIVIDER	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_J015	JUNCTION	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_J020	DIVIDER	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_J025	JUNCTION	0.8	1.2	1.6	2.3	2.6	2.9	3.3
TRE_J030	DIVIDER	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_J035	JUNCTION	0.4	0.5	0.7	1.0	1.2	1.5	2.1
TRE_J040	JUNCTION	0.2	0.2	0.3	0.4	0.5	0.6	0.8
TRE_J045	DIVIDER	0.2	0.2	0.3	0.4	0.5	0.6	0.8
TRE_J200	JUNCTION	2.3	3.3	4.4	6.4	8.0	9.8	12.8
TRE_J205	DIVIDER	2.3	3.3	4.4	6.4	8.0	9.8	14.1
TRE_J210	JUNCTION	1.5	2.1	2.7	3.8	4.6	5.5	7.5
TRE_J215	JUNCTION	1.5	2.1	2.7	3.8	4.6	5.6	7.5
TRE_J220	JUNCTION	1.5	2.1	2.7	3.8	4.6	5.6	7.5
TRE_J225	DIVIDER	1.5	2.1	2.7	3.8	4.6	5.6	7.9
TRE_O005	OUTFALL	0.8	1.2	1.6	2.5	3.2	4.0	5.9
TRE_O010	OUTFALL	2.3	3.3	4.4	6.4	8.0	9.8	14.1
WCE_B005	JUNCTION	0.1	0.2	0.4	0.7	0.9	1.1	1.7
WCE_B010	JUNCTION	0.4	0.6	0.8	1.3	1.6	2.1	3.0
WCE_B015	JUNCTION	0.8	1.3	1.7	2.7	3.4	4.3	6.3
WCE_B020	JUNCTION	0.6	0.8	1.2	1.8	2.2	2.8	4.1
WCE_B025	JUNCTION	0.4	0.5	0.8	1.2	1.5	1.9	2.7
WCE_B029	JUNCTION	0.3	0.5	0.7	1.1	1.4	1.9	2.8
WCE_B030	JUNCTION	0.6	1.0	1.4	2.2	2.9	3.7	5.4
WCE_B035	JUNCTION	0.7	1.0	1.4	2.1	2.7	3.3	4.9
WCE_B040	JUNCTION	0.1	0.1	0.2	0.3	0.4	0.5	0.7
WCE_B045	JUNCTION	0.9	1.3	1.8	2.7	3.3	4.1	6.1
WCE_B050	JUNCTION	0.2	0.4	0.6	1.1	1.5	1.9	2.9
WCE_B055	JUNCTION	0.6	0.9	1.2	1.9	2.4	3.0	4.4
WCE_B056	JUNCTION	0.1	0.2	0.2	0.3	0.4	0.5	0.7
WCE_B060	JUNCTION	0.6	0.8	1.0	1.3	1.5	1.8	2.4
WCE_B065	JUNCTION	1.1	1.5	1.9	2.6	3.1	3.7	5.0
WCE_B070	JUNCTION	0.8	1.1	1.4	1.8	2.2	2.6	3.7
WCE_B075	JUNCTION	0.7	1.0	1.2	1.5	1.8	2.2	3.0
WCE_B080	JUNCTION	0.8	1.1	1.4	1.8	2.2	2.6	3.5
WCE_B085	JUNCTION	0.4	0.5	0.7	0.9	1.0	1.2	1.6
WCE_B090	JUNCTION	2.5	3.4	4.3	5.7	6.9	8.2	11.5
WCE_B095	JUNCTION	0.4	0.6	0.7	1.0	1.1	1.3	1.8
WCE_B100	JUNCTION	1.7	2.3	2.9	3.7	4.4	5.2	7.2
WCE_B105	JUNCTION	1.6	2.2	2.7	3.5	4.2	4.9	6.8

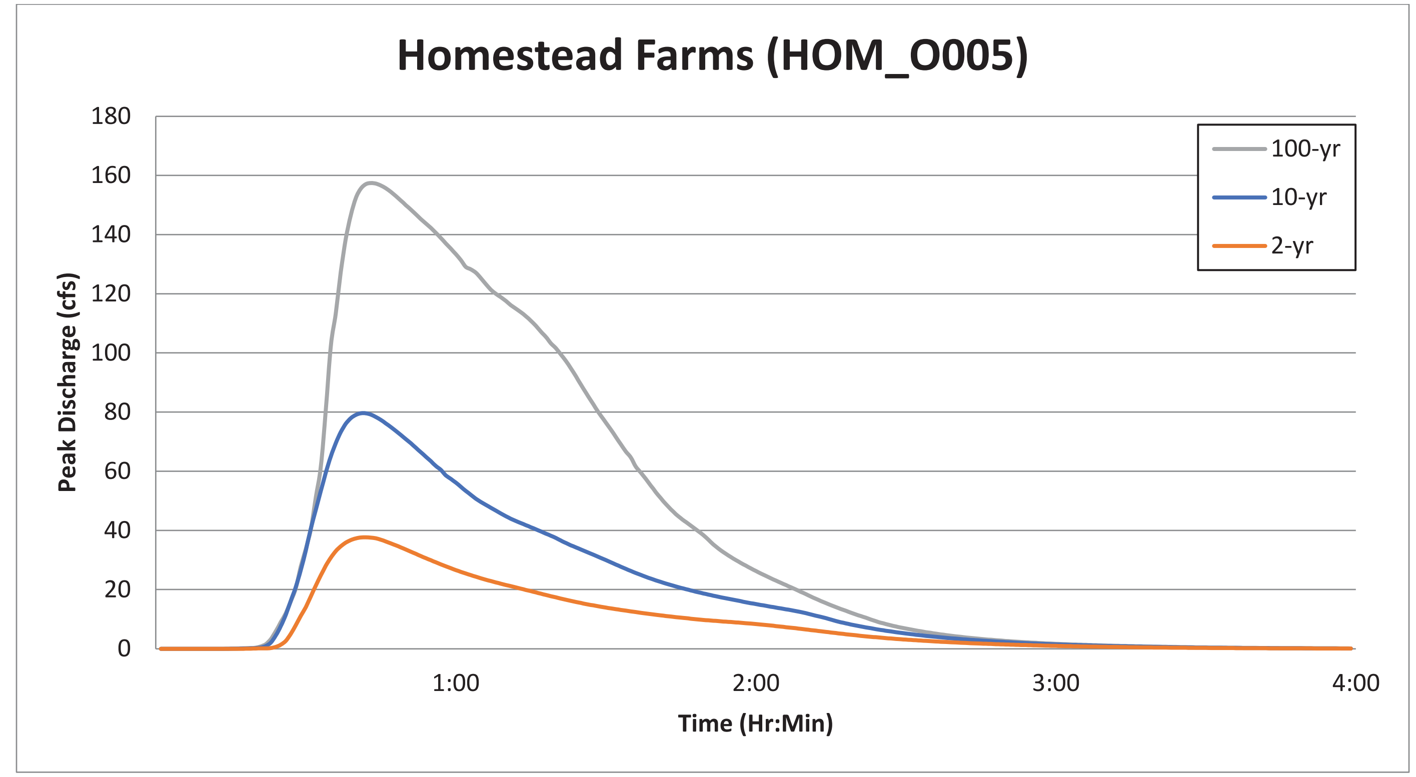
Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE_B110	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.7	5.0
WCE_J005	JUNCTION	18.2	25.2	33.8	48.5	60.5	73.7	105.9
WCE_J010	JUNCTION	17.2	24.0	32.2	46.6	58.3	71.2	102.8
WCE_J015	JUNCTION	16.4	22.7	30.4	43.9	54.6	66.6	96.1
WCE_J020	JUNCTION	16.2	22.3	29.8	42.7	53.4	65.1	93.3
WCE_J025	JUNCTION	13.4	18.1	23.8	33.5	41.4	50.0	71.2
WCE_J030	JUNCTION	12.5	16.7	21.9	30.5	37.7	45.4	64.4
WCE_J035	JUNCTION	12.3	16.4	21.4	29.5	36.5	43.6	61.7
WCE_J040	JUNCTION	11.9	15.6	20.3	27.7	34.1	40.8	57.4
WCE_J045	JUNCTION	10.3	13.4	17.3	23.6	29.0	34.7	48.8
WCE_J064	JUNCTION	8.6	11.6	14.6	19.1	23.2	27.2	37.4
WCE_J065	JUNCTION	7.4	10.1	12.7	16.6	19.3	21.4	25.5
WCE_J070	JUNCTION	7.4	10.1	12.7	16.6	19.3	21.4	25.5
WCE_J075	JUNCTION	7.4	10.1	12.7	16.6	19.3	21.4	25.5
WCE_J080	JUNCTION	7.4	10.1	12.7	16.6	19.3	21.4	25.5
WCE_J085	DIVIDER	7.4	10.1	12.7	16.6	20.1	23.5	32.5
WCE_J090	JUNCTION	7.4	10.1	12.7	16.6	19.8	21.9	26.3
WCE_J095	DIVIDER	7.4	10.1	12.7	16.6	19.9	23.5	32.2
WCE_J100	JUNCTION	4.9	6.7	8.3	10.8	13.0	15.3	20.9
WCE_J105	JUNCTION	4.5	6.1	7.6	9.7	11.0	12.0	14.1
WCE_J110	JUNCTION	4.5	6.1	7.6	9.7	11.0	12.0	14.1
WCE_J115	DIVIDER	4.5	6.1	7.6	9.9	11.8	13.9	19.1
WCE_J120	JUNCTION	2.9	3.9	4.9	6.4	7.6	8.9	12.2
WCE_J125	DIVIDER	2.9	3.9	4.9	6.4	7.6	8.9	12.2
WCE_J130	JUNCTION	2.9	3.9	4.9	6.4	7.6	8.9	11.1
WCE_J135	DIVIDER	2.9	3.9	4.9	6.4	7.6	8.9	12.2
WCE_J140	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J145	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J150	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J155	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J160	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J165	JUNCTION	1.2	1.6	2.0	2.6	3.1	3.4	4.1
WCE_J170	DIVIDER	1.2	1.6	2.0	2.6	3.1	3.7	5.0
WCE_J180	DIVIDER	1.6	2.2	2.7	3.5	4.2	4.9	6.8
WCE_J200	JUNCTION	0.9	1.1	1.2	1.2	1.3	1.3	1.4
WCE_J205	JUNCTION	0.9	1.1	1.2	1.2	1.3	1.3	1.4
WCE_J210	JUNCTION	0.9	1.1	1.2	1.2	1.3	1.3	1.4
WCE_J215	JUNCTION	0.9	1.1	1.2	1.2	1.3	1.3	1.4
WCE_J220	DIVIDER	1.2	1.9	2.6	4.0	5.1	6.3	9.3
WCE_J225	DIVIDER	1.2	1.9	2.6	4.0	5.1	6.3	9.3
WCE_J230	JUNCTION	0.8	1.3	1.7	2.7	3.4	4.3	6.3
WCE_J300	JUNCTION	0.6	0.8	1.0	1.3	1.5	1.8	2.4
WCE_J400	JUNCTION	0.8	1.1	1.4	1.8	2.2	2.4	2.9
WCE_J405	JUNCTION	0.8	1.1	1.4	1.8	2.2	2.4	2.9
WCE_J410	DIVIDER	0.8	1.1	1.4	1.8	2.2	2.6	3.5

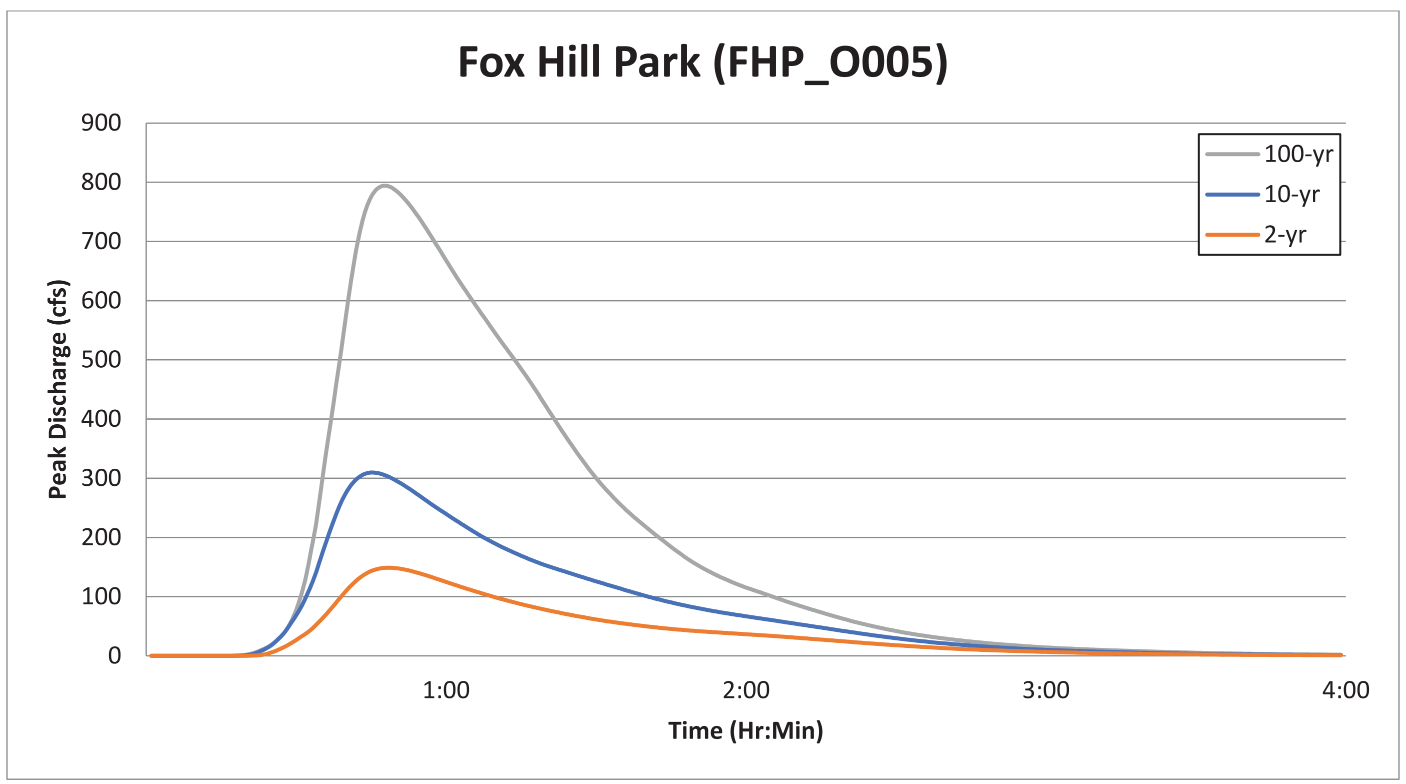
Future Conditions Total Node Inflow (Ac-ft.)

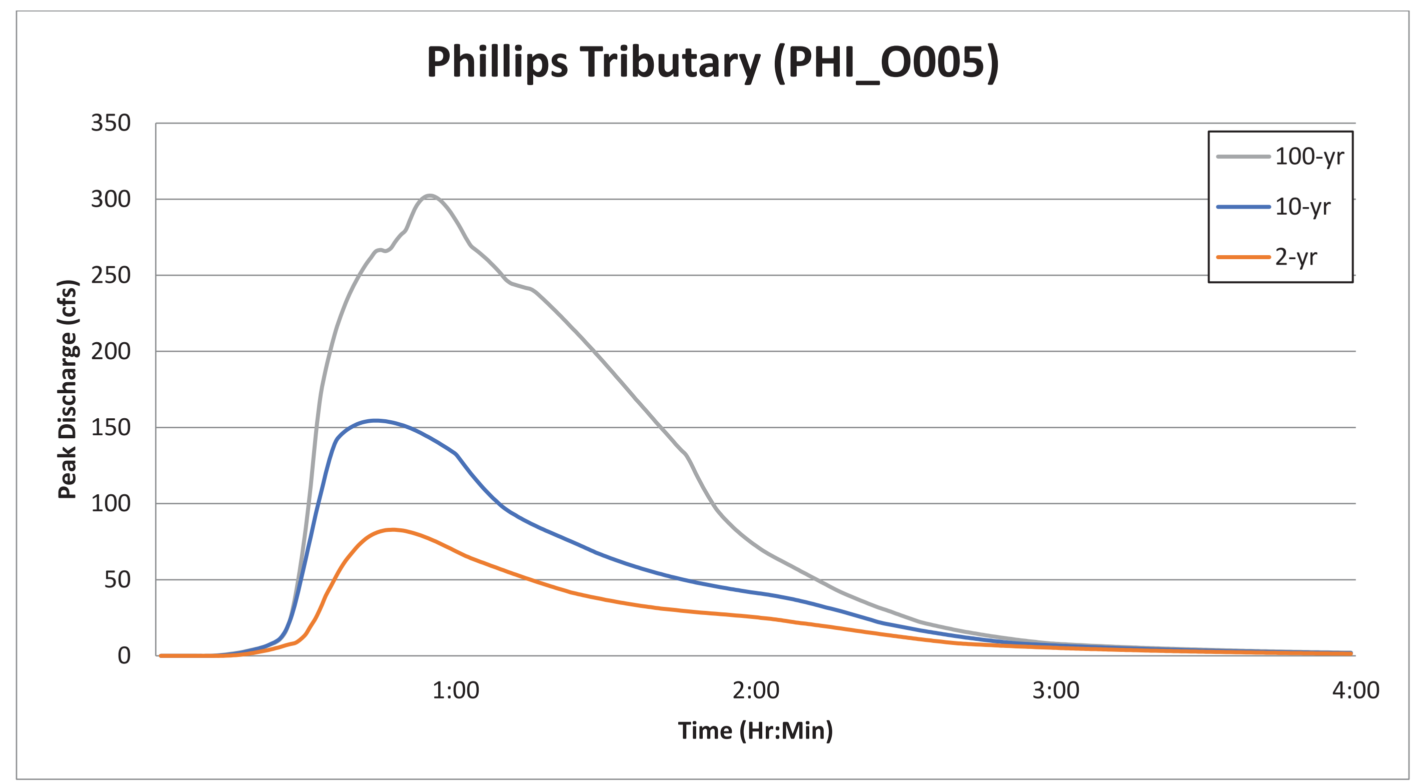
Node	Junction Type	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
WCE_J415	JUNCTION	1.1	1.5	1.9	2.4	2.9	3.5	5.2
WCE_J420	JUNCTION	0.4	0.5	0.7	0.9	1.0	1.2	1.6
WCE_O005	OUTFALL	18.4	25.9	35.0	51.3	64.1	78.6	113.5
WCE_S100	STORAGE	10.2	13.8	17.4	22.8	27.6	32.2	43.9
WSC_B005	JUNCTION	1.0	1.6	2.3	3.7	4.8	6.1	9.1
WSC_B010	JUNCTION	0.3	0.4	0.6	0.9	1.2	1.5	2.1
WSC_B015	JUNCTION	0.5	0.7	1.0	1.6	2.0	2.5	3.7
WSC_B020	JUNCTION	1.2	1.6	2.1	2.8	3.4	4.1	5.7
WSC_B025	JUNCTION	1.3	1.8	2.4	3.2	3.9	4.6	6.4
WSC_J005	JUNCTION	4.3	6.3	8.5	12.4	15.5	19.1	27.0
WSC_J010	JUNCTION	3.3	4.7	6.1	8.7	10.7	13.0	18.0
WSC_J015	JUNCTION	2.8	3.9	5.1	7.1	8.7	10.5	14.3
WSC_J020	JUNCTION	2.8	3.9	5.1	7.1	8.7	10.5	14.3
WSC_J025	JUNCTION	2.5	3.5	4.5	6.2	7.5	9.0	12.2
WSC_J030	JUNCTION	1.3	1.8	2.4	3.2	3.9	4.5	5.7
WSC_J035	JUNCTION	1.3	1.8	2.4	3.2	3.9	4.5	5.7
WSC_J040	JUNCTION	1.3	1.8	2.4	3.2	3.9	4.5	5.7
WSC_J045	JUNCTION	1.3	1.8	2.4	3.2	3.9	4.5	5.7
WSC_J050	DIVIDER	1.3	1.8	2.4	3.2	3.9	4.6	6.4
WSC_J100	JUNCTION	0.5	0.7	1.0	1.6	2.0	2.5	3.7

Future Conditions 2-, 10-, and 100-year Outfall Hydrographs

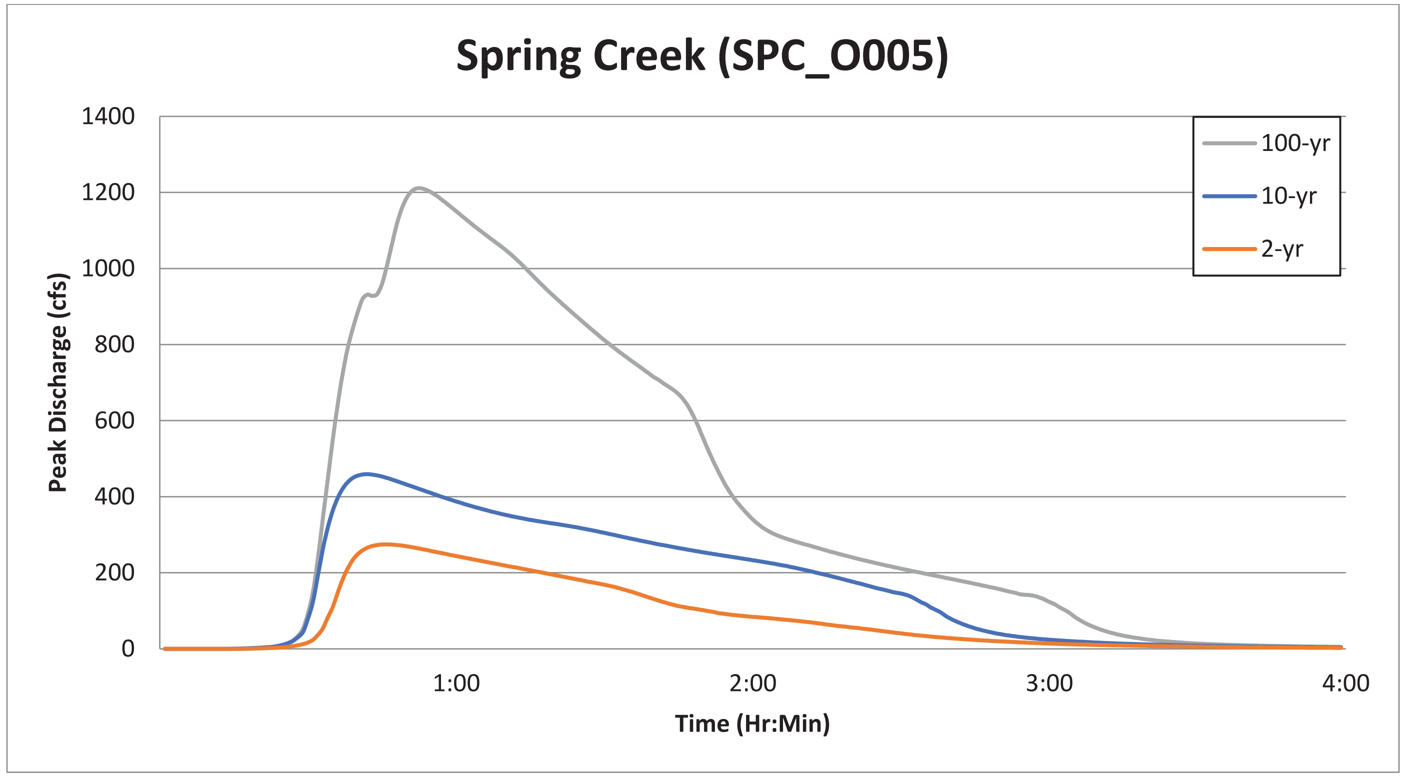


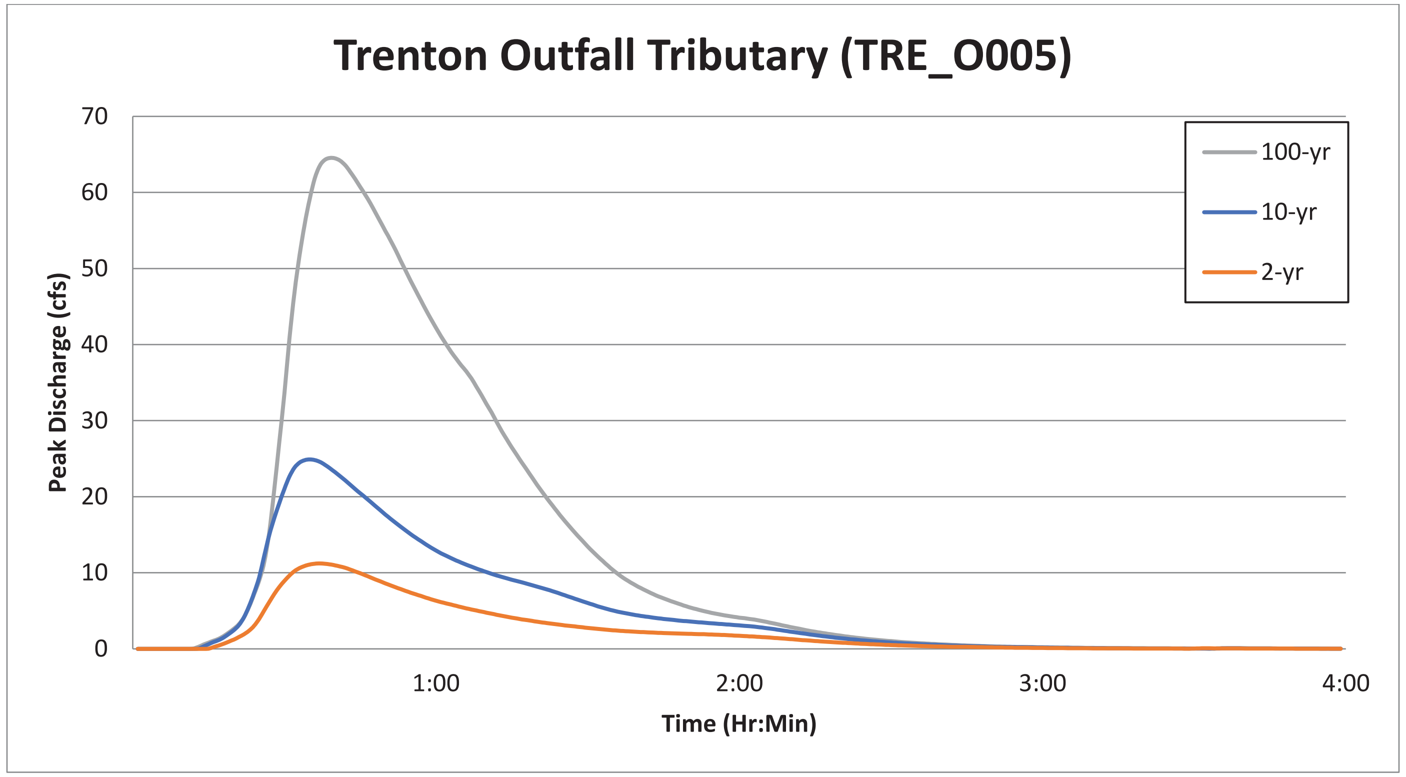


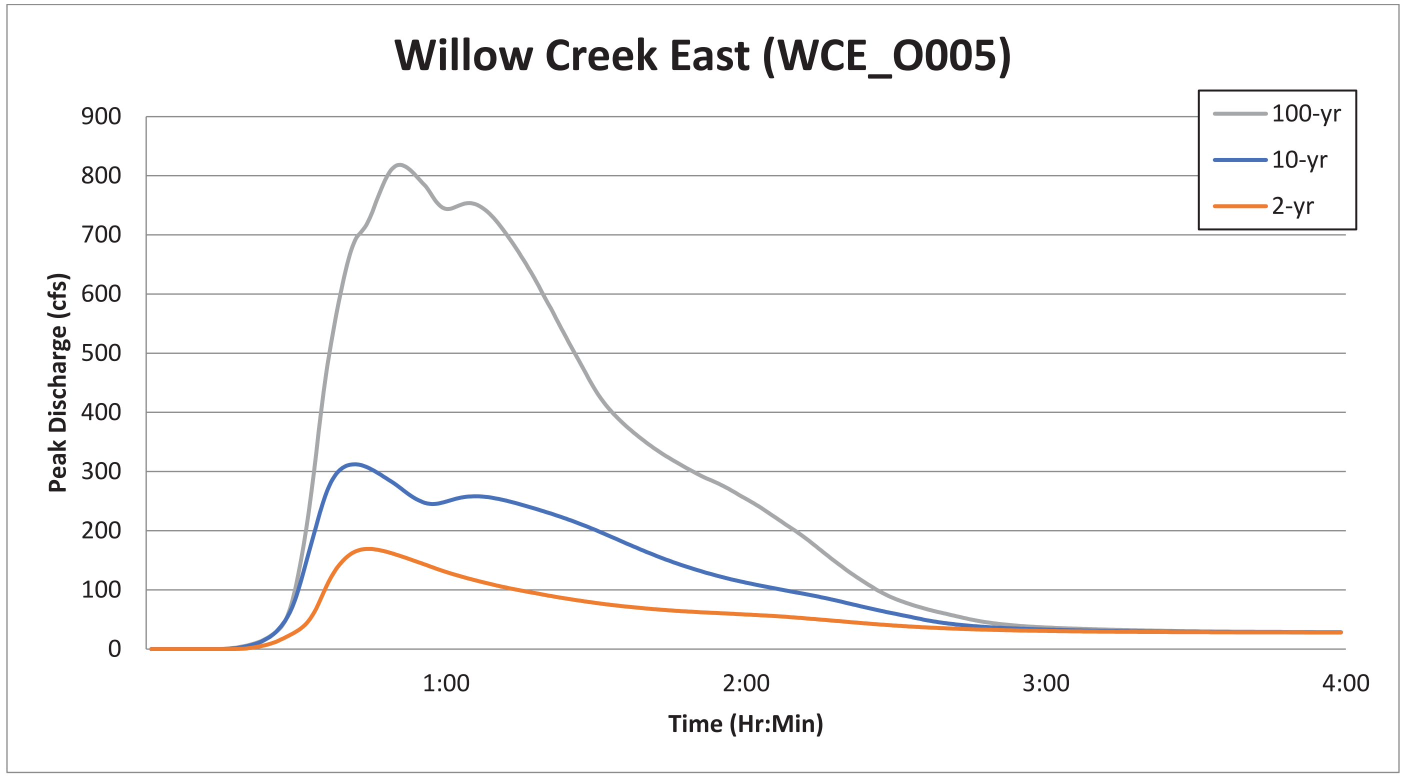




Future Conditions 2-, 10-, and 100-year Outfall Hydrographs







ICON ENGINEERING

MHFD MILE HIGH FLOOD DISTRICT Southeast Metro Stormwater Authority

SWMM Future Input File

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[TITLE]
;;Project Title/Notes
Baseline Hydrology Model for Willow Creek MDP & FHAD

[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           01/01/2005
START_TIME           00:00:00
REPORT_START_DATE    01/01/2005
REPORT_START_TIME    00:00:00
END_DATE             01/01/2005
END_TIME             04:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:15:00
ROUTING_STEP         0:00:01
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

[FILES]
;;Interfacing Files
USE INFLOWS "P:\P\18045WCT\08_Hydrology\CUHP\Flood_Frequency\WCT_Fut_100yr_Omi^2_Interface.txt"

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
ACR_B005         5714.35    10         0          0          0
ACR_B010         5714.46    10         0          0          0
ACR_B015         5710.37    10         0          0          0
ACR_B020         5757.84    10         0          0          0
ACR_B025         5765.93    10         0          0          0
ACR_B030         5785.83    10         0          0          0
ACR_B035         5789.02    10         0          0          0
ACR_B040         5828.52    10         0          0          0
ACR_B045         5785.12    10         0          0          0
ACR_B050         5833.81    10         0          0          0
ACR_B055         5862.34    10         0          0          0
ACR_J005         5687.61    10         0          0          0
ACR_J010         5689.8     50         0          0          0
ACR_J035         5713.8     10         0          0          0
ACR_J050         5724       10         0          0          0
ACR_J060         5758.66    10         0          0          0
ACR_J065         5754.18    10         0          0          0
ACR_J070         5766.43    10         0          0          0
ACR_J080         5798.78    10         0          0          0
ACR_J085         5827.87    10         0          0          0
ACR_J204         5745.00    10         0          0          0
ACR_J205         5746.10    12.5       0          0          0
ACR_J210         5746.96    12.6       0          0          0
ACR_J215         5747.76    11.1       0          0          0
ACR_J220         5748.66    14.7       0          0          0
ACR_J225         5751.56    14.3       0          0          0
ACR_J235         5758.88    9.4        0          0          0
ACR_J240         5761.66    7.3        0          0          0
ACR_J245         5763.11    11.8       0          0          0
ACR_J250         5768.02    13.4       0          0          0
DFA_B042         5718.38    10         0          0          0
DFA_B043         5740.12    10         0          0          0
DFA_J005         5697.65    10         0          0          0
DFA_J010         5724.8     10         0          0          0
FHP_B005         5596.4     10         0          0          0
FHP_B010         5662.10    10         0          0          0
FHP_B015         5636.53    10         0          0          0
FHP_B020         5632.99    10         0          0          0
FHP_B025         5645.68    10         0          0          0
FHP_B030         5646.03    10         0          0          0
FHP_B035         5658.67    10         0          0          0
FHP_B040         5661.43    10         0          0          0
FHP_B045         5683.43    10         0          0          0
FHP_B050         5682.74    10         0          0          0
FHP_B055         5694.82    10         0          0          0
FHP_B060         5732.39    10         0          0          0
FHP_B065         5716.12    10         0          0          0
FHP_B070         5740.94    10         0          0          0
FHP_B075         5742.7     10         0          0          0
FHP_B080         5678.99    10         0          0          0
FHP_B085         5722.41    10         0          0          0
FHP_B090         5713.35    10         0          0          0
FHP_B095         5763.17    10         0          0          0
FHP_B100         5763.75    10         0          0          0
FHP_B105         5782.48    10         0          0          0
FHP_J005         5595.55    10         0          0          0
FHP_J010         5603.07    10         0          0          0
FHP_J020         5633.22    10         0          0          0
FHP_J030         5645.67    10         0          0          0
FHP_J035         5652.74    50         0          0          0
FHP_J040         5684.49    50         0          0          0
FHP_J045         5719.51    50         0          0          0
FHP_J055         5768.1     50         0          0          0
FHP_J060         5771.1     9          0          0          0
FHP_J100         5658.51    6.7        0          0          0
FHP_J105         5667.25    7.4        0          0          0
FHP_J110         5669.05    7.4        0          0          0
FHP_J115         5671.71    12.7       0          0          0
FHP_J140         5711.97    50         0          0          0
FHP_J160         5680.13    7.3        0          0          0
FHP_J215         5683.74    10         0          0          0
HFT_B005         5643.1     10         0          0          0
HFT_B010         5689.7     10         0          0          0
HFT_B015         5656.8     10         0          0          0
HFT_B020         5649.59    10         0          0          0
HFT_B025         5713.65    10         0          0          0
HFT_B030         5725.20    10         0          0          0
HFT_J005         5606.3     10         0          0          0
HFT_J010         5629.99    10         0          0          0
```

SWMM Future Input File

HFT_J101	5615.1	0	0	0	0
HFT_J105	5606.4	9.6	0	0	0
HFT_J120	5616.79	12.8	0	0	0
HFT_J125	5637.94	10.1	0	0	0
HFT_J130	5660.9	8.3	0	0	0
HFT_J135	5669.67	11.1	0	0	0
HFT_J140	5674.94	12.6	0	0	0
HFT_J150	5682.44	7.6	0	0	0
HFT_J155	5685.06	7	0	0	0
HFT_J160	5686.11	6.9	0	0	0
HFT_J165	5690.8	7.9	0	0	0
HFT_J170	5692.63	12.1	0	0	0
HOM_B005	5628.87	10	0	0	0
HOM_B010	5676.46	10	0	0	0
HOM_B015	5683.9	10	0	0	0
HOM_B020	5720.79	10	0	0	0
HOM_J005	5603.06	10	0	0	0
HOM_J010	5607.03	10	0	0	0
HOM_J015	5626.82	10	0	0	0
HOM_J020	5627.81	4.8	0	0	0
HOM_J035	5633.38	6	0	0	0
HOM_J040	5635.72	8.7	0	0	0
HOM_J050	5636.41	6.4	0	0	0
HOM_J055	5639.31	6.9	0	0	0
HOM_J060	5644.09	7.5	0	0	0
HOM_J080	5675.84	9.0	0	0	0
HOM_J085	5679.85	11.6	0	0	0
JAM_B005	5722.72	10	0	0	0
JAM_B010	5776.68	10	0	0	0
JAM_J005	5727.52	5.5	0	0	0
JAM_J010	5729.63	11.1	0	0	0
JAM_J015	5737.54	11.1	0	0	0
KET_B005	5760.19	10	0	0	0
KET_B010	5807.67	50	0	0	0
KET_J011	5730.81	4.2	0	0	0
KET_J020	5744.47	10	0	0	0
KET_J025	5752.4	5.2	0	0	0
KET_J030	5754.33	7.21	0	0	0
KET_J040	5770.12	10	0	0	0
PHI_B100	5771.5	10	0	0	0
PHI_B105	5782.87	10	0	0	0
PHI_B110	5778.7	10	0	0	0
PHI_B115	5825.12	10	0	0	0
PHI_J010	5722.9	10	0	0	0
PHI_J015	5750.62	10	0	0	0
PHI_J020	5772.56	10	0	0	0
SPC_B005	5632.71	10	0	0	0
SPC_B010	5654.64	10	0	0	0
SPC_B015	5738.19	10	0	0	0
SPC_B020	5721.1	10	0	0	0
SPC_B025	5702.92	10	0	0	0
SPC_B030	5716.24	10	0	0	0
SPC_B035	5749.66	10	0	0	0
SPC_B036	5748.12	10	0	0	0
SPC_B040	5756.23	10	0	0	0
SPC_B045	5793	10	0	0	0
SPC_B046	5810.46	10	0	0	0
SPC_B050	5803.08	10	0	0	0
SPC_B055	5794.23	10	0	0	0
SPC_B060	5843.86	10	0	0	0
SPC_B065	5921.23	10	0	0	0
SPC_B070	5847.11	10	0	0	0
SPC_B080	5936.87	10	0	0	0
SPC_B085	5924.96	10	0	0	0
SPC_B090	5842.9	10	0	0	0
SPC_B095	5802.57	10	0	0	0
SPC_B100	5867.35	10	0	0	0
SPC_B105	5820.66	10	0	0	0
SPC_B110	5887.43	10	0	0	0
SPC_J005	5614.07	10	0	0	0
SPC_J010	5628.77	10	0	0	0
SPC_J015	5637.61	10	0	0	0
SPC_J025	5648.07	10	0	0	0
SPC_J030	5685.73	10	0	0	0
SPC_J035	5704.968	10	0	0	0
SPC_J045	5746.57	10	0	0	0
SPC_J050	5748.1	20.7	0	0	0
SPC_J055	5748.4	19.9	0	0	0
SPC_J060	5749.1	20.2	0	0	0
SPC_J065	5750.5	23.1	0	0	0
SPC_J070	5751.8	23.0	0	0	0
SPC_J075	5756.5	23.7	0	0	0
SPC_J080	5760.7	22.9	0	0	0
SPC_J085	5763.4	22.5	0	0	0
SPC_J095	5775.8	17.4	0	0	0
SPC_J100	5777.2	18.1	0	0	0
SPC_J105	5779.3	15.9	0	0	0
SPC_J120	5790.25	10	0	0	0
SPC_J125	5807.11	10	0	0	0
SPC_J130	5871.25	10	0	0	0
SPC_J135	5809.49	10	0	0	0
SPC_J140	5899.6	10	0	0	0
SPC_J150	5783.2	11.3	0	0	0
SPC_J155	5785.5	9.5	0	0	0
SPC_J160	5789.9	10.4	0	0	0
SPC_J165	5834.52	10	0	0	0
SPC_J170	5883.96	10	0	0	0
SPC_J200	5766.15	10	0	0	0
SPC_J205	5770.74	10	0	0	0
SPC_J210	5770.82	10	0	0	0
SPC_J215	5773.27	10	0	0	0
SPC_J220	5776.89	10	0	0	0
SPC_J225	5777.89	10	0	0	0
SPC_J230	5786.28	10	0	0	0
SPC_J235	5788.48	10	0	0	0
SPC_J245	5789.73	10	0	0	0
SPC_J255	5829.22	10	0	0	0
SPC_J260	5794.28	10	0	0	0
SPC_J270	5847.71	10	0	0	0
SPC_J275	5853.74	10	0	0	0
SPC_J300	5639.67	17	0	0	0
SPC_J305	5652.15	5.5	0	0	0
SPC_J400	5773.76	18.95	0	0	0
SPC_J405	5775.39	18.52	0	0	0
SPC_J410	5775.88	19.39	0	0	0
TRE_B005	5704.78	10	0	0	0
TRE_B010	5742.57	10	0	0	0
TRE_B015	5716.79	10	0	0	0
TRE_B020	5757.76	10	0	0	0
TRE_B025	5773.57	10	0	0	0
TRE_J005	5671.16	8	0	0	0
TRE_J015	5689.62	6.5	0	0	0
TRE_J025	5691.46	7	0	0	0
TRE_J035	5731.21	10	0	0	0
TRE_J040	5749.65	10	0	0	0
TRE_J200	5657.08	12.3	0	0	0
TRE_J210	5685.77	5.5	0	0	0
TRE_J215	5700.81	5.5	0	0	0
TRE_J220	5707.85	5	0	0	0
WCE_B005	5692.5	10	0	0	0
WCE_B010	5695.23	10	0	0	0
WCE_B015	5748.2	10	0	0	0
WCE_B020	5701.04	10	0	0	0
WCE_B025	5705.89	10	0	0	0

SWMM Future Input File

```
WCE_B029        5710.14   10        0         0         0
WCE_B030        5718.21   10        0         0         0
WCE_B035        5731.79   10        0         0         0
WCE_B040        5750.45   10        0         0         0
WCE_B045        5743.17   10        0         0         0
WCE_B050        5727.92   10        0         0         0
WCE_B055        5759.49   10        0         0         0
WCE_B056        5770.49   10        0         0         0
WCE_B060        5810.44   10        0         0         0
WCE_B065        5775.68   10        0         0         0
WCE_B070        5770.61   10        0         0         0
WCE_B075        5802.34   10        0         0         0
WCE_B080        5807.72   10        0         0         0
WCE_B085        5837.53   10        0         0         0
WCE_B090        5832.14   10        0         0         0
WCE_B095        5800.61   10        0         0         0
WCE_B100        5835.23   10        0         0         0
WCE_B105        5812.34   10        0         0         0
WCE_B110        5825.79   10        0         0         0
WCE_J005        5656.3    10        0         0         0
WCE_J010        5666.83   10        0         0         0
WCE_J015        5678.68   10        0         0         0
WCE_J020        5695.89   10        0         0         0
WCE_J025        5710.37   10        0         0         0
WCE_J030        5714.85   10        0         0         0
WCE_J035        5717.02   10        0         0         0
WCE_J040        5721.52   10        0         0         0
WCE_J045        5736.59   10        0         0         0
WCE_J064        5746.07   0         0         0         0
WCE_J065        5746.69   10.2      0         0         0
WCE_J070        5747.03   9.8       0         0         0
WCE_J075        5748.57   12.14     0         0         0
WCE_J080        5748.83   14        0         0         0
WCE_J090        5762.76   17.3      0         0         0
WCE_J100        5772.1    9.5       0         0         0
WCE_J105        5773.3    9.3       0         0         0
WCE_J110        5775.38   9         0         0         0
WCE_J120        5783.9    7.8       0         0         0
WCE_J130        5790.1    12        0         0         0
WCE_J140        5793.71   9.1       0         0         0
WCE_J145        5794.15   8.6       0         0         0
WCE_J150        5795.04   7.8       0         0         0
WCE_J155        5797.02   7.1       0         0         0
WCE_J160        5799.38   6.9       0         0         0
WCE_J165        5803.61   6.2       0         0         0
WCE_J200        5660.31   10        0         0         0
WCE_J205        5660.63   8.1       0         0         0
WCE_J210        5663.17   6.5       0         0         0
WCE_J215        5667.37   4.8       0         0         0
WCE_J230        5713.32   10        0         0         0
WCE_J300        5800.35   10        0         0         0
WCE_J400        5749.86   7         0         0         0
WCE_J405        5763.24   12.2      0         0         0
WCE_J415        5759.18   0         0         0         0
WCE_J420        5807.63   10        0         0         0
WSC_B005        5719.73   10        0         0         0
WSC_B010        5748.54   10        0         0         0
WSC_B015        5767.05   10        0         0         0
WSC_B020        5765.67   10        0         0         0
WSC_B025        5779.37   10        0         0         0
WSC_J005        5646.85   10        0         0         0
WSC_J010        5705.82   10        0         0         0
WSC_J015        5709.90   11.50     0         0         0
WSC_J020        5720.51   10        0         0         0
WSC_J025        5740.75   10        0         0         0
WSC_J030        5743.95   10        0         0         0
WSC_J035        5745.34   10        0         0         0
WSC_J040        5752.59   10        0         0         0
WSC_J045        5752.35   10        0         0         0
WSC_J100        5736.08   10        0         0         0
FHP_J050        5725.28   50        0         0         0
```

```
[OUTFALLS]
;;Name          Elevation  Type       Stage Data       Gated    Route To
;;------------- ---------- ---------- ---------------- -------- ----------------
ACR_0005        5669.98    FREE                        NO
ACR_0010        5729.44    FREE                        NO
DFA_B005        5586.40    FREE                        NO
DFA_B010        5655.80    FREE                        NO
DFA_B015        5666.70    FREE                        NO
DFA_B020        5640.69    FREE                        NO
DFA_B021        5673.50    FREE                        NO
DFA_B025        5635.60    FREE                        NO
DFA_B030        5699.69    FREE                        NO
DFA_B035        5657.80    FREE                        NO
DFA_B040        5651.74    FREE                        NO
DFA_B041        5676.76    FREE                        NO
DFA_B045        5666.72    FREE                        NO
DFA_B046        5671.73    FREE                        NO
DFA_B050        5717.03    FREE                        NO
DFA_B051        5766.21    FREE                        NO
DFA_B055        5746.70    FREE                        NO
DFA_B060        5680.96    FREE                        NO
DFA_B061        5734.55    FREE                        NO
DFA_B065        5699.12    FREE                        NO
DFA_B100        5632.93    FREE                        NO
DFA_B105        5639.99    FREE                        NO
DFA_0005        5647.75    FREE                        NO
FHP_0005        5588.74    FREE                        NO
HFT_0005        5605.45    FREE                        NO
HFT_0010        5600.40    FREE                        NO
HOM_0005        5588.22    FREE                        NO
HOM_0010        5632.85    FREE                        NO
PHI_0005        5708.65    FREE                        NO
SPC_0005        5602.89    FREE                        NO
TRE_0005        5668.65    FREE                        NO
TRE_0010        5652.98    FREE                        NO
WCE_0005        5644.79    FREE                        NO

[DIVIDERS]
;;Name          Elevation  Diverted Link    Type       Parameters
;;------------- ---------- ---------------- ---------- ----------
ACR_J045        5724.8     ACR_L045_OF      OVERFLOW   16.1       0          0          0
ACR_J055        5736.79    ACR_L055_OF      OVERFLOW   10         0          0          0
ACR_J075        5766.29    ACR_L075_OF      OVERFLOW   10         0          0          0
ACR_J200        5737.3     ACR_L200_OF      OVERFLOW   7.9        0          0          0
ACR_J230        5757.77    ACR_L230_OF      OVERFLOW   8.9        0          0          0
FHP_J015        5610.71    FHP_L015_OF      OVERFLOW   10         0          0          0
FHP_J065        5772.01    FHP_L065_OF      OVERFLOW   7          0          0          0
FHP_J120        5673.2     FHP_L215_OF      OVERFLOW   12         0          0          0
FHP_J125        5674.21    FHP_L125_OF      OVERFLOW   12         0          0          0
FHP_J130        5680.38    FHP_L130_OF      OVERFLOW   3.5        0          0          0
FHP_J135        5708.43    FHP_L025_OF      OVERFLOW   50         0          0          0
FHP_J145        5712.95    FHP_L145_OF      OVERFLOW   50         0          0          0
FHP_J150        5683.1     FHP_L150_OF      OVERFLOW   11.3       0          0          0
FHP_J165        5685.52    FHP_L165_OF      OVERFLOW   50         0          0          0
FHP_J200        5662.08    FHP_L200_OF      OVERFLOW   3.5        0          0          0
FHP_J205        5675.42    FHP_L205_OF      OVERFLOW   10         0          0          0
FHP_J210        5674.99    FHP_L210_OF      OVERFLOW   3.5        0          0          0
HFT_J100        5605.52    HFT_L100_OF      OVERFLOW   10         0          0          0
HFT_J110        5607.17    HFT_L110_OF      OVERFLOW   8.5        0          0          0
HFT_J115        5612.5     HFL_L115_OF      OVERFLOW   6.8        0          0          0
HFT_J145        5678.68    HFT_L145_OF      OVERFLOW   9.6        0          0          0
HOM_J025        5627.95    HOM_L025_OF      OVERFLOW   5          0          0          0
```

SWMM Future Input File

```
HOM_J030        5630.82   HOM_L030_OF     OVERFLOW  5.9       0         0         0
HOM_J045        5636.30   HOM_L045_OF     OVERFLOW  6.99      0         0         0
HOM_J065        5650.03   HOM_L010_OF     OVERFLOW  5.64      0         0         0
HOM_J070        5663.36   HOM_L070_OF     OVERFLOW  6.0       0         0         0
HOM_J075        5672.46   HOM_L075_OF     OVERFLOW  7.6       0         0         0
HOM_J090        5680.31   HOM_L090_OF     OVERFLOW  11.6      0         0         0
KET_J005        5728.9    KET_L005_OF     OVERFLOW  4.2       0         0         0
KET_J010        5729.33   KET_L010_OF     OVERFLOW  4.2       0         0         0
KET_J015        5731.50   KET_L015_OF     OVERFLOW  0         0         0         0
KET_J035        5759.7    KET_L035_OF     OVERFLOW  0         0         0         0
SPC_J020        5638.04   SPC_L020_OF     OVERFLOW  15.5      0         0         0
SPC_J040        5727.21   SPC_L040_OF     OVERFLOW  20        0         0         0
SPC_J090        5772.6    SPC_L090_OF     OVERFLOW  17.5      0         0         0
SPC_J110        5780.9    SPC_L110_OF     OVERFLOW  14.6      0         0         0
SPC_J115        5785.67   SPC_L115_OF     OVERFLOW  10        0         0         0
SPC_J240        5788.76   SPC_L240_OF     OVERFLOW  50        0         0         0
SPC_J250        5792.6    SPC_L250_OF     OVERFLOW  50        0         0         0
SPC_J265        5795.42   SPC_L265_OF     OVERFLOW  10        0         0         0
SPC_J310        5677.98   SPC_L310_OF     OVERFLOW  6.6       0         0         0
TRE_J010        5685.92   TRE_L010_OF     OVERFLOW  5.5       0         0         0
TRE_J020        5691.26   TRE_L020_OF     OVERFLOW  7         0         0         0
TRE_J030        5692.46   TRE_L030_OF     OVERFLOW  10        0         0         0
TRE_J045        5753.99   TRE_L045_OF     OVERFLOW  10        0         0         0
TRE_J205        5663.69   TRE_L205_OF     OVERFLOW  8         0         0         0
TRE_J225        5713.05   TRE_L225_OF     OVERFLOW  3.5       0         0         0
WCE_J085        5756.67   WCE_L085_OF     OVERFLOW  18.6      0         0         0
WCE_J095        5767.3    WCE_L095_OF     OVERFLOW  15.5      0         0         0
WCE_J115        5781.27   WCE_L115_OF     OVERFLOW  9         0         0         0
WCE_J125        5786.9    WCE_L125_OF     OVERFLOW  7.6       0         0         0
WCE_J135        5792.57   WCE_L135_OF     OVERFLOW  10.7      0         0         0
WCE_J170        5807.16   WCE_L170_OF     OVERFLOW  7.5       0         0         0
WCE_J180        5785.14   WCE_L180_OF     OVERFLOW  7.9       0         0         0
WCE_J220        5668.58   WCE_L220_OF     OVERFLOW  4.9       0         0         0
WCE_J225        5669.50   WCE_L225_OF     OVERFLOW  0         0         0         0
WCE_J410        5776.03   WCE_L410_OF     OVERFLOW  12.0      0         0         0
WSC_J050        5754.98   WSC_L050_OF     OVERFLOW  10        0         0         0

[STORAGE]
;;Name          Elev.     MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap
Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -------- --------
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ACR_S100        5739      13         0          TABULAR    ACR_S100_Storage             0        0
PHI_S100        5754      11         0          TABULAR    PHI_S100_Storage             0        0
PHI_S200        5778      5          0          TABULAR    PHI_S200_Storage             0        0
SPC_S100        5705.17   28.83      0          TABULAR    SPC_S100_Storage             0        0
WCE_S100        5741      16.5       0          TABULAR    WCE_S100_Storage             0        0

[CONDUITS]
;;Name          From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow
MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- --
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ACR_L_B005      ACR_B005         ACR_J005         350.62     0.1        0          0          0          0
ACR_L_B010      ACR_B010         ACR_J005         649.65     0.1        0          0          0          0
ACR_L_B015      ACR_B015         ACR_J010         650.11     0.1        0          0          0          0
ACR_L_B020      ACR_B020         ACR_J050         578.51     0.1        0          0          0          0
ACR_L_B025      ACR_B025         ACR_J050         847.44     0.1        0          6          0          0
ACR_L_B030      ACR_B030         ACR_S100         1180.22    0.1        0          0          0          0
ACR_L_B035      ACR_B035         ACR_S100         973.25     0.1        0          8.14       0          0
ACR_L_B040      ACR_B040         ACR_J250         931.38     0.1        0          6          0          0
ACR_L_B045      ACR_B045         ACR_J075         460.91     0.1        0          0          0          0
ACR_L_B050      ACR_B050         ACR_J080         487.92     0.1        0          0          0          0
ACR_L_B055      ACR_B055         ACR_J085         535.87     0.1        0          5          0          0
ACR_L005        ACR_J005         ACR_O005         541.3      0.01       0          0          0          0
ACR_L010        ACR_J010         ACR_J005         113.86     0.1        0          0          0          0
ACR_L035        ACR_J035         ACR_J010         904.20     0.01       0          0          0          0
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ACR_L045        ACR_J045         ACR_J035         466.50     0.016      0          0          0          0
ACR_L045_OF     ACR_J045         ACR_O010         1263       0.02       16.1       0          0          0
ACR_L050        ACR_J050         ACR_J045         269.64     0.1        0          0          0          0
ACR_L055        ACR_J055         ACR_J050         463.18     0.03       0          4          0
289
ACR_L055_OF     ACR_J055         ACR_J050         491        0.02       0          0          0          0
ACR_L060        ACR_J060         ACR_J050         665.35     0.02       0          6.04       0          0
ACR_L065        ACR_J065         ACR_J055         429.1      0.01       0          0          0          0
ACR_L070        ACR_J070         ACR_J060         448.56     0.02       0          0          0          0
ACR_L075        ACR_J075         ACR_J065         389.04     0.01       0          0          0          0
ACR_L075_OF     ACR_J075         ACR_J070         50         0.02       1          0          0          0
ACR_L080        ACR_J080         ACR_J075         1265.64    0.01       0          0          0          0
ACR_L085        ACR_J085         ACR_J080         857.8      0.01       0          0          0          0
ACR_L200        ACR_J200         ACR_J055         219.2      0.016      0.4        0          0          0
ACR_L200_OF     ACR_J200         ACR_J055         190        0.02       0          0          0          0
ACR_L204        ACR_J204         ACR_S100         150        0.1        0          0          0          0
ACR_L205        ACR_J205         ACR_J204         61.95      0.016      0          0          0          0
ACR_L210        ACR_J210         ACR_J205         34.95      0.01       0          0          0          0
ACR_L215        ACR_J215         ACR_J210         40.1       0.016      0          0          0          0
ACR_L220        ACR_J220         ACR_J215         45         0.016      0          0          0          0
ACR_L225        ACR_J225         ACR_J220         145.13     0.016      0          0          0          0
ACR_L230        ACR_J230         ACR_J225         310.44     0.016      0          0          0          0
ACR_L230_OF     ACR_J230         ACR_J070         100        0.02       8.9        0          0          0
ACR_L235        ACR_J235         ACR_J230         55.21      0.016      0          0          0          0
ACR_L240        ACR_J240         ACR_J235         139.05     0.016      0          0          0          0
ACR_L245        ACR_J245         ACR_J240         72.46      0.016      0          0          0          0
ACR_L250        ACR_J250         ACR_J245         245.95     0.016      0          0          0          0
DFA_L_B042      DFA_B042         DFA_J005         404.34     0.1        0          0          0          0
DFA_L_B043      DFA_B043         DFA_J010         501.66     0.1        0          0          0          0
DFA_L005        DFA_J005         DFA_O005         1159.95    0.01       0          0          0          0
DFA_L010        DFA_J010         DFA_J005         721.60     0.02       0          0          0          0
FHP_L_B005      FHP_B005         FHP_O005         565.80     0.1        0          0          0          0
FHP_L_B010      FHP_B010         FHP_J005         1226.77    0.1        0          0          0          0
FHP_L_B015      FHP_B015         FHP_J005         812.58     0.1        0          0          0          0
FHP_L_B020      FHP_B020         FHP_J005         536.20     0.1        0          0          0          0
FHP_L_B025      FHP_B025         FHP_J010         279.99     0.1        0          0          0          0
FHP_L_B030      FHP_B030         FHP_J015         700.93     0.1        0          0          0          0
FHP_L_B035      FHP_B035         FHP_J020         337.22     0.1        0          0          0          0
FHP_L_B040      FHP_B040         FHP_J020         457.93     0.1        0          0          0          0
FHP_L_B045      FHP_B045         FHP_J205         365.38     0.1        0          0          0          0
FHP_L_B050      FHP_B050         FHP_J210         415.31     0.1        0          0          0          0
FHP_L_B055      FHP_B055         FHP_J125         112.32     0.1        0          0          0          0
FHP_L_B060      FHP_B060         FHP_J165         693.72     0.1        0          0          0          0
FHP_L_B065      FHP_B065         FHP_J150         692.57     0.1        0          0          0          0
FHP_L_B070      FHP_B070         FHP_J145         809.91     0.1        0          0          0          0
FHP_L_B075      FHP_B075         FHP_J145         400        0.1        0          0          0          0
FHP_L_B080      FHP_B080         FHP_J035         664.42     0.1        0          0          0          0
FHP_L_B085      FHP_B085         FHP_J040         915.62     0.1        0          0          0          0
FHP_L_B090      FHP_B090         FHP_J040         706.34     0.1        0          0          0          0
FHP_L_B095      FHP_B095         FHP_J050         640.25     0.1        0          0          0          0
FHP_L_B100      FHP_B100         FHP_J045         632.04     0.1        0          0          0          0
FHP_L_B105      FHP_B105         FHP_J065         227.85     0.1        0          9          0          0
FHP_L005        FHP_J005         FHP_O005         780.64     0.045      0          0          0          0
FHP_L010        FHP_J010         FHP_J005         715.10     0.045      0          0          0          0
FHP_L015        FHP_J015         FHP_J010         372.54     0.016      0          0          0          0
FHP_L015_OF     FHP_J015         FHP_J010         398.75     0.02       18.7       21.75      0          0
FHP_L020        FHP_J020         FHP_J015         1141.38    0.04       0          12         0          0
FHP_L025        FHP_J135         FHP_J130         921.07     0.016      0          0          0          0
FHP_L025_OF     FHP_J135         FHP_J130         981.10     0.02       2.2        3.5        0          0
FHP_L030        FHP_J030         FHP_J020         488.77     0.01       0          10         0          0
FHP_L035        FHP_J035         FHP_J030         92.72      0.016      0          0          0          0
FHP_L040        FHP_J040         FHP_J035         1083.87    0.04       0          0          0          0
FHP_L045        FHP_J045         FHP_J040         1566.19    0.01       0          0          0          0
FHP_L050        FHP_J050         FHP_J045         93.71      0.016      0          0          0          0
FHP_L055        FHP_J055         FHP_J050         957.66     0.01       0          0          0          0
FHP_L060        FHP_J060         FHP_J055         58.99      0.016      0          0          0          0
FHP_L065        FHP_J065         FHP_J060         138.98     0.016      0          0.0        0          0
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SWMM Future Input File

FHP_L065_OF	FHP_J065	WSC_J025	1632.89	0.02	9	8.19	0	0
FHP_L100	FHP_J100	FHP_J030	477.53	0.016	0	0	0	0
FHP_L105	FHP_J105	FHP_J100	300.81	0.016	0	0.1	0	0
FHP_L110	FHP_J110	FHP_J105	46.01	0.016	0	0.1	0	0
FHP_L115	FHP_J115	FHP_J110	325.27	0.016	0	0	0	0
FHP_L120	FHP_J120	FHP_J115	94.45	0.016	0	0.1	0	73
FHP_L125	FHP_J125	FHP_J120	17.54	0.016	0	0.0	0	0
FHP_L125_OF	FHP_J125	FHP_J215	44.96	0.01	12	0	0	0
FHP_L130	FHP_J130	FHP_J125	66.46	0.016	0	0.0	0	0
FHP_L130_OF	FHP_J130	FHP_J215	67.74	0.01	5	0	0	0
FHP_L140	FHP_J140	FHP_J135	172.53	0.016	0	0	0	0
FHP_L145	FHP_J145	FHP_J140	47.67	0.016	0	0	0	4
FHP_L145_OF	FHP_J145	FHP_J135	247.24	0.02	5	2.2	0	0
FHP_L150	FHP_J150	FHP_J125	157.07	0.016	0	0.0	0	0
FHP_L150_OF	FHP_J150	FHP_J215	200	0.04	11.3	0	0	0
FHP_L160	FHP_J160	FHP_J120	144.6	0.016	0	2.7	0	
14.5								
FHP_L165	FHP_J165	FHP_J160	90.23	0.016	0	0.0	0	14
FHP_L165_OF	FHP_J165	FHP_J215	298.7	0.01	8.2	0	0	0
FHP_L200	FHP_J200	FHP_J100	28.3	0.016	0	2.7	0	0
FHP_L200_OF	FHP_J200	FHP_J030	509.96	0.02	3.5	6.05	0	0
FHP_L205	FHP_J205	FHP_J110	50	0.02	0	0	0	3
FHP_L205_OF	FHP_J205	FHP_J200	322.76	0.02	0	3.5	0	0
FHP_L210	FHP_J210	FHP_J105	182.17	0.016	0	1.1	0	0
FHP_L210_OF	FHP_J210	FHP_J030	888.54	0.016	3.5	12.2	0	0
FHP_L215	FHP_J215	FHP_J205	412.69	0.02	0	0	0	0
FHP_L215_OF	FHP_J120	FHP_J215	20	0.1	12	0	0	0
HFL_L115_OF	HFT_J115	HFT_J110	178.69	0.02	0	0	0	0
HFT_L_B005	HFT_B005	HFT_J005	632.71	0.1	0	0	0	0
HFT_L_B010	HFT_B010	HFT_J010	829.34	0.1	0	0	0	0
HFT_L_B015	HFT_B015	HFT_J115	914.12	0.1	0	0	0	0
HFT_L_B020	HFT_B020	HFT_J100	783.41	0.1	0	0	0	0
HFT_L_B025	HFT_B025	HFT_J145	630.93	0.1	0	0	0	0
HFT_L_B030	HFT_B030	HFT_J170	400	0.1	0	0	0	0
HFT_L005	HFT_J005	HFT_O010	157.00	0.01	0	0	0	0
HFT_L010	HFT_J010	HFT_J005	762.22	0.04	0	0	0	0
HFT_L100	HFT_J100	HFT_O005	24.92	0.016	0	0	0	0
HFT_L100_OF	HFT_J100	HFT_J101	100	0.1	10	0	0	0
HFT_L101_OF	HFT_J101	HFT_O010	274.19	0.02	10	12.5	0	0
HFT_L105	HFT_J105	HFT_J100	34.75	0.016	0	0.1	0	0
HFT_L110	HFT_J110	HFT_J105	34.0	0.016	0	0.5	0	0
HFT_L110_OF	HFT_J110	HFT_J101	100	0.01	8.5	0	0	0
HFT_L115	HFT_J115	HFT_J110	154.21	0.016	0	0.1	0	0
HFT_L120	HFT_J120	HFT_J105	395.32	0.016	0	0	0	52
HFT_L125	HFT_J125	HFT_J120	405.31	0.016	0	2.7	0	52
HFT_L130	HFT_J130	HFT_J125	400.17	0.016	0	0.3	0	52
HFT_L135	HFT_J135	HFT_J130	253.02	0.016	0	0.3	0	52
HFT_L140	HFT_J140	HFT_J135	198.34	0.016	0	0.3	0	52
HFT_L145	HFT_J145	HFT_J140	69.52	0.016	0	0.5	0	51
HFT_L145_OF	HFT_J145	HFT_J110	1671.51	0.02	9.6	8.5	0	0
HFT_L150	HFT_J150	HFT_J145	106.39	0.016	0	2.4	0	0
HFT_L155	HFT_J155	HFT_J150	215.87	0.016	0	0.3	0	0
HFT_L160	HFT_J160	HFT_J155	76.02	0.016	0	0.0	0	0
HFT_L165	HFT_J165	HFT_J160	399.97	0.016	0	0.0	0	0
HFT_L170	HFT_J170	HFT_J165	254.08	0.016	0	0	0	0
HOM_L_B005	HOM_B005	HOM_J005	428.24	0.1	0	0	0	0
HOM_L_B010	HOM_B010	HOM_J030	619.78	0.1	0	5.9	0	0
HOM_L_B015	HOM_B015	HOM_J045	957.97	0.1	0	6.4	0	0
HOM_L010	HOM_J010	HOM_J005	235.89	0.01	0	0	0	0
HOM_L010_OF	HOM_J065	HOM_J045	395	0.02	5.64	8.93	0	0
HOM_L015	HOM_J015	HOM_J010	517.24	0.04	0	0	0	0
HOM_L020	HOM_J020	HOM_J015	18.58	0.016	0	0	0	0
HOM_L021	HOM_B020	HOM_J090	691.8	0.01	0	4	0	0
HOM_L023	HOM_J005	HOM_O005	590.68	0.01	0	0	0	0
HOM_L025	HOM_J025	HOM_J020	25.3	0.016	0	0.1	0	0
HOM_L025_OF	HOM_J025	HOM_J015	53.25	0.02	5	6	0	0
HOM_L030	HOM_J030	HOM_J025	163.22	0.016	0	0.1	0	0
HOM_L030_OF	HOM_J030	HOM_J025	180.89	0.02	5.9	5	0	0
HOM_L035	HOM_J035	HOM_J030	126.11	0.016	0	0.1	0	0
HOM_L040	HOM_J040	HOM_J035	286.7	0.016	0	0.1	0	0
HOM_L045	HOM_J045	HOM_J040	97.41	0.016	0	0.1	0	0
HOM_L045_OF	HOM_J045	HOM_O010	246.7	0.02	8.93	0	0	0
HOM_L050	HOM_J050	HOM_J045	17.84	0.016	0	0	0	0
HOM_L055	HOM_J055	HOM_J050	107.06	0.016	0	0.4	0	0
HOM_L060	HOM_J060	HOM_J055	173.1	0.016	0	0.1	0	0
HOM_L065	HOM_J065	HOM_J060	115.1	0.016	0	0.1	0	80
HOM_L070	HOM_J070	HOM_J065	258.56	0.016	0	0.1	0	0
HOM_L070_OF	HOM_J070	HOM_J065	260	0.02	6	5.64	0	0
HOM_L075	HOM_J075	HOM_J070	236.01	0.016	0	0	0	0
HOM_L075_OF	HOM_J075	HOM_J070	240	0.02	7.6	6.0	0	0
HOM_L080	HOM_J080	HOM_J075	76.91	0.016	0	2.5	0	0
HOM_L085	HOM_J085	HOM_J080	208.77	0.016	0	0.1	0	0
HOM_L090	HOM_J090	HOM_J085	54.84	0.016	0	0.1	0	0
HOM_L090_OF	HOM_J090	HOM_J075	285	0.016	11.6	8.66	0	0
JAM_L_B005	JAM_B005	WCE_J020	744.71	0.1	0	0	0	0
JAM_L_B010	JAM_B010	JAM_J015	844.48	0.1	0	0	0	0
JAM_L005	JAM_J005	WCE_J020	1263.23	0.01	0	0	0	0
JAM_L010	JAM_J010	JAM_J005	76.41	0.016	0	0	0	0
JAM_L015	JAM_J015	JAM_J010	100.48	0.016	0	0.3	0	0
KET_L_B005	KET_B005	KET_J005	314.61	0.1	0	0	0	0
KET_L_B010	KET_B010	KET_J040	582.42	0.1	0	0	0	0
KET_L005	KET_J005	WCE_J040	162.44	0.016	0	0	0	0
KET_L005_OF	KET_J005	WCE_J040	227.28	0.045	5.71	0	0	0
KET_L010	KET_J010	KET_J005	34.49	0.016	0	0.1	0	0
KET_L010_OF	KET_J010	KET_J005	52.71	0.01	4.2	3	0	0
KET_L011	KET_J011	KET_J010	76.7	0.016	0	0.1	0	0
KET_L015	KET_J015	KET_J011	60.1	0.016	0	0.1	0	0
KET_L015_OF	KET_J015	KET_J010	156.13	0.04	3.61	3.01	0	0
KET_L020	KET_J020	KET_J015	310.54	0.01	0	0	0	0
KET_L025	KET_J025	KET_J020	175.52	0.016	0	0	0	
115.25								
KET_L030	KET_J030	KET_J025	40.97	0.016	0	0	0	
115.25								
KET_L035	KET_J035	KET_J030	101.08	0.016	0	0	0	
115								
KET_L035_OF	KET_J035	KET_J005	953.33	0.01	5.67	5.71	0	0
KET_L040	KET_J040	KET_J035	434.66	0.01	0	0	0	0
PHI_L_B100	PHI_B100	PHI_J010	955.02	0.1	0	0	0	0
PHI_L_B105	PHI_B105	PHI_J015	629.40	0.1	0	0	0	0
PHI_L_B110	PHI_B110	PHI_S100	377.07	0.1	0	0	0	0
PHI_L_B115	PHI_B115	PHI_S200	1210.97	0.1	0	0	0	0
PHI_L010	PHI_J010	PHI_O005	273.25	0.01	0	0	0	0
PHI_L015	PHI_J015	PHI_J010	385.19	0.01	0	0	0	0
PHI_L020	PHI_J020	PHI_S100	510	0.016	0	0	0	0
SPC_L_B005	SPC_B005	SPC_J005	502.82	0.1	0	0	0	0
SPC_L_B010	SPC_B010	SPC_J010	435.53	0.1	0	0	0	0
SPC_L_B015	SPC_B015	SPC_J310	1132.42	0.1	0	0	0	0
SPC_L_B020	SPC_B020	SPC_J015	854.41	0.1	0	4.7	0	0
SPC_L_B025	SPC_B025	SPC_J025	665.91	0.1	0	4.41	0	0
SPC_L_B030	SPC_B030	SPC_J030	765.51	0.1	0	0	0	0
SPC_L_B035	SPC_B035	SPC_S100	373.5	0.1	0	35	0	0
SPC_L_B040	SPC_B040	SPC_J040	419.28	0.1	0	0	0	0
SPC_L_B045	SPC_B045	SPC_J055	401.10	0.1	0	11	0	0
SPC_L_B046	SPC_B046	SPC_J410	500.57	0.1	0	0	0	0
SPC_L_B050	SPC_B050	SPC_J160	116.21	0.1	0	10.4	0	0
SPC_L_B055	SPC_B055	SPC_J120	115.78	0.1	0	0	0	0
SPC_L_B060	SPC_B060	SPC_J125	697.88	0.1	0	6	0	0
SPC_L_B065	SPC_B065	SPC_J130	572.00	0.1	0	0	0	0
SPC_L_B070	SPC_B070	SPC_J135	658.69	0.1	0	7	0	0
SPC_L_B080	SPC_B080	SPC_J140	617.53	0.1	0	10	0	0
SPC_L_B085	SPC_B085	SPC_J170	583.81	0.1	0	0	0	0
SPC_L_B090	SPC_B090	SPC_J165	237.57	0.1	0	0	0	0
SPC_L_B095	SPC_B095	SPC_J220	1029.54	0.1	0	9.66	0	0
SPC_L_B100	SPC_B100	SPC_J255	781.87	0.1	0	4.42	0	0

SWMM Future Input File

SPC_L_B105	SPC_B105	SPC_J265	927.84	0.1	0	6.5	0	0	
SPC_L_B110	SPC_B110	SPC_J275	779.01	0.1	0	5.5	0	0	
SPC_L005	SPC_J005	SPC_O005	490.29	0.01	0	4	0	0	
SPC_L010	SPC_J010	SPC_J005	950.55	0.01	0	0	0	0	
SPC_L015	SPC_J015	SPC_J010	817.02	0.01	0	0	0	0	
SPC_L020	SPC_J020	SPC_J015	82.51	0.016	0	0	0	0	
SPC_L020_OF	SPC_J020	SPC_J015	122.39	0.02	15.5	15	0	0	
SPC_L025	SPC_J025	SPC_J020	145.04	0.01	4.41	0	0	0	
SPC_L030	SPC_J030	SPC_J025	1616.24	0.01	0	6	0	0	
SPC_L035	SPC_J035	SPC_J030	1118.06	0.06	0	10	0	0	
SPC_L040	SPC_J040	SPC_S100	357.89	0.016	0	0	0	0	
SPC_L040_OF	SPC_J040	SPC_S100	193.05	0.02	17.92	24.27	0	0	
SPC_L045	SPC_J045	SPC_J040	768.42	0.01	0	0	0	0	
SPC_L050	SPC_J050	SPC_J045	69.3	0.016	0	0	0	0	
SPC_L055	SPC_J055	SPC_J050	14.99	0.016	0	0	0	0	
SPC_L060	SPC_J060	SPC_J055	35.6	0.016	0	0	0	0	
SPC_L065	SPC_J065	SPC_J060	68.33	0.016	0	0	0	0	
SPC_L070	SPC_J070	SPC_J065	58.63	0.016	0	0	0	0	
SPC_L075	SPC_J075	SPC_J070	229.7	0.016	0	0	0	0	
SPC_L080	SPC_J080	SPC_J075	199.69	0.016	0	0	0	0	
SPC_L085	SPC_J085	SPC_J080	130.21	0.016	0	0	0	0	
SPC_L090	SPC_J090	SPC_J085	440.94	0.016	0	0	0		300
SPC_L090_OF	SPC_J090	SPC_J060	1055	0.02	17.5	20.2	0	0	
SPC_L095	SPC_J095	SPC_J090	156.27	0.016	0	0	0	0	
SPC_L100	SPC_J100	SPC_J095	66.97	0.016	0	0	0	0	
SPC_L105	SPC_J105	SPC_J100	100.94	0.016	0	0	0	0	
SPC_L110	SPC_J110	SPC_J105	75.71	0.016	0	0	0		300
SPC_L110_OF	SPC_J110	SPC_J090	390	0.02	14.6	17.5	0	0	
SPC_L115	SPC_J115	SPC_J110	155.29	0.016	3.66	0	0	0	
SPC_L115_OF	SPC_J115	SPC_J110	129.67	0.01	9	5.8	0	0	
SPC_L120	SPC_J120	SPC_J115	332.34	0.01	3.67	0	0	0	
SPC_L125	SPC_J125	SPC_J120	529.56	0.01	0	0	0	0	
SPC_L130	SPC_J130	SPC_J125	1589.49	0.01	0	0	0	0	
SPC_L135	SPC_J135	SPC_J120	531.53	0.01	0	0	0	0	
SPC_L140	SPC_J140	SPC_J135	1667.51	0.01	0	0	0	0	
SPC_L150	SPC_J150	SPC_J110	116.1	0.016	0	0	0	0	
SPC_L155	SPC_J155	SPC_J150	112	0.016	0	0	0	0	
SPC_L160	SPC_J160	SPC_J155	219.94	0.016	0	0	0	0	
SPC_L165	SPC_J165	SPC_J160	843.88	0.016	0	10.4	0	0	
SPC_L170	SPC_J170	SPC_J165	1981.19	0.02	0	0	0	0	
SPC_L200	SPC_J200	SPC_J055	397.66	0.016	0	0	0	0	
SPC_L205	SPC_J205	SPC_J200	305.27	0.016	0	0	0	0	
SPC_L210	SPC_J210	SPC_J205	74.93	0.016	1.05	0	0	0	
SPC_L215	SPC_J215	SPC_J210	93.24	0.016	0	1.05	0	0	
SPC_L220	SPC_J220	SPC_J215	96.38	0.016	0	0	0		531
SPC_L225	SPC_J225	SPC_J220	26.6	0.016	0	0	0	0	
SPC_L230	SPC_J230	SPC_J225	223.43	0.016	0	0	0	0	
SPC_L235	SPC_J235	SPC_J230	199.86	0.016	0	0	0	0	
SPC_L240	SPC_J240	SPC_J235	106.66	0.016	0	0	0	0	
SPC_L240_OF	SPC_J240	SPC_J220	536.54	0.01	5.59	9.66	0	0	
SPC_L245	SPC_J245	SPC_J240	194.11	0.016	0	0	0	0	
SPC_L250	SPC_J250	SPC_J245	80.28	0.016	0	0	0	84	
SPC_L250_OF	SPC_J250	SPC_J240	240.05	0.01	3.35	5.59	0	0	
SPC_L255	SPC_J255	SPC_J250	1273.15	0.01	0	0	0	0	
SPC_L260	SPC_J260	SPC_J230	399.89	0.016	0	0	0	0	
SPC_L265	SPC_J265	SPC_J260	181.64	0.016	0	0	0	0	
SPC_L265_OF	SPC_J265	SPC_J240	729.02	0.02	6.22	5.59	0	0	
SPC_L270	SPC_J270	SPC_J265	1569.29	0.01	0	0	0	0	
SPC_L275	SPC_J275	SPC_J270	246.23	0.016	0	0	0	0	
SPC_L300	SPC_J300	SPC_J015	58.95	0.016	0	0	0	0	
SPC_L305	SPC_J305	SPC_J300	108.56	0.016	0	7	0	0	
SPC_L310	SPC_J310	SPC_J305	474.94	0.016	0	0.1	0	74	
SPC_L310_OF	SPC_J310	SPC_J015	624.43	0.02	6.6	15.8	0	0	
SPC_L400	SPC_J400	SPC_J090	67.99	0.016	0	0	0	0	

SPC_L405	SPC_J405	SPC_J400	55.20	0.016	0	0	0	0	
SPC_L410	SPC_J410	SPC_J405	31.08	0.016	0	0	0	0	
TRE_L_B005	TRE_B005	TRE_J205	770.48	0.1	0	0	0	0	
TRE_L_B010	TRE_B010	TRE_J225	441.33	0.1	0	0	0	0	
TRE_L_B015	TRE_B015	TRE_J030	431.05	0.1	0	3.5	0	0	
TRE_L_B020	TRE_B020	TRE_J035	282.53	0.1	0	0	0	0	
TRE_L_B025	TRE_B025	TRE_J045	285.73	0.1	0	0	0	0	
TRE_L005	TRE_J005	TRE_O005	122.45	0.016	0	0	0	0	
TRE_L010	TRE_J010	TRE_J005	365.73	0.016	0	0.0	0	0	
TRE_L010_OF	TRE_J010	TRE_O005	550	0.04	5.5	0	0	0	
TRE_L015	TRE_J015	TRE_J010	177.52	0.016	0	0.0	0	0	
TRE_L020	TRE_J020	TRE_J015	44.96	0.016	0	0.0	0	0	
TRE_L020_OF	TRE_J020	TRE_J010	225	0.02	8.84	8.55	0	0	
TRE_L025	TRE_J025	TRE_J020	43.69	0.016	0	0.0	0	0	
TRE_L030	TRE_J030	TRE_J025	31.9	0.016	0	0.0	0	30	
TRE_L030_OF	TRE_J030	TRE_J020	40	0.02	6.78	7	0	0	
TRE_L035	TRE_J035	TRE_J030	1335.88	0.01	0	0	0	0	
TRE_L040	TRE_J040	TRE_J035	234.57	0.04	0	0	0	0	
TRE_L045	TRE_J045	TRE_J040	158.91	0.016	0	0	0	0	
TRE_L045_OF	TRE_J045	ACR_J045	1129.70	0.02	0	16.1	0	0	
TRE_L200	TRE_J200	TRE_O010	128.11	0.016	0	0	0	0	
TRE_L205	TRE_J205	TRE_J200	283.78	0.01	0	0.1	0		145
TRE_L205_OF	TRE_J205	TRE_O010	330	0.02	8	17	0	0	
TRE_L210	TRE_J210	TRE_J205	503.14	0.016	0	0.5	0	0	
TRE_L215	TRE_J215	TRE_J210	397.48	0.016	0	0.0	0	0	
TRE_L220	TRE_J220	TRE_J215	119.47	0.016	0	0.0	0	0	
TRE_L225	TRE_J225	TRE_J220	119.47	0.016	0	0	0		105
TRE_L225_OF	TRE_J225	TRE_J205	1295	0.02	3.5	8	0	0	
WCE_L_B005	WCE_B005	WCE_J005	1176.22	0.1	0	0	0	0	
WCE_L_B010	WCE_B010	WCE_J225	318.13	0.1	0	0	0	0	
WCE_L_B015	WCE_B015	WCE_J230	796.01	0.1	0	0	0	0	
WCE_L_B020	WCE_B020	WCE_J010	620.34	0.1	0	0	0	0	
WCE_L_B025	WCE_B025	WCE_J010	730.02	0.1	0	0	0	0	
WCE_L_B029	WCE_B029	WCE_J015	393.42	0.1	0	0	0	0	
WCE_L_B030	WCE_B030	WCE_J020	907.68	0.1	0	0	0	0	
WCE_L_B035	WCE_B035	WCE_J020	952.23	0.1	0	0	0	0	
WCE_L_B040	WCE_B040	WCE_J025	554.36	0.1	0	0	0	0	
WCE_L_B045	WCE_B045	WCE_J025	606.44	0.1	0	0	0	0	
WCE_L_B050	WCE_B050	WCE_J030	667.07	0.1	0	0	0	0	
WCE_L_B055	WCE_B055	WCE_J035	944.86	0.1	0	0	0	0	
WCE_L_B056	WCE_B056	WCE_J045	452.83	0.1	0	14.92	0	0	
WCE_L_B060	WCE_B060	WCE_J300	308.97	0.1	0	0	0	0	
WCE_L_B065	WCE_B065	WCE_J064	394.48	0.1	0	0	0	0	
WCE_L_B070	WCE_B070	WCE_S100	438.24	0.01	0	0	0	0	
WCE_L_B075	WCE_B075	WCE_J415	407.73	0.1	0	14.92	0	0	
WCE_L_B080	WCE_B080	WCE_J410	496.85	0.1	0	0	0	0	
WCE_L_B085	WCE_B085	WCE_J420	610.34	0.1	0	0	0	0	
WCE_L_B090	WCE_B090	WCE_J095	883.12	0.1	0	0	0	0	
WCE_L_B095	WCE_B095	WCE_J100	852.18	0.1	0	0	0	0	
WCE_L_B100	WCE_B100	WCE_J135	464.73	0.1	0	0	0	0	
WCE_L_B105	WCE_B105	WCE_J180	759.4	0.1	0	0	0	0	
WCE_L_B110	WCE_B110	WCE_J170	710.47	0.1	0	0	0	0	
WCE_L005	WCE_J005	WCE_O005	386.33	0.01	0	0	0	0	
WCE_L010	WCE_J010	WCE_J005	404.93	0.01	0	0	0	0	
WCE_L015	WCE_J015	WCE_J010	707.19	0.01	0	0	0	0	
WCE_L020	WCE_J020	WCE_J015	486.41	0.01	0	0	0	0	
WCE_L025	WCE_J025	WCE_J020	1228.69	0.01	0	0	0	0	
WCE_L030	WCE_J030	WCE_J025	94.24	0.024	0	0	0	0	
WCE_L035	WCE_J035	WCE_J030	300.87	0.01	0	0	0	0	
WCE_L040	WCE_J040	WCE_J035	387.7	0.01	0	0	0	0	
WCE_L045	WCE_J045	WCE_J040	735.94	0.01	0	0	0	0	
WCE_L064	WCE_J064	WCE_S100	269.19	0.01	0	0	0	0	
WCE_L065	WCE_J065	WCE_J064	31.76	0.016	0	0	0	0	
WCE_L070	WCE_J070	WCE_J065	38.03	0.016	0	0.1	0	0	
WCE_L075	WCE_J075	WCE_J070	173.49	0.016	0	0	0	0	

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WCE_L080         WCE_J080         WCE_J075         42.69      0.016      0          0          0          0
WCE_L085         WCE_J085         WCE_J080         215.28     0.016      0          4          0
265
WCE_L085_OF      WCE_J085         WCE_J064         444.65     0.01       18.6       12.3       0          0
WCE_L090         WCE_J090         WCE_J085         145.53     0.016      0          4.1        0          0
WCE_L095         WCE_J095         WCE_J090         118.26     0.016      0          3.3        0          0
WCE_L095_OF      WCE_J095         WCE_J085         270.42     0.01       15.5       18.6       0          0
WCE_L100         WCE_J100         WCE_J095         121.61     0.016      0          2.5        0          0
WCE_L105         WCE_J105         WCE_J100         123.54     0.016      0          0.2        0          0
WCE_L110         WCE_J110         WCE_J105         17.33      0.016      0          0.4        0          0
WCE_L115         WCE_J115         WCE_J110         247.03     0.016      0          0.1        0
140
WCE_L115_OF      WCE_J115         WCE_J100         388.3      0.02       9          9.5        0          0
WCE_L120         WCE_J120         WCE_J115         42.55      0.016      0          0          0          0
WCE_L125         WCE_J125         WCE_J120         81.92      0.016      0          0.0        0          0
WCE_L125_OF      WCE_J125         WCE_J115         125.8      0.02       7.6        9          0          0
WCE_L130         WCE_J130         WCE_J125         240.03     0.016      0          0.1        0          0
WCE_L135         WCE_J135         WCE_J130         102.53     0.016      0          0.1        0
130
WCE_L135_OF      WCE_J135         WCE_J125         345.57     0.01       10.7       7.6        0          0
WCE_L140         WCE_J140         WCE_J135         88.95      0.016      0          0.1        0          0
WCE_L145         WCE_J145         WCE_J140         124.79     0.016      0          0.1        0          0
WCE_L150         WCE_J150         WCE_J145         75.85      0.016      0          0.1        0          0
WCE_L155         WCE_J155         WCE_J150         107.29     0.016      0          0.40       0          0
WCE_L160         WCE_J160         WCE_J155         116.93     0.016      0          0.2        0          0
WCE_L165         WCE_J165         WCE_J160         181.05     0.016      0          0.3        0          0
WCE_L170         WCE_J170         WCE_J165         221.68     0.016      0          0.1        0          42
WCE_L170_OF      WCE_J170         WCE_J135         695        0.02       7.5        8.6        0          0
WCE_L180         WCE_J180         WCE_J115         71.71      0.016      0          2.4        0          0
WCE_L180_OF      WCE_J180         WCE_J115         117.1      0.02       7.9        9.0        0          0
WCE_L200         WCE_J200         WCE_J005         32.6       0.1        0          0          0          0
WCE_L205         WCE_J205         WCE_J200         190.93     0.016      0          0          0          0
WCE_L210         WCE_J210         WCE_J205         147.29     0.016      0          0.3        0          0
WCE_L215         WCE_J215         WCE_J210         128.04     0.016      0          1.7        0          0
WCE_L220         WCE_J220         WCE_J215         21.89      0.016      0          1.2        0          0
WCE_L220_OF      WCE_J220         WCE_0005         698.49     0.04       4.9        0          0          0
WCE_L225         WCE_J225         WCE_J220         59.31      0.016      0          0.1        0          0
WCE_L225_OF      WCE_J225         WCE_J220         84.41      0.02       9.85       10.59      0          0
WCE_L230         WCE_J230         WCE_J225         984.66     0.01       0          0          0          0
WCE_L300         WCE_J300         WCE_J045         905.95     0.02       0          14.92      0          0
WCE_L400         WCE_J400         WCE_S100         20.41      0.016      0          6.57       0          0
WCE_L405         WCE_J405         WCE_J400         266.51     0.016      0          2.5        0          0
WCE_L410         WCE_J410         WCE_J405         286.77     0.016      0          0.2        0          37
WCE_L410_OF      WCE_J410         WCE_J415         681.60     0.02       0          0          0          0
WCE_L415         WCE_J415         WCE_J045         433.95     0.016      0          0          0          0
WCE_L420         WCE_J420         WCE_J415         1311.83    0.02       0          0          0          0
WSC_L_B005       WSC_B005         WSC_J005         1104.61    0.1        0          0          0          0
WSC_L_B010       WSC_B010         WSC_J020         489.54     0.1        0          0          0          0
WSC_L_B015       WSC_B015         WSC_J100         618.47     0.1        0          4.5        0          0
WSC_L_B020       WSC_B020         WSC_J025         569.07     0.1        0          7.58       0          0
WSC_L_B025       WSC_B025         WSC_J050         432.75     0.1        0          6          0          0
WSC_L005         WSC_J005         SPC_J020         163.34     0.01       0          0          0          0
WSC_L010         WSC_J010         WSC_J005         1754.22    0.01       0          0          0          0
WSC_L015         WSC_J015         WSC_J010         48.84      0.016      0          0          0          0
WSC_L020         WSC_J020         WSC_J015         126.55     0.016      0          0          0          0
WSC_L025         WSC_J025         WSC_J020         733.13     0.01       0          0          0          0
WSC_L030         WSC_J030         WSC_J025         140.03     0.016      0          0          0          0
WSC_L035         WSC_J035         WSC_J030         60.56      0.016      0          0          0          0
WSC_L040         WSC_J040         WSC_J035         323.42     0.016      0          0          0          0
WSC_L045         WSC_J045         WSC_J040         53.02      0.016      1.43       0          0          0
WSC_L050         WSC_J050         WSC_J045         232.18     0.016      0          1.43       0          82
WSC_L050_OF      WSC_J050         SPC_S100         1520.62    0.02       6.1        24.95      0          0
WSC_L100         WSC_J100         WSC_J010         457.86     0.02       4.78       8.93       0          0
SPC_L_B036       SPC_B036         SPC_S100         756.78     0.1        0          0          0          0

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff    Qexpon
Gated
;;-------------- ---------------- ---------------- ---------- --------------- ---------------- ---------- --
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ACR_S100_OUTLET  ACR_S100         ACR_J200         0          TABULAR/DEPTH   ACR_S100_Outlet             NO
PHI_AKRON_OUTLET PHI_S200         PHI_J020         0          TABULAR/DEPTH   PHI_AKRON_OUTLET            NO
PHI_YOSEMITE_OUTLET PHI_S100         PHI_J015         0          TABULAR/DEPTH   PHI_S100_OUTLET
NO
SPC_S100_OUTLET  SPC_S100         SPC_J035         0          TABULAR/DEPTH   SPC_S100_OUTLET             NO
WCE_S100_OUTLET  WCE_S100         WCE_J045         0          TABULAR/DEPTH   WCE_S100_OUTLET             NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
ACR_L_B005       DUMMY        0                0          0          0          1
ACR_L_B010       DUMMY        0                0          0          0          1
ACR_L_B015       DUMMY        0                0          0          0          1
ACR_L_B020       DUMMY        0                0          0          0          1
ACR_L_B025       DUMMY        0                0          0          0          1
ACR_L_B030       DUMMY        0                0          0          0          1
ACR_L_B035       DUMMY        0                0          0          0          1
ACR_L_B040       DUMMY        0                0          0          0          1
ACR_L_B045       DUMMY        0                0          0          0          1
ACR_L_B050       DUMMY        0                0          0          0          1
ACR_L_B055       DUMMY        0                0          0          0          1
ACR_L005         IRREGULAR    ACR_L005         0          0          0          1
ACR_L010         DUMMY        0                0          0          0          1
ACR_L035         IRREGULAR    ACR_L035         0          0          0          1
ACR_L045         CIRCULAR     6                0          0          1          1
ACR_L045_OF      IRREGULAR    Street_100ft     0          0          0          1
ACR_L050         DUMMY        0                0          0          0          1
ACR_L055         CIRCULAR     6                0          0          1          1
ACR_L055_OF      IRREGULAR    Street_070ft     0          0          0          1
ACR_L060         IRREGULAR    Street_070ft     0          0          0          1
ACR_L065         CIRCULAR     4                0          0          1          1
ACR_L070         IRREGULAR    Street_070ft     0          0          0          1
ACR_L075         CIRCULAR     4                0          0          1          1
ACR_L075_OF      TRAPEZOIDAL  5                1          20         20         1
ACR_L080         IRREGULAR    ACR_L080         0          0          0          1
ACR_L085         IRREGULAR    TRE_L035         0          0          0          1
ACR_L200         CIRCULAR     4.5              0          0          1          1
ACR_L200_OF      TRAPEZOIDAL  5                1          20         20         1
ACR_L204         DUMMY        0                0          0          0          1
ACR_L205         CIRCULAR     4                0          0          1          1
ACR_L210         CIRCULAR     4                0          0          1          1
ACR_L215         RECT_CLOSED  4                3          0          0          1
ACR_L220         CIRCULAR     4                0          0          1          1
ACR_L225         CIRCULAR     4                0          0          1          1
ACR_L230         CIRCULAR     4                0          0          1          1
ACR_L230_OF      TRAPEZOIDAL  5                1          20         20         1
ACR_L235         CIRCULAR     4                0          0          1          1
ACR_L240         CIRCULAR     4                0          0          1          1
ACR_L245         CIRCULAR     4                0          0          1          1
ACR_L250         CIRCULAR     4                0          0          1          1
DFA_L_B042       DUMMY        0                0          0          0          1
DFA_L_B043       DUMMY        0                0          0          0          1
DFA_L005         IRREGULAR    Street_050ft     0          0          0          1
DFA_L010         IRREGULAR    Street_050ft     0          0          0          1
FHP_L_B005       DUMMY        0                0          0          0          1
FHP_L_B010       DUMMY        0                0          0          0          1
FHP_L_B015       DUMMY        0                0          0          0          1
FHP_L_B020       DUMMY        0                0          0          0          1
FHP_L_B025       DUMMY        0                0          0          0          1
FHP_L_B030       DUMMY        0                0          0          0          1
FHP_L_B035       DUMMY        0                0          0          0          1
FHP_L_B040       DUMMY        0                0          0          0          1
FHP_L_B045       DUMMY        0                0          0          0          1
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FHP_L_B050	DUMMY	0	0	0	0	1
FHP_L_B055	DUMMY	0	0	0	0	1
FHP_L_B060	DUMMY	0	0	0	0	1
FHP_L_B065	DUMMY	0	0	0	0	1
FHP_L_B070	DUMMY	0	0	0	0	1
FHP_L_B075	DUMMY	0	0	0	0	1
FHP_L_B080	DUMMY	0	0	0	0	1
FHP_L_B085	DUMMY	0	0	0	0	1
FHP_L_B090	DUMMY	0	0	0	0	1
FHP_L_B095	DUMMY	0	0	0	0	1
FHP_L_B100	DUMMY	0	0	0	0	1
FHP_L_B105	DUMMY	0	0	0	0	1
FHP_L005	IRREGULAR	FHP_L005	0	0	0	1
FHP_L010	IRREGULAR	FHP_L010	0	0	0	1
FHP_L015	RECT_CLOSED	6	8	0	0	1
FHP_L015_OF	TRAPEZOIDAL	5	100	3	3	1
FHP_L020	IRREGULAR	FHP_L020	0	0	0	1
FHP_L025	CIRCULAR	1.5	0	0	0	1
FHP_L025_OF	IRREGULAR	Street_070ft	0	0	0	1
FHP_L030	IRREGULAR	FHP_L030	0	0	0	1
FHP_L035	DUMMY	0	0	0	0	1
FHP_L040	IRREGULAR	FHP_L040	0	0	0	1
FHP_L045	IRREGULAR	FHP_L045	0	0	0	1
FHP_L050	DUMMY	0	0	0	0	1
FHP_L055	IRREGULAR	FHP_L055	0	0	0	1
FHP_L060	CIRCULAR	1.5	1.5	0	0	1
FHP_L065	CIRCULAR	1.5	1.5	0	0	1
FHP_L065_OF	TRAPEZOIDAL	5	1	20	20	1
FHP_L100	CIRCULAR	3.5	3.5	0	0	1
FHP_L105	CIRCULAR	3.5	3.5	0	0	1
FHP_L110	CIRCULAR	3.5	3.5	0	0	1
FHP_L115	CIRCULAR	3.5	3.5	0	0	1
FHP_L120	CIRCULAR	3.5	3.5	0	0	1
FHP_L125	CIRCULAR	3.5	3.5	0	0	1
FHP_L125_OF	DUMMY	0	0	0	0	1
FHP_L130	CIRCULAR	1.5	1.5	0	0	1
FHP_L130_OF	DUMMY	0	0	0	0	1
FHP_L140	CIRCULAR	1	0	0	0	1
FHP_L145	CIRCULAR	1	0	0	0	1
FHP_L145_OF	IRREGULAR	Street_070ft	0	0	0	1
FHP_L150	CIRCULAR	3	3	0	0	1
FHP_L150_OF	TRAPEZOIDAL	5	1	20	20	1
FHP_L160	CIRCULAR	1.5	1.5	0	0	1
FHP_L165	CIRCULAR	1.75	1.75	0	0	1
FHP_L165_OF	IRREGULAR	Street_060ft	0	0	0	1
FHP_L200	CIRCULAR	1	0	0	0	1
FHP_L200_OF	IRREGULAR	Street_035ft	0	0	0	1
FHP_L205	DUMMY	0	0	0	0	1
FHP_L205_OF	IRREGULAR	Street_035ft	0	0	0	1
FHP_L210	CIRCULAR	1.5	0	0	0	1
FHP_L210_OF	IRREGULAR	Street_030ft	0	0	0	1
FHP_L215	IRREGULAR	Street_035ft	0	0	0	1
FHP_L215_OF	DUMMY	0	0	0	0	1
HFL_L115_OF	TRAPEZOIDAL	1	1	50	50	1
HFT_L_B005	DUMMY	0	0	0	0	1
HFT_L_B010	DUMMY	0	0	0	0	1
HFT_L_B015	DUMMY	0	0	0	0	1
HFT_L_B020	DUMMY	0	0	0	0	1
HFT_L_B025	DUMMY	0	0	0	0	1
HFT_L_B030	DUMMY	0	0	0	0	1
HFT_L005	DUMMY	0	0	0	0	1
HFT_L010	IRREGULAR	HFT_L010	0	0	0	1
HFT_L100	CIRCULAR	3.5	0	0	0	1
HFT_L100_OF	DUMMY	0	0	0	0	1
HFT_L101_OF	IRREGULAR	Street_060ft	0	0	0	1
HFT_L105	CIRCULAR	3.5	0	0	0	1
HFT_L110	CIRCULAR	3	0	0	0	1
HFT_L110_OF	DUMMY	0	0	0	0	1
HFT_L115	CIRCULAR	3	0	0	0	1
HFT_L120	CIRCULAR	2.5	0	0	0	1
HFT_L125	CIRCULAR	2.5	0	0	0	1
HFT_L130	CIRCULAR	2.5	0	0	0	1
HFT_L135	CIRCULAR	2.5	0	0	0	1
HFT_L140	CIRCULAR	2.5	0	0	0	1
HFT_L145	CIRCULAR	2.5	0	0	0	1
HFT_L145_OF	IRREGULAR	Street_070ft	0	0	0	1
HFT_L150	CIRCULAR	2.5	0	0	0	1
HFT_L155	CIRCULAR	3	0	0	0	1
HFT_L160	CIRCULAR	3	0	0	0	1
HFT_L165	CIRCULAR	3	0	0	0	1
HFT_L170	CIRCULAR	2.5	0	0	0	1
HOM_L_B005	DUMMY	0	0	0	0	1
HOM_L_B010	DUMMY	0	0	0	0	1
HOM_L_B015	DUMMY	0	0	0	0	1
HOM_L010	IRREGULAR	HOM_L010	0	0	0	1
HOM_L010_OF	IRREGULAR	Street_030ft	0	0	0	1
HOM_L015	IRREGULAR	HOM_L015	0	0	0	1
HOM_L020	CIRCULAR	4	4	0	0	1
HOM_L021	DUMMY	0	0	0	0	1
HOM_L023	IRREGULAR	HOM_L023	0	0	0	1
HOM_L025	CIRCULAR	4	4	0	0	1
HOM_L025_OF	TRAPEZOIDAL	5	1	20	20	1
HOM_L030	CIRCULAR	3.5	3.5	0	0	1
HOM_L030_OF	IRREGULAR	Street_030ft	0	0	0	1
HOM_L035	CIRCULAR	3.5	3.5	0	0	1
HOM_L040	CIRCULAR	3.5	3.5	0	0	1
HOM_L045	CIRCULAR	3.5	3.5	0	0	1
HOM_L045_OF	IRREGULAR	Street_030ft	0	0	0	1
HOM_L050	CIRCULAR	4	4	0	0	1
HOM_L055	CIRCULAR	3	3	0	0	1
HOM_L060	CIRCULAR	3	3	0	0	1
HOM_L065	CIRCULAR	3	3	0	0	1
HOM_L070	CIRCULAR	2.5	2.5	0	0	1
HOM_L070_OF	IRREGULAR	Street_030ft	0	0	0	1
HOM_L075	CIRCULAR	2.75	2.75	0	0	1
HOM_L075_OF	IRREGULAR	Street_030ft	0	0	0	1
HOM_L080	CIRCULAR	2.5	2.5	0	0	1
HOM_L085	CIRCULAR	2.5	2.5	0	0	1
HOM_L090	CIRCULAR	2	2	0	0	1
HOM_L090_OF	TRAPEZOIDAL	5	1	20	20	1
JAM_L_B005	DUMMY	0	0	0	0	1
JAM_L_B010	DUMMY	0	0	0	0	1
JAM_L005	IRREGULAR	JAM_L005	0	0	0	1
JAM_L010	CIRCULAR	4	4	0	0	1
JAM_L015	CIRCULAR	4	4	0	0	1
KET_L_B005	DUMMY	0	0	0	0	1
KET_L_B010	DUMMY	0	0	0	0	1
KET_L005	HORIZ_ELLIPSE	2	4	0	0	1
KET_L005_OF	TRAPEZOIDAL	2	20	10	10	1
KET_L010	CIRCULAR	2.5	2.5	0	0	1
KET_L010_OF	TRAPEZOIDAL	5.00	1	20	20	1
KET_L011	CIRCULAR	2.5	2.5	0	0	1
KET_L015	CIRCULAR	2.5	2.5	0	0	1
KET_L015_OF	TRAPEZOIDAL	5	1	20	20	1
KET_L020	IRREGULAR	KET_L020	0	0	0	1
KET_L025	CIRCULAR	3	3	0	0	1
KET_L030	CIRCULAR	3	3	0	0	1
KET_L035	HORIZ_ELLIPSE	2.5	4	0	0	1
KET_L035_OF	IRREGULAR	Street_030ft	0	0	0	1
KET_L040	IRREGULAR	KET_L040	0	0	0	1
PHI_L_B100	DUMMY	0	0	0	0	1
PHI_L_B105	DUMMY	0	0	0	0	1
PHI_L_B110	DUMMY	0	0	0	0	1
PHI_L_B115	DUMMY	0	0	0	0	1

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PHI_L010	IRREGULAR	PHI_L010	0	0	0	1
PHI_L015	IRREGULAR	PHI_L015	0	0	0	1
PHI_L020	DUMMY	0	0	0	0	1
SPC_L_B005	DUMMY	0	0	0	0	1
SPC_L_B010	DUMMY	0	0	0	0	1
SPC_L_B015	DUMMY	0	0	0	0	1
SPC_L_B020	DUMMY	0	0	0	0	1
SPC_L_B025	DUMMY	0	0	0	0	1
SPC_L_B030	DUMMY	0	0	0	0	1
SPC_L_B035	DUMMY	0	0	0	0	1
SPC_L_B040	DUMMY	0	0	0	0	1
SPC_L_B045	DUMMY	0	0	0	0	1
SPC_L_B046	DUMMY	0	0	0	0	1
SPC_L_B050	DUMMY	0	0	0	0	1
SPC_L_B055	DUMMY	0	0	0	0	1
SPC_L_B060	DUMMY	0	0	0	0	1
SPC_L_B065	DUMMY	0	0	0	0	1
SPC_L_B070	DUMMY	0	0	0	0	1
SPC_L_B080	DUMMY	0	0	0	0	1
SPC_L_B085	DUMMY	0	0	0	0	1
SPC_L_B090	DUMMY	0	0	0	0	1
SPC_L_B095	DUMMY	0	0	0	0	1
SPC_L_B100	DUMMY	0	0	0	0	1
SPC_L_B105	DUMMY	0	0	0	0	1
SPC_L_B110	DUMMY	0	0	0	0	1
SPC_L005	IRREGULAR	SPC_L005	0	0	0	1
SPC_L010	IRREGULAR	SPC_L010	0	0	0	1
SPC_L015	IRREGULAR	SPC_L015	0	0	0	1
SPC_L020	RECT_CLOSED	10	10	0	0	1
SPC_L020_OF	TRAPEZOIDAL	5.00	1	20	20	1
SPC_L025	IRREGULAR	SPC_L025	0	0	0	1
SPC_L030	IRREGULAR	SPC_L030	0	0	0	1
SPC_L035	IRREGULAR	SPC_L035	0	0	0	1
SPC_L040	CIRCULAR	9	0	0	1	1
SPC_L040_OF	TRAPEZOIDAL	5.00	1	20	20	1
SPC_L045	IRREGULAR	SPC_L045	0	0	0	1
SPC_L050	CIRCULAR	9	0	0	0	1
SPC_L055	CIRCULAR	9	0	0	1	1
SPC_L060	CIRCULAR	9	0	0	1	1
SPC_L065	CIRCULAR	7	0	0	1	1
SPC_L070	CIRCULAR	5	0	0	1	1
SPC_L075	CIRCULAR	5	0	0	1	1
SPC_L080	CIRCULAR	5	0	0	1	1
SPC_L085	CIRCULAR	5	0	0	1	1
SPC_L090	CIRCULAR	5	0	0	1	1
SPC_L090_OF	TRAPEZOIDAL	2	1	20	20	1
SPC_L095	CIRCULAR	5	0	0	1	1
SPC_L100	CIRCULAR	5	0	0	1	1
SPC_L105	CIRCULAR	5	0	0	1	1
SPC_L110	CIRCULAR	5	0	0	1	1
SPC_L110_OF	TRAPEZOIDAL	1	1	20	20	1
SPC_L115	CIRCULAR	5	0	0	1	1
SPC_L115_OF	TRAPEZOIDAL	1	1	20	20	1
SPC_L120	IRREGULAR	SPC_L120	0	0	0	1
SPC_L125	IRREGULAR	SPC_L125	0	0	0	1
SPC_L130	IRREGULAR	SPC_L130	0	0	0	1
SPC_L135	IRREGULAR	SPC_L135	0	0	0	1
SPC_L140	IRREGULAR	SPC_L140	0	0	0	1
SPC_L150	CIRCULAR	4.5	0	0	0	1
SPC_L155	CIRCULAR	4.5	0	0	0	1
SPC_L160	CIRCULAR	4.5	0	0	0	1
SPC_L165	IRREGULAR	Street_100ft	0	0	0	1
SPC_L170	IRREGULAR	Street_100ft	0	0	0	1
SPC_L200	CIRCULAR	6.5	0	0	1	1
SPC_L205	CIRCULAR	6.5	0	0	1	1
SPC_L210	CIRCULAR	6.5	0	0	1	1
SPC_L215	CIRCULAR	6.5	0	0	1	1
SPC_L220	CIRCULAR	6.5	0	0	1	1
SPC_L225	CIRCULAR	4.5	0	0	1	1
SPC_L230	CIRCULAR	4.5	0	0	1	1
SPC_L235	CIRCULAR	4.5	0	0	1	1
SPC_L240	CIRCULAR	4.5	0	0	1	1
SPC_L240_OF	TRAPEZOIDAL	5.00	1	20	20	1
SPC_L245	CIRCULAR	4.5	0	0	1	1
SPC_L250	CIRCULAR	4.5	0	0	1	1
SPC_L250_OF	TRAPEZOIDAL	5	1	20	20	1
SPC_L255	IRREGULAR	SPC_L255	0	0	0	1
SPC_L260	CIRCULAR	4	0	0	1	1
SPC_L265	CIRCULAR	4.5	0	0	1	1
SPC_L265_OF	IRREGULAR	Street_100ft	0	0	0	1
SPC_L270	IRREGULAR	SPC_L270	0	0	0	1
SPC_L275	CIRCULAR	3.5	0	0	1	1
SPC_L300	CIRCULAR	4	4	0	0	1
SPC_L305	CIRCULAR	2.5	2.5	0	0	1
SPC_L310	CIRCULAR	2.5	2.5	0	0	1
SPC_L310_OF	IRREGULAR	Street_035ft	0	0	0	1
SPC_L400	CIRCULAR	3.5	0	0	0	1
SPC_L405	CIRCULAR	3.5	0	0	0	1
SPC_L410	CIRCULAR	3.5	0	0	0	1
TRE_L_B005	DUMMY	0	0	0	0	1
TRE_L_B010	DUMMY	0	0	0	0	1
TRE_L_B015	DUMMY	0	0	0	0	1
TRE_L_B020	DUMMY	0	0	0	0	1
TRE_L_B025	DUMMY	0	0	0	0	1
TRE_L005	CIRCULAR	4	0	0	1	1
TRE_L010	CIRCULAR	4	0	0	1	1
TRE_L010_OF	TRAPEZOIDAL	3	1	20	20	1
TRE_L015	CIRCULAR	3.5	0	0	1	1
TRE_L020	CIRCULAR	3.5	0	0	1	1
TRE_L020_OF	TRAPEZOIDAL	10	1	20	20	1
TRE_L025	CIRCULAR	3.5	0	0	1	1
TRE_L030	CIRCULAR	3.5	0	0	1	1
TRE_L030_OF	TRAPEZOIDAL	10	1	20	20	1
TRE_L035	IRREGULAR	TRE_L035	0	0	0	1
TRE_L040	TRAPEZOIDAL	5	5	4	4	1
TRE_L045	CIRCULAR	3.5	0	0	0	1
TRE_L045_OF	IRREGULAR	Street_100ft	0	0	0	1
TRE_L200	CIRCULAR	3.5	0	0	0	1
TRE_L205	CIRCULAR	3.5	0	0	0	1
TRE_L205_OF	IRREGULAR	Street_050ft	0	0	0	1
TRE_L210	CIRCULAR	3	0	0	0	1
TRE_L215	CIRCULAR	3	0	0	0	1
TRE_L220	CIRCULAR	3	0	0	0	1
TRE_L225	CIRCULAR	3	0	0	0	1
TRE_L225_OF	IRREGULAR	Street_050ft	0	0	0	1
WCE_L_B005	DUMMY	0	0	0	0	1
WCE_L_B010	DUMMY	0	0	0	0	1
WCE_L_B015	DUMMY	0	0	0	0	1
WCE_L_B020	DUMMY	0	0	0	0	1
WCE_L_B025	DUMMY	0	0	0	0	1
WCE_L_B029	DUMMY	0	0	0	0	1
WCE_L_B030	DUMMY	0	0	0	0	1
WCE_L_B035	DUMMY	0	0	0	0	1
WCE_L_B040	DUMMY	0	0	0	0	1
WCE_L_B045	DUMMY	0	0	0	0	1
WCE_L_B050	DUMMY	0	0	0	0	1
WCE_L_B055	DUMMY	0	0	0	0	1
WCE_L_B056	DUMMY	0	0	0	0	1
WCE_L_B060	DUMMY	0	0	0	0	1
WCE_L_B065	DUMMY	0	0	0	0	1
WCE_L_B070	DUMMY	0	0	0	0	1
WCE_L_B075	DUMMY	0	0	0	0	1
WCE_L_B080	DUMMY	0	0	0	0	1
WCE_L_B085	DUMMY	0	0	0	0	1

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WCE_L_B090      DUMMY        0              0          0          0          1
WCE_L_B095      DUMMY        0              0          0          0          1
WCE_L_B100      DUMMY        0              0          0          0          1
WCE_L_B105      DUMMY        0              0          0          0          1
WCE_L_B110      DUMMY        0              0          0          0          1
WCE_L005        IRREGULAR    WCE_L005       0          0          0          1
WCE_L010        IRREGULAR    WCE_L010       0          0          0          1
WCE_L015        IRREGULAR    WCE_L015       0          0          0          1
WCE_L020        IRREGULAR    WCE_L020       0          0          0          1
WCE_L025        IRREGULAR    WCE_L025       0          0          0          1
WCE_L030        CIRCULAR     7.5            7.5        0          0          1
WCE_L035        IRREGULAR    WCE_L035       0          0          0          1
WCE_L040        IRREGULAR    WCE_L040       0          0          0          1
WCE_L045        IRREGULAR    WCE_L045       0          0          0          1
WCE_L064        DUMMY        0              0          0          0          1
WCE_L065        CIRCULAR     6              6          0          0          1
WCE_L070        CIRCULAR     6              6          0          0          1
WCE_L075        CIRCULAR     6              6          0          0          1
WCE_L080        CIRCULAR     6              6          0          0          1
WCE_L085        CIRCULAR     6              6          0          0          1
WCE_L085_OF     IRREGULAR    Street_040ft   0          0          0          1
WCE_L090        CIRCULAR     5.5            5.5        0          0          1
WCE_L095        CIRCULAR     5.5            5.5        0          0          1
WCE_L095_OF     IRREGULAR    Street_040ft   0          0          0          1
WCE_L100        CIRCULAR     5.5            5.5        0          0          1
WCE_L105        CIRCULAR     4.5            4.5        0          0          1
WCE_L110        CIRCULAR     4              4          0          0          1
WCE_L115        CIRCULAR     4              4          0          0          1
WCE_L115_OF     IRREGULAR    Street_100ft   0          0          0          1
WCE_L120        HORIZ_ELLIPSE 4              5          0          0          1
WCE_L125        HORIZ_ELLIPSE 4              5          0          0          1
WCE_L125_OF     IRREGULAR    Street_100ft   0          0          0          1
WCE_L130        CIRCULAR     4              4          0          0          1
WCE_L135        CIRCULAR     4              4          0          0          1
WCE_L135_OF     IRREGULAR    Street_100ft   0          0          0          1
WCE_L140        CIRCULAR     4              0          0          0          1
WCE_L145        CIRCULAR     3.5            0          0          0          1
WCE_L150        CIRCULAR     3              0          0          0          1
WCE_L155        CIRCULAR     3              0          0          0          1
WCE_L160        CIRCULAR     3              0          0          0          1
WCE_L165        CIRCULAR     3              0          0          0          1
WCE_L170        CIRCULAR     3              0          0          0          1
WCE_L170_OF     IRREGULAR    Street_100ft   0          0          0          1
WCE_L180        CIRCULAR     3              0          0          0          1
WCE_L180_OF     IRREGULAR    Street_040ft   0          0          0          1
WCE_L200        DUMMY        0              0          0          0          1
WCE_L205        CIRCULAR     2.5            2.5        0          0          1
WCE_L210        CIRCULAR     2.5            2.5        0          0          1
WCE_L215        CIRCULAR     2.5            2.5        0          0          1
WCE_L220        CIRCULAR     2.5            2.5        0          0          1
WCE_L220_OF     TRAPEZOIDAL  5              1          20         20         1
WCE_L225        CIRCULAR     2.5            2.5        0          0          1
WCE_L225_OF     TRAPEZOIDAL  5.00           1          20         20         1
WCE_L230        IRREGULAR    WCE_L270       0          0          0          1
WCE_L300        IRREGULAR    Street_060ft   0          0          0          1
WCE_L400        CIRCULAR     2              0          0          0          1
WCE_L405        CIRCULAR     2              0          0          0          1
WCE_L410        CIRCULAR     2              0          0          0          1
WCE_L410_OF     TRAPEZOIDAL  5              1          20         20         1
WCE_L415        IRREGULAR    Street_050ft   0          0          0          1
WCE_L420        IRREGULAR    Street_050ft   0          0          0          1
WSC_L_B005      DUMMY        0              0          0          0          1
WSC_L_B010      DUMMY        0              0          0          0          1
WSC_L_B015      DUMMY        0              0          0          0          1
WSC_L_B020      DUMMY        0              0          0          0          1
WSC_L_B025      DUMMY        0              0          0          0          1
WSC_L005        IRREGULAR    WSC_L005       0          0          0          1
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WSC_L010        IRREGULAR    WSC_L010       0          0          0          1
WSC_L015        CIRCULAR     5              5          0          0          1
WSC_L020        CIRCULAR     5              5          0          0          1
WSC_L025        IRREGULAR    WSC_L025       0          0          0          1
WSC_L030        CIRCULAR     4              0          0          1          1
WSC_L035        CIRCULAR     4              0          0          1          1
WSC_L040        CIRCULAR     4              0          0          1          1
WSC_L045        CIRCULAR     4              0          0          1          1
WSC_L050        CIRCULAR     4              0          0          1          1
WSC_L050_OF     TRAPEZOIDAL  5              1          20         20         1
WSC_L100        IRREGULAR    Street_030ft   0          0          0          1
SPC_L_B036      DUMMY        0              0          0          0          1

[TRANSECTS]
;;Transect Data in HEC-2 format
;
[OMITTED DUE TO LENGTH]


[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
;Sam's Club Detention Basin Rating Curve
ACR_S100_Outlet  Rating     0.0        0.0
ACR_S100_Outlet             0.5        0.0
ACR_S100_Outlet             1.0        0.1
ACR_S100_Outlet             1.5        0.3
ACR_S100_Outlet             2.0        0.4
ACR_S100_Outlet             2.5        0.6
ACR_S100_Outlet             3.0        0.9
ACR_S100_Outlet             3.5        1.1
ACR_S100_Outlet             4.0        1.4
ACR_S100_Outlet             4.5        1.7
ACR_S100_Outlet             5.0        2.0
ACR_S100_Outlet             5.5        2.3
ACR_S100_Outlet             6.0        2.6
ACR_S100_Outlet             6.5        3.0
ACR_S100_Outlet             7.0        3.4
ACR_S100_Outlet             7.5        3.8
ACR_S100_Outlet             8.0        4.1
ACR_S100_Outlet             8.5        4.6
ACR_S100_Outlet             8.9        4.8
ACR_S100_Outlet             9.0        7.4
ACR_S100_Outlet             9.5        31.2
ACR_S100_Outlet             10.0       67.0
ACR_S100_Outlet             10.5       79.6
ACR_S100_Outlet             11.0       90.4
ACR_S100_Outlet             11.5       191.9
ACR_S100_Outlet             12.0       368.8
ACR_S100_Outlet             12.5       594.5
ACR_S100_Outlet             13.0       859.8
;
PHI_S100_OUTLET  Rating     0          0.0
PHI_S100_OUTLET             0.8        0.1
PHI_S100_OUTLET             1.0        0.9
PHI_S100_OUTLET             1.5        7.5
PHI_S100_OUTLET             2.0        19.6
PHI_S100_OUTLET             2.5        36.5
PHI_S100_OUTLET             3.0        58.0
PHI_S100_OUTLET             3.5        83.8
PHI_S100_OUTLET             4.0        117.1
PHI_S100_OUTLET             4.5        131.4
PHI_S100_OUTLET             5.0        144.3
PHI_S100_OUTLET             5.5        156.2
PHI_S100_OUTLET             6.0        167.2
PHI_S100_OUTLET             6.5        177.6
PHI_S100_OUTLET             7.0        187.3
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PHI_S100_OUTLET             7.5         196.6
PHI_S100_OUTLET             8.0         205.5
PHI_S100_OUTLET             8.5         205.5
PHI_S100_OUTLET             9.0         223.3
PHI_S100_OUTLET             9.5         283.1
PHI_S100_OUTLET             10.0        366.8
PHI_S100_OUTLET             10.5        468.2
PHI_S100_OUTLET             11.0        584.4
;
;Pond inv = 5778
PHI_AKRON_OUTLET Rating     0.0         0.0
PHI_AKRON_OUTLET            0.5         30.3
PHI_AKRON_OUTLET            1.0         171.6
PHI_AKRON_OUTLET            1.5         315.2
PHI_AKRON_OUTLET            2.0         360.0
PHI_AKRON_OUTLET            2.5         384.0
PHI_AKRON_OUTLET            3.0         408.0
PHI_AKRON_OUTLET            3.5         432.0
PHI_AKRON_OUTLET            4.0         456.0
PHI_AKRON_OUTLET            5.0         480.0
;
;Inv = 5705.17
SPC_S100_OUTLET  Rating     0           0.0
SPC_S100_OUTLET             0.33        1.4
SPC_S100_OUTLET             0.83        7.1
SPC_S100_OUTLET             1.33        16.7
SPC_S100_OUTLET             1.83        29.6
SPC_S100_OUTLET             2.33        34.8
SPC_S100_OUTLET             2.83        55.1
SPC_S100_OUTLET             3.33        69.8
SPC_S100_OUTLET             3.83        81.9
SPC_S100_OUTLET             4.33        92.4
SPC_S100_OUTLET             4.83        101.8
SPC_S100_OUTLET             5.33        110.4
SPC_S100_OUTLET             5.83        118.4
SPC_S100_OUTLET             6.33        125.9
SPC_S100_OUTLET             6.83        133.0
SPC_S100_OUTLET             7.33        139.7
SPC_S100_OUTLET             7.83        146.1
SPC_S100_OUTLET             8.33        152.2
SPC_S100_OUTLET             8.83        158.1
SPC_S100_OUTLET             9.33        163.8
SPC_S100_OUTLET             9.83        169.3
SPC_S100_OUTLET             10.33       174.6
SPC_S100_OUTLET             10.83       179.8
SPC_S100_OUTLET             11.33       184.8
SPC_S100_OUTLET             11.83       189.7
SPC_S100_OUTLET             12.33       194.5
SPC_S100_OUTLET             12.83       199.1
SPC_S100_OUTLET             13.33       203.7
SPC_S100_OUTLET             13.83       208.1
SPC_S100_OUTLET             14.33       212.5
SPC_S100_OUTLET             14.83       216.7
SPC_S100_OUTLET             15.33       257.7
SPC_S100_OUTLET             15.83       329.0
SPC_S100_OUTLET             16.33       420.1
SPC_S100_OUTLET             16.83       488.4
SPC_S100_OUTLET             17.33       522.4
SPC_S100_OUTLET             17.83       541.7
SPC_S100_OUTLET             18.33       550.1
SPC_S100_OUTLET             18.83       558.5
SPC_S100_OUTLET             19.33       566.7
SPC_S100_OUTLET             19.83       574.9
SPC_S100_OUTLET             20.33       582.9
SPC_S100_OUTLET             20.83       590.8
SPC_S100_OUTLET             21.33       598.6
SPC_S100_OUTLET             21.83       606.2
SPC_S100_OUTLET             22.33       613.8
SPC_S100_OUTLET             22.83       621.3
SPC_S100_OUTLET             23.33       628.8
SPC_S100_OUTLET             23.83       636.1
SPC_S100_OUTLET             24.33       643.3
SPC_S100_OUTLET             24.83       650.5
SPC_S100_OUTLET             25.33       657.6
SPC_S100_OUTLET             25.83       664.6
SPC_S100_OUTLET             26.33       671.5
SPC_S100_OUTLET             26.83       678.4
SPC_S100_OUTLET             27.33       685.2
SPC_S100_OUTLET             27.83       691.9
;
WCE_S100_OUTLET  Rating     0.00        0
WCE_S100_OUTLET             0.60        0.00
WCE_S100_OUTLET             1.00        0.65
WCE_S100_OUTLET             1.50        1.60
WCE_S100_OUTLET             2.00        2.90
WCE_S100_OUTLET             2.50        4.34
WCE_S100_OUTLET             3.00        6.06
WCE_S100_OUTLET             3.50        7.86
WCE_S100_OUTLET             4.00        9.91
WCE_S100_OUTLET             4.50        12.01
WCE_S100_OUTLET             5.00        14.34
WCE_S100_OUTLET             5.50        16.71
WCE_S100_OUTLET             6.00        19.28
WCE_S100_OUTLET             6.11        19.85
WCE_S100_OUTLET             6.50        27.25
WCE_S100_OUTLET             7.00        28.00
WCE_S100_OUTLET             7.50        28.00
WCE_S100_OUTLET             8.00        28.00
WCE_S100_OUTLET             8.50        28.00
WCE_S100_OUTLET             9.00        28.00
WCE_S100_OUTLET             9.50        28.00
WCE_S100_OUTLET             10.00       28.00
WCE_S100_OUTLET             10.14       29.00
WCE_S100_OUTLET             10.50       51.40
WCE_S100_OUTLET             11.00       114.40
WCE_S100_OUTLET             11.50       149.19
WCE_S100_OUTLET             12.00       169.58
WCE_S100_OUTLET             12.50       173.32
WCE_S100_OUTLET             13.00       176.96
WCE_S100_OUTLET             13.48       180.38
WCE_S100_OUTLET             13.50       182.26
WCE_S100_OUTLET             14.00       281.49
WCE_S100_OUTLET             14.50       455.24
WCE_S100_OUTLET             15.00       677.97
;
;Sam's Club Detention Basin
ACR_S100_Storage Storage    0           0
ACR_S100_Storage            1           3736
ACR_S100_Storage            2           14506
ACR_S100_Storage            3           25105
ACR_S100_Storage            4           39455
ACR_S100_Storage            5           50060
ACR_S100_Storage            6           57979
ACR_S100_Storage            7           64800
ACR_S100_Storage            8           71971
ACR_S100_Storage            9           78052
ACR_S100_Storage            10          78052
ACR_S100_Storage            11          78052
ACR_S100_Storage            12          78052
ACR_S100_Storage            13          78052
;
PHI_S100_Storage Storage    0           29962
PHI_S100_Storage            1           35438
PHI_S100_Storage            2           39056
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PHI_S100_Storage           3          42247
PHI_S100_Storage           4          45338
PHI_S100_Storage           5          48540
PHI_S100_Storage           6          52081
PHI_S100_Storage           7          56096
PHI_S100_Storage           8          56096
PHI_S100_Storage           9          56096
PHI_S100_Storage           10         56096
PHI_S100_Storage           11         56096
;
PHI_S200_Storage Storage   0          17058
PHI_S200_Storage           1          22803
PHI_S200_Storage           2          26142
PHI_S200_Storage           3          29483
PHI_S200_Storage           4          29483
PHI_S200_Storage           5          29483
;
;Spring Creek Pond, invert = 5705.17'.
SPC_S100_Storage Storage   0          0
SPC_S100_Storage           4.83       7386
SPC_S100_Storage           5.83       18869
SPC_S100_Storage           6.83       26607
SPC_S100_Storage           7.83       31986
SPC_S100_Storage           8.83       35764
SPC_S100_Storage           9.83       38981
SPC_S100_Storage           10.83      42001
SPC_S100_Storage           11.83      45120
SPC_S100_Storage           12.83      48163
SPC_S100_Storage           13.83      51098
SPC_S100_Storage           14.83      53951
SPC_S100_Storage           15.83      56725
SPC_S100_Storage           16.83      59546
SPC_S100_Storage           17.83      62566
SPC_S100_Storage           18.83      66070
SPC_S100_Storage           19.83      70632
SPC_S100_Storage           20.83      76494
SPC_S100_Storage           21.83      90522
SPC_S100_Storage           22.83      102624
SPC_S100_Storage           23.83      112373
SPC_S100_Storage           24.83      121115
SPC_S100_Storage           25.83      129600
SPC_S100_Storage           26.83      139312
SPC_S100_Storage           27.83      155128
SPC_S100_Storage           28.83      155128
;
WCE_S100_Storage Storage   0          0
WCE_S100_Storage           6          0.1
WCE_S100_Storage           6.1        63137
WCE_S100_Storage           7          67009
WCE_S100_Storage           8          70679
WCE_S100_Storage           9          74633
WCE_S100_Storage           10         78986
WCE_S100_Storage           11         83855
WCE_S100_Storage           12         89051
WCE_S100_Storage           13         93985
WCE_S100_Storage           13.5       96323
WCE_S100_Storage           14         98661
WCE_S100_Storage           15         98661

[REPORT]
;;Reporting Options
INPUT      YES
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
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[MAP]
DIMENSIONS 3161076.045 1624506.446 3176346.464 1640546.972
Units      Feet

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
ACR_B005         3169917.094        1632963.898
ACR_B010         3170805.267        1632537.737
ACR_B015         3169833.455        1631881.598
ACR_B020         3169487.941        1631328.281
ACR_B025         3168714.045        1631023.342
ACR_B030         3168778.624        1630347.757
ACR_B035         3169223.840        1629872.760
ACR_B040         3169231.115        1628831.082
ACR_B045         3170317.824        1629600.289
ACR_B050         3170176.342        1628254.151
ACR_B055         3169900.471        1627284.103
ACR_J005         3170347.598        1632966.188
ACR_J010         3170356.297        1632852.666
ACR_J035         3170275.895        1631961.776
ACR_J050         3170123.672        1631275.978
ACR_J060         3170047.028        1630484.629
ACR_J065         3170061.619        1630389.007
ACR_J070         3170060.445        1630036.268
ACR_J080         3170120.433        1628738.858
ACR_J085         3169946.752        1627817.972
ACR_J204         3169950.321        1630574.150
ACR_J205         3169953.339        1630516.997
ACR_J210         3169957.889        1630482.343
ACR_J215         3169958.485        1630442.243
ACR_J220         3169959.097        1630396.855
ACR_J225         3170000.632        1630258.189
ACR_J235         3169954.548        1629921.841
ACR_J240         3169815.656        1629922.481
ACR_J245         3169813.230        1629850.063
ACR_J250         3169659.436        1629658.134
DFA_B042         3167686.597        1633921.929
DFA_B043         3167606.089        1633137.720
DFA_J005         3167925.983        1634244.506
DFA_J010         3167928.121        1633522.370
FHP_B005         3164341.684        1637977.805
FHP_B010         3163393.462        1637375.165
FHP_B015         3163955.245        1637271.320
FHP_B020         3164697.480        1637344.523
FHP_B025         3164123.780        1636997.238
FHP_B030         3163759.747        1636453.429
FHP_B035         3163710.635        1635507.282
FHP_B040         3164218.142        1635470.745
FHP_B045         3162802.419        1635649.797
FHP_B050         3162790.634        1635009.059
FHP_B055         3162558.923        1635492.079
FHP_B060         3161871.732        1635762.972
FHP_B065         3161900.382        1634963.645
FHP_B070         3162146.627        1633509.378
FHP_B075         3162520.792        1633317.709
FHP_B080         3163298.487        1634803.207
FHP_B085         3162794.118        1633624.360
FHP_B090         3163897.369        1633708.082
FHP_B095         3162952.589        1632118.668
FHP_B100         3163796.753        1632272.846
FHP_B105         3163568.857        1631338.010
FHP_J005         3164523.838        1637851.830
FHP_J010         3164342.179        1637172.449
FHP_J020         3163891.623        1635791.815
FHP_J030         3163851.381        1635304.950
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FHP_J035	3163816.776	1635218.934
FHP_J040	3163414.953	1634224.025
FHP_J045	3163337.225	1632706.787
FHP_J055	3163506.039	1631662.679
FHP_J060	3163555.164	1631630.035
FHP_J100	3163383.702	1635459.094
FHP_J105	3163085.206	1635421.932
FHP_J110	3163039.199	1635421.470
FHP_J115	3162713.955	1635418.207
FHP_J140	3162601.819	1634231.834
FHP_J160	3162621.274	1635538.120
FHP_J215	3162646.859	1635382.159
HFT_B005	3162000.007	1639087.194
HFT_B010	3161011.322	1638341.878
HFT_B015	3162049.441	1637684.022
HFT_B020	3162903.435	1637754.204
HFT_B025	3162048.618	1636475.572
HFT_B030	3160916.919	1636705.316
HFT_J005	3162572.146	1638798.124
HFT_J010	3161837.128	1638440.378
HFT_J101	3162677.402	1638556.299
HFT_J105	3162642.713	1638504.617
HFT_J120	3162642.713	1638099.639
HFT_J125	3162644.376	1637667.218
HFT_J130	3162648.534	1637302.155
HFT_J135	3162647.703	1636996.134
HFT_J140	3162647.703	1636848.945
HFT_J150	3162463.989	1636848.535
HFT_J155	3162303.831	1636847.902
HFT_J160	3162232.298	1636848.535
HFT_J165	3161777.145	1636848.535
HFT_J170	3161517.601	1636848.535
HOM_B005	3166078.693	1638042.190
HOM_B010	3167007.371	1638376.424
HOM_B015	3167541.428	1637918.154
HOM_B020	3168589.393	1637786.020
HOM_J005	3165703.270	1637836.155
HOM_J010	3165947.574	1637737.745
HOM_J015	3166437.784	1637822.359
HOM_J020	3166455.767	1637827.031
HOM_J035	3166673.245	1637756.767
HOM_J040	3166743.361	1637478.776
HOM_J050	3166754.278	1637364.808
HOM_J055	3166861.329	1637363.658
HOM_J060	3167023.281	1637424.781
HOM_J080	3167686.515	1637478.888
HOM_J085	3167886.770	1637537.901
JAM_B005	3170692.666	1636325.241
JAM_B010	3171680.710	1637230.789
JAM_J005	3170899.744	1636698.491
JAM_J010	3170881.021	1636772.591
JAM_J015	3170919.350	1636865.495
KET_B005	3172640.340	1635394.223
KET_B010	3173527.485	1634211.025
KET_J011	3172478.479	1635492.974
KET_J020	3172650.961	1635174.439
KET_J025	3172737.071	1635021.450
KET_J030	3172772.780	1635001.340
KET_J040	3173070.558	1634572.176
PHI_B100	3172853.980	1631857.249
PHI_B105	3172986.141	1633228.203
PHI_B110	3173535.372	1633290.154
PHI_B115	3174797.491	1633547.363
PHI_J010	3172409.307	1631957.341
PHI_J015	3173102.596	1632609.669
PHI_J020	3173939.586	1632986.216
SPC_B005	3166032.871	1635799.044
SPC_B010	3166204.769	1635019.773
SPC_B015	3164621.542	1633436.879
SPC_B020	3166464.021	1634559.520
SPC_B025	3166529.347	1633886.296
SPC_B030	3167108.495	1632393.339
SPC_B035	3167041.285	1631330.211
SPC_B036	3167064.644	1630856.949
SPC_B040	3166888.740	1630338.772
SPC_B045	3166094.356	1629630.689
SPC_B046	3165783.067	1628355.954
SPC_B050	3166253.607	1628303.404
SPC_B055	3166847.174	1627652.482
SPC_B060	3167486.172	1627526.319
SPC_B065	3167986.062	1625605.344
SPC_B070	3166337.469	1626985.987
SPC_B080	3167157.735	1625282.153
SPC_B085	3166544.869	1625140.906
SPC_B090	3165667.994	1627596.763
SPC_B095	3167962.115	1629170.615
SPC_B100	3168958.885	1627466.138
SPC_B105	3167626.324	1628355.482
SPC_B110	3168527.100	1626512.197
SPC_J005	3165712.366	1636186.483
SPC_J010	3165831.595	1635244.337
SPC_J015	3165850.555	1634441.830
SPC_J025	3166022.849	1634318.611
SPC_J030	3166512.968	1632708.852
SPC_J035	3166589.279	1631669.412
SPC_J045	3166502.867	1629778.537
SPC_J050	3166490.704	1629722.099
SPC_J055	3166488.066	1629707.346
SPC_J060	3166482.741	1629681.408
SPC_J065	3166468.071	1629609.002
SPC_J070	3166424.792	1629577.309
SPC_J075	3166390.767	1629350.142
SPC_J080	3166354.201	1629153.833
SPC_J085	3166338.808	1629024.534
SPC_J095	3166508.625	1628586.542
SPC_J100	3166554.758	1628538.001
SPC_J105	3166609.358	1628453.100
SPC_J120	3166800.904	1627999.004
SPC_J125	3167192.015	1627590.393
SPC_J130	3167660.906	1626075.937
SPC_J135	3166525.659	1627414.983
SPC_J140	3166883.849	1625835.625
SPC_J150	3166551.086	1628350.202
SPC_J155	3166463.215	1628302.083
SPC_J160	3166354.423	1628245.595
SPC_J165	3165904.418	1627573.479
SPC_J170	3166222.162	1625627.422
SPC_J200	3166876.251	1629610.667
SPC_J205	3167179.192	1629573.067
SPC_J210	3167180.991	1629498.159
SPC_J215	3167183.225	1629404.942
SPC_J220	3167192.244	1629308.981
SPC_J225	3167195.225	1629282.551
SPC_J230	3167326.958	1629102.083
SPC_J235	3167525.284	1629077.383
SPC_J245	3167755.823	1628885.690
SPC_J255	3168484.883	1627881.190
SPC_J260	3167195.450	1628724.433
SPC_J270	3167966.887	1627212.212
SPC_J275	3168209.969	1627208.973
SPC_J300	3165836.432	1634391.755
SPC_J305	3165728.203	1634383.255
SPC_J400	3166333.877	1628518.372
SPC_J405	3166278.829	1628522.433

SWMM Future Input File

SPC_J410	3166263.886	1628495.181
TRE_B005	3168405.149	1633814.397
TRE_B010	3168469.305	1632639.235
TRE_B015	3169330.356	1632791.626
TRE_B020	3168886.482	1631985.310
TRE_B025	3168389.624	1631714.000
TRE_J005	3169747.984	1633772.407
TRE_J015	3169466.414	1633309.003
TRE_J025	3169482.921	1633221.913
TRE_J035	3169185.923	1631919.186
TRE_J040	3169107.428	1631707.304
TRE_J200	3169211.286	1634366.256
TRE_J210	3168951.086	1633650.706
TRE_J215	3168913.633	1633224.924
TRE_J220	3168828.931	1633043.580
WCE_B005	3169427.828	1635491.375
WCE_B010	3168963.825	1636169.801
WCE_B015	3169811.358	1637249.935
WCE_B020	3169519.729	1636273.730
WCE_B025	3169923.279	1635914.728
WCE_B029	3170395.029	1635198.287
WCE_B030	3171105.023	1635107.819
WCE_B035	3171207.130	1636152.855
WCE_B040	3171855.528	1636135.695
WCE_B045	3171857.535	1635089.454
WCE_B050	3171962.828	1635883.955
WCE_B055	3172578.618	1636459.230
WCE_B056	3173180.091	1636426.828
WCE_B060	3173466.528	1636923.158
WCE_B065	3173746.045	1636535.155
WCE_B070	3173817.689	1635752.230
WCE_B075	3173405.398	1635301.484
WCE_B080	3173992.363	1634939.793
WCE_B085	3174157.695	1634406.634
WCE_B090	3175014.400	1635260.268
WCE_B095	3174324.393	1636695.795
WCE_B100	3174668.188	1637297.431
WCE_B105	3175462.684	1636267.085
WCE_B110	3175652.354	1636591.888
WCE_J005	3168814.775	1635455.554
WCE_J010	3169187.329	1635613.212
WCE_J015	3169967.355	1635582.578
WCE_J020	3170432.762	1635627.384
WCE_J025	3171617.442	1635643.504
WCE_J030	3171711.201	1635653.238
WCE_J035	3171986.691	1635722.763
WCE_J040	3172357.783	1635772.829
WCE_J045	3173029.949	1635967.598
WCE_J064	3173725.858	1636029.608
WCE_J065	3173742.103	1636056.895
WCE_J070	3173766.126	1636086.394
WCE_J075	3173919.956	1636006.090
WCE_J080	3173957.819	1635986.356
WCE_J090	3174299.922	1635882.698
WCE_J100	3174389.955	1636027.984
WCE_J105	3174361.965	1636148.342
WCE_J110	3174366.767	1636165.001
WCE_J120	3174452.570	1636441.492
WCE_J130	3174504.237	1636758.960
WCE_J140	3174595.882	1636868.974
WCE_J145	3174594.146	1636993.743
WCE_J150	3174669.987	1636993.132
WCE_J155	3174777.275	1636993.016
WCE_J160	3174894.196	1636994.251
WCE_J165	3175074.873	1637005.720
WCE_J200	3168802.649	1635486.719
WCE_J205	3168724.279	1635666.296
WCE_J210	3168669.476	1635803.047
WCE_J215	3168653.602	1635930.125
WCE_J230	3169123.162	1636849.955
WCE_J300	3173158.999	1636893.308
WCE_J400	3173527.244	1635898.929
WCE_J405	3173637.515	1635631.130
WCE_J415	3173182.912	1635643.159
WCE_J420	3173593.451	1634639.324
WSC_B005	3165917.554	1633333.146
WSC_B010	3165091.427	1631956.427
WSC_B015	3164523.270	1632055.066
WSC_B020	3164746.881	1631395.383
WSC_B025	3164899.480	1630651.083
WSC_J005	3165770.078	1634252.671
WSC_J010	3165381.829	1632547.220
WSC_J015	3165343.959	1632516.375
WSC_J020	3165275.094	1632410.207
WSC_J025	3165284.428	1631677.399
WSC_J030	3165297.681	1631538.436
WSC_J035	3165296.600	1631477.884
WSC_J040	3165265.704	1631155.947
WSC_J045	3165213.079	1631162.378
WSC_J100	3164969.850	1632482.934
FHP_J050	3163356.849	1632615.155
ACR_0005	3170282.710	1633461.871
ACR_0010	3171398.892	1631575.368
DFA_B005	3164597.383	1639284.310
DFA_B010	3165201.952	1639565.603
DFA_B015	3165903.084	1639179.350
DFA_B020	3166968.719	1637082.264
DFA_B021	3165301.287	1636634.807
DFA_B025	3167317.588	1636563.214
DFA_B030	3168074.891	1636303.689
DFA_B035	3168233.195	1635627.505
DFA_B040	3166734.721	1636197.326
DFA_B041	3167411.188	1635584.676
DFA_B045	3168462.052	1634844.391
DFA_B046	3168981.102	1634980.536
DFA_B050	3170020.653	1634110.961
DFA_B051	3171606.428	1634100.085
DFA_B055	3171173.625	1633179.224
DFA_B060	3169331.422	1633876.963
DFA_B061	3172023.370	1632183.992
DFA_B065	3171084.281	1632345.340
DFA_B100	3163245.241	1638473.502
DFA_B105	3163717.385	1638033.920
DFA_0005	3167922.158	1635403.874
FHP_0005	3164767.277	1638350.625
HFT_0005	3162728.030	1638504.402
HFT_0010	3162729.048	1638803.749
HOM_0005	3165180.764	1638069.113
HOM_0010	3165919.878	1636874.429
PHI_0005	3172163.715	1631715.407
SPC_0005	3165915.407	1636632.750
TRE_0005	3169843.754	1633848.716
TRE_0010	3169222.682	1634513.471
WCE_0005	3168454.666	1635359.878
ACR_J045	3170192.530	1631454.407
ACR_J055	3170128.902	1630812.826
ACR_J075	3170090.208	1630001.080
ACR_J200	3169941.183	1630780.919
ACR_J230	3170003.512	1629947.763
FHP_J015	3164368.523	1636800.843
FHP_J065	3163664.825	1631544.668
FHP_J120	3162622.784	1635393.534
FHP_J125	3162605.617	1635389.923
FHP_J130	3162612.438	1635323.813

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FHP_J135         3162612.130        1634404.051
FHP_J145         3162563.184        1634203.918
FHP_J150         3162448.578        1635386.887
FHP_J165         3162540.336        1635578.001
FHP_J200         3163376.613        1635443.266
FHP_J205         3163059.328        1635392.148
FHP_J210         3163084.239        1635302.788
HFT_J100         3162678.471        1638504.617
HFT_J110         3162603.629        1638504.617
HFT_J115         3162455.608        1638502.954
HFT_J145         3162557.045        1636849.168
HOM_J025         3166479.537        1637835.707
HOM_J030         3166637.280        1637877.637
HOM_J045         3166747.908        1637381.474
HOM_J065         3167138.248        1637419.329
HOM_J070         3167396.740        1637425.392
HOM_J075         3167632.750        1637423.893
HOM_J090         3167939.573        1637552.724
KET_J005         3172412.079        1635582.168
KET_J010         3172433.412        1635555.061
KET_J015         3172495.573        1635435.343
KET_J035         3172822.845        1634913.504
SPC_J020         3165886.279        1634367.460
SPC_J040         3166649.783        1630685.100
SPC_J090         3166352.376        1628583.800
SPC_J110         3166598.459        1628378.184
SPC_J115         3166576.091        1628224.517
SPC_J240         3167614.092        1629018.317
SPC_J250         3167707.397        1628821.661
SPC_J265         3167277.358        1628562.309
SPC_J310         3165253.312        1634376.690
TRE_J010         3169544.935        1633468.218
TRE_J020         3169475.400        1633264.951
TRE_J030         3169491.843        1633191.288
TRE_J045         3169104.946        1631548.412
TRE_J205         3169117.165        1634108.806
TRE_J225         3168755.520        1632975.174
WCE_J085         3174155.523        1635901.036
WCE_J095         3174415.241        1635909.005
WCE_J115         3174436.945        1636401.908
WCE_J125         3174472.361        1636521.006
WCE_J135         3174507.255        1636861.468
WCE_J170         3175328.712        1636988.653
WCE_J180         3174554.880        1636414.063
WCE_J220         3168665.348        1635948.606
WCE_J225         3168694.701        1636000.155
WCE_J410         3173723.318        1635357.497
WSC_J050         3165229.685        1630930.793
ACR_S100         3169914.153        1630669.475
PHI_S100         3173370.531        1632756.170
PHI_S200         3174089.039        1633063.801
SPC_S100         3166651.850        1631458.186
WCE_S100         3173461.634        1636007.723

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
[OMITTED DUE TO LENGTH]


[BACKDROP]
FILE       "P:\P\18045WCT\08_Hydrology\SWMM\SWMM_Background.jpg"
DIMENSIONS 3160193.070 1624269.995 3176653.360 1640821.804
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SWMM Future 100-yr Output File

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*************************************************************
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 ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2005 00:00:00
Ending Date .............. 01/01/2005 04:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Routing Time Step ........ 1.00 sec


**************************        Volume         Volume
Flow Routing Continuity        acre-feet       10^6 gal
**************************       ---------      ---------
Dry Weather Inflow .......           0.000          0.000
Wet Weather Inflow .......           0.000          0.000
Groundwater Inflow .......           0.000          0.000
RDII Inflow ..............           0.000          0.000
External Inflow ..........         485.289        158.139
External Outflow .........         472.002        153.809
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 ......          13.904          4.531
Continuity Error (%) .....          -0.127


*********************************
Highest Flow Instability Indexes
*********************************
Link WCE_L040 (3)
Link WCE_L045 (2)
Link WCE_L035 (2)
Link WCE_S100_OUTLET (2)
Link WCE_L030 (2)


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     1.00 sec
Average Time Step           :     1.00 sec
Maximum Time Step           :     1.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.01
Percent Not Converging      :     0.00


******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days	Time of Max Occurrence hr:min	Reported Max Depth Feet
ACR_B005	JUNCTION	0.00	0.00	5714.35	0	00:00	0.00
ACR_B010	JUNCTION	0.00	0.00	5714.46	0	00:00	0.00
ACR_B015	JUNCTION	0.00	0.00	5710.37	0	00:00	0.00
ACR_B020	JUNCTION	0.00	0.00	5757.84	0	00:00	0.00
ACR_B025	JUNCTION	0.00	0.00	5765.93	0	00:00	0.00
ACR_B030	JUNCTION	0.00	0.00	5785.83	0	00:00	0.00
ACR_B035	JUNCTION	0.00	0.00	5789.02	0	00:00	0.00
ACR_B040	JUNCTION	0.00	0.00	5828.52	0	00:00	0.00
ACR_B045	JUNCTION	0.00	0.00	5785.12	0	00:00	0.00
ACR_B050	JUNCTION	0.00	0.00	5833.81	0	00:00	0.00
ACR_B055	JUNCTION	0.00	0.00	5862.34	0	00:00	0.00
ACR_J005	JUNCTION	1.20	2.79	5690.40	0	00:39	2.79
ACR_J010	JUNCTION	0.74	1.67	5691.47	0	00:39	1.67
ACR_J035	JUNCTION	1.40	3.54	5717.34	0	00:38	3.54
ACR_J050	JUNCTION	6.51	8.61	5732.61	0	00:38	8.60
ACR_J060	JUNCTION	0.00	0.00	5758.66	0	00:00	0.00
ACR_J065	JUNCTION	0.70	2.49	5756.67	0	00:37	2.49
ACR_J070	JUNCTION	0.00	0.00	5766.43	0	00:00	0.00
ACR_J080	JUNCTION	0.36	1.00	5799.78	0	00:37	1.00
ACR_J085	JUNCTION	5.00	5.00	5832.87	0	00:00	5.00
ACR_J204	JUNCTION	0.64	1.97	5746.97	0	00:40	1.97
ACR_J205	JUNCTION	0.64	1.97	5748.07	0	00:40	1.97
ACR_J210	JUNCTION	0.58	2.10	5749.06	0	00:40	2.10
ACR_J215	JUNCTION	0.64	2.10	5749.86	0	00:40	2.10
ACR_J220	JUNCTION	0.62	1.90	5750.56	0	00:40	1.90
ACR_J225	JUNCTION	0.62	1.90	5753.46	0	00:39	1.90
ACR_J235	JUNCTION	0.62	1.90	5760.78	0	00:39	1.90
ACR_J240	JUNCTION	0.62	1.90	5763.56	0	00:39	1.90
ACR_J245	JUNCTION	0.62	1.90	5765.01	0	00:39	1.90
ACR_J250	JUNCTION	6.00	6.00	5774.02	0	00:00	6.00
DFA_B042	JUNCTION	0.00	0.00	5718.38	0	00:00	0.00
DFA_B043	JUNCTION	0.00	0.00	5740.12	0	00:00	0.00
DFA_J005	JUNCTION	0.22	0.62	5698.27	0	00:35	0.62
DFA_J010	JUNCTION	0.20	0.60	5725.40	0	00:33	0.60
FHP_B005	JUNCTION	0.00	0.00	5596.40	0	00:00	0.00
FHP_B010	JUNCTION	0.00	0.00	5662.10	0	00:00	0.00
FHP_B015	JUNCTION	0.00	0.00	5636.53	0	00:00	0.00
FHP_B020	JUNCTION	0.00	0.00	5632.99	0	00:00	0.00
FHP_B025	JUNCTION	0.00	0.00	5645.68	0	00:00	0.00
FHP_B030	JUNCTION	0.00	0.00	5646.03	0	00:00	0.00
FHP_B035	JUNCTION	0.00	0.00	5658.67	0	00:00	0.00
FHP_B040	JUNCTION	0.00	0.00	5661.43	0	00:00	0.00
FHP_B045	JUNCTION	0.00	0.00	5683.43	0	00:00	0.00
FHP_B050	JUNCTION	0.00	0.00	5682.74	0	00:00	0.00
FHP_B055	JUNCTION	0.00	0.00	5694.82	0	00:00	0.00
FHP_B060	JUNCTION	0.00	0.00	5732.39	0	00:00	0.00
FHP_B065	JUNCTION	0.00	0.00	5716.12	0	00:00	0.00
FHP_B070	JUNCTION	0.00	0.00	5740.94	0	00:00	0.00
FHP_B075	JUNCTION	0.00	0.00	5742.70	0	00:00	0.00
FHP_B080	JUNCTION	0.00	0.00	5678.99	0	00:00	0.00
FHP_B085	JUNCTION	0.00	0.00	5722.41	0	00:00	0.00
FHP_B090	JUNCTION	0.00	0.00	5713.35	0	00:00	0.00
FHP_B095	JUNCTION	0.00	0.00	5763.17	0	00:00	0.00
FHP_B100	JUNCTION	0.00	0.00	5763.75	0	00:00	0.00
FHP_B105	JUNCTION	0.00	0.00	5782.48	0	00:00	0.00
FHP_J005	JUNCTION	1.08	2.87	5598.42	0	00:46	2.87
FHP_J010	JUNCTION	21.75	21.75	5624.82	0	00:00	21.75
FHP_J020	JUNCTION	11.31	13.69	5646.91	0	00:43	13.69
FHP_J030	JUNCTION	12.20	12.20	5657.87	0	00:00	12.20
FHP_J035	JUNCTION	0.64	1.97	5654.71	0	00:41	1.97

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FHP_J040	JUNCTION	0.66	1.97	5686.46	0	00:38	1.97
FHP_J045	JUNCTION	0.54	1.60	5721.11	0	00:36	1.60
FHP_J055	JUNCTION	0.22	0.65	5768.75	0	00:23	0.64
FHP_J060	JUNCTION	0.44	1.50	5772.60	0	00:23	1.50
FHP_J100	JUNCTION	3.01	3.70	5662.21	0	00:27	3.70
FHP_J105	JUNCTION	1.46	2.23	5669.48	0	00:37	2.23
FHP_J110	JUNCTION	1.33	2.83	5671.88	0	01:25	2.83
FHP_J115	JUNCTION	1.36	2.83	5674.54	0	01:25	2.83
FHP_J140	JUNCTION	0.60	0.79	5712.76	0	02:26	0.79
FHP_J160	JUNCTION	0.52	1.18	5681.31	0	01:29	1.18
FHP_J215	JUNCTION	0.18	0.83	5684.57	0	00:41	0.83
HFT_B005	JUNCTION	0.00	0.00	5643.10	0	00:00	0.00
HFT_B010	JUNCTION	0.00	0.00	5689.70	0	00:00	0.00
HFT_B015	JUNCTION	0.00	0.00	5656.80	0	00:00	0.00
HFT_B020	JUNCTION	0.00	0.00	5649.59	0	00:00	0.00
HFT_B025	JUNCTION	0.00	0.00	5713.65	0	00:00	0.00
HFT_B030	JUNCTION	0.00	0.00	5725.20	0	00:00	0.00
HFT_J005	JUNCTION	0.46	1.33	5607.63	0	00:41	1.33
HFT_J010	JUNCTION	0.46	1.33	5631.32	0	00:40	1.33
HFT_J101	JUNCTION	10.14	10.57	5625.67	0	00:42	10.57
HFT_J105	JUNCTION	1.55	3.50	5609.90	0	00:31	3.50
HFT_J120	JUNCTION	3.25	4.27	5621.06	0	00:45	4.27
HFT_J125	JUNCTION	0.82	1.76	5639.70	0	00:45	1.76
HFT_J130	JUNCTION	0.90	2.05	5662.95	0	00:45	2.05
HFT_J135	JUNCTION	0.96	2.28	5671.95	0	00:45	2.28
HFT_J140	JUNCTION	1.05	2.05	5676.99	0	00:44	2.05
HFT_J150	JUNCTION	0.63	1.35	5683.79	0	00:37	1.35
HFT_J155	JUNCTION	0.33	1.05	5686.11	0	00:37	1.05
HFT_J160	JUNCTION	0.32	1.02	5687.13	0	00:37	1.02
HFT_J165	JUNCTION	0.39	1.28	5692.08	0	00:36	1.28
HFT_J170	JUNCTION	0.39	1.28	5693.91	0	00:36	1.28
HOM_B005	JUNCTION	0.00	0.00	5628.87	0	00:00	0.00
HOM_B010	JUNCTION	0.00	0.00	5676.46	0	00:00	0.00
HOM_B015	JUNCTION	0.00	0.00	5683.90	0	00:00	0.00
HOM_B020	JUNCTION	0.00	0.00	5720.79	0	00:00	0.00
HOM_J005	JUNCTION	0.47	1.10	5604.16	0	00:40	1.10
HOM_J010	JUNCTION	0.46	1.11	5608.14	0	00:39	1.11
HOM_J015	JUNCTION	6.28	7.25	5634.07	0	00:37	7.25
HOM_J020	JUNCTION	1.84	4.10	5631.91	0	00:27	4.10
HOM_J035	JUNCTION	1.08	2.62	5636.00	0	00:31	2.51
HOM_J040	JUNCTION	1.37	3.60	5639.32	0	00:31	3.60
HOM_J050	JUNCTION	1.02	2.38	5638.79	0	00:41	2.38
HOM_J055	JUNCTION	0.69	1.92	5641.23	0	00:40	1.92
HOM_J060	JUNCTION	0.64	1.82	5645.91	0	00:40	1.82
HOM_J080	JUNCTION	0.61	1.18	5677.02	0	00:26	1.15
HOM_J085	JUNCTION	1.00	2.10	5681.95	0	00:26	2.10
JAM_B005	JUNCTION	0.00	0.00	5722.72	0	00:00	0.00
JAM_B010	JUNCTION	0.00	0.00	5776.68	0	00:00	0.00
JAM_J005	JUNCTION	0.57	1.87	5729.39	0	00:37	1.87
JAM_J010	JUNCTION	0.75	1.87	5731.50	0	00:37	1.87
JAM_J015	JUNCTION	0.44	1.41	5738.95	0	00:37	1.41
KET_B005	JUNCTION	0.00	0.00	5760.19	0	00:00	0.00
KET_B010	JUNCTION	0.00	0.00	5807.67	0	00:00	0.00
KET_J011	JUNCTION	0.82	2.60	5733.41	0	00:28	2.60
KET_J020	JUNCTION	0.43	1.71	5746.18	0	00:35	1.71
KET_J025	JUNCTION	0.43	1.71	5754.11	0	00:35	1.71
KET_J030	JUNCTION	0.43	1.69	5756.02	0	00:35	1.69
KET_J040	JUNCTION	0.30	1.09	5771.21	0	00:35	1.09
PHI_B100	JUNCTION	0.00	0.00	5771.50	0	00:00	0.00
PHI_B105	JUNCTION	0.00	0.00	5782.87	0	00:00	0.00
PHI_B110	JUNCTION	0.00	0.00	5778.70	0	00:00	0.00
PHI_B115	JUNCTION	0.00	0.00	5825.12	0	00:00	0.00
PHI_J010	JUNCTION	0.93	2.07	5724.97	0	00:54	2.07
PHI_J015	JUNCTION	0.73	1.68	5752.30	0	00:54	1.68
PHI_J020	JUNCTION	0.00	0.00	5772.56	0	00:00	0.00
SPC_B005	JUNCTION	0.00	0.00	5632.71	0	00:00	0.00
SPC_B010	JUNCTION	0.00	0.00	5654.64	0	00:00	0.00

SPC_B015	JUNCTION	0.00	0.00	5738.19	0	00:00	0.00
SPC_B020	JUNCTION	0.00	0.00	5721.10	0	00:00	0.00
SPC_B025	JUNCTION	0.00	0.00	5702.92	0	00:00	0.00
SPC_B030	JUNCTION	0.00	0.00	5716.24	0	00:00	0.00
SPC_B035	JUNCTION	0.00	0.00	5749.66	0	00:00	0.00
SPC_B036	JUNCTION	0.00	0.00	5748.12	0	00:00	0.00
SPC_B040	JUNCTION	0.00	0.00	5756.23	0	00:00	0.00
SPC_B045	JUNCTION	0.00	0.00	5793.00	0	00:00	0.00
SPC_B046	JUNCTION	0.00	0.00	5810.46	0	00:00	0.00
SPC_B050	JUNCTION	0.00	0.00	5803.08	0	00:00	0.00
SPC_B055	JUNCTION	0.00	0.00	5794.23	0	00:00	0.00
SPC_B060	JUNCTION	0.00	0.00	5843.86	0	00:00	0.00
SPC_B065	JUNCTION	0.00	0.00	5921.23	0	00:00	0.00
SPC_B070	JUNCTION	0.00	0.00	5847.11	0	00:00	0.00
SPC_B080	JUNCTION	0.00	0.00	5936.87	0	00:00	0.00
SPC_B085	JUNCTION	0.00	0.00	5924.96	0	00:00	0.00
SPC_B090	JUNCTION	0.00	0.00	5842.90	0	00:00	0.00
SPC_B095	JUNCTION	0.00	0.00	5802.57	0	00:00	0.00
SPC_B100	JUNCTION	0.00	0.00	5867.35	0	00:00	0.00
SPC_B105	JUNCTION	0.00	0.00	5820.66	0	00:00	0.00
SPC_B110	JUNCTION	0.00	0.00	5887.43	0	00:00	0.00
SPC_J005	JUNCTION	2.50	5.30	5619.37	0	00:51	5.30
SPC_J010	JUNCTION	2.72	5.48	5634.25	0	00:50	5.48
SPC_J015	JUNCTION	15.82	16.09	5653.70	0	00:42	16.09
SPC_J025	JUNCTION	7.99	9.93	5658.00	0	00:54	9.93
SPC_J030	JUNCTION	11.85	13.70	5699.43	0	01:09	13.70
SPC_J035	JUNCTION	1.85	3.70	5708.67	0	01:06	3.70
SPC_J045	JUNCTION	1.51	4.34	5750.91	0	00:43	4.33
SPC_J050	JUNCTION	1.55	4.46	5752.56	0	00:43	4.46
SPC_J055	JUNCTION	11.00	11.00	5759.40	0	00:00	11.00
SPC_J060	JUNCTION	20.22	20.53	5769.63	0	00:51	20.52
SPC_J065	JUNCTION	1.33	3.90	5754.40	0	00:51	3.90
SPC_J070	JUNCTION	1.37	4.06	5755.86	0	00:51	4.06
SPC_J075	JUNCTION	1.37	4.06	5760.56	0	00:51	4.06
SPC_J080	JUNCTION	1.37	4.03	5764.73	0	00:51	4.03
SPC_J085	JUNCTION	1.37	4.03	5767.43	0	00:51	4.03
SPC_J095	JUNCTION	1.28	3.73	5779.53	0	00:47	3.73
SPC_J100	JUNCTION	1.28	3.70	5780.90	0	00:47	3.70
SPC_J105	JUNCTION	1.28	3.70	5783.00	0	00:47	3.70
SPC_J120	JUNCTION	4.02	4.58	5794.83	0	00:44	4.58
SPC_J125	JUNCTION	6.00	6.00	5813.11	0	00:00	6.00
SPC_J130	JUNCTION	0.22	0.57	5871.82	0	00:42	0.57
SPC_J135	JUNCTION	7.00	7.00	5816.49	0	00:00	7.00
SPC_J140	JUNCTION	10.00	10.00	5909.60	0	00:00	10.00
SPC_J150	JUNCTION	0.66	1.61	5784.81	0	00:50	1.61
SPC_J155	JUNCTION	0.66	1.60	5787.10	0	00:50	1.60
SPC_J160	JUNCTION	10.65	10.86	5800.76	0	00:51	10.86
SPC_J165	JUNCTION	0.25	0.46	5834.98	0	00:48	0.46
SPC_J170	JUNCTION	0.20	0.46	5884.42	0	00:40	0.46
SPC_J200	JUNCTION	1.09	3.23	5769.38	0	00:42	3.23
SPC_J205	JUNCTION	1.09	3.23	5773.97	0	00:42	3.23
SPC_J210	JUNCTION	2.14	4.28	5775.10	0	00:42	4.28
SPC_J215	JUNCTION	1.09	3.23	5776.50	0	00:42	3.23
SPC_J220	JUNCTION	9.66	9.66	5786.55	0	00:00	9.66
SPC_J225	JUNCTION	0.80	2.32	5780.21	0	00:44	2.32
SPC_J230	JUNCTION	0.81	2.32	5788.60	0	00:44	2.32
SPC_J235	JUNCTION	0.97	3.35	5791.83	0	00:43	3.35
SPC_J245	JUNCTION	0.81	2.66	5792.39	0	00:42	2.65
SPC_J255	JUNCTION	4.42	4.42	5833.64	0	00:00	4.42
SPC_J260	JUNCTION	1.01	2.78	5797.06	0	00:44	2.78
SPC_J270	JUNCTION	0.50	1.59	5849.30	0	00:38	1.59
SPC_J275	JUNCTION	5.50	5.50	5859.24	0	00:00	5.50
SPC_J300	JUNCTION	7.64	9.02	5648.69	0	00:49	9.02
SPC_J305	JUNCTION	0.73	2.05	5654.20	0	00:49	2.05
SPC_J400	JUNCTION	0.41	1.52	5775.28	0	00:36	1.52
SPC_J405	JUNCTION	0.42	1.56	5776.95	0	00:36	1.56
SPC_J410	JUNCTION	0.42	1.56	5777.44	0	00:36	1.56

SWMM Future 100-yr Output File

TRE_B005	JUNCTION	0.00	0.00	5704.78	0	00:00	0.00
TRE_B010	JUNCTION	0.00	0.00	5742.57	0	00:00	0.00
TRE_B015	JUNCTION	0.00	0.00	5716.79	0	00:00	0.00
TRE_B020	JUNCTION	0.00	0.00	5757.76	0	00:00	0.00
TRE_B025	JUNCTION	0.00	0.00	5773.57	0	00:00	0.00
TRE_J005	JUNCTION	0.51	1.73	5672.89	0	00:39	1.73
TRE_J015	JUNCTION	0.54	1.85	5691.47	0	00:38	1.85
TRE_J025	JUNCTION	0.71	1.84	5693.30	0	01:10	1.84
TRE_J035	JUNCTION	0.19	0.62	5731.83	0	00:35	0.62
TRE_J040	JUNCTION	0.20	0.57	5750.22	0	00:36	0.57
TRE_J200	JUNCTION	0.85	2.78	5659.86	0	00:38	2.78
TRE_J210	JUNCTION	0.57	2.19	5687.96	0	00:36	2.19
TRE_J215	JUNCTION	0.57	2.19	5703.00	0	00:36	2.19
TRE_J220	JUNCTION	0.55	2.07	5709.92	0	00:36	2.07
WCE_B005	JUNCTION	0.00	0.00	5692.50	0	00:00	0.00
WCE_B010	JUNCTION	0.00	0.00	5695.23	0	00:00	0.00
WCE_B015	JUNCTION	0.00	0.00	5748.20	0	00:00	0.00
WCE_B020	JUNCTION	0.00	0.00	5701.04	0	00:00	0.00
WCE_B025	JUNCTION	0.00	0.00	5705.89	0	00:00	0.00
WCE_B029	JUNCTION	0.00	0.00	5710.14	0	00:00	0.00
WCE_B030	JUNCTION	0.00	0.00	5718.21	0	00:00	0.00
WCE_B035	JUNCTION	0.00	0.00	5731.79	0	00:00	0.00
WCE_B040	JUNCTION	0.00	0.00	5750.45	0	00:00	0.00
WCE_B045	JUNCTION	0.00	0.00	5743.17	0	00:00	0.00
WCE_B050	JUNCTION	0.00	0.00	5727.92	0	00:00	0.00
WCE_B055	JUNCTION	0.00	0.00	5759.49	0	00:00	0.00
WCE_B056	JUNCTION	0.00	0.00	5770.49	0	00:00	0.00
WCE_B060	JUNCTION	0.00	0.00	5810.44	0	00:00	0.00
WCE_B065	JUNCTION	0.00	0.00	5775.68	0	00:00	0.00
WCE_B070	JUNCTION	0.00	0.00	5770.61	0	00:00	0.00
WCE_B075	JUNCTION	0.00	0.00	5802.34	0	00:00	0.00
WCE_B080	JUNCTION	0.00	0.00	5807.72	0	00:00	0.00
WCE_B085	JUNCTION	0.00	0.00	5837.53	0	00:00	0.00
WCE_B090	JUNCTION	0.00	0.00	5832.14	0	00:00	0.00
WCE_B095	JUNCTION	0.00	0.00	5800.61	0	00:00	0.00
WCE_B100	JUNCTION	0.00	0.00	5835.23	0	00:00	0.00
WCE_B105	JUNCTION	0.00	0.00	5812.34	0	00:00	0.00
WCE_B110	JUNCTION	0.00	0.00	5825.79	0	00:00	0.00
WCE_J005	JUNCTION	1.60	3.16	5659.46	0	00:50	3.16
WCE_J010	JUNCTION	1.61	3.16	5669.99	0	00:49	3.16
WCE_J015	JUNCTION	1.50	3.02	5681.70	0	00:49	3.02
WCE_J020	JUNCTION	1.43	2.87	5698.76	0	01:03	2.87
WCE_J025	JUNCTION	1.72	3.64	5714.01	0	01:01	3.64
WCE_J030	JUNCTION	1.71	3.64	5718.49	0	01:01	3.64
WCE_J035	JUNCTION	1.24	2.39	5719.41	0	01:00	2.39
WCE_J040	JUNCTION	1.25	2.39	5723.91	0	01:00	2.39
WCE_J045	JUNCTION	15.06	15.30	5751.89	0	00:37	15.30
WCE_J064	JUNCTION	12.35	12.88	5758.95	0	00:38	12.88
WCE_J065	JUNCTION	1.62	4.87	5751.56	0	00:54	4.86
WCE_J070	JUNCTION	1.52	4.77	5751.80	0	00:54	4.76
WCE_J075	JUNCTION	1.53	4.85	5753.42	0	00:30	4.85
WCE_J080	JUNCTION	5.11	7.27	5756.10	0	00:30	7.27
WCE_J090	JUNCTION	4.77	8.80	5771.56	0	00:32	8.80
WCE_J100	JUNCTION	9.56	10.08	5782.18	0	00:37	10.08
WCE_J105	JUNCTION	1.35	3.59	5776.89	0	00:56	3.59
WCE_J110	JUNCTION	1.02	2.77	5778.15	0	00:56	2.77
WCE_J120	JUNCTION	0.52	1.61	5785.51	0	00:39	1.61
WCE_J130	JUNCTION	0.95	3.21	5793.31	0	00:41	3.21
WCE_J140	JUNCTION	1.00	2.92	5796.63	0	00:52	2.92
WCE_J145	JUNCTION	0.93	2.82	5796.97	0	00:51	2.82
WCE_J150	JUNCTION	0.99	2.14	5797.18	0	00:51	2.14
WCE_J155	JUNCTION	0.75	1.82	5798.84	0	00:51	1.82
WCE_J160	JUNCTION	0.83	1.85	5801.23	0	00:51	1.85
WCE_J165	JUNCTION	0.68	1.81	5805.42	0	00:51	1.81
WCE_J200	JUNCTION	0.79	1.30	5661.61	0	02:08	1.28
WCE_J205	JUNCTION	0.87	1.33	5661.96	0	00:22	1.30
WCE_J210	JUNCTION	2.11	2.39	5665.56	0	00:22	2.37

WCE_J215	JUNCTION	2.62	3.70	5671.07	0	00:22	3.70
WCE_J230	JUNCTION	0.25	0.68	5714.00	0	00:41	0.68
WCE_J300	JUNCTION	0.14	0.39	5800.74	0	00:35	0.39
WCE_J400	JUNCTION	2.93	4.13	5753.99	0	00:44	4.13
WCE_J405	JUNCTION	0.62	1.77	5765.01	0	00:44	1.77
WCE_J415	JUNCTION	14.92	14.92	5774.10	0	00:00	14.92
WCE_J420	JUNCTION	0.15	0.40	5808.03	0	00:35	0.40
WSC_B005	JUNCTION	0.00	0.00	5719.73	0	00:00	0.00
WSC_B010	JUNCTION	0.00	0.00	5748.54	0	00:00	0.00
WSC_B015	JUNCTION	0.00	0.00	5767.05	0	00:00	0.00
WSC_B020	JUNCTION	0.00	0.00	5765.67	0	00:00	0.00
WSC_B025	JUNCTION	0.00	0.00	5779.37	0	00:00	0.00
WSC_J005	JUNCTION	0.70	2.26	5649.11	0	00:41	2.26
WSC_J010	JUNCTION	9.12	9.40	5715.22	0	00:37	9.40
WSC_J015	JUNCTION	0.52	1.89	5711.79	0	00:37	1.89
WSC_J020	JUNCTION	0.54	1.89	5722.40	0	00:37	1.89
WSC_J025	JUNCTION	8.25	8.60	5749.35	0	00:38	8.60
WSC_J030	JUNCTION	0.50	1.92	5745.87	0	00:39	1.92
WSC_J035	JUNCTION	0.51	1.93	5747.27	0	00:39	1.93
WSC_J040	JUNCTION	0.50	1.93	5754.52	0	00:38	1.93
WSC_J045	JUNCTION	2.19	4.64	5756.99	0	00:38	4.63
WSC_J100	JUNCTION	4.97	5.25	5741.33	0	00:37	5.25
FHP_J050	JUNCTION	0.13	0.34	5725.62	0	00:59	0.34
ACR_0005	OUTFALL	1.20	2.79	5672.77	0	00:40	2.79
ACR_0010	OUTFALL	0.00	0.00	5729.44	0	00:00	0.00
DFA_B005	OUTFALL	0.00	0.00	5586.40	0	00:00	0.00
DFA_B010	OUTFALL	0.00	0.00	5655.80	0	00:00	0.00
DFA_B015	OUTFALL	0.00	0.00	5666.70	0	00:00	0.00
DFA_B020	OUTFALL	0.00	0.00	5640.69	0	00:00	0.00
DFA_B021	OUTFALL	0.00	0.00	5673.50	0	00:00	0.00
DFA_B025	OUTFALL	0.00	0.00	5635.60	0	00:00	0.00
DFA_B030	OUTFALL	0.00	0.00	5699.69	0	00:00	0.00
DFA_B035	OUTFALL	0.00	0.00	5657.80	0	00:00	0.00
DFA_B040	OUTFALL	0.00	0.00	5651.74	0	00:00	0.00
DFA_B041	OUTFALL	0.00	0.00	5676.76	0	00:00	0.00
DFA_B045	OUTFALL	0.00	0.00	5666.72	0	00:00	0.00
DFA_B046	OUTFALL	0.00	0.00	5671.73	0	00:00	0.00
DFA_B050	OUTFALL	0.00	0.00	5717.03	0	00:00	0.00
DFA_B051	OUTFALL	0.00	0.00	5766.21	0	00:00	0.00
DFA_B055	OUTFALL	0.00	0.00	5746.70	0	00:00	0.00
DFA_B060	OUTFALL	0.00	0.00	5680.96	0	00:00	0.00
DFA_B061	OUTFALL	0.00	0.00	5734.55	0	00:00	0.00
DFA_B065	OUTFALL	0.00	0.00	5699.12	0	00:00	0.00
DFA_B100	OUTFALL	0.00	0.00	5632.93	0	00:00	0.00
DFA_B105	OUTFALL	0.00	0.00	5639.99	0	00:00	0.00
DFA_0005	OUTFALL	0.22	0.62	5648.37	0	00:37	0.62
FHP_0005	OUTFALL	0.95	2.63	5591.37	0	00:47	2.63
HFT_0005	OUTFALL	1.69	3.50	5608.95	0	00:27	3.50
HFT_0010	OUTFALL	12.64	13.07	5613.47	0	00:42	13.07
HOM_0005	OUTFALL	0.44	1.01	5589.23	0	00:43	1.01
HOM_0010	OUTFALL	0.09	0.52	5633.37	0	00:41	0.52
PHI_0005	OUTFALL	0.93	2.07	5710.72	0	00:54	2.07
SPC_0005	OUTFALL	6.24	8.39	5611.28	0	00:52	8.39
TRE_0005	OUTFALL	0.51	1.73	5670.38	0	00:39	1.73
TRE_0010	OUTFALL	17.00	17.00	5669.98	0	00:00	17.00
WCE_0005	OUTFALL	1.30	2.48	5647.27	0	00:50	2.48
ACR_J045	DIVIDER	16.10	16.10	5740.90	0	00:00	16.10
ACR_J055	DIVIDER	1.87	4.61	5741.40	0	00:37	4.61
ACR_J075	DIVIDER	1.20	2.49	5768.78	0	00:37	2.49
ACR_J200	DIVIDER	1.66	3.27	5740.57	0	01:25	3.27
ACR_J230	DIVIDER	8.90	8.90	5766.67	0	00:00	8.90
FHP_J015	DIVIDER	18.70	18.70	5629.41	0	00:00	18.70
FHP_J065	DIVIDER	9.04	9.42	5781.43	0	00:32	9.42
FHP_J120	DIVIDER	12.00	12.00	5685.20	0	00:00	12.00
FHP_J125	DIVIDER	12.00	12.00	5686.21	0	00:00	12.00
FHP_J130	DIVIDER	5.00	5.00	5685.38	0	00:00	5.00
FHP_J135	DIVIDER	2.43	2.83	5711.26	0	00:41	2.83

FHP_J145	DIVIDER	5.23	5.63	5718.58	0	00:41	5.63
FHP_J150	DIVIDER	11.30	11.30	5694.40	0	00:00	11.30
FHP_J165	DIVIDER	8.29	8.63	5694.15	0	00:38	8.63
FHP_J200	DIVIDER	3.69	4.31	5666.39	0	00:42	4.31
FHP_J205	DIVIDER	0.19	0.83	5676.25	0	00:42	0.83
FHP_J210	DIVIDER	3.50	3.50	5678.49	0	00:00	3.50
HFT_J100	DIVIDER	10.00	10.00	5615.52	0	00:00	10.00
HFT_J110	DIVIDER	8.51	8.68	5615.85	0	00:44	8.68
HFT_J115	DIVIDER	0.68	2.08	5614.58	0	00:41	2.08
HFT_J145	DIVIDER	9.61	9.79	5688.47	0	00:40	9.79
HOM_J025	DIVIDER	5.28	6.25	5634.20	0	00:37	6.25
HOM_J030	DIVIDER	5.95	6.40	5637.22	0	00:37	6.40
HOM_J045	DIVIDER	9.01	9.45	5645.75	0	00:41	9.45
HOM_J065	DIVIDER	5.64	5.64	5655.67	0	00:00	5.64
HOM_J070	DIVIDER	6.00	6.00	5669.36	0	00:00	6.00
HOM_J075	DIVIDER	8.78	9.18	5681.64	0	00:40	9.18
HOM_J090	DIVIDER	11.72	12.12	5692.43	0	00:40	12.12
KET_J005	DIVIDER	5.74	6.12	5735.02	0	00:36	6.12
KET_J010	DIVIDER	4.24	4.63	5733.96	0	00:37	4.63
KET_J015	DIVIDER	3.69	4.42	5735.92	0	00:36	4.42
KET_J035	DIVIDER	5.67	5.67	5765.37	0	00:00	5.67
SPC_J020	DIVIDER	15.50	15.50	5653.54	0	00:00	15.50
SPC_J040	DIVIDER	17.92	17.92	5745.13	0	00:00	17.92
SPC_J090	DIVIDER	17.51	17.83	5790.43	0	00:46	17.83
SPC_J110	DIVIDER	14.60	14.60	5795.50	0	00:00	14.60
SPC_J115	DIVIDER	9.00	9.00	5794.67	0	00:00	9.00
SPC_J240	DIVIDER	5.59	5.59	5794.35	0	00:00	5.59
SPC_J250	DIVIDER	3.35	3.35	5795.95	0	00:00	3.35
SPC_J265	DIVIDER	6.50	6.50	5801.92	0	00:00	6.50
SPC_J310	DIVIDER	6.61	6.89	5684.87	0	00:40	6.89
TRE_J010	DIVIDER	8.55	8.55	5694.47	0	00:00	8.55
TRE_J020	DIVIDER	8.84	8.84	5700.10	0	00:00	8.84
TRE_J030	DIVIDER	6.85	7.34	5699.80	0	00:38	7.34
TRE_J045	DIVIDER	0.20	0.57	5754.56	0	00:36	0.57
TRE_J205	DIVIDER	8.00	8.00	5671.69	0	00:00	8.00
TRE_J225	DIVIDER	3.50	3.50	5716.55	0	00:00	3.50
WCE_J085	DIVIDER	18.65	19.19	5775.86	0	00:37	19.19
WCE_J095	DIVIDER	15.54	16.09	5783.39	0	00:37	16.09
WCE_J115	DIVIDER	9.06	9.58	5790.85	0	00:36	9.58
WCE_J125	DIVIDER	7.61	7.81	5794.71	0	00:39	7.81
WCE_J135	DIVIDER	10.70	10.92	5803.49	0	00:38	10.92
WCE_J170	DIVIDER	7.53	7.86	5815.02	0	00:36	7.86
WCE_J180	DIVIDER	7.91	8.23	5793.37	0	00:35	8.23
WCE_J220	DIVIDER	10.76	11.59	5680.17	0	00:41	11.59
WCE_J225	DIVIDER	10.01	10.85	5680.35	0	00:41	10.85
WCE_J410	DIVIDER	0.42	1.57	5777.60	0	00:28	1.57
WSC_J050	DIVIDER	6.11	6.40	5761.38	0	00:35	6.40
ACR_S100	STORAGE	8.05	10.35	5749.35	0	01:25	10.35
PHI_S100	STORAGE	3.35	9.22	5763.22	0	00:54	9.22
PHI_S200	STORAGE	0.39	1.97	5779.97	0	00:37	1.97
SPC_S100	STORAGE	9.57	22.35	5727.52	0	01:06	22.35
WCE_S100	STORAGE	9.99	13.97	5754.97	0	01:01	13.97

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Node Inflow Summary
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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
ACR_B005	JUNCTION	38.35	38.35	0	00:40	0.972	0.972	0.000
ACR_B010	JUNCTION	26.87	26.87	0	00:38	0.677	0.677	0.000
ACR_B015	JUNCTION	29.83	29.83	0	00:37	0.718	0.718	0.000
ACR_B020	JUNCTION	49.14	49.14	0	00:40	1.31	1.31	0.000
ACR_B025	JUNCTION	60.48	60.48	0	00:36	1.32	1.32	0.000
ACR_B030	JUNCTION	80.89	80.89	0	00:38	1.98	1.98	0.000
ACR_B035	JUNCTION	66.71	66.71	0	00:37	1.4	1.4	0.000
ACR_B040	JUNCTION	75.72	75.72	0	00:39	1.78	1.78	0.000
ACR_B045	JUNCTION	103.08	103.08	0	00:35	1.68	1.68	0.000
ACR_B050	JUNCTION	86.80	86.80	0	00:35	1.42	1.42	0.000
ACR_B055	JUNCTION	56.11	56.11	0	00:41	1.44	1.44	0.000
ACR_J005	JUNCTION	0.00	439.63	0	00:39	0	12.1	0.000
ACR_J010	JUNCTION	0.00	374.53	0	00:39	0	10.4	0.000
ACR_J035	JUNCTION	0.00	345.13	0	00:38	0	9.72	0.000
ACR_J050	JUNCTION	0.00	345.15	0	00:38	0	9.72	0.000
ACR_J060	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
ACR_J065	JUNCTION	0.00	234.43	0	00:37	0	4.54	0.000
ACR_J070	JUNCTION	0.00	0.00	0	00:00	0	0	0.000 gal
ACR_J080	JUNCTION	0.00	136.43	0	00:37	0	2.86	0.000
ACR_J085	JUNCTION	0.00	56.11	0	00:41	0	1.44	0.000
ACR_J204	JUNCTION	0.00	75.71	0	00:40	0	1.78	0.000
ACR_J205	JUNCTION	0.00	75.71	0	00:40	0	1.78	-0.000
ACR_J210	JUNCTION	0.00	75.71	0	00:40	0	1.78	0.000
ACR_J215	JUNCTION	0.00	75.71	0	00:40	0	1.78	0.000
ACR_J220	JUNCTION	0.00	75.71	0	00:40	0	1.78	0.000
ACR_J225	JUNCTION	0.00	75.71	0	00:39	0	1.78	0.000
ACR_J235	JUNCTION	0.00	75.71	0	00:39	0	1.78	0.000
ACR_J240	JUNCTION	0.00	75.71	0	00:39	0	1.78	-0.000
ACR_J245	JUNCTION	0.00	75.71	0	00:39	0	1.78	0.000
ACR_J250	JUNCTION	0.00	75.72	0	00:39	0	1.78	0.000
DFA_B042	JUNCTION	15.35	15.35	0	00:36	0.343	0.343	0.000
DFA_B043	JUNCTION	68.18	68.18	0	00:33	1.09	1.09	0.000
DFA_J005	JUNCTION	0.00	83.37	0	00:35	0	1.44	0.000
DFA_J010	JUNCTION	0.00	68.18	0	00:33	0	1.09	0.000
FHP_B005	JUNCTION	16.05	16.05	0	00:51	0.624	0.624	0.000
FHP_B010	JUNCTION	26.30	26.30	0	00:40	0.689	0.689	0.000
FHP_B015	JUNCTION	15.22	15.22	0	00:35	0.265	0.265	0.000
FHP_B020	JUNCTION	20.16	20.16	0	00:35	0.364	0.364	0.000
FHP_B025	JUNCTION	18.60	18.60	0	00:37	0.453	0.453	0.000
FHP_B030	JUNCTION	164.72	164.72	0	00:36	3.02	3.02	0.000
FHP_B035	JUNCTION	6.19	6.19	0	00:47	0.229	0.229	0.000
FHP_B040	JUNCTION	43.24	43.24	0	00:41	1.11	1.11	0.000
FHP_B045	JUNCTION	21.35	21.35	0	00:36	0.47	0.47	0.000
FHP_B050	JUNCTION	14.97	14.97	0	00:36	0.335	0.335	0.000
FHP_B055	JUNCTION	11.62	11.62	0	00:40	0.307	0.307	0.000
FHP_B060	JUNCTION	50.65	50.65	0	00:38	1.15	1.15	0.000
FHP_B065	JUNCTION	70.77	70.77	0	00:40	1.76	1.76	0.000
FHP_B070	JUNCTION	63.01	63.01	0	00:40	1.56	1.56	0.000
FHP_B075	JUNCTION	7.32	7.32	0	00:51	0.325	0.325	0.000
FHP_B080	JUNCTION	64.47	64.47	0	00:37	1.33	1.33	0.000
FHP_B085	JUNCTION	90.08	90.08	0	00:36	1.78	1.78	0.000
FHP_B090	JUNCTION	52.32	52.32	0	00:35	0.897	0.897	0.000
FHP_B095	JUNCTION	56.14	56.14	0	00:36	1.1	1.1	0.000
FHP_B100	JUNCTION	32.02	32.02	0	00:37	0.692	0.692	0.000
FHP_B105	JUNCTION	22.12	22.12	0	00:32	0.325	0.325	0.000
FHP_J005	JUNCTION	0.00	780.25	0	00:45	0	18	0.000
FHP_J010	JUNCTION	0.00	728.89	0	00:44	0	16.7	0.000
FHP_J020	JUNCTION	0.00	571.73	0	00:43	0	13.3	0.000
FHP_J030	JUNCTION	0.00	523.51	0	00:41	0	11.9	0.000
FHP_J035	JUNCTION	0.00	288.89	0	00:41	0	6.01	0.000
FHP_J040	JUNCTION	0.00	227.26	0	00:38	0	4.67	0.000
FHP_J045	JUNCTION	0.00	94.95	0	00:36	0	1.99	0.000
FHP_J055	JUNCTION	0.00	7.48	0	00:23	0	0.201	0.000
FHP_J060	JUNCTION	0.00	7.47	0	00:23	0	0.201	0.000
FHP_J100	JUNCTION	0.00	96.04	0	00:37	0	3.74	0.000
FHP_J105	JUNCTION	0.00	90.97	0	00:37	0	3.57	0.000
FHP_J110	JUNCTION	0.00	76.05	0	01:25	0	3.24	0.000
FHP_J115	JUNCTION	0.00	73.01	0	01:25	0	3.09	0.000
FHP_J140	JUNCTION	0.00	4.00	0	02:26	0	0.3	0.000
FHP_J160	JUNCTION	0.00	14.00	0	01:29	0	0.574	0.000

SWMM Future 100-yr Output File

FHP_J215	JUNCTION	0.00	127.92	0	00:41	0	2.02	0.000
HFT_B005	JUNCTION	63.32	63.32	0	00:38	1.47	1.47	0.000
HFT_B010	JUNCTION	109.03	109.03	0	00:40	2.55	2.55	0.000
HFT_B015	JUNCTION	82.57	82.57	0	00:41	2.07	2.07	0.000
HFT_B020	JUNCTION	23.73	23.73	0	00:46	0.795	0.795	0.000
HFT_B025	JUNCTION	38.04	38.04	0	00:41	1.05	1.05	0.000
HFT_B030	JUNCTION	14.74	14.74	0	00:36	0.318	0.318	0.000
HFT_J005	JUNCTION	0.00	171.84	0	00:40	0	4.03	0.000
HFT_J010	JUNCTION	0.00	109.03	0	00:40	0	2.55	0.000
HFT_J101	JUNCTION	0.00	114.01	0	00:42	0	2.13	0.000
HFT_J105	JUNCTION	0.00	99.31	0	00:46	0	3.04	0.000
HFT_J120	JUNCTION	0.00	51.01	0	00:45	0	1.37	0.000
HFT_J125	JUNCTION	0.00	51.01	0	00:45	0	1.37	0.000
HFT_J130	JUNCTION	0.00	51.01	0	00:45	0	1.37	0.000
HFT_J135	JUNCTION	0.00	51.01	0	00:45	0	1.37	0.000
HFT_J140	JUNCTION	0.00	51.00	0	00:44	0	1.37	0.000
HFT_J150	JUNCTION	0.00	14.71	0	00:37	0	0.318	0.000
HFT_J155	JUNCTION	0.00	14.71	0	00:37	0	0.318	0.000
HFT_J160	JUNCTION	0.00	14.71	0	00:37	0	0.318	0.000
HFT_J165	JUNCTION	0.00	14.73	0	00:36	0	0.318	0.000
HFT_J170	JUNCTION	0.00	14.74	0	00:36	0	0.318	0.000
HOM_B005	JUNCTION	24.13	24.13	0	00:36	0.508	0.508	0.000
HOM_B010	JUNCTION	77.87	77.87	0	00:37	1.6	1.6	0.000
HOM_B015	JUNCTION	46.08	46.08	0	00:41	1.2	1.2	0.000
HOM_B020	JUNCTION	60.81	60.81	0	00:40	1.49	1.49	0.000
HOM_J005	JUNCTION	0.00	158.49	0	00:40	0	4.17	0.000
HOM_J010	JUNCTION	0.00	134.87	0	00:39	0	3.66	0.000
HOM_J015	JUNCTION	0.00	135.19	0	00:37	0	3.66	0.000
HOM_J020	JUNCTION	0.00	50.21	0	00:27	0	2.04	0.000
HOM_J035	JUNCTION	0.00	62.57	0	00:31	0	2.06	0.000
HOM_J040	JUNCTION	0.00	62.09	0	01:17	0	2.06	0.000
HOM_J050	JUNCTION	0.00	60.80	0	00:41	0	1.49	0.000
HOM_J055	JUNCTION	0.00	60.80	0	00:40	0	1.49	0.000
HOM_J060	JUNCTION	0.00	60.80	0	00:40	0	1.49	-0.000
HOM_J080	JUNCTION	0.00	16.05	0	00:26	0	0.678	0.000
HOM_J085	JUNCTION	0.00	16.11	0	01:39	0	0.678	0.000
JAM_B005	JUNCTION	33.54	33.54	0	00:40	0.804	0.804	0.000
JAM_B010	JUNCTION	86.31	86.31	0	00:37	1.86	1.86	0.000
JAM_J005	JUNCTION	0.00	86.30	0	00:37	0	1.86	0.000
JAM_J010	JUNCTION	0.00	86.30	0	00:37	0	1.86	0.000
JAM_J015	JUNCTION	0.00	86.31	0	00:37	0	1.86	0.000
KET_B005	JUNCTION	40.44	40.44	0	00:36	0.813	0.813	0.000
KET_B010	JUNCTION	71.76	71.76	0	00:35	1.22	1.22	0.000
KET_J011	JUNCTION	0.00	35.72	0	00:28	0	0.921	0.000
KET_J020	JUNCTION	0.00	71.74	0	00:35	0	1.22	0.000
KET_J025	JUNCTION	0.00	71.74	0	00:35	0	1.22	0.000
KET_J030	JUNCTION	0.00	71.74	0	00:35	0	1.22	0.000
KET_J040	JUNCTION	0.00	71.76	0	00:35	0	1.22	0.000
PHI_B100	JUNCTION	38.91	38.91	0	00:37	0.829	0.829	0.000
PHI_B105	JUNCTION	25.10	25.10	0	00:44	0.795	0.795	0.000
PHI_B110	JUNCTION	125.28	125.28	0	00:35	2.08	2.08	0.000
PHI_B115	JUNCTION	378.12	378.12	0	00:34	5.95	5.95	0.000
PHI_J010	JUNCTION	0.00	302.42	0	00:54	0	9.38	0.000
PHI_J015	JUNCTION	0.00	272.93	0	00:54	0	8.56	0.000
PHI_J020	JUNCTION	0.00	357.26	0	00:37	0	5.95	0.000
SPC_B005	JUNCTION	52.83	52.83	0	00:38	1.23	1.23	0.000
SPC_B010	JUNCTION	66.17	66.17	0	00:37	1.35	1.35	0.000
SPC_B015	JUNCTION	80.27	80.27	0	00:40	1.96	1.96	0.000
SPC_B020	JUNCTION	30.55	30.55	0	00:42	0.905	0.905	0.000
SPC_B025	JUNCTION	81.98	81.98	0	00:40	2.02	2.02	0.000
SPC_B030	JUNCTION	188.18	188.18	0	00:35	2.93	2.93	0.000
SPC_B035	JUNCTION	112.69	112.69	0	00:33	1.71	1.71	0.000
SPC_B036	JUNCTION	77.57	77.57	0	00:36	1.61	1.61	0.000
SPC_B040	JUNCTION	245.90	245.90	0	00:32	3.45	3.45	0.000
SPC_B045	JUNCTION	185.50	185.50	0	00:35	2.9	2.9	0.000
SPC_B046	JUNCTION	41.99	41.99	0	00:36	0.771	0.771	0.000
SPC_B050	JUNCTION	13.79	13.79	0	00:41	0.369	0.369	0.000
SPC_B055	JUNCTION	32.37	32.37	0	00:40	0.735	0.735	0.000
SPC_B060	JUNCTION	35.57	35.57	0	00:42	0.973	0.973	0.000
SPC_B065	JUNCTION	36.37	36.37	0	00:42	0.98	0.98	0.000
SPC_B070	JUNCTION	73.11	73.11	0	00:41	1.76	1.76	0.000
SPC_B080	JUNCTION	41.47	41.47	0	00:41	1.08	1.08	0.000
SPC_B085	JUNCTION	39.69	39.69	0	00:40	0.959	0.959	0.000
SPC_B090	JUNCTION	10.56	10.56	0	00:51	0.436	0.436	0.000
SPC_B095	JUNCTION	101.84	101.84	0	00:37	2.09	2.09	0.000
SPC_B100	JUNCTION	75.10	75.10	0	00:37	1.6	1.6	0.000
SPC_B105	JUNCTION	35.67	35.67	0	00:46	1.17	1.17	0.000
SPC_B110	JUNCTION	54.31	54.31	0	00:38	1.23	1.23	0.000
SPC_J005	JUNCTION	0.00	1211.82	0	00:51	0	40.4	0.000
SPC_J010	JUNCTION	0.00	1169.05	0	00:50	0	39.2	0.000
SPC_J015	JUNCTION	0.00	1115.73	0	00:49	0	37.9	0.000
SPC_J025	JUNCTION	0.00	756.73	0	00:52	0	28.8	0.000
SPC_J030	JUNCTION	0.00	686.84	0	00:51	0	26.8	0.000
SPC_J035	JUNCTION	0.00	614.05	0	01:06	0	23.8	0.000
SPC_J045	JUNCTION	0.00	706.97	0	00:43	0	17.1	0.000
SPC_J050	JUNCTION	0.00	706.98	0	00:43	0	17.1	0.000
SPC_J055	JUNCTION	0.00	706.98	0	00:43	0	17.1	0.000
SPC_J060	JUNCTION	0.00	308.11	0	00:51	0	8.06	0.000
SPC_J065	JUNCTION	0.00	300.08	0	00:51	0	8.03	0.000
SPC_J070	JUNCTION	0.00	300.09	0	00:51	0	8.03	0.000
SPC_J075	JUNCTION	0.00	300.09	0	00:51	0	8.03	0.000
SPC_J080	JUNCTION	0.00	300.10	0	00:51	0	8.03	0.000
SPC_J085	JUNCTION	0.00	300.12	0	00:51	0	8.04	0.000
SPC_J095	JUNCTION	0.00	273.98	0	00:47	0	7.29	0.000
SPC_J100	JUNCTION	0.00	273.98	0	00:47	0	7.29	0.000
SPC_J105	JUNCTION	0.00	273.98	0	00:47	0	7.29	0.000
SPC_J120	JUNCTION	0.00	214.01	0	00:44	0	5.53	0.000
SPC_J125	JUNCTION	0.00	70.81	0	00:45	0	1.95	0.000
SPC_J130	JUNCTION	0.00	36.37	0	00:42	0	0.98	0.000
SPC_J135	JUNCTION	0.00	112.83	0	00:42	0	2.84	0.000
SPC_J140	JUNCTION	0.00	41.47	0	00:41	0	1.08	0.000
SPC_J150	JUNCTION	0.00	61.46	0	00:50	0	1.77	0.000
SPC_J155	JUNCTION	0.00	61.46	0	00:50	0	1.77	0.000
SPC_J160	JUNCTION	0.00	61.46	0	00:50	0	1.77	0.000
SPC_J165	JUNCTION	0.00	48.68	0	00:48	0	1.4	0.000
SPC_J170	JUNCTION	0.00	39.69	0	00:40	0	0.959	0.000
SPC_J200	JUNCTION	0.00	258.66	0	00:42	0	6.1	0.000
SPC_J205	JUNCTION	0.00	258.67	0	00:42	0	6.1	0.000
SPC_J210	JUNCTION	0.00	258.67	0	00:42	0	6.1	0.000
SPC_J215	JUNCTION	0.00	258.67	0	00:42	0	6.1	0.000
SPC_J220	JUNCTION	0.00	258.67	0	00:42	0	6.1	0.000
SPC_J225	JUNCTION	0.00	162.56	0	00:44	0	4.01	0.000
SPC_J230	JUNCTION	0.00	162.56	0	00:44	0	4.01	0.000
SPC_J235	JUNCTION	0.00	73.91	0	00:43	0	1.6	0.000
SPC_J245	JUNCTION	0.00	73.92	0	00:42	0	1.61	0.000
SPC_J255	JUNCTION	0.00	75.10	0	00:37	0	1.6	0.000
SPC_J260	JUNCTION	0.00	88.93	0	00:44	0	2.4	0.000
SPC_J270	JUNCTION	0.00	54.30	0	00:38	0	1.23	0.000
SPC_J275	JUNCTION	0.00	54.31	0	00:38	0	1.23	0.000
SPC_J300	JUNCTION	0.00	74.04	0	00:49	0	1.93	0.000
SPC_J305	JUNCTION	0.00	74.04	0	00:49	0	1.93	0.000
SPC_J400	JUNCTION	0.00	41.98	0	00:36	0	0.771	0.000
SPC_J405	JUNCTION	0.00	41.98	0	00:36	0	0.771	0.000
SPC_J410	JUNCTION	0.00	41.99	0	00:36	0	0.771	0.000
TRE_B005	JUNCTION	50.43	50.43	0	00:42	1.38	1.38	0.000
TRE_B010	JUNCTION	93.18	93.18	0	00:36	1.81	1.81	0.000
TRE_B015	JUNCTION	40.90	40.90	0	00:36	0.818	0.818	0.000
TRE_B020	JUNCTION	17.41	17.41	0	00:35	0.287	0.287	0.000
TRE_B025	JUNCTION	7.86	7.86	0	00:36	0.196	0.196	0.000
TRE_J005	JUNCTION	0.00	64.55	0	00:39	0	1.3	0.000
TRE_J015	JUNCTION	0.00	64.56	0	00:38	0	1.3	0.000
TRE_J025	JUNCTION	0.00	30.00	0	01:10	0	0.933	-0.000
TRE_J035	JUNCTION	0.00	24.98	0	00:35	0	0.483	-0.000
TRE_J040	JUNCTION	0.00	7.86	0	00:36	0	0.196	0.000

SWMM Future 100-yr Output File

TRE_J200	JUNCTION	0.00	141.75	0	00:38	0	3.18	0.000
TRE_J210	JUNCTION	0.00	93.09	0	00:36	0	1.8	-0.000
TRE_J215	JUNCTION	0.00	93.15	0	00:36	0	1.81	-0.000
TRE_J220	JUNCTION	0.00	93.16	0	00:36	0	1.81	0.000
WCE_B005	JUNCTION	8.19	8.19	0	00:52	0.366	0.366	0.000
WCE_B010	JUNCTION	32.17	32.17	0	00:36	0.668	0.668	0.000
WCE_B015	JUNCTION	54.83	54.83	0	00:41	1.39	1.39	0.000
WCE_B020	JUNCTION	43.66	43.66	0	00:37	0.907	0.907	0.000
WCE_B025	JUNCTION	25.05	25.05	0	00:40	0.607	0.607	0.000
WCE_B029	JUNCTION	21.68	21.68	0	00:41	0.603	0.603	0.000
WCE_B030	JUNCTION	40.36	40.36	0	00:43	1.19	1.19	0.000
WCE_B035	JUNCTION	40.93	40.93	0	00:41	1.09	1.09	0.000
WCE_B040	JUNCTION	4.81	4.81	0	00:44	0.158	0.158	0.000
WCE_B045	JUNCTION	56.08	56.08	0	00:39	1.35	1.35	0.000
WCE_B050	JUNCTION	17.06	17.06	0	00:47	0.623	0.623	0.000
WCE_B055	JUNCTION	43.42	43.42	0	00:37	0.972	0.972	0.000
WCE_B056	JUNCTION	6.93	6.93	0	00:37	0.168	0.168	0.000
WCE_B060	JUNCTION	31.67	31.67	0	00:35	0.577	0.577	0.000
WCE_B065	JUNCTION	80.96	80.96	0	00:31	1.19	1.19	0.000
WCE_B070	JUNCTION	43.32	43.32	0	00:36	0.853	0.853	0.000
WCE_B075	JUNCTION	33.83	33.83	0	00:36	0.703	0.703	0.000
WCE_B080	JUNCTION	48.05	48.05	0	00:35	0.836	0.836	0.000
WCE_B085	JUNCTION	18.56	18.56	0	00:35	0.39	0.39	0.000
WCE_B090	JUNCTION	129.82	129.82	0	00:37	2.68	2.68	0.000
WCE_B095	JUNCTION	19.62	19.62	0	00:36	0.436	0.436	0.000
WCE_B100	JUNCTION	78.11	78.11	0	00:37	1.71	1.71	0.000
WCE_B105	JUNCTION	88.11	88.11	0	00:35	1.61	1.61	0.000
WCE_B110	JUNCTION	56.56	56.56	0	00:36	1.19	1.19	0.000
WCE_J005	JUNCTION	0.00	745.36	0	00:50	0	24	0.000
WCE_J010	JUNCTION	0.00	730.22	0	00:49	0	23.2	-0.000
WCE_J015	JUNCTION	0.00	672.13	0	00:49	0	21.7	0.000
WCE_J020	JUNCTION	0.00	651.47	0	00:48	0	21.2	0.000
WCE_J025	JUNCTION	0.00	475.93	0	01:01	0	16.3	0.000
WCE_J030	JUNCTION	0.00	430.28	0	01:01	0	14.8	0.000
WCE_J035	JUNCTION	0.00	414.91	0	01:00	0	14.2	0.000
WCE_J040	JUNCTION	0.00	385.64	0	01:00	0	13.3	0.000
WCE_J045	JUNCTION	0.00	328.59	0	01:00	0	11.3	0.000
WCE_J064	JUNCTION	0.00	440.13	0	00:37	0	8.86	0.000
WCE_J065	JUNCTION	0.00	265.11	0	00:54	0	6.98	0.000
WCE_J070	JUNCTION	0.00	265.12	0	00:54	0	6.98	0.000
WCE_J075	JUNCTION	0.00	265.17	0	00:30	0	6.98	0.000
WCE_J080	JUNCTION	0.00	265.47	0	00:30	0	6.98	0.000
WCE_J090	JUNCTION	0.00	302.29	0	00:32	0	7.14	0.000
WCE_J100	JUNCTION	0.00	241.90	0	00:37	0	4.97	0.000
WCE_J105	JUNCTION	0.00	140.08	0	00:56	0	3.92	0.000
WCE_J110	JUNCTION	0.00	140.08	0	00:56	0	3.92	0.000
WCE_J120	JUNCTION	0.00	132.27	0	00:39	0	2.9	0.000
WCE_J130	JUNCTION	0.00	130.01	0	00:41	0	2.9	0.000
WCE_J140	JUNCTION	0.00	42.03	0	00:52	0	1.1	0.000
WCE_J145	JUNCTION	0.00	42.02	0	00:51	0	1.1	0.000
WCE_J150	JUNCTION	0.00	42.02	0	00:51	0	1.1	0.000
WCE_J155	JUNCTION	0.00	42.03	0	00:51	0	1.1	0.000
WCE_J160	JUNCTION	0.00	42.03	0	00:51	0	1.1	0.000
WCE_J165	JUNCTION	0.00	42.03	0	00:51	0	1.1	0.000
WCE_J200	JUNCTION	0.00	7.24	0	02:08	0	0.413	0.000
WCE_J205	JUNCTION	0.00	7.54	0	00:22	0	0.413	0.000
WCE_J210	JUNCTION	0.00	7.83	0	00:22	0	0.413	0.000
WCE_J215	JUNCTION	0.00	7.70	0	00:22	0	0.413	0.000
WCE_J230	JUNCTION	0.00	54.83	0	00:41	0	1.39	0.000
WCE_J300	JUNCTION	0.00	31.67	0	00:35	0	0.577	0.000
WCE_J400	JUNCTION	0.00	37.04	0	00:44	0	0.787	0.000
WCE_J405	JUNCTION	0.00	37.04	0	00:44	0	0.787	0.000
WCE_J415	JUNCTION	0.00	61.85	0	00:36	0	1.15	0.000
WCE_J420	JUNCTION	0.00	18.56	0	00:35	0	0.39	0.000
WSC_B005	JUNCTION	73.26	73.26	0	00:42	1.98	1.98	0.000
WSC_B010	JUNCTION	22.26	22.26	0	00:36	0.473	0.473	0.000
WSC_B015	JUNCTION	37.36	37.36	0	00:37	0.814	0.814	0.000

WSC_B020	JUNCTION	69.06	69.06	0	00:36	1.33	1.33	0.000
WSC_B025	JUNCTION	88.53	88.53	0	00:35	1.5	1.5	0.000
WSC_J005	JUNCTION	0.00	295.60	0	00:41	0	6.21	-0.000
WSC_J010	JUNCTION	0.00	223.34	0	00:37	0	4.22	-0.000
WSC_J015	JUNCTION	0.00	186.02	0	00:37	0	3.41	-0.000
WSC_J020	JUNCTION	0.00	186.02	0	00:37	0	3.41	0.000
WSC_J025	JUNCTION	0.00	164.11	0	00:36	0	2.94	0.000
WSC_J030	JUNCTION	0.00	82.08	0	00:39	0	1.48	0.000
WSC_J035	JUNCTION	0.00	82.09	0	00:39	0	1.48	0.000
WSC_J040	JUNCTION	0.00	82.10	0	00:38	0	1.48	0.000
WSC_J045	JUNCTION	0.00	82.10	0	00:38	0	1.48	0.000
WSC_J100	JUNCTION	0.00	37.36	0	00:37	0	0.814	0.000
FHP_J050	JUNCTION	0.00	62.97	0	00:36	0	1.3	0.000
ACR_0005	OUTFALL	0.00	439.46	0	00:40	0	12.1	0.000
ACR_0010	OUTFALL	0.00	0.00	0	00:00	0	0	0.000 gal
DFA_B005	OUTFALL	190.78	190.78	0	00:49	6.18	6.18	0.000
DFA_B010	OUTFALL	42.14	42.14	0	00:40	1.03	1.03	0.000
DFA_B015	OUTFALL	103.50	103.50	0	00:36	1.82	1.82	0.000
DFA_B020	OUTFALL	27.87	27.87	0	00:43	0.868	0.868	0.000
DFA_B021	OUTFALL	63.86	63.86	0	00:42	1.79	1.79	0.000
DFA_B025	OUTFALL	77.64	77.64	0	00:35	1.16	1.16	0.000
DFA_B030	OUTFALL	40.04	40.04	0	00:42	1.17	1.17	0.000
DFA_B035	OUTFALL	29.33	29.33	0	00:36	0.573	0.573	0.000
DFA_B040	OUTFALL	64.49	64.49	0	00:41	1.62	1.62	0.000
DFA_B041	OUTFALL	58.25	58.25	0	00:38	1.31	1.31	0.000
DFA_B045	OUTFALL	48.34	48.34	0	00:41	1.26	1.26	0.000
DFA_B046	OUTFALL	42.21	42.21	0	00:41	1.09	1.09	0.000
DFA_B050	OUTFALL	119.94	119.94	0	00:37	2.39	2.39	0.000
DFA_B051	OUTFALL	41.41	41.41	0	00:36	0.761	0.761	0.000
DFA_B055	OUTFALL	112.00	112.00	0	00:36	2.08	2.08	0.000
DFA_B060	OUTFALL	30.14	30.14	0	00:47	0.983	0.983	0.000
DFA_B061	OUTFALL	24.26	24.26	0	00:42	0.696	0.696	0.000
DFA_B065	OUTFALL	36.34	36.34	0	00:43	1.06	1.06	0.000
DFA_B100	OUTFALL	13.41	13.41	0	00:40	0.334	0.334	0.000
DFA_B105	OUTFALL	31.50	31.50	0	00:35	0.541	0.541	0.000
DFA_0005	OUTFALL	0.00	82.87	0	00:37	0	1.44	0.000
FHP_0005	OUTFALL	0.00	794.31	0	00:47	0	18.7	0.000
HFT_0005	OUTFALL	0.00	46.85	0	00:27	0	2.12	0.000
HFT_0010	OUTFALL	0.00	285.46	0	00:41	0	6.15	0.000
HOM_0005	OUTFALL	0.00	157.46	0	00:43	0	4.17	0.000
HOM_0010	OUTFALL	0.00	49.48	0	00:41	0	0.631	0.000
PHI_0005	OUTFALL	0.00	302.39	0	00:54	0	9.38	0.000
SPC_0005	OUTFALL	0.00	1211.38	0	00:52	0	40.4	0.000
TRE_0005	OUTFALL	0.00	64.55	0	00:39	0	1.3	0.000
TRE_0010	OUTFALL	0.00	141.75	0	00:38	0	3.18	0.000
WCE_0005	OUTFALL	0.00	818.48	0	00:50	0	25.6	0.000
ACR_J045	DIVIDER	0.00	345.15	0	00:38	0	9.72	0.000
ACR_J055	DIVIDER	0.00	236.63	0	00:37	0	7.1	0.000
ACR_J075	DIVIDER	0.00	234.43	0	00:37	0	4.54	0.000
ACR_J200	DIVIDER	0.00	75.80	0	01:25	0	2.56	0.000
ACR_J230	DIVIDER	0.00	75.71	0	00:39	0	1.78	0.000
FHP_J015	DIVIDER	0.00	711.27	0	00:44	0	16.3	0.000
FHP_J065	DIVIDER	0.00	22.12	0	00:32	0	0.325	0.000
FHP_J120	DIVIDER	0.00	122.44	0	00:40	0	3.83	0.000
FHP_J125	DIVIDER	0.00	108.44	0	00:40	0	3.25	0.000
FHP_J130	DIVIDER	0.00	69.42	0	00:44	0	1.89	0.000
FHP_J135	DIVIDER	0.00	69.69	0	00:41	0	1.89	0.000
FHP_J145	DIVIDER	0.00	69.71	0	00:41	0	1.89	0.000
FHP_J150	DIVIDER	0.00	70.77	0	00:40	0	1.76	0.000
FHP_J165	DIVIDER	0.00	50.65	0	00:38	0	1.15	0.000
FHP_J200	DIVIDER	0.00	145.04	0	00:42	0	2.34	0.000
FHP_J205	DIVIDER	0.00	148.05	0	00:41	0	2.5	-0.000
FHP_J210	DIVIDER	0.00	14.97	0	00:36	0	0.335	0.000
HFT_J100	DIVIDER	0.00	123.04	0	00:46	0	3.83	0.000
HFT_J110	DIVIDER	0.00	82.89	0	00:41	0	2.08	0.000
HFT_J115	DIVIDER	0.00	82.57	0	00:41	0	2.07	0.000
HFT_J145	DIVIDER	0.00	52.40	0	00:40	0	1.37	0.000

HOM_J025	DIVIDER	0.00	135.20	0	00:37	0	3.66	0.000
HOM_J030	DIVIDER	0.00	135.25	0	00:37	0	3.66	0.000
HOM_J045	DIVIDER	0.00	106.87	0	00:41	0	2.69	0.000
HOM_J065	DIVIDER	0.00	60.80	0	00:40	0	1.49	0.000
HOM_J070	DIVIDER	0.00	60.80	0	00:40	0	1.49	0.000
HOM_J075	DIVIDER	0.00	60.80	0	00:40	0	1.49	0.000
HOM_J090	DIVIDER	0.00	60.81	0	00:40	0	1.49	0.000
KET_J005	DIVIDER	0.00	111.97	0	00:36	0	2.04	0.000
KET_J010	DIVIDER	0.00	71.65	0	00:37	0	1.22	0.000
KET_J015	DIVIDER	0.00	71.69	0	00:36	0	1.22	0.000
KET_J035	DIVIDER	0.00	71.75	0	00:35	0	1.22	0.000
SPC_J020	DIVIDER	0.00	1009.14	0	00:49	0	35	0.000
SPC_J040	DIVIDER	0.00	869.44	0	00:41	0	20.5	0.000
SPC_J090	DIVIDER	0.00	308.54	0	00:46	0	8.06	0.000
SPC_J110	DIVIDER	0.00	273.98	0	00:47	0	7.29	0.000
SPC_J115	DIVIDER	0.00	213.94	0	00:45	0	5.53	0.000
SPC_J240	DIVIDER	0.00	73.91	0	00:42	0	1.61	0.000
SPC_J250	DIVIDER	0.00	73.92	0	00:42	0	1.61	0.000
SPC_J265	DIVIDER	0.00	88.93	0	00:44	0	2.4	0.000
SPC_J310	DIVIDER	0.00	80.27	0	00:40	0	1.96	0.000
TRE_J010	DIVIDER	0.00	64.56	0	00:38	0	1.3	0.000
TRE_J020	DIVIDER	0.00	64.56	0	00:38	0	1.3	0.000
TRE_J030	DIVIDER	0.00	64.56	0	00:38	0	1.3	0.000
TRE_J045	DIVIDER	0.00	7.86	0	00:36	0	0.196	0.000
TRE_J205	DIVIDER	0.00	141.75	0	00:37	0	3.18	0.000
TRE_J225	DIVIDER	0.00	93.18	0	00:36	0	1.81	0.000
WCE_J085	DIVIDER	0.00	371.32	0	00:37	0	7.67	0.000
WCE_J095	DIVIDER	0.00	371.53	0	00:37	0	7.66	0.000
WCE_J115	DIVIDER	0.00	223.51	0	00:36	0	4.53	0.000
WCE_J125	DIVIDER	0.00	132.27	0	00:39	0	2.9	0.000
WCE_J135	DIVIDER	0.00	132.58	0	00:38	0	2.9	0.000
WCE_J170	DIVIDER	0.00	56.56	0	00:36	0	1.19	0.000
WCE_J180	DIVIDER	0.00	88.11	0	00:35	0	1.61	0.000
WCE_J220	DIVIDER	0.00	85.66	0	00:41	0	2.06	0.000
WCE_J225	DIVIDER	0.00	85.67	0	00:41	0	2.06	0.000
WCE_J410	DIVIDER	0.00	48.05	0	00:35	0	0.836	0.000
WSC_J050	DIVIDER	0.00	88.53	0	00:35	0	1.5	0.000
ACR_S100	STORAGE	0.00	222.03	0	00:38	0	5.16	-0.000
PHI_S100	STORAGE	0.00	478.17	0	00:36	0	8.03	0.004
PHI_S200	STORAGE	0.00	378.12	0	00:34	0	5.95	0.000
SPC_S100	STORAGE	0.00	1034.89	0	00:40	0	23.8	0.005
WCE_S100	STORAGE	0.00	519.57	0	00:37	0	10.5	0.005

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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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
ACR_S100	328.446	48	0	0	471.940	70	0	01:25	75.80
PHI_S100	138.433	26	0	0	430.122	81	0	00:54	249.31
PHI_S200	7.777	6	0	0	43.605	33	0	00:37	357.26
SPC_S100	275.487	16	0	0	899.719	52	0	01:06	614.05
WCE_S100	315.236	36	0	0	633.116	72	0	01:01	276.20

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Outfall Loading Summary
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Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
ACR_0005	95.71	117.05	439.46	12.067
ACR_0010	0.00	0.00	0.00	0.000
DFA_B005	97.06	59.10	190.78	6.178
DFA_B010	83.33	11.48	42.14	1.031
DFA_B015	69.15	24.47	103.50	1.823
DFA_B020	97.08	8.30	27.87	0.868
DFA_B021	91.66	18.18	63.86	1.795
DFA_B025	62.73	17.13	77.64	1.158
DFA_B030	94.22	11.50	40.04	1.167
DFA_B035	73.50	7.24	29.33	0.573
DFA_B040	86.52	17.33	64.49	1.615
DFA_B041	80.05	15.17	58.25	1.308
DFA_B045	88.08	13.24	48.34	1.256
DFA_B046	87.23	11.64	42.21	1.093
DFA_B050	75.66	29.35	119.94	2.391
DFA_B051	70.21	10.06	41.41	0.761
DFA_B055	71.26	27.14	112.00	2.083
DFA_B060	96.96	9.41	30.14	0.983
DFA_B061	92.55	6.99	24.26	0.696
DFA_B065	94.40	10.40	36.34	1.058
DFA_B100	83.13	3.74	13.41	0.334
DFA_B105	67.60	7.43	31.50	0.541
DFA_0005	88.42	15.09	82.87	1.437
FHP_0005	96.84	178.92	794.31	18.661
HFT_0005	96.83	20.29	46.85	2.116
HFT_0010	94.92	60.20	285.46	6.154
HOM_0005	94.50	40.99	157.46	4.172
HOM_0010	22.45	26.11	49.48	0.631
PHI_0005	96.13	90.61	302.39	9.381
SPC_0005	95.17	394.17	1211.38	40.401
TRE_0005	95.22	12.70	64.55	1.302
TRE_0010	92.72	31.86	141.75	3.182
WCE_0005	94.28	251.94	818.48	25.583
System	82.59	1559.21	818.48	153.798

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Link Flow Summary
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Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
ACR_L_B005	DUMMY	38.35	0	00:40			
ACR_L_B010	DUMMY	26.87	0	00:38			
ACR_L_B015	DUMMY	29.83	0	00:37			
ACR_L_B020	DUMMY	49.14	0	00:40			
ACR_L_B025	DUMMY	60.48	0	00:36			
ACR_L_B030	DUMMY	80.89	0	00:38			
ACR_L_B035	DUMMY	66.71	0	00:37			
ACR_L_B040	DUMMY	75.72	0	00:39			
ACR_L_B045	DUMMY	103.08	0	00:35			
ACR_L_B050	DUMMY	86.80	0	00:35			
ACR_L_B055	DUMMY	56.11	0	00:41			
ACR_L005	CHANNEL	439.46	0	00:40	8.17	0.16	0.42

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ACR_L010	DUMMY	374.53	0	00:39			
ACR_L035	CHANNEL	344.93	0	00:39	13.22	0.04	0.21
ACR_L045	CONDUIT	345.13	0	00:38	19.91	0.65	0.59
ACR_L045_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ACR_L050	DUMMY	345.15	0	00:38			
ACR_L055	CONDUIT	236.53	0	00:38	10.18	0.94	0.77
ACR_L055_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ACR_L060	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ACR_L065	CONDUIT	234.42	0	00:37	31.54	0.62	0.57
ACR_L070	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
ACR_L075	CONDUIT	234.43	0	00:37	28.46	0.71	0.62
ACR_L075_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
ACR_L080	CHANNEL	136.03	0	00:39	9.07	0.04	0.26
ACR_L085	CHANNEL	56.03	0	00:42	5.31	0.00	0.07
ACR_L200	CONDUIT	75.80	0	01:25	7.08	0.74	0.64
ACR_L200_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
ACR_L204	DUMMY	75.71	0	00:40			
ACR_L205	CONDUIT	75.71	0	00:40	12.29	0.49	0.49
ACR_L210	CONDUIT	75.71	0	00:40	19.56	0.26	0.35
ACR_L215	CONDUIT	75.71	0	00:40	12.01	0.53	0.53
ACR_L220	CONDUIT	75.71	0	00:40	12.85	0.46	0.48
ACR_L225	CONDUIT	75.71	0	00:40	12.85	0.46	0.48
ACR_L230	CONDUIT	75.71	0	00:39	12.85	0.46	0.48
ACR_L230_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
ACR_L235	CONDUIT	75.71	0	00:39	12.88	0.46	0.47
ACR_L240	CONDUIT	75.71	0	00:39	12.85	0.46	0.48
ACR_L245	CONDUIT	75.71	0	00:39	12.85	0.46	0.48
ACR_L250	CONDUIT	75.71	0	00:39	12.84	0.46	0.48
DFA_L_B042	DUMMY	15.35	0	00:36			
DFA_L_B043	DUMMY	68.18	0	00:33			
DFA_L005	CHANNEL	82.87	0	00:37	6.69	0.07	0.38
DFA_L010	CHANNEL	68.12	0	00:35	6.90	0.07	0.37
FHP_L_B005	DUMMY	16.05	0	00:51			
FHP_L_B010	DUMMY	26.30	0	00:40			
FHP_L_B015	DUMMY	15.22	0	00:35			
FHP_L_B020	DUMMY	20.16	0	00:35			
FHP_L_B025	DUMMY	18.60	0	00:37			
FHP_L_B030	DUMMY	164.72	0	00:36			
FHP_L_B035	DUMMY	6.19	0	00:47			
FHP_L_B040	DUMMY	43.24	0	00:41			
FHP_L_B045	DUMMY	21.35	0	00:36			
FHP_L_B050	DUMMY	14.97	0	00:36			
FHP_L_B055	DUMMY	11.62	0	00:40			
FHP_L_B060	DUMMY	50.65	0	00:38			
FHP_L_B065	DUMMY	70.77	0	00:40			
FHP_L_B070	DUMMY	63.01	0	00:40			
FHP_L_B075	DUMMY	7.32	0	00:51			
FHP_L_B080	DUMMY	64.47	0	00:37			
FHP_L_B085	DUMMY	90.08	0	00:36			
FHP_L_B090	DUMMY	52.32	0	00:35			
FHP_L_B095	DUMMY	56.14	0	00:36			
FHP_L_B100	DUMMY	32.02	0	00:37			
FHP_L_B105	DUMMY	22.12	0	00:32			
FHP_L005	CHANNEL	778.34	0	00:47	5.31	0.02	0.21
FHP_L010	CHANNEL	727.99	0	00:46	5.71	0.01	0.12
FHP_L015	CONDUIT	711.26	0	00:44	21.39	0.78	0.69
FHP_L015_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
FHP_L020	CHANNEL	569.55	0	00:45	5.86	0.02	0.21
FHP_L025	CONDUIT	16.12	0	01:52	10.10	1.08	1.00
FHP_L025_OF	CHANNEL	54.52	0	00:44	>50.00	0.00	0.10
FHP_L030	CHANNEL	522.81	0	00:43	4.48	0.53	0.75
FHP_L035	DUMMY	288.89	0	00:41			
FHP_L040	CHANNEL	226.30	0	00:41	5.74	0.08	0.34
FHP_L045	CHANNEL	92.01	0	00:42	4.13	0.04	0.26
FHP_L050	DUMMY	62.97	0	00:36			
FHP_L055	CHANNEL	7.13	0	00:59	2.31	0.00	0.05
FHP_L060	CONDUIT	7.48	0	00:23	10.40	0.39	0.43
FHP_L065	CONDUIT	7.47	0	00:23	4.63	1.08	1.00
FHP_L065_OF	CONDUIT	13.95	0	00:38	9.28	0.00	0.08
FHP_L100	CONDUIT	96.04	0	00:37	15.15	0.72	0.63
FHP_L105	CONDUIT	90.97	0	00:37	15.36	0.66	0.59
FHP_L110	CONDUIT	76.05	0	01:26	16.20	0.48	0.49
FHP_L115	CONDUIT	73.05	0	01:25	8.78	0.99	0.81
FHP_L120	CONDUIT	73.01	0	01:25	11.27	0.74	0.64
FHP_L125	CONDUIT	108.44	0	00:40	20.90	0.55	0.53
FHP_L125_OF	DUMMY	0.00	0	00:00			
FHP_L130	CONDUIT	28.19	0	00:32	17.23	1.08	1.00
FHP_L130_OF	DUMMY	43.36	0	00:44			
FHP_L140	CONDUIT	4.00	0	02:26	6.05	0.97	0.79
FHP_L145	CONDUIT	4.00	0	02:26	6.03	0.96	0.79
FHP_L145_OF	CHANNEL	65.69	0	00:41	>50.00	0.00	0.11
FHP_L150	CONDUIT	70.76	0	00:40	18.67	0.55	0.53
FHP_L150_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
FHP_L160	CONDUIT	14.01	0	01:29	9.44	0.96	0.79
FHP_L165	CONDUIT	14.00	0	01:29	12.72	0.44	0.47
FHP_L165_OF	CHANNEL	36.61	0	00:38	>50.00	0.00	0.08
FHP_L200	CONDUIT	5.49	0	00:27	7.58	1.08	1.00
FHP_L200_OF	CHANNEL	139.92	0	00:43	>50.00	0.03	0.15
FHP_L205	DUMMY	3.00	0	00:18			
FHP_L205_OF	CHANNEL	145.04	0	00:42	>50.00	0.02	0.15
FHP_L210	CONDUIT	14.97	0	00:37	10.46	0.92	0.76
FHP_L210_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
FHP_L215	CHANNEL	127.89	0	00:42	>50.00	0.03	0.15
FHP_L215_OF	DUMMY	49.44	0	00:40			
HFL_L115_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
HFT_L_B005	DUMMY	63.32	0	00:38			
HFT_L_B010	DUMMY	109.03	0	00:40			
HFT_L_B015	DUMMY	82.57	0	00:41			
HFT_L_B020	DUMMY	23.73	0	00:46			
HFT_L_B025	DUMMY	38.04	0	00:41			
HFT_L_B030	DUMMY	14.74	0	00:36			
HFT_L005	DUMMY	171.84	0	00:40			
HFT_L010	CHANNEL	108.93	0	00:41	6.16	0.00	0.11
HFT_L100	CONDUIT	46.85	0	00:27	5.27	1.08	1.00
HFT_L100_OF	DUMMY	79.71	0	00:46			
HFT_L101_OF	CHANNEL	114.00	0	00:42	>50.00	0.01	0.10
HFT_L105	CONDUIT	99.31	0	00:46	14.17	0.81	0.68
HFT_L110	CONDUIT	52.24	0	00:30	8.00	1.08	1.00
HFT_L110_OF	DUMMY	34.60	0	00:41			
HFT_L115	CONDUIT	82.57	0	00:41	15.78	0.83	0.69
HFT_L120	CONDUIT	51.02	0	00:46	12.53	0.94	0.77
HFT_L125	CONDUIT	51.01	0	00:45	15.77	0.72	0.63
HFT_L130	CONDUIT	51.01	0	00:45	17.17	0.64	0.58
HFT_L135	CONDUIT	51.01	0	00:45	13.91	0.84	0.70
HFT_L140	CONDUIT	51.01	0	00:45	12.25	0.97	0.79
HFT_L145	CONDUIT	51.00	0	00:44	15.90	0.71	0.62
HFT_L145_OF	CHANNEL	1.26	0	00:44	>50.00	0.00	0.03
HFT_L150	CONDUIT	14.71	0	00:37	7.20	0.39	0.43
HFT_L155	CONDUIT	14.71	0	00:37	6.69	0.26	0.35
HFT_L160	CONDUIT	14.71	0	00:37	7.33	0.23	0.33
HFT_L165	CONDUIT	14.71	0	00:37	6.91	0.25	0.34
HFT_L170	CONDUIT	14.73	0	00:36	5.82	0.52	0.51
HOM_L_B005	DUMMY	24.13	0	00:36			
HOM_L_B010	DUMMY	77.87	0	00:37			
HOM_L_B015	DUMMY	46.08	0	00:41			
HOM_L010	CHANNEL	134.82	0	00:40	3.32	0.04	0.28
HOM_L010_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
HOM_L015	CHANNEL	134.87	0	00:39	4.12	0.02	0.25
HOM_L020	CONDUIT	50.19	0	00:27	16.50	0.19	0.29
HOM_L021	DUMMY	60.81	0	00:40			
HOM_L023	CHANNEL	157.46	0	00:43	2.81	0.04	0.33
HOM_L025	CONDUIT	50.21	0	00:27	4.34	1.08	1.00
HOM_L025_OF	CONDUIT	88.78	0	00:37	3.23	0.03	0.25
HOM_L030	CONDUIT	115.22	0	00:31	13.01	1.08	1.00

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HOM_L030_OF	CHANNEL	28.70	0	00:37	>50.00	0.01	0.09
HOM_L035	CONDUIT	61.24	0	00:31	12.13	0.54	0.52
HOM_L040	CONDUIT	62.57	0	00:31	8.75	0.87	0.70
HOM_L045	CONDUIT	62.09	0	01:17	7.03	1.08	1.00
HOM_L045_OF	CHANNEL	49.48	0	00:41	>50.00	0.01	0.10
HOM_L050	CONDUIT	60.80	0	00:41	7.79	0.66	0.60
HOM_L055	CONDUIT	60.80	0	00:41	12.80	0.73	0.64
HOM_L060	CONDUIT	60.80	0	00:40	13.56	0.68	0.61
HOM_L065	CONDUIT	60.80	0	00:40	17.26	0.50	0.50
HOM_L070	CONDUIT	60.80	0	00:40	17.09	0.81	0.68
HOM_L070_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
HOM_L075	CONDUIT	60.80	0	00:40	15.47	0.72	0.63
HOM_L075_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
HOM_L080	CONDUIT	15.51	0	00:26	7.05	0.44	0.46
HOM_L085	CONDUIT	16.05	0	00:26	8.71	0.35	0.40
HOM_L090	CONDUIT	16.11	0	01:39	5.58	1.08	1.00
HOM_L090_OF	CONDUIT	45.91	0	00:40	8.16	0.00	0.10
JAM_L_B005	DUMMY	33.54	0	00:40			
JAM_L_B010	DUMMY	86.31	0	00:37			
JAM_L005	CHANNEL	85.24	0	00:41	5.07	0.01	0.20
JAM_L010	CONDUIT	86.30	0	00:37	14.98	0.44	0.47
JAM_L015	CONDUIT	86.30	0	00:37	21.70	0.27	0.35
KET_L_B005	DUMMY	40.44	0	00:36			
KET_L_B010	DUMMY	71.76	0	00:35			
KET_L005	CONDUIT	81.04	0	00:31	17.58	1.12	1.00
KET_L005_OF	CONDUIT	39.44	0	00:37	3.97	0.05	0.21
KET_L010	CONDUIT	35.27	0	00:29	7.79	1.08	1.00
KET_L010_OF	CONDUIT	39.05	0	00:37	9.65	0.00	0.09
KET_L011	CONDUIT	36.45	0	00:28	10.55	0.82	0.67
KET_L015	CONDUIT	35.72	0	00:28	7.90	1.08	1.00
KET_L015_OF	CONDUIT	38.63	0	00:37	4.62	0.01	0.16
KET_L020	CHANNEL	71.69	0	00:36	4.90	0.02	0.19
KET_L025	CONDUIT	71.74	0	00:35	17.18	0.62	0.57
KET_L030	CONDUIT	71.74	0	00:35	17.46	0.61	0.56
KET_L035	CONDUIT	71.74	0	00:35	17.98	0.50	0.50
KET_L035_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
KET_L040	CHANNEL	71.75	0	00:35	4.88	0.02	0.19
PHI_L_B100	DUMMY	38.91	0	00:37			
PHI_L_B105	DUMMY	25.10	0	00:44			
PHI_L_B110	DUMMY	125.28	0	00:35			
PHI_L_B115	DUMMY	378.12	0	00:34			
PHI_L010	CHANNEL	302.39	0	00:54	8.15	0.15	0.42
PHI_L015	CHANNEL	272.89	0	00:54	8.53	0.08	0.31
PHI_L020	DUMMY	357.26	0	00:37			
SPC_L_B005	DUMMY	52.83	0	00:38			
SPC_L_B010	DUMMY	66.17	0	00:37			
SPC_L_B015	DUMMY	80.27	0	00:40			
SPC_L_B020	DUMMY	30.55	0	00:42			
SPC_L_B025	DUMMY	81.98	0	00:40			
SPC_L_B030	DUMMY	188.18	0	00:35			
SPC_L_B035	DUMMY	112.69	0	00:33			
SPC_L_B040	DUMMY	245.90	0	00:32			
SPC_L_B045	DUMMY	185.50	0	00:35			
SPC_L_B046	DUMMY	41.99	0	00:36			
SPC_L_B050	DUMMY	13.79	0	00:41			
SPC_L_B055	DUMMY	32.37	0	00:40			
SPC_L_B060	DUMMY	35.57	0	00:42			
SPC_L_B065	DUMMY	36.37	0	00:42			
SPC_L_B070	DUMMY	73.11	0	00:41			
SPC_L_B080	DUMMY	41.47	0	00:41			
SPC_L_B085	DUMMY	39.69	0	00:40			
SPC_L_B090	DUMMY	10.56	0	00:51			
SPC_L_B095	DUMMY	101.84	0	00:37			
SPC_L_B100	DUMMY	75.10	0	00:37			
SPC_L_B105	DUMMY	35.67	0	00:46			
SPC_L_B110	DUMMY	54.31	0	00:38			
SPC_L005	CHANNEL	1211.38	0	00:52	7.50	0.38	0.69
SPC_L010	CHANNEL	1166.69	0	00:51	7.49	0.04	0.28
SPC_L015	CHANNEL	1114.40	0	00:50	7.63	0.34	0.65
SPC_L020	CONDUIT	1009.14	0	00:49	13.84	0.82	0.73
SPC_L020_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L025	CHANNEL	756.73	0	00:52	10.94	0.01	0.09
SPC_L030	CHANNEL	686.38	0	00:54	9.21	0.01	0.12
SPC_L035	CHANNEL	613.94	0	01:09	4.37	0.02	0.15
SPC_L040	CONDUIT	869.43	0	00:41	35.94	0.35	0.41
SPC_L040_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L045	CHANNEL	706.73	0	00:43	8.97	0.11	0.36
SPC_L050	CONDUIT	706.97	0	00:43	23.31	0.47	0.48
SPC_L055	CONDUIT	706.98	0	00:43	22.47	0.49	0.50
SPC_L060	CONDUIT	308.08	0	00:51	17.86	0.22	0.32
SPC_L065	CONDUIT	300.08	0	00:52	18.28	0.40	0.44
SPC_L070	CONDUIT	300.08	0	00:51	18.26	0.95	0.78
SPC_L075	CONDUIT	300.09	0	00:51	17.59	0.99	0.81
SPC_L080	CONDUIT	300.09	0	00:51	17.82	0.98	0.80
SPC_L085	CONDUIT	300.10	0	00:51	17.69	0.98	0.81
SPC_L090	CONDUIT	300.12	0	00:51	17.77	0.98	0.80
SPC_L090_OF	CONDUIT	8.11	0	00:51	11.55	0.01	0.15
SPC_L095	CONDUIT	273.98	0	00:47	17.46	0.90	0.75
SPC_L100	CONDUIT	273.98	0	00:47	17.61	0.90	0.74
SPC_L105	CONDUIT	273.98	0	00:47	17.57	0.90	0.74
SPC_L110	CONDUIT	273.98	0	00:47	17.70	0.89	0.74
SPC_L110_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L115	CONDUIT	213.94	0	00:45	24.23	0.43	0.46
SPC_L115_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L120	CHANNEL	213.94	0	00:45	4.16	0.00	0.07
SPC_L125	CHANNEL	70.77	0	00:47	4.06	0.00	0.07
SPC_L130	CHANNEL	35.91	0	00:47	4.20	0.00	0.08
SPC_L135	CHANNEL	112.78	0	00:43	5.48	0.01	0.08
SPC_L140	CHANNEL	40.93	0	00:45	4.69	0.00	0.05
SPC_L150	CONDUIT	61.46	0	00:50	12.05	0.27	0.36
SPC_L155	CONDUIT	61.46	0	00:50	12.20	0.27	0.35
SPC_L160	CONDUIT	61.46	0	00:50	12.09	0.27	0.36
SPC_L165	CHANNEL	48.57	0	00:51	>50.00	0.00	0.08
SPC_L170	CHANNEL	38.15	0	00:48	>50.00	0.00	0.08
SPC_L200	CONDUIT	258.66	0	00:43	23.44	0.29	0.37
SPC_L205	CONDUIT	258.66	0	00:42	15.70	0.50	0.50
SPC_L210	CONDUIT	258.67	0	00:42	15.72	0.49	0.50
SPC_L215	CONDUIT	258.67	0	00:42	15.69	0.50	0.50
SPC_L220	CONDUIT	258.67	0	00:42	22.01	0.31	0.38
SPC_L225	CONDUIT	162.56	0	00:44	19.71	0.52	0.51
SPC_L230	CONDUIT	162.56	0	00:44	19.70	0.52	0.51
SPC_L235	CONDUIT	73.91	0	00:43	10.21	0.44	0.46
SPC_L240	CONDUIT	73.91	0	00:43	5.83	0.90	0.74
SPC_L240_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L245	CONDUIT	73.91	0	00:42	7.57	0.65	0.59
SPC_L250	CONDUIT	73.92	0	00:42	15.70	0.24	0.34
SPC_L250_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
SPC_L255	CHANNEL	73.92	0	00:42	4.32	0.00	0.09
SPC_L260	CONDUIT	88.93	0	00:45	13.38	0.54	0.52
SPC_L265	CONDUIT	88.93	0	00:44	8.62	0.70	0.62
SPC_L265_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
SPC_L270	CHANNEL	53.42	0	00:43	4.20	0.00	0.06
SPC_L275	CONDUIT	54.30	0	00:38	12.75	0.42	0.45
SPC_L300	CONDUIT	74.03	0	00:49	15.69	0.34	0.40
SPC_L305	CONDUIT	74.04	0	00:49	17.40	0.99	0.81
SPC_L310	CONDUIT	74.04	0	00:49	18.03	0.95	0.78
SPC_L310_OF	CHANNEL	6.01	0	00:42	>50.00	0.00	0.05
SPC_L400	CONDUIT	41.98	0	00:36	10.43	0.39	0.44
SPC_L405	CONDUIT	41.98	0	00:36	12.75	0.30	0.37
SPC_L410	CONDUIT	41.98	0	00:36	10.13	0.41	0.45
TRE_L_B005	DUMMY	50.43	0	00:42			
TRE_L_B010	DUMMY	93.18	0	00:36			
TRE_L_B015	DUMMY	40.90	0	00:36			
TRE_L_B020	DUMMY	17.41	0	00:35			

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TRE_L_B025	DUMMY	7.86	0	00:36			
TRE_L005	CONDUIT	64.55	0	00:39	12.44	0.39	0.43
TRE_L010	CONDUIT	64.55	0	00:39	15.93	0.28	0.36
TRE_L010_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
TRE_L015	CONDUIT	64.56	0	00:38	12.54	0.55	0.53
TRE_L020	CONDUIT	64.56	0	00:38	15.46	0.41	0.45
TRE_L020_OF	CONDUIT	0.00	0	00:00	0.00	0.00	0.00
TRE_L025	CONDUIT	30.01	0	01:11	5.87	0.54	0.52
TRE_L030	CONDUIT	30.00	0	01:10	11.87	0.21	0.31
TRE_L030_OF	CONDUIT	34.56	0	00:38	5.10	0.00	0.06
TRE_L035	CHANNEL	24.17	0	00:39	3.89	0.00	0.05
TRE_L040	CONDUIT	7.86	0	00:37	4.16	0.00	0.06
TRE_L045	CONDUIT	7.86	0	00:36	7.67	0.06	0.16
TRE_L045_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
TRE_L200	CONDUIT	141.75	0	00:38	17.31	0.97	0.79
TRE_L205	CONDUIT	141.75	0	00:38	22.38	0.72	0.63
TRE_L205_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
TRE_L210	CONDUIT	93.04	0	00:36	17.77	0.83	0.69
TRE_L215	CONDUIT	93.09	0	00:36	16.85	0.88	0.73
TRE_L220	CONDUIT	93.15	0	00:36	20.19	0.71	0.62
TRE_L225	CONDUIT	93.16	0	00:36	17.87	0.82	0.69
TRE_L225_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
WCE_L_B005	DUMMY	8.19	0	00:52			
WCE_L_B010	DUMMY	32.17	0	00:36			
WCE_L_B015	DUMMY	54.83	0	00:41			
WCE_L_B020	DUMMY	43.66	0	00:37			
WCE_L_B025	DUMMY	25.05	0	00:40			
WCE_L_B029	DUMMY	21.68	0	00:41			
WCE_L_B030	DUMMY	40.36	0	00:43			
WCE_L_B035	DUMMY	40.93	0	00:41			
WCE_L_B040	DUMMY	4.81	0	00:44			
WCE_L_B045	DUMMY	56.08	0	00:39			
WCE_L_B050	DUMMY	17.06	0	00:47			
WCE_L_B055	DUMMY	43.42	0	00:37			
WCE_L_B056	DUMMY	6.93	0	00:37			
WCE_L_B060	DUMMY	31.67	0	00:35			
WCE_L_B065	DUMMY	80.96	0	00:31			
WCE_L_B070	DUMMY	43.32	0	00:36			
WCE_L_B075	DUMMY	33.83	0	00:36			
WCE_L_B080	DUMMY	48.05	0	00:35			
WCE_L_B085	DUMMY	18.56	0	00:35			
WCE_L_B090	DUMMY	129.82	0	00:37			
WCE_L_B095	DUMMY	19.62	0	00:36			
WCE_L_B100	DUMMY	78.11	0	00:37			
WCE_L_B105	DUMMY	88.11	0	00:35			
WCE_L_B110	DUMMY	56.56	0	00:36			
WCE_L005	CHANNEL	745.22	0	00:50	8.06	0.22	0.54
WCE_L010	CHANNEL	730.07	0	00:50	9.47	0.43	0.73
WCE_L015	CHANNEL	671.44	0	00:50	7.99	0.12	0.42
WCE_L020	CHANNEL	651.29	0	00:49	10.31	0.16	0.45
WCE_L025	CHANNEL	473.68	0	01:03	5.71	0.26	0.57
WCE_L030	CONDUIT	430.28	0	01:01	20.26	0.47	0.48
WCE_L035	CHANNEL	414.33	0	01:01	3.77	0.09	0.35
WCE_L040	CHANNEL	384.39	0	01:00	5.11	0.12	0.41
WCE_L045	CHANNEL	328.26	0	01:01	6.10	0.10	0.38
WCE_L064	DUMMY	440.13	0	00:37			
WCE_L065	CONDUIT	265.11	0	00:54	17.41	0.55	0.53
WCE_L070	CONDUIT	265.11	0	00:54	11.01	0.97	0.79
WCE_L075	CONDUIT	265.12	0	00:54	12.80	0.82	0.69
WCE_L080	CONDUIT	265.17	0	00:30	10.84	0.99	0.81
WCE_L085	CONDUIT	265.47	0	00:30	16.88	0.58	0.54
WCE_L085_OF	CHANNEL	106.07	0	00:38	>50.00	0.01	0.11
WCE_L090	CONDUIT	308.51	0	00:32	15.95	0.97	0.78
WCE_L095	CONDUIT	302.29	0	00:32	13.84	1.08	1.00
WCE_L095_OF	CHANNEL	91.93	0	00:37	>50.00	0.01	0.11
WCE_L100	CONDUIT	241.90	0	00:37	16.80	0.64	0.58
WCE_L105	CONDUIT	140.08	0	00:56	10.32	0.97	0.80
WCE_L110	CONDUIT	140.08	0	00:56	27.08	0.38	0.43
WCE_L115	CONDUIT	140.08	0	00:56	15.77	0.78	0.67
WCE_L115_OF	CHANNEL	82.49	0	00:37	>50.00	0.00	0.10
WCE_L120	CONDUIT	132.27	0	00:39	21.97	0.25	0.36
WCE_L125	CONDUIT	132.27	0	00:39	18.10	0.32	0.40
WCE_L125_OF	CHANNEL	0.00	0	00:00	0.00	0.00	0.00
WCE_L130	CONDUIT	130.04	0	00:41	12.04	0.98	0.80
WCE_L135	CONDUIT	130.01	0	00:41	15.43	0.73	0.64
WCE_L135_OF	CHANNEL	2.27	0	00:39	>50.00	0.00	0.04
WCE_L140	CONDUIT	42.03	0	00:52	9.03	0.33	0.40
WCE_L145	CONDUIT	42.03	0	00:52	5.08	0.99	0.81
WCE_L150	CONDUIT	42.02	0	00:51	8.61	0.76	0.65
WCE_L155	CONDUIT	42.02	0	00:51	9.87	0.64	0.58
WCE_L160	CONDUIT	42.03	0	00:51	10.76	0.57	0.54
WCE_L165	CONDUIT	42.03	0	00:51	11.45	0.53	0.52
WCE_L170	CONDUIT	42.03	0	00:51	10.09	0.62	0.57
WCE_L170_OF	CHANNEL	13.46	0	00:39	>50.00	0.00	0.06
WCE_L180	CONDUIT	83.89	0	00:35	12.85	1.08	0.96
WCE_L180_OF	CHANNEL	10.38	0	00:35	>50.00	0.00	0.06
WCE_L200	DUMMY	7.24	0	02:08			
WCE_L205	CONDUIT	7.24	0	02:08	2.86	0.53	0.52
WCE_L210	CONDUIT	7.54	0	00:22	6.44	0.18	0.29
WCE_L215	CONDUIT	7.83	0	00:22	7.29	0.17	0.27
WCE_L220	CONDUIT	7.70	0	00:22	1.71	1.08	1.00
WCE_L220_OF	CONDUIT	78.33	0	00:43	6.17	0.01	0.18
WCE_L225	CONDUIT	42.39	0	00:29	9.38	1.08	1.00
WCE_L225_OF	CONDUIT	46.48	0	00:41	3.33	0.01	0.20
WCE_L230	CHANNEL	54.73	0	00:42	5.84	0.01	0.12
WCE_L300	CHANNEL	31.35	0	00:37	>50.00	0.00	0.07
WCE_L400	CONDUIT	37.04	0	00:44	20.53	0.60	0.56
WCE_L405	CONDUIT	37.04	0	00:44	13.54	1.00	0.82
WCE_L410	CONDUIT	37.04	0	00:44	14.02	0.96	0.79
WCE_L410_OF	CONDUIT	10.83	0	00:36	10.32	0.00	0.07
WCE_L415	CHANNEL	61.75	0	00:37	6.70	0.05	0.34
WCE_L420	CHANNEL	18.09	0	00:39	6.26	0.02	0.24
WSC_L_B005	DUMMY	73.26	0	00:42			
WSC_L_B010	DUMMY	22.26	0	00:36			
WSC_L_B015	DUMMY	37.36	0	00:37			
WSC_L_B020	DUMMY	69.06	0	00:36			
WSC_L_B025	DUMMY	88.53	0	00:35			
WSC_L005	CHANNEL	295.58	0	00:41	9.93	0.00	0.07
WSC_L010	CHANNEL	222.49	0	00:40	9.83	0.00	0.06
WSC_L015	CONDUIT	186.02	0	00:37	27.36	0.30	0.38
WSC_L020	CONDUIT	186.02	0	00:37	27.40	0.30	0.38
WSC_L025	CHANNEL	163.88	0	00:37	6.41	0.01	0.18
WSC_L030	CONDUIT	82.08	0	00:39	13.79	0.47	0.48
WSC_L035	CONDUIT	82.08	0	00:39	13.81	0.46	0.48
WSC_L040	CONDUIT	82.09	0	00:39	13.71	0.47	0.48
WSC_L045	CONDUIT	82.10	0	00:38	13.70	0.47	0.48
WSC_L050	CONDUIT	82.10	0	00:38	7.65	0.98	0.80
WSC_L050_OF	CONDUIT	6.11	0	00:38	10.75	0.00	0.05
WSC_L100	CHANNEL	37.31	0	00:37	>50.00	0.01	0.09
SPC_L_B036	DUMMY	77.57	0	00:36			
ACR_S100_OUTLET	DUMMY	75.80	0	01:25			
PHI_AKRON_OUTLET	DUMMY	357.26	0	00:37			
PHI_YOSEMITE_OUTLET	DUMMY	249.31	0	00:54			
SPC_S100_OUTLET	DUMMY	614.05	0	01:06			
WCE_S100_OUTLET	DUMMY	276.20	0	01:01			

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*************************
Conduit Surcharge Summary
*************************

---------------------------------------------------------------------------
                                                        Hours        Hours
                       --------- Hours Full --------  Above Full   Capacity
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Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
FHP_L025	1.42	1.42	1.42	1.44	1.42
FHP_L065	0.60	0.60	0.60	0.61	0.60
FHP_L130	1.07	1.07	1.07	1.07	1.07
FHP_L200	1.13	1.13	1.13	0.01	1.13
HFT_L100	1.28	1.28	1.28	1.28	1.28
HFT_L110	0.72	0.72	0.72	0.72	0.72
HOM_L025	1.14	1.14	1.14	1.14	1.14
HOM_L030	0.51	0.51	0.51	0.51	0.51
HOM_L045	0.78	0.78	0.78	0.78	0.78
HOM_L090	1.24	1.24	1.24	0.02	1.24
KET_L005	0.40	0.40	0.40	0.40	0.40
KET_L010	0.54	0.54	0.54	0.03	0.54
KET_L015	0.53	0.53	0.53	0.02	0.53
WCE_L095	0.36	0.36	0.36	0.36	0.36
WCE_L180	0.19	0.19	0.19	0.19	0.19
WCE_L220	1.76	1.76	1.76	0.02	1.76
WCE_L225	0.84	0.84	0.84	0.84	0.84

Analysis begun on: Mon Jan 27 14:46:27 2020
Analysis ended on: Mon Jan 27 14:46:31 2020
Total elapsed time: 00:00:04

Threshold Runoff

Threshold runoff is defined as "the amount of *effective* rainfall of a given duration falling over a watershed that is just enough to cause *bankfull* conditions at the outlet of the draining stream." (Modrick, 2015; Shamir, 2018). Threshold runoff is an important physically-based characteristic of a watershed used by Weather Forecast Offices and River Forecast Centers, and is a prime indicator of maximal sustainable surface runoff for a given watershed (Carpenter et al., 1999). When combined with current soil moisture conditions and doppler radar, threshold runoff estimates become an essential component of the flash flood warning and flash flood guidance systems, especially in watersheds prone to flash flooding.

Threshold runoff estimates are commonly evaluated by application of the thresholdR Method or through GIS-based assessments. The thresholdR Method, developed by NOAA's National Weather Service as part of the Threshold Runoff Program that following deployment of Doppler radar in the early 1990s, is used for flash flood guidance purposes. This method defines threshold runoff as the ratio of the streamflow at bankfull conditions to the unit hydrograph peak flow in a given watershed. Bankfull flow is derived by applying Manning's flow equation for a given stream or through USGS regression equations for a two-year return frequency. The unit hydrograph peak flow is estimated through Snyder's unit hydrograph method or the geomorphologic unit hydrograph (NWS, 2001).

Initial soil moisture content (or soil moisture deficit) is the most critical factor relating the precipitation to threshold runoff because threshold runoff quantifies the saturated and unsaturated soil condition relationship to direct runoff during varying precipitation events. Several research papers and experiments studies address these hydrologic-hydraulic through experimental studies and modeling applications.

- Ajmal et al. (2015) evaluated event-based rainfall-runoff models in terms of antecedent soil moisture conditions for NRCS curve numbers and nonlinear runoff estimation methods.
- Kusumastuti et al. (2007) illustrated the effects of threshold runoff to flood frequency.
- Kampf et al. (2018) and Faulconer (2015) (master's thesis) evaluated the occurrence of runoff in hyperarid and semi-arid ephemeral streams due to rainfall intensity thresholds and illustrated the importance of runoff frequency and scale-dependence in threshold analyses in these types of watersheds.
- Hrncir et al. (2010) determined that initial soil water content is a statistically significant physical parameter influencing the rainfall-runoff relationship and runoff forming process at the catchment scale.
- Reed (2001) (presentation) and Reed et al. (2002) provided an overview of GIS applications for deriving threshold runoff values to assist in flash flood guidance, and discussed methods for determining threshold runoff estimates for application purposes.
- Curtu et al. (2014) presented ordinary differential equations to quantify the relationship between soil moisture, groundwater, and surface runoff dynamics.
- Minet et al. (2011) determined simulated runoff response in a watershed is highly sensitive to spatial variability of soil moisture within a distributed hydrologic model.
- Scaife and Band (2017) illustrated seasonal and interannual nonstationary associated with stormflow thresholds as a function of precipitation and antecedent soil moisture conditions, including recent climate dryness, ecosystem water use, and catchment geophysical properties such as vegetation-climate influences on long-term rainfall-runoff relationships.
- Schoener and Stone (2019) researched the impact of soil moisture on runoff in a semi-arid climate and determined that antecedent soil moisture, when modeled at the catchment scale, performed poorly for small runoff events compared to large discharge events that considered antecedent soil moisture conditions.
- Penna et al. 2011 evaluated soil moisture in alpine headwater streams and determined clear threshold relationships between soil water content and streamflow on hydrologic response timing.
- Other relevant research for modeling relationship of soil moisture and precipitation to storm runoff/hydrologic response are discussed in Ali et al. (2015), Williams et al. (pre-print), Zehe et al. (2005), and Zhang et al. (2011).

To summarize, threshold runoff is a one-time, physically-based calculation relating watershed characteristics (area, length, slope) to channel properties (bankfull channel width and depth) of a given drainage area, whereas flash flood guidance systems integrate the threshold runoff as a physically-based characteristic with soil moisture parameters and parameter for flood forecasting and warnings. The influence of antecedent soil water content to flow frequency is significant when compared to other hydrologic and hydraulic parameters on threshold runoff estimates.

The literature indicates much variability for threshold runoff based on watershed conditions, and unfortunately, a detailed study of this phenomena has not been conducted in the Denver region. Such a study could potentially be conducted for small watersheds in the metropolitan area using UDFCD rainfall and stream gauges. The studies with greatest applicability to the western US are summarized in Table 1. Heavily forested watersheds may have thresholds well in excess of an inch of rainfall as reported by Ali et al. (2015), which is not surprising since the forest canopy and heavy "duff" layer can store significant amounts of rain and because shallow subsurface flow may occur in many of the watersheds. The study by Kampf et al. (2018), which is based in Arizona with arid and semi-arid watersheds, reported significantly lower thresholds, on the order of 0.5 inches of precipitation over a short duration (e.g., several hours). Given differences between watersheds in Arizona and Front Range watersheds in Colorado, we would expect these values to be somewhat lower than in Colorado. The study by Carpenter et al. (1999) found threshold runoff values for short duration storms in Iowa, Oklahoma, and California that generally fell between those found by Ali et al. (2015) in the northwest and Kampf et al. (2018) in Arizona.

Absent a detailed study in Colorado, WWE supplemented the literature review with some Curve Number calculations to determine typical initial abstractions for different types of land cover. Table 2 presents these results. For herbaceous cover in good condition, the initial abstraction for Hydrologic Soil Group C is approximately 0.7 inches. The initial abstraction is very similar to the 1-hour, 1-year depth from NOAA Atlas 14 in the study area, which is 0.68 inches. If more woody vegetation is present, the initial abstraction is somewhat higher.

This literature review and calculations indicate that threshold runoff is very sensitive to site-specific conditions, including vegetative cover, hydrologic conditions, soils, antecedent moisture, and other watershed characteristics. Detailed data are not available for Colorado, but based on studies in western states and calculations, it seems reasonable to assume a threshold for runoff around the 1-year event for short duration (1- to 3- hour storms) for native grasslands. WWE found similar results in our continuous simulation modeling of the Oak Gulch watershed. UDFCD hopes to collect baseline data in the Oak Gulch watershed before the development is constructed to help verify a range of threshold runoff values for different antecedent conditions.

Table 1. Major Findings from Literature Review of Threshold Runoff

Reference	Study Area	Findings
Ali et al. 2015	Nine North-Watch catchments (US, Sweden, Canada, and Scotland); catchment area ranged from 100 to 7,400 acres	- Threshold values were highly variable between catchments - For rainfall events without consideration for the storage deficit, values ranged from 2.0 to 3.9 inches (median of 3.1 inches). - For rainfall events with consideration for the storage deficit, values ranged from 1.4 to 3.1 inches (median of 2.1 inches). - For snowmelt events without consideration for the storage deficit, values ranged from 1.0 to 7.1 inches (median of 4.7 inches) - For snowmelt events with consideration for the storage deficit, values ranged from 1.2 to 7.1 inches (median of 3.3 inches)
Carpenter et al. 1999	Three different regions evaluated with the four different *threshR* methods, including: - California (1,794 subbasins with areas ranging from 2 to 1,420 mi^2), - Iowa (10,878 subbasins with areas ranging from 2 to 4,500 mi^2), and - Oklahoma (15,879 subbasins with areas ranging from 2 to 7,500 mi^2)	- Threshold runoff values varied between each region with averages of 1.3 inches for Oklahoma, 0.6 inches for Iowa, and 0.4 inches for California - Manually procedure-computed threshold runoff values for Iowa and Oklahoma were 0.1 to 1.7 inches and 0.4 to 1.7 inches, respectively. - Relative frequency of threshold runoff values for the four methods and three effective rainfall durations (1-hour, 3-hour, and 6-hour) were computed for Oklahoma basins and represented in Figure 9 of the text.
Kampf et al. 2018	Study watersheds in Arizona, including one hyperarid and one semiarid watershed	- Watershed mean 60-min intensity thresholds ranged from 0.1-0.5 in/hr in hyperarid watersheds and 0.3-0.6 in/hr in semiarid watersheds. - The maximum MI_{60} threshold values increased with drainage area (around 0.2 in/hr in the smallest watersheds up to over 1.0 in/hr in the largest watersheds). - The choice of rain data strongly influenced threshold values; single rain gauges were only adequate for threshold prediction with watershed areas less than 0.4 mi^2, and incomplete rainfall data led to increases in thresholds with increased drainage areas.

Table 2. Estimated Initial Abstraction by NRCS Runoff Curve Numbers for Arid and Semiarid Rangelands

Land Cover Description		Hydrologic soil group C			Hydrologic soil group D			Range of I_a for Type C/D Soils
Cover Type	Condition	CN	S (in)	I_a (in)	CN	S (in)	I_a (in)	I_a (in)
Herbaceous – mixture of grass, weeds and low-growing brush, with brush the minor element	Poor	87	1.5	0.3	93	0.8	0.2	0.2 to 0.3
	Fair	81	2.3	0.5	89	1.2	0.2	0.2 to 0.5
	Good	74	3.5	0.7	85	1.8	0.4	0.4 to 0.7
Oak-Aspen – mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush	Poor	74	3.5	0.7	79	2.7	0.5	0.5 to 0.7
	Fair	57	7.5	1.5	63	5.9	1.2	1.2 to 1.5
	Good	41	14.4	2.9	48	10.8	2.2	2.2 to 2.9
Pinyon-juniper – pinyon, juniper, or both; grass understory	Poor	85	1.8	0.4	89	1.2	0.2	0.2 to 0.4
	Fair	73	3.7	0.7	80	2.5	0.5	0.5 to 0.7
	Good	61	6.4	1.3	71	4.1	0.8	0.8 to 1.3
Sage-grass – sage with grass understory	Poor	80	2.5	0.5	85	1.8	0.4	0.4 to 0.5
	Fair	63	5.9	1.2	70	4.3	0.9	0.9 to 1.2
	Good	47	11.3	2.3	55	8.2	1.6	1.6 to 2.3
Desert shrub – major plants include saltbush, greasewood, creosote bush, blackbrush, bursage, paloverde, mesquite, and cactus	Poor	85	1.8	0.4	88	1.4	0.3	0.3 to 0.4
	Fair	81	2.3	0.5	86	1.6	0.3	0.3 to 0.5
	Good	79	2.7	0.5	84	1.9	0.4	0.4 to 0.5

NOTES
1) CN represent NRCS runoff curve numbers for rangelands from Table 2-2d.
2) S represent potential maximum retention after runoff begins (inches), where S=1000/CN-10.
3) Ia represents initial abstraction (inches), where Ia = 0.2S

References

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Screenshots of tables from *Urban hydrology for small watersheds (TR-55)* by Cronshey (1986)

Table 2-2d Runoff curve numbers for arid and semiarid rangelands [1]

Cover description: Cover type	Cover description: Hydrologic condition [2]	Curve numbers for hydrologic soil group: A [3]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

1 Average runoff condition, and I_a, = 0.2S. For range in humid regions, use table 2-2c.
2 Poor: <30% ground cover (litter, grass, and brush overstory).
Fair: 30 to 70% ground cover.
Good: > 70% ground cover.
3 Curve numbers for group A have been developed only for desert shrub.

Table 4-1 I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	70	0.857
41	2.878	71	0.817
42	2.762	72	0.778
43	2.651	73	0.740
44	2.545	74	0.703
45	2.444	75	0.667
46	2.348	76	0.632
47	2.255	77	0.597
48	2.167	78	0.564
49	2.082	79	0.532
50	2.000	80	0.500
51	1.922	81	0.469
52	1.846	82	0.439
53	1.774	83	0.410
54	1.704	84	0.381
55	1.636	85	0.353
56	1.571	86	0.326
57	1.509	87	0.299
58	1.448	88	0.273
59	1.390	89	0.247
60	1.333	90	0.222
61	1.279	91	0.198
62	1.226	92	0.174
63	1.175	93	0.151
64	1.125	94	0.128
65	1.077	95	0.105
66	1.030	96	0.083
67	0.985	97	0.062
68	0.941	98	0.041
69	0.899		