



**DONALD W. MCINTOSH
ASSOCIATES, INC.**

**FONTANA
(NAVD 88)
OSCEOLA COUNTY, FLORIDA**

ENGINEERING REPORT

**Application for:
CONCEPTUAL ENVIRONMENTAL
RESOURCE PERMIT MODIFICATION**

CIVIL ENGINEERS

LAND PLANNERS

SURVEYORS

**Submitted to:
SOUTH FLORIDA WATER MANAGEMENT DISTRICT**

FEBRUARY, 2021

Revisions in Italics

PREPARED BY:

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Certification of Authorization No. 68

Dated March 7, 2001

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Fontana

Revisions to the Post-Development Model – August 2020

Basins

SMA-1	Revised basin area from 106.28 acres to 99.19 acres
MARINA	New basin of 7.14 acres
W-16	Revised basin from 15.88 acres to 15.94 acres

Nodes

MARINA	New node of 1.35 acres at DNW
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Links

CS-MARINA	Added control structure from MARINA to LK TOHO outfall
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Water Quality

SMA-1	Revised water quality calculations to include MARINA
MARINA	Added water quality calculations



FONTANA ENGINEERING REPORT

A. PROJECT OVERVIEW

1. Project Description

Fontana is a proposed mixed use development consisting primarily of residential uses. *The development will include approximately 3,020 single family and multi-family residential units, with interspersed neighborhood and commercial centers, a centrally located school site and a future commercial marina with related facilities, to be permitted separately, at the southwest corner of the property.* A copy of the current conceptual plan for the project is included with this application separately for reference. Water quantity and quality requirements will be met using 16 wet detention pond systems.

2. Project Area

The total property area is 677 acres, including approximately 624 acres of development.

3. Project Location

The property is located in unincorporated Osceola County in Sections 27, 28, 33, and 34, Township 26 South, and Range 30 East. The property is west of the Florida Turnpike (S.R. 91) and north of Friar's Cove Road. The property abuts Friar's Cove on the eastern side of Lake Tohopekaliga. Please refer to the Vicinity Map, Appendix B.1

4. Project Datum

All datum references contained within this report, the supporting calculations, and the conceptual stormwater management plans reference NAVD88 Datum.

5. Project Results

See the Critical Data Summary provided in Appendix A for tabulated results which meet the requirements of Osceola County and the South Florida Water Management District (SFWMD).

B. EXISTING CONDITIONS AND GENERAL SITE INFORMATION

1. Existing Drainage and Topography

The site topography slopes primarily to the east and the west, with the highest areas being located near to the center of the site. This results in easterly and westerly flow patterns. The easterly flow drains into the Gator Bay Slough via ditches and wetlands. The Gator Bay Slough flows into the WPA Canal, which



discharges at Friar's Cove and ultimately to Lake Tohopekaliga. The westerly flow drains into the WPA Canal and Lake Tohopekaliga via wetlands, ditches, and existing drainage pipes. Review of the elevation contours depicted on the LIDAR topographic data obtained from Osceola County indicates the site elevations range between 54 feet NAVD near Friar's Cove, to 68 feet NAVD at the high areas in the center of the site. General topographic information for the project area is depicted on the U.S.G.S. Quad Map, Appendix B.2. Site specific topographic information is presented on the Pre-Development Basin Map included in Appendix C and on the mass grading plans.

The project site is contained within the Lake Tohopekaliga drainage basin. The ultimate discharge point receiving runoff from the site is Lake Tohopekaliga, via ditches, wetlands, and canals. A small offsite area south of Friar's Cove Road drains onto the property.

2. Existing Land Use

The property is primarily pasture, wetlands, woods, and former orange groves. There is also extensive ditching from past agricultural use, as shown in the FLUCCS Map, Appendix B.6. The land use utilized in the analyses is a combination of off-site land coverage provided by SFWMD, as well as on-site land coverage as determined by the environmental consultant, Bio-Tech Consulting, Inc.

3. Soils and Groundwater

Please refer to the NRCS Soil Map, Appendix B.4, for a graphical representation of the soil types described in the Natural Resources Conservation Service (NRCS) Soil Survey of Osceola County. *For further information, please refer to the Geotechnical Report for Fontana Property and related supporting documentation prepared by Devo Engineering and submitted for the original permit, Application No. 180510-569, a copy of which is included with this application submittal for completeness.*

4. Lake Tohopekaliga

The ultimate discharge point of the site is Lake Tohopekaliga. Lake Tohopekaliga is a regulated lake with controlled elevations ranging between 51 and 54 feet NAVD. See Osceola County Lakes Management Plan Excerpt for more information, Appendix C.3.

5. 100-Year Floodplain

The western portion of the property abutting the WPA Canal lies within a Zone AE 100-year floodplain with a base flood elevation of 57.1 NAVD, as determined by FEMA, FIRM Maps 12097C0255G and 12097C0265G, and LOMR Case No. 16-04-3250P. The northeastern portion of the property lies within a Zone A 100-



year floodplain. Please refer to the FEMA Flood Zone Map, Appendix B.5, for further information.

C. WATER QUANTITY ANALYSIS

1. Proposed Drainage Overview

The Fontana property is designed with 16 wet detention ponds for managing runoff generated from the development. The proposed ponds will discharge into on- and off-site wetlands and the WPA Canal. The ponds along the southern portion of the property will treat, attenuate, and cascade until discharging into the WPA Canal and nearby wetlands. The ponds located in the northern half of the property will treat, attenuate, and discharge into nearby wetlands and the Gator Bay Slough.

2. Design Criteria

Water quantity design and performance criteria are in accordance with SFWMD and Osceola County stormwater management system requirements as summarized below.

Discharge Rate Control (SFWMD):

Limit the post development peak discharge rate to that of pre-development for the 10-year, 72-hour design storm event or the design storm criteria specified by the local government, whichever is more stringent.

More specifically, the project lies within the Lake Tohopekaliga Basin (84,130 acres) as depicted on Figure 10 included in Appendix R (formerly Appendix 2) of the SFWMD SWERP Manual, “Allowable Discharge Values for Projects within the South Florida Water Management District”. Appendix R prescribes the allowable discharge rate for Osceola County within the Lake Tohopekaliga Basin to be 17.5 CSM for the 10-year design event (10-year, 72-hour). Included in this appendix is a section titled “Use of Appendix 2 to Determine Allowable Discharge Values”, which states: “It is also likely that the smaller basins should have higher unit area discharges.” As indicated in Case 1 described in the Appendix, the immediate receiving waters comprise a) overland sheet flow directly to Friars Cove/Lake Tohopekaliga and b) secondary or tertiary man-made ditch (the WPA Canal and Gator Bay Slough, respectively), therefore the post development instantaneous peak discharge rate should be equal to (or no greater than) the pre-development rate for the appropriate design storm event so that new adverse water quantity impacts are not created. The proposed design is based on the latter criterion.

Discharge Rate Control (Osceola County):

Limit the post-development peak rate of discharge to that of the pre-development for the 10-year frequency, 72-hour duration design storm.



Freeboard (Osceola County):

All ponds are required to provide a minimum of twelve (12) inches freeboard between the design high water level for the 10-year, 72-hour design storm event and the minimum berm elevation.

3. Design Methodology

i. Runoff Hydrographs

Curve Number:

Hydrologic simulations of the design storm events were performed using the SCS Unit Hydrograph Method. Curve numbers were obtained from the SCS TR55 Manual, Second Edition, June 1986. Curve numbers were based on hydrologic soil group (per the NRCS Soils Survey of Osceola County) and land cover.

Rainfall Distribution(s):

Mean Annual (1-year/24-hour frequency) and the SFMWD 72-hr distribution (10-year/72-hour and 100-year/72-hour frequency storms)

Total Rainfall:

4.0 inches (1-year/24-hour)
7.5 inches (10-year/72-hour)
11.4 inches (100-year/72-hour)

Unit Hydrograph Shape Factor:

A shape factor of 256 was used in pre-development and post development hydrograph generations.

Time of Concentration:

The simplified form of the Kinematic Wave Equation was utilized in the time of concentration calculations, as outlined in the National Engineering Handbook Part 630, Chapter 15 (2010).

ii. Routing Analysis

Routing calculations were performed by Interconnected Pond Routing (v4.03.02) by Streamline Technologies, Inc.

iii. Boundary Conditions

Five (5) boundary nodes are used in the routing model. These include one node at Friar's Cove, representing Lake Tohopekaliga, two nodes in the



WPA Canal, and two nodes in the Gator Bay Slough. Lake Tohopekaliga is modeled as a fixed tailwater at elevation 54 feet NAVD, the highest regulated stage. The Gator Bay Slough and WPA Canal nodes are named and located based upon the Gator Bay Slough Study (2001) of Osceola County. The stages for all nodes are fixed at 54 feet NAVD, except for the node in the Gator Bay Slough at the northeast corner of site, adjacent to the Florida Turnpike, which is fixed at 57 feet NAVD, based upon the difference between initial stages provided in the Slough study. See Appendix C.2 for supporting documentation.

The total drainage area modeled includes both the on-site basins and related off-site basins contributing to the boundary nodes modeled. The total drainage area includes the areas of the water courses within the Gator Bay Slough and the WPA Canal; however, no modifications or alterations are proposed to these existing facilities.

D. WATER QUALITY ANALYSIS

1. Design Criteria

Water quality design and performance criteria are in accordance with SFWMD and Osceola County stormwater management system requirements, summarized as follows:

Wet Detention (SFWMD):

Treatment volume shall be the greater of the first inch of runoff from the basin or 2.5 inches of runoff times the percentage of imperviousness. An additional 50% of the volume required will be treated due to the project discharge to an impaired water body.

The outfall structure should be designed to drawdown no more than one-half inch of the required treatment volume within 24 hours following the design storm event.

Dry pretreatment for commercial projects within the proposed mixed-use development, as required by SFWMD rule, will be addressed at the time of final design on a project-specific basis.

Impaired Water Body (SFWMD and Osceola County):

Systems discharging to a waterbody that has been identified as impaired by FDEP are subject to additional criteria. An additional 50% water quality treatment volume must be provided and a site-specific pollutant analysis must be performed for the pollutant of concern.



2. Design Methodology

The project is within the Lake Tohopekaliga basin, which eventually contributes to Lake Okeechobee. Thus, it is subject to the impaired water body criteria. As a result, an additional 50% water quality treatment volume has been provided and a site-specific pollutant analysis has been performed for the pollutant of concern (phosphorous). The site-specific pollutant loading analysis was done for the site using BMPTRAINS (v8.6).

Land use maps are provided in Appendix D.2 which include land coverage categories used in BMPTRAINS, based upon FLUCCS codes and corresponding categories developed by BMPTRAINS. These land use categories with correlated FLUCCS codes are included in Appendix D.2.

E. WETLAND HYDROLOGY

1. Design Criteria

Preserve wetland hydrologic patterns based upon the Mean Annual design storm to limit adverse effects.

Lake-Wetland Separation Requirements (SFWMD):

Hydraulic gradients between 0.005 ft/ft and 0.015 ft/ft include calculations for drawdown that does not exceed 12 vertical inches in a 90-day period.

2. Design Methodology

Post development flows to the preserved wetlands are designed to match pre-development flows and stages, as practicable. Thus, treated discharge from the adjacent stormwater management areas is routed to the preserved wetlands to maintain hydration and control structures are placed within the perimeter buffers of the preserved wetlands to regulate stage and flow. Flows to the wetlands for both the pre-development and post-development conditions were evaluated using the Mean Annual storm event and comparative time-stage hydrographs for the pre-development and post development conditions are included in Appendix E, demonstrating adequate hydration flows and comparable wetland stages.

The Lake-Wetland Separation Table provided in Appendix E provides the calculated hydraulic gradient between the preserved wetlands and the adjacent wet detention ponds.



F. 100-YEAR FLOOD PLAIN COMPENSATING STORAGE

1. Design Criteria

Flood Plain Encroachment (SFWMD and Osceola County):

No net encroachment into the floodplain, between the average wet season water table and that encompassed by the 100-year event.

2. Methodology

Compensating storage is provided within the wet detention ponds to offset the fill of the proposed development. *Two additional compensating storage areas are provided to address the flood plain encroachment associated with the proposed boat ramps, access road/parking area and future development pad. These compensating storage areas include a) the boat trailer access road and parking area which is graded to the 10-year storm peak stage elevation (55.8) and provide storage above that elevation for the FEMA 100-year event at elevation 57.1, and b) an upland excavation area between the boat ramps and the retaining wall around the future development pad. Flood plain impact and compensating storage exhibits and calculations are included in appendix F.*

For the portion of the site within Zone AE, the limits of the floodplain were established by re-mapping the 57.1 foot NAVD base flood elevation onto the Osceola County LIDAR contours from 2016. The re-mapped 57.1 foot NAVD elevation is used as the limits of the flood, for comparing existing and proposed storage for the 100-year storm event. Similarly, the Zone A limits when projected onto the LIDAR contours correspond to an average elevation of 62.9 feet NAVD. The 62.9 foot NAVD contour was mapped onto the LIDAR contours, and used as the limits for existing and proposed storage in the 100-year storm event.



APPENDIX A

CRITICAL DATA SUMMARY



Critical Data Summary

Project Name:	Fontana
District Permit No:	Existing Conceptual ERP: 49-100503-P/App. No. 190110-1099
Location:	Osceola County, S27,28,33,34/T26S/R30E
Project Area:	Proposed permit modification area is 7.5± acres. Overall project area previously permitted is ± 677.4 acres.
Project Datum:	NAVD88
Project Land Use:	Commercial, Residential
Prepared By:	Donald W. McIntosh Associates, Inc.
Prepared For:	Fontana Lakes, LLC



New Projects or Previously Permitted Projects (Modifications)

Is this a new project or a modification to an existing project?

- ☐ New (The District will provide a permit number upon issuance).
☒ Modification

Application Types

- ☒ ERP (All new projects and most others)
☐ SWM (Grandfathered projects only)
☐ D & F (Grandfathered projects only)

Location

County

- ☐ Orange
☒ Osceola
☐ Polk

General Location:

Section **27, 28, 33 & 34**
Township **26 South**
Range **30 East**

Owner and Permittee: **Fontana Lakes, LLC**

(Note: These entities should be the same unless the applicant has a Contract for Sale for the site. If so, the Contract for Sale should be submitted. In all cases the Warranty Deed should be submitted. If they are co-applicants, list both.)

Operating Entity: **Fontana Lakes Master Homeowners Association, Inc. (draft documents on file with the District)**

Project/Phase Area: **Proposed permit modification area is 7.5± acres. Overall project area previously permitted is ± 677.4 acres**

Project Land Use:

- ☒ Commercial
☒ Residential
☐ Industrial



☐ Other (Specify type: _____)

Drainage Basin (pick one): **Lake Tohopekaliga**
Receiving Water Body: **Lake Tohopekaliga**
Total Acres of Wetlands Onsite: **See Environmental Report**
Total Acres of Wetlands Impacts: **See Environmental Report**
Total Acres Preserved Wetlands: **See Environmental Report**

2.0 Project Site Description

The proposed Fontana development is a planned mixed use development, primarily residential. This site is located west of the Florida Turnpike (S.R. 91), and north of Friar's Cove Road, abutting Friar's Cove in Lake Tohopekaliga.

This development shall be divided into phases in the Preliminary Subdivision Plan (PSP).

3.0 Proposed Project

The proposed Fontana project is a 677.4 acres mixed use development, primarily residential, but also includes a school, community and commercial centers. The site is topographically divided approximately in the center, with slopes to the east and west. The westerly flow goes into Lake Tohopekaliga, and easterly flow makes its way into the Gator Bay Slough, through wetlands and ditches on-site and along the Florida Turnpike. The proposed development will contain 15 ponds for stormwater management. These stormwater management areas will provide water quality treatment and attenuation in accordance with the South Florida Water Management District and Osceola County design criteria. The post development peak discharge rates will be limited by the pre-development peak rates and the pre-development drainage patterns will be preserved, where possible. The western portion of the site adjacent to the WPA Canal is located within the 100-year floodplain Zone AE with a base flood elevation of 57.1 NAVD, as determined by FEMA, FIRM Maps 12097C0255G and 12097C0265G, LOMR Case No. 16-04-3250P. There is also a 100-year floodplain Zone A crossing through the northeast corner of the site, connecting the Gator Bay Slough with an existing wetland, as determined by FEMA, FIRM Maps 12097C0260G and 12097C0270G. Compensating storage for the floodplains will be provided in the proposed stormwater management areas.

This application is for a modification to the existing Conceptual Permit No. 49-100503-P/Application No. 190110-1099 for the Fontana project. As discussed with District Staff during the September 2, 2020 preapplication meeting and in subsequent telephone discussions, this modification includes changes to the previously permitted surface water management system for the project to add boat ramps with finger piers, an access road and parking area, and building pad grading for a future commercial facility at the southwest corner of the project site.

Modifications to the previously approved conceptual mass grading plans include the reconfiguration of stormwater management area SMA-1 and the addition of SMA-Marina with related changes to their respective drainage basins. The area of the proposed permit modification is $7.5 \pm$ acres. Revised and updated stormwater management system calculations are provided demonstrating that the project remains



consistent with the previously permitted water quality, discharge rate and floodplain compensating storage volume requirements.



4.0 Conceptual Land Use Drainage Basins

Conceptual Land Use – Basin Level Breakdown¹

Basin ID	Buildings ² (acres)	Pavement (acres)	Water Mgmt (acres)	Pervious (acres)	Preservation (acres)	Total (acres)
SMA-1 ^{3,3A}	11.08	31.98	29.78	26.35	0.00	99.19
SMA-2	1.47	7.90	2.36	6.09	0.00	17.81
SMA-3	2.34	9.18	6.44	6.98	0.00	24.94
SMA-4A	0.44	3.04	1.24	2.37	0.00	7.10
SMA-4B	0.44	3.06	1.31	2.91	0.00	7.72
SMA-5	4.65	25.82	4.64	15.15	0.00	50.26
SMA-6	2.03	13.63	3.97	16.74	0.00	36.37
POND-7	0.00	0.00	0.50	0.66	0.00	1.16
SMA-8	3.17	17.25	2.80	10.53	0.00	33.75
SMA-9	1.23	5.16	0.99	3.67	0.00	11.05
SMA-10	5.50	22.64	5.34	14.30	0.00	47.78
SMA-12 ³	9.49	36.15	9.40	22.72	0.00	77.76
SMA-13 ³	8.59	36.12	8.13	22.18	0.00	75.02
SMA-14	4.46	19.89	4.85	14.13	0.00	43.33
SMA-15 ³	5.64	29.62	7.91	18.07	0.00	61.24
SMA-16	1.52	6.66	2.16	5.05	0.00	15.39
W-11	0.00	0.00	0.00	4.48	6.44	10.92
W-14	0.00	0.00	0.00	1.00	12.06	13.06
W-15	0.00	0.00	0.00	5.55	4.52	10.07
W-16	0.00	0.06	0.00	1.12	14.76	15.94
W-4 ⁴	0.00	0.00	0.00	25.09	23.19	48.28
OFF-1 ⁴	0.00	0.00	0.00	5.16	0.00	5.16
OFF-2 ⁶	0.00	0.00	0.00	7.48	0.00	7.48
CANAL ⁷	0.00	0.00	0.00	0.00	12.19	12.19
MARINA ^{3A}	0.19	4.48	1.35	1.12	0.00	7.14
Total	63.51	272.00	90.61	241.24	72.64	740.11 ⁸

¹See “Wet Detention Water Quality Calculations” (Appendix D.2) for land use breakdown per basin²Includes proposed buildings for residential, civic, and commercial land uses³Basins include off-site drainage area from anticipated future development of Friar’s Cove Road (9.24 acres)^{3A} Water quality treatment volume for Marina basin provided in SMA-1 – SMA-3 treatment volume⁴Basin W-4 includes on- and off-site drainage areas; the off-site drainage area is 47.57 acres⁵Basin OFF-1 includes only off-site drainage area south of Friar’s Cove Road⁶Basin OFF-2 includes on- and off-site drainage areas; the off-site drainage area is 0.80 acres located within the Turnpike R/W⁷CANAL encompasses the area of the WPA Canal and Gator Bay Slough within property limits⁸Total Area less the off-site drainage area is 677.34 acres (740.11 ac – 9.24 ac – 47.57 ac – 5.16 ac – 0.80 ac = 677.34 ac)



5.0 Surface Water Management Design Parameters

SMA ID	WQ Volume Required (ac-ft)	WQ Volume Provided (ac-ft)	Overflow Elevation (ft)	Maximum Discharge ¹ 10-year/72-hour (cfs)	Receiving Node(s) ^{2,3}
SMA-1	19.49	25.40	54.90	105.77	WPA-006, WPA001, LK TOHO
SMA-2				15.80	
SMA-3				7.10	
SMA-4A	11.03	11.25	59.50	9.12	SMA-6
SMA-4B				4.61	
SMA-5				35.82	
SMA-6	4.55	5.34	58.80	57.02	W-11, GBS-001
SMA-8	15.97	16.09	62.20	23.37	W-4, GBS-004
SMA-9				7.32	
SMA-10				76.67	
SMA-12	13.12	13.47	59.40	189.86	SMA-1
SMA-13	12.95	13.37	62.60	136.35	SMA-12
SMA-14	7.03	7.51	63.50	27.13	SMA-13
SMA-15	12.70	13.06	64.10	41.90	SMA-13
SMA-16				6.66	
SMA-Marina	0.89 ⁴	1.03 ⁴	55.0	9.17	W-16

Note: All elevations are given in NAVD

¹See Post-Development ICPR Nodal Maximum Conditions (Appendix C.2)

²W = Wetland, WPA = WPA Canal, GBS = Gator Bay Slough, LK TOHO = Lake Tohopekaliga

³WPA Canal and Gator Bay Slough ultimately discharge into Lake Tohopekaliga

⁴Based on 1" over basin area, additional water quality treatment volume for impervious area provided in SMA-1

Design Storm Event	10-year/72-hour	10-year/72-hour
Tailwater Node	Pre-Development Max Inflow	Post Development Max Inflow
GBS-004	173.94 cfs	62.16 cfs
GBS-001	80.34 cfs	56.55 cfs
WPA-006	12.20 cfs	12.20 cfs
WPA-001	87.57 cfs	85.85 cfs
LK TOHO	109.40 cfs	94.08 cfs
Total	463.45 cfs	310.84 cfs
Total Drainage Area¹	740.11 ac	740.11 ac
Pro Rata Discharge	0.63 cfs/ac	0.42 cfs/ac

¹Total Drainage Area includes all modeled basin areas, including on-site and related off-site basin areas (See Narrative C.3.iii.)



Design Storm Stages

SMA ID	Control Elevation (ft)	10yr/72hr Stage (ft)	Proposed Min. Rd. Crown¹ (ft)	100yr/72hr Stage (ft)	Proposed Min. FFE² (ft)
SMA-1	54.25	56.75	56.75	57.65	58.75
SMA-2	54.25	56.78	56.78	57.69	58.78
SMA-3	54.25	56.77	56.77	57.69	58.77
SMA-4A	58.00	60.86	60.86	61.89	62.86
SMA-4B	58.00	60.90	60.90	61.95	62.90
SMA-5	58.00	60.82	60.82	61.85	62.82
SMA-6	57.50	60.12	60.12	60.73	62.12
POND-7 ³	58.00	59.13	60.00	59.77	62.00
SMA-8	60.50	63.70	63.70	65.02	65.70
SMA-9	60.50	63.49	63.49	64.46	65.49
SMA-10	60.50	63.16	63.16	63.73	65.16
SMA-12	58.00	60.98	60.98	61.79	62.98
SMA-13	61.00	63.69	63.69	64.68	65.69
SMA-14	62.00	64.71	64.71	65.89	66.71
SMA-15	62.50	65.10	65.10	66.37	67.10
SMA-16	62.50	65.26	65.26	66.54	67.26
<i>SMA Marina</i>	54.25	55.61	55.61	56.02	57.61

Note: All elevations are given in NAVD

¹Proposed minimum road crown elevations are set at the greater of 2' above the Control Elevation or the 10yr/72hr maximum flood stage (per SFMWD criteria).

^{1A}Marina crown elevation set at 10yr/72hr stage according to SFWMD criteria

²Proposed minimum finished floor elevations have been set at the greater of 2' above the proposed road crown (per Osceola County criteria) or the 100yr/72hr maximum flood stage (per SFWMD criteria).

³No treatment or attenuation proposed in POND-7



Control Structures

Control Structure	Orifice/Weir			Drop Inlet			Pipe		
	Type	Invert El. (ft)	Dimension	Type	Grate El. (ft)	Dimension	Type	Dia.	Length (ft)
CS-1A	R	54.25	3"x2'-7"	R	56.25	3'x8'-9"	C	60"	49
	R	54.90	(2) 2'x1' (1) 6'x1'						
CS-1B	R	54.90	2'x6"	R	56.25	3'-1"x4'-1"	C	36"	83
CS-5	C	58.00	6"	R	60.50	3'x8'-9"	C	48"	552
	R	59.50	(2) 2'x10" (1) 7'x10"						
CS-6A	C	57.50	5"	R	60.00	3'x6'-7"	C	48"	267
	R	58.80	(2) 2'x1' (1) 6'x1'						
CS-6B				R	58.80	2'x3'-1"	C	18"	230
CS-W11				R	55.70	3'x4'-6"	C	24"	87
CS-8				R	62.20	2'x3'-1"	C	24"	1734
CS-10A	C	60.50	(2) 5"	R	63.5	3'x8'-9"	C	42"	575
	R	62.20	(2) 3'x1'-2" (1) 8'x1'-2"						
CS-10B				R	62.50	3'x6'-7"	C	42"	581
CS-12A	C	58.00	(2) 5"	R	60.50	3'x8'-9"	C	48"	272
	R	59.40	(2) 2'x9" (1) 6'x9"						
CS-12B				R	59.50	3'x8'-9"	C	48"	274
CS-13A	C	61.00	(2) 4.5"	R	62.60	3'x6'-7"	C	42"	160
CS-13B				R	62.60	3'x6'-7"	C	42"	160
CS-14	C	62.00	5"	R	64.50	3'x8'-9"	C	42"	618
	R	63.50	(2) 2'x10" (1) 5'x10"						
CS-15	C	62.50	6"	R	64.10	3'x8'-9"	C	48"	1552
CS-Marina	C	54.25	2.75"	R	55.00	2'x3'-1"	C	18"	198

Note: All elevations are given in NAVD

Types:

C = Circular, R = Rectangular



6.0 Water Use Sources – Potable, Wastewater, Dewatering, Irrigation

☐ Potable water supplier: **Potable water service to be supplied by the City of St. Cloud.**

☐ Wastewater supplier **Wastewater service to be supplied by the City of St. Cloud.**

Irrigation source:

☐ Public Utility supplier **Reclaimed water service to be supplied by the City of St. Cloud.**

☐ Irrigation Wells _____ Water Use Permit required

☐ Reuse water supplier _____ Water Use Permit required

☐ Surface Water _____ Water Use Permit required

Dewatering:

A dewatering permit application will be submitted at the time of construction ERP permitting if required.

7.0 Water Resources

N/A

8.0 Wetland Impacts

See Environmental Report.

9.0 Mitigation

See Environmental Report.

10.0 Cumulative Impacts

See Environmental Report.

11.0 Wetland Inventory

See Environmental Report.

12.0 Threatened and Endangered Species

See Environmental Report.



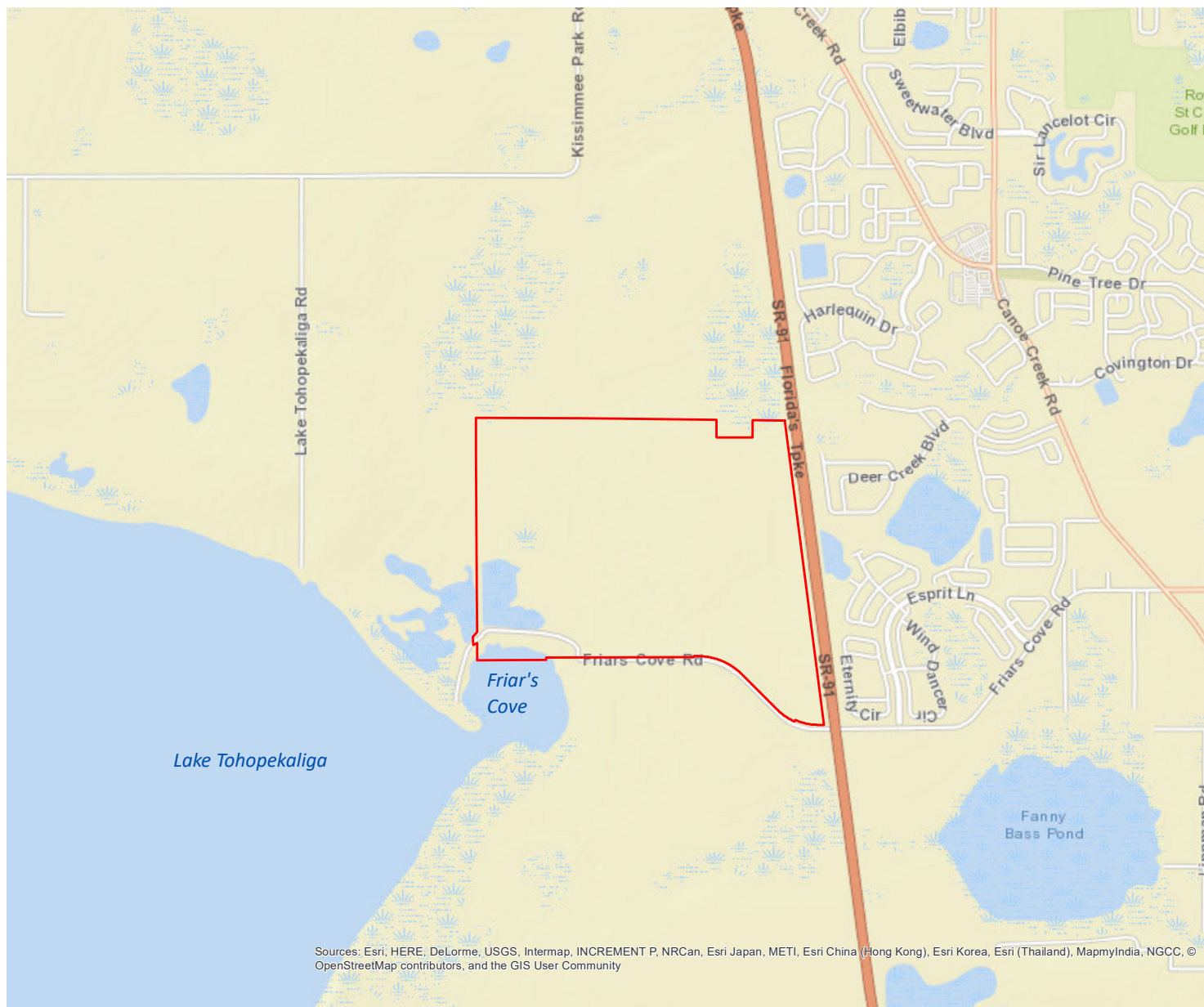
APPENDIX B

MAPS

N
1"=3,000'

Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

 Project Boundary

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The base map shown hereon was obtained in digital format from ESRI ArcGIS online, based on the sources listed above.

Map B.1 Vicinity Map

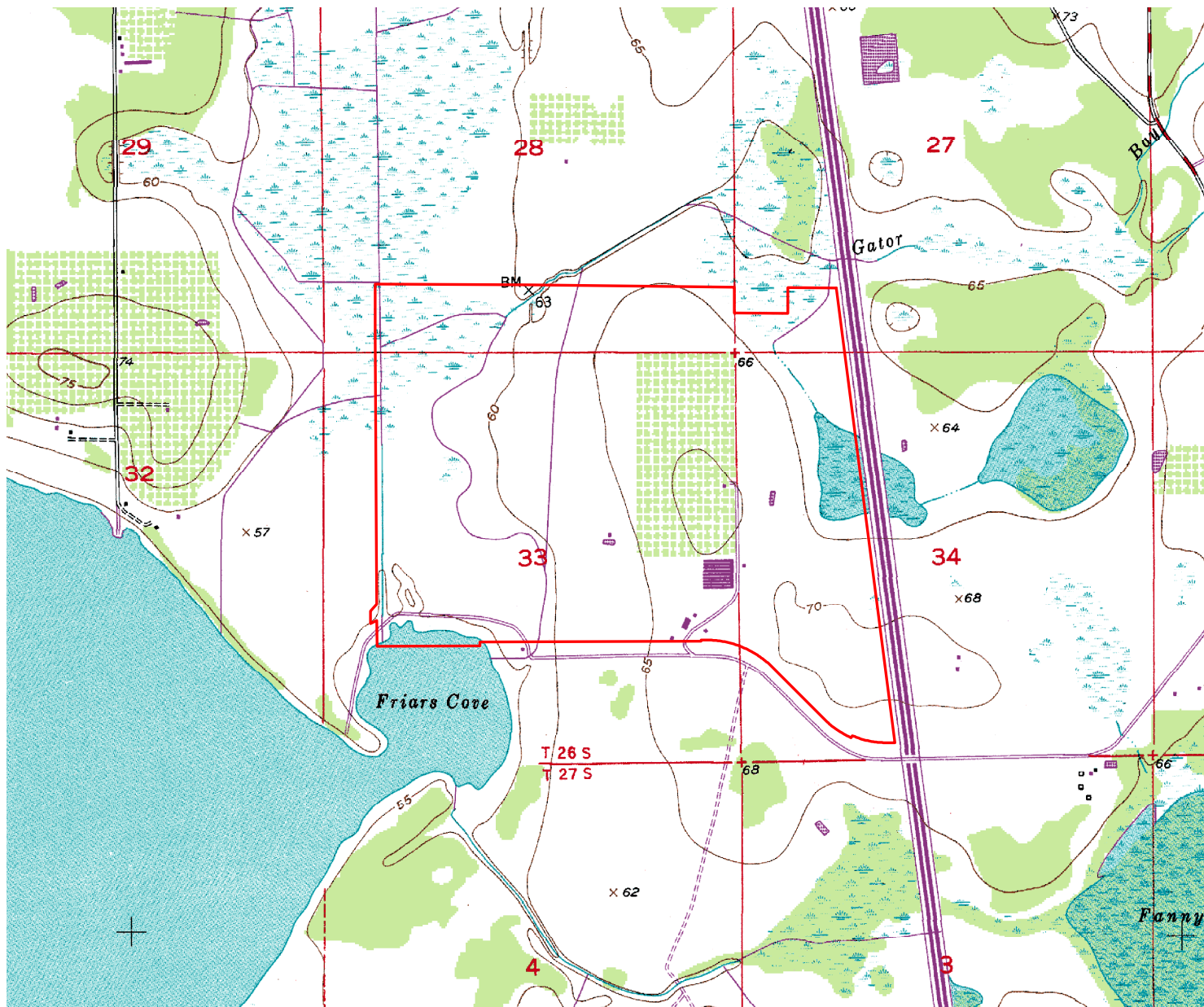


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N
1"=2,000'

Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

 Project Boundary

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The Quad Map shown hereon was obtained in digital format from USGS, St. Cloud S panel.
- 4) This Quad Map is in NGVD29.

Map B.2 Quad Map

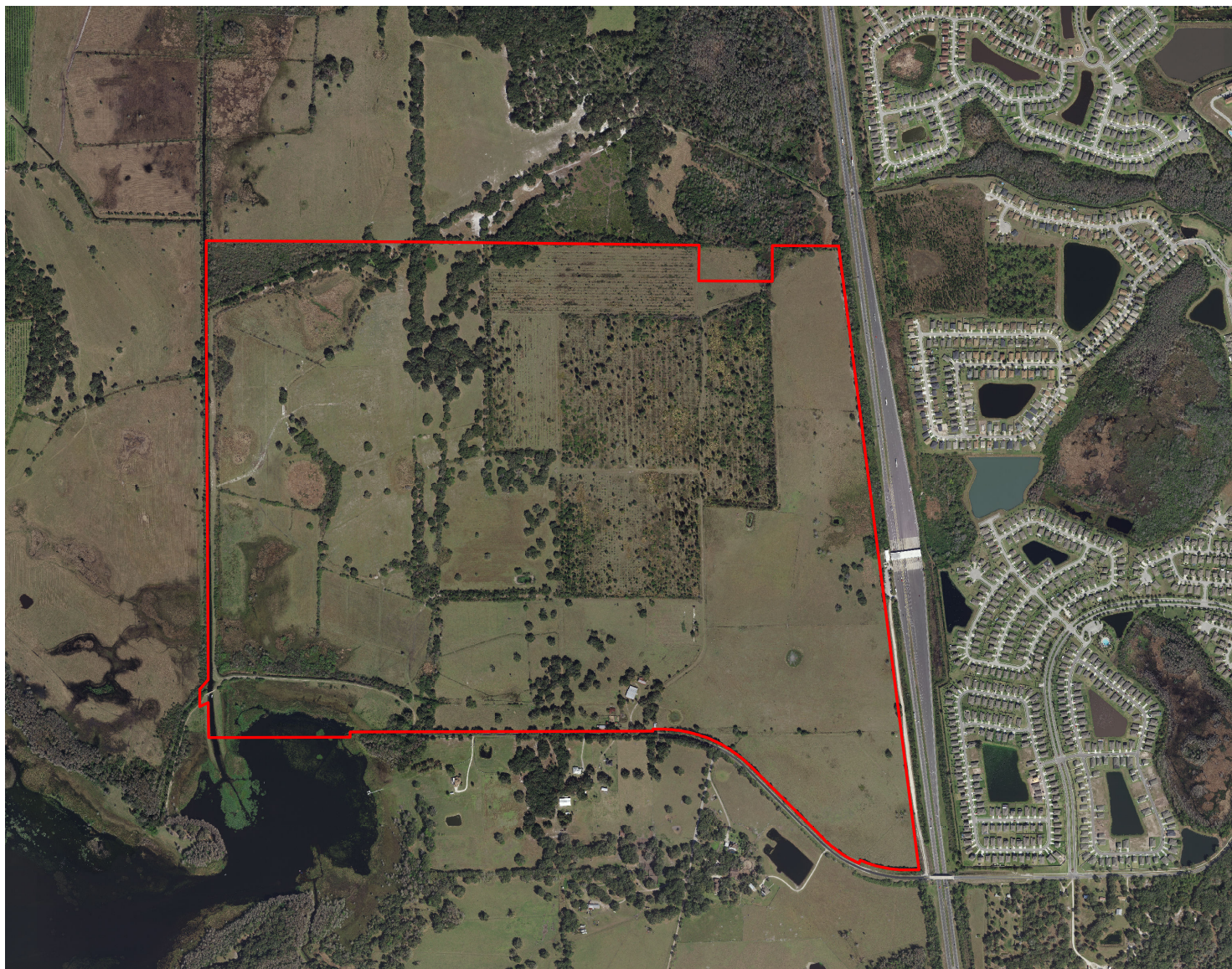


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N
1"=1,500'

Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

 Project Boundary

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The Aerial map shown hereon was obtained in digital format from Osceola County (2017).

Map B.3 Site Aerial Map

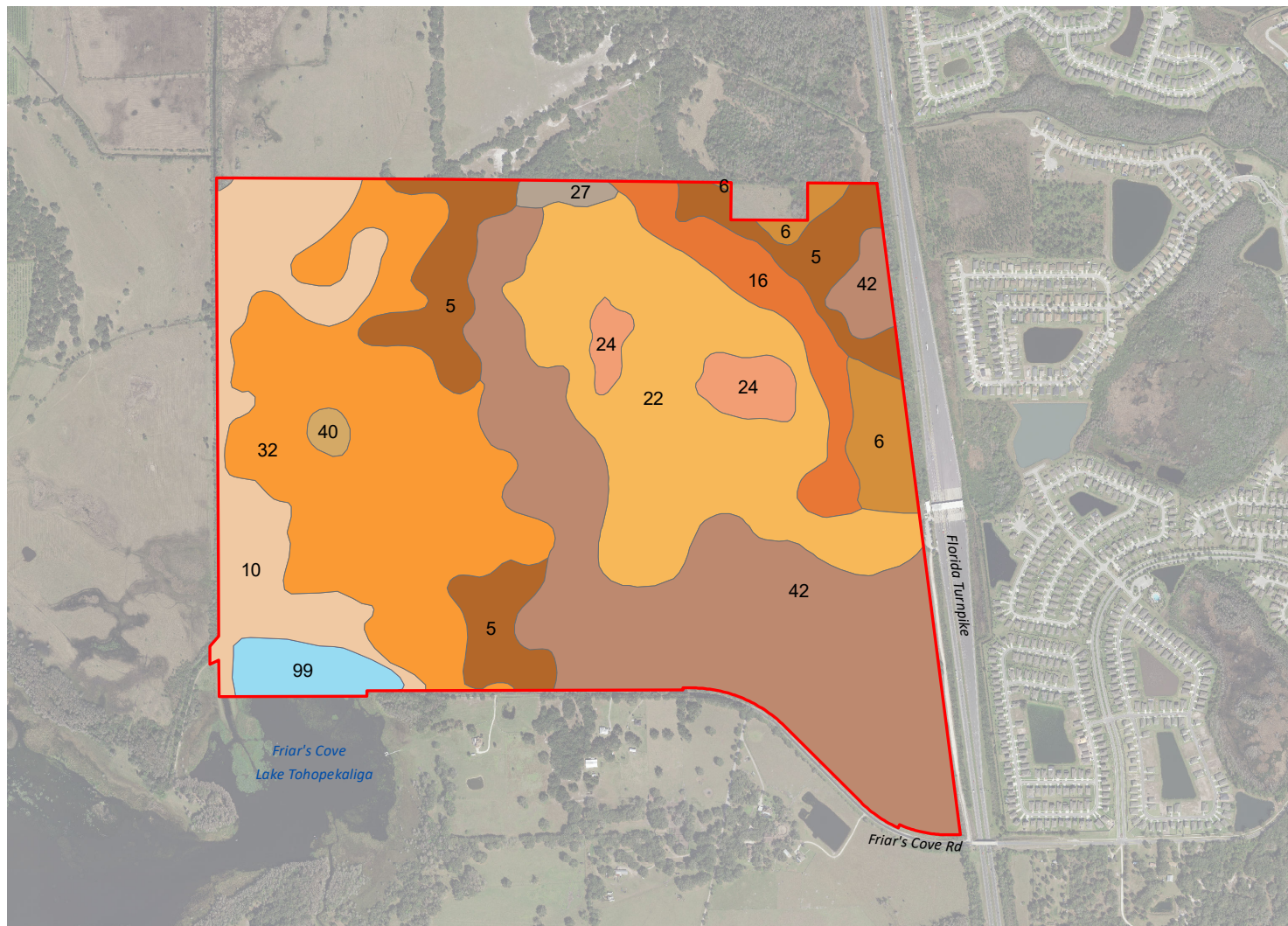


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Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

Project Boundary

NRCS Soils

- 10 - Delray loamy fine sand, depressional
- 16 - Immokalee fine sand
- 22 - Myakka fine sand, 0 to 2 percent slopes
- 24 - Narcoossee fine sand, 0 to 2 percent slopes
- 27 - Ona fine sand
- 32 - Placid fine sand, depressional
- 40 - Samsula muck
- 42 - Smyrna fine sand, 0 to 2 percent slopes
- 5 - Basinger fine sand, 0 to 2 percent slopes
- 6 - Basinger fine sand, depressional, 0 to 1 percent slopes
- 99 - Water

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The soils data shown hereon was obtained in digital format from the USDA Natural Resources Conservation Service Soil Survey map of Osceola County.

Map B.4 NRCS Soils Map

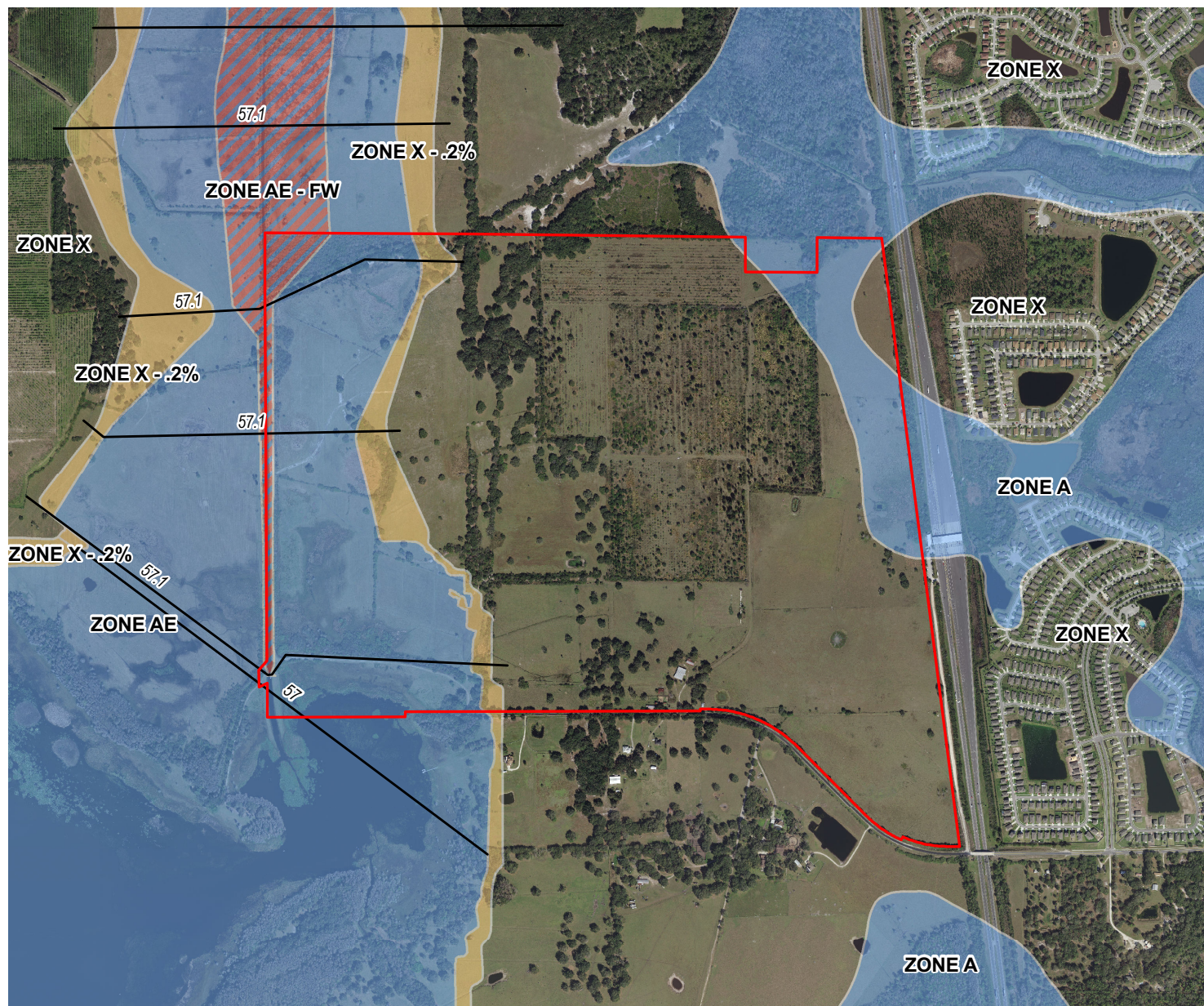


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N
1"=1,500'

Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

 Project Boundary

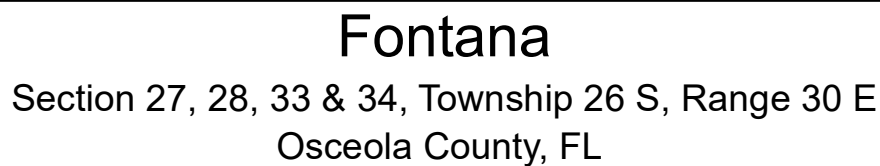
NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The flood zones shown hereon were obtained in digital format from FEMA and correspond to LOMR Case No. 16-04-3250P (eff. 3/31/2017) and Osceola County FIRM Maps: 12097C0255G (eff. 03/31/17), 12097C0260G (eff. 05/03/17), 12097C0265G (eff. 03/31/17), and 12097C0270G (eff. 6/18/13).

Map B.5 FEMA Flood Zone Map



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- ## FLUCCS

-
- | Category | Acres |
|---------------------------------|-------|
| Lakes larger than 500 acres | 5210 |
| Reservoirs less than 10 acres | 5340 |
| Mixed Wetland Hardwoods | 6170 |
| Exotic Wetland Hardwoods | 6190 |
| Cypress | 6210 |
| Wetland Forested Mixed | 6300 |
| Vegetated Non-Forested Wetlands | 6400 |
| Freshwater Marshes | 6410 |
| Wet Prairies | 6430 |
| Roads and Highways | 8140 |

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The land use data shown hereon was obtained in digital format from the South Florida Water Management District (2010) for all areas outside of the project boundary. Areas within the project boundary are based upon land use determined by Bio-Tech Consultants, Inc.

Map B.6 FLUCCS Map



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APPENDIX C

WATER QUANTITY ANALYSIS



APPENDIX C.1

PRE-DEVELOPMENT WATER QUANTITY ANALYSIS

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LEGEND

- Property Boundary
- Boundary
- Basins
- TC PATH

W-14
DNW 54.0

PRE-1
19.76 AC

OUTFALL
LK TOHO
DNW 54.0

NODE I.D.

BASIN I.D.

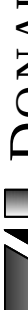
OUTFALL

INITIAL STAGE ELEVATION

BASIN ACREAGE

OUTFALL I.D.

- GENERAL NOTES:
- THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
 - LIDAR TOPO FROM OSCEOLA COUNTY (2016)
 - ELEVATIONS ARE IN NAVD88 DATUM

DRAWING 13189-XPREMAP	FONTANA OSCEOLA COUNTY, FL PRE-DEVELOPMENT BASIN MAP		DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS PLANNERS SURVEYORS 2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4068 CERTIFICATE OF AUTHORIZATION NO. 68					JAMES C. NUGENT FLORIDA P.E. No. 57553 DATE: _____			NO.	DATE	REVISIONS	CHK.
			DESIGNED BY ACC	CHECKED BY JCN	DATE 4/24/2018	SCALE 1"=400'	JOB NUMBER 13189							



W-14 DNW 54.0	NODE I.D. INITIAL STAGE ELEVATION
PRE-1 19.76 AC	Basin I.D. Basin Acreage
OUTFALL LK TOHO DNW 54.0	OUTFALL OUTFALL I.D. INITIAL STAGE ELEVATION
W-14-WPA001 WEIR @ 54.92	LINK I.D. LINK Description

DRAWING 13189-XPRENODE	FONTANA OSCEOLA COUNTY, FL PRE-DEVELOPMENT NODAL DIAGRAM	 DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS PLANNERS SURVEYORS 2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4058 CERTIFICATE OF AUTHORIZATION NO. 68	DESIGNED BY ACC _____		CHECKED BY JON _____	DATE 4/24/2018	SCALE NTS	JOB NUMBER 13189	JAMES C. NUGENT FLORIDA P.E. No. 57553 DATE: _____	NO. _____ DATE _____ REVISIONS _____ CHK. _____
			DRAWN BY ACC _____							
SHEET 1 OF 1										

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	CANAL
Receiving Node:	LK TOHO
Basin Area:	12.19 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
17	Kaliga muck	C/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	1.86		1.86	149
Woods (Good)	D	77	1.55		1.55	119
Wetlands	D	98		0.62	0.62	0
Water Surface	D	98		8.15	8.15	0
Totals:			3.41	8.78	12.19	268

Composite CN (exc. DCIA) = 79**Composite DCIA = 72%****Time of Concentration (T_c) Calculations****Equations**

Sheet Flow:
$$T_t = \frac{0.007(nL)^{0.8}}{(4.8)^{0.5}(S^{0.4}/100)}$$
 where: L ≤ 100 ft.
S = slope (%)
n = Manning's "n"

Shallow Concentrated Flow:

$$T_t = \frac{L}{60V}$$

where:

$$V = 2.516(S)^{0.5}$$

$$V = 5.032(S)^{0.5}$$

$$V = 6.962(S)^{0.5}$$

$$V = 8.762(S)^{0.5}$$

$$V = 9.965(S)^{0.5}$$

$$V = 16.135(S)^{0.5}$$

$$V = 20.328(S)^{0.5}$$

Description:

Forest & Meadow (F&M)

Fallow & Woodland (F&W)

Short Grass Pasture (Pasture)

Nearly Bare Ground (Bare)

Cultivated Straight Row Crops (Cultivated)

Grassed Waterway (GW)

Pavement & Small Upland Gullies (Paved)

Note: Shallow Concentrated Flow Velocity equations
obtained from the National Engineering Handbook,
Part 630 Hydrology, Chapter 15, Table 15-3

Channel Flow:

$$T_t = \frac{L}{60V}$$

where:

$$V = 2.5 \text{ fps (assumed)}$$

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	65	0.24	6.2	-	5.3

Note: 10-minute Time of Concentration is used when calculated value is less.

Time of Conc. = 5 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	OFF-1
Receiving Node:	OFF-1
Basin Area:	5.16 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
24	Narcoossee fine sand	A
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	A	39	0.21		0.21	8
Pasture (Good)	D	80	4.26		4.26	341
Woods-Grass Comb. (Good)	A	32	0.68		0.68	22
Woods-Grass Comb. (Good)	D	79	0.01		0.01	1
Totals:			5.16	-	5.16	372

Composite CN (exc. DCIA) = 72**Composite DCIA = -****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.9	-	11.9
Shallow Conc. (Pasture)	495		0.4	0.44	18.7

Time of Conc. = 31 Minutes

Basin Name:	OFF-2
Receiving Node:	OFF
Basin Area:	2.26 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	2.26		2.26	181
Totals:			2.26	-	2.26	181

Composite CN (exc. DCIA) = 80**Composite DCIA = -****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	4.4	-	8.5
Shallow Conc. (Pasture)	10		1.9	0.96	0.2

Note: 10-minute Time of Concentration is used when calculated value is less.

Time of Conc. = 9 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	OFF-3
Receiving Node:	W-4
Basin Area:	48.28 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Brush (Good)	D	73	11.83		11.83	864
Pasture (Good)	D	80	5.66		5.66	453
Woods-Grass Comb. (Good)	D	79	7.15		7.15	565
Wetlands	D	98		23.64	23.64	0
Totals:			24.64	23.64	48.28	1881

Composite CN (exc. DCIA) = 76**Composite DCIA = 49%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.8	-	16.8
Shallow Conc. (Pasture)	820		0.7	0.58	23.5

Time of Conc. = 40 Minutes

Basin Name:	PRE-1
Receiving Node:	LK TOHO
Basin Area:	19.76 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D
99	Water	N/A

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	4.21		4.21	337
Water Surface	D	98		15.55	15.55	0
Totals:			4.21	15.55	19.76	337

Composite CN (exc. DCIA) = 80**Composite DCIA = 79%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.7	-	17.7
Shallow Conc. (Pasture)	185		0.8	0.62	5.0

Time of Conc. = 23 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	PRE-2
Receiving Node:	W-14
Basin Area:	270.76 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
22	Myakka fine sand	A/D
32	Placid fine sand, depressional	A/D
40	Samsula muck	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	175.04		175.04	14003
Woods (Good)	D	77	17.53		17.53	1350
Woods-Grass Comb. (Good)	D	79	28.15		28.15	2224
Wetlands	D	98		37.64	37.64	0
Water Surface	D	98		12.40	12.40	0
Totals:			220.72	50.04	270.76	17577

Composite CN (exc. DCIA) = 80**Composite DCIA = 18%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.2	-	29.3
Shallow Conc. (Pasture)	2200		0.3	0.38	96.2
Channel Flow	1975			2.50	13.2

Time of Conc. = 139 Minutes

Basin Name:	PRE-3
Receiving Node:	W-10
Basin Area:	21.33 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	18.62		18.62	1490
Wetlands	D	98		0.84	0.84	0
Water Surface	D	98		1.87	1.87	0
Totals:			18.62	2.71	21.33	1490

Composite CN (exc. DCIA) = 80**Composite DCIA = 13%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.4	-	22.2
Shallow Conc. (Pasture)	1485		0.4	0.44	56.2

Time of Conc. = 78 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	PRE-4
Receiving Node:	W-11
Basin Area:	30.10 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	21.28		21.28	1702
Woods (Good)	D	77	1.26		1.26	97
Wetlands	D	98		6.47	6.47	0
Water Surface	D	98		1.09	1.09	0
Totals:			22.54	7.56	30.10	1799

Composite CN (exc. DCIA) = 80**Composite DCIA = 25%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.5	-	20.3
Shallow Conc. (Pasture)	1080		0.5	0.49	36.6

Time of Conc. = 57 Minutes

Basin Name:	PRE-5
Receiving Node:	GBS-001
Basin Area:	70.23 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
27	Ona fine sand	B/D
32	Placid fine sand, depressional	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	0.22		0.22	18
Woods (Good)	D	77	23.22		23.22	1788
Woods-Grass Comb. (Good)	A	32	1.20		1.20	38
Woods-Grass Comb. (Good)	D	79	39.05		39.05	3085
Water Surface	D	98		6.54	6.54	0
Totals:			63.69	6.54	70.23	4929

Composite CN (exc. DCIA) = 77**Composite DCIA = 9%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.2	-	29.3
Shallow Conc. (Pasture)	440		0.7	0.58	12.6
Channel Flow	2465			2.50	16.4

Time of Conc. = 58 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	PRE-6
Receiving Node:	W-4
Basin Area:	110.54 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
27	Ona fine sand	B/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	22.14		22.14	1771
Woods-Grass Comb. (Good)	A	32	13.58		13.58	435
Woods-Grass Comb. (Good)	D	79	68.61		68.61	5420
Wetlands	D	98		1.30	1.30	0
Water Surface	D	98		4.91	4.91	0
Totals:			104.33	6.21	110.54	7626

Composite CN (exc. DCIA) = 73**Composite DCIA = 6%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (T _t) (min)
Sheet Flow	100	0.24	0.2	-	29.3
Shallow Conc. (Pasture)	1540		0.4	0.44	58.3
Channel Flow	195			2.50	1.3

Time of Conc. = 89 Minutes

Basin Name:	PRE-7
Receiving Node:	W-3
Basin Area:	99.76 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	86.81		86.81	6945
Woods-Grass Comb. (Good)	D	79	0.01		0.01	1
Wetlands	D	98		12.29	12.29	0
Water Surface	D	98		0.65	0.65	0
Totals:			86.82	12.94	99.76	6946

Composite CN (exc. DCIA) = 80**Composite DCIA = 13%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (T _t) (min)
Sheet Flow	100	0.24	1.1	-	14.8
Shallow Conc. (Pasture)	1475		0.5	0.49	49.9

Time of Conc. = 65 Minutes

Fontana
Pre-Development Basin Hydrology Calculations

Date: 4/27/2018

By: ACC

Chk: JCN

Basin Name:	PRE-8
Receiving Node:	PRE-8
Basin Area:	39.67 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	39.11		39.11	3129
R.O.W. (Paved, Open Ditch)	D	93		0.56	0.56	0
Totals:			39.11	0.56	39.67	3129

Composite CN (exc. DCIA) = 80**Composite DCIA = 1%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.2	-	29.3
Shallow Conc. (Pasture)	2195		0.2	0.31	117.5

Time of Conc. = 147 Minutes

Basin Name:	PRE-9
Receiving Node:	WPA-006
Basin Area:	10.07 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
17	Kaliga muck	C/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Woods (Good)	D	77	5.55		5.55	427
Wetlands	D	98		4.52	4.52	0
Totals:			5.55	4.52	10.07	427

Composite CN (exc. DCIA) = 77**Composite DCIA = 45%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.6	-	12.7
Shallow Conc. (Pasture)	1070		0.3	0.38	46.8

Time of Conc. = 60 Minutes

Manual Basin: CANAL

Scenario: Pre
Node: LK TOHO
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
12.19	CANAL	D	

Comment:

Manual Basin: OFF-1

Scenario: Pre
Node: OFF-1
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 31.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
5.16	OFF-1	D	

Comment:

Manual Basin: OFF-2

Scenario: Pre
Node: OFF
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
2.26	OFF-2	D	

Comment:

Manual Basin: OFF-3

Scenario: Pre
Node: W-4
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 40.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
48.28	OFF-3	D	

Comment:

Manual Basin: PRE-1

Scenario: Pre
Node: LK TOHO
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 23.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
19.76	PRE-1	D	

Comment:

Manual Basin: PRE-2

Scenario: Pre
Node: W-14
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 139.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
270.76	PRE-2	D	

Comment:

Manual Basin: PRE-3

Scenario: Pre
Node: W-10
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 78.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
21.33	PRE-3	D	

Comment:

Manual Basin: PRE-4

Scenario: Pre
Node: W-11
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 57.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
30.10	PRE-4	D	

Comment:

Manual Basin: PRE-5

Scenario: Pre
Node: GBS-001
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 58.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
70.23	PRE-5	D	

Comment:

Manual Basin: PRE-6

Scenario: Pre
Node: W-4
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 89.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
110.54	PRE-6	D	

Comment:

Manual Basin: PRE-7

Scenario: Pre
Node: W-3
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 65.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
99.76	PRE-7	D	

Comment:

Manual Basin: PRE-8

Scenario: Pre
Node: PRE-8
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 147.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
39.67	PRE-8	D	

Comment:

Manual Basin: PRE-9

Scenario: Pre
 Node: WPA-006
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 60.00 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.00 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
10.07	PRE-9	D	

Comment:

Curve Number: Basin Composite CN [Set]

Land Cover Zone	Soil Zone	Curve Number [dec]
CANAL	D	79.0
OFF-1	D	72.0
OFF-2	D	80.0
OFF-3	D	76.0
PRE-1	D	80.0
PRE-2	D	80.0
PRE-3	D	80.0
PRE-4	D	80.0
PRE-5	D	77.0
PRE-6	D	73.0
PRE-7	D	80.0
PRE-8	D	80.0
PRE-9	D	77.0

Impervious: Basin Composite DCIA [Set]

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
CANAL	72.00	72.00	0.00	0.000	0.000
OFF-1	0.00	0.00	0.00	0.000	0.000
OFF-2	0.00	0.00	0.00	0.000	0.000
OFF-3	49.00	49.00	0.00	0.000	0.000
PRE-1	79.00	79.00	0.00	0.000	0.000
PRE-2	18.00	18.00	0.00	0.000	0.000
PRE-3	13.00	13.00	0.00	0.000	0.000
PRE-4	25.00	25.00	0.00	0.000	0.000
PRE-5	9.00	9.00	0.00	0.000	0.000
PRE-6	6.00	6.00	0.00	0.000	0.000

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
PRE-7	13.00	13.00	0.00	0.000	0.000
PRE-8	1.00	1.00	0.00	0.000	0.000
PRE-9	45.00	45.00	0.00	0.000	0.000

Node: GBS-001

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: GBS-004

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 57.00 ft
 Warning Stage: 57.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	57.00
0	0	0	100.00	57.00

Comment:

Node: LK TOHO

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: OFF

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 65.00 ft
 Warning Stage: 65.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	65.00
0	0	0	100.00	65.00

Comment:

Node: OFF-1

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 67.00 ft
 Warning Stage: 68.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
67.00	0.00	0
67.50	0.23	10019
68.00	0.61	26572

Comment:

Node: PRE-8

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 65.00 ft
 Warning Stage: 67.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
65.00	0.00	0
65.50	0.05	2178
66.00	0.24	10454
66.50	2.33	101495
67.00	5.98	260489

Comment:

Node: W-10

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 54.93 ft
 Warning Stage: 57.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
54.90	0.00	0
55.00	0.03	1307
55.50	1.27	55321
56.00	3.80	165528
56.50	9.27	403801
57.00	15.75	686070

Comment:

Node: W-11

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 55.00 ft
 Warning Stage: 57.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
55.00	0.00	0
55.50	2.40	104544
56.00	6.07	264409
56.50	11.24	489614
57.00	17.02	741391

Comment:

Node: W-14

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 56.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
54.00	0.29	12632
54.50	11.40	496584
55.00	24.68	1075061
55.50	43.02	1873951
56.00	65.31	2844904

Comment:

Node: W-3

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 61.00 ft
 Warning Stage: 63.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
61.00	0.02	871
61.50	3.60	156816
62.00	8.79	382892
62.50	15.75	686070
63.00	23.78	1035857

Comment:

Node: W-4

Scenario: Pre
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 58.83 ft
 Warning Stage: 61.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
58.00	0.01	436
59.00	6.30	274428
59.50	16.75	729630
60.00	29.37	1279357
60.50	44.18	1924481

Stage [ft]	Volume [ac-ft]	Volume [ft3]
61.00	59.89	2608808

Comment:

Node: WPA-001

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: WPA-006

Scenario: Pre
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	999.00	54.00

Comment:

Pipe Link: P-1	Upstream	Downstream
Scenario: Pre	Invert: 51.29 ft	Invert: 50.80 ft
From Node: W-14	Manning's N: 0.012	Manning's N: 0.012
To Node: WPA-001	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 2.50 ft	Max Depth: 2.50 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 40.00 ft	Op Table:	Op Table:
FHWA Code: 6	Ref Node:	Ref Node:

Entr Loss Coef:	0.90	Manning's N:	0.000	Manning's N:	0.000
Exit Loss Coef:	1.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.000	Manning's N:	0.000
Comment:					

Pipe Link: P-2		Upstream	Downstream
Scenario:	Pre	Invert: 52.17 ft	Invert: 52.39 ft
From Node:	W-14	Manning's N: 0.012	Manning's N: 0.012
To Node:	LK TOHO	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 2.50 ft	Max Depth: 2.50 ft
Flow Direction:	Both	Bottom Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	40.00 ft	Op Table:	Op Table:
FHWA Code:	6	Ref Node:	Ref Node:
Entr Loss Coef:	0.90	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef:	1.00	Top Clip	
Bend Loss Coef:	0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location:	0.00 ft	Op Table:	Op Table:
Energy Switch:	Energy	Ref Node:	Ref Node:
		Manning's N: 0.000	Manning's N: 0.000
Comment:			

Pipe Link: P-3		Upstream	Downstream
Scenario:	Pre	Invert: 52.73 ft	Invert: 52.14 ft
From Node:	W-14	Manning's N: 0.012	Manning's N: 0.012
To Node:	LK TOHO	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction:	Both	Bottom Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	40.00 ft	Op Table:	Op Table:
FHWA Code:	6	Ref Node:	Ref Node:
Entr Loss Coef:	0.90	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef:	1.00	Top Clip	
Bend Loss Coef:	0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location:	0.00 ft	Op Table:	Op Table:
Energy Switch:	Energy	Ref Node:	Ref Node:
		Manning's N: 0.000	Manning's N: 0.000
Comment:			

Pipe Link: P-4		Upstream	Downstream
Scenario:	Pre	Invert: 52.91 ft	Invert: 52.36 ft
From Node:	W-14	Manning's N: 0.012	Manning's N: 0.012
To Node:	LK TOHO	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction:	Both	Bottom Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	40.00 ft	Op Table:	Op Table:
FHWA Code:	6	Ref Node:	Ref Node:
Entr Loss Coef:	0.90	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef:	1.00	Top Clip	
Bend Loss Coef:	0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location:	0.00 ft	Op Table:	Op Table:
Energy Switch:	Energy	Ref Node:	Ref Node:
		Manning's N: 0.000	Manning's N: 0.000
Comment:			

Pipe Link: P-5		Upstream	Downstream
Scenario:	Pre	Invert: 51.69 ft	Invert: 51.67 ft
From Node:	W-14	Manning's N: 0.012	Manning's N: 0.012
To Node:	LK TOHO	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction:	Both	Bottom Clip	
Damping:	0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length:	40.00 ft	Op Table:	Op Table:
FHWA Code:	6	Ref Node:	Ref Node:
Entr Loss Coef:	0.90	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef:	1.00	Top Clip	
Bend Loss Coef:	0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location:	0.00 ft	Op Table:	Op Table:
Energy Switch:	Energy	Ref Node:	Ref Node:
		Manning's N: 0.000	Manning's N: 0.000
Comment:			

Weir Link: W-8-GBS004			
Scenario:	Pre	Bottom Clip	
From Node:	PRE-8	Default:	0.00 ft
To Node:	GBS-004	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	Top Clip	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Irregular	Ref Node:	
Invert:	65.83 ft	Discharge Coefficients	
Control Elevation:	65.83 ft	Weir Default:	2.800

Cross Section: X-8-GBS004

Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-OFF1-8

Scenario: Pre
From Node: OFF-1
To Node: PRE-8
Link Count: 1
Flow Direction: Both
Damping: 0.0000 ft
Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 67.20 ft
Control Elevation: 67.20 ft
Cross Section: X-OFF1-8

Bottom Clip
Default: 0.00 ft
Op Table:
Ref Node:
Top Clip
Default: 0.00 ft
Op Table:
Ref Node:
Discharge Coefficients
Weir Default: 2.800
Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-W10-W14

Scenario: Pre
From Node: W-10
To Node: W-14
Link Count: 1
Flow Direction: Both
Damping: 0.0000 ft
Weir Type: Broad Crested Vertical
Geometry Type: Irregular
Invert: 54.93 ft
Control Elevation: 54.93 ft
Cross Section: X-10-14

Bottom Clip
Default: 0.00 ft
Op Table:
Ref Node:
Top Clip
Default: 0.00 ft
Op Table:
Ref Node:
Discharge Coefficients
Weir Default: 2.800
Weir Table:
Orifice Default: 0.600
Orifice Table:

Comment:

Weir Link: W-W11-W10

Scenario: Pre
From Node: W-11
To Node: W-10

Bottom Clip
Default: 0.00 ft
Op Table:

Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 55.71 ft
 Control Elevation: 55.71 ft
 Cross Section: X-11-10

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 2.800

Weir Table:

Orifice Default: 0.600

Orifice Table:

Comment:

Weir Link: W-W14-WPA001

Scenario: Pre
 From Node: W-14
 To Node: WPA-001
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 54.92 ft
 Control Elevation: 54.92 ft
 Cross Section: X-W14-WPA001

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 2.800

Weir Table:

Orifice Default: 0.600

Orifice Table:

Comment:

Weir Link: W-W3-GBS004

Scenario: Pre
 From Node: W-3
 To Node: GBS-004
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 60.97 ft
 Control Elevation: 60.97 ft
 Cross Section: X-W3-GBS004

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 2.800

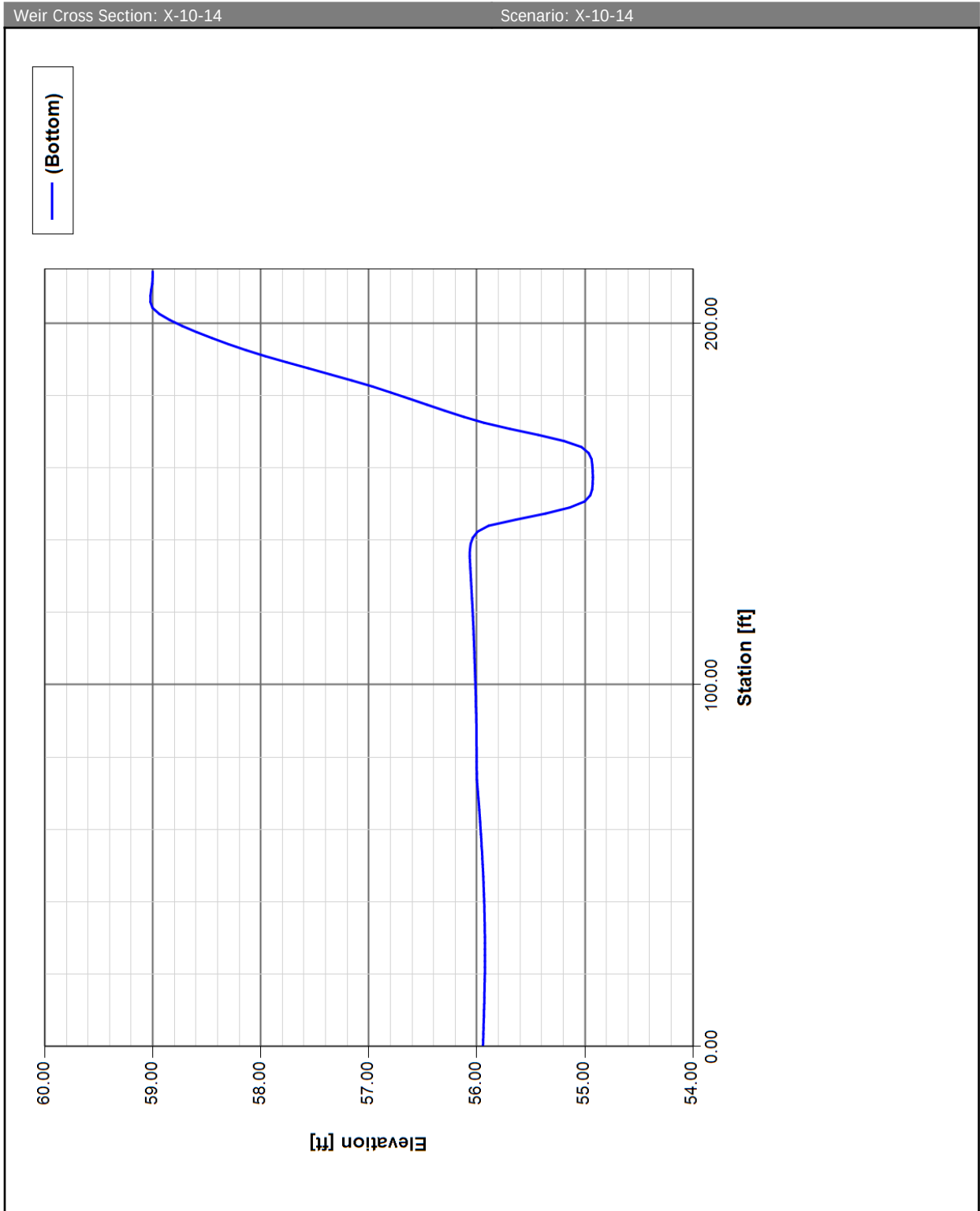
Weir Table:

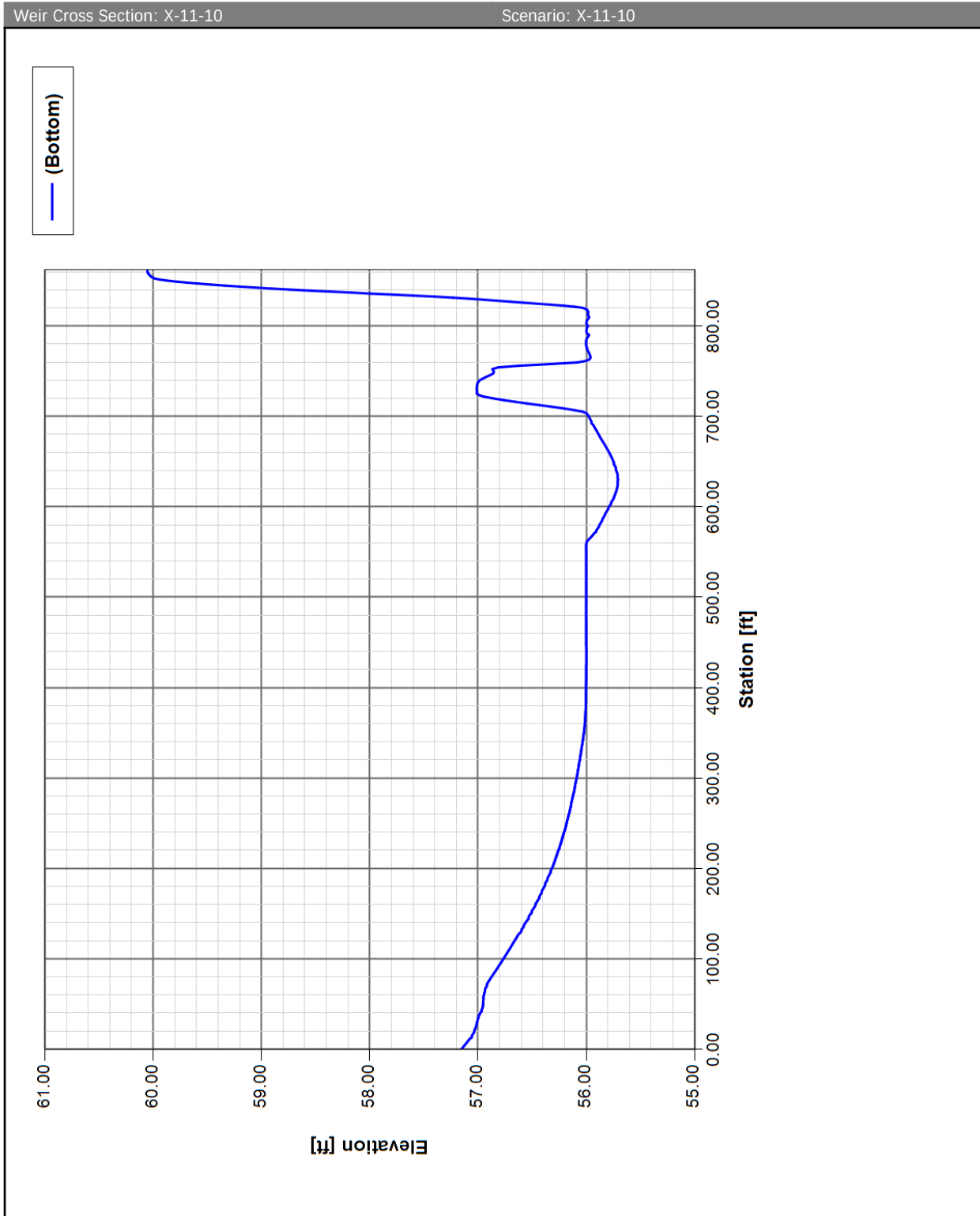
Orifice Default: 0.600

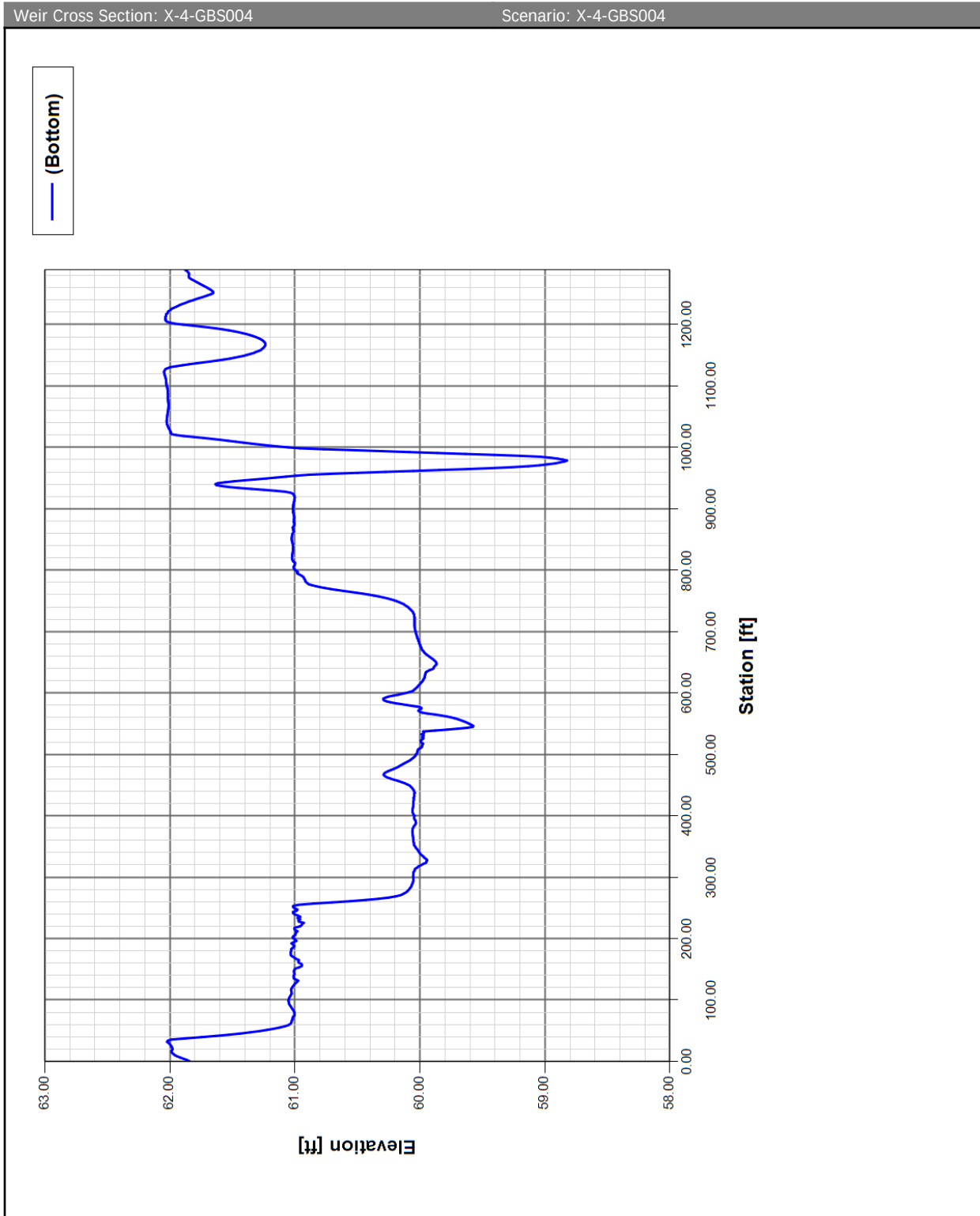
Orifice Table:

Comment:

Weir Link: W-W4-GBS004	
Scenario: Pre	Bottom Clip
From Node: W-4	Default: 0.00 ft
To Node: GBS-004	Op Table:
Link Count: 1	Ref Node:
Flow Direction: Both	Top Clip
Damping: 0.0000 ft	Default: 0.00 ft
Weir Type: Broad Crested Vertical	Op Table:
Geometry Type: Irregular	Ref Node:
Invert: 58.83 ft	Discharge Coefficients
Control Elevation: 58.83 ft	Weir Default: 2.800
Cross Section: X-4-GBS004	Weir Table:
	Orifice Default: 0.600
	Orifice Table:
Comment:	



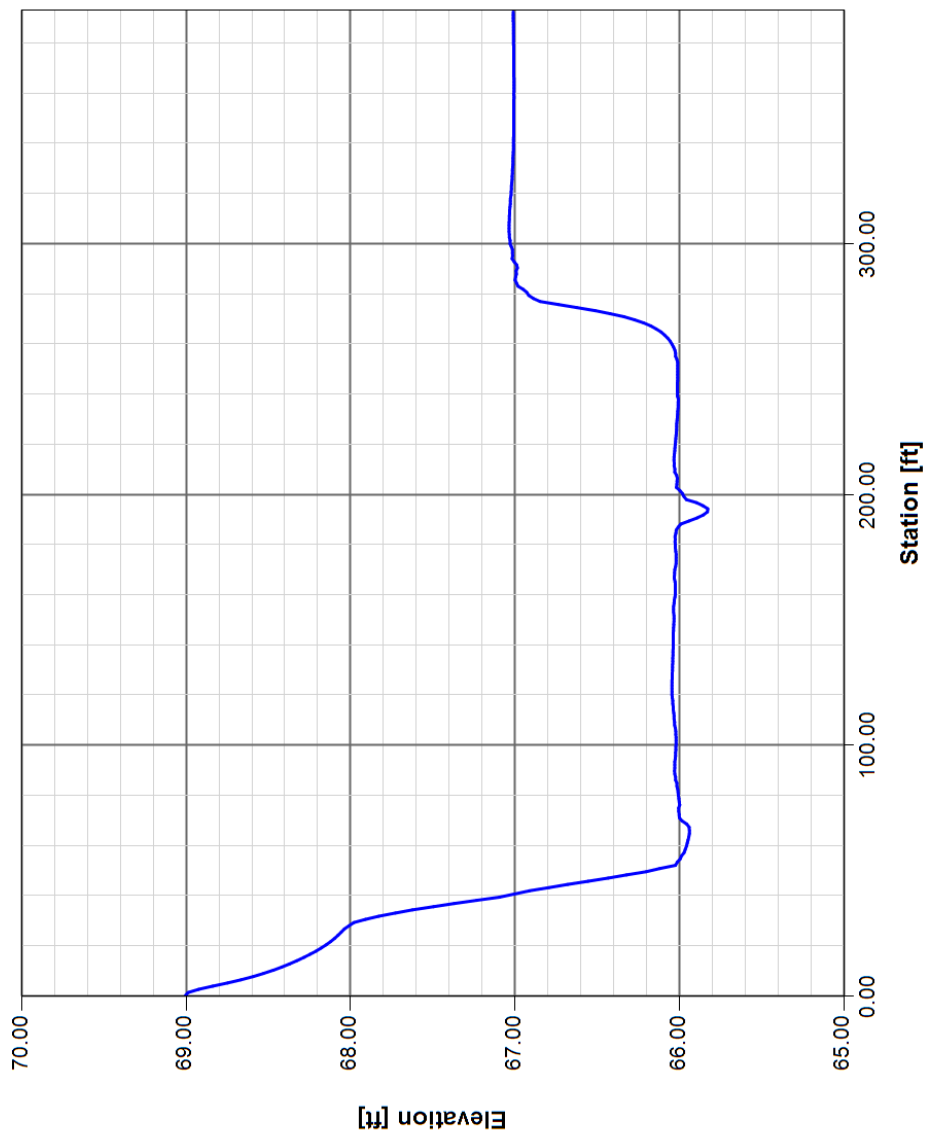


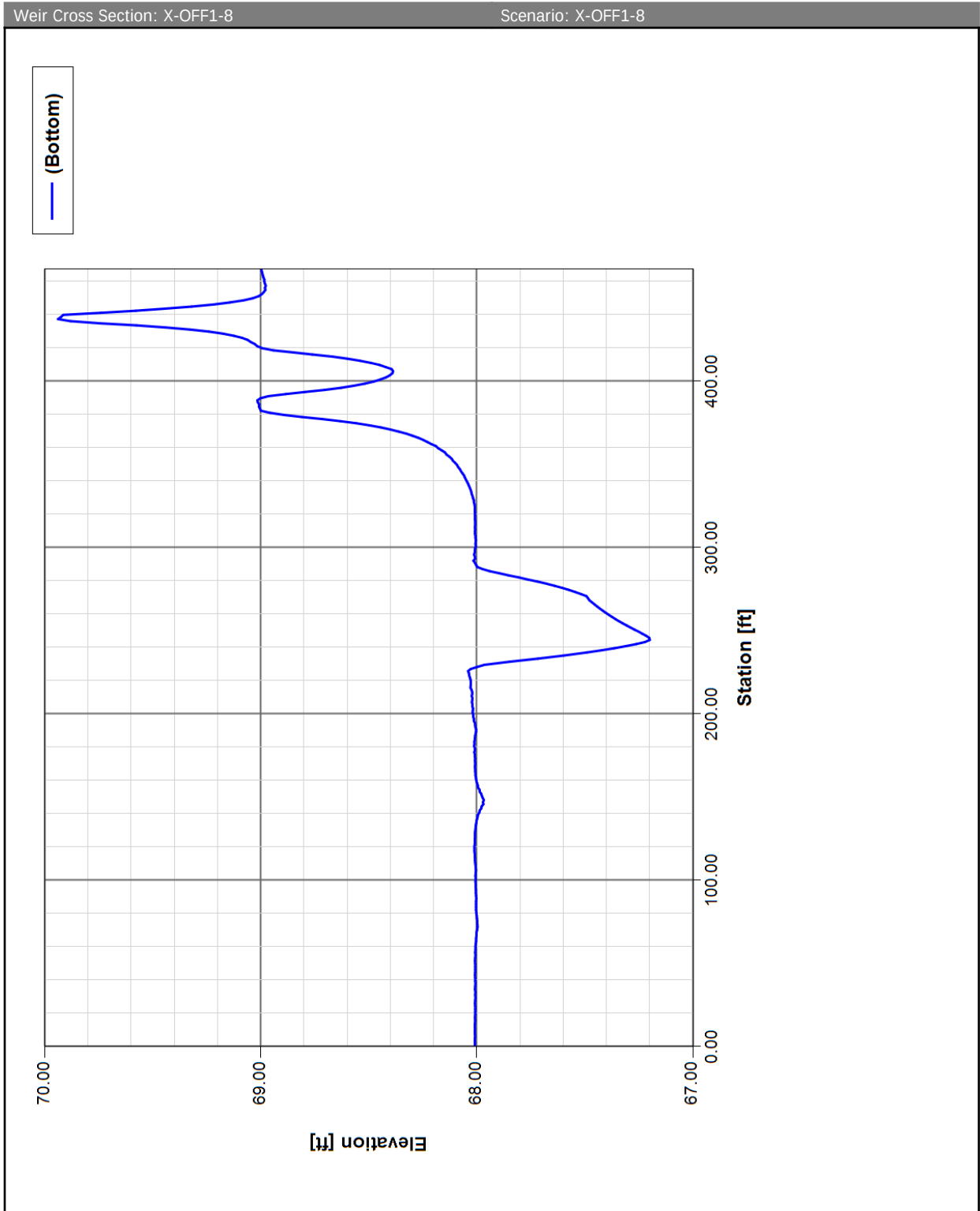


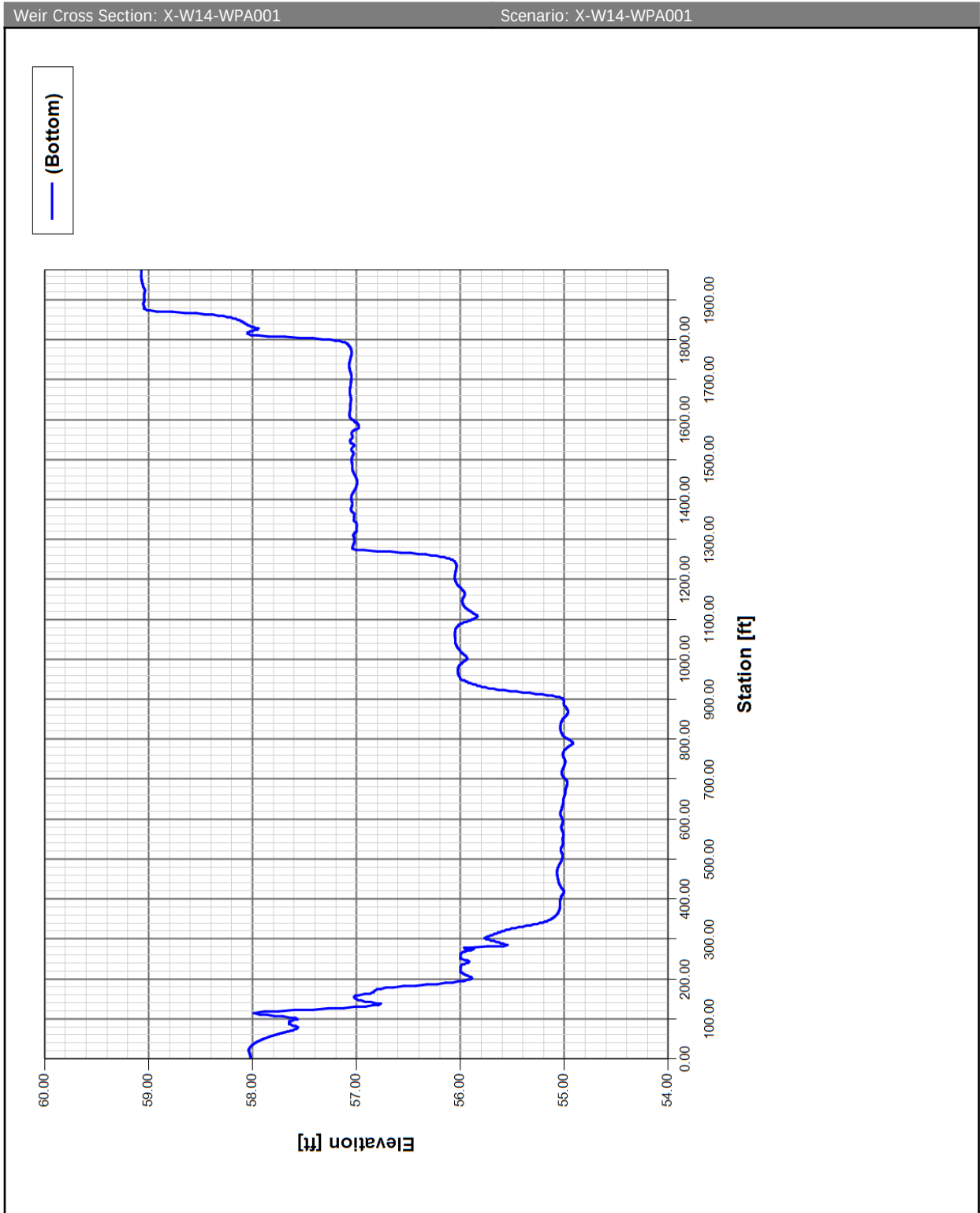
Weir Cross Section: X-8-GBS004

Scenario: X-8-GBS004

— (Bottom)



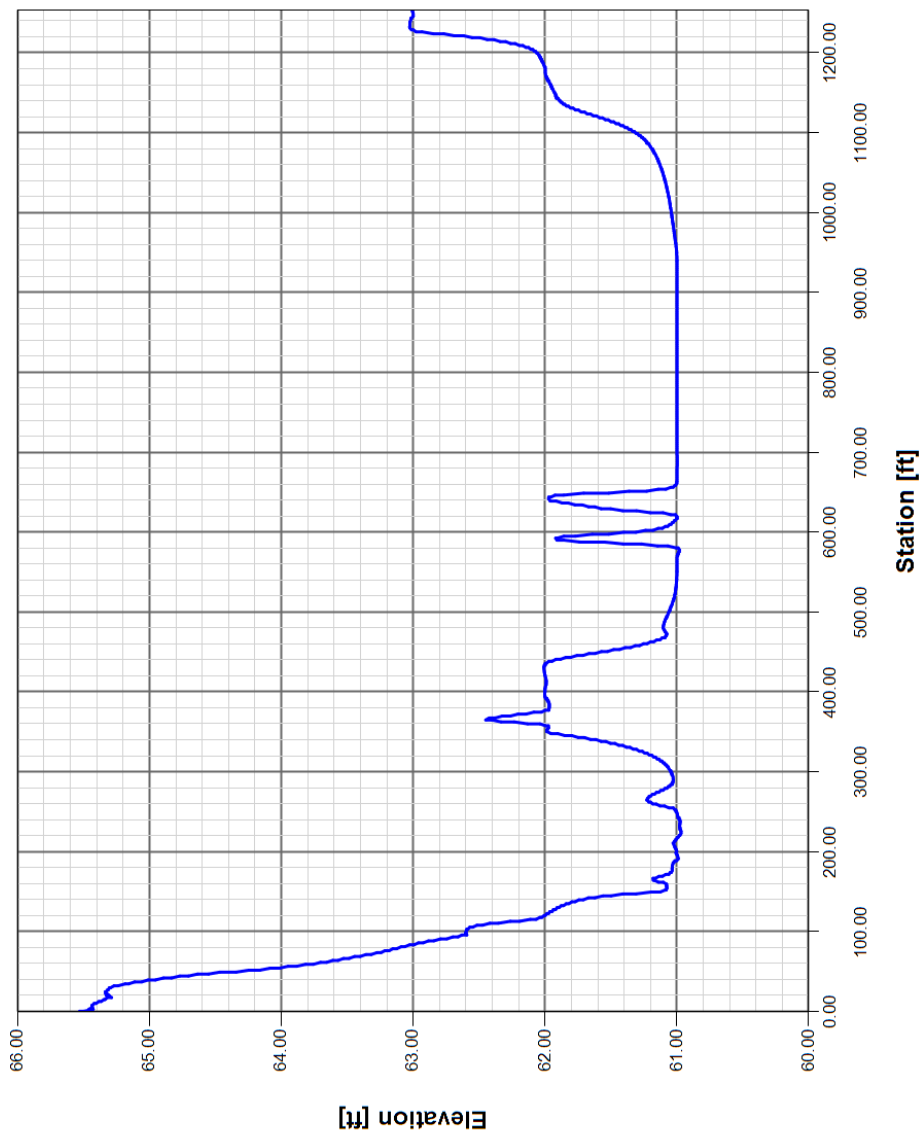




Weir Cross Section: X-W3-GBS004

Scenario: X-W3-GBS004

— (Bottom)



Simulation: 100yr-72hr

Scenario: Pre
 Run Date/Time: 6/8/2018 9:48:31 AM
 Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	100.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: Basin Composite CN

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR
 Max Iterations: 6
 Over-Relax Weight 0.5 dec
 Fact:
 dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.00 hr

 Manual Basin Rain Opt: Global

Max dZ: 1.0000 ft
 Link Optimizer Tol: 0.0001 ft
 Edge Length Option: Automatic

Rainfall Name: ~SFWMD-72
 Rainfall Amount: 11.40 in
 Storm Duration: 72.00 hr
 Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area (1D): 100 ft2
 Energy Switch (1D): Energy

Comment:

Simulation: 10yr-72hr

Scenario: Pre
 Run Date/Time: 6/8/2018 9:48:53 AM
 Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	100.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00
0	0	0	60.00	0.60
0	0	0	65.00	15.00
0	0	0	100.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00
0	0	0	60.00	0.60
0	0	0	65.00	15.00
0	0	0	100.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: Basin Composite CN

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~SFWM-72

Rainfall Amount: 7.50 in

Storm Duration: 72.00 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: MEAN

Scenario: Pre

Run Date/Time: 6/8/2018 9:49:40 AM

Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	30.00
	Hydrology [sec]	Surface Hydraulics [sec]		

Min Calculation Time: 60.0000 0.1000
 Max Calculation Time: 60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: Basin Composite CN

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR
 Max Iterations: 6
 Over-Relax Weight: 0.5 dec
 Fact:
 dZ Tolerance: 0.0010 ft
 Max dZ: 1.0000 ft
 Link Optimizer Tol: 0.0001 ft

 Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

 Manual Basin Rain Opt: Global

 Rainfall Name: ~FLMOD
 Rainfall Amount: 4.00 in
 Storm Duration: 24.00 hr

 Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area: 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:

Node Max Conditions [Pre]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
GBS-001	100yr-72hr	54.50	54.00	0.0000	133.38	0.00	0
GBS-004	100yr-72hr	57.50	57.00	0.0000	370.72	0.00	0
LK TOHO	100yr-72hr	54.50	54.00	0.0000	167.36	0.00	0
OFF	100yr-72hr	65.50	65.00	0.0000	10.57	0.00	0
OFF-1	100yr-72hr	68.00	67.60	0.0010	13.55	12.86	29213
PRE-8	100yr-72hr	67.00	66.19	0.0010	46.21	46.06	157458
W-10	100yr-72hr	57.00	56.00	0.0010	88.08	66.99	349438
W-11	100yr-72hr	57.00	56.05	0.0006	60.11	53.97	394841
W-14	100yr-72hr	56.00	55.30	0.0010	360.85	323.40	1609291
W-3	100yr-72hr	63.00	61.23	0.0008	180.79	179.80	306426
W-4	100yr-72hr	61.00	60.19	0.0010	243.16	187.06	1244680
WPA-001	100yr-72hr	54.50	54.00	0.0000	253.33	0.00	0
WPA-006	100yr-72hr	54.50	54.00	0.0000	19.50	0.00	0
GBS-001	10yr-72hr	54.50	54.00	0.0000	80.34	0.00	0
GBS-004	10yr-72hr	57.50	57.00	0.0000	173.94	0.00	0
LK TOHO	10yr-72hr	54.50	54.00	0.0000	109.40	0.00	0
OFF	10yr-72hr	65.50	65.00	0.0000	6.49	0.00	0
OFF-1	10yr-72hr	68.00	67.52	0.0010	7.80	7.17	26967
PRE-8	10yr-72hr	67.00	66.14	0.0010	28.03	27.92	141852
W-10	10yr-72hr	57.00	55.75	0.0010	49.09	39.58	256594
W-11	10yr-72hr	57.00	55.99	0.0009	37.39	28.99	382373
W-14	10yr-72hr	56.00	55.14	0.0010	220.09	152.59	1483709
W-3	10yr-72hr	63.00	61.17	0.0009	111.28	110.46	290624
W-4	10yr-72hr	61.00	59.97	0.0010	145.88	74.30	1185116
WPA-001	10yr-72hr	54.50	54.00	0.0000	87.57	0.00	0
WPA-006	10yr-72hr	54.50	54.00	0.0000	12.20	0.00	0
GBS-001	MEAN	54.50	54.00	0.0000	37.70	0.00	0
GBS-004	MEAN	57.50	57.00	0.0000	71.21	0.00	0
LK TOHO	MEAN	54.50	54.00	0.0000	62.72	0.00	0
OFF	MEAN	65.50	65.00	0.0000	3.24	0.00	0
OFF-1	MEAN	68.00	67.38	0.0010	2.90	1.92	23465
PRE-8	MEAN	67.00	66.09	0.0010	12.79	12.60	125239
W-10	MEAN	57.00	55.26	0.0007	10.78	8.36	115464
W-11	MEAN	57.00	55.82	0.0009	20.46	3.68	340846
W-14	MEAN	56.00	54.51	0.0010	101.34	61.64	1066676
W-3	MEAN	63.00	61.12	0.0010	57.26	56.65	275162
W-4	MEAN	61.00	59.54	0.0009	69.85	23.81	1020774
WPA-001	MEAN	54.50	54.00	0.0000	18.83	0.00	0
WPA-006	MEAN	54.50	54.00	0.0000	7.09	0.00	0

Link Min/Max Conditions [Pre]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
P-1	100yr-72hr	30.11	0.00	-0.08	6.13	6.13	6.13
P-2	100yr-72hr	20.85	0.00	-0.06	4.25	6.24	5.24
P-3	100yr-72hr	15.91	0.00	-0.05	5.07	9.63	7.35
P-4	100yr-72hr	14.50	0.00	-0.04	4.61	5.26	4.94
P-5	100yr-72hr	18.81	0.00	-0.05	5.99	5.99	5.99
W-8-GBS004	100yr-72hr	46.06	0.00	-0.10	1.20	1.20	1.20
W-OFF1-8	100yr-72hr	12.86	0.00	0.05	1.44	1.44	1.44
W-W10-W14	100yr-72hr	66.99	0.00	-0.13	2.60	2.60	2.60
W-W11-W10	100yr-72hr	53.97	0.00	0.14	1.26	1.26	1.26
W-W14-WPA001	100yr-72hr	223.22	0.00	1.01	1.46	1.46	1.46
W-W3-GBS004	100yr-72hr	179.80	0.00	0.47	1.26	1.26	1.26
W-W4-GBS004	100yr-72hr	187.06	0.00	-0.50	2.30	2.30	2.30
P-1	10yr-72hr	28.19	0.00	-0.08	5.74	5.74	5.74
P-2	10yr-72hr	19.52	0.00	-0.06	3.98	5.84	4.91
P-3	10yr-72hr	14.66	0.00	-0.05	4.67	9.44	7.05
P-4	10yr-72hr	13.23	0.00	-0.04	4.21	4.80	4.51
P-5	10yr-72hr	17.61	0.00	-0.05	5.61	5.61	5.61
W-8-GBS004	10yr-72hr	27.92	0.00	0.06	1.03	1.03	1.03
W-OFF1-8	10yr-72hr	7.17	0.00	0.04	1.27	1.27	1.27
W-W10-W14	10yr-72hr	39.58	0.00	-0.07	2.37	2.37	2.37
W-W11-W10	10yr-72hr	28.99	0.00	0.07	1.25	1.25	1.25
W-W14-WPA001	10yr-72hr	59.38	0.00	0.52	0.96	0.96	0.96
W-W3-GBS004	10yr-72hr	110.46	0.00	0.40	1.09	1.09	1.09
W-W4-GBS004	10yr-72hr	74.30	0.00	-0.10	2.30	2.30	2.30
P-1	MEAN	18.83	0.00	0.09	3.84	3.84	3.84
P-2	MEAN	13.09	0.00	0.06	2.74	3.92	3.33
P-3	MEAN	9.68	0.00	0.05	3.28	3.18	3.23
P-4	MEAN	8.28	0.00	0.05	3.08	3.00	3.04
P-5	MEAN	11.76	0.00	0.05	3.74	3.74	3.74
W-8-GBS004	MEAN	12.60	0.00	0.13	0.85	0.85	0.85
W-OFF1-8	MEAN	1.92	0.00	0.01	0.99	0.99	0.99
W-W10-W14	MEAN	8.36	0.00	0.02	1.53	1.53	1.53

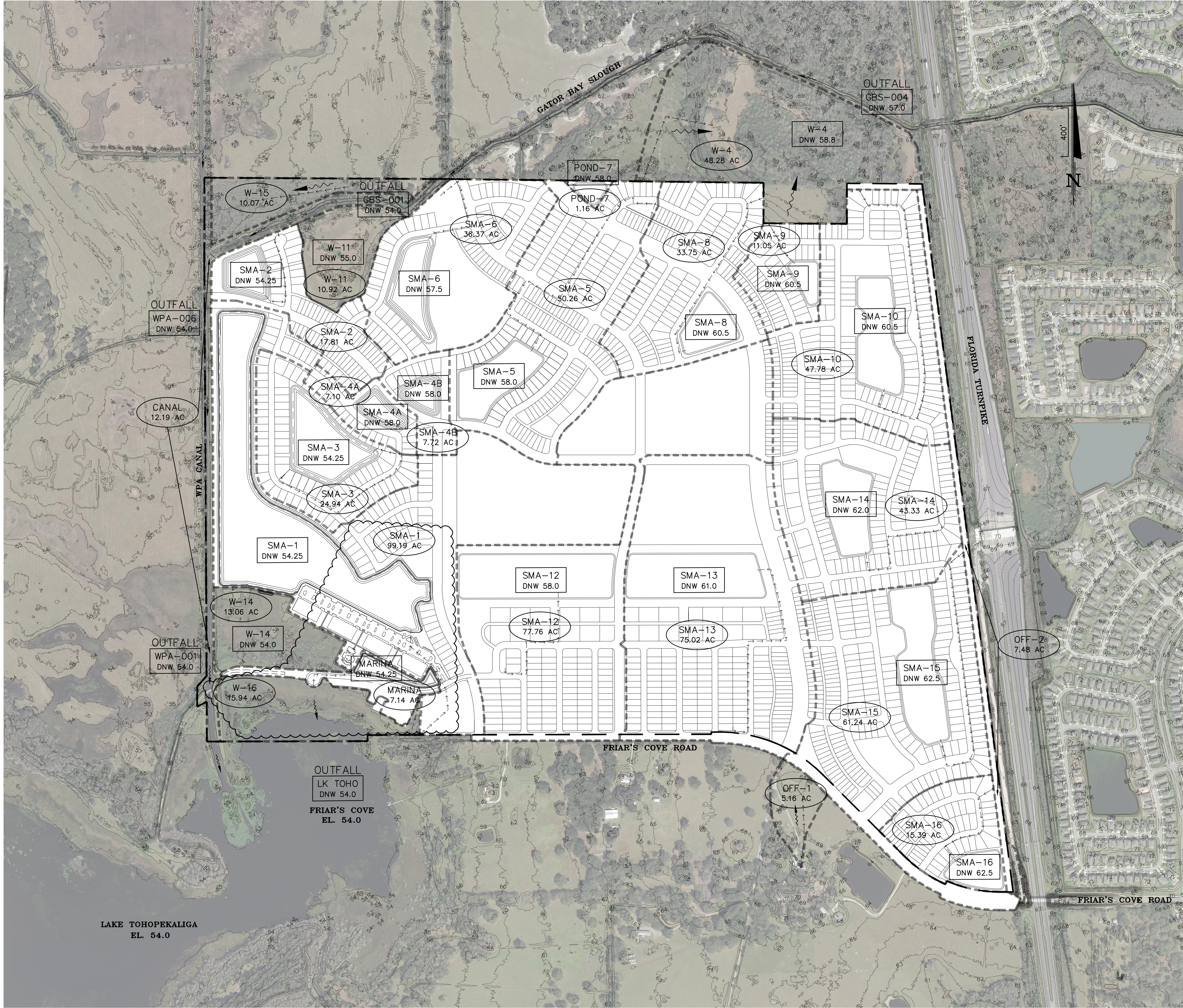
Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
W-W11-W10	MEAN	3.68	0.00	0.04	0.79	0.79	0.79
W-W14-WPA001	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
W-W3-GBS004	MEAN	56.65	0.00	0.18	0.90	0.90	0.90
W-W4-GBS004	MEAN	23.81	0.00	0.04	2.09	2.09	2.09



APPENDIX C.2

POST DEVELOPMENT WATER QUANTITY ANALYSIS

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LEGEND

- Property Boundary
- Basins
- TC Path

SMA-1
DNW 54.25

NODE I.D.
INITIAL STAGE
ELEVATION

SMA-1
99.19 AC

BASIN I.D.
BASIN
ACREAGE

OUTFALL
LK TOHO
DNW 54.0

OUTFALL
OUTFALL I.D.
INITIAL STAGE
ELEVATION

- GENERAL NOTES:
- THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
 - LIDAR TOPO FROM OSCEOLA COUNTY (2016)
 - ELEVATIONS ARE IN NAVD88 DATUM

DRAWING 13189-POSTMAP	SHEET 1 OF 1	FONTANA OSCEOLA COUNTY, FL POST-DEVELOPMENT BASIN MAP		DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS 2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4068 CERTIFICATE OF AUTHORIZATION NO. 68		JAMES C. NUGENT FLORIDA P.E. No. 57553 DATE: _____		NO. _____ DATE _____		2 4/24/20 ADDING MARINA LAYOUT 1 10/19/18 UPDATING MULTI-USE ROAD AND SMA1, 2, 4 AND 6 REVISIONS		CHK



W-14-WPA001	LINK I.D.
WEIR @ 54.92	LINK DESCRIPTION

DRAWING
13189-XPOSTNODE
SHEET
1 OF 1

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	CANAL
Receiving Node:	LK TOHO
Basin Area:	12.19 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
17	Kaliga muck	C/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	1.86		1.86	149
Woods (Good)	D	77	1.55		1.55	119
Wetlands	D	98		0.62	0.62	0
Water Surface	D	98		8.15	8.15	0
Totals:			3.41	8.78	12.19	268

Composite CN (exc. DCIA) =	79
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Composite DCIA =	72%
-------------------------	------------

Time of Concentration (T_c) Calculations**Equations**

Sheet Flow:
$$T_t = \frac{0.007(nL)^{0.8}}{(4.8)^{0.5}(S^{0.4}/100)}$$
 where: $L \leq 100$ ft.
 S = slope (%)
 n = Manning's "n"

Shallow Concentrated Flow:

$$T_t = \frac{L}{60V}$$

where:

Description:
 $V = 2.516(S)^{0.5}$ Forest & Meadow (F&M)
 $V = 5.032(S)^{0.5}$ Fallow & Woodland (F&W)
 $V = 6.962(S)^{0.5}$ Short Grass Pasture (Pasture)
 $V = 8.762(S)^{0.5}$ Nearly Bare Ground (Bare)
 $V = 9.965(S)^{0.5}$ Cultivated Straight Row Crops (Cultivated)
 $V = 16.135(S)^{0.5}$ Grassed Waterway (GW)
 $V = 20.328(S)^{0.5}$ Pavement & Small Upland Gullies (Paved)

*Note: Shallow Concentrated Flow Velocity equations
 obtained from the National Engineering Handbook, Part
 630 Hydrology, Chapter 15, Table 15-3*

Channel Flow:

$$T_t = \frac{L}{60V}$$

where:

 $V = 2.5$ fps (assumed)**Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	65	0.24	6.2	-	5.3

Note: 10-minute Time of Concentration is used when calculated value is less.

Time of Conc. =	5 Minutes
------------------------	------------------

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018
 By: NRB
 Chk: JCN
 Rev: 6/26/2020

Basin Name:	OFF-1
Receiving Node:	SMA-15
Basin Area:	5.16 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
24	Narcoossee fine sand	A
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	A	39	0.21		0.21	8
Pasture (Good)	D	80	4.26		4.26	341
Woods-Grass Comb. (Good)	A	32	0.68		0.68	22
Woods-Grass Comb. (Good)	D	79	0.01		0.01	1
Totals:			5.16	-	5.16	372

Composite CN (exc. DCIA) =	72
Composite DCIA =	-

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.9	-	11.9
Shallow Conc. (Pasture)	495		0.4	0.44	18.7

Time of Conc. =	31 Minutes
------------------------	-------------------

Basin Name:	OFF-2
Receiving Node:	GBS-004
Basin Area:	7.48 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
22	Myakka fine sand	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Open Space (Good)	D	80	7.48		7.48	598
Totals:			7.48	-	7.48	598

Composite CN (exc. DCIA) =	80
Composite DCIA =	-

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	50	0.3	6.0	-	5.2

Note: 10-minute Time of Concentration is used when calculated value is less.

Time of Conc. =	5 Minutes
------------------------	------------------

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-1
Receiving Node:	SMA-1
Basin Area:	99.19 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D
99	Water	N/A

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Condominiums (70%)	D	82	2.99	5.94	8.93	245
Residential (70%)	D	92	10.97	0.85	11.82	1009
Residential (60%)	D	90	0.19	0.01	0.20	17
Civ-Com-Multi (80%)	D	92	14.56	9.70	24.26	1339
Open Space (Good)	D	80	6.65		6.65	532
Park (25%)	D	84	8.44	0.56	9.00	709
50' R/W (72%)	D	90	1.40	0.84	2.24	126
60' R/W (77%)	D	91	0.65	0.47	1.12	59
80' R/W (82.5%)	D	92	2.58	2.45	5.03	238
Friar's Cove Road (82.5%)	D	92	0.08	0.08	0.16	8
Water Surface	N/A	98		29.78	29.78	0
Totals:			48.50	50.69	99.19	4281

¹Future marina to be permitted separately

Composite CN (exc. DCIA) =	88
Composite DCIA =	51%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.3	1.00	-	18.4
Shallow Conc. (GW)	50		1.00	1.61	0.5
Shallow Conc. (Paved)	65		0.40	1.29	0.8
Channel/Pipe Flow	750			2.50	5.0

Time of Conc. =	25 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-2
Receiving Node:	SMA-2
Basin Area:	17.81 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	4.19	0.25	4.44	386
Residential (60%)	D	90	4.26	0.33	4.59	383
Open Space (Good)	D	80	2.10		2.10	168
Park (25%)	D	84	0.08	0.01	0.08	6
50' R/W (72%)	D	90	0.74	0.44	1.18	66
80' R/W (82.5%)	D	92	1.26	1.19	2.45	116
Alley (100%)	D	98		0.61	0.61	0
Water Surface	N/A	98		2.36	2.36	0
Totals:			12.62	5.19	17.81	1125

Composite CN (exc. DCIA) =	89
Composite DCIA =	29%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	100		1.50	1.98	0.8
Shallow Conc. (Paved)	150		0.40	1.29	1.9
Channel/Pipe Flow	945			2.50	6.3

Time of Conc. =	22 Minutes
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Fontana

Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-3
Receiving Node:	SMA-3
Basin Area:	24.94 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
32	Placid fine sand, depressional	A/D
40	Samsula muck	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	11.24	0.67	11.91	1034
Residential (60%)	D	90	1.57	0.12	1.69	141
Open Space (Good)	D	80	1.90		1.90	152
50' R/W (72%)	D	90	1.78	1.07	2.85	160
60' R/W (77%)	D	91	0.09	0.06	0.15	8
Water Surface	N/A	98		6.44	6.44	0
Totals:			16.58	8.36	24.94	1496

Composite CN (exc. DCIA) = 90

Composite DCIA = 34%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	80	0.24	1.50	-	10.9
Shallow Conc. (Paved)	160		1.50	2.49	1.1
Channel/Pipe Flow	1400			2.50	9.3

Time of Conc. = 21 Minutes

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-4A
Receiving Node:	SMA-4A
Basin Area:	7.10 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	0.99	0.06	1.05	91
Residential (60%)	D	90	1.61	0.12	1.73	144
Open Space (Good)	D	80	0.86		0.86	69
50' R/W (72%)	D	90	0.29	0.17	0.46	26
60' R/W (77%)	D	91	0.73	0.54	1.27	67
80' R/W (82.5%)	D	92	0.25	0.24	0.49	23
Water Surface	N/A	98		1.24	1.24	0
Totals:			4.73	2.37	7.10	420

Composite CN (exc. DCIA) =	89
Composite DCIA =	33%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	20		1.50	1.98	0.2
Shallow Conc. (Paved)	160		0.40	1.29	2.1
Channel/Pipe Flow	750			2.50	5.0

Time of Conc. =	20 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-4B
Receiving Node:	SMA-4B
Basin Area:	7.72 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	1.22	0.07	1.29	112
Residential (60%)	D	90	0.06	0.00	0.06	5
Civ-Com-Multi (80%)	D	92	0.45	0.30	0.75	41
Open Space (Good)	D	80	0.88		0.88	70
Park (25%)	D	84	1.31	0.09	1.40	110
50' R/W (72%)	D	90	0.42	0.25	0.67	38
80' R/W (82.5%)	D	92	0.68	0.64	1.32	62
Alley (100%)	D	98		0.04	0.04	0
Water Surface	N/A	98		1.31	1.31	0
Totals:			5.01	2.71	7.72	439

Composite CN (exc. DCIA) =	88
Composite DCIA =	35%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	20		1.50	1.98	0.2
Shallow Conc. (Paved)	160		0.40	1.29	2.1
Channel/Pipe Flow	750			2.50	5.0

Time of Conc. =	20 Minutes
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Fontana

Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-5
Receiving Node:	SMA-5
Basin Area:	50.26 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
27	Ona fine sand	B/D
32	Placid fine sand, depressional	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	16.41	0.97	17.38	1509
Residential (65%)	D	91	1.85	0.12	1.97	169
Residential (60%)	A	73	0.11	0.01	0.12	8
Residential (60%)	D	90	7.84	0.61	8.45	706
Open Space (Good)	D	80	1.61		1.61	129
Park (25%)	D	84	1.04	0.07	1.11	87
132' R/W (70%)	D	90	1.76	0.95	2.70	158
50' R/W (72%)	A	72	0.04	0.03	0.07	3
50' R/W (72%)	D	90	2.23	1.34	3.57	201
60' R/W (77%)	D	91	2.42	1.77	4.19	220
80' R/W (82.5%)	D	92	1.72	1.64	3.36	159
Alley (100%)	A	98		0.06	0.06	0
Alley (100%)	D	98		1.03	1.03	0
Water Surface	N/A	98		4.64	4.64	0
Totals:			37.04	13.22	50.26	3349

Composite CN (exc. DCIA) = 90

Composite DCIA = 26%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	25		1.50	1.98	0.2
Shallow Conc. (Paved)	180		0.40	1.29	2.3
Channel/Pipe Flow	2225			2.50	14.8

Time of Conc. = 30 Minutes

Basin Name:	SMA-6
Receiving Node:	SMA-6
Basin Area:	36.37 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
27	Ona fine sand	B/D
32	Placid fine sand, depressional	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	8.23	0.49	8.72	757
Residential (60%)	D	90	3.12	0.24	3.36	281
Open Space (Good)	D	80	2.33		2.33	186
Park (25%)	D	84	11.54	0.77	12.31	969
50' R/W (72%)	D	90	1.60	0.95	2.55	144
60' R/W (77%)	D	91	0.54	0.39	0.93	49
80' R/W (82.5%)	D	92	0.85	0.81	1.66	78
Alley (100%)	D	98		0.54	0.54	0
Water Surface	N/A	98		3.97	3.97	0
Totals:			28.20	8.17	36.37	2465

Composite CN (exc. DCIA) =	87
Composite DCIA =	22%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	90		1.50	1.98	0.8
Shallow Conc. (Paved)	90		0.40	1.29	1.2
Channel/Pipe Flow	665			2.50	4.4

Time of Conc. = 19 Minutes

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	POND-7
Receiving Node:	POND-7
Basin Area:	1.16 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
27	Ona fine sand	B/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Open Space (Good)	D	80	0.66		0.66	53
Water Surface	D	98		0.50	0.50	0
Totals:			0.66	0.50	1.16	53

Composite CN (exc. DCIA) =	80
Composite DCIA =	43%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.50	-	13.1
Shallow Conc. (GW)	15		1.50	1.98	0.1

Time of Conc. =	13 Minutes
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Basin Name:	SMA-8
Receiving Node:	SMA-8
Basin Area:	33.75 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	A	79	0.65	0.04	0.69	51
Residential (70%)	D	92	11.74	0.70	12.44	1080
Residential (60%)	A	73	1.32	0.10	1.42	96
Residential (60%)	D	90	4.05	0.31	4.36	364
Open Space (Good)	D	80	1.54		1.54	123
132' R/W (70%)	D	90	2.57	1.38	3.95	231
50' R/W (72%)	A	72	0.26	0.15	0.41	18
50' R/W (72%)	D	90	2.04	1.22	3.26	184
60' R/W (77%)	D	91	0.97	0.71	1.68	88
80' R/W (82.5%)	A	78	0.39	0.37	0.76	30
80' R/W (82.5%)	D	92	0.03	0.02	0.05	2
Alley (100%)	D	98		0.39	0.39	0
Water Surface	N/A	98		2.80	2.80	0
Totals:			25.55	8.20	33.75	2269

Composite CN (exc. DCIA) =	89
Composite DCIA =	24%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	60	0.3	1.50	-	10.4
Shallow Conc. (GW)	150		1.50	1.98	1.3
Channel/Pipe Flow	1445			2.50	9.6

Time of Conc. =	21 Minutes
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Fontana

Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-9
Receiving Node:	SMA-9
Basin Area:	11.05 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	4.57	0.27	4.84	420
Residential (60%)	D	90	2.38	0.19	2.57	215
Open Space (Good)	D	80	0.79		0.79	63
50' R/W (72%)	D	90	0.39	0.23	0.62	35
60' R/W (77%)	D	91	0.56	0.41	0.97	51
Alley (100%)	D	98		0.27	0.27	0
Water Surface	N/A	98		0.99	0.99	0
Totals:			8.69	2.36	11.05	784

Composite CN (exc. DCIA) =	90
Composite DCIA =	21%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.3	1.50	-	15.6
Shallow Conc. (GW)	120		1.50	1.98	1.0
Channel/Pipe Flow	225		1.00	2.50	1.5

Time of Conc. =	18 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-10
Receiving Node:	SMA-10
Basin Area:	47.78 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	A	79	1.70	0.10	1.80	134
Residential (70%)	D	92	22.32	1.32	23.64	2053
Residential (60%)	A	73	1.27	0.10	1.37	93
Residential (60%)	D	90	1.22	0.09	1.31	109
Civ-Com-Multi (80%)	D	92	1.40	0.93	2.33	129
Open Space (Good)	D	80	1.98		1.98	158
Park (25%)	D	84	0.96	0.06	1.02	80
50' R/W (72%)	A	72	0.19	0.11	0.30	14
50' R/W (72%)	D	90	4.58	2.74	7.32	412
60' R/W (77%)	A	74	0.32	0.23	0.55	23
60' R/W (77%)	D	91	0.31	0.22	0.53	28
Alley (100%)	D	98		0.29	0.29	0
Water Surface	N/A	98		5.34	5.34	0
Totals:			36.23	11.55	47.78	3234

Composite CN (exc. DCIA) =	89
Composite DCIA =	24%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	80	0.3	1.50	-	13.1
Shallow Conc. (GW)	160		1.50	1.98	1.3
Channel/Pipe Flow	2540			2.50	16.9

Time of Conc. =	31 Minutes
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Basin Name:	SMA-12
Receiving Node:	SMA-12
Basin Area:	77.76 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
32	Placid fine sand, depressional	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	12.27	0.73	13.00	1129
Residential (65%)	D	91	5.15	0.32	5.47	469
Residential (60%)	A	73	0.62	0.05	0.67	45
Residential (60%)	D	90	0.51	0.04	0.55	46
Civ-Com-Multi (80%)	A	78	1.56	1.04	2.60	122
Civ-Com-Multi (80%)	D	92	11.60	7.74	19.34	1068
Open Space (Good)	D	80	3.53		3.53	282
Park (25%)	D	84	6.22	0.41	6.63	522
132' R/W (70%)	A	71	1.06	0.57	1.63	75
132' R/W (70%)	D	90	0.81	0.43	1.24	73
50' R/W (72%)	A	72	0.04	0.03	0.07	3
50' R/W (72%)	D	90	1.83	1.10	2.93	165
60' R/W (77%)	D	91	0.94	0.69	1.63	86
80' R/W (82.5%)	A	78	0.17	0.17	0.34	14
80' R/W (82.5%)	D	92	3.21	3.04	6.25	295
Friar's Cove Road (82.5%)	D	92	0.88	0.83	1.71	81
Alley (100%)	D	98		0.77	0.77	0
Water Surface	N/A	98		9.40	9.40	0
Totals:			50.41	27.35	77.76	4474

Composite CN (exc. DCIA) =	89
Composite DCIA =	35%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	50	0.3	1.50	-	9.0
Shallow Conc. (Paved)	265		0.40	1.29	3.4
Channel/Pipe Flow	840			2.50	5.6

Time of Conc. = 18 Minutes

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-13
Receiving Node:	SMA-13
Basin Area:	75.02 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
22	Myakka fine sand	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	14.71	0.87	15.58	1353
Residential (65%)	D	91	6.93	0.43	7.36	631
Residential (60%)	D	90	4.08	0.32	4.40	367
Civ-Com-Multi (80%)	D	92	8.59	5.73	14.32	790
Open Space (Good)	D	80	2.50		2.50	200
Park (25%)	D	84	4.31	0.29	4.60	362
132' R/W (70%)	D	90	4.82	2.59	7.41	433
50' R/W (72%)	D	90	2.22	1.33	3.55	200
60' R/W (77%)	D	91	1.05	0.78	1.83	96
80' R/W (82.5%)	D	92	0.84	0.80	1.64	77
80' R/W (82.5%)	D	92	1.28	1.21	2.49	118
Alley (100%)	D	98		1.21	1.21	0
Water Surface	N/A	98		8.13	8.13	0
Totals:			51.34	23.68	75.02	4628

Composite CN (exc. DCIA) =	90
Composite DCIA =	32%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	35	0.3	1.50	-	6.7
Shallow Conc. (GW)	125		1.50	1.98	1.1
Shallow Conc. (Paved)	175		0.40	1.29	2.3
Channel/Pipe Flow	1610			2.50	10.7

Time of Conc. =	21 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-14
Receiving Node:	SMA-14
Basin Area:	43.33 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D
22	Myakka fine sand	A/D
24	Narcoossee fine sand	A
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	A	79	0.88	0.05	0.93	69
Residential (70%)	D	92	15.61	0.93	16.54	1436
Residential (65%)	D	91	3.60	0.22	3.82	327
Residential (60%)	A	73	0.67	0.05	0.72	49
Residential (60%)	D	90	0.96	0.07	1.03	86
Civ-Com-Multi (80%)	D	92	1.12	0.75	1.87	103
Open Space (Good)	D	80	1.90		1.90	152
Park (25%)	D	84	3.17	0.21	3.38	266
50' R/W (72%)	D	90	3.51	2.10	5.61	316
60' R/W (77%)	A	74	0.13	0.10	0.23	10
60' R/W (77%)	D	91	1.05	0.77	1.82	95
Alley (100%)	A	98		0.08	0.08	0
Alley (100%)	D	98		0.55	0.55	0
Water Surface	N/A	98		4.85	4.85	0
Totals:			32.59	10.74	43.33	2910

Composite CN (exc. DCIA) =	89
Composite DCIA =	25%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.3	1.00	-	18.4
Shallow Conc. (GW)	155		1.00	1.61	1.6
Shallow Conc. (Paved)	135		0.50	1.44	1.6
Channel/Pipe Flow	1120			2.50	7.5

Time of Conc. =	29 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	SMA-15
Receiving Node:	SMA-15
Basin Area:	61.24 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
22	Myakka fine sand	A/D
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	20.30	1.20	21.50	1867
Residential (60%)	D	90	7.43	0.58	8.01	669
Civ-Com-Multi (80%)	D	92	1.46	0.97	2.43	134
Open Space (Good)	D	80	2.47		2.47	198
Park (25%)	D	84	2.65	0.18	2.83	223
50' R/W (72%)	D	90	3.20	1.91	5.11	288
60' R/W (77%)	D	91	1.50	1.11	2.61	137
80' R/W (82.5%)	D	92	0.93	0.89	1.82	86
Friar's Cove Road (82.5%)	D	92	2.89	2.74	5.63	266
Alley (100%)	D	98		0.92	0.92	0
Water Surface	N/A	98		7.91	7.91	0
Totals:			42.84	18.40	61.24	3867

Composite CN (exc. DCIA) = 90**Composite DCIA = 30%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	55	0.3	1.50	-	9.7
Shallow Conc. (GW)	155		1.50	1.98	1.3
Shallow Conc. (Paved)	185		0.40	1.29	2.4
Channel/Pipe Flow	1870			2.50	12.5

Time of Conc. = 26 Minutes

Basin Name:	SMA-16
Receiving Node:	SMA-16
Basin Area:	15.39 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
42	Smyrna fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Residential (70%)	D	92	6.45	0.38	6.83	593
Residential (60%)	D	90	2.01	0.16	2.17	181
Open Space (Good)	D	80	1.51		1.51	121
50' R/W (72%)	D	90	0.88	0.52	1.40	79
60' R/W (77%)	D	91	0.58	0.43	1.01	53
Alley (100%)	D	98		0.31	0.31	0
Water Surface	N/A	98		2.16	2.16	0
Totals:			11.43	3.96	15.39	1027

Composite CN (exc. DCIA) = 90**Composite DCIA = 26%****Time of Concentration (T_c) Calculations**

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.3	1.50	-	15.6
Shallow Conc. (GW)	155		1.50	1.98	1.3
Channel/Pipe Flow	775			2.50	5.2

Time of Conc. = 22 Minutes

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018
 By: NRB
 Chk: JCN
 Rev: 6/26/2020

Basin Name:	MARINA
Receiving Node:	MARINA
Basin Area:	7.14 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Future Marina (80%)	D	85	1.19	3.06	4.25	101
Access Easement	D	85		1.08	1.08	0
Water Surface	D	98	0.46	1.35	1.81	45
Totals:			1.65	5.49	7.14	146

Composite CN (exc. DCIA) = 89

Composite DCIA = 77%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	40	0.24	1.50	-	6.3
Shallow Conc. (Paved)	50		1.50	2.49	0.3
Channel/Pipe Flow	400			2.50	2.7

Note: 10-minute Time of Concentration is used when calculated value is less.

Time of Conc. = 9 Minutes

Basin Name:	W-4
Receiving Node:	W-4
Basin Area:	48.28 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
6	Basinger fine sand, depressional	A/D
16	Immokalee fine sand	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Open Space (Good)	D	80	0.71		0.71	57
Brush (Good)	D	73	11.83		11.83	864
Pasture (Good)	D	80	5.39		5.39	431
Wetlands	D	80		23.19	23.19	0
Woods-Grass Comb. (Good)	D	79	7.16		7.16	566
Totals:			25.09	23.19	48.28	1917

Composite CN (exc. DCIA) = 76

Composite DCIA = 48%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	0.8	-	16.8
Shallow Conc. (Pasture)	820		0.7	0.58	23.5

Time of Conc. = 40 Minutes

Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	W-11
Receiving Node:	WPA
Basin Area:	10.92 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Pasture (Good)	D	80	4.36		4.36	349
Wetlands	D	98		6.44	6.44	0
Water Surface	D	98		0.12	0.12	0
Totals:			4.36	6.56	10.92	349

Composite CN (exc. DCIA) =	80
Composite DCIA =	60%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	2.30	-	11.0
Shallow Conc. (Pasture)	125		0.800	0.62	3.3

Time of Conc. =	14 Minutes
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Basin Name:	W-14
Receiving Node:	LK TOHO
Basin Area:	13.06 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D
	#N/A	#N/A

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Open Space (Good)	D	80	0.65		0.65	52
Pasture (Good)	D	80	0.35		0.35	28
Wetlands	D	98		11.68	11.68	0
Water Surface	D	98		0.38	0.38	0
Totals:			1.00	12.06	13.06	80

Composite CN (exc. DCIA) =	80
Composite DCIA =	92%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	80	0.24	1.00	-	12.9

Time of Conc. =	13 Minutes
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Fontana
Post Development Basin Hydrology Calculations

Date: 7/2/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

Basin Name:	W-15
Receiving Node:	WPA-006
Basin Area:	10.07 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
5	Basinger fine sand	A/D
10	Delray loamy fine sand, depressional	A/D
17	Kaliga muck	C/D
32	Placid fine sand, depressional	A/D

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Woods (Good)	D	77	5.55		5.55	427
Wetlands	D	98		4.52	4.52	0
Totals:			5.55	4.52	10.07	427

Composite CN (exc. DCIA) =	77
Composite DCIA =	45%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.60	-	12.7
Shallow Conc. (Pasture)	1070		0.300	0.38	46.8

Time of Conc. =	60 Minutes
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Basin Name:	W-16
Receiving Node:	LK TOHO
Basin Area:	15.94 acres

Curve Number (CN) Calculations

Soil Index Number	Soil Index Name	Hydrologic Group
10	Delray loamy fine sand, depressional	A/D
32	Placid fine sand, depressional	A/D
99	Water	N/A

Land Cover	Hydrologic Group	Curve Number (Excluding DCIA)	Pervious & NDCIA Area (ac)	DCIA (ac)	Total Area (ac)	CN x Area (exc. DCIA)
Open Space (Good)	D	80	0.20		0.20	16
Pasture (Good)	D	80	0.89		0.89	71
Park (25%)	D	84	0.03	0.06	0.09	2
Water Surface	D	98		14.76	14.76	0
Totals:			1.12	14.82	15.94	89

Composite CN (exc. DCIA) =	80
Composite DCIA =	93%

Time of Concentration (T_c) Calculations

Type of Flow	Length (L) (ft)	Roughness Coefficient (n)	Slope (S) (%)	Velocity (V) (fps)	Travel Time (Tt) (min)
Sheet Flow	100	0.24	1.0	-	15.4
Shallow Conc. (Pasture)	190		1.0	0.70	4.5

Time of Conc. =	20 Minutes
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Fontana Spreader Swale Sizing Calculations

By: NRB

Rev: 6/26

Equations

Where:

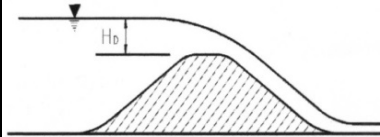
V = Velocity (fps)

$A = \text{Area (ft}^2\text{)}$

L = Length of Swale (ft)

 $H_D = \text{Depth of Flow (ft)}$

H_D (ft)	q (cfs/ft)	V (fps)
0.10	0.1	0.9
0.20	0.3	1.3
0.30	0.5	1.6
0.40	0.8	1.9
0.45	0.9	2.0
0.50	1.1	2.1
0.60	1.4	2.3
0.70	1.8	2.5
0.80	2.1	2.7
0.90	2.6	2.8
1.00	3.0	3.0



Discharge From	Discharge To	Link Name	Q _{MAX} (cfs)	L _{Req'd} (ft)	L _{Provided} (ft)
SMA-1	W-14	BU-W14	88.24	97.4	124
SMA-6	W-11	BU-W11	9.61	10.6	40
SMA-10	W-4	BU-W4A,B	76.67	84.7	99

$$L_{\text{Req'd}} = Q_{\text{max}} / q$$
$$L_{\text{Req'd}} = Q_{\text{max}} / q$$

Manual Basin: CANAL

Scenario: Post
Node: LK TOHO
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 12.19 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
12.19	CANAL	D	

Comment:

Manual Basin: MARINA

Scenario: Post
Node: MARINA
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 7.14 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
7.14	MARINA	D	

Comment:

Manual Basin: OFF-1

Scenario: Post
Node: SMA-15
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 31.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 5.16 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
5.16	OFF-1	D	

Comment:

Manual Basin: OFF-2

Scenario: Post
Node: GBS-004
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 7.48 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
7.48	OFF-2	D	

Comment:

Manual Basin: POND-7

Scenario: Post
Node: POND-7
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 13.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 1.16 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
1.16	POND-7	D	

Comment:

Manual Basin: SMA-1

Scenario: Post
Node: SMA-1
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 25.00 min
Max Allowable Q: 0.00 cfs

Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 99.19 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
99.19	SMA-1	D	

Comment:

Manual Basin: SMA-10

Scenario: Post
Node: SMA-10
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 31.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 47.78 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
47.78	SMA-10	D	

Comment:

Manual Basin: SMA-12

Scenario: Post
Node: SMA-12
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 18.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 77.76 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
77.76	SMA-12	D	

Comment:

Manual Basin: SMA-13

Scenario: Post
Node: SMA-13
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 21.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 75.02 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
75.02	SMA-13	D	

Comment:

Manual Basin: SMA-14

Scenario: Post
Node: SMA-14
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 29.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 43.33 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
43.33	SMA-14	D	

Comment:

Manual Basin: SMA-15

Scenario: Post
Node: SMA-15
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 26.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 61.24 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
61.24	SMA-15	D	

Comment:

Manual Basin: SMA-16

Scenario: Post
Node: SMA-16
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 22.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 15.39 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
15.39	SMA-16	D	

Comment:

Manual Basin: SMA-2

Scenario: Post
Node: SMA-2
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 22.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 17.81 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
17.81	SMA-2	D	

Comment:

Manual Basin: SMA-3

Scenario: Post
Node: SMA-3
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 21.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr

Unit Hydrograph: UH256
Peaking Factor: 256
Area: 24.94 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
24.94	SMA-3	D	

Comment:

Manual Basin: SMA-4A

Scenario: Post
Node: SMA-4A
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 20.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 7.10 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
7.10	SMA-4A	D	

Comment:

Manual Basin: SMA-4B

Scenario: Post
Node: SMA-4B
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 20.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 7.72 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
7.72	SMA-4B	D	

Comment:

Manual Basin: SMA-5

Scenario: Post

Node: SMA-5
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 30.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 50.26 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
50.26	SMA-5	D	

Comment:

Manual Basin: SMA-6

Scenario: Post
Node: SMA-6
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 19.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 36.37 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
36.37	SMA-6	D	

Comment:

Manual Basin: SMA-8

Scenario: Post
Node: SMA-8
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 21.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 33.75 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
33.75	SMA-8	D	

Comment:

Manual Basin: SMA-9

Scenario: Post
 Node: SMA-9
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 18.00 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.00 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256
 Area: 11.05 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
11.05	SMA-9	D	

Comment:

Manual Basin: W-11

Scenario: Post
 Node: W-11
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 14.00 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.00 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256
 Area: 10.92 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
10.92	W-11	D	

Comment:

Manual Basin: W-14

Scenario: Post
 Node: W-14
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 13.00 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.00 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256
 Area: 13.06 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
13.06	W-14	D	

Comment:

Manual Basin: W-15

Scenario: Post
Node: WPA-006
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 60.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 10.07 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
10.07	W-15	D	

Comment:

Manual Basin: W-16

Scenario: Post
Node: LK TOHO
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 20.00 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.00 hr
Unit Hydrograph: UH256
Peaking Factor: 256
Area: 15.94 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
15.94	W-16	D	

Comment:

Manual Basin: W-4

Scenario: Post
Node: W-4
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 40.00 min
Max Allowable Q: 0.00 cfs

Time Shift: 0.00 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256
 Area: 48.28 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
48.28	W-4	D	

Comment:

Curve Number: Basin Composite CN [Set]

Land Cover Zone	Soil Zone	Curve Number [dec]
CANAL	D	79.0
MARINA	D	89.0
OFF-1	D	72.0
OFF-2	D	80.0
POND-7	D	80.0
SMA-1	D	88.0
SMA-10	D	89.0
SMA-12	D	89.0
SMA-13	D	90.0
SMA-14	D	89.0
SMA-15	D	90.0
SMA-16	D	90.0
SMA-2	D	89.0
SMA-3	D	90.0
SMA-4A	D	89.0
SMA-4B	D	88.0
SMA-5	D	90.0
SMA-6	D	87.0
SMA-8	D	89.0
SMA-9	D	90.0
W-10	D	80.0
W-11	D	80.0
W-14	D	80.0
W-15	D	77.0
W-16	D	80.0
W-4	D	76.0

Impervious: Basin Composite DCIA [Set]

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
CANAL	72.00	72.00	0.00	0.000	0.000
MARINA	77.00	77.00	0.00	0.000	0.000
OFF-1	0.00	0.00	0.00	0.000	0.000

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
OFF-2	0.00	0.00	0.00	0.000	0.000
POND-7	43.00	43.00	0.00	0.000	0.000
SMA-1	51.00	51.00	0.00	0.000	0.000
SMA-10	24.00	24.00	0.00	0.000	0.000
SMA-12	35.00	35.00	0.00	0.000	0.000
SMA-13	32.00	32.00	0.00	0.000	0.000
SMA-14	25.00	25.00	0.00	0.000	0.000
SMA-15	30.00	30.00	0.00	0.000	0.000
SMA-16	26.00	26.00	0.00	0.000	0.000
SMA-2	29.00	29.00	0.00	0.000	0.000
SMA-3	34.00	34.00	0.00	0.000	0.000
SMA-4A	33.00	33.00	0.00	0.000	0.000
SMA-4B	35.00	35.00	0.00	0.000	0.000
SMA-5	26.00	26.00	0.00	0.000	0.000
SMA-6	22.00	22.00	0.00	0.000	0.000
SMA-8	24.00	24.00	0.00	0.000	0.000
SMA-9	21.00	21.00	0.00	0.000	0.000
W-10	58.00	58.00	0.00	0.000	0.000
W-11	60.00	60.00	0.00	0.000	0.000
W-14	92.00	92.00	0.00	0.000	0.000
W-15	45.00	45.00	0.00	0.000	0.000
W-16	93.00	93.00	0.00	0.000	0.000
W-4	48.00	48.00	0.00	0.000	0.000

Node: BU-W11

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 57.50 ft
 Warning Stage: 60.50 ft

Stage [ft]	Area [ac]	Area [ft2]
50.00	0.00	44
60.50	0.00	44

Comment:

Node: BU-W14

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 57.00 ft

Stage [ft]	Area [ac]	Area [ft2]
40.00	0.00	44
57.00	0.00	44

Comment:

Node: BU-W4A,B

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 60.00 ft
 Warning Stage: 63.00 ft

Stage [ft]	Area [ac]	Area [ft2]
50.00	0.00	44
63.00	0.00	44

Comment:

Node: GBS-001

Scenario: Post
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: GBS-004

Scenario: Post
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 57.00 ft
 Warning Stage: 57.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	57.00
0	0	0	100.00	57.00

Comment:

Node: LK TOHO

Scenario: Post
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: MARINA

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 54.25 ft
 Warning Stage: 57.25 ft

Stage [ft]	Area [ac]	Area [ft2]
54.25	1.35	58806
55.25	1.50	65340
56.25	1.65	71874
57.25	1.81	78844

Comment:

Node: MH-8-14

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 61.00 ft
 Warning Stage: 67.00 ft

Stage [ft]	Area [ac]	Area [ft2]
54.00	0.00	44
67.00	0.00	44

Comment:

Node: MH-8-9-10

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 60.50 ft
 Warning Stage: 65.00 ft

Stage [ft]	Area [ac]	Area [ft2]
50.00	0.00	44
65.00	0.00	44

Comment:

Node: POND-7

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 58.00 ft
 Warning Stage: 62.00 ft

Stage [ft]	Area [ac]	Area [ft2]
58.00	0.50	21649
59.00	0.55	23958
60.00	0.61	26572
61.00	0.68	29621
62.00	0.84	36590

Comment:

Node: SMA-1

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 54.25 ft
 Warning Stage: 58.25 ft

Stage [ft]	Area [ac]	Area [ft2]
54.25	29.78	1297217
55.25	30.43	1325531
56.25	31.08	1353845
57.25	31.73	1382159
58.25	33.35	1452726

Comment:

Node: SMA-10

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 60.50 ft
 Warning Stage: 64.50 ft

Stage [ft]	Area [ac]	Area [ft2]
60.50	5.34	232610
61.50	5.56	242194
62.50	5.78	251777
63.50	6.01	261796
64.50	6.59	287060

Comment:

Node: SMA-12

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 58.00 ft
 Warning Stage: 62.00 ft

Stage [ft]	Area [ac]	Area [ft2]
58.00	9.40	409464
59.00	9.68	421661
60.00	9.97	434293
61.00	10.26	446926
62.00	11.00	479160

Comment:

Node: SMA-13

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 61.00 ft
 Warning Stage: 65.00 ft

Stage [ft]	Area [ac]	Area [ft2]
61.00	8.13	354143
62.00	8.39	365468
63.00	8.64	376358
64.00	8.90	387684
65.00	9.56	416434

Comment:

Node: SMA-14

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 62.00 ft
 Warning Stage: 66.00 ft

Stage [ft]	Area [ac]	Area [ft2]
62.00	4.85	211266
63.00	5.04	219542
64.00	5.22	227383
65.00	5.41	235660
66.00	5.89	256568

Comment:

Node: SMA-15

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 62.50 ft
 Warning Stage: 66.50 ft

Stage [ft]	Area [ac]	Area [ft2]
62.50	7.91	344560
63.50	8.20	357192
64.50	8.49	369824
65.50	8.78	382457
66.50	9.52	414691

Comment:

Node: SMA-16

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 62.50 ft
Warning Stage: 66.50 ft

Stage [ft]	Area [ac]	Area [ft2]
62.50	2.16	94090
63.50	2.28	99317
64.50	2.40	104544
65.50	2.51	109336
66.50	2.82	122839

Comment:

Node: SMA-2

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 54.25 ft
Warning Stage: 58.25 ft

Stage [ft]	Area [ac]	Area [ft2]
54.25	2.36	102802
55.25	2.48	108029
56.25	2.60	113256
57.25	2.72	118483
58.25	3.04	132422

Comment:

Node: SMA-3

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 54.25 ft
Warning Stage: 58.25 ft

Stage [ft]	Area [ac]	Area [ft2]
54.25	6.44	280526
55.25	6.65	289674
56.25	6.86	298822
57.25	7.08	308405
58.25	7.64	332798

Comment:

Node: SMA-4A

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 58.00 ft
Warning Stage: 62.00 ft

Stage [ft]	Area [ac]	Area [ft2]
58.00	1.24	54014
59.00	1.33	57935
60.00	1.43	62291
61.00	1.53	66647
62.00	1.79	77972

Comment:

Node: SMA-4B

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 58.00 ft
Warning Stage: 62.00 ft

Stage [ft]	Area [ac]	Area [ft2]
58.00	1.31	57064
59.00	1.40	60984
60.00	1.50	65340
61.00	1.59	69260
62.00	1.84	80150

Comment:

Node: SMA-5

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 58.00 ft
 Warning Stage: 62.00 ft

Stage [ft]	Area [ac]	Area [ft2]
58.00	4.64	202118
59.00	4.82	209959
60.00	5.01	218236
61.00	5.20	226512
62.00	5.69	247856

Comment:

Node: SMA-6

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 57.50 ft
 Warning Stage: 61.50 ft

Stage [ft]	Area [ac]	Area [ft2]
57.50	3.97	172933
58.50	4.16	181210
59.50	4.35	189486
60.50	4.54	197762
61.50	5.03	219107

Comment:

Node: SMA-8

Scenario: Post
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 60.50 ft
 Warning Stage: 65.00 ft

Stage [ft]	Area [ac]	Area [ft2]
60.50	2.74	119354
61.50	2.87	125017
62.50	3.00	130680
63.50	3.13	136343
64.50	3.38	147233
65.00	3.55	154638

Comment:

Node: SMA-9

Scenario: Post
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 60.50 ft
Warning Stage: 64.50 ft

Stage [ft]	Area [ac]	Area [ft2]
60.50	0.99	43124
61.50	1.07	46609
62.50	1.16	50530
63.50	1.25	54450
64.50	1.49	64904

Comment:

Node: W-11

Scenario: Post
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 55.00 ft
Warning Stage: 57.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
54.00	0.00	0
55.00	0.00	0
55.50	2.40	104544
56.00	5.99	260924
56.50	10.58	460865
57.00	15.51	675616

Comment:

Node: W-14

Scenario: Post
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 54.00 ft
Warning Stage: 56.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
54.00	0.14	6098
54.50	7.30	317988
55.00	15.51	675616
55.50	24.48	1066349
56.00	33.62	1464487

Comment:

Node: W-4

Scenario: Post
 Type: Stage/Volume
 Base Flow: 0.00 cfs
 Initial Stage: 58.83 ft
 Warning Stage: 61.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
58.00	0.01	436
59.00	6.30	274428
59.50	16.75	729630
60.00	29.37	1279357
60.50	44.18	1924481
61.00	59.89	2608808

Comment:

Node: WPA-001

Scenario: Post
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Node: WPA-006

Scenario: Post
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 54.00 ft
 Warning Stage: 54.50 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.00	54.00
0	0	0	100.00	54.00

Comment:

Weir Link: BU-W11

Scenario:	Post	Bottom Clip
From Node:	BU-W11	Default: 0.00 ft
To Node:	W-11	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Rectangular	Ref Node:
Invert:	57.50 ft	Discharge Coefficients
Control Elevation:	57.50 ft	Weir Default: 3.000
Max Depth:	999.00 ft	Weir Table:
Max Width:	40.00 ft	Orifice Default: 0.600
Fillet:	0.00 ft	Orifice Table:

Comment:

Weir Link: BU-W14

Scenario:	Post	Bottom Clip
From Node:	BU-W14	Default: 0.00 ft
To Node:	W-14	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Rectangular	Ref Node:
Invert:	54.00 ft	Discharge Coefficients
Control Elevation:	54.00 ft	Weir Default: 3.000
Max Depth:	999.00 ft	Weir Table:
Max Width:	124.00 ft	Orifice Default: 0.600
Fillet:	0.00 ft	Orifice Table:

Comment:

Weir Link: BU-W4A,B	
Scenario: Post	Bottom Clip
From Node: BU-W4A,B	Default: 0.00 ft
To Node: W-4	Op Table:
Link Count: 1	Ref Node:
Flow Direction: Both	Top Clip
Damping: 0.0000 ft	Default: 0.00 ft
Weir Type: Broad Crested Vertical	Op Table:
Geometry Type: Rectangular	Ref Node:
Invert: 60.00 ft	Discharge Coefficients
Control Elevation: 60.00 ft	Weir Default: 3.000
Max Depth: 999.00 ft	Weir Table:
Max Width: 99.00 ft	Orifice Default: 0.600
Fillet: 0.00 ft	Orifice Table:
Comment:	

Drop Structure Link: CS-10A		Upstream Pipe	Downstream Pipe
Scenario: Post	Invert: 53.00 ft	Invert: 53.00 ft	
From Node: SMA-10	Manning's N: 0.012	Manning's N: 0.012	
To Node: BU-W4A,B	Geometry: Circular	Geometry: Circular	
Link Count: 1	Max Depth: 3.50 ft	Max Depth: 3.50 ft	
Flow Direction: Both	Bottom Clip		
Solution: Split	Default: 0.00 ft	Default: 0.00 ft	
Pipe Count: 1	Op Table:	Op Table:	
Damping: 0.1000 ft	Ref Node:	Ref Node:	
Length: 575.00 ft	Manning's N: 0.000	Manning's N: 0.000	
FHWA Code: 1	Top Clip		
Entr Loss Coef: 0.50	Default: 0.00 ft	Default: 0.00 ft	
Exit Loss Coef: 1.00	Op Table:	Op Table:	
Bend Loss Coef: 0.00	Ref Node:	Ref Node:	
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000	
Energy Switch: Energy			
Pipe Comment:			

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 2	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 60.00 ft	Op Table:
Control Elevation: 60.50 ft	Ref Node:
Max Depth: 0.42 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600

Orifice Table:

Weir Comment: (2) 5" orifices

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 62.20 ft	Op Table:
Control Elevation: 62.20 ft	Ref Node:
Max Depth: 1.17 ft	Discharge Coefficients
Max Width: 14.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: (2) 3'x1'-2" and (1) 8'x1'-2"

Weir Component	
Weir: 3	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 63.50 ft	Op Table:
Control Elevation: 63.50 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 8.75 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-10B		Upstream Pipe	Downstream Pipe
Scenario: Post		Invert: 53.00 ft	Invert: 53.00 ft
From Node: SMA-10		Manning's N: 0.012	Manning's N: 0.012
To Node: BU-W4A,B		Geometry: Circular	Geometry: Circular
Link Count: 1		Max Depth: 3.50 ft	Max Depth: 3.50 ft
Flow Direction: Both		Bottom Clip	
Solution: Split		Default: 0.00 ft	Default: 0.00 ft
Pipe Count: 1		Op Table:	Op Table:
Damping: 0.1000 ft		Ref Node:	Ref Node:

Length:	581.00 ft	Manning's N:	0.000	Manning's N:	0.000
FHWA Code:	1	Top Clip			
Entr Loss Coef:	0.50	Default:	0.00 ft	Default:	0.00 ft
Exit Loss Coef:	1.00	Op Table:		Op Table:	
Bend Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Location:	0.00 ft	Manning's N:	0.000	Manning's N:	0.000
Energy Switch:	Energy				
Pipe Comment:					

Weir Component					
Weir:	1	Bottom Clip			
Weir Count:	1	Default:	0.00 ft		
Weir Flow Direction:	Both	Op Table:			
Damping:	0.0000 ft	Ref Node:			
Weir Type:	Horizontal	Top Clip			
Geometry Type:	Rectangular	Default:	0.00 ft		
Invert:	62.50 ft	Op Table:			
Control Elevation:	62.50 ft	Ref Node:			
Max Depth:	3.00 ft	Discharge Coefficients			
Max Width:	6.58 ft	Weir Default:	3.200		
Fillet:	0.00 ft	Weir Table:			
		Orifice Default:	0.600		
		Orifice Table:			
Weir Comment: FDOT TYPE H					

Drop Structure Comment:

Drop Structure Link: CS-12A		Upstream Pipe		Downstream Pipe	
Scenario:	Post	Invert:	51.50 ft	Invert:	48.00 ft
From Node:	SMA-12	Manning's N:	0.012	Manning's N:	0.012
To Node:	SMA-1	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Solution:	Split	Default:	0.00 ft	Default:	0.00 ft
Pipe Count:	1	Op Table:		Op Table:	
Damping:	0.1000 ft	Ref Node:		Ref Node:	
Length:	272.00 ft	Manning's N:	0.000	Manning's N:	0.000
FHWA Code:	1	Top Clip			
Entr Loss Coef:	0.50	Default:	0.00 ft	Default:	0.00 ft
Exit Loss Coef:	1.00	Op Table:		Op Table:	
Bend Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Location:	0.00 ft	Manning's N:	0.000	Manning's N:	0.000
Energy Switch:	Energy				
Pipe Comment:					

Weir Component	
Weir:	1
Bottom Clip	

Weir Count: 2
 Weir Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Horizontal
 Geometry Type: Circular
 Invert: 57.50 ft
 Control Elevation: 58.00 ft
 Max Depth: 0.42 ft

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: (2) 5" orifices

Weir Component

Weir: 2
 Weir Count: 1
 Weir Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Sharp Crested Vertical
 Geometry Type: Rectangular
 Invert: 59.40 ft
 Control Elevation: 59.40 ft
 Max Depth: 0.75 ft
 Max Width: 10.00 ft
 Fillet: 0.00 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: (2) 2'x9" and (1) 6'x9"

Weir Component

Weir: 3
 Weir Count: 1
 Weir Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Horizontal
 Geometry Type: Rectangular
 Invert: 60.50 ft
 Control Elevation: 60.50 ft
 Max Depth: 3.00 ft
 Max Width: 8.75 ft
 Fillet: 0.00 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-12B		Upstream Pipe	Downstream Pipe
Scenario:	Post	Invert: 51.50 ft	Invert: 48.00 ft
From Node:	SMA-12	Manning's N: 0.012	Manning's N: 0.012
To Node:	SMA-1	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction:	Both	Bottom Clip	
Solution:	Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count:	1	Op Table:	Op Table:
Damping:	0.1000 ft	Ref Node:	Ref Node:
Length:	274.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code:	1	Top Clip	
Entr Loss Coef:	0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef:	1.00	Op Table:	Op Table:
Bend Loss Coef:	0.00	Ref Node:	Ref Node:
Bend Location:	0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch:	Energy		
Pipe Comment:			

Weir Component			
Weir:	1	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	Top Clip	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	59.50 ft	Op Table:	
Control Elevation:	59.50 ft	Ref Node:	
Max Depth:	3.00 ft	Discharge Coefficients	
Max Width:	8.75 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-13A		Upstream Pipe	Downstream Pipe
Scenario:	Post	Invert: 52.00 ft	Invert: 52.00 ft
From Node:	SMA-13	Manning's N: 0.012	Manning's N: 0.012
To Node:	SMA-12	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 3.50 ft	Max Depth: 3.50 ft
Flow Direction:	Both	Bottom Clip	
Solution:	Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count:	1	Op Table:	Op Table:
Damping:	0.1000 ft	Ref Node:	Ref Node:
Length:	160.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code:	1	Top Clip	

Entr Loss Coef: 0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef: 1.00	Op Table:	Op Table:
Bend Loss Coef: 0.00	Ref Node:	Ref Node:
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch: Energy		

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 2	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 60.50 ft	Op Table:
Control Elevation: 61.00 ft	Ref Node:
Max Depth: 0.38 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: (2) 4.5" orifices

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 62.60 ft	Op Table:
Control Elevation: 62.60 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 6.58 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: FDOT TYPE H

Drop Structure Comment:

Drop Structure Link: CS-13B	Upstream Pipe	Downstream Pipe
Scenario: Post	Invert: 52.00 ft	Invert: 52.00 ft
From Node: SMA-13	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-12	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 3.50 ft	Max Depth: 3.50 ft

Flow Direction:	Both	Bottom Clip	
Solution:	Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count:	1	Op Table:	Op Table:
Damping:	0.1000 ft	Ref Node:	Ref Node:
Length:	160.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code:	1	Top Clip	
Entr Loss Coef:	0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef:	1.00	Op Table:	Op Table:
Bend Loss Coef:	0.00	Ref Node:	Ref Node:
Bend Location:	0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch:	Energy		
Pipe Comment:			

Weir Component	
Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Rectangular
Invert:	62.60 ft
Control Elevation:	62.60 ft
Max Depth:	3.00 ft
Max Width:	6.58 ft
Fillet:	0.00 ft
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Top Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Discharge Coefficients	
Weir Default: 3.200	
Weir Table:	
Orifice Default: 0.600	
Orifice Table:	

Weir Comment: FDOT TYPE H

Drop Structure Comment:

Drop Structure Link: CS-14	Upstream Pipe	Downstream Pipe
Scenario: Post	Invert: 56.20 ft	Invert: 53.39 ft
From Node: SMA-14	Manning's N: 0.012	Manning's N: 0.012
To Node: MH-8-14	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 3.50 ft	Max Depth: 3.50 ft
Flow Direction: Both	Bottom Clip	
Solution: Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count: 1	Op Table:	Op Table:
Damping: 0.1000 ft	Ref Node:	Ref Node:
Length: 618.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code: 1	Top Clip	
Entr Loss Coef: 0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef: 1.00	Op Table:	Op Table:
Bend Loss Coef: 0.00	Ref Node:	Ref Node:
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch: Energy		

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 61.50 ft	Op Table:
Control Elevation: 62.00 ft	Ref Node:
Max Depth: 0.42 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: 5" orifice

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 63.50 ft	Op Table:
Control Elevation: 63.50 ft	Ref Node:
Max Depth: 0.83 ft	Discharge Coefficients
Max Width: 9.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: (2) 2'x10" and (1) 5'x10"

Weir Component	
Weir: 3	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 64.50 ft	Op Table:
Control Elevation: 64.50 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 8.75 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-15		Upstream Pipe	Downstream Pipe
Scenario:	Post	Invert: 55.60 ft	Invert: 52.97 ft
From Node:	SMA-15	Manning's N: 0.012	Manning's N: 0.012
To Node:	SMA-13	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction:	Both	Bottom Clip	
Solution:	Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count:	1	Op Table:	Op Table:
Damping:	0.1000 ft	Ref Node:	Ref Node:
Length:	1552.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code:	1	Top Clip	
Entr Loss Coef:	0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef:	1.00	Op Table:	Op Table:
Bend Loss Coef:	0.00	Ref Node:	Ref Node:
Bend Location:	0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch:	Energy		

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 62.00 ft	Op Table:
Control Elevation: 62.50 ft	Ref Node:
Max Depth: 0.50 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: 6" orifice

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 64.10 ft	Op Table:
Control Elevation: 64.10 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 8.75 ft	Weir Default: 3.200

Fillet: 0.00 ft

Weir Table:
Orifice Default: 0.600
Orifice Table:

Weir Comment: FDOT TYPE H

Drop Structure Comment:

Drop Structure Link: CS-1A

Upstream Pipe

Downstream Pipe

Scenario: Post	Invert: 44.92 ft	Invert: 44.92 ft
From Node: SMA-1	Manning's N: 0.012	Manning's N: 0.012
To Node: BU-W14	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 5.00 ft	Max Depth: 5.00 ft
Flow Direction: Both	Bottom Clip	
Solution: Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count: 1	Op Table:	Op Table:
Damping: 0.1500 ft	Ref Node:	Ref Node:
Length: 49.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code: 1	Top Clip	
Entr Loss Coef: 0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef: 1.00	Op Table:	Op Table:
Bend Loss Coef: 0.00	Ref Node:	Ref Node:
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch: Energy		

Pipe Comment:

Weir Component

Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 54.25 ft	Op Table:
Control Elevation: 54.25 ft	Ref Node:
Max Depth: 0.25 ft	Discharge Coefficients
Max Width: 2.58 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: 3"X31" slot

Weir Component

Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:

Weir Type: Sharp Crested Vertical
 Geometry Type: Rectangular
 Invert: 54.90 ft
 Control Elevation: 54.90 ft
 Max Depth: 1.00 ft
 Max Width: 10.00 ft
 Fillet: 0.00 ft

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: (2) 2'x1' and (1) 6'x1'

Weir Component

Weir: 3

Weir Count: 1

Weir Flow Direction: Both

Damping: 0.0000 ft

Weir Type: Horizontal

Geometry Type: Rectangular

Invert: 56.25 ft

Control Elevation: 56.25 ft

Max Depth: 3.00 ft

Max Width: 8.75 ft

Fillet: 0.00 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-1B

Upstream Pipe

Downstream Pipe

Scenario: Post

Invert: 48.75 ft

Invert: 48.75 ft

From Node: SMA-1

Manning's N: 0.012

Manning's N: 0.012

To Node: WPA-001

Geometry: Circular

Geometry: Circular

Link Count: 1

Max Depth: 3.00 ft

Max Depth: 3.00 ft

Flow Direction: Both

Bottom Clip

Solution: Split

Default: 0.00 ft

Default: 0.00 ft

Pipe Count: 1

Op Table:

Op Table:

Damping: 0.1000 ft

Ref Node:

Ref Node:

Length: 83.00 ft

Manning's N: 0.000

Manning's N: 0.000

FHWA Code: 1

Top Clip

Entr Loss Coef: 0.50

Default: 0.00 ft

Default: 0.00 ft

Exit Loss Coef: 1.00

Op Table:

Op Table:

Bend Loss Coef: 0.00

Ref Node:

Ref Node:

Bend Location: 0.00 ft

Manning's N: 0.000

Manning's N: 0.000

Energy Switch: Energy

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 54.90 ft	Op Table:
Control Elevation: 54.90 ft	Ref Node:
Max Depth: 0.50 ft	Discharge Coefficients
Max Width: 2.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: (1) 2"x6" slot

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 56.25 ft	Op Table:
Control Elevation: 56.25 ft	Ref Node:
Max Depth: 3.08 ft	Discharge Coefficients
Max Width: 4.08 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: FDOT TYPE D

Drop Structure Comment:

Drop Structure Link: CS-5		Upstream Pipe	Downstream Pipe
Scenario: Post		Invert: 49.40 ft	Invert: 49.40 ft
From Node: SMA-5		Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-6		Geometry: Circular	Geometry: Circular
Link Count: 1		Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both		Bottom Clip	
Solution: Split		Default: 0.00 ft	Default: 0.00 ft
Pipe Count: 1		Op Table:	Op Table:
Damping: 0.1000 ft		Ref Node:	Ref Node:
Length: 552.00 ft		Manning's N: 0.000	Manning's N: 0.000
FHWA Code: 1		Top Clip	
Entr Loss Coef: 0.50		Default: 0.00 ft	Default: 0.00 ft

Exit Loss Coef: 1.00	Op Table:	Op Table:
Bend Loss Coef: 0.00	Ref Node:	Ref Node:
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch: Energy		

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 57.50 ft	Op Table:
Control Elevation: 58.00 ft	Ref Node:
Max Depth: 0.50 ft	Discharge Coefficients
	Weir Default: 3.200
	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: 6" orifice

Weir Component	
Weir: 2	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 59.50 ft	Op Table:
Control Elevation: 59.50 ft	Ref Node:
Max Depth: 0.83 ft	Discharge Coefficients
Max Width: 11.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment: (2) 2'x10" and (1) 7'x10"

Weir Component	
Weir: 3	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 60.50 ft	Op Table:
Control Elevation: 60.50 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 8.75 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: FDOT TYPE H (4-grate)

Drop Structure Comment:

Drop Structure Link: CS-6A		Upstream Pipe	Downstream Pipe
Scenario:	Post	Invert: 50.00 ft	Invert: 50.00 ft
From Node:	SMA-6	Manning's N: 0.012	Manning's N: 0.012
To Node:	GBS-001	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction:	Both	Bottom Clip	
Solution:	Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count:	1	Op Table:	Op Table:
Damping:	0.1000 ft	Ref Node:	Ref Node:
Length:	267.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code:	1	Top Clip	
Entr Loss Coef:	0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef:	1.00	Op Table:	Op Table:
Bend Loss Coef:	0.00	Ref Node:	Ref Node:
Bend Location:	0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch:	Energy		

Pipe Comment:

Weir Component	
Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Circular
Invert:	57.00 ft
Control Elevation:	57.50 ft
Max Depth:	0.42 ft
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Top Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Discharge Coefficients	
Weir Default: 3.200	
Weir Table:	
Orifice Default: 0.600	
Orifice Table:	

Weir Comment: 5" orifice

Weir Component	
Weir:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	
Top Clip	

Geometry Type: Rectangular
 Invert: 58.80 ft
 Control Elevation: 58.80 ft
 Max Depth: 1.00 ft
 Max Width: 10.00 ft
 Fillet: 0.00 ft

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: (2) 2'x1' and (1) 6'x1'

Weir Component

Weir: 3

Bottom Clip

Weir Count: 1

Default: 0.00 ft

Weir Flow Direction: Both

Op Table:

Damping: 0.0000

Ref Node:

Weir Type: Horizontal

Top Clip

Geometry Type: Rectangular

Default: 0.00 ft

Invert: 60.00 ft

Op Table:

Control Elevation: 60.00 ft

Ref Node:

Max Depth: 3.00 ft

Discharge Coefficients

Max Width: 6.58 ft

Weir Default: 3.200

Fillet: 0.00 ft

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: FDOT TYPE H

Drop Structure Comment:

Drop Structure Link: CS-6B

Upstream Pipe

Downstream Pipe

Scenario: Post

Invert: 54.05 ft

Invert: 54.05 ft

From Node: SMA-6

Manning's N: 0.012

Manning's N: 0.012

To Node: BU-W11

Geometry: Circular

Geometry: Circular

Link Count: 1

Max Depth: 1.50 ft

Max Depth: 1.50 ft

Flow Direction: Both

Bottom Clip

Solution: Split

Default: 0.00 ft

Default: 0.00 ft

Pipe Count: 1

Op Table:

Op Table:

Damping: 0.1000

Ref Node:

Ref Node:

Length: 230.00 ft

Manning's N: 0.000

Manning's N: 0.000

FHWA Code: 1

Top Clip

Entr Loss Coef: 0.50

Default: 0.00 ft

Default: 0.00 ft

Exit Loss Coef: 1.00

Op Table:

Op Table:

Bend Loss Coef: 0.00

Ref Node:

Ref Node:

Bend Location: 0.00 ft

Manning's N: 0.000

Manning's N: 0.000

Energy Switch: Energy

Pipe Comment:

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 58.80 ft	Op Table:
Control Elevation: 58.80 ft	Ref Node:
Max Depth: 2.00 ft	Discharge Coefficients
Max Width: 3.08 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:
Weir Comment: FDOT TYPE C	

Drop Structure Comment:

Drop Structure Link: CS-8	Upstream Pipe	Downstream Pipe
Scenario: Post	Invert: 56.25 ft	Invert: 54.39 ft
From Node: SMA-8	Manning's N: 0.012	Manning's N: 0.012
To Node: MH-8-14	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction: Positive	Bottom Clip	
Solution: Split	Default: 0.00 ft	Default: 0.00 ft
Pipe Count: 1	Op Table:	Op Table:
Damping: 0.1000 ft	Ref Node:	Ref Node:
Length: 1734.00 ft	Manning's N: 0.000	Manning's N: 0.000
FHWA Code: 1	Top Clip	
Entr Loss Coef: 0.50	Default: 0.00 ft	Default: 0.00 ft
Exit Loss Coef: 1.00	Op Table:	Op Table:
Bend Loss Coef: 0.00	Ref Node:	Ref Node:
Bend Location: 0.00 ft	Manning's N: 0.000	Manning's N: 0.000
Energy Switch: Energy		
Pipe Comment:		

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.1000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 62.20 ft	Op Table:
Control Elevation: 62.20 ft	Ref Node:
Max Depth: 2.00 ft	Discharge Coefficients
Max Width: 3.08 ft	Weir Default: 3.200

Fillet: 0.00 ft

Weir Table:
Orifice Default: 0.600
Orifice Table:

Weir Comment: FDOT TYPE C

Drop Structure Comment:

Drop Structure Link: CS-MARINA

Upstream Pipe

Downstream Pipe

Scenario:	Post	Invert:	49.87 ft	Invert:	49.28 ft
From Node:	MARINA	Manning's N:	0.012	Manning's N:	0.012
To Node:	LK TOHO	Geometry:	Circular	Geometry:	Circular
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.000	Manning's N:	0.000
Length:	198.00 ft	Top Clip			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.000	Manning's N:	0.000
Bend Location:	0.00 ft				
Energy Switch:	Energy				

Pipe Comment:

Weir Component

Weir:	1	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	
Damping:	0.0000 ft	Ref Node:	
Weir Type:	Horizontal	Top Clip	
Geometry Type:	Rectangular	Default:	0.00 ft
Invert:	55.00 ft	Op Table:	
Control Elevation:	55.00 ft	Ref Node:	
Max Depth:	3.08 ft	Discharge Coefficients	
Max Width:	2.00 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment: FDOT TYPE C

Weir Component

Weir:	2	Bottom Clip	
Weir Count:	1	Default:	0.00 ft
Weir Flow Direction:	Both	Op Table:	

Damping: 0.0000 ft
 Weir Type: Sharp Crested Vertical
 Geometry Type: Circular
 Invert: 54.25 ft
 Control Elevation: 54.25 ft
 Max Depth: 0.23 ft

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment:

Drop Structure Comment:

Drop Structure Link: CS-W11

Upstream Pipe

Downstream Pipe

Scenario: Post
 From Node: W-11
 To Node: GBS-001
 Link Count: 1
 Flow Direction: Both
 Solution: Split
 Pipe Count: 1
 Damping: 0.0000 ft
 Length: 87.00 ft
 FHWA Code: 1
 Entr Loss Coef: 0.50
 Exit Loss Coef: 1.00
 Bend Loss Coef: 0.00
 Bend Location: 0.00 ft
 Energy Switch: Energy

Invert: 50.00 ft

Manning's N: 0.012

Geometry: Circular

Max Depth: 2.00 ft

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.000

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.000

Invert: 50.00 ft

Manning's N: 0.012

Geometry: Circular

Max Depth: 2.00 ft

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.000

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.000

Pipe Comment:

Weir Component

Weir: 1

Weir Count: 1

Weir Flow Direction: Both

Damping: 0.0000 ft

Weir Type: Horizontal

Geometry Type: Rectangular

Invert: 55.70 ft

Control Elevation: 55.70 ft

Max Depth: 3.00 ft

Max Width: 4.50 ft

Fillet: 0.00 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment: FDOT TYPE E

Drop Structure Comment:

Pipe Link: P-1-2	Upstream	Downstream
Scenario: Post	Invert: 47.25 ft	Invert: 47.25 ft
From Node: SMA-1	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-2	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 185.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000
Comment:		

Pipe Link: P-1-3	Upstream	Downstream
Scenario: Post	Invert: 47.50 ft	Invert: 47.50 ft
From Node: SMA-1	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-3	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 380.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000
Comment:		

Pipe Link: P-16-15	Upstream	Downstream
Scenario: Post	Invert: 56.00 ft	Invert: 56.00 ft
From Node: SMA-16	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-15	Geometry: Circular	Geometry: Circular

Link Count:	1	Max Depth:	2.50 ft	Max Depth:	2.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.1000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	1412.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.70	Manning's N:	0.000	Manning's N:	0.000
Exit Loss Coef:	1.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.000	Manning's N:	0.000
Comment:					

Pipe Link: P-4A-4B	Upstream	Downstream
Scenario: Post	Invert: 52.00 ft	Invert: 52.00 ft
From Node: SMA-4A	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-4B	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 168.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000
Comment:		

Pipe Link: P-5-4	Upstream	Downstream
Scenario: Post	Invert: 50.00 ft	Invert: 50.00 ft
From Node: SMA-5	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-4A	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 215.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000

Comment:

Pipe Link: P-8-14-13	Upstream	Downstream
Scenario: Post	Invert: 53.39 ft	Invert: 53.24 ft
From Node: MH-8-14	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-13	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 3.50 ft	Max Depth: 3.50 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 154.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000

Comment:

Pipe Link: P-8-9-10	Upstream	Downstream
Scenario: Post	Invert: 54.00 ft	Invert: 54.00 ft
From Node: MH-8-9-10	Manning's N: 0.012	Manning's N: 0.012
To Node: SMA-10	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 387.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000

Comment:

Pipe Link: P-8-MH	Upstream	Downstream
Scenario: Post	Invert: 54.00 ft	Invert: 54.00 ft
From Node: SMA-8	Manning's N: 0.012	Manning's N: 0.012
To Node: MH-8-9-10	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 4.00 ft	Max Depth: 4.00 ft
Flow Direction: Both	Bottom Clip	

Damping:	0.1000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	847.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.000	Manning's N:	0.000
Exit Loss Coef:	1.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.000	Manning's N:	0.000
Comment:					

Pipe Link: P-9-MH	Upstream	Downstream
Scenario: Post	Invert: 54.00 ft	Invert: 54.00 ft
From Node: SMA-9	Manning's N: 0.012	Manning's N: 0.012
To Node: MH-8-9-10	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 3.50 ft	Max Depth: 3.50 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.1000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 39.00 ft	Op Table:	Op Table:
FHWA Code: 1	Ref Node:	Ref Node:
Entr Loss Coef: 0.50	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000
Comment:		

Pipe Link: P-W14-TOHO	Upstream	Downstream
Scenario: Post	Invert: 52.17 ft	Invert: 52.39 ft
From Node: W-14	Manning's N: 0.012	Manning's N: 0.012
To Node: LK TOHO	Geometry: Circular	Geometry: Circular
Link Count: 1	Max Depth: 2.50 ft	Max Depth: 2.50 ft
Flow Direction: Both	Bottom Clip	
Damping: 0.0000 ft	Default: 0.00 ft	Default: 0.00 ft
Length: 40.00 ft	Op Table:	Op Table:
FHWA Code: 6	Ref Node:	Ref Node:
Entr Loss Coef: 0.90	Manning's N: 0.000	Manning's N: 0.000
Exit Loss Coef: 1.00	Top Clip	
Bend Loss Coef: 0.00	Default: 0.00 ft	Default: 0.00 ft
Bend Location: 0.00 ft	Op Table:	Op Table:
Energy Switch: Energy	Ref Node:	Ref Node:
	Manning's N: 0.000	Manning's N: 0.000
Comment:		

Weir Link: W-W14-WPA001

Scenario: Post
 From Node: W-14
 To Node: WPA-001
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 54.92 ft
 Control Elevation: 54.92 ft
 Cross Section: X-W14-WPA001

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Link: W-W4-GBS004

Scenario: Post
 From Node: W-4
 To Node: GBS-004
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Irregular
 Invert: 58.83 ft
 Control Elevation: 58.83 ft
 Cross Section: X-W4-GBS004

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Weir Cross Section: X-W14-WPA001

Scenario: Post
 Lid: No

Bottom Point Table

Order	Station [ft]	Elevation [ft]
0	0.00	58.02
1	1.09	58.02
2	2.19	58.02
3	3.28	58.02
4	4.38	58.02
5	5.47	58.02
6	6.57	58.02

Order	Station [ft]	Elevation [ft]
7	7.66	58.03
8	8.76	58.03
9	9.85	58.03
10	10.95	58.03
11	12.04	58.03
12	13.14	58.03
13	14.23	58.03
14	15.33	58.03
15	16.42	58.03
16	17.52	58.04
17	18.61	58.04
18	19.71	58.04
19	20.80	58.04
20	21.90	58.04
21	22.99	58.04
22	24.09	58.04
23	25.18	58.04
24	26.28	58.03
25	27.37	58.03
26	28.47	58.03
27	29.56	58.02
28	30.66	58.02
29	31.75	58.02
30	32.85	58.01
31	33.94	58.01
32	35.04	58.00
33	36.13	58.00
34	37.23	57.99
35	38.32	57.99
36	39.41	57.98
37	40.51	57.97
38	41.60	57.97
39	42.70	57.96
40	43.79	57.95
41	44.89	57.94
42	45.98	57.93
43	47.08	57.92
44	48.17	57.91
45	49.27	57.90
46	50.36	57.89
47	51.46	57.88
48	52.55	57.87
49	53.65	57.86
50	54.74	57.85
51	55.84	57.83
52	56.93	57.82
53	58.03	57.81
54	59.12	57.79
55	60.22	57.78

Order	Station [ft]	Elevation [ft]
56	61.31	57.76
57	62.41	57.75
58	63.50	57.74
59	64.60	57.72
60	65.69	57.70
61	66.79	57.69
62	67.88	57.67
63	68.98	57.65
64	70.07	57.63
65	72.07	57.62
66	74.07	57.60
67	76.06	57.58
68	78.06	57.57
69	80.06	57.56
70	82.06	57.59
71	84.05	57.61
72	86.05	57.64
73	88.05	57.65
74	90.05	57.65
75	92.04	57.64
76	94.04	57.65
77	96.04	57.62
78	98.04	57.60
79	100.03	57.57
80	102.03	57.59
81	104.03	57.64
82	106.03	57.71
83	108.02	57.79
84	110.02	57.87
85	112.02	57.93
86	114.02	57.99
87	116.01	57.97
88	118.01	57.88
89	120.01	57.75
90	122.01	57.59
91	124.00	57.42
92	126.00	57.26
93	128.00	57.13
94	130.00	57.01
95	131.99	56.92
96	133.99	56.84
97	135.99	56.79
98	137.99	56.77
99	139.98	56.81
100	141.98	56.87
101	143.98	56.92
102	145.98	56.96
103	147.98	56.99
104	149.97	57.00

Order	Station [ft]	Elevation [ft]
105	151.97	57.01
106	153.97	57.02
107	155.97	57.03
108	157.96	57.01
109	159.96	56.99
110	161.96	56.92
111	163.96	56.87
112	165.95	56.85
113	167.95	56.84
114	169.95	56.83
115	171.95	56.82
116	173.94	56.80
117	175.94	56.77
118	177.94	56.72
119	179.94	56.65
120	181.93	56.54
121	183.93	56.43
122	185.93	56.32
123	187.93	56.23
124	189.92	56.14
125	191.92	56.08
126	193.92	56.02
127	195.92	55.97
128	197.91	55.93
129	199.01	55.91
130	200.10	55.90
131	201.20	55.89
132	202.29	55.89
133	203.39	55.88
134	204.48	55.89
135	205.58	55.90
136	206.67	55.92
137	207.77	55.93
138	208.86	55.94
139	209.96	55.95
140	211.05	55.96
141	212.15	55.96
142	213.24	55.97
143	214.34	55.98
144	215.43	55.99
145	216.53	55.99
146	217.62	56.00
147	218.72	56.00
148	219.81	56.00
149	220.91	56.00
150	222.00	56.00
151	223.10	56.00
152	224.19	56.00
153	225.29	56.00

Order	Station [ft]	Elevation [ft]
154	226.38	56.00
155	227.48	56.00
156	228.57	56.00
157	229.67	56.00
158	230.76	56.00
159	231.86	56.00
160	232.95	56.00
161	234.05	56.00
162	235.14	55.99
163	236.24	55.99
164	237.33	55.97
165	238.43	55.96
166	239.52	55.95
167	240.62	55.94
168	241.71	55.93
169	242.81	55.92
170	243.90	55.92
171	245.00	55.92
172	246.09	55.93
173	247.19	55.95
174	248.28	55.96
175	249.38	55.98
176	250.47	56.00
177	251.57	56.00
178	252.66	56.00
179	253.76	56.00
180	254.86	56.00
181	255.95	56.00
182	257.05	56.00
183	258.14	56.00
184	259.24	56.00
185	260.33	56.00
186	261.43	56.00
187	262.52	56.00
188	263.62	56.00
189	264.71	56.00
190	265.81	55.99
191	266.90	55.98
192	268.00	55.97
193	269.09	55.95
194	270.19	55.94
195	271.28	55.92
196	272.38	55.90
197	273.47	55.86
198	274.57	55.89
199	275.66	55.95
200	276.76	55.96
201	277.85	55.96
202	278.95	55.91

Order	Station [ft]	Elevation [ft]
203	280.04	55.87
204	281.14	55.73
205	282.23	55.60
206	283.33	55.62
207	284.42	55.56
208	285.52	55.58
209	286.61	55.59
210	287.71	55.61
211	288.80	55.62
212	289.90	55.63
213	290.99	55.64
214	292.09	55.66
215	293.18	55.67
216	294.28	55.68
217	295.37	55.70
218	296.47	55.72
219	297.56	55.74
220	298.66	55.75
221	299.75	55.76
222	300.85	55.78
223	301.94	55.79
224	303.04	55.78
225	304.13	55.78
226	305.23	55.76
227	306.32	55.75
228	307.42	55.74
229	308.51	55.73
230	309.61	55.72
231	310.70	55.71
232	311.80	55.70
233	312.89	55.69
234	313.99	55.67
235	315.08	55.66
236	316.18	55.65
237	317.27	55.64
238	318.37	55.63
239	319.46	55.61
240	320.56	55.60
241	321.65	55.59
242	322.75	55.58
243	323.84	55.56
244	324.94	55.54
245	326.03	55.53
246	327.13	55.50
247	328.22	55.48
248	329.32	55.46
249	330.41	55.44
250	331.51	55.41
251	332.60	55.39

Order	Station [ft]	Elevation [ft]
252	333.70	55.36
253	334.79	55.34
254	335.89	55.32
255	336.98	55.29
256	338.08	55.27
257	339.17	55.25
258	340.27	55.24
259	341.36	55.22
260	342.46	55.20
261	343.55	55.19
262	344.65	55.18
263	345.74	55.17
264	346.84	55.16
265	347.93	55.15
266	349.03	55.14
267	350.12	55.13
268	351.22	55.12
269	352.31	55.12
270	353.41	55.11
271	354.50	55.10
272	355.60	55.10
273	356.69	55.10
274	357.79	55.09
275	358.88	55.09
276	359.98	55.08
277	361.07	55.08
278	362.17	55.08
279	363.26	55.07
280	364.36	55.07
281	365.45	55.07
282	366.55	55.06
283	367.64	55.06
284	368.74	55.06
285	369.83	55.06
286	370.93	55.05
287	372.02	55.05
288	373.12	55.05
289	374.21	55.05
290	375.31	55.05
291	376.40	55.05
292	377.50	55.05
293	378.59	55.05
294	379.69	55.04
295	380.78	55.04
296	381.88	55.04
297	382.97	55.04
298	384.07	55.04
299	385.16	55.04
300	386.26	55.04

Order	Station [ft]	Elevation [ft]
301	387.35	55.04
302	388.45	55.04
303	389.54	55.04
304	390.64	55.04
305	391.73	55.04
306	392.83	55.04
307	393.92	55.04
308	395.02	55.04
309	396.11	55.04
310	397.21	55.04
311	398.30	55.04
312	399.40	55.04
313	400.49	55.04
314	401.59	55.04
315	402.68	55.04
316	403.78	55.04
317	404.87	55.04
318	405.97	55.03
319	407.06	55.03
320	408.16	55.03
321	409.25	55.03
322	410.35	55.03
323	411.44	55.02
324	412.54	55.02
325	413.63	55.02
326	414.73	55.02
327	415.82	55.01
328	416.92	55.01
329	418.01	55.01
330	419.11	55.01
331	420.20	55.01
332	421.30	55.01
333	422.39	55.01
334	423.49	55.01
335	424.58	55.02
336	425.68	55.02
337	426.77	55.02
338	427.87	55.03
339	428.96	55.03
340	430.06	55.03
341	431.15	55.04
342	432.25	55.04
343	433.34	55.04
344	434.44	55.04
345	435.53	55.05
346	436.63	55.05
347	437.72	55.05
348	438.82	55.05
349	439.91	55.05

Order	Station [ft]	Elevation [ft]
350	441.01	55.05
351	442.10	55.06
352	443.20	55.06
353	444.29	55.06
354	445.39	55.06
355	446.48	55.06
356	447.58	55.06
357	448.67	55.06
358	449.77	55.06
359	450.86	55.06
360	451.96	55.06
361	453.05	55.07
362	454.15	55.07
363	455.24	55.07
364	456.34	55.07
365	457.43	55.07
366	458.53	55.07
367	459.62	55.07
368	460.72	55.07
369	461.81	55.07
370	462.91	55.07
371	464.00	55.07
372	465.10	55.07
373	466.19	55.07
374	467.29	55.07
375	468.38	55.07
376	469.48	55.07
377	470.57	55.07
378	471.67	55.07
379	472.76	55.07
380	473.86	55.07
381	474.95	55.07
382	476.05	55.07
383	477.14	55.07
384	478.24	55.07
385	479.33	55.06
386	480.43	55.06
387	481.52	55.06
388	482.62	55.06
389	483.71	55.06
390	484.81	55.06
391	485.90	55.05
392	487.00	55.05
393	488.09	55.05
394	489.19	55.05
395	490.28	55.05
396	491.38	55.04
397	492.48	55.04
398	493.57	55.04

Order	Station [ft]	Elevation [ft]
399	494.67	55.04
400	495.76	55.04
401	496.86	55.03
402	497.95	55.03
403	499.05	55.03
404	500.14	55.03
405	501.24	55.03
406	502.33	55.03
407	503.43	55.03
408	504.52	55.02
409	505.62	55.02
410	506.71	55.02
411	507.81	55.02
412	508.90	55.02
413	510.00	55.02
414	511.09	55.02
415	512.19	55.03
416	513.28	55.03
417	514.38	55.03
418	515.47	55.03
419	516.57	55.03
420	517.66	55.03
421	518.76	55.03
422	519.85	55.03
423	520.95	55.03
424	522.04	55.04
425	523.14	55.04
426	524.23	55.04
427	525.33	55.04
428	526.42	55.04
429	527.52	55.04
430	528.61	55.03
431	529.71	55.03
432	530.80	55.03
433	531.90	55.03
434	532.99	55.03
435	534.09	55.03
436	535.18	55.02
437	536.28	55.02
438	537.37	55.02
439	538.47	55.02
440	539.56	55.02
441	540.66	55.02
442	541.75	55.02
443	542.85	55.02
444	543.94	55.02
445	545.04	55.02
446	546.13	55.02
447	547.23	55.02

Order	Station [ft]	Elevation [ft]
448	548.32	55.02
449	549.42	55.02
450	550.51	55.02
451	551.61	55.02
452	552.70	55.02
453	553.80	55.02
454	554.89	55.02
455	555.99	55.02
456	557.08	55.02
457	558.18	55.02
458	559.27	55.02
459	560.37	55.02
460	561.46	55.02
461	562.56	55.02
462	563.65	55.02
463	564.75	55.02
464	565.84	55.02
465	566.94	55.02
466	568.03	55.02
467	569.13	55.02
468	570.22	55.02
469	571.32	55.02
470	572.41	55.02
471	573.51	55.03
472	574.60	55.03
473	575.70	55.03
474	576.79	55.03
475	577.89	55.03
476	578.98	55.03
477	580.08	55.03
478	581.17	55.03
479	582.27	55.03
480	583.36	55.03
481	584.46	55.03
482	585.55	55.03
483	586.65	55.03
484	587.74	55.03
485	588.84	55.03
486	589.93	55.02
487	591.03	55.02
488	592.12	55.02
489	593.22	55.02
490	594.31	55.02
491	595.41	55.02
492	596.50	55.02
493	597.60	55.02
494	598.69	55.02
495	599.79	55.02
496	600.88	55.02

Order	Station [ft]	Elevation [ft]
497	601.98	55.03
498	603.07	55.03
499	604.17	55.03
500	605.26	55.03
501	606.36	55.03
502	607.45	55.03
503	608.55	55.04
504	609.64	55.04
505	610.74	55.04
506	611.83	55.04
507	612.93	55.04
508	614.02	55.04
509	615.12	55.04
510	616.21	55.04
511	617.31	55.04
512	618.40	55.04
513	619.50	55.04
514	620.59	55.04
515	621.69	55.04
516	622.78	55.04
517	623.88	55.03
518	624.97	55.03
519	626.07	55.03
520	627.16	55.03
521	628.26	55.03
522	629.35	55.03
523	630.45	55.03
524	631.54	55.03
525	632.64	55.03
526	633.73	55.02
527	634.83	55.02
528	635.92	55.02
529	637.02	55.02
530	638.11	55.02
531	639.21	55.02
532	640.30	55.02
533	641.40	55.02
534	642.49	55.02
535	643.59	55.02
536	644.68	55.02
537	645.78	55.02
538	646.87	55.01
539	647.97	55.01
540	649.06	55.01
541	650.16	55.01
542	651.25	55.01
543	652.35	55.01
544	653.44	55.01
545	654.54	55.01

Order	Station [ft]	Elevation [ft]
546	655.63	55.01
547	656.73	55.01
548	657.82	55.01
549	658.92	55.00
550	660.01	55.00
551	661.11	55.00
552	662.20	55.00
553	663.30	55.00
554	664.39	55.00
555	665.49	55.00
556	666.58	55.00
557	667.68	55.00
558	668.77	55.00
559	669.87	55.00
560	670.96	55.00
561	672.06	55.00
562	673.15	55.00
563	674.25	54.99
564	675.34	54.99
565	676.44	54.99
566	677.53	54.99
567	678.63	54.99
568	679.72	54.99
569	680.82	54.99
570	681.91	54.99
571	683.01	54.99
572	684.10	54.99
573	685.20	54.98
574	686.29	54.98
575	687.39	54.98
576	688.48	54.98
577	689.58	54.98
578	690.67	54.98
579	691.77	54.98
580	692.86	54.98
581	693.96	54.98
582	695.05	54.98
583	696.15	54.99
584	697.24	54.99
585	698.34	54.99
586	699.43	54.99
587	700.53	55.00
588	701.62	55.00
589	702.72	55.00
590	703.81	55.01
591	704.91	55.01
592	706.00	55.01
593	707.10	55.02
594	708.19	55.02

Order	Station [ft]	Elevation [ft]
595	709.29	55.02
596	710.38	55.03
597	711.48	55.03
598	712.57	55.03
599	713.67	55.03
600	714.76	55.03
601	715.86	55.03
602	716.95	55.03
603	718.05	55.03
604	719.14	55.03
605	720.24	55.03
606	721.33	55.03
607	722.43	55.03
608	723.52	55.03
609	724.62	55.02
610	725.71	55.02
611	726.81	55.02
612	727.90	55.02
613	729.00	55.02
614	730.10	55.02
615	731.19	55.01
616	732.29	55.01
617	733.38	55.01
618	734.48	55.01
619	735.57	55.01
620	736.67	55.00
621	737.76	55.00
622	738.86	55.00
623	739.95	55.00
624	741.05	55.00
625	742.14	55.00
626	743.24	55.00
627	744.33	54.99
628	745.43	54.99
629	746.52	55.00
630	747.62	55.00
631	748.71	55.00
632	749.81	55.00
633	750.90	55.00
634	752.00	55.00
635	753.09	55.00
636	754.19	55.01
637	755.28	55.01
638	756.38	55.01
639	757.47	55.01
640	758.57	55.01
641	759.66	55.01
642	760.76	55.02
643	761.85	55.02

Order	Station [ft]	Elevation [ft]
644	762.95	55.02
645	764.04	55.02
646	765.14	55.02
647	766.23	55.02
648	767.33	55.02
649	768.42	55.01
650	769.52	55.01
651	770.61	55.01
652	771.71	55.01
653	772.80	55.00
654	773.90	55.00
655	774.99	55.00
656	776.09	54.99
657	777.18	54.99
658	778.28	54.98
659	779.37	54.98
660	780.47	54.97
661	781.56	54.97
662	782.66	54.96
663	783.75	54.96
664	784.85	54.95
665	785.94	54.95
666	787.04	54.94
667	788.13	54.94
668	789.23	54.93
669	790.32	54.93
670	791.42	54.93
671	792.51	54.93
672	793.61	54.94
673	794.70	54.94
674	795.80	54.95
675	796.89	54.95
676	797.99	54.96
677	799.08	54.96
678	800.18	54.97
679	801.27	54.98
680	802.37	54.98
681	803.46	54.99
682	804.56	54.99
683	805.65	55.00
684	806.75	55.00
685	807.84	55.01
686	808.94	55.01
687	810.03	55.01
688	811.13	55.02
689	812.22	55.02
690	813.32	55.02
691	814.41	55.03
692	815.51	55.03

Order	Station [ft]	Elevation [ft]
693	816.60	55.03
694	817.70	55.03
695	818.79	55.03
696	819.89	55.03
697	820.98	55.04
698	822.08	55.04
699	823.17	55.04
700	824.27	55.04
701	825.36	55.04
702	826.46	55.04
703	827.55	55.04
704	828.65	55.04
705	829.74	55.04
706	830.84	55.04
707	831.93	55.04
708	833.03	55.04
709	834.12	55.04
710	835.22	55.04
711	836.31	55.04
712	837.41	55.04
713	838.50	55.04
714	839.60	55.04
715	840.69	55.04
716	841.79	55.04
717	842.88	55.03
718	843.98	55.03
719	845.07	55.03
720	846.17	55.03
721	847.26	55.03
722	848.36	55.03
723	849.45	55.02
724	850.55	55.02
725	851.64	55.02
726	852.74	55.02
727	853.83	55.01
728	854.93	55.01
729	856.02	55.01
730	857.12	55.00
731	858.21	55.00
732	859.31	55.00
733	860.40	54.99
734	861.50	54.99
735	862.59	54.99
736	863.69	54.99
737	864.78	54.98
738	865.88	54.98
739	866.97	54.98
740	868.07	54.98
741	869.16	54.98

Order	Station [ft]	Elevation [ft]
742	870.26	54.98
743	871.35	54.98
744	872.45	54.98
745	873.54	54.98
746	874.64	54.98
747	875.73	54.98
748	876.83	54.98
749	877.92	54.99
750	879.02	54.99
751	880.11	54.99
752	881.21	54.99
753	882.30	54.99
754	883.40	55.00
755	884.49	55.00
756	885.59	55.01
757	886.68	55.01
758	887.78	55.01
759	888.87	55.00
760	889.97	55.00
761	891.06	55.00
762	892.16	55.00
763	893.25	55.00
764	894.35	55.00
765	895.44	55.00
766	896.54	55.00
767	897.63	55.00
768	898.73	55.00
769	899.82	55.00
770	900.92	55.00
771	902.01	55.00
772	903.11	55.01
773	904.20	55.01
774	905.30	55.02
775	906.39	55.04
776	907.49	55.06
777	908.58	55.08
778	909.68	55.10
779	910.77	55.13
780	911.87	55.17
781	912.96	55.20
782	914.06	55.24
783	915.15	55.27
784	916.25	55.30
785	917.34	55.34
786	918.44	55.38
787	919.53	55.41
788	920.63	55.44
789	921.72	55.48
790	922.82	55.51

Order	Station [ft]	Elevation [ft]
791	923.91	55.54
792	925.01	55.57
793	926.10	55.60
794	927.20	55.62
795	928.29	55.65
796	929.39	55.67
797	930.48	55.69
798	931.58	55.71
799	932.67	55.72
800	933.77	55.73
801	934.86	55.74
802	935.96	55.75
803	937.05	55.76
804	938.15	55.77
805	939.24	55.77
806	940.34	55.79
807	941.43	55.81
808	942.53	55.83
809	943.62	55.85
810	944.72	55.87
811	945.81	55.88
812	946.91	55.90
813	948.00	55.91
814	949.10	55.93
815	950.19	55.95
816	951.29	55.96
817	952.38	55.97
818	953.48	55.98
819	954.57	55.99
820	955.67	56.00
821	956.76	56.00
822	957.86	56.01
823	958.95	56.01
824	960.05	56.01
825	961.14	56.02
826	962.24	56.02
827	963.33	56.02
828	964.43	56.02
829	965.52	56.02
830	966.62	56.02
831	967.72	56.02
832	968.81	56.03
833	969.91	56.03
834	971.00	56.03
835	972.10	56.03
836	973.19	56.03
837	974.29	56.03
838	975.38	56.03
839	976.48	56.03

Order	Station [ft]	Elevation [ft]
840	977.57	56.03
841	978.67	56.02
842	979.76	56.02
843	980.86	56.02
844	981.95	56.02
845	983.05	56.02
846	984.14	56.02
847	985.24	56.01
848	986.33	56.01
849	987.43	56.01
850	988.52	56.00
851	989.62	56.00
852	990.71	55.99
853	991.81	55.99
854	992.90	55.98
855	994.00	55.98
856	995.09	55.97
857	996.19	55.96
858	997.28	55.96
859	998.38	55.95
860	999.47	55.95
861	1000.57	55.94
862	1001.66	55.94
863	1002.76	55.94
864	1003.85	55.93
865	1004.95	55.93
866	1006.04	55.94
867	1007.14	55.94
868	1008.23	55.94
869	1009.33	55.94
870	1010.42	55.95
871	1011.52	55.95
872	1012.61	55.95
873	1013.71	55.96
874	1014.80	55.96
875	1015.90	55.97
876	1016.99	55.97
877	1018.09	55.98
878	1019.18	55.98
879	1020.28	55.99
880	1021.37	55.99
881	1022.47	55.99
882	1023.56	56.00
883	1024.66	56.00
884	1025.75	56.00
885	1026.85	56.01
886	1027.94	56.01
887	1029.04	56.02
888	1030.13	56.02

Order	Station [ft]	Elevation [ft]
889	1031.23	56.02
890	1032.32	56.03
891	1033.42	56.03
892	1034.51	56.03
893	1035.61	56.03
894	1036.70	56.04
895	1037.80	56.04
896	1038.89	56.04
897	1039.99	56.04
898	1041.08	56.04
899	1042.18	56.04
900	1043.27	56.05
901	1044.37	56.05
902	1045.46	56.05
903	1046.56	56.05
904	1047.65	56.05
905	1048.75	56.05
906	1049.84	56.05
907	1050.94	56.05
908	1052.03	56.05
909	1053.13	56.05
910	1054.22	56.05
911	1055.32	56.05
912	1056.41	56.05
913	1057.51	56.05
914	1058.60	56.05
915	1059.70	56.05
916	1060.79	56.05
917	1061.89	56.05
918	1062.98	56.05
919	1064.08	56.05
920	1065.17	56.05
921	1066.27	56.05
922	1067.36	56.05
923	1068.46	56.05
924	1069.55	56.05
925	1070.65	56.05
926	1071.74	56.05
927	1072.84	56.05
928	1073.93	56.05
929	1075.03	56.05
930	1076.12	56.05
931	1077.22	56.05
932	1078.31	56.05
933	1079.41	56.04
934	1080.50	56.04
935	1081.60	56.04
936	1082.69	56.04
937	1083.79	56.03

Order	Station [ft]	Elevation [ft]
938	1084.88	56.03
939	1085.98	56.03
940	1087.07	56.02
941	1088.17	56.01
942	1089.26	56.01
943	1090.36	56.00
944	1091.45	55.99
945	1092.55	55.98
946	1093.64	55.97
947	1094.74	55.95
948	1095.83	55.93
949	1096.93	55.92
950	1098.02	55.91
951	1099.12	55.90
952	1100.21	55.89
953	1101.31	55.89
954	1102.40	55.89
955	1103.50	55.88
956	1104.59	55.87
957	1105.69	55.87
958	1106.78	55.86
959	1107.88	55.86
960	1108.97	55.87
961	1110.07	55.87
962	1111.16	55.88
963	1112.26	55.89
964	1113.35	55.89
965	1114.45	55.90
966	1115.54	55.90
967	1116.64	55.91
968	1117.73	55.91
969	1118.83	55.92
970	1119.92	55.92
971	1121.02	55.93
972	1122.11	55.93
973	1123.21	55.93
974	1124.30	55.94
975	1125.40	55.94
976	1126.49	55.95
977	1127.59	55.95
978	1128.68	55.95
979	1129.78	55.96
980	1130.87	55.96
981	1131.97	55.96
982	1133.06	55.97
983	1134.16	55.97
984	1135.25	55.97
985	1136.35	55.97
986	1137.44	55.98

Order	Station [ft]	Elevation [ft]
987	1138.54	55.98
988	1139.63	55.98
989	1140.73	55.99
990	1141.82	55.99
991	1142.92	55.99
992	1144.01	55.99
993	1145.11	56.00
994	1146.20	56.00
995	1147.30	56.00
996	1148.39	56.00
997	1149.49	56.00
998	1150.58	56.00
999	1151.68	56.00
1000	1152.77	55.99
1001	1153.87	55.99
1002	1154.96	55.99
1003	1156.06	55.99
1004	1157.15	55.99
1005	1158.25	55.99
1006	1159.34	55.99
1007	1160.44	55.98
1008	1161.53	55.98
1009	1162.63	55.98
1010	1163.72	55.98
1011	1164.82	55.98
1012	1165.91	55.98
1013	1167.01	55.98
1014	1168.10	55.98
1015	1169.20	55.98
1016	1170.29	55.98
1017	1171.39	55.98
1018	1172.48	55.98
1019	1173.58	55.98
1020	1174.67	55.99
1021	1175.77	55.99
1022	1176.86	55.99
1023	1177.96	56.00
1024	1179.05	56.00
1025	1180.15	56.01
1026	1181.24	56.01
1027	1182.34	56.01
1028	1183.43	56.02
1029	1184.53	56.02
1030	1185.62	56.03
1031	1186.72	56.03
1032	1187.81	56.03
1033	1188.91	56.04
1034	1190.00	56.04
1035	1191.10	56.04

Order	Station [ft]	Elevation [ft]
1036	1192.19	56.04
1037	1193.29	56.05
1038	1194.38	56.05
1039	1195.48	56.05
1040	1196.57	56.05
1041	1197.67	56.05
1042	1198.76	56.05
1043	1199.86	56.05
1044	1200.95	56.06
1045	1202.05	56.06
1046	1203.14	56.06
1047	1204.24	56.06
1048	1205.33	56.06
1049	1206.43	56.06
1050	1207.53	56.06
1051	1208.62	56.06
1052	1209.72	56.05
1053	1210.81	56.05
1054	1211.91	56.05
1055	1213.00	56.05
1056	1214.10	56.05
1057	1215.19	56.05
1058	1216.29	56.05
1059	1217.38	56.05
1060	1218.48	56.05
1061	1219.57	56.05
1062	1220.67	56.05
1063	1221.76	56.04
1064	1222.86	56.04
1065	1223.95	56.04
1066	1225.05	56.04
1067	1226.14	56.04
1068	1227.24	56.04
1069	1228.33	56.04
1070	1229.43	56.04
1071	1230.52	56.03
1072	1231.62	56.03
1073	1232.71	56.03
1074	1233.81	56.03
1075	1234.90	56.03
1076	1236.00	56.03
1077	1237.09	56.03
1078	1238.19	56.03
1079	1239.28	56.03
1080	1240.38	56.04
1081	1241.47	56.04
1082	1242.57	56.04
1083	1243.66	56.04
1084	1244.76	56.05

Order	Station [ft]	Elevation [ft]
1085	1245.85	56.05
1086	1246.95	56.05
1087	1248.04	56.06
1088	1249.14	56.07
1089	1250.23	56.07
1090	1251.33	56.09
1091	1252.42	56.10
1092	1253.52	56.11
1093	1254.61	56.13
1094	1255.71	56.15
1095	1256.80	56.17
1096	1257.90	56.19
1097	1258.99	56.21
1098	1260.09	56.24
1099	1261.18	56.27
1100	1262.28	56.30
1101	1263.37	56.34
1102	1264.47	56.38
1103	1265.56	56.43
1104	1266.66	56.48
1105	1267.75	56.54
1106	1268.85	56.61
1107	1269.94	56.69
1108	1271.04	56.76
1109	1272.13	56.85
1110	1273.23	56.93
1111	1274.32	57.00
1112	1275.42	57.02
1113	1276.51	57.05
1114	1277.61	57.06
1115	1278.70	57.06
1116	1279.80	57.06
1117	1280.89	57.06
1118	1281.99	57.06
1119	1283.08	57.06
1120	1284.18	57.06
1121	1285.27	57.06
1122	1286.37	57.05
1123	1287.46	57.05
1124	1288.56	57.05
1125	1289.65	57.05
1126	1290.75	57.04
1127	1291.84	57.04
1128	1292.94	57.04
1129	1294.03	57.03
1130	1295.13	57.03
1131	1296.22	57.02
1132	1297.32	57.02
1133	1298.41	57.02

Order	Station [ft]	Elevation [ft]
1134	1299.51	57.01
1135	1300.60	57.01
1136	1301.70	57.01
1137	1302.79	57.01
1138	1303.89	57.01
1139	1304.98	57.01
1140	1306.08	57.01
1141	1307.17	57.02
1142	1308.27	57.02
1143	1309.36	57.03
1144	1310.46	57.04
1145	1311.55	57.04
1146	1312.65	57.04
1147	1313.74	57.04
1148	1314.84	57.04
1149	1315.93	57.04
1150	1317.03	57.04
1151	1318.12	57.04
1152	1319.22	57.04

Comment:

Weir Cross Section: X-W4-GBS004

Scenario: Post

Lid: No

Bottom Point Table

Order	Station [ft]	Elevation [ft]
0	0.00	60.97
1	1.33	60.98
2	2.66	60.96
3	3.99	60.96
4	5.33	60.98
5	6.66	61.00
6	7.99	61.00
7	9.32	61.02
8	10.65	61.03
9	11.98	61.03
10	13.31	61.03
11	14.64	61.03
12	15.98	61.04
13	17.31	61.03
14	18.64	61.03
15	19.97	61.03
16	21.30	61.03
17	22.63	61.03

Order	Station [ft]	Elevation [ft]
18	23.96	61.01
19	25.29	61.00
20	26.63	61.00
21	27.96	61.01
22	29.29	61.02
23	30.62	61.02
24	31.95	61.02
25	33.28	61.01
26	34.61	60.98
27	35.95	60.99
28	37.28	61.00
29	38.61	61.00
30	39.94	61.02
31	41.27	61.02
32	42.60	61.02
33	43.93	61.00
34	45.26	60.98
35	46.60	61.00
36	47.93	60.99
37	49.26	60.98
38	50.59	60.98
39	51.92	60.99
40	53.25	61.00
41	54.58	61.00
42	55.91	61.00
43	57.25	61.00
44	58.58	60.95
45	59.91	60.94
46	61.24	60.96
47	62.57	60.94
48	63.90	60.92
49	65.23	60.93
50	66.57	60.96
51	67.90	60.97
52	69.23	60.95
53	70.56	60.96
54	71.89	60.98
55	73.22	60.96
56	74.55	60.96
57	75.88	60.97
58	77.22	60.99
59	78.55	61.00
60	79.88	61.01
61	81.21	61.02
62	82.54	61.01
63	83.87	60.99
64	85.20	60.97
65	86.53	60.98
66	87.87	61.00

Order	Station [ft]	Elevation [ft]
67	89.20	61.01
68	90.53	61.01
69	91.86	61.01
70	93.19	60.99
71	94.52	60.96
72	95.85	60.86
73	97.19	60.76
74	98.52	60.65
75	99.85	60.55
76	101.18	60.47
77	102.51	60.39
78	103.84	60.32
79	105.17	60.27
80	106.50	60.23
81	107.84	60.19
82	109.17	60.16
83	110.50	60.15
84	111.83	60.13
85	113.16	60.12
86	114.49	60.11
87	115.82	60.10
88	117.15	60.10
89	118.49	60.09
90	119.82	60.08
91	121.15	60.08
92	122.48	60.07
93	123.81	60.07
94	125.14	60.07
95	126.47	60.06
96	127.81	60.06
97	129.14	60.06
98	130.47	60.05
99	131.80	60.05
100	133.13	60.05
101	134.46	60.05
102	135.79	60.05
103	137.12	60.05
104	138.46	60.05
105	139.79	60.05
106	141.12	60.05
107	142.45	60.05
108	143.78	60.05
109	145.11	60.05
110	146.44	60.05
111	147.77	60.05
112	149.11	60.04
113	150.44	60.04
114	151.77	60.04
115	153.10	60.03

Order	Station [ft]	Elevation [ft]
116	154.43	60.02
117	155.76	60.01
118	157.09	60.00
119	158.43	59.99
120	159.76	59.98
121	161.09	59.97
122	162.42	59.96
123	163.75	59.95
124	165.08	59.95
125	166.41	59.95
126	167.74	59.95
127	169.08	59.96
128	170.41	59.96
129	171.74	59.97
130	173.07	59.98
131	174.40	59.99
132	175.73	59.99
133	177.06	60.00
134	178.39	60.00
135	179.73	60.01
136	181.06	60.01
137	182.39	60.01
138	183.72	60.02
139	185.05	60.03
140	186.38	60.03
141	187.71	60.04
142	189.05	60.04
143	190.38	60.04
144	191.71	60.05
145	193.04	60.05
146	194.37	60.05
147	195.70	60.05
148	197.03	60.05
149	198.36	60.05
150	199.70	60.05
151	201.03	60.05
152	202.36	60.05
153	203.69	60.06
154	205.02	60.06
155	206.35	60.06
156	207.68	60.06
157	209.01	60.06
158	210.35	60.06
159	211.68	60.06
160	213.01	60.06
161	214.34	60.06
162	215.67	60.06
163	217.00	60.06
164	218.33	60.06

Order	Station [ft]	Elevation [ft]
165	219.67	60.05
166	221.00	60.05
167	222.33	60.05
168	223.66	60.04
169	224.99	60.04
170	226.32	60.03
171	227.65	60.03
172	228.98	60.03
173	230.32	60.03
174	231.65	60.04
175	232.98	60.04
176	234.31	60.05
177	235.64	60.05
178	236.97	60.05
179	238.30	60.05
180	239.63	60.05
181	240.97	60.05
182	242.30	60.06
183	243.63	60.06
184	244.96	60.06
185	246.29	60.06
186	247.62	60.06
187	248.95	60.06
188	250.29	60.06
189	251.62	60.06
190	252.95	60.05
191	254.28	60.05
192	255.61	60.05
193	256.94	60.05
194	258.27	60.05
195	259.60	60.05
196	260.94	60.05
197	262.27	60.05
198	263.60	60.05
199	264.93	60.05
200	266.26	60.05
201	267.59	60.05
202	268.92	60.05
203	270.25	60.04
204	271.59	60.04
205	272.92	60.04
206	274.25	60.04
207	275.58	60.04
208	276.91	60.04
209	278.24	60.05
210	279.57	60.05
211	280.91	60.05
212	282.24	60.06
213	283.57	60.06

Order	Station [ft]	Elevation [ft]
214	284.90	60.07
215	286.23	60.07
216	287.56	60.08
217	288.89	60.09
218	290.22	60.10
219	291.56	60.12
220	292.89	60.13
221	294.22	60.15
222	295.55	60.17
223	296.88	60.20
224	298.21	60.21
225	299.54	60.24
226	300.87	60.26
227	302.21	60.27
228	303.54	60.28
229	304.87	60.29
230	306.20	60.29
231	307.53	60.29
232	308.86	60.28
233	310.19	60.27
234	311.53	60.26
235	312.86	60.24
236	314.19	60.22
237	315.52	60.21
238	316.85	60.19
239	318.18	60.18
240	319.51	60.17
241	320.84	60.16
242	322.18	60.15
243	323.51	60.13
244	324.84	60.12
245	326.17	60.11
246	327.50	60.10
247	328.83	60.09
248	330.16	60.08
249	331.49	60.07
250	332.83	60.06
251	334.16	60.05
252	335.49	60.04
253	336.82	60.03
254	338.15	60.03
255	339.48	60.03
256	340.81	60.02
257	342.35	60.02
258	343.89	60.02
259	345.43	60.02
260	346.96	60.01
261	348.50	60.00
262	350.04	59.99

Order	Station [ft]	Elevation [ft]
263	351.58	59.98
264	353.12	59.98
265	354.65	59.98
266	356.19	59.98
267	357.73	59.99
268	359.27	59.99
269	360.80	59.99
270	362.34	59.99
271	363.88	59.97
272	365.42	59.97
273	366.95	59.98
274	368.49	59.97
275	370.03	59.97
276	371.57	59.99
277	373.10	59.96
278	374.64	59.96
279	376.18	59.98
280	377.72	59.88
281	379.26	59.79
282	380.79	59.70
283	382.33	59.62
284	383.87	59.57
285	385.41	59.57
286	386.94	59.59
287	388.48	59.60
288	390.02	59.62
289	391.56	59.64
290	393.09	59.65
291	394.63	59.68
292	396.17	59.70
293	397.71	59.72
294	399.25	59.75
295	400.78	59.79
296	402.32	59.83
297	403.86	59.88
298	405.40	59.94
299	406.93	59.99
300	408.47	60.00
301	410.01	60.01
302	411.55	60.00
303	413.08	59.99
304	414.62	59.99
305	416.16	60.01
306	417.70	60.06
307	419.23	60.10
308	420.77	60.15
309	422.31	60.20
310	423.85	60.24
311	425.39	60.27

Order	Station [ft]	Elevation [ft]
312	426.92	60.29
313	428.46	60.29
314	430.00	60.29
315	431.54	60.28
316	433.07	60.26
317	434.61	60.22
318	436.15	60.18
319	437.69	60.14
320	439.22	60.11
321	440.76	60.08
322	442.30	60.06
323	443.84	60.05
324	445.38	60.04
325	446.91	60.03
326	448.45	60.02
327	449.99	60.01
328	451.53	60.01
329	453.06	60.00
330	454.60	60.00
331	456.14	59.99
332	457.68	59.98
333	459.21	59.98
334	460.75	59.97
335	462.29	59.97
336	463.83	59.97
337	465.36	59.97
338	466.90	59.96
339	468.44	59.96
340	469.98	59.96
341	471.52	59.96
342	473.05	59.95
343	474.59	59.94
344	476.13	59.93
345	477.67	59.91
346	479.20	59.89
347	480.74	59.89
348	482.28	59.89
349	483.82	59.88
350	485.35	59.87
351	486.89	59.87
352	488.43	59.87
353	489.97	59.88
354	491.51	59.88
355	493.04	59.89
356	494.58	59.90
357	496.12	59.91
358	497.66	59.92
359	499.19	59.93
360	500.73	59.94

Order	Station [ft]	Elevation [ft]
361	502.27	59.95
362	503.81	59.96
363	505.34	59.97
364	506.88	59.98
365	508.42	59.98
366	509.96	59.99
367	511.49	59.99
368	513.03	59.99
369	514.57	60.00
370	516.11	60.00
371	517.65	60.00
372	519.18	60.01
373	520.72	60.01
374	522.26	60.01
375	523.80	60.02
376	525.33	60.02
377	526.87	60.02
378	528.41	60.02
379	529.95	60.03
380	531.48	60.03
381	533.02	60.03
382	534.56	60.03
383	536.10	60.03
384	537.64	60.03
385	539.17	60.04
386	540.71	60.04
387	542.25	60.04
388	543.79	60.04
389	545.32	60.04
390	546.86	60.04
391	548.40	60.04
392	549.94	60.04
393	551.47	60.04
394	553.01	60.04
395	554.55	60.04
396	556.09	60.04
397	557.62	60.04
398	559.16	60.04
399	560.70	60.05
400	562.24	60.05
401	563.78	60.05
402	565.31	60.05
403	566.85	60.05
404	568.39	60.05
405	569.93	60.06
406	571.46	60.06
407	573.00	60.07
408	574.54	60.08
409	576.08	60.08

Order	Station [ft]	Elevation [ft]
410	577.61	60.09
411	579.15	60.10
412	580.69	60.11
413	582.23	60.12
414	583.77	60.14
415	585.30	60.15
416	586.84	60.17
417	588.38	60.19
418	589.92	60.21
419	591.45	60.23
420	592.99	60.26
421	594.53	60.29
422	596.07	60.33
423	597.60	60.37
424	599.14	60.41
425	600.68	60.46
426	602.22	60.51
427	603.75	60.56
428	605.29	60.62
429	606.83	60.67
430	608.37	60.72
431	609.91	60.76
432	611.44	60.80
433	612.98	60.83
434	614.52	60.87
435	616.06	60.89
436	617.59	60.90
437	619.13	60.91
438	620.67	60.92
439	622.21	60.92
440	623.74	60.92
441	625.28	60.93
442	626.82	60.93
443	628.36	60.94
444	629.90	60.95
445	631.43	60.96
446	632.97	60.97
447	634.51	60.98
448	636.05	60.98
449	637.58	60.99
450	639.12	61.00
451	640.66	61.00
452	642.20	61.01
453	643.73	61.01
454	645.27	61.01
455	646.81	61.00
456	648.35	61.00
457	649.88	61.00
458	651.42	61.01

Order	Station [ft]	Elevation [ft]
459	652.96	61.01
460	654.50	61.02
461	656.04	61.02
462	657.57	61.02
463	659.11	61.02
464	660.65	61.02
465	662.19	61.02
466	663.72	61.02
467	665.26	61.02
468	666.80	61.02
469	668.34	61.02
470	669.87	61.02
471	671.41	61.02
472	672.95	61.02
473	674.49	61.02
474	676.03	61.02
475	677.56	61.02
476	679.10	61.02
477	680.64	61.02
478	682.18	61.02
479	683.71	61.02
480	685.25	61.02
481	686.79	61.02
482	688.33	61.03
483	689.86	61.03
484	691.40	61.03
485	692.94	61.03
486	694.48	61.02
487	696.02	61.02
488	697.55	61.02
489	699.09	61.02
490	700.63	61.01
491	702.17	61.01
492	703.70	61.01
493	705.24	61.01
494	706.78	61.02
495	708.32	61.02
496	709.85	61.01
497	711.39	61.01
498	712.93	61.00
499	714.47	61.01
500	716.00	61.00
501	717.54	61.00
502	719.08	61.01
503	720.62	61.00
504	722.16	61.00
505	723.69	61.00
506	725.23	61.00
507	726.77	61.00

Order	Station [ft]	Elevation [ft]
508	728.31	61.01
509	729.84	61.01
510	731.38	61.01
511	732.92	61.02
512	734.46	61.02
513	735.99	61.02
514	737.53	61.02
515	739.07	61.02
516	740.61	61.02
517	742.15	61.02
518	743.68	61.02
519	745.22	61.01
520	746.76	61.01
521	748.30	61.01
522	749.83	61.01
523	751.37	61.01
524	752.91	61.01
525	754.45	61.01
526	755.98	61.00
527	757.52	61.00
528	759.06	61.01
529	760.60	61.01
530	762.13	61.01
531	763.67	61.02
532	765.21	61.04
533	766.75	61.07
534	768.29	61.15
535	769.82	61.25
536	771.36	61.34
537	772.90	61.45
538	774.44	61.53
539	775.97	61.59
540	777.51	61.64
541	779.05	61.64
542	780.59	61.61
543	782.12	61.56
544	783.66	61.49
545	785.20	61.41
546	786.74	61.32
547	788.28	61.23
548	789.81	61.15
549	791.35	61.06
550	792.89	60.99
551	794.43	60.89
552	795.96	60.71
553	797.50	60.49
554	799.04	60.27
555	800.58	60.05
556	802.11	59.84

Order	Station [ft]	Elevation [ft]
557	803.65	59.61
558	805.19	59.41
559	806.73	59.27
560	808.26	59.14
561	809.80	59.04
562	811.34	58.98
563	812.88	58.92
564	814.42	58.88
565	815.95	58.85
566	817.49	58.83
567	819.03	58.85
568	820.57	58.90
569	822.10	58.96
570	823.64	59.04
571	825.18	59.19
572	826.72	59.41
573	828.25	59.64
574	829.79	59.86
575	831.33	60.09
576	832.87	60.31
577	834.41	60.52
578	835.94	60.79
579	837.48	60.96
580	839.02	61.06
581	840.56	61.14
582	842.09	61.21
583	843.63	61.28
584	845.17	61.35
585	846.71	61.41
586	848.24	61.47
587	849.78	61.54
588	851.32	61.60
589	852.86	61.67
590	854.39	61.73
591	855.93	61.81
592	857.47	61.89
593	859.01	61.95
594	860.55	61.99
595	862.08	62.00
596	863.62	61.99
597	865.16	62.00
598	866.70	62.00
599	868.23	62.00
600	869.77	62.01
601	871.31	62.01
602	872.85	62.02
603	874.38	62.02
604	875.92	62.02
605	877.46	62.02

Order	Station [ft]	Elevation [ft]
606	879.00	62.02
607	880.54	62.02
608	882.07	62.03
609	883.61	62.02
610	885.15	62.02
611	886.69	62.02
612	888.22	62.02
613	889.76	62.02
614	891.30	62.02
615	892.84	62.02
616	894.37	62.02
617	895.91	62.02
618	897.45	62.02
619	898.99	62.02
620	900.52	62.01
621	902.06	62.01
622	903.60	62.01
623	905.14	62.01
624	906.68	62.01
625	908.21	62.01
626	909.75	62.01
627	911.29	62.01
628	912.83	62.01
629	914.36	62.01
630	915.90	62.02
631	917.44	62.02
632	918.98	62.02
633	920.51	62.02
634	922.05	62.02
635	923.59	62.02
636	925.13	62.02
637	926.67	62.02
638	928.20	62.02
639	929.74	62.02
640	931.28	62.02
641	932.82	62.02
642	934.35	62.02
643	935.89	62.02
644	937.43	62.03
645	938.97	62.03
646	940.50	62.03
647	942.04	62.03
648	943.58	62.03
649	945.12	62.03
650	946.65	62.03
651	948.19	62.03
652	949.73	62.03
653	951.27	62.03
654	952.81	62.04

Order	Station [ft]	Elevation [ft]
655	954.34	62.04
656	955.88	62.04
657	957.42	62.04
658	958.96	62.04
659	960.49	62.05
660	962.03	62.05
661	963.57	62.04
662	965.11	62.04
663	966.64	62.03
664	968.18	62.02
665	969.72	62.00
666	971.26	61.95
667	972.80	61.90
668	974.33	61.85
669	975.87	61.79
670	977.41	61.73
671	978.95	61.68
672	980.48	61.62
673	982.02	61.57
674	983.56	61.53
675	985.10	61.49
676	986.63	61.45
677	988.17	61.41
678	989.71	61.38
679	991.25	61.36
680	992.78	61.33
681	994.32	61.31
682	995.86	61.29
683	997.40	61.28
684	998.94	61.27
685	1000.47	61.26
686	1002.01	61.25
687	1003.55	61.24
688	1005.09	61.24
689	1006.62	61.24
690	1008.16	61.24
691	1009.70	61.24
692	1011.24	61.25
693	1012.77	61.26
694	1014.31	61.27
695	1015.85	61.28
696	1017.39	61.30
697	1018.93	61.32
698	1020.46	61.34
699	1022.00	61.36
700	1023.54	61.39
701	1025.08	61.42
702	1026.61	61.45
703	1028.15	61.49

Order	Station [ft]	Elevation [ft]
704	1029.69	61.53
705	1031.23	61.58
706	1032.76	61.63
707	1034.30	61.69
708	1035.84	61.75
709	1037.38	61.82
710	1038.91	61.89
711	1040.45	61.96
712	1041.99	62.00
713	1043.53	62.02
714	1045.07	62.03
715	1046.60	62.03
716	1048.14	62.03
717	1049.68	62.03
718	1051.22	62.03
719	1052.75	62.03
720	1054.29	62.03
721	1055.83	62.02
722	1057.37	62.02
723	1058.90	62.01
724	1060.44	62.01
725	1061.98	62.00
726	1063.52	61.99
727	1065.06	61.98
728	1066.59	61.96
729	1068.13	61.95
730	1069.67	61.93
731	1071.21	61.92
732	1072.74	61.90
733	1074.28	61.88
734	1075.82	61.86
735	1077.36	61.83
736	1078.89	61.81
737	1080.43	61.79
738	1081.97	61.77
739	1083.51	61.74
740	1085.04	61.72
741	1086.58	61.70
742	1088.12	61.68
743	1089.66	61.66
744	1091.20	61.65
745	1092.73	61.66
746	1094.27	61.67
747	1095.81	61.68
748	1097.35	61.69
749	1098.88	61.70
750	1100.42	61.72
751	1101.96	61.73
752	1103.50	61.74

Order	Station [ft]	Elevation [ft]
753	1105.03	61.76
754	1106.57	61.77
755	1108.11	61.78
756	1109.65	61.80
757	1111.19	61.81
758	1112.72	61.83
759	1114.26	61.84
760	1115.80	61.85
761	1117.34	61.85
762	1118.87	61.85
763	1120.41	61.85
764	1121.95	61.85
765	1123.49	61.85
766	1125.02	61.86
767	1126.56	61.87
768	1128.10	61.88

Comment:

Simulation: 100YR-24HR

Scenario: Post
Run Date/Time: 7/20/2020 10:48:20 AM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	30.00
	Hydrology [sec]	Surface Hydraulics [sec]		
Min Calculation Time:	60.0000	0.1000		
Max Calculation Time:		30.0000		

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
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Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: Basin Composite CN

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

Smp/Man Basin Rain Global
Opt:

Rainfall Name: ~SCSII-24

Rainfall Amount: 8.00 in

Storm Duration: 24.00 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 100YR-72HR

Scenario: Post

Run Date/Time: 7/20/2020 10:51:40 AM

Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00

End Time: 0 0 0 100.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: Basin Composite CN

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

Smp/Man Basin Rain Opt: Global

Rainfall Name: ~SFWMD-72
Rainfall Amount: 11.40 in
Storm Duration: 72.00 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 10YR-24HR

Scenario: Post
Run Date/Time: 7/20/2020 11:02:37 AM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	30.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: Basin Composite CN

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.00 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: ~SCSII-24
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 5.00 in
	Storm Duration: 24.00 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: 10YR-72HR

Scenario: Post
Run Date/Time: 7/20/2020 11:05:48 AM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	100.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00
0	0	0	60.00	0.60
0	0	0	65.00	15.00
0	0	0	100.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00
0	0	0	60.00	0.60
0	0	0	65.00	15.00
0	0	0	100.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: Basin Composite CN

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

Smp/Man Basin Rain Global
Opt:

Rainfall Name: ~SFWMD-72

Rainfall Amount: 7.50 in

Storm Duration: 72.00 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Simulation: 25YR-24HR

Scenario: Post

Run Date/Time: 7/20/2020 11:24:46 AM

Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	30.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: Basin Composite CN

 Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.00 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: ~SCSII-24
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 6.00 in
Edge Length Option: Automatic	Storm Duration: 24.00 hr

Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:

Simulation: 5YR-24HR

Scenario: Post
 Run Date/Time: 7/20/2020 11:28:20 AM
 Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	30.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		60.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set: Basin Composite CN
 Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.00 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	
Fact:	
dZ Tolerance: 0.0010 ft	Smp/Man Basin Rain Global
	Opt:
Max dZ: 1.0000 ft	Rainfall Name: ~SCSII-24
Link Optimizer Tol: 0.0001 ft	Rainfall Amount: 4.50 in
	Storm Duration: 24.00 hr
Edge Length Option: Automatic	
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: MEAN

Scenario: Post
 Run Date/Time: 7/20/2020 11:31:23 AM
 Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.00
End Time:	0	0	0	60.00

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.00	15.00

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: Basin Composite CN

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: Basin Composite DCIA

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight 0.5 dec

Fact:

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.00 hr

Smp/Man Basin Rain Global
Opt:

Rainfall Name: ~FLMOD

Rainfall Amount: 4.00 in

Storm Duration: 24.00 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area 100 ft2

(1D):

Energy Switch (1D): Energy

Comment:

Node Max Conditions [Post]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
BU-W11	100YR-24HR	60.50	57.69	0.0001	9.93	9.93	100
BU-W14	100YR-24HR	57.00	55.17	0.0031	92.93	97.72	100
BU-W4A,B	100YR-24HR	63.00	60.47	0.0010	94.98	94.98	100
GBS-001	100YR-24HR	54.50	54.00	0.0000	65.84	0.00	0
GBS-004	100YR-24HR	57.50	57.00	0.0000	88.75	0.00	0
LK TOHO	100YR-24HR	54.50	54.00	0.0000	158.95	0.00	0
MARINA	100YR-24HR	57.25	55.96	0.0002	46.24	10.19	69998
MH-8-14	100YR-24HR	67.00	64.16	0.0009	31.83	31.83	105
MH-8-9-10	100YR-24HR	65.00	63.67	0.0010	35.12	35.11	100
POND-7	100YR-24HR	62.00	59.21	0.0001	6.04	0.00	24516
SMA-1	100YR-24HR	58.25	56.89	0.0002	463.51	123.66	1371878
SMA-10	100YR-24HR	64.50	63.30	0.0005	185.81	94.98	259802
SMA-12	100YR-24HR	62.00	61.12	0.0005	380.03	205.30	450843
SMA-13	100YR-24HR	65.00	63.87	0.0005	322.42	147.84	386255
SMA-14	100YR-24HR	66.00	64.99	0.0004	148.75	31.82	235552
SMA-15	100YR-24HR	66.50	65.36	0.0004	240.30	44.90	380707
SMA-16	100YR-24HR	66.50	65.50	0.0004	63.72	7.35	109383
SMA-2	100YR-24HR	58.25	56.92	0.0003	73.27	28.52	116764
SMA-3	100YR-24HR	58.25	56.92	0.0002	106.95	11.20	305225
SMA-4A	100YR-24HR	62.00	61.11	0.0004	43.61	10.68	67855
SMA-4B	100YR-24HR	62.00	61.13	0.0004	36.44	5.31	70718
SMA-5	100YR-24HR	62.00	61.08	0.0005	170.40	42.39	228270
SMA-6	100YR-24HR	61.50	60.29	0.0004	160.11	68.67	196065
SMA-8	100YR-24HR	65.00	64.03	0.0006	142.54	27.29	142197
SMA-9	100YR-24HR	64.50	63.72	0.0005	51.53	10.88	56791
W-11	100YR-24HR	57.00	56.07	0.0001	61.55	10.80	364481
W-14	100YR-24HR	56.00	55.14	0.0001	99.81	94.83	759956
W-4	100YR-24HR	61.00	60.02	0.0001	169.23	87.15	1200943
WPA-001	100YR-24HR	54.50	54.00	0.0000	104.77	0.00	0
WPA-006	100YR-24HR	54.50	54.00	0.0000	18.84	0.00	0
BU-W11	100YR-72HR	60.50	57.70	0.0000	10.72	10.72	100
BU-W14	100YR-72HR	57.00	55.25	0.0030	154.49	163.10	100
BU-W4A,B	100YR-72HR	63.00	60.55	0.0010	122.00	122.00	100
GBS-001	100YR-72HR	54.50	54.00	0.0000	118.74	0.00	0
GBS-004	100YR-72HR	57.50	57.00	0.0000	167.42	0.00	0
LK TOHO	100YR-72HR	54.50	54.00	0.0000	144.75	0.00	0
MARINA	100YR-72HR	57.25	56.02	0.0002	35.82	10.34	70386
MH-8-14	100YR-72HR	67.00	65.04	0.0010	36.07	36.08	105
MH-8-9-10	100YR-72HR	65.00	64.39	0.0010	47.54	47.54	100
POND-7	100YR-72HR	62.00	59.77	0.0001	5.16	0.00	25958
SMA-1	100YR-72HR	58.25	57.65	0.0001	578.30	219.55	1410311
SMA-10	100YR-72HR	64.50	63.73	0.0001	184.16	122.00	267499
SMA-12	100YR-72HR	62.00	61.79	0.0002	460.14	244.39	472247
SMA-13	100YR-72HR	65.00	64.68	0.0002	338.52	153.95	407400
SMA-14	100YR-72HR	66.00	65.89	0.0002	136.39	36.06	254222
SMA-15	100YR-72HR	66.50	66.37	0.0002	222.91	51.55	410514

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
SMA-16	100YR-72HR	66.50	66.54	0.0002	56.18	9.44	122875
SMA-2	100YR-72HR	58.25	57.69	0.0001	64.86	21.19	124612
SMA-3	100YR-72HR	58.25	57.69	0.0001	101.39	15.12	319145
SMA-4A	100YR-72HR	62.00	61.89	0.0001	31.74	15.54	76750
SMA-4B	100YR-72HR	62.00	61.95	0.0001	29.41	7.67	79576
SMA-5	100YR-72HR	62.00	61.85	0.0002	155.85	57.13	244673
SMA-6	100YR-72HR	61.50	60.73	0.0002	168.97	107.52	202656
SMA-8	100YR-72HR	65.00	65.02	0.0002	125.60	36.10	154672
SMA-9	100YR-72HR	64.50	64.46	0.0002	44.34	13.13	64457
W-11	100YR-72HR	57.00	56.31	0.0001	57.58	21.98	393094
W-14	100YR-72HR	56.00	55.21	0.0001	166.45	157.66	765262
W-4	100YR-72HR	61.00	60.16	0.0000	232.39	164.38	1237283
WPA-001	100YR-72HR	54.50	54.00	0.0000	202.65	0.00	0
WPA-006	100YR-72HR	54.50	54.00	0.0000	19.50	0.00	0
BU-W11	10YR-24HR	60.50	57.66	0.0001	7.98	7.98	100
BU-W14	10YR-24HR	57.00	55.03	0.0030	32.29	41.76	100
BU-W4A,B	10YR-24HR	63.00	60.19	0.0010	24.62	24.61	100
GBS-001	10YR-24HR	54.50	54.00	0.0000	17.36	0.00	0
GBS-004	10YR-24HR	57.50	57.00	0.0000	24.51	0.00	0
LK TOHO	10YR-24HR	54.50	54.00	0.0000	94.18	0.00	0
MARINA	10YR-24HR	57.25	55.38	0.0002	28.47	7.64	66194
MH-8-14	10YR-24HR	67.00	63.16	0.0010	11.22	11.24	105
MH-8-9-10	10YR-24HR	65.00	62.77	0.0010	21.78	21.73	100
POND-7	10YR-24HR	62.00	58.71	0.0001	3.45	0.00	23292
SMA-1	10YR-24HR	58.25	55.80	0.0001	255.20	34.04	1341047
SMA-10	10YR-24HR	64.50	62.71	0.0002	113.65	24.60	253940
SMA-12	10YR-24HR	62.00	60.12	0.0002	217.19	57.98	435798
SMA-13	10YR-24HR	65.00	63.10	0.0002	193.12	44.58	377527
SMA-14	10YR-24HR	66.00	64.01	0.0002	87.55	11.21	227504
SMA-15	10YR-24HR	66.50	64.42	0.0002	141.47	14.95	368911
SMA-16	10YR-24HR	66.50	64.48	0.0002	37.90	2.52	104460
SMA-2	10YR-24HR	58.25	55.82	0.0001	43.36	20.65	111012
SMA-3	10YR-24HR	58.25	55.82	0.0001	63.98	5.48	294883
SMA-4A	10YR-24HR	62.00	60.08	0.0002	26.30	5.44	62644
SMA-4B	10YR-24HR	62.00	60.10	0.0002	21.15	1.74	65716
SMA-5	10YR-24HR	62.00	60.07	0.0002	101.11	17.50	218807
SMA-6	10YR-24HR	61.50	59.37	0.0002	93.04	22.68	188437
SMA-8	10YR-24HR	65.00	62.83	0.0003	84.01	16.20	132564
SMA-9	10YR-24HR	64.50	62.80	0.0002	30.56	7.34	51714
W-11	10YR-24HR	57.00	55.98	0.0001	33.31	7.08	352336
W-14	10YR-24HR	56.00	55.02	0.0000	48.89	23.89	750295
W-4	10YR-24HR	61.00	59.54	0.0000	69.47	23.74	1019751
WPA-001	10YR-24HR	54.50	54.00	0.0000	8.97	0.00	0
WPA-006	10YR-24HR	54.50	54.00	0.0000	10.54	0.00	0
BU-W11	10YR-72HR	60.50	57.69	0.0000	9.61	9.61	100
BU-W14	10YR-72HR	57.00	55.15	0.0031	82.01	88.24	100
BU-W4A,B	10YR-72HR	63.00	60.41	0.0010	76.67	76.67	100

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
GBS-001	10YR-72HR	54.50	54.00	0.0000	56.55	0.00	0
GBS-004	10YR-72HR	57.50	57.00	0.0000	62.16	0.00	0
LK TOHO	10YR-72HR	54.50	54.00	0.0000	94.08	0.00	0
MARINA	10YR-72HR	57.25	55.61	0.0002	23.44	9.17	67696
MH-8-14	10YR-72HR	67.00	63.90	0.0010	27.14	27.14	105
MH-8-9-10	10YR-72HR	65.00	63.44	0.0010	30.41	30.39	100
POND-7	10YR-72HR	62.00	59.13	0.0001	3.27	0.00	24299
SMA-1	10YR-72HR	58.25	56.75	0.0002	345.81	105.77	1368133
SMA-10	10YR-72HR	64.50	63.16	0.0003	116.55	76.67	258412
SMA-12	10YR-72HR	62.00	60.98	0.0004	279.37	189.86	446734
SMA-13	10YR-72HR	65.00	63.69	0.0003	207.00	136.35	384195
SMA-14	10YR-72HR	66.00	64.71	0.0003	87.99	27.13	233250
SMA-15	10YR-72HR	66.50	65.10	0.0003	140.63	41.90	377396
SMA-16	10YR-72HR	66.50	65.26	0.0003	36.38	6.66	108222
SMA-2	10YR-72HR	58.25	56.78	0.0002	41.91	15.80	116046
SMA-3	10YR-72HR	58.25	56.77	0.0002	61.14	7.10	303809
SMA-4A	10YR-72HR	62.00	60.86	0.0003	22.89	9.12	66036
SMA-4B	10YR-72HR	62.00	60.90	0.0003	20.35	4.61	68864
SMA-5	10YR-72HR	62.00	60.82	0.0003	100.88	35.82	225061
SMA-6	10YR-72HR	61.50	60.12	0.0003	105.04	57.02	194668
SMA-8	10YR-72HR	65.00	63.70	0.0004	81.05	23.37	138580
SMA-9	10YR-72HR	64.50	63.49	0.0004	28.68	7.32	54411
W-11	10YR-72HR	57.00	56.07	0.0001	39.02	10.70	364219
W-14	10YR-72HR	56.00	55.13	0.0001	90.43	82.95	758796
W-4	10YR-72HR	61.00	59.90	0.0001	131.94	60.99	1156431
WPA-001	10YR-72HR	54.50	54.00	0.0000	85.85	0.00	0
WPA-006	10YR-72HR	54.50	54.00	0.0000	12.20	0.00	0
BU-W11	25YR-24HR	60.50	57.67	0.0001	8.78	8.78	100
BU-W14	25YR-24HR	57.00	55.09	0.0027	47.81	56.95	100
BU-W4A,B	25YR-24HR	63.00	60.30	0.0010	49.45	49.45	100
GBS-001	25YR-24HR	54.50	54.00	0.0000	32.46	0.00	0
GBS-004	25YR-24HR	57.50	57.00	0.0000	41.42	0.00	0
LK TOHO	25YR-24HR	54.50	54.00	0.0000	117.21	0.00	0
MARINA	25YR-24HR	57.25	55.56	0.0003	34.40	8.95	67359
MH-8-14	25YR-24HR	67.00	63.51	0.0010	19.29	19.29	105
MH-8-9-10	25YR-24HR	65.00	63.05	0.0010	24.49	24.43	100
POND-7	25YR-24HR	62.00	58.88	0.0001	4.31	0.00	23680
SMA-1	25YR-24HR	58.25	56.25	0.0001	311.61	54.91	1353760
SMA-10	25YR-24HR	64.50	62.95	0.0003	137.99	49.45	256299
SMA-12	25YR-24HR	62.00	60.50	0.0003	266.44	107.53	440572
SMA-13	25YR-24HR	65.00	63.38	0.0003	236.43	86.60	380766
SMA-14	25YR-24HR	66.00	64.30	0.0003	108.01	19.29	229896
SMA-15	25YR-24HR	66.50	64.67	0.0002	174.42	32.12	371983
SMA-16	25YR-24HR	66.50	64.76	0.0002	46.53	4.48	105814
SMA-2	25YR-24HR	58.25	56.27	0.0001	53.36	23.64	113381
SMA-3	25YR-24HR	58.25	56.27	0.0001	78.35	8.07	299004
SMA-4A	25YR-24HR	62.00	60.40	0.0003	32.45	6.03	64039

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
SMA-4B	25YR-24HR	62.00	60.42	0.0002	26.29	3.10	66983
SMA-5	25YR-24HR	62.00	60.38	0.0002	124.27	26.62	221421
SMA-6	25YR-24HR	61.50	59.71	0.0003	115.43	37.45	191229
SMA-8	25YR-24HR	65.00	63.15	0.0003	103.58	19.54	134392
SMA-9	25YR-24HR	64.50	63.09	0.0003	37.58	8.68	52829
W-11	25YR-24HR	57.00	56.02	0.0001	41.05	8.62	358460
W-14	25YR-24HR	56.00	55.08	0.0000	58.76	48.13	754803
W-4	25YR-24HR	61.00	59.74	0.0001	87.11	40.44	1095405
WPA-001	25YR-24HR	54.50	54.00	0.0000	34.15	0.00	0
WPA-006	25YR-24HR	54.50	54.00	0.0000	13.27	0.00	0
BU-W11	5YR-24HR	60.50	57.65	0.0001	7.14	7.14	100
BU-W14	5YR-24HR	57.00	54.73	0.0029	23.06	29.07	100
BU-W4A,B	5YR-24HR	63.00	60.13	0.0010	13.67	13.67	100
GBS-001	5YR-24HR	54.50	54.00	0.0000	11.31	0.00	0
GBS-004	5YR-24HR	57.50	57.00	0.0000	20.04	0.00	0
LK TOHO	5YR-24HR	54.50	54.00	0.0000	83.15	0.00	0
MARINA	5YR-24HR	57.25	55.31	0.0005	25.50	5.80	65736
MH-8-14	5YR-24HR	67.00	63.00	0.0010	7.02	7.02	105
MH-8-9-10	5YR-24HR	65.00	62.63	0.0010	20.32	20.28	100
POND-7	5YR-24HR	62.00	58.63	0.0001	3.02	0.00	23099
SMA-1	5YR-24HR	58.25	55.59	0.0001	226.51	24.57	1335253
SMA-10	5YR-24HR	64.50	62.58	0.0003	101.38	13.67	252574
SMA-12	5YR-24HR	62.00	59.94	0.0004	192.52	36.59	433556
SMA-13	5YR-24HR	65.00	62.95	0.0004	171.41	27.06	375895
SMA-14	5YR-24HR	66.00	63.87	0.0003	77.31	6.99	226336
SMA-15	5YR-24HR	66.50	64.30	0.0003	125.02	8.03	367388
SMA-16	5YR-24HR	66.50	64.36	0.0003	33.57	1.51	103837
SMA-2	5YR-24HR	58.25	55.61	0.0002	38.36	18.72	109935
SMA-3	5YR-24HR	58.25	55.61	0.0002	56.78	4.23	292997
SMA-4A	5YR-24HR	62.00	59.93	0.0003	23.17	5.01	61984
SMA-4B	5YR-24HR	62.00	59.95	0.0003	18.60	1.11	65120
SMA-5	5YR-24HR	62.00	59.92	0.0003	89.52	12.22	217563
SMA-6	5YR-24HR	61.50	59.19	0.0004	81.85	15.80	186941
SMA-8	5YR-24HR	65.00	62.67	0.0004	74.20	15.09	131690
SMA-9	5YR-24HR	64.50	62.65	0.0004	27.05	6.81	51126
W-11	5YR-24HR	57.00	55.93	0.0002	29.46	5.32	343083
W-14	5YR-24HR	56.00	54.72	0.0001	43.92	15.56	704568
W-4	5YR-24HR	61.00	59.43	0.0001	60.79	17.10	947912
WPA-001	5YR-24HR	54.50	54.00	0.0000	3.22	0.00	0
WPA-006	5YR-24HR	54.50	54.00	0.0000	9.20	0.00	0
BU-W11	MEAN	60.50	57.60	0.0000	4.01	4.01	100
BU-W14	MEAN	57.00	54.39	0.0033	15.96	19.24	100
BU-W4A,B	MEAN	63.00	60.08	0.0010	6.96	6.95	100
GBS-001	MEAN	54.50	54.00	0.0000	6.89	0.00	0
GBS-004	MEAN	57.50	57.00	0.0000	12.54	0.00	0
LK TOHO	MEAN	54.50	54.00	0.0000	56.81	0.00	0
MARINA	MEAN	57.25	55.22	0.0003	16.40	3.61	65165

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
MH-8-14	MEAN	67.00	62.85	0.0009	3.68	3.67	105
MH-8-9-10	MEAN	65.00	62.47	0.0010	15.72	15.69	100
POND-7	MEAN	62.00	58.54	0.0001	1.93	0.00	22907
SMA-1	MEAN	58.25	55.39	0.0001	158.84	16.54	1329667
SMA-10	MEAN	64.50	62.43	0.0002	73.65	6.93	251161
SMA-12	MEAN	62.00	59.77	0.0003	129.61	19.77	431434
SMA-13	MEAN	65.00	62.81	0.0003	117.80	13.16	374342
SMA-14	MEAN	66.00	63.72	0.0002	55.01	3.63	225209
SMA-15	MEAN	66.50	64.22	0.0002	87.73	4.38	366368
SMA-16	MEAN	66.50	64.27	0.0002	23.10	0.84	103358
SMA-2	MEAN	58.25	55.41	0.0001	26.34	13.29	108869
SMA-3	MEAN	58.25	55.39	0.0001	38.93	2.31	290958
SMA-4A	MEAN	62.00	59.78	0.0002	17.47	4.23	61324
SMA-4B	MEAN	62.00	59.81	0.0002	13.39	0.62	64505
SMA-5	MEAN	62.00	59.75	0.0002	64.18	9.50	216214
SMA-6	MEAN	61.50	59.05	0.0003	54.89	8.78	185765
SMA-8	MEAN	65.00	62.51	0.0003	50.56	11.80	130773
SMA-9	MEAN	64.50	62.49	0.0003	18.13	4.72	50509
W-11	MEAN	57.00	55.86	0.0001	19.22	3.20	330469
W-14	MEAN	56.00	54.38	0.0000	29.61	11.37	648022
W-4	MEAN	61.00	59.32	0.0000	45.06	11.20	853236
WPA-001	MEAN	54.50	54.00	0.0000	2.25	0.00	0
WPA-006	MEAN	54.50	54.00	0.0000	7.09	0.00	0

Link Min/Max Conditions [Post]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
BU-W11	100YR-24HR	9.93	0.00	0.01	1.31	1.31	1.31
BU-W14	100YR-24HR	97.72	0.00	-20.59	0.85	0.85	0.85
BU-W4A,B	100YR-24HR	94.98	0.00	-0.25	2.05	2.05	2.05
CS-10A - Pipe	100YR-24HR	51.15	0.00	-0.49	5.32	5.32	5.32
CS-10A - Weir: 1	100YR-24HR	2.00	0.00	0.00	7.21	7.21	7.21
CS-10A - Weir: 2	100YR-24HR	49.88	0.00	0.02	3.27	3.27	3.27
CS-10A - Weir: 3	100YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	100YR-24HR	43.83	-0.02	-0.03	4.56	4.56	4.56
CS-10B - Weir: 1	100YR-24HR	43.83	0.00	0.01	2.86	2.86	2.86
CS-12A - Pipe	100YR-24HR	81.03	0.00	0.08	6.45	6.45	6.45
CS-12A - Weir: 1	100YR-24HR	2.36	0.00	0.00	8.50	8.50	8.50
CS-12A - Weir: 2	100YR-24HR	41.87	0.00	0.03	5.58	5.58	5.58
CS-12A - Weir: 3	100YR-24HR	36.82	0.00	0.01	2.52	2.52	2.52
CS-12B - Pipe	100YR-24HR	126.92	-0.02	0.08	10.10	10.10	10.10
CS-12B - Weir: 1	100YR-24HR	126.96	0.00	0.05	4.84	4.84	4.84
CS-13A - Pipe	100YR-24HR	74.06	0.00	0.05	7.70	7.70	7.70
CS-13A - Weir: 1	100YR-24HR	1.68	0.00	0.00	7.39	7.39	7.39
CS-13A - Weir: 2	100YR-24HR	73.19	0.00	0.04	3.31	3.31	3.31
CS-13B - Pipe	100YR-24HR	73.77	-0.08	0.06	7.67	7.67	7.67
CS-13B - Weir: 1	100YR-24HR	73.77	0.00	0.04	3.33	3.33	3.33
CS-14 - Pipe	100YR-24HR	31.83	0.00	-0.25	3.31	3.31	3.31
CS-14 - Weir: 1	100YR-24HR	0.60	0.00	0.00	4.36	4.36	4.36
CS-14 - Weir: 2	100YR-24HR	23.76	0.00	0.01	3.17	3.17	3.17
CS-14 - Weir: 3	100YR-24HR	17.67	0.00	0.01	1.69	1.69	1.69
CS-15 - Pipe	100YR-24HR	44.90	0.00	0.04	3.57	3.57	3.57
CS-15 - Weir: 1	100YR-24HR	1.13	0.00	0.00	5.73	5.73	5.73
CS-15 - Weir: 2	100YR-24HR	44.55	0.00	0.02	2.41	2.41	2.41
CS-1A - Pipe	100YR-24HR	92.93	0.00	5.31	4.73	4.73	4.73
CS-1A - Weir: 1	100YR-24HR	3.93	0.00	0.00	6.09	6.09	6.09
CS-1A - Weir: 2	100YR-24HR	55.43	0.00	0.01	5.54	5.54	5.54
CS-1A - Weir: 3	100YR-24HR	38.08	0.00	0.00	2.55	2.55	2.55
CS-1B - Pipe	100YR-24HR	29.54	0.00	-0.04	4.18	4.18	4.18

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-1B - Weir: 1	100YR-24HR	6.34	0.00	0.00	6.34	6.34	6.34
CS-1B - Weir: 2	100YR-24HR	23.21	0.00	0.00	2.55	2.55	2.55
CS-5 - Pipe	100YR-24HR	42.39	0.00	0.06	3.37	3.37	3.37
CS-5 - Weir: 1	100YR-24HR	0.78	0.00	0.00	3.97	3.97	3.97
CS-5 - Weir: 2	100YR-24HR	28.03	0.00	0.01	3.07	3.07	3.07
CS-5 - Weir: 3	100YR-24HR	23.49	0.00	0.01	1.79	1.79	1.79
CS-6A - Pipe	100YR-24HR	58.73	0.00	0.08	4.67	4.67	4.67
CS-6A - Weir: 1	100YR-24HR	1.11	0.00	0.00	8.04	8.04	8.04
CS-6A - Weir: 2	100YR-24HR	47.93	0.00	0.02	4.79	4.79	4.79
CS-6A - Weir: 3	100YR-24HR	9.69	0.00	0.00	1.73	1.73	1.73
CS-6B - Pipe	100YR-24HR	9.93	0.00	0.01	5.62	5.62	5.62
CS-6B - Weir: 1	100YR-24HR	9.93	0.00	0.01	1.96	1.96	1.96
CS-8 - Pipe	100YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	100YR-24HR	1.88	-0.01	-0.03	1.24	1.24	1.24
CS-MARINA - Pipe	100YR-24HR	10.19	0.00	0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	100YR-24HR	10.12	0.00	0.01	1.95	1.95	1.95
CS-MARINA - Weir: 2	100YR-24HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	100YR-24HR	10.80	0.00	0.05	3.44	3.44	3.44
CS-W11 - Weir: 1	100YR-24HR	10.80	0.00	0.00	1.95	1.95	1.95
P-1-2	100YR-24HR	4.09	-28.52	-0.03	-2.27	-2.27	-2.27
P-1-3	100YR-24HR	24.08	-11.20	-0.05	1.92	1.92	1.92
P-16-15	100YR-24HR	7.35	-1.27	0.00	1.50	1.50	1.50
P-4A-4B	100YR-24HR	6.56	-5.31	-0.02	2.09	2.09	2.09
P-5-4	100YR-24HR	18.59	-10.68	-0.05	1.48	1.48	1.48
P-8-14-13	100YR-24HR	31.83	0.00	0.13	3.31	3.31	3.31
P-8-9-10	100YR-24HR	35.11	0.00	1.01	2.79	2.79	2.79
P-8-MH	100YR-24HR	27.29	0.00	-0.77	2.17	2.17	2.17
P-9-MH	100YR-24HR	10.88	0.00	0.72	1.13	1.13	1.13
P-W14-TOHO	100YR-24HR	19.58	0.00	0.05	3.99	5.86	4.92
W-W14-WPA001	100YR-24HR	75.26	0.00	0.02	1.03	1.03	1.03
W-W4-GBS004	100YR-24HR	87.15	0.00	0.01	2.30	2.30	2.30

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
BU-W11	100YR-72HR	10.72	0.00	0.00	1.34	1.34	1.34
BU-W14	100YR-72HR	163.10	0.00	-19.95	1.05	1.05	1.05
BU-W4A,B	100YR-72HR	122.00	0.00	0.33	2.23	2.23	2.23
CS-10A - Pipe	100YR-72HR	60.97	0.00	-1.03	6.34	6.34	6.34
CS-10A - Weir: 1	100YR-72HR	2.00	0.00	0.00	7.21	7.21	7.21
CS-10A - Weir: 2	100YR-72HR	56.23	0.00	0.01	3.43	3.43	3.43
CS-10A - Weir: 3	100YR-72HR	8.03	0.00	0.00	1.52	1.52	1.52
CS-10B - Pipe	100YR-72HR	61.03	0.00	-0.03	6.34	6.34	6.34
CS-10B - Weir: 1	100YR-72HR	61.03	0.00	0.02	3.09	3.09	3.09
CS-12A - Pipe	100YR-72HR	123.49	0.00	-1.02	9.83	9.83	9.83
CS-12A - Weir: 1	100YR-72HR	2.35	0.00	0.00	8.49	8.49	8.49
CS-12A - Weir: 2	100YR-72HR	45.95	0.00	0.01	6.13	6.13	6.13
CS-12A - Weir: 3	100YR-72HR	92.31	0.00	-0.03	3.30	3.30	3.30
CS-12B - Pipe	100YR-72HR	122.27	0.00	0.49	9.73	9.73	9.73
CS-12B - Weir: 1	100YR-72HR	122.30	0.00	0.04	4.66	4.66	4.66
CS-13A - Pipe	100YR-72HR	77.08	0.00	-0.22	8.01	8.01	8.01
CS-13A - Weir: 1	100YR-72HR	1.66	0.00	0.00	7.33	7.33	7.33
CS-13A - Weir: 2	100YR-72HR	76.20	0.00	0.02	3.86	3.86	3.86
CS-13B - Pipe	100YR-72HR	76.89	0.00	0.06	7.99	7.99	7.99
CS-13B - Weir: 1	100YR-72HR	76.88	0.00	0.03	3.89	3.89	3.89
CS-14 - Pipe	100YR-72HR	36.07	0.00	-0.17	3.75	3.75	3.75
CS-14 - Weir: 1	100YR-72HR	0.60	0.00	0.00	4.35	4.35	4.35
CS-14 - Weir: 2	100YR-72HR	23.66	0.00	-0.01	3.16	3.16	3.16
CS-14 - Weir: 3	100YR-72HR	26.41	0.00	0.01	1.70	1.70	1.70
CS-15 - Pipe	100YR-72HR	51.56	0.00	0.03	4.10	4.10	4.10
CS-15 - Weir: 1	100YR-72HR	1.13	0.00	0.00	5.76	5.76	5.76
CS-15 - Weir: 2	100YR-72HR	51.17	0.00	0.01	2.43	2.43	2.43
CS-1A - Pipe	100YR-72HR	154.49	0.00	-4.55	7.87	7.87	7.87
CS-1A - Weir: 1	100YR-72HR	3.71	0.00	0.00	5.74	5.74	5.74
CS-1A - Weir: 2	100YR-72HR	55.82	0.00	0.01	5.58	5.58	5.58
CS-1A - Weir: 3	100YR-72HR	108.45	0.00	-0.04	3.30	3.30	3.30
CS-1B - Pipe	100YR-72HR	65.12	0.00	0.04	9.21	9.21	9.21
CS-1B - Weir: 1	100YR-72HR	6.73	0.00	0.00	6.73	6.73	6.73

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-1B - Weir: 2	100YR-72HR	60.32	0.00	0.02	4.80	4.80	4.80
CS-5 - Pipe	100YR-72HR	57.13	0.00	0.07	4.55	4.55	4.55
CS-5 - Weir: 1	100YR-72HR	0.78	0.00	0.00	3.96	3.96	3.96
CS-5 - Weir: 2	100YR-72HR	28.23	0.00	-0.01	3.09	3.09	3.09
CS-5 - Weir: 3	100YR-72HR	42.15	0.00	0.01	1.82	1.82	1.82
CS-6A - Pipe	100YR-72HR	96.81	0.00	0.06	7.70	7.70	7.70
CS-6A - Weir: 1	100YR-72HR	1.20	0.00	0.00	8.65	8.65	8.65
CS-6A - Weir: 2	100YR-72HR	57.51	0.00	0.01	5.75	5.75	5.75
CS-6A - Weir: 3	100YR-72HR	38.10	0.00	0.01	2.73	2.73	2.73
CS-6B - Pipe	100YR-72HR	10.72	0.00	0.00	6.06	6.06	6.06
CS-6B - Weir: 1	100YR-72HR	10.72	0.00	0.00	1.90	1.90	1.90
CS-8 - Pipe	100YR-72HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	100YR-72HR	0.20	-0.02	0.00	0.01	0.01	0.01
CS-MARINA - Pipe	100YR-72HR	10.34	0.00	0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	100YR-72HR	10.28	0.00	-0.01	1.95	1.95	1.95
CS-MARINA - Weir: 2	100YR-72HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	100YR-72HR	21.98	0.00	-0.11	7.00	7.00	7.00
CS-W11 - Weir: 1	100YR-72HR	21.98	0.00	0.01	2.44	2.44	2.44
P-1-2	100YR-72HR	0.00	-21.19	-0.04	-1.69	-1.69	-1.69
P-1-3	100YR-72HR	17.89	-15.12	-0.05	1.42	1.42	1.42
P-16-15	100YR-72HR	9.44	0.00	0.00	1.92	1.92	1.92
P-4A-4B	100YR-72HR	3.33	-7.67	-0.01	-2.44	-2.44	-2.44
P-5-4	100YR-72HR	9.25	-15.54	-0.05	-1.24	-1.24	-1.24
P-8-14-13	100YR-72HR	36.08	0.00	0.12	3.75	3.75	3.75
P-8-9-10	100YR-72HR	47.54	0.00	-0.38	3.78	3.78	3.78
P-8-MH	100YR-72HR	36.10	0.00	0.31	2.87	2.87	2.87
P-9-MH	100YR-72HR	13.13	0.00	0.15	1.36	1.36	1.36
P-W14-TOHO	100YR-72HR	20.13	0.00	0.05	4.10	6.02	5.06
W-W14-WPA001	100YR-72HR	137.53	0.00	0.02	1.25	1.25	1.25
W-W4-GBS004	100YR-72HR	164.38	0.00	0.01	2.30	2.30	2.30
BU-W11	10YR-24HR	7.98	0.00	0.00	1.22	1.22	1.22

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
BU-W14	10YR-24HR	41.76	0.00	22.87	0.64	0.64	0.64
BU-W4A,B	10YR-24HR	24.61	0.00	0.21	1.31	1.31	1.31
CS-10A - Pipe	10YR-24HR	18.51	0.00	-0.61	1.92	1.92	1.92
CS-10A - Weir: 1	10YR-24HR	1.98	0.00	0.00	7.16	7.16	7.16
CS-10A - Weir: 2	10YR-24HR	16.53	0.00	0.01	2.30	2.30	2.30
CS-10A - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	10YR-24HR	6.11	-0.01	-0.07	0.63	0.63	0.63
CS-10B - Weir: 1	10YR-24HR	6.09	0.00	0.00	1.48	1.48	1.48
CS-12A - Pipe	10YR-24HR	21.42	0.00	-0.08	1.70	1.70	1.70
CS-12A - Weir: 1	10YR-24HR	1.94	0.00	0.00	7.00	7.00	7.00
CS-12A - Weir: 2	10YR-24HR	19.48	0.00	0.01	2.71	2.71	2.71
CS-12A - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-12B - Pipe	10YR-24HR	36.55	-0.02	-0.05	2.91	2.91	2.91
CS-12B - Weir: 1	10YR-24HR	36.56	0.00	0.01	2.52	2.52	2.52
CS-13A - Pipe	10YR-24HR	23.08	0.00	0.13	2.40	2.40	2.40
CS-13A - Weir: 1	10YR-24HR	1.58	0.00	0.00	6.97	6.97	6.97
CS-13A - Weir: 2	10YR-24HR	21.50	0.00	0.01	2.26	2.26	2.26
CS-13B - Pipe	10YR-24HR	21.50	-0.05	0.05	2.23	2.23	2.23
CS-13B - Weir: 1	10YR-24HR	21.50	0.00	0.01	2.26	2.26	2.26
CS-14 - Pipe	10YR-24HR	11.22	0.00	-0.18	1.17	1.17	1.17
CS-14 - Weir: 1	10YR-24HR	0.61	0.00	0.00	4.37	4.37	4.37
CS-14 - Weir: 2	10YR-24HR	10.63	0.00	0.00	2.30	2.30	2.30
CS-14 - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-15 - Pipe	10YR-24HR	14.95	0.00	0.03	1.19	1.19	1.19
CS-15 - Weir: 1	10YR-24HR	1.13	0.00	0.00	5.74	5.74	5.74
CS-15 - Weir: 2	10YR-24HR	13.93	0.00	0.01	1.82	1.82	1.82
CS-1A - Pipe	10YR-24HR	32.29	0.00	4.83	1.64	1.64	1.64
CS-1A - Weir: 1	10YR-24HR	3.37	0.00	0.00	5.22	5.22	5.22
CS-1A - Weir: 2	10YR-24HR	27.16	0.00	-0.01	3.03	3.03	3.03
CS-1A - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-1B - Pipe	10YR-24HR	3.89	0.00	-0.12	0.55	0.55	0.55
CS-1B - Weir: 1	10YR-24HR	3.87	0.00	0.00	3.87	3.87	3.87
CS-1B - Weir: 2	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-5 - Pipe	10YR-24HR	15.81	0.00	0.05	1.26	1.26	1.26
CS-5 - Weir: 1	10YR-24HR	0.78	0.00	0.00	3.96	3.96	3.96
CS-5 - Weir: 2	10YR-24HR	15.07	0.00	0.00	2.41	2.41	2.41
CS-5 - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6A - Pipe	10YR-24HR	14.74	0.00	0.06	1.17	1.17	1.17
CS-6A - Weir: 1	10YR-24HR	0.91	0.00	0.00	6.58	6.58	6.58
CS-6A - Weir: 2	10YR-24HR	13.79	0.00	0.00	2.42	2.42	2.42
CS-6A - Weir: 3	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6B - Pipe	10YR-24HR	7.98	0.00	-0.01	4.51	4.51	4.51
CS-6B - Weir: 1	10YR-24HR	7.98	0.00	0.00	1.91	1.91	1.91
CS-8 - Pipe	10YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	10YR-24HR	0.77	0.00	-0.01	0.92	0.92	0.92
CS-MARINA - Pipe	10YR-24HR	7.64	0.00	-0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	10YR-24HR	7.53	0.00	-0.01	1.95	1.95	1.95
CS-MARINA - Weir: 2	10YR-24HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	10YR-24HR	7.08	0.00	-0.06	2.25	2.25	2.25
CS-W11 - Weir: 1	10YR-24HR	7.08	0.00	0.00	1.69	1.69	1.69
P-1-2	10YR-24HR	0.69	-20.65	-0.02	-1.64	-1.64	-1.64
P-1-3	10YR-24HR	7.92	-5.48	-0.02	0.63	0.63	0.63
P-16-15	10YR-24HR	2.52	-2.07	0.01	0.51	0.51	0.51
P-4A-4B	10YR-24HR	5.44	-1.74	-0.01	1.73	1.73	1.73
P-5-4	10YR-24HR	13.02	-3.38	-0.02	1.04	1.04	1.04
P-8-14-13	10YR-24HR	11.24	0.00	-0.11	1.17	1.17	1.17
P-8-9-10	10YR-24HR	21.73	0.00	-1.01	1.73	1.73	1.73
P-8-MH	10YR-24HR	16.20	0.00	0.76	1.29	1.29	1.29
P-9-MH	10YR-24HR	7.34	0.00	0.58	0.76	0.76	0.76
P-W14-TOHO	10YR-24HR	18.53	0.00	0.05	3.77	5.54	4.66
W-W14-WPA001	10YR-24HR	5.37	0.00	0.00	0.55	0.55	0.55
W-W4-GBS004	10YR-24HR	23.74	0.00	0.00	2.09	2.09	2.09
BU-W11	10YR-72HR	9.61	0.00	0.00	1.29	1.29	1.29
BU-W14	10YR-72HR	88.24	0.00	-17.49	0.97	0.97	0.97

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
BU-W4A,B	10YR-72HR	76.67	0.00	0.26	1.91	1.91	1.91
CS-10A - Pipe	10YR-72HR	43.74	0.00	-0.79	4.55	4.55	4.55
CS-10A - Weir: 1	10YR-72HR	2.00	0.00	0.00	7.21	7.21	7.21
CS-10A - Weir: 2	10YR-72HR	42.19	0.00	0.02	3.14	3.14	3.14
CS-10A - Weir: 3	10YR-72HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	10YR-72HR	32.93	-0.01	0.03	3.42	3.42	3.42
CS-10B - Weir: 1	10YR-72HR	32.93	0.00	0.01	2.60	2.60	2.60
CS-12A - Pipe	10YR-72HR	67.29	0.00	-0.32	5.35	5.35	5.35
CS-12A - Weir: 1	10YR-72HR	2.30	0.00	0.00	8.31	8.31	8.31
CS-12A - Weir: 2	10YR-72HR	39.68	0.00	0.02	5.29	5.29	5.29
CS-12A - Weir: 3	10YR-72HR	25.32	0.00	0.01	2.23	2.23	2.23
CS-12B - Pipe	10YR-72HR	123.06	0.00	0.23	9.79	9.79	9.79
CS-12B - Weir: 1	10YR-72HR	123.08	0.00	0.05	3.73	3.73	3.73
CS-13A - Pipe	10YR-72HR	68.45	0.00	0.15	7.11	7.11	7.11
CS-13A - Weir: 1	10YR-72HR	1.66	0.00	0.00	7.33	7.33	7.33
CS-13A - Weir: 2	10YR-72HR	67.41	0.00	0.03	3.28	3.28	3.28
CS-13B - Pipe	10YR-72HR	67.88	0.00	-0.13	7.06	7.06	7.06
CS-13B - Weir: 1	10YR-72HR	67.89	0.00	0.03	3.29	3.29	3.29
CS-14 - Pipe	10YR-72HR	27.14	0.00	0.14	2.82	2.82	2.82
CS-14 - Weir: 1	10YR-72HR	0.61	0.00	0.00	4.37	4.37	4.37
CS-14 - Weir: 2	10YR-72HR	23.73	0.00	0.01	3.17	3.17	3.17
CS-14 - Weir: 3	10YR-72HR	7.18	0.00	0.00	1.46	1.46	1.46
CS-15 - Pipe	10YR-72HR	41.91	0.00	0.03	3.33	3.33	3.33
CS-15 - Weir: 1	10YR-72HR	1.13	0.00	0.00	5.75	5.75	5.75
CS-15 - Weir: 2	10YR-72HR	41.51	0.00	0.02	2.40	2.40	2.40
CS-1A - Pipe	10YR-72HR	82.01	0.00	4.37	4.18	4.18	4.18
CS-1A - Weir: 1	10YR-72HR	3.97	0.00	0.00	6.14	6.14	6.14
CS-1A - Weir: 2	10YR-72HR	54.50	0.00	0.01	5.45	5.45	5.45
CS-1A - Weir: 3	10YR-72HR	26.83	0.00	0.00	2.27	2.27	2.27
CS-1B - Pipe	10YR-72HR	22.44	0.00	-0.05	3.18	3.18	3.18
CS-1B - Weir: 1	10YR-72HR	6.09	0.00	0.00	6.09	6.09	6.09
CS-1B - Weir: 2	10YR-72HR	16.35	0.00	0.00	2.27	2.27	2.27
CS-5 - Pipe	10YR-72HR	35.82	0.00	0.05	2.85	2.85	2.85

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-5 - Weir: 1	10YR-72HR	0.78	0.00	0.00	3.97	3.97	3.97
CS-5 - Weir: 2	10YR-72HR	28.04	0.00	0.01	3.07	3.07	3.07
CS-5 - Weir: 3	10YR-72HR	13.16	0.00	0.01	1.74	1.74	1.74
CS-6A - Pipe	10YR-72HR	47.41	0.00	0.08	3.77	3.77	3.77
CS-6A - Weir: 1	10YR-72HR	1.08	0.00	0.00	7.79	7.79	7.79
CS-6A - Weir: 2	10YR-72HR	43.67	0.00	0.02	4.37	4.37	4.37
CS-6A - Weir: 3	10YR-72HR	2.66	0.00	0.00	1.12	1.12	1.12
CS-6B - Pipe	10YR-72HR	9.61	0.00	0.00	5.44	5.44	5.44
CS-6B - Weir: 1	10YR-72HR	9.61	0.00	0.00	1.91	1.91	1.91
CS-8 - Pipe	10YR-72HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	10YR-72HR	0.43	-0.01	-0.01	0.75	0.75	0.75
CS-MARINA - Pipe	10YR-72HR	9.17	0.00	0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	10YR-72HR	9.10	0.00	0.01	1.95	1.95	1.95
CS-MARINA - Weir: 2	10YR-72HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	10YR-72HR	10.70	0.00	-0.13	3.41	3.41	3.41
CS-W11 - Weir: 1	10YR-72HR	10.70	0.00	0.00	1.94	1.94	1.94
P-1-2	10YR-72HR	3.47	-15.80	-0.03	-1.26	-1.26	-1.26
P-1-3	10YR-72HR	21.78	-7.10	-0.03	1.73	1.73	1.73
P-16-15	10YR-72HR	6.66	-0.10	-0.01	1.36	1.36	1.36
P-4A-4B	10YR-72HR	3.44	-4.61	-0.01	-1.47	-1.47	-1.47
P-5-4	10YR-72HR	8.05	-9.12	-0.04	-0.73	-0.73	-0.73
P-8-14-13	10YR-72HR	27.14	0.00	0.07	2.82	2.82	2.82
P-8-9-10	10YR-72HR	30.39	0.00	0.77	2.42	2.42	2.42
P-8-MH	10YR-72HR	23.37	0.00	0.68	1.86	1.86	1.86
P-9-MH	10YR-72HR	7.32	0.00	0.88	0.76	0.76	0.76
P-W14-TOHO	10YR-72HR	19.45	0.00	0.04	3.96	5.82	4.89
W-W14-WPA001	10YR-72HR	63.50	0.00	0.02	0.98	0.98	0.98
W-W4-GBS004	10YR-72HR	60.99	0.00	0.01	2.30	2.30	2.30
BU-W11	25YR-24HR	8.78	0.00	0.00	1.25	1.25	1.25
BU-W14	25YR-24HR	56.95	0.00	-18.60	0.75	0.75	0.75
BU-W4A,B	25YR-24HR	49.45	0.00	-0.20	1.65	1.65	1.65

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-10A - Pipe	25YR-24HR	30.95	0.00	0.42	3.22	3.22	3.22
CS-10A - Weir: 1	25YR-24HR	2.00	0.00	0.00	7.21	7.21	7.21
CS-10A - Weir: 2	25YR-24HR	29.09	0.00	0.01	2.77	2.77	2.77
CS-10A - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	25YR-24HR	18.50	-0.01	-0.04	1.92	1.92	1.92
CS-10B - Weir: 1	25YR-24HR	18.50	0.00	0.01	2.15	2.15	2.15
CS-12A - Pipe	25YR-24HR	32.75	0.00	0.06	2.61	2.61	2.61
CS-12A - Weir: 1	25YR-24HR	2.11	0.00	0.00	7.60	7.60	7.60
CS-12A - Weir: 2	25YR-24HR	30.65	0.00	0.01	4.09	4.09	4.09
CS-12A - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-12B - Pipe	25YR-24HR	74.76	-0.02	0.07	5.95	5.95	5.95
CS-12B - Weir: 1	25YR-24HR	74.77	0.00	0.02	3.19	3.19	3.19
CS-13A - Pipe	25YR-24HR	44.10	0.00	0.04	4.58	4.58	4.58
CS-13A - Weir: 1	25YR-24HR	1.67	0.00	0.00	7.35	7.35	7.35
CS-13A - Weir: 2	25YR-24HR	42.50	0.00	0.01	2.83	2.83	2.83
CS-13B - Pipe	25YR-24HR	42.50	-0.06	0.04	4.42	4.42	4.42
CS-13B - Weir: 1	25YR-24HR	42.50	0.00	0.01	2.83	2.83	2.83
CS-14 - Pipe	25YR-24HR	19.29	0.00	0.25	2.00	2.00	2.00
CS-14 - Weir: 1	25YR-24HR	0.61	0.00	0.00	4.37	4.37	4.37
CS-14 - Weir: 2	25YR-24HR	18.80	0.00	0.01	2.63	2.63	2.63
CS-14 - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-15 - Pipe	25YR-24HR	32.12	0.00	0.04	2.56	2.56	2.56
CS-15 - Weir: 1	25YR-24HR	1.13	0.00	0.00	5.74	5.74	5.74
CS-15 - Weir: 2	25YR-24HR	31.46	0.00	0.01	2.37	2.37	2.37
CS-1A - Pipe	25YR-24HR	47.81	0.00	4.00	2.43	2.43	2.43
CS-1A - Weir: 1	25YR-24HR	3.60	0.00	0.00	5.57	5.57	5.57
CS-1A - Weir: 2	25YR-24HR	44.24	0.00	-0.01	4.42	4.42	4.42
CS-1A - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-1B - Pipe	25YR-24HR	5.07	0.00	0.05	0.72	0.72	0.72
CS-1B - Weir: 1	25YR-24HR	5.04	0.00	0.00	5.04	5.04	5.04
CS-1B - Weir: 2	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-5 - Pipe	25YR-24HR	25.71	0.00	0.05	2.05	2.05	2.05
CS-5 - Weir: 1	25YR-24HR	0.78	0.00	0.00	3.97	3.97	3.97

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-5 - Weir: 2	25YR-24HR	25.09	0.00	0.01	2.75	2.75	2.75
CS-5 - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6A - Pipe	25YR-24HR	28.68	0.00	0.07	2.28	2.28	2.28
CS-6A - Weir: 1	25YR-24HR	0.99	0.00	0.00	7.15	7.15	7.15
CS-6A - Weir: 2	25YR-24HR	27.68	0.00	0.01	3.05	3.05	3.05
CS-6A - Weir: 3	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6B - Pipe	25YR-24HR	8.78	0.00	0.00	4.97	4.97	4.97
CS-6B - Weir: 1	25YR-24HR	8.78	0.00	0.00	1.93	1.93	1.93
CS-8 - Pipe	25YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	25YR-24HR	1.26	0.00	-0.02	1.08	1.08	1.08
CS-MARINA - Pipe	25YR-24HR	8.95	0.00	0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	25YR-24HR	8.87	0.00	-0.01	1.95	1.95	1.95
CS-MARINA - Weir: 2	25YR-24HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	25YR-24HR	8.62	0.00	0.06	2.74	2.74	2.74
CS-W11 - Weir: 1	25YR-24HR	8.62	0.00	0.00	1.81	1.81	1.81
P-1-2	25YR-24HR	2.10	-23.64	-0.02	-1.88	-1.88	-1.88
P-1-3	25YR-24HR	14.86	-8.07	-0.03	1.18	1.18	1.18
P-16-15	25YR-24HR	4.48	-2.29	0.01	0.91	0.91	0.91
P-4A-4B	25YR-24HR	5.96	-3.10	-0.01	1.90	1.90	1.90
P-5-4	25YR-24HR	15.71	-6.03	-0.02	1.25	1.25	1.25
P-8-14-13	25YR-24HR	19.29	0.00	-0.14	2.01	2.01	2.01
P-8-9-10	25YR-24HR	24.43	0.00	-1.34	1.94	1.94	1.94
P-8-MH	25YR-24HR	18.33	0.00	1.06	1.46	1.46	1.46
P-9-MH	25YR-24HR	8.68	0.00	1.00	0.90	0.90	0.90
P-W14-TOHO	25YR-24HR	19.02	0.00	0.05	3.88	5.69	4.78
W-W14-WPA001	25YR-24HR	29.11	0.00	0.01	0.77	0.77	0.77
W-W4-GBS004	25YR-24HR	40.44	0.00	0.00	2.23	2.23	2.23
BU-W11	5YR-24HR	7.14	0.00	0.00	1.17	1.17	1.17
BU-W14	5YR-24HR	29.07	0.00	-18.01	0.61	0.61	0.61
BU-W4A,B	5YR-24HR	13.67	0.00	0.23	1.08	1.08	1.08
CS-10A - Pipe	5YR-24HR	12.34	0.00	-0.61	1.28	1.28	1.28

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-10A - Weir: 1	5YR-24HR	1.92	0.00	0.00	6.94	6.94	6.94
CS-10A - Weir: 2	5YR-24HR	10.41	0.00	0.00	1.97	1.97	1.97
CS-10A - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	5YR-24HR	1.34	0.00	-0.01	0.14	0.14	0.14
CS-10B - Weir: 1	5YR-24HR	1.34	0.00	0.00	0.89	0.89	0.89
CS-12A - Pipe	5YR-24HR	14.60	0.00	0.07	1.17	1.16	1.17
CS-12A - Weir: 1	5YR-24HR	1.86	0.00	0.00	6.70	6.70	6.70
CS-12A - Weir: 2	5YR-24HR	12.72	0.00	0.00	2.35	2.35	2.35
CS-12A - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-12B - Pipe	5YR-24HR	22.00	-0.02	-0.07	1.76	1.75	1.75
CS-12B - Weir: 1	5YR-24HR	22.00	0.00	0.01	2.12	2.12	2.12
CS-13A - Pipe	5YR-24HR	14.30	0.00	0.05	1.49	1.49	1.49
CS-13A - Weir: 1	5YR-24HR	1.52	0.00	0.00	6.72	6.72	6.72
CS-13A - Weir: 2	5YR-24HR	12.77	0.00	0.01	1.90	1.90	1.90
CS-13B - Pipe	5YR-24HR	12.78	-0.05	0.06	1.33	1.33	1.33
CS-13B - Weir: 1	5YR-24HR	12.77	0.00	0.01	1.90	1.90	1.90
CS-14 - Pipe	5YR-24HR	7.02	0.00	0.21	0.73	0.73	0.73
CS-14 - Weir: 1	5YR-24HR	0.61	0.00	0.00	4.37	4.37	4.37
CS-14 - Weir: 2	5YR-24HR	6.39	0.00	0.00	1.94	1.94	1.94
CS-14 - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-15 - Pipe	5YR-24HR	8.06	0.00	0.04	0.64	0.64	0.64
CS-15 - Weir: 1	5YR-24HR	1.13	0.00	0.00	5.75	5.75	5.75
CS-15 - Weir: 2	5YR-24HR	6.95	0.00	0.00	1.45	1.45	1.45
CS-1A - Pipe	5YR-24HR	23.06	0.00	4.58	1.17	1.17	1.17
CS-1A - Weir: 1	5YR-24HR	3.26	0.00	0.00	5.04	5.04	5.04
CS-1A - Weir: 2	5YR-24HR	18.41	0.00	0.00	2.66	2.66	2.66
CS-1A - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-1B - Pipe	5YR-24HR	3.22	0.00	0.03	0.46	0.46	0.46
CS-1B - Weir: 1	5YR-24HR	3.20	0.00	0.00	3.20	3.20	3.20
CS-1B - Weir: 2	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-5 - Pipe	5YR-24HR	10.30	0.00	0.06	0.82	0.82	0.82
CS-5 - Weir: 1	5YR-24HR	0.78	0.00	0.00	3.96	3.96	3.96
CS-5 - Weir: 2	5YR-24HR	9.50	0.00	0.00	2.07	2.07	2.07

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-5 - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6A - Pipe	5YR-24HR	8.69	0.00	-0.08	0.69	0.69	0.69
CS-6A - Weir: 1	5YR-24HR	0.87	0.00	0.00	6.26	6.26	6.26
CS-6A - Weir: 2	5YR-24HR	7.79	0.00	0.00	2.00	2.00	2.00
CS-6A - Weir: 3	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-6B - Pipe	5YR-24HR	7.14	0.00	0.00	4.04	4.04	4.04
CS-6B - Weir: 1	5YR-24HR	7.14	0.00	0.00	1.90	1.90	1.90
CS-8 - Pipe	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	5YR-24HR	0.64	0.00	-0.01	0.86	0.86	0.86
CS-MARINA - Pipe	5YR-24HR	5.79	0.00	0.01	0.00	0.00	0.00
CS-MARINA - Weir: 1	5YR-24HR	5.63	0.00	0.01	1.78	1.78	1.78
CS-MARINA - Weir: 2	5YR-24HR	0.19	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	5YR-24HR	5.32	0.00	0.05	1.69	1.69	1.69
CS-W11 - Weir: 1	5YR-24HR	5.32	0.00	0.00	1.54	1.54	1.54
P-1-2	5YR-24HR	0.07	-18.72	-0.02	-1.49	-1.49	-1.49
P-1-3	5YR-24HR	4.26	-4.23	-0.01	0.34	0.34	0.34
P-16-15	5YR-24HR	1.51	-1.84	0.01	-0.38	-0.38	-0.38
P-4A-4B	5YR-24HR	5.01	-1.11	-0.01	1.59	1.59	1.59
P-5-4	5YR-24HR	11.62	-2.15	-0.01	0.92	0.92	0.92
P-8-14-13	5YR-24HR	7.02	0.00	-0.11	0.73	0.73	0.73
P-8-9-10	5YR-24HR	20.28	0.00	-1.05	1.61	1.61	1.61
P-8-MH	5YR-24HR	15.09	0.00	0.85	1.20	1.20	1.20
P-9-MH	5YR-24HR	6.81	-0.63	0.67	0.71	0.71	0.71
P-W14-TOHO	5YR-24HR	15.56	0.00	0.05	3.17	4.66	3.91
W-W14-WPA001	5YR-24HR	0.00	0.00	0.00	0.00	0.00	0.00
W-W4-GBS004	5YR-24HR	17.10	0.00	0.00	1.92	1.92	1.92
BU-W11	MEAN	4.01	0.00	0.00	0.97	0.97	0.97
BU-W14	MEAN	19.24	0.00	-11.86	0.59	0.59	0.59
BU-W4A,B	MEAN	6.95	0.00	0.21	0.86	0.86	0.86
CS-10A - Pipe	MEAN	6.96	0.00	-0.47	0.72	0.72	0.72
CS-10A - Weir: 1	MEAN	1.85	0.00	0.00	6.69	6.69	6.69

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-10A - Weir: 2	MEAN	5.08	0.00	0.00	1.55	1.55	1.55
CS-10A - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-10B - Pipe	MEAN	0.01	0.00	-0.01	0.00	0.00	0.00
CS-10B - Weir: 1	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-12A - Pipe	MEAN	9.12	0.00	0.10	0.74	0.73	0.73
CS-12A - Weir: 1	MEAN	1.78	0.00	0.00	6.41	6.41	6.41
CS-12A - Weir: 2	MEAN	7.28	0.00	0.00	1.95	1.95	1.95
CS-12A - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-12B - Pipe	MEAN	10.75	-0.02	0.11	0.88	0.86	0.87
CS-12B - Weir: 1	MEAN	10.71	0.00	0.00	1.67	1.67	1.67
CS-13A - Pipe	MEAN	7.34	0.00	0.06	0.76	0.76	0.76
CS-13A - Weir: 1	MEAN	1.47	0.00	0.00	6.47	6.47	6.47
CS-13A - Weir: 2	MEAN	5.84	0.00	0.00	1.46	1.46	1.46
CS-13B - Pipe	MEAN	5.87	-0.03	0.07	0.61	0.61	0.61
CS-13B - Weir: 1	MEAN	5.84	0.00	0.00	1.46	1.46	1.46
CS-14 - Pipe	MEAN	3.68	0.00	0.31	0.38	0.38	0.38
CS-14 - Weir: 1	MEAN	0.61	0.00	0.00	4.38	4.38	4.38
CS-14 - Weir: 2	MEAN	3.03	0.00	0.00	1.51	1.51	1.51
CS-14 - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-15 - Pipe	MEAN	4.40	0.00	0.04	0.35	0.35	0.35
CS-15 - Weir: 1	MEAN	1.13	0.00	0.00	5.75	5.75	5.75
CS-15 - Weir: 2	MEAN	3.27	0.00	0.00	1.12	1.12	1.12
CS-1A - Pipe	MEAN	15.96	0.00	3.72	0.81	0.81	0.81
CS-1A - Weir: 1	MEAN	3.13	0.00	0.00	4.84	4.84	4.84
CS-1A - Weir: 2	MEAN	11.13	0.00	0.00	2.25	2.25	2.25
CS-1A - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-1B - Pipe	MEAN	2.25	0.00	0.03	0.32	0.32	0.32
CS-1B - Weir: 1	MEAN	2.23	0.00	0.00	2.25	2.25	2.25
CS-1B - Weir: 2	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-5 - Pipe	MEAN	5.33	0.00	-0.06	0.42	0.42	0.42
CS-5 - Weir: 1	MEAN	0.78	0.00	0.00	3.96	3.96	3.96
CS-5 - Weir: 2	MEAN	4.52	0.00	0.00	1.61	1.61	1.61
CS-5 - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CS-6A - Pipe	MEAN	4.81	0.00	-0.06	0.38	0.38	0.38
CS-6A - Weir: 1	MEAN	0.83	0.00	0.00	5.99	5.99	5.99
CS-6A - Weir: 2	MEAN	3.95	0.00	0.00	1.59	1.59	1.59
CS-6A - Weir: 3	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-6B - Pipe	MEAN	4.01	0.00	0.00	2.27	2.27	2.27
CS-6B - Weir: 1	MEAN	4.01	0.00	0.00	1.59	1.59	1.59
CS-8 - Pipe	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
CS-8 - Weir: 1	MEAN	0.34	0.00	-0.01	0.11	0.11	0.11
CS-MARINA - Pipe	MEAN	3.61	0.00	0.00	0.00	0.00	0.00
CS-MARINA - Weir: 1	MEAN	3.43	0.00	-0.01	1.51	1.51	1.51
CS-MARINA - Weir: 2	MEAN	0.18	0.00	0.00	0.00	0.00	0.00
CS-W11 - Pipe	MEAN	3.20	0.00	-0.10	1.02	1.02	1.02
CS-W11 - Weir: 1	MEAN	3.20	0.00	0.00	1.30	1.30	1.30
P-1-2	MEAN	0.00	-13.29	-0.02	-1.06	-1.06	-1.06
P-1-3	MEAN	1.83	-2.31	-0.01	-0.18	-0.18	-0.18
P-16-15	MEAN	0.84	-1.40	0.01	-0.28	-0.28	-0.28
P-4A-4B	MEAN	4.23	-0.62	-0.01	1.35	1.35	1.35
P-5-4	MEAN	8.89	-1.21	-0.02	0.71	0.71	0.71
P-8-14-13	MEAN	3.67	0.00	-0.22	0.38	0.38	0.38
P-8-9-10	MEAN	15.69	0.00	1.17	1.25	1.25	1.25
P-8-MH	MEAN	11.80	0.00	-0.90	0.94	0.94	0.94
P-9-MH	MEAN	4.72	-0.65	-0.67	0.49	0.49	0.49
P-W14-TOHO	MEAN	11.37	0.00	0.04	2.48	3.40	2.94
W-W14-WPA001	MEAN	0.00	0.00	0.00	0.00	0.00	0.00
W-W4-GBS004	MEAN	11.20	0.00	0.00	1.72	1.72	1.72



APPENDIX C.3

SUPPORTING DOCUMENTATION



ADDITIONAL INFORMATION
APR 19 2007
ORLANDO SERVICE CENTER

MASTER SURFACE WATER MANAGEMENT PLAN

for the

**GATOR BAY SLOUGH
DRAINAGE BASIN STUDY**

Osceola County, Florida

RHPA

Ron Howse, P.A.

An Engineering and Land Planning Professional Association

June 2001

SECTION 3.8

adICPR INPUT DATA

for

***GATOR BAY SLOUGH
DRAINAGE BASIN STUDY***

Osceola County, Florida

RHPA

Advanced Interconnected Channel & Pond Routing (ICPR Ver 2.20) [1]
Copyright 1995, Streamline Technologies, Inc.

Gator Bay Slough Present Condition (100yr/72hr)
Revised June 2001

***** Input Report *****

-----Class: Node-----
Name: 999 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: West Lake Tohopekaliga (100yr/72hr)

Time(hrs)	Stage(ft)
0	53.5
39.3	53.5
57	54
65.3	55
69.8	56
74.6	57
81.2	58
86.6	58.5
95.6	59.5
140	59.48

-----Class: Node-----
Name: GBS-001 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.52+00 (BL-A)

Stage(ft) Area(ac)

-----Class: Node-----
Name: GBS-002 Base Flow(cfs): 0 Init Stage(ft): 54.25
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.68+00 (BL-A)

Stage(ft) Area(ac)

-----Class: Node-----
Name: GBS-003 Base Flow(cfs): 0 Init Stage(ft): 54.74
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.84+00 (BL-A)

Stage(ft) Area(ac)

-----Class: Node-----
Name: GBS-003A Base Flow(cfs): 0 Init Stage(ft): 59.2
Group: BL-A Warn Stage(ft): 9999
Comment: Stage/Area Relationship of Wetland #8

Stage(ft)	Area(ac)
59.2	4.45
60	17.62
61	27.2
62	35.17
63	40.01
64	47.97

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Gator Bay Slough Present Condition (100yr/72hr)
Revised June 2001

***** Input Report *****

-----Class: Node-----
Name: GBS-003B Base Flow(cfs): 0 Init Stage(ft): 58.6
Group: BL-A Warn Stage(ft): 9999
Comment: Stage/Area Relationship of Wetland #7

Stage(ft)	Area(ac)
58.6	6.08
59	9.44
60	24.92
61	36.95
62	57.54
63	70.39
64	80.7

-----Class: Node-----
Name: GBS-004 Base Flow(cfs): 0 Init Stage(ft): 56.45
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.100+00 (BL-A)

Stage(ft)	Area(ac)
56.45	0.2
61	0.6
62	8.8
63	15.6
64	23.5
65	37.7

-----Class: Node-----
Name: GBS-005 Base Flow(cfs): 0 Init Stage(ft): 56.45
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.100+00 (BL-A)

Stage(ft)	Area(ac)
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-----Class: Node-----
Name: GBS-006 Base Flow(cfs): 0 Init Stage(ft): 57.2
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.114+00 (BL-A)

Stage(ft)	Area(ac)
-----------	----------

-----Class: Node-----
Name: GBS-007 Base Flow(cfs): 0 Init Stage(ft): 57.48
Group: BL-A Warn Stage(ft): 9999
Comment: Wetland 6 / Junction sta.128+00 (BL-A)

Stage(ft)	Area(ac)
-----------	----------

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Gator Bay Slough Present Condition (100yr/72hr)
Revised June 2001

***** Input Report *****

-----Class: Node-----
Name: WPA-001 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.0+00 (BL-A)

Stage(ft) Area(ac)
-----Class: Node-----
Name: WPA-002 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.0+00 (Upstream Face of Timber Bridge)

Stage(ft) Area(ac)
-----Class: Node-----
Name: WPA-002A Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 60
Comment: Stage/Area Relationship of Wetland #11

Stage(ft)	Area(ac)
53.5	0.28
54	0.96
55	24.4
56	31.6
57	45.7
58	69.5
59	80.3
60	89.9

-----Class: Node-----
Name: WPA-002B Base Flow(cfs): 0 Init Stage(ft): 53.9
Group: BL-A Warn Stage(ft): 60
Comment: Stage/Area Relationship of Wetland #12

Stage(ft)	Area(ac)
53.9	1
54	11
55	52.8
56	81.9
57	143.1
58	169.3
59	176.3
60	181.7

-----Class: Node-----
Name: WPA-003 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta. 6+00 (BL-A)

Stage(ft) Area(ac)

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Gator Bay Slough Present Condition (100yr/72hr)
Revised June 2001

***** Input Report *****

-----Class: Node-----
Name: WPA-004 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction sta.18+00 (BL-A)

Stage(ft) Area(ac)
-----Class: Node-----
Name: WPA-005 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction Sta. 27+75 (BL-A)

Stage(ft) Area(ac)
-----Class: Node-----
Name: WPA-005A Base Flow(cfs): 0 Init Stage(ft): 54.9
Group: BL-A Warn Stage(ft): 60
Comment: Stage/Area Relationship of Wetland #10

Stage(ft)	Area(ac)
54.9	0.5
55	4.9
56	10.7
57	24.2
58	39.6
59	50.5
60	57.2

-----Class: Node-----
Name: WPA-006 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 9999
Comment: Junction Sta. 35+50 (BL-A)

Stage(ft) Area(ac)
-----Class: Node-----
Name: WPA-007 Base Flow(cfs): 0 Init Stage(ft): 53.5
Group: BL-A Warn Stage(ft): 60
Comment: Wetland #9 - WPA Canal Connection

Stage(ft)	Area(ac)
49.76	0.4
53.5	2.4
54	38.1
55	120.7
56	187.3
57	267
58	321.7
59	382.4
60	413.2

**ALLOWABLE DISCHARGE VALUES FOR
PROJECTS WITHIN THE SOUTH FLORIDA
WATER MANAGEMENT DISTRICT**

February 17, 1994

Formerly known as “Appendix 2”

USE OF APPENDIX 2 TO DETERMINE ALLOWABLE DISCHARGE VALUES

The assignment of allowable discharge values for waterways in south Florida is based on very inexact science. Not only are the properties of the waterway often in doubt, but they are constantly changing. Inflows to the waterway are even more of a mystery, since their varying amounts and times, subject to all the variables of hydrology, are additive if and when they reach the waterway. In south Florida almost all inflows are also constrained by waterway tailwaters at some point in time.

Many of the allowable discharges derived over the years were estimated from a single or minimum number of hydraulic routings of inflows and waterway flows, using traditional hydrologic methods, which didn't provide for sheetflow, out of bank flow, tailwater constraints, reverse flow, pumped discharge, etc. The allowable discharge values which were derived for many of the lower east coast canals were of the form:

$$Q = \left[\frac{a}{A^{0.5}} + b \right] A$$

where: Q = allowable discharge (cubic feet/second)

a and b = constants (conversion units)

A = contributing area (square miles)

The form of the equation was established during the 1920's for the Everglades Agricultural Area (EAA) by unknown parties based on unknown principle. It obviously assigns larger unit discharge values to smaller contributing areas and vice-versa. This makes sense, usually. It presumes inflow hydrograph peaks are not additive (the sum of the parts exceeds the whole at any single point in time). It just so happens it really applies less in the EAA than anywhere else in the District because most contributing areas in the EAA are pumped discharges and thus the peaks are additive. The allowable discharge for the EAA should actually be 0.75 inches per day, the pump capacity of the overall system.

The constants a and b were different for each canal and derived from two points on a curve, one for the discharge for the entire basin and one for an estimated discharge for one square mile. In general the method gave extremely generous allowable discharge values with typical values for one square mile of three to five inches per day.

In addition to the problem caused by pumped discharge peaks being coincident, an additional problem was that many contributing areas were small (high unit discharge) and highly impervious. Thus, their actual discharge was much greater than the allowable discharge formula estimates. The end result is that there is very little correlation between the old allowable discharge formulas and actual discharges. Without basin studies, no one can say how a basin performs.

In recent years, knowledge of the above problem has caused allowable discharge to be computed from the pure division of the waterway capacity by the area of the basin. This would be conservative for an undeveloped basin, but few such basins exist. Many of the basins in

Appendix 2 have received this treatment since publication of earlier versions of Appendix 2.

The new values in Appendix 2 come from many sources, some as described above, a few from basin studies, and others from estimates by the District, local governments, permit applicants, etc. The best available sources were used, but new studies were not conducted.

The end result of the above is a series of values which generally ignore basin size. They range from less than one half inch per day to as much as 12 inches per day. These of course range from a large flat basin to a steeper basin. It is unlikely that there is really that much disparity in south Florida waterways or the discharges to them. It is also likely that the smaller basins should have higher unit area discharges. Therefore, Appendix 2 should be used as follows:

Case 1: If the immediate receiving water is a natural stream, overland sheetflow area, secondary or tertiary man made ditch, swale or other conveyance with undefined capacity; then the post-development instantaneous peak discharge rate should equal the pre-development rate for the appropriate design storm event such that new adverse water quantity impacts are not created.

Case 2: If the immediate receiving water is a primary waterway with allowable discharge capacity listed in Appendix 2, then the allowable instantaneous peak discharge rate is the lesser of either the listed value or the value calculated by using the appropriate formula below:

For a 25 year/3 day design storm: $Q = 53A^{0.64}$

For a 25 year/1 day design storm: $Q = 46A^{0.64}$

For a 10 year/3 day design storm: $Q = 30A^{0.64}$

where: Q = allowable discharge (cubic feet/second)

A = contributing area (square miles)

Note: These two cases do not apply to the C-51 Basin. Use the subbasin discharge coefficients for that basin.

The above formulas were derived from the experience gained in many years of issuing permits and reviewing applicants submissions. They generally fit an average basin with an SCS curve number of 65. If an applicant believes either the formula or the listed value are inappropriate, the District will consider other submitted information. It is acknowledged that such conditions as; downstream flow attenuation areas, steep slopes, reduced soil storage and other such factors may make pre-development/post-development values more appropriate. The important factors are:

- 1) That waterway capacity not be unused,
- 2) That new adverse impacts are not created,
- 3) That historic drainage rights are preserved and,
- 4) Recognition is given to contributing drainage area size when possible.

LAKE TOHOPEKALIGA BASIN (Osceola and Orange County)

The design storm is a 10 year event in Osceola County and a 25 year event in Orange County. The allowable discharge rate is 17.5 CSM. See Figures 1 and 10.

SHINGLE CREEK BASIN (Orange and Osceola Counties)

The design storm is a 10 year event in Osceola County and a 25 year event in Orange County. See Figures 1 and 11. The maximum allowable discharge rate for areas located north of Sand Lake Road is 320 CSM. The maximum allowable discharge rate for those areas located south of Sand Lake road, within Orange County, is 192 CSM. For those areas south of Sand lake Road, within Osceola County, the allowable discharge rate is 64 CSM, except for the following areas which should be allowed a maximum rate of 192 CSM.

T25S/R28E/Sections 1, 2, the East half of 3, all of 11 except for that part of the West half of the Southwest quarter which is not presently developed.

T25S/R29E/Sections 5, East portion of 6 and East portion of Northeast quarter of 7 which lie East of Shingle Creek, that part of 8 which lies North of the East-West ditch which approximately bisects this section, the Northwest quarter of 9.

EAST LAKE TOHOPEKALIGA BASIN (Orange and Osceola Counties)

The design storm is a 10 year event in Osceola County and a 25 year event in Orange County. The allowable discharge rate is 16.1 CSM. See Figures 1 and 12.

BOGGY CREEK BASIN (Orange and Osceola Counties)

The design storm is a 25 year event in Orange County and a 10 year event in Osceola County. The allowable discharge rate is 50 CSM. See Figures 1 and 13.

LAKE HART BASIN (Orange and Osceola Counties)

The design storm is a 10 year event in Osceola County and a 25 year event in Orange County. The allowable discharge rate is 10.6 CSM. See Figures 1 and 14.

LAKE MYRTLE BASIN (Osceola and Orange Counties)

The design storm is a 10 year event in Osceola County and a 25 year event in Orange County. The allowable discharge rate is 3.6 CSM. See Figures 1 and 15.

LAKE CYPRESS BASIN (Osceola and Polk Counties)

The design storm is a 10 year event in Osceola County and a 25 year event in Polk County. The allowable discharge rates for the various subbasins can be determined from Figure 5 (Drainage Analysis Unit 8/Kissimmee River Above Lake Hatchineha). This illustration was taken from the Surface Water Management Plan which was prepared for Polk County by Envisors, Inc. It covers numerous drainage basins within Polk and Osceola Counties and has been modified by the District in order to reflect allowable discharge rates in units of cfs per square mile (CSM). The allowable discharge rate for portions of the basin not covered by Figure 5 is 31.1 CSM. Also see Figures 1 and 16.

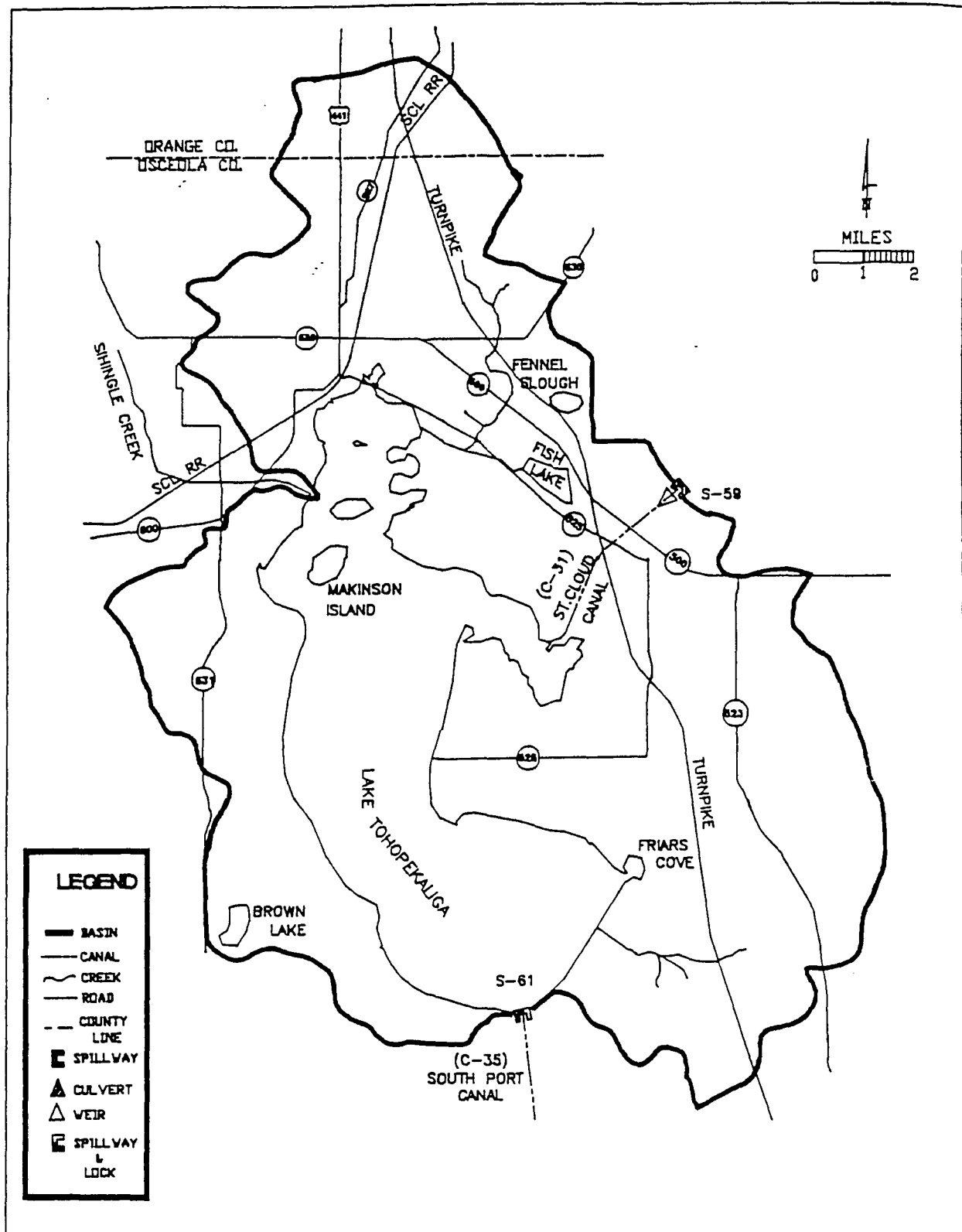
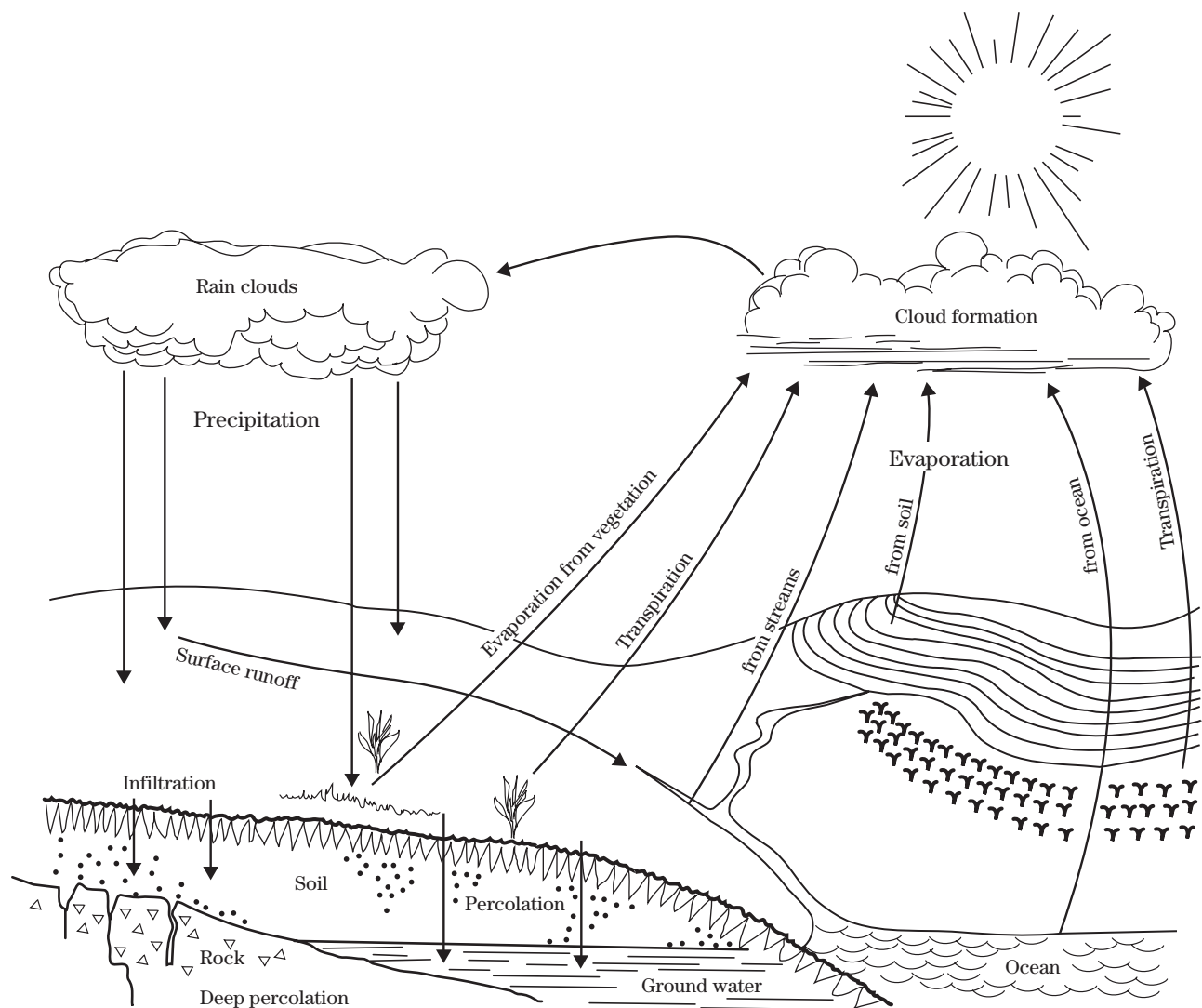


FIGURE 10 Lake Tohopekaliga Basin (84,130 acres).

Chapter 15 Time of Concentration





APPENDIX D

WATER QUALITY ANALYSIS



APPENDIX D.1

WET DETENTION WATER QUALITY CALCULATIONS

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-1
Treatment Ponds:	SMA-1,2,&3
Basin Area:	106.33 acres

*Including future marina for treatment - Marina is its own basin as shown in Hydrology calculations

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Condominiums (70%)	2.68	4.06		2.19	8.93
Residential (70%)	3.55	6.21		2.07	11.82
Residential (60%)	0.08	0.09		0.03	0.20
Civ-Com-Multi (80%)	4.85	12.62		6.79	24.26
Open Space (Good)	6.65				6.65
Park (25%)	6.75	2.25			9.00
50' R/W (72%)	0.63	1.61			2.24
60' R/W (77%)	0.26	0.86			1.12
80' R/W (82.5%)	0.88	4.15			5.03
Friar's Cove Road (82.5%)	0.03	0.13			0.16
Water Surface			29.78		29.78
Future Marina (80%)	1.12	4.48	1.35	0.19	7.14
Totals:	27.47	36.46	31.13	11.27	106.33

Basin:	SMA-2
Treatment Ponds:	SMA-1,2,&3
Basin Area:	17.81 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	1.33	2.33		0.78	4.44
Residential (60%)	1.84	2.07		0.69	4.59
Open Space (Good)	2.10				2.10
Park (25%)	0.06	0.02			0.08
50' R/W (72%)	0.33	0.85			1.18
80' R/W (82.5%)	0.43	2.02			2.45
Alley (100%)		0.61			0.61
Water Surface			2.36		2.36
Totals:	6.09	7.90	2.36	1.47	17.81

Basin:	SMA-3
Treatment Ponds:	SMA-1,2,&3
Basin Area:	24.94 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	3.57	6.25		2.08	11.91
Residential (60%)	0.68	0.76		0.25	1.69
Open Space (Good)	1.90				1.90
50' R/W (72%)	0.80	2.05			2.85
60' R/W (77%)	0.03	0.12			0.15
Water Surface			6.44		6.44
Totals:	6.98	9.18	6.44	2.34	24.94

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basins:	SMA-1,2,&3
Treatment Ponds:	SMA-1,2,&3
Basin Area:	141.94 acres

*Including future marina for treatment - Marina is its own basin as shown in Hydrology calculations

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Condominiums (70%)	2.68	4.06		2.19	8.93
Residential (70%)	8.45	14.79		4.93	28.17
Residential (60%)	2.59	2.92		0.97	6.48
Civ-Com-Multi (80%)	4.85	12.62		6.79	24.26
Open Space (Good)	10.65				10.65
Park (25%)	6.81	2.27			9.08
50' R/W (72%)	1.76	4.51			6.27
60' R/W (77%)	0.29	0.98			1.27
80' R/W (82.5%)	1.31	6.17			7.48
Friar's Cove Road (82.5%)	0.03	0.13			0.16
Alley (100%)		0.61			0.61
Water Surface			38.58		38.58
Future Marina (80%)	1.12	4.48	1.35	0.19	7.14
Totals:	40.54	53.54	39.93	15.07	149.08

Percent Impervious = 57%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**

Is project zoned commercial or industrial? **No**

No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 12.42 ac-ft

2.5" x % Impervious = 12.94 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Additional Treatment Volume for loss of littoral zone = 2sf x 1191 lf 0.05 ac-ft (0.075 ac-ft with 50% treatment volume)

Req'd Wet Det. Treatment Volume = 19.49 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	SMA-1 Area (ac)	SMA-2 Area (ac)	SMA-3 Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)
44.25	24.95	1.66	5.11	345.75	
51.25	27.54	2.03	5.81	110.93	
54.25	29.78	2.36	6.44	0.00	0.00
55.25	30.43	2.48	6.65		39.07
56.25	31.08	2.60	6.86		79.12
57.25	31.73	2.72	7.08		120.16
58.25	33.35	3.04	7.64		162.94

Pond Bottom
 Grade Break
DNW

Outside Top of Berm

Minimum weir elevation = 54.75 ft

Design Weir Elevation = 54.90 ft
Treatment Volume Provided = 25.40 ac-ft

Control Device Calculations

Control device:	Rectangular slot
Height, h (in.) =	3
Width (in.) =	31.00
Total Head (ft) =	0.37
1/2" Detention Volume =	4.55 ac-ft
Recovery Time =	28.9 hours

*Total Head = Min. weir elevation - DNW+h/2

*1/2" runoff over the contributing area (total area - water surface)

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-4A
Treatment Ponds:	SMA-4A,4B&5
Basin Area:	7.10 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	0.32	0.55		0.18	1.05
Residential (60%)	0.69	0.78		0.26	1.73
Open Space (Good)	0.86				0.86
50' R/W (72%)	0.13	0.33			0.46
60' R/W (77%)	0.29	0.98			1.27
80' R/W (82.5%)	0.09	0.40			0.49
Water Surface			1.24		1.24
Totals:	2.37	3.04	1.24	0.44	7.10

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Basin:	SMA-4B
Treatment Ponds:	SMA-4A,4B&5
Basin Area:	7.72 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	0.39	0.68		0.23	1.29
Residential (60%)	0.02	0.03		0.01	0.06
Civ-Com-Multi (80%)	0.15	0.39		0.21	0.75
Open Space (Good)	0.88				0.88
Park (25%)	1.05	0.35			1.40
50' R/W (72%)	0.19	0.48			0.67
80' R/W (82.5%)	0.23	1.09			1.32
Alley (100%)		0.04			0.04
Water Surface			1.31		1.31
Totals:	2.91	3.06	1.31	0.44	7.72

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Basin:	SMA-5
Treatment Ponds:	SMA-4A,4B&5
Basin Area:	50.26 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	5.21	9.12		3.04	17.38
Residential (65%)	0.69	0.96		0.32	1.97
Residential (60%)	3.43	3.86		1.29	8.57
Open Space (Good)	1.61				1.61
Park (25%)	0.83	0.28			1.11
132' R/W (70%)	0.81	1.89			2.70
50' R/W (72%)	1.02	2.62			3.64
60' R/W (77%)	0.96	3.23			4.19
80' R/W (82.5%)	0.59	2.77			3.36
Alley (100%)		1.09			1.09
Water Surface			4.64		4.64
Totals:	15.15	25.82	4.64	4.65	50.26

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basins:	SMA-4A,4B&5
Treatment Ponds:	SMA-4A,4B&5
Basin Area:	65.08 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	5.92	10.35		3.45	19.72
Residential (65%)	0.69	0.96		0.32	1.97
Residential (60%)	4.14	4.66		1.55	10.36
Civ-Com-Multi (80%)	0.15	0.39		0.21	0.75
Open Space (Good)	3.35				3.35
Park (25%)	1.88	0.63			2.51
132' R/W (70%)	0.81	1.89			2.70
50' R/W (72%)	1.34	3.43			4.77
60' R/W (77%)	1.26	4.20			5.46
80' R/W (82.5%)	0.90	4.27			5.17
Alley (100%)		1.13			1.13
Water Surface			7.19		7.19
Totals:	20.44	31.92	7.19	5.54	65.08

Note: Commercial development within Basin SMA-4 will require dry pretreatment to be designed with project-specific final design

Percent Impervious = 61%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 5.42 ac-ft
 2.5" x % Impervious = 7.35 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 11.03 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	SMA-4A Area (ac)	SMA-4B Area (ac)	SMA-5 Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
38			2.68	96.95		Pond Bottom (SMA-5)
48	0.69	0.78	3.49	58.75		Pond Bottom (SMA-4A&4B)
55	0.97	1.06	4.09	19.97		Grade Break
58	1.24	1.31	4.64	0.00	0.00	DNW
59	1.33	1.40	4.82		7.38	
60	1.43	1.50	5.01		15.13	
61	1.53	1.59	5.20		23.26	
62	1.79	1.84	5.69		32.07	Outside Top of Berm

Minimum weir elevation = 59.47 ft

Design Weir Elevation = 59.50 ft
Treatment Volume Provided = 11.25 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	1	
Diameter, d (in.) =	6.00	
Total Head (ft) =	1.22	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	2.41 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	27.9 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-6
Treatment Pond:	SMA-6
Basin Area:	36.37 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	2.62	4.58		1.53	8.72
Residential (60%)	1.34	1.51		0.50	3.36
Open Space (Good)	2.33				2.33
Park (25%)	9.23	3.08			12.31
50' R/W (72%)	0.71	1.84			2.55
60' R/W (77%)	0.21	0.72			0.93
80' R/W (82.5%)	0.29	1.37			1.66
Alley (100%)		0.54			0.54
Water Surface			3.97		3.97
Totals:	16.74	13.63	3.97	2.03	36.37

Percent Impervious = 45%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 3.03 ac-ft Minimum required PAV
 2.5" x % Impervious = 3.03 ac-ft

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 4.55 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
47.5	2.81	32.89		Pond Bottom
54.5	3.42	11.09		Grade Break
57.5	3.97	0.00	0.00	DNW
58.5	4.16		4.06	
59.5	4.35		8.32	
60.5	4.54		12.76	
61.5	5.03		17.55	Outside Top of Berm

Minimum weir elevation = 58.61 ft

Design Weir Elevation = 58.80 ft
Treatment Volume Provided = 5.34 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	1	
Diameter, d (in.) =	5.00	
Total Head (ft) =	0.90	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	1.35 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	26.2 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-8
Treatment Ponds:	SMA-8,9,&10
Basin Area:	33.75 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	3.94	6.89		2.30	13.13
Residential (60%)	2.31	2.60		0.87	5.78
Open Space (Good)	1.54				1.54
132' R/W (70%)	1.19	2.77			3.95
50' R/W (72%)	1.03	2.64			3.67
60' R/W (77%)	0.39	1.29			1.68
80' R/W (82.5%)	0.14	0.67			0.81
Alley (100%)		0.39			0.39
Water Surface			2.80		2.80
Totals:	10.53	17.25	2.80	3.17	33.75

Basin:	SMA-9
Treatment Ponds:	SMA-8,9,&10
Basin Area:	11.05 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	1.45	2.54		0.85	4.84
Residential (60%)	1.03	1.16		0.39	2.57
Open Space (Good)	0.79				0.79
50' R/W (72%)	0.17	0.45			0.62
60' R/W (77%)	0.22	0.75			0.97
Alley (100%)		0.27			0.27
Water Surface			0.99		0.99
Totals:	3.67	5.16	0.99	1.23	11.05

Basin:	SMA-10
Treatment Ponds:	SMA-8,9,&10
Basin Area:	47.78 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	7.63	13.36		4.45	25.44
Residential (60%)	1.07	1.21		0.40	2.68
Civ-Com-Multi (80%)	0.47	1.21		0.65	2.33
Open Space (Good)	1.98				1.98
Park (25%)	0.77	0.26			1.02
50' R/W (72%)	2.13	5.49			7.62
60' R/W (77%)	0.25	0.83			1.08
Alley (100%)		0.29			0.29
Water Surface			5.34		5.34
Totals:	14.30	22.64	5.34	5.50	47.78

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basins:	SMA-8,9,&10
Treatment Ponds:	SMA-8,9,&10
Basin Area:	92.58 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	13.02	22.79		7.60	43.41
Residential (60%)	4.41	4.96		1.65	11.03
Civ-Com-Multi (80%)	0.47	1.21		0.65	2.33
Open Space (Good)	4.31				4.31
Park (25%)	0.77	0.26			1.02
132' R/W (70%)	1.19	2.77			3.95
50' R/W (72%)	3.33	8.58			11.91
60' R/W (77%)	0.86	2.87			3.73
80' R/W (82.5%)	0.14	0.67			0.81
Alley (100%)		0.95			0.95
Water Surface			9.13		9.13
Totals:	28.50	45.05	9.13	9.90	92.58

Note: Commercial development within Basin SMA-10 will require dry pretreatment to be designed with project-specific final design

Percent Impervious = 61%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious?	No
Is project zoned commercial or industrial?	No
No dry pretreatment required.	

Wet Detention Treatment Volume Calculations

1" x Total Area = 7.72 ac-ft
 2.5" x % Impervious = 10.65 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 15.97 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	SMA-8 Area (ac)	SMA-9 Area (ac)	SMA-10 Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)
35.5		0.10	2.51	149.47	
40.5	1.43	0.20	2.97	131.41	
57.5	2.43	0.75	4.69	25.40	
60.5	2.74	0.99	5.34	0.00	0.00
61.5	2.87	1.07	5.56		9.29
62.5	3.00	1.16	5.78		19.01
63.5	3.13	1.25	6.01		29.18
64.5	3.38	1.49	6.59		40.10
65	3.55				43.85

Pond Bottom (SMA-9,10)

Pond Bottom (SMA-8)

Grade Break

DNW

Outside Top of Berm (SMA-9,10)

Outside Top of Berm (SMA-8)

Minimum weir elevation = 62.19 ft

Design Weir Elevation =	62.20 ft
Treatment Volume Provided =	16.09 ac-ft

Control Device Calculations

Control device:	Circular Orifice
# of devices:	2
Diameter, d (in.) =	5.00
Total Head (ft) =	1.48
1/2" Detention Volume =	3.48 ac-ft
Recovery Time =	26.3 hours

*Total Head = Min. weir elevation - DNW+d/2

*1/2" runoff over the contributing area (total area - water surface)

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-12
Treatment Pond:	SMA-12
Basin Area:	77.76 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	3.90	6.83		2.28	13.00
Residential (65%)	1.91	2.67		0.89	5.47
Residential (60%)	0.49	0.55		0.18	1.22
Civ-Com-Multi (80%)	4.39	11.41		6.14	21.94
Open Space (Good)	3.53				3.53
Park (25%)	4.97	1.66			6.63
132' R/W (70%)	0.86	2.01			2.87
50' R/W (72%)	0.84	2.16			3.00
60' R/W (77%)	0.37	1.26			1.63
80' R/W (82.5%)	1.15	5.44			6.59
Friar's Cove Road (82.5%)	0.30	1.41			1.71
Alley (100%)		0.77			0.77
Water Surface			9.40		9.40
Totals:	22.72	36.15	9.40	9.49	77.76

Percent Impervious = 61%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 6.48 ac-ft
 2.5" x % Impervious = 8.74 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 13.12 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
38	3.05	128.84		Pond Bottom
45	7.19	105.63		
55	8.55	26.92		Grade Break
58	9.40	0.00	0.00	DNW
59	9.68		9.54	
60	9.97		19.37	
61	10.26		29.49	
62	11.00		40.12	Outside Top of Berm

Minimum weir elevation = 59.36 ft

Design Weir Elevation = 59.40 ft
Treatment Volume Provided = 13.47 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	2	
Diameter, d (in.) =	5.00	
Total Head (ft) =	1.16	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	2.85 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	24.4 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-13
Treatment Pond:	SMA-13
Basin Area:	75.02 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	4.67	8.18		2.73	15.58
Residential (65%)	2.58	3.59		1.20	7.36
Residential (60%)	1.76	1.98		0.66	4.40
Civ-Com-Multi (80%)	2.86	7.45		4.01	14.32
Open Space (Good)	2.50				2.50
Park (25%)	3.45	1.15			4.60
132' R/W (70%)	2.22	5.19			7.41
50' R/W (72%)	0.99	2.56			3.55
60' R/W (77%)	0.42	1.41			1.83
80' R/W (82.5%)	0.29	1.35			1.64
Friar's Cove Road (82.5%)	0.44	2.05			2.49
Alley (100%)		1.21			1.21
Water Surface			8.13		8.13
Totals:	22.18	36.12	8.13	8.59	75.02

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Percent Impervious = 62%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 6.25 ac-ft
 2.5" x % Impervious = 8.63 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 12.95 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
37	4.93	152.49		Pond Bottom
58	7.38	23.26		Grade Break
61	8.13	0.00	0.00	DNW
62	8.39		8.26	
63	8.64		16.77	
64	8.90		25.55	
65	9.56		34.78	Outside Top of Berm

Minimum weir elevation = 62.55 ft

Design Weir Elevation = 62.60 ft
Treatment Volume Provided = 13.37 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	2	
Diameter, d (in.) =	4.50	
Total Head (ft) =	1.36	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	2.79 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	27.2 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-14
Treatment Pond:	SMA-14
Basin Area:	43.33 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	5.24	9.17		3.06	17.47
Residential (65%)	1.34	1.86		0.62	3.82
Residential (60%)	0.70	0.79		0.26	1.75
Civ-Com-Multi (80%)	0.37	0.97		0.52	1.87
Open Space (Good)	1.90				1.90
Park (25%)	2.54	0.85			3.38
50' R/W (72%)	1.57	4.04			5.61
60' R/W (77%)	0.47	1.58			2.05
Alley (100%)		0.63			0.63
Water Surface			4.85		4.85
Totals:	14.13	19.89	4.85	4.46	43.33

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Percent Impervious = 58%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 3.61 ac-ft
 2.5" x % Impervious = 4.69 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 7.03 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
37	2.54	89.14		Pond Bottom
59	4.31	13.75		Grade Break
62	4.85	0.00	0.00	DNW
63	5.04		4.94	
64	5.22		10.07	
65	5.41		15.39	
66	5.89		21.04	Outside Top of Berm

Minimum weir elevation = 63.41 ft

Design Weir Elevation = 63.50 ft
Treatment Volume Provided = 7.51 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	1	
Diameter, d (in.) =	5.00	
Total Head (ft) =	1.20	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	1.60 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	27.0 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	SMA-15
Treatment Ponds:	SMA-15&16
Basin Area:	61.24 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	6.45	11.29		3.76	21.50
Residential (60%)	3.20	3.60		1.20	8.01
Civ-Com-Multi (80%)	0.49	1.26		0.68	2.43
Open Space (Good)	2.47				2.47
Park (25%)	2.12	0.71			2.83
50' R/W (72%)	1.43	3.68			5.11
60' R/W (77%)	0.60	2.01			2.61
80' R/W (82.5%)	0.32	1.50			1.82
Friar's Cove Road (82.5%)	0.99	4.64			5.63
Alley (100%)		0.92			0.92
Water Surface			7.91		7.91
Totals:	18.07	29.62	7.91	5.64	61.24

Note: Commercial development within this basin will require dry pretreatment to be designed with project-specific final design

Basin:	SMA-16
Treatment Ponds:	SMA-15&16
Basin Area:	15.39 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	2.05	3.59		1.20	6.83
Residential (60%)	0.87	0.98		0.33	2.17
Open Space (Good)	1.51				1.51
50' R/W (72%)	0.39	1.01			1.40
60' R/W (77%)	0.23	0.78			1.01
Alley (100%)		0.31			0.31
Water Surface			2.16		2.16
Totals:	5.05	6.66	2.16	1.52	15.39

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basins:	SMA-15&16
Treatment Ponds:	SMA-15&16
Basin Area:	76.63 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Residential (70%)	8.50	14.87		4.96	28.33
Residential (60%)	4.07	4.58		1.53	10.18
Civ-Com-Multi (80%)	0.49	1.26		0.68	2.43
Open Space (Good)	3.98				3.98
Park (25%)	2.12	0.71			2.83
R.O.W. (72%)	1.82	4.69			6.51
60' R/W (77%)	0.83	2.79			3.62
80' R/W (82.5%)	0.32	1.50			1.82
Friar's Cove Road (82.5%)	0.99	4.64			5.63
Alley (100%)		1.23			1.23
Water Surface			10.07		10.07
Totals:	23.12	36.28	10.07	7.17	76.63

Note: Commercial development within Basin SMA-15 will require dry pretreatment to be designed with project-specific final design

Percent Impervious = 61%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious? **No**
 Is project zoned commercial or industrial? **No**
No dry pretreatment required.

Wet Detention Treatment Volume Calculations

1" x Total Area = 6.39 ac-ft
 2.5" x % Impervious = 8.47 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 12.70 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	SMA-15 Area (ac)	SMA-16 Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
36.5		0.79	168.98		Pond Bottom (SMA-16)
44.5	5.04	1.11	141.24		Pond Bottom (SMA-15)
59.5	7.06	1.83	28.45		Grade Break
62.5	7.91	2.16	0.00	0.00	DNW
63.5	8.20	2.28		8.05	
64.5	8.49	2.40		16.39	
65.5	8.78	2.51		25.03	
66.5	9.52	2.82		34.18	Outside Top of Berm

Minimum weir elevation = 64.06 ft

Design Weir Elevation = 64.10 ft
Treatment Volume Provided = 13.06 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	1	
Diameter, d (in.) =	6.00	
Total Head (ft) =	1.31	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	2.77 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	31.0 hours	

Fontana
Wet Detention Water Quality Calculations

Date: 7/2/18
 By: NRB
 Chk: JCN
 Rev: 9/21/2020

Basin:	MARINA
Treatment Pond:	MARINA
Basin Area:	7.14 acres

Basin Summary

Land Cover	Pervious Area (ac)	Impervious Area (ac)	Water Surface (ac)	Roof Area (ac)	Total Area (ac)
Future Marina (80%)	0.66	3.40		0.19	4.25
Access Easement		1.08			1.08
Water Surface	0.46		1.35		1.81
Totals:	1.12	4.48	1.35	0.19	7.14

Percent Impervious = 80%

Does basin discharge directly to waters listed in A.H. 4.2.2(b) and is greater than 40% impervious?	No
Is project zoned commercial or industrial?	No
No dry pretreatment required.	

Wet Detention Treatment Volume Calculations

1" x Total Area = 0.60 ac-ft Minimum required PAV

Does basin discharge to an O.F.W. or impaired water body? **Yes**

Req'd Wet Det. Treatment Volume = 0.89 ac-ft (includes additional 50% treatment volume)

Pond Data

Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
48.25	0.70	5.78		Pond Bottom
51.25	0.91	3.38		Grade Break
54.25	1.35	0.00	0.00	DNW
55.25	1.50		1.42	
56.25	1.65		3.00	
57.25	1.81		4.73	Outside Top of Berm

Minimum weir elevation = 54.91 ft

Design Weir Elevation =	55.00 ft
Treatment Volume Provided =	1.03 ac-ft

Control Device Calculations

Control device:	Circular Orifice	
# of devices:	1	
Diameter, d (in.) =	2.75	
Total Head (ft) =	0.55	*Total Head = Min. weir elevation - DNW+d/2
1/2" Detention Volume =	0.24 ac-ft	*1/2" runoff over the contributing area (total area - water surface)
Recovery Time =	19.9 hours	

Fontana
POND-7 Stage-Storage Calculations

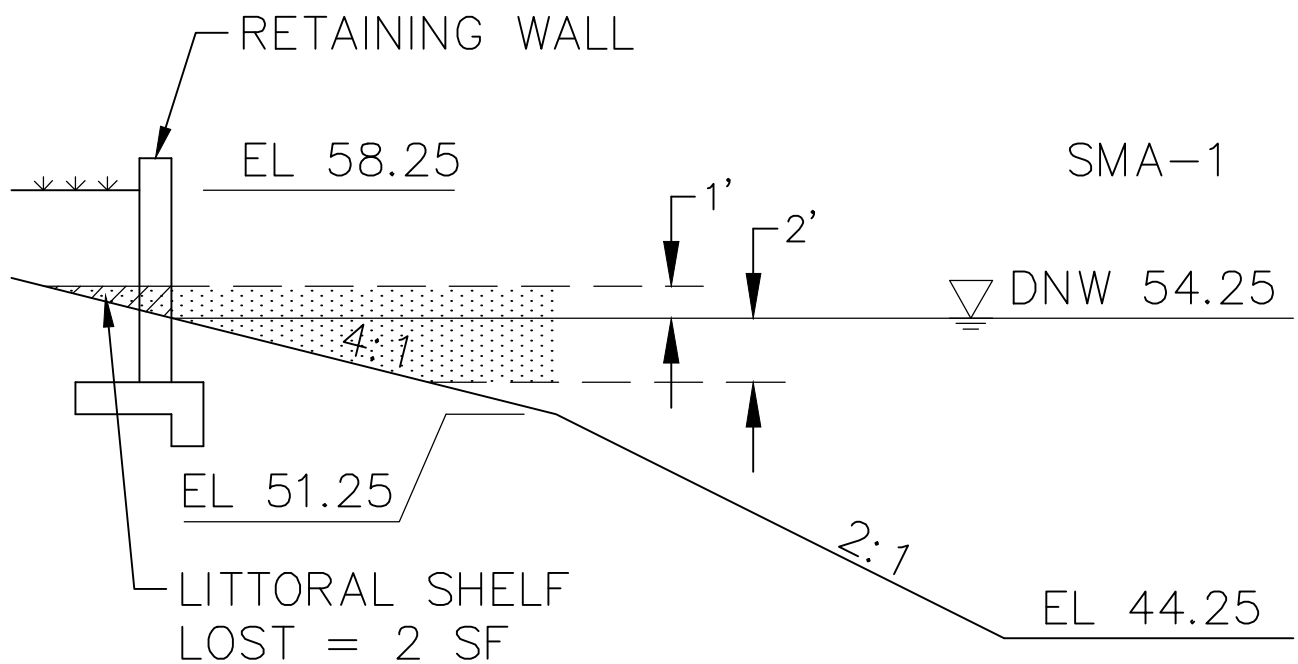
Date: 5/29/2018

By: ACC

Chk: JCN

POND-7 Pond Data				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
40	0.06	4.25		Pond Bottom
55	0.34	1.25		Grade Break
58	0.50	0.00	0.00	DNW
59	0.55		0.53	
60	0.61		1.11	
61	0.68		1.76	
62	0.84		2.51	Outside Top of Berm

Note: No treatment or attenuation proposed in POND-7



DONALD W. MCINTOSH ASSOCIATES, INC.
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DRAWN BY: ET	DESIGNED BY: JCN	APPROVED BY: JCN	SCALE	JOB NUMBER
DATE: 9/21/20	DATE: 9/21/20	DATE: 9/21/20	1"=6'H, 1"=6'V	13189

FONTANA
 OSCEOLA COUNTY, FLORIDA

WET DETENTION EXHIBIT



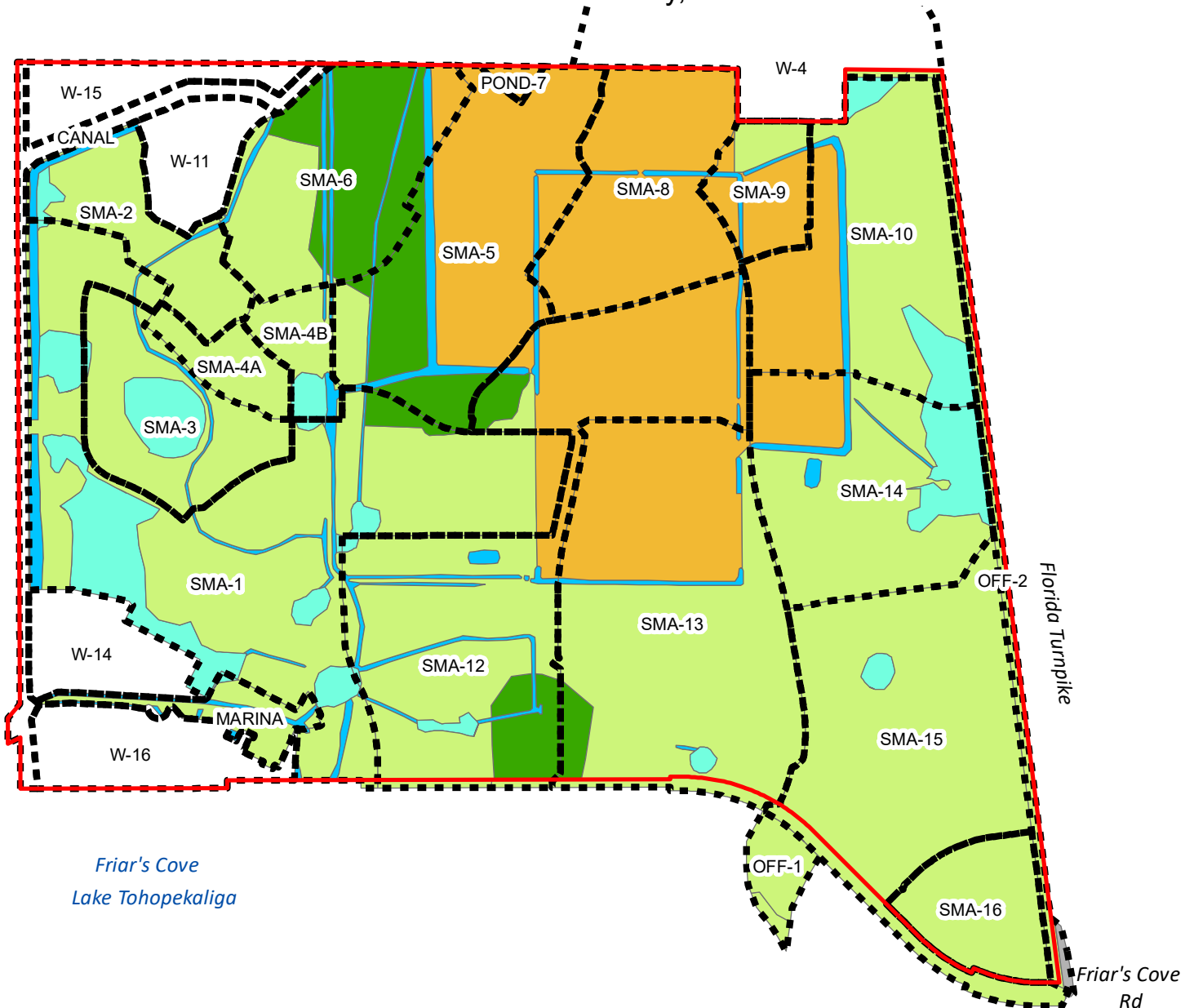
APPENDIX D.2

BMPTRAINS POLLUTANT LOADING ANALYSIS



Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

	Project Boundary
	Post-Development Drainage Basins
	DRY PRAIRIE
	HIGHWAY
	PASTURE
	RUDERAL UPLAND PINE*
	UNDEVELOPED
	WATER
	WETLAND*

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.
- 3) The land use data shown hereon is based upon land use determined by Bio-Tech Consultants, Inc.

BMPTRAINS Land Use Pre-Development

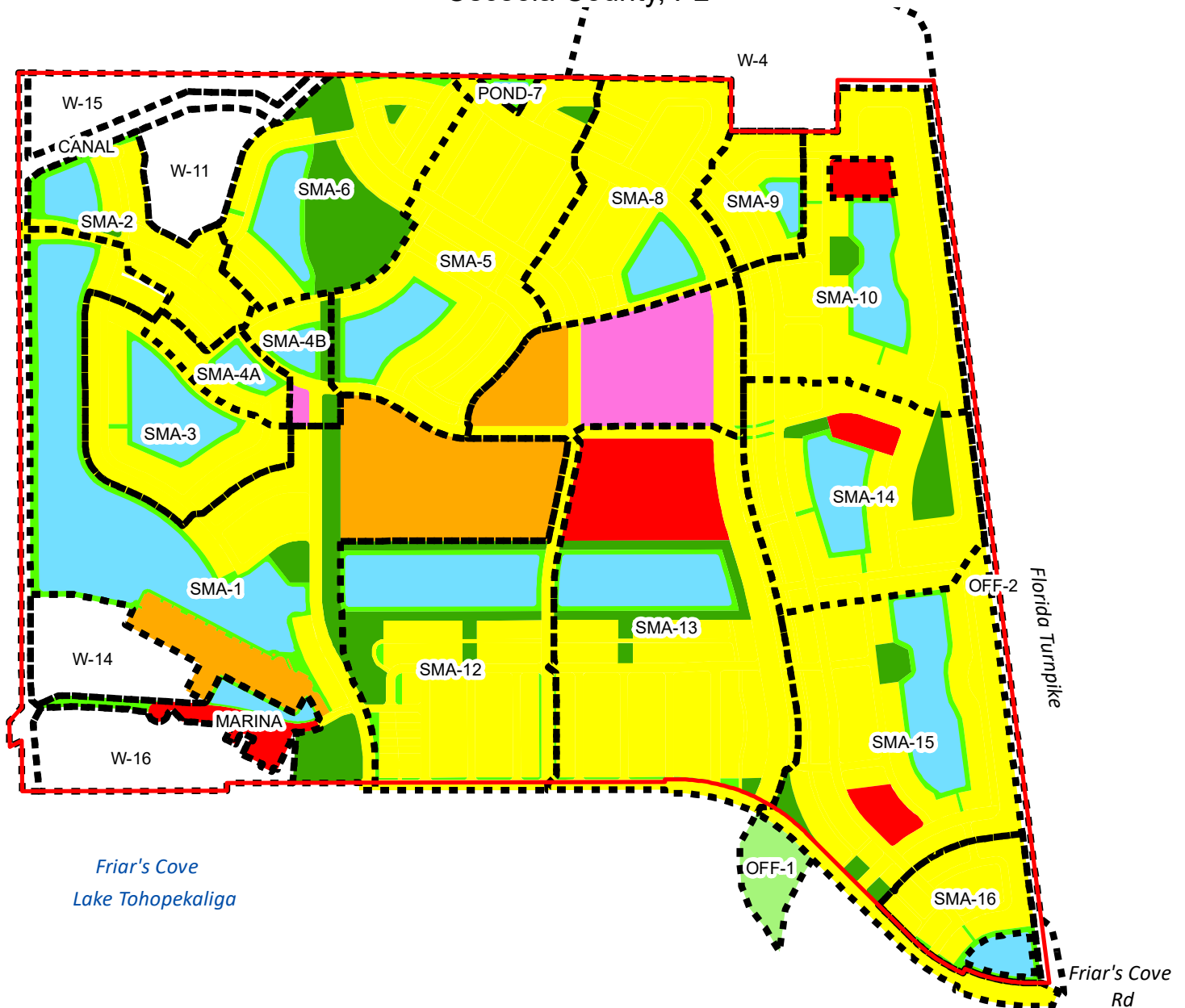


DONALD W. MCINTOSH ASSOCIATES, INC.
CIVIL ENGINEERS - LAND PLANNERS - SURVEYORS
2200 PARK AVENUE NORTH, WINTER PARK, FL 32789
PHONE 407.644.4068 FAX 407.644.8318



Fontana

Section 27, 28, 33 & 34, Township 26 S, Range 30 E
Osceola County, FL



Legend

- Project Boundary
- basins_2020.06
- AVG OF MFR + UNDEVELOPED
- HIGH INTENSITY COMMERCIAL
- LOW INTENSITY COMM
- MULTI FAMILY RES
- PASTURE
- SINGLE FAMILY RES
- UNDEVELOPED
- WATER SURFACE

NOTES

- 1) This is not a survey.
- 2) This map is for planning and permitting activity for the above named project and should be used for those purposes only.

BMPTRAINS Land Use Post Development



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BMPTRAINS Phosphorous Loading Summary

Date: 4/27/2018

By: NRB

Chk: JCN

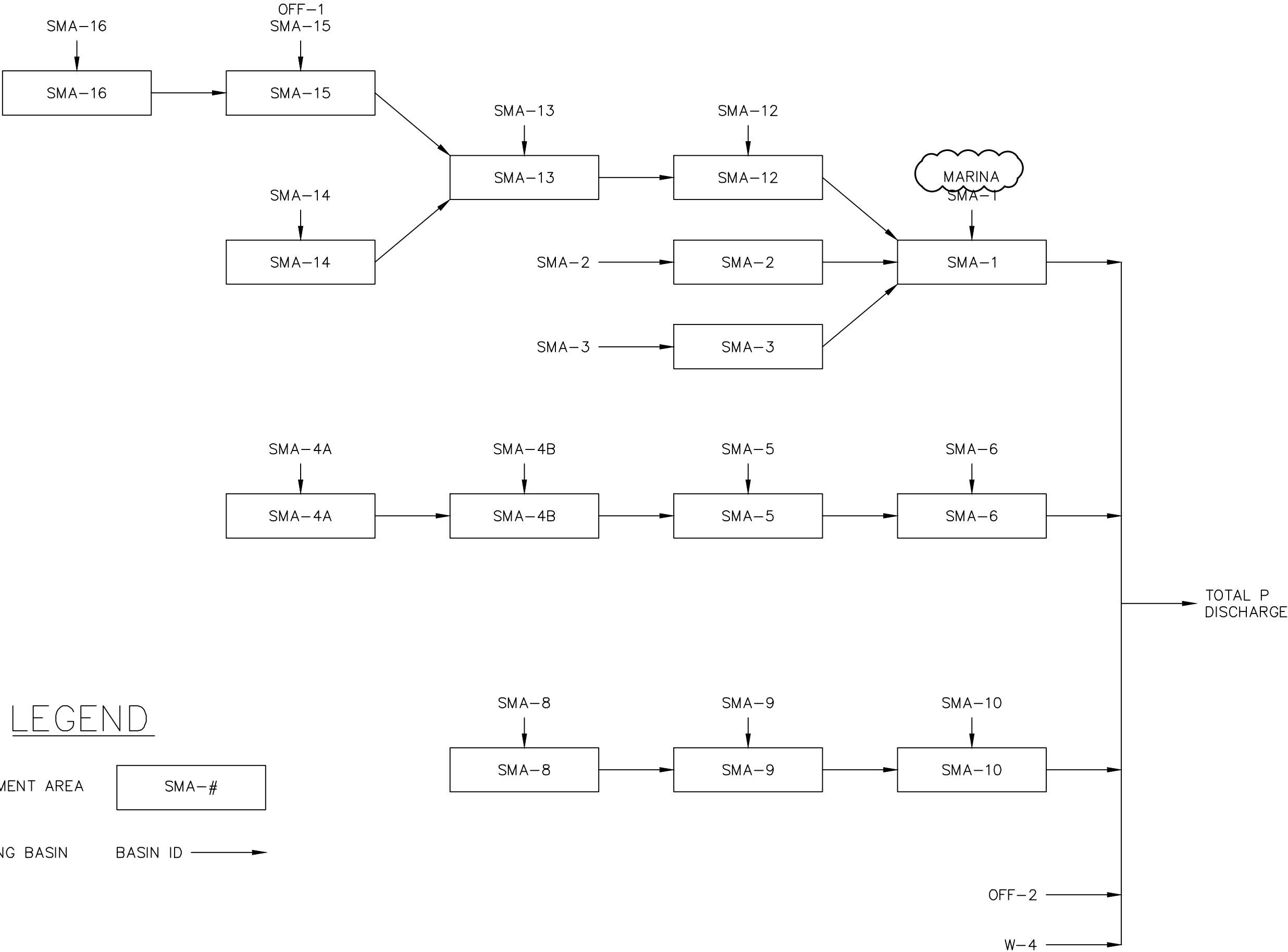
Rev: 6/26/2020

Basin	Area (ac)	Pre-Development TP Load (kg/yr)	Post Development TP Load (kg/yr)	Provided BMP	BMP Name	Provided BMP TP Removal Efficiency (%)	Discharged TP to SMA-1 (kg/yr)	Discharged TP Load (kg/yr)	
SMA-1	99.2	37.26	122.19	Wet Detention	SMA-1	86.75%		38.78	
SMA-2	17.8	6.64	11.26	Wet Detention	SMA-2	85.61%	3.72		
SMA-3	24.9	9.28	17.42	Wet Detention	SMA-3	87.96%			
SMA-4A	7.1	5.41	10.25	Wet Detention	SMA-4A	86.43%			9.70
SMA-4B	7.7			Wet Detention	SMA-4B				
SMA-5	50.3	9.95	32.96	Wet Detention	SMA-5	86.00%			
SMA-6	36.4	9.20	22.21	Wet Detention	SMA-6	83.14%			
SMA-8	33.8	1.07	16.12	Wet Detention	SMA-8	85.24%		5.93	
SMA-9	11.1	1.49	4.99	Wet Detention	SMA-9	84.79%			
SMA-10	47.8	5.51	23.47	Wet Detention	SMA-10	87.96%			
SMA-12	77.8	11.27	45.61	Wet Detention	SMA-12	86.24%	18.94		
SMA-13	75.0	7.58	39.43	Wet Detention	SMA-13	87.96%			
SMA-14	43.3	5.85	22.41	Wet Detention	SMA-14	87.96%			
OFF-1, SMA-15	66.4	6.89	34.65	Wet Detention	SMA-15	87.83%			
SMA-16	15.4	1.72	7.60	Wet Detention	SMA-16	87.96%			
OFF-2	6.7	0.91	0.36					0.36	
W-4	0.7	2.22	0.04					0.04	
Totals:		122.25	410.96					54.80	

Required Removal Efficiency:	70.25%
Provided Removal Efficiency:	86.66%

Notes

- Ponds which discharge into downstream ponds are included in the "Discharged TP to SMA-1" column; all other ponds discharge off-site
- See BMPTRAINS input and results for detailed phosphorous loading analysis



FONTANA											
OSCEOLA COUNTY, FLORIDA											
BMP TRAINS SCHEMATIC DIAGRAM											
				DONALD W. MCINTOSH ASSOCIATES, INC.							
				ENGINEERS				PLANNERS			
				SURVEYORS							
				2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4068							
DRAWN BY: <u>ACC</u>				JOB NO. <u>13189</u>		SCALE <u>NTS</u>		SHEET <u>1</u> OF <u>1</u>		DATE <u>6/14/2018</u>	
CHECKED BY: <u>JCN</u>											

Fontana
Residence Time Calculations

Date: 5/29/2018
 By: NRB
 Chk: JCN
 Rev: 6/26/2020

SMA-1				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
44.25	24.95	269.68		Pond Bottom
51.25	27.54	85.98		Grade Break
54.25	29.78	0.00	0.00	DNW
55.25	30.43		30.11	
56.25	31.08		60.86	
57.25	31.73		92.27	
58.25	33.35		124.81	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	228.97
Pond Volume below DNW (ac-ft):	269.68
Residence Time (yr):	1.18
Residence Time (days):	430

SMA-2				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
44.25	1.66	19.50		Pond Bottom
51.25	2.03	6.59		Grade Break
54.25	2.36	0.00	0.00	DNW
55.25	2.48		2.42	
56.25	2.60		4.96	
57.25	2.72		7.62	
58.25	3.04		10.50	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	25.16
Pond Volume below DNW (ac-ft):	19.50
Residence Time (yr):	0.78
Residence Time (days):	283

SMA-3				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
44.25	5.11	56.57		Pond Bottom
51.25	5.81	18.37		Grade Break
54.25	6.44	0.00	0.00	DNW
55.25	6.65		6.54	
56.25	6.86		13.30	
57.25	7.08		20.27	
58.25	7.64		27.63	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	39.00
Pond Volume below DNW (ac-ft):	56.57
Residence Time (yr):	1.45
Residence Time (days):	529

Fontana
Residence Time Calculations

Date: 5/29/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

SMA-4A				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
48	0.69	9.12		Pond Bottom
55	0.97	3.32		Grade Break
58	1.24	0.00	0.00	DNW
59	1.33		1.29	
60	1.43		2.67	
61	1.53		4.15	
62	1.79		5.81	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	22.42
Pond Volume below DNW (ac-ft):	9.12
Residence Time (yr):	0.41
Residence Time (days):	148

SMA-4B				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
48	0.78	10.00		Pond Bottom
55	1.06	3.56		Grade Break
58	1.31	0.00	0.00	DNW
59	1.40		1.36	
60	1.50		2.81	
61	1.59		4.35	
62	1.84		6.07	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	22.42
Pond Volume below DNW (ac-ft):	10.00
Residence Time (yr):	0.45
Residence Time (days):	163

SMA-5				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
38	2.68	70.69		Pond Bottom
55	4.09	13.10		Grade Break
58	4.64	0.00	0.00	DNW
59	4.82		4.73	
60	5.01		9.65	
61	5.20		14.75	
62	5.69		20.20	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	64.18
Pond Volume below DNW (ac-ft):	70.69
Residence Time (yr):	1.10
Residence Time (days):	402

Fontana
Residence Time Calculations

Date: 5/29/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

SMA-6				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
47.5	2.81	32.89		Pond Bottom
54.5	3.42	11.09		Grade Break
57.5	3.97	0.00	0.00	DNW
58.5	4.16		4.06	
59.5	4.35		8.32	
60.5	4.54		12.76	
61.5	5.03		17.55	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	35.15
Pond Volume below DNW (ac-ft):	32.89
Residence Time (yr):	0.94
Residence Time (days):	342

SMA-8				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
40.5	1.43	40.55		Pond Bottom
57.5	2.43	7.75		Grade Break
60.5	2.74	0.00	0.00	DNW
61	2.80		1.39	
62	2.93		4.25	
63	3.07		7.26	
64	3.20		10.39	
65	3.55		13.77	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	40.15
Pond Volume below DNW (ac-ft):	40.55
Residence Time (yr):	1.01
Residence Time (days):	369

SMA-9				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
35.5	0.10	11.98		Pond Bottom
57.5	0.75	2.60		Grade Break
60.5	0.99	0.00	0.00	DNW
61.5	1.07		1.03	
62.5	1.16		2.15	
63.5	1.25		3.36	
64.5	1.49		4.80	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	12.46
Pond Volume below DNW (ac-ft):	11.98
Residence Time (yr):	0.96
Residence Time (days):	351

Fontana
Residence Time Calculations

Date: 5/29/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

SMA-10			
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)
35.5	2.51	94.23	
57.5	4.69	15.04	
60.5	5.34	0.00	0.00
61.5	5.56		5.45
62.5	5.78		11.12
63.5	6.01		17.02
64.5	6.59		23.49

Pond Bottom
Grade Break
DNW

Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	57.80
Pond Volume below DNW (ac-ft):	94.23
Residence Time (yr):	1.63
Residence Time (days):	595

SMA-12			
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)
38	3.05	128.84	
45	7.19	105.63	
55	8.55	26.92	0.00
58	9.40	0.00	26.92
59	9.68		36.47
60	9.97		
61	10.26		56.42
62	11.00		67.50

Pond Bottom
Grade Break
DNW

Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	114.00
Pond Volume below DNW (ac-ft):	128.84
Residence Time (yr):	1.13
Residence Time (days):	413

SMA-13			
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)
37	4.93	152.49	
58	7.38	23.26	
61	8.13	0.00	0.00
62	8.39		8.26
63	8.64		16.77
64	8.90		25.55
65	9.56		34.98

Pond Bottom
Grade Break
DNW

Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	106.22
Pond Volume below DNW (ac-ft):	152.49
Residence Time (yr):	1.44
Residence Time (days):	524

Fontana
Residence Time Calculations

Date: 5/29/2018

By: NRB

Chk: JCN

Rev: 6/26/2020

SMA-14				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
37	2.54	89.14		Pond Bottom Grade Break DNW
59	4.31	13.75		
62	4.85	0.00	0.00	
63	5.04		4.94	
64	5.22		10.07	
65	5.41		15.39	
66	5.89		21.19	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	52.09
Pond Volume below DNW (ac-ft):	89.14
Residence Time (yr):	1.71
Residence Time (days):	625

SMA-15				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
44.5	5.04	113.17		Pond Bottom Grade Break DNW
59.5	7.06	22.45		
62.5	7.91	0.00	0.00	
63.5	8.20		8.05	
64.5	8.49		16.39	
65.5	8.78		25.03	
66.5	9.52		34.40	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	83.82
Pond Volume below DNW (ac-ft):	113.17
Residence Time (yr):	1.35
Residence Time (days):	493

SMA-16				
Stage (ft - NAVD)	Area (ac)	Volume Below DNW (ac-ft)	Volume Above DNW (ac-ft)	
36.5	0.79	36.16		Pond Bottom Grade Break DNW
59.5	1.83	6.00		
62.5	2.16	0.00	0.00	
63.5	2.28		2.22	
64.5	2.40		4.56	
65.5	2.51		7.01	
66.5	2.82		9.78	Outside Top of Berm

BMPTRAINS Annual Runoff (ac-ft/yr):	19.05
Pond Volume below DNW (ac-ft):	36.16
Residence Time (yr):	1.90
Residence Time (days):	693

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE		4/27/2018	Blue Numbers =	Input data
		Red Numbers =				Calculated or Carryover	
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis				NAME OF PROJECT Fontana (SMA-15-16)		HELP Rainfall	
						VIEW ZONE MAP	
Meteorological Zone (Please use zone map):				CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):				49.00 Inches		VIEW MEAN ANNUAL RAINFALL	
Type of analysis:				CLICK ON CELL BELOW TO SELECT Net improvement			
Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):				%		GO TO WATERSHED	
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.			
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				RESET INPUT FOR STORMWATER TREATMENT ANALYSIS			
				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu . The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.			
				METHODOLOGY FOR CALCULATING REQUIRED TREATMENT			
				METHODOLOGY FOR		METHODOLOGY FOR WET	
				METHODOLOGY FOR		METHODOLOGY FOR	

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers = Red Numbers =	Input data Calculated	LAND USES/EMC
SELECT CATCHMENT CONFIGURATION		4/27/2018		VIEW CATCHMENT CONFIGURATION		
CLICK ON CELL BELOW TO SELECT CONFIGURATION		F - Mixed-3 Catchment-2 Series-Parallel (A)				
For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain		COMINGLING		MULTI-LAND USE		
GO TO GENERAL SITE INFORMATION PAGE		OVERWRITE DEFAULT CONCENTRATIONS USING:				
Delay [hrs] 15	CATCHMENT NO.1 NAME: OFF-1	VIEW AVERAGE ANNUAL		PRE: mg/L POST: mg/L		
CLICK ON CELL BELOW TO SELECT		VIEW EMC & FLUCCS		EMC(N): mg/L EMC(P): mg/L		
CLICK ON CELL BELOW TO SELECT		GO TO GIS LANDUSE DATA		IMPORT GIS CONCENTRATIONS		
Pre-development land use: with default EMCs	GIS Import Data	From GIS data		Average annual pre runoff volume: 0.542 ac-ft/year		
Post-development land use: with default EMCs	GIS Import Data	5.2		Average annual post runoff volume (note no BMP area): 0.542 ac-ft/year		
Total pre-development catchment area:	5.200 AC	57.2		Pre-development Annual Mass Loading - Nitrogen: 2.346 kg/year		
Total post-development catchment or for BMP analysis:	5.200 AC	0%		Pre-development Annual Mass Loading - Phosphorus: 0.458 kg/year		
Pre-development Non DCIA CN:	57.20	57.2		Post-development Annual Mass Loading - Nitrogen: 2.346 kg/year		
Pre-development DCIA percentage:	0.00 %	0%		Post-development Annual Mass Loading - Phosphorus: 0.458 kg/year		
Post-development Non DCIA CN:	57.20	0%				
Post-development DCIA percentage:	0.00 %					
Estimated BMP Area (No loading from this area)	AC					
CATCHMENT NO.2 NAME: SMA-16		SMA-16		OVERWRITE DEFAULT CONCENTRATIONS:		
CLICK ON CELL BELOW TO SELECT		From GIS data		PRE: mg/L POST: mg/L		
Pre-development land use: with default EMCs	GIS Import Data	15.4		EMC(N): mg/L EMC(P): mg/L		
Post-development land use: with default EMCs	GIS Import Data	61.0		IMPORT GIS CONCENTRATIONS		
Total pre-development catchment area:	15.400 AC	61.0		Average annual pre runoff volume: 2.037 ac-ft/year		
Total post-development catchment or BMP analysis area:	15.400 AC	0%		Average annual post runoff volume (note no BMP area): 19.052 ac-ft/year		
Pre-development Non DCIA CN:	61.00	0%		Pre-development Annual Mass Loading - Nitrogen: 8.819 kg/year		
Pre-development DCIA percentage:	0.00 %	81.5		Pre-development Annual Mass Loading - Phosphorus: 1.724 kg/year		
Post-development Non DCIA CN:	81.50	26%		Post-development Annual Mass Loading - Nitrogen: 48.347 kg/year		
Post-development DCIA percentage:	26.00 %			Post-development Annual Mass Loading - Phosphorus: 7.602 kg/year		
Estimated BMP Area (No loading from this area)	AC					
CATCHMENT NO.3 NAME: SMA-15		SMA-15		OVERWRITE DEFAULT CONCENTRATIONS:		
CLICK ON CELL BELOW TO SELECT		From GIS data		PRE: mg/L POST: mg/L		
Pre-development land use: with default EMCs	GIS Import Data	61.2		EMC(N): mg/L EMC(P): mg/L		
Post-development land use: with default EMCs	GIS Import Data	61.0		IMPORT GIS CONCENTRATIONS		
Total pre-development catchment area:	61.200 AC	61.0		Average annual pre runoff volume: 10.036 ac-ft/year		
Total post-development catchment or BMP analysis area:	61.200 AC	1%		Average annual post runoff volume (note no BMP area): 83.816 ac-ft/year		
Pre-development Non DCIA CN:	61.00	82.2		Pre-development Annual Mass Loading - Nitrogen: 35.750 kg/year		
Pre-development DCIA percentage:	1.00 %	30%		Pre-development Annual Mass Loading - Phosphorus: 6.435 kg/year		
Post-development Non DCIA CN:	82.20			Post-development Annual Mass Loading - Nitrogen: 216.439 kg/year		
Post-development DCIA percentage:	30.00 %			Post-development Annual Mass Loading - Phosphorus: 34.190 kg/year		
Estimated BMP Area (no loading from this area)	AC					

V 8.6

Note: Soil hydrologic groups would be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would be artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

GO TO WATERSHED CHARACTERISTICS

[VIEW EMC & FLUCCS](#)

Pre-Development EMC Calculation Table

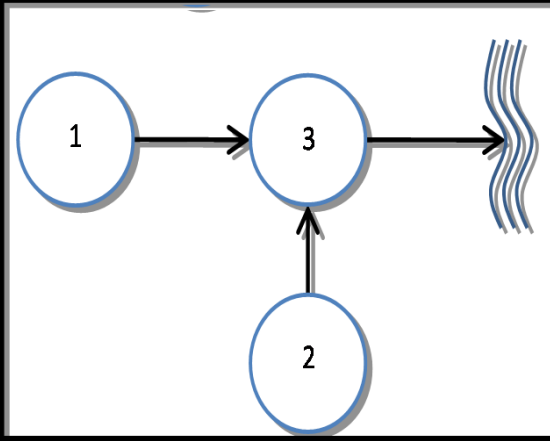
EMC Overwrite		Basin ID	FLUCSCCODE	FLUCDESC	HYDROGRP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on Basin?		C*Area* TP _{EMC}	C*Area* TP _{P092}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
TP [mg/L]	TP [mg/L]													TP [mg/L]	TP [mg/L]				TP [mg/L]	TP [mg/L]					
	OFF-1	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.00134	3.51	0.686	0.00472	0.00092	YES		3.51	0.686	OFF-1			0%	57.2
	OFF-1	2110	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	1.3802	3.51	0.686	0.48446	0.09468	NO								
	OFF-1	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.00435	3.51	0.686	0.01528	0.00299	NO								
	OFF-1	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.00032	3.51	0.686	0.00114	0.00022	NO								
	SMA-16	2110	Improved Pastures	B	61.0	No	15.39	PASTURE	15.39	938.99	0.0324	3.51	0.686	0.42426	YES			3.51	0.686	SMA-16	15.4		0%	61.0	
	SMA-15	2110	Improved Pasture	B	61.0	No	5.6	PASTURE	5.6	344.6	0.0324	0.18144	3.51	0.686	0.63685	0.12447	YES		2.89	0.520	SMA-15	61.2		1%	61.0
	SMA-15	8140	Roads and Highways	B	89.0	No	0.02	HIGHWAY	0.02	1.78	0.2256	0.00451	1.52	0.2	0.00686	0.0009	NO								
	SMA-15	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.86	WETLAND*	0.86	84.28	0.809	0.69574	1.15	0.055	0.8001	0.03827	NO						0.9		
	SMA-15	2110	Improved Pastures	B	61.0	No	51.02	PASTURE	51.02	3112.22	0.0324	1.65305	3.51	0.686	5.8022	1.13399	NO								
	SMA-15	2110	Improved Pastures	B	61.0	No	3.74	PASTURE	3.74	228.14	0.0324	0.12118	3.51	0.686	0.42533	0.08313	NO								

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCCODE	FLUCSDISC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		OFF-1	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.00134	3.51	0.686	0.00472	0.00092	YES	3.51	0.686	OFF-1	5.2		0%	57.2
		OFF-1	2110	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	0.13802	3.51	0.686	0.48446	0.09468	NO							
		OFF-1	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.00435	3.51	0.686	0.01528	0.00299	NO							
		OFF-1	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.00032	3.51	0.686	0.00114	0.00022	NO							
		SMA-16	1210	Residential (70%)	B	86.0	Yes	0.38	SINGLE FAMILY RES	0.38	32.68	0.809	0.30742	2.07	0.327	0.63636	0.10053	YES	2.06	0.324	SMA-16	15.4	0.4	26%	81.5
		SMA-16	1210		B	86.0	No	6.45	SINGLE FAMILY RES	6.45	554.7	0.1764	1.13778	2.07	0.327	2.3352	0.37205	NO							
		SMA-16	1210	Residential (60%)	B	82.0	Yes	0.16	SINGLE FAMILY RES	0.16	13.12	0.809	0.12944	2.07	0.327	0.26794	0.04233	NO					0.2		
		SMA-16	1210		B	82.0	No	2.01	SINGLE FAMILY RES	2.01	164.82	0.1306	0.26251	2.07	0.327	0.54339	0.08584	NO							
		SMA-16	1210	50' R/W (72%)	B	81.0	Yes	0.52	SINGLE FAMILY RES	0.52	42.12	0.809	0.42068	2.07	0.327	0.87081	0.13756	NO					0.5		
		SMA-16	1210		B	81.0	No	0.88	SINGLE FAMILY RES	0.88	71.28	0.1208	0.1063	2.07	0.327	0.22005	0.03476	NO							
		SMA-16	1210	60' R/W (77%)	B	83.0	Yes	0.43	SINGLE FAMILY RES	0.43	35.69	0.809	0.34787	2.07	0.327	0.72009	0.11375	NO					0.4		
		SMA-16	1210		B	83.0	No	0.58	SINGLE FAMILY RES	0.58	48.14	0.1404	0.08143	2.07	0.327	0.16856	0.02663	NO							
		SMA-16	1210	Alley (100%)	B	98.0	Yes	0.31	SINGLE FAMILY RES	0.31	30.38	0.809	0.25079	2.07	0.327	0.51914	0.08201	NO					0.3		
		SMA-16	1900	Open Space (Good)	B	61.0	No	1.51	UNDEVELOPED	1.51	92.11	0.0324	0.04892	1.288	0.107	0.06301	0.00523	NO							
		SMA-16	8370	Water Surface	B	98.0	Yes	2.16	WATER			0.809		0	0			NO					2.2		
		SMA-15	1210	Residential (70%)	B	86.0	Yes	1.2	SINGLE FAMILY RES	1.2	103.2	0.809	0.9708	2.07	0.327	2.00956	0.31745	YES	2.09	0.331	SMA-15	61.2	1.2	30%	82.2
		SMA-15	1210		B	86.0	No	20.3	SINGLE FAMILY RES	20.3	1745.8	0.1764	3.58092	2.07	0.327	7.4125	1.17096	NO							
		SMA-15	1210	Residential (60%)	B	82.0	Yes	0.58	SINGLE FAMILY RES	0.58	47.56	0.809	0.46922	2.07	0.327	0.97129	0.15343	NO					0.6		
		SMA-15	1210		B	82.0	No	7.43	SINGLE FAMILY RES	7.43	609.26	0.1306	0.97036	2.07	0.327	2.00864	0.31731	NO							
		SMA-15	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.97	HIGH INTENSITY COMMERC	0.97	83.42	0.809	0.78473	2.4	0.345	1.88335	0.27073	NO					1.0		
		SMA-15	1400		B	86.0	No	1.46	HIGH INTENSITY COMMERC	1.46	125.56	0.1764	0.25754	2.4	0.345	0.61811	0.08885	NO							
		SMA-15	1850	Park (25%)	B	68.0	Yes	0.18	AVERAGE OF MFR+UNDEVEL	0.18	12.24	0.809	0.14562	2.32	0.52	0.33784	0.07572	NO					0.2		
		SMA-15	1850		B	68.0	No	2.65	AVERAGE OF MFR+UNDEVEL	2.65	180.2	0.051	0.13515	2.32	0.52	0.31355	0.07028	NO							
		SMA-15	1210	50' R/W (72%)	B	81.0	Yes	1.91	SINGLE FAMILY RES	1.91	154.71	0.809	1.54519	2.07	0.327	3.19854	0.50528	NO					1.9		
		SMA-15	1210		B	81.0	No	3.2	SINGLE FAMILY RES	3.2	259.2	0.1208	0.38656	2.07	0.327	0.80018	0.12641	NO							
		SMA-15	1210	60' R/W (77%)	B	83.0	Yes	1.11E+00	SINGLE FAMILY RES	1.11	92.13	0.809	0.89799	2.07	0.327	1.85884	0.29364	NO					1.1		
		SMA-15	1210		B	83.0	No	1.5	SINGLE FAMILY RES	1.5	124.5	0.1404	0.2106	2.07	0.327	0.43594	0.06887	NO							
		SMA-15	1210	80' R/W (82.5%)	B	85.0	Yes	0.89	SINGLE FAMILY RES	0.89	75.65	0.809	0.72001	2.07	0.327	1.49042	0.23544	NO					0.9		
		SMA-15	1210		B	85.0	No	0.93	SINGLE FAMILY RES	0.93	79.05	0.16	0.1488	2.07	0.327	0.30802	0.04866	NO							
		SMA-15	1210	Friar's Cove Road (82.5%)	B	85.0	Yes	2.74	SINGLE FAMILY RES	2.74	232.9	0.809	2.21666	2.07	0.327	4.58849	0.72485	NO					2.7		
		SMA-15	1210		B	85.0	No	2.89	SINGLE FAMILY RES	2.89	245.65	0.16	0.4624	2.07	0.327	0.95717	0.1512	NO							
		SMA-15	1210	Alley (100%)	B	98.0	Yes	0.92	SINGLE FAMILY RES	0.92	90.16	0.809	0.74428	2.07	0.327	1.54066	0.24338	NO					0.9		
		SMA-15	1900	Open Space (Good)	B	61.0	No	2.47	UNDEVELOPED	2.47	150.67	0.0324	0.08003	1.288	0.107	0.10308	0.00856	NO							
		SMA-15	8370	Water Surface	B	98.0	Yes	7.91	WATER			0.809		0	0			NO					7.9		

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
OFF-1	5.2	3.51	0.686	57.2	0%	3.51	0.686	57.2	0%
SMA-16	15.4	3.51	0.686	61.0	0%	2.06	0.324	81.5	26%
SMA-15	61.2	2.89	0.520	61.0	1%	2.09	0.331	82.183	30%

WET DETENTION / MANAGED AQUATIC PLANTS:		4/27/2018 V 8.6	
Also called: FLOATING ISLANDS and includes a wet detention pond:		Fontana (SMA-15-16)	
Total pre-development catchment area:	OFF-1	SMA-16	SMA-15
Total post-development catchment area:	5.200	15.400	61.200
Average annual residence time (between 1 and 500 days)	5.200	15.400	61.200
Littoral Zone or other improvements used?*		500.00	493.00
Littoral Zone or other improvement efficiency credit:		NO	NO
Floating Wetland or Mats used in the design:		NO	NO
Floating Wetland or Mats credit:			
Total Nitrogen removal required:	0.000	81.758	83.483
Total Phosphorus removal required:	0.000	77.325	81.180
Total Nitrogen removal efficiency:	0.000	43.370	43.365
Total Phosphorus removal efficiency:	0.000	87.956	87.829
Is the wet detention sufficient:		NO	NO
Average annual runoff volume:	0.542	19.052	83.816
* pond coverage must follow Regulatory Requirements			
Wet Detention Pond Characteristic:			
Minimum Pond Permanent Pool Volume:		26.099	113.210
		NOTE FOR TREATMENT EFFICIENCY GRAPH: The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.	
GO TO STORMWATER TREATMENT ANALYSIS REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION.			
Source of Graphic: draft STORMWATER QUALITY APPLICANT'S HANDBOOK dated March 2010, by the Department of Environmental Protection, available at: http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater , March 2010			

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-15-16)	Optional Identification		
	OFF-1	SMA-16	SMA-15	Catchment 4
BMP Name		Wet Detention/ MAPs	Wet Detention/ MAPs	
BMP Name				
BMP Name				
REVIEW, ONE OR MORE CATCHMENT HAS BEEN SPECIFIED WITHOUT A BMP				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	F - Mixed-3 Catchment-2 Series-Parallel (A)	Treatment Objectives or Target for TN NOT MET TP MET	4/27/2018	
Nitrogen Pre Load (kg/yr)	46.91		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	8.62			
Nitrogen Post Load (kg/yr)	267.13			
Phosphorus Post Load (kg/yr)	42.25			
Target Load Reduction (N) %	82			
Target Load Reduction (P) %	80			
Target Discharge Load, N (kg/yr)	48.08			
Target Discharge Load, P (kg/yr)	8.45			
Provided Overall Efficiency, N (%)	43			
Provided Overall Efficiency, P (%)	87			
Discharged Load, N (kg/yr & lb/yr):	152.10		335.02	
Discharged Load, P (kg/yr & lb/yr):	5.44		11.98	
Load Removed, N (kg/yr & lb/yr):	115.03		253.36	
Load Removed, P (kg/yr & lb/yr):	36.81		81.08	

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE	4/27/2018	Blue Numbers = Red Numbers =	Input data Calculated or Carryover
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis			NAME OF PROJECT Fontana (SMA-12-16)		HELP Rainfall VIEW ZONE MAP VIEW MEAN ANNUAL RAINFALL GO TO WATERSHED	
Meteorological Zone (Please use zone map):			CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):			49.00 Inches			
Type of analysis: Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):			CLICK ON CELL BELOW TO SELECT Net improvement			
			%			
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.		
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.		
				METHODOLOGY FOR CALCULATING REQUIRED TREATMENT		
				METHODOLOGY FOR		METHODOLOGY FOR WET
				METHODOLOGY FOR		METHODOLOGY FOR
RESET INPUT FOR STORMWATER TREATMENT ANALYSIS						

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers =	Input data	LAND USES/EMC
SELECT CATCHMENT CONFIGURATION 4/27/2018		CLICK ON CELL BELOW TO SELECT CONFIGURATION K - Mixed-4 Catchment-Series (B)		Red Numbers =	Calculated	
For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain Delay [hrs] CATCHMENT NO.1 NAME: SMA-15-16 max delay = 15 hrs. Pre-development land use: GIS Import Data with default EMCs Post-development land use: GIS Import Data with default EMCs Total pre-development catchment area: 81.800 AC Total post-development catchment or for BMP analysis: 81.800 AC Pre-development Non DCIA CN: 60.80 Pre-development DCIA percentage: 1.00 % Post-development Non DCIA CN: 79.90 Post-development DCIA percentage: 27.00 % Estimated BMP Area (No loading from this area) 27.00 AC		COMINGLING MULTI-LAND USE VIEW AVERAGE ANNUAL VIEW EMC & FLUCCS GO TO GIS LANDUSE DATA		VIEW CATCHMENT CONFIGURATION GO TO GENERAL SITE INFORMATION PAGE OVERWRITE DEFAULT CONCENTRATIONS USING: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 13.256 ac-ft/year Average annual post runoff volume (note no BMP area): 99.720 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 49.201 kg/year Pre-development Annual Mass Loading - Phosphorus: 9.028 kg/year Post-development Annual Mass Loading - Nitrogen: 258.135 kg/year Post-development Annual Mass Loading - Phosphorus: 40.874 kg/year		
CATCHMENT NO.2 NAME: SMA-14 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data Pre-development land use: GIS Import Data with default EMCs Post-development land use: GIS Import Data with default EMCs Total pre-development catchment area: 43.300 AC Total post-development catchment or BMP analysis area: 43.300 AC Pre-development Non DCIA CN: 59.00 Pre-development DCIA percentage: 19.00 % Post-development Non DCIA CN: 81.30 Post-development DCIA percentage: 25.00 % Estimated BMP Area (No loading from this area) 25.00 AC		From GIS data 81.8 60.8 1% 79.9 27%		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 31.260 ac-ft/year Average annual post runoff volume (note no BMP area): 52.091 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 58.380 kg/year Pre-development Annual Mass Loading - Phosphorus: 5.847 kg/year Post-development Annual Mass Loading - Nitrogen: 136.290 kg/year Post-development Annual Mass Loading - Phosphorus: 22.411 kg/year		
CATCHMENT NO.3 NAME: SMA-13 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data Pre-development land use: GIS Import Data with default EMCs Post-development land use: GIS Import Data with default EMCs Total pre-development catchment area: 75.000 AC Total post-development catchment or BMP analysis area: 75.000 AC Pre-development Non DCIA CN: 59.80 Pre-development DCIA percentage: 2.00 % Post-development Non DCIA CN: 81.90 Post-development DCIA percentage: 32.00 % Estimated BMP Area (no loading from this area) 32.00 AC		From GIS data 75.0 59.8 2% 81.9 32%		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 13.867 ac-ft/year Average annual post runoff volume (note no BMP area): 106.221 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 45.108 kg/year Pre-development Annual Mass Loading - Phosphorus: 7.577 kg/year Post-development Annual Mass Loading - Nitrogen: 235.740 kg/year Post-development Annual Mass Loading - Phosphorus: 39.434 kg/year		
CATCHMENT NO.4 NAME: SMA-12 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data Pre-development land use: GIS Import Data with default EMCs Post-development land use: GIS Import Data with default EMCs Total pre-development catchment area: 77.800 AC Total post-development catchment or BMP analysis area: 77.800 AC Pre-development Non DCIA CN: 57.40 Pre-development DCIA percentage: 7.00 % Post-development Non DCIA CN: 80.60 Post-development DCIA percentage: 35.00 % Estimated BMP Area (no loading from this area) 35.00 AC		From GIS data 77.8 57.4 7% 80.6 35%		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 25.621 ac-ft/year Average annual post runoff volume (note no BMP area): 113.997 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 72.858 kg/year Pre-development Annual Mass Loading - Phosphorus: 11.274 kg/year Post-development Annual Mass Loading - Nitrogen: 257.852 kg/year Post-development Annual Mass Loading - Phosphorus: 45.612 kg/year		

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering in a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

GO TO WATERSHED CHARACTERISTICS

VIEW EMC & FLUCCS

Pre-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCSDSC	HYDROGRP	CN	DCIA [Yes/ No]	Area [acres]	Compressed Land Use	Area [acres] [for CN]		C	C*Area	EMC's Based on		C*Area* TP _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
TN [mg/L]	TP [mg/L]									TN [mg/L]	TP [mg/L]			TN [mg/L]	TP [mg/L]										
		SMA-15-16	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.00134	3.51	0.686	0.00472	0.00092	YES							
		SMA-15-16	2110	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	0.13802	3.51	0.686	0.48446	0.09468	NO							
		SMA-15-16	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.00435	3.51	0.686	0.01528	0.00299	NO							
		SMA-15-16	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.00032	3.51	0.686	0.00114	0.00022	NO							
		SMA-15-16	2110	Improved Pastures	B	61.0	No	15.39	PASTURE	15.39	938.79	0.0324	0.49864	3.51	0.686	1.75021	0.34206	NO							
		SMA-15-16	2110	Improved Pasture	B	61.0	No	5.6	PASTURE	5.6	341.6	0.0324	0.18144	3.51	0.686	0.63685	0.12447	NO							
		SMA-15-16	8140	Roads and Highways	B	89.0	No	0.02	HIGHWAY	0.02	1.78	0.2256	0.00451	1.52	0.2	0.00686	0.0009	NO							
		SMA-15-16	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.86	WETLAND*	0.86	84.28	0.809	0.69574	1.15	0.055	0.8001	0.03827	NO					0.9		
		SMA-15-16	2110	Improved Pastures	B	61.0	No	51.02	PASTURE	51.02	3112.22	0.0324	1.65305	3.51	0.686	5.8022	1.13399	NO							
		SMA-15-16	2110	Improved Pastures	B	61.0	No	3.74	PASTURE	3.74	228.14	0.0324	0.12118	3.51	0.686	0.42533	0.08313	NO							
		SMA-14	6410	Freshwater Marshes	B	98.0	Yes	0.17	WETLAND*	0.17	16.66	0.809	0.13753	1.15	0.055	0.15816	0.00756	YES	1.51	0.152	SMA-14	43.3	0.2	19%	59.0
		SMA-14	6410	Freshwater Marshes	B	98.0	Yes	6.19	WETLAND*	6.19	606.62	0.809	5.00771	1.15	0.055	5.75887	0.27542	NO					6.2		
		SMA-14	6410	Freshwater Marshes	B	98.0	Yes	0.05	WETLAND*	0.05	4.9	0.809	0.04045	1.15	0.055	0.04652	0.00222	NO					0.1		
		SMA-14	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.38	WATER			0.809	0	0	0			NO					0.4		
		SMA-14	5100	Streams and Waterways	B	98.0	Yes	0.07	WATER			0.809	0	0	0			NO					0.1		
		SMA-14	5100	Streams and Waterways	B	98.0	Yes	0.1	WATER			0.809	0	0	0			NO					0.1		
		SMA-14	5100	Streams and Waterways	B	98.0	Yes	1.17	WATER			0.809	0	0	0			NO					1.2		
		SMA-14	2240	Abandoned Citrus Groves	A	32.0	No	1.96	RUDERAL UPLAND PINE*	1.96	62.72	0.0028	0.00549	1.694	0.162	0.0093	0.00089	NO							
		SMA-14	2240	Abandoned Citrus Groves	B	58.0	No	4.36	RUDERAL UPLAND PINE*	4.36	252.88	0.0268	0.11685	1.694	0.162	0.19794	0.01893	NO							
		SMA-14	2110	Improved Pastures	B	61.0	No	6.99	PASTURE	6.99	426.39	0.0324	0.22648	3.51	0.686	0.79493	0.15536	NO							
		SMA-14	2110	Improved Pastures	B	61.0	No	1.96	PASTURE	1.96	119.56	0.0324	0.0635	3.51	0.686	0.2229	0.04356	NO							
		SMA-14	2110	Improved Pastures	B	61.0	No	2.63	PASTURE	2.63	160.43	0.0324	0.08521	3.51	0.686	0.29909	0.05846	NO							
		SMA-14	2110	Improved Pastures	B	61.0	No	17.3	PASTURE	17.3	1055.3	0.0324	0.56052	3.51	0.686	1.96743	0.38452	NO							
		SMA-13	2110	Improved Pasture	B	61.0	No	2.25	PASTURE	2.25	137.25	0.0324	0.0729	3.51	0.686	0.25588	0.05001	YES	2.64	0.443	SMA-13	75.0		2%	59.8
		SMA-13	6410	Freshwater Marshes	B	98.0	Yes	0.49	WETLAND*	0.49	48.02	0.809	0.39641	1.15	0.055	0.45587	0.0218	NO					0.5		
		SMA-13	5100	Streams and Waterways	B	98.0	Yes	0.38	WATER			0.809	0	0	0			NO					0.4		
		SMA-13	5100	Streams and Waterways	B	98.0	Yes	0.75	WATER			0.809	0	0	0			NO					0.8		
		SMA-13	2240	Abandoned Citrus Groves	B	58.0	No	2.17	RUDERAL UPLAND PINE*	2.17	125.86	0.0268	0.05816	1.694	0.162	0.09852	0.00942	NO							
		SMA-13	2240	Abandoned Citrus Groves	B	58.0	No	23.09	RUDERAL UPLAND PINE*	23.09	1339.22	0.0268	0.61881	1.694	0.162	1.04827	0.10025	NO							
		SMA-13	4270	Live Oak	B	55.0	No	2.28	UNDEVELOPED	2.28	125.4	0.022	0.05016	1.288	0.107	0.06461	0.00537	NO							
		SMA-13	2110	Improved Pastures	B	61.0	No	37.37	PASTURE	37.37	2279.57	0.0324	1.21079	3.51	0.686	4.24987	0.8306	NO							
		SMA-13	2110	Improved Pastures	B	61.0	No	6.24	PASTURE	6.24	380.64	0.0324	0.20218	3.51	0.686	0.70964	0.13869	NO							
		SMA-12	2130	Woodland Pasture	B	58.0	No	0.46	PASTURE	0.46	26.68	0.0268	0.01233	3.51	0.686	0.04327	0.00846	YES	2.31	0.357	SMA-12	77.8		7%	57.4
		SMA-12	2110	Improved Pasture	B	61.0	No	0.4	PASTURE	0.4	24.4	0.0324	0.01296	3.51	0.686	0.04549	0.00889	NO							
		SMA-12	2110	Improved Pasture	B	61.0	No	0.04	PASTURE	0.04	2.44	0.0324	0.0013	3.51	0.686	0.00455	0.00099	NO							
		SMA-12	2110	Improved Pasture	B	61.0	No	0.46	PASTURE	0.46	28.06	0.0324	0.0149	3.51	0.686	0.05231	0.01022	NO							
		SMA-12	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.12	WATER			0.809	0	0	0			NO					0.1		
		SMA-12	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.25	WATER			0.809	0	0	0			NO					0.3		
		SMA-12	6410	Freshwater Marshes	B	98.0	Yes	0.23	WETLAND*	0.23	22.54	0.809	0.18607	1.15	0.055	0.21398	0.01023	NO					0.2		
		SMA-12	6410	Freshwater Marshes	B	98.0	Yes	0.08	WETLAND*	0.08	7.84	0.809	0.06472	1.15	0.055	0.07443	0.00356	NO					0.1		
		SMA-12	5100	Streams and Waterways	B	98.0	Yes	0.78	WATER			0.809	0	0	0			NO					0.8		
		SMA-12	5100	Streams and Waterways	B	98.0	Yes	1.02	WATER			0.809	0	0	0			NO					1.0		
		SMA-12	5100	Streams and Waterways	B	98.0	Yes	1.01	WATER			0.809	0	0	0			NO					1.0		
		SMA-12	5100	Streams and Waterways	A	98.0	Yes	0.29	WATER			0.809	0	0	0			NO					0.3		
		SMA-12	5100	Streams and Waterways	B	98.0	Yes	0.57	WATER			0.809	0	0	0			NO					0.8		
		SMA-12	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.57	WETLAND*	0.57	55.86	0.809	0.46113	1.15	0.055	0.5303	0.02536	NO					0.6		
		SMA-12	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.11	WETLAND*	0.11	10.78	0.809	0.08899	1.15	0.055	0.10234	0.00489	NO					0.1		
		SMA-12	2240	Abandoned Citrus Groves	A	32.0	No	1.39	RUDERAL UPLAND PINE*	1.39	44.48	0.0028	0.00389	1.694	0.162	0.00659	0.00063	NO							
		SMA-12	2240	Abandoned Citrus Groves	B	58.0	No	1.19	RUDERAL UPLAND PINE*	1.19	69.02	0.0268	0.03189	1.694	0.162	0.05403	0.00517	NO							
		SMA-12	2240	Abandoned Citrus Groves	A	32.0	No	3.63E+00	RUDERAL UPLAND PINE*	3.63	116.16	0.0028	0.01016	1.694	0.162	0.01722	0.00165	NO							
		SMA-12	2240	Abandoned Citrus Groves	B	58.0	No	20.52	RUDERAL UPLAND PINE*	20.52	1190.16	0.0268	0.54994	1.694	0.162	0.93159	0.08909	NO							
		SMA-12	4270	Live Oak	B	55.0	No	0.01	UNDEVELOPED	0.01	0.55	0.022	0.00022	1.288	0.107	0.00028	2.4E-05	NO							
		SMA-12	4270	Live Oak	B	55.0	No	4.82	UNDEVELOPED	4.82	265.1	0.022	0.10604	1.288	0.107	0.13658	0.01135	NO							
		SMA-12	2110	Improved Pastures	B	61.0	No	5.66	PASTURE	5.66	345.26	0.0324	0.18338	3.51	0.686	0.64368	0.1258	NO							
		SMA-12	2110	Improved Pastures	B	61.0	No	0.1	PASTURE	0.1	6.1	0.0324	0.00324	3.51	0.686	0.01137	0.00222	NO							
		SMA-12	2110	Improved Pastures	B	61.0	No	0.34	PASTURE	0.34	20.74	0.0324	0.01102	3.51	0.686	0.03867	0.00756	NO							
		SMA-12	4270	Live Oak	B	55.0	No	1.19	UNDEVELOPED	1.19	65.45	0.022	0.02618	1.288	0.107	0.03372	0.0028	NO							
		SMA-12	2110	Improved Pastures	B	61.0	No	3.3																	

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCCODE	FLUCDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres]		C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]	
TN [mg/L]	TP [mg/L]									TN [mg/L]	TP [mg/L]			TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]						
		SMA-15-16	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.00134	3.51	0.686	0.00472	0.00092	YES	2.10	0.332	SMA-15-16	81.8			27%	79.9
		SMA-15-16	2110	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	0.13803	3.51	0.686	0.48446	0.09468	NO								
		SMA-15-16	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.00435	3.51	0.686	0.01528	0.00299	NO								
		SMA-15-16	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.00032	3.51	0.686	0.00114	0.00022	NO								
		SMA-15-16	1210	Residential (70%)	B	86.0	Yes	0.38	SINGLE FAMILY RES	0.38	32.68	0.809	0.30742	2.07	0.327	0.63636	0.10053	NO						0.4		
		SMA-15-16	1210		B	86.0	No	6.45	SINGLE FAMILY RES	6.45	554.7	0.1764	1.13778	2.07	0.327	2.3552	0.37205	NO								
		SMA-15-16	1210	Residential (60%)	B	82.0	Yes	0.16	SINGLE FAMILY RES	0.16	13.12	0.809	0.12944	2.07	0.327	0.26794	0.04233	NO						0.2		
		SMA-15-16	1210		B	82.0	No	2.01	SINGLE FAMILY RES	2.01	164.82	0.1306	0.26251	2.07	0.327	0.54339	0.08584	NO								
		SMA-15-16	1210	50' R/W (72%)	B	81.0	Yes	0.52	SINGLE FAMILY RES	0.52	42.12	0.809	0.42068	2.07	0.327	0.87081	0.13756	NO						0.5		
		SMA-15-16	1210		B	81.0	No	0.88	SINGLE FAMILY RES	0.88	71.28	0.1208	0.1063	2.07	0.327	0.22005	0.03476	NO								
		SMA-15-16	1210	60' R/W (77%)	B	83.0	Yes	0.43	SINGLE FAMILY RES	0.43	35.69	0.809	0.34787	2.07	0.327	0.72009	0.11375	NO						0.4		
		SMA-15-16	1210		B	83.0	No	0.58	SINGLE FAMILY RES	0.58	48.14	0.1404	0.08143	2.07	0.327	0.16856	0.02663	NO								
		SMA-15-16	1210	Alley (100%)	B	98.0	Yes	0.31	SINGLE FAMILY RES	0.31	30.38	0.809	0.25079	2.07	0.327	0.51914	0.08201	NO						0.3		
		SMA-15-16	1900	Open Space (Good)	B	61.0	No	1.51	UNDEVELOPED	1.51	92.11	0.0324	0.04892	1.288	0.107	0.06301	0.00523	NO							2.2	
		SMA-15-16	8370	Water Surface	B	98.0	Yes	2.16	WATER			0.809		0	0			NO							0.3	
		SMA-15-16	1210	Residential (70%)	B	86.0	Yes	1.2	SINGLE FAMILY RES	1.2	103.2	0.809	0.9708	2.07	0.327	2.00956	0.31745	NO						1.2		
		SMA-15-16	1210		B	86.0	No	20.3	SINGLE FAMILY RES	20.3	1745.8	0.1764	3.58092	2.07	0.327	7.4125	1.17096	NO								
		SMA-15-16	1210	Residential (60%)	B	82.0	Yes	0.58	SINGLE FAMILY RES	0.58	47.56	0.809	0.46922	2.07	0.327	0.97129	0.15343	NO						0.6		
		SMA-15-16	1210		B	82.0	No	7.43	SINGLE FAMILY RES	7.43	609.26	0.1306	0.97036	2.07	0.327	2.00864	0.31731	NO								
		SMA-15-16	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.97	HIGH INTENSITY COMMERCIAL	0.97	83.42	0.809	0.78473	2.4	0.345	1.88335	0.27073	NO						1.0		
		SMA-15-16	1400		B	86.0	No	1.46	HIGH INTENSITY COMMERCIAL	1.46	125.56	0.1764	0.25754	2.4	0.345	0.61811	0.08885	NO								
		SMA-15-16	1850	Park (25%)	B	68.0	Yes	0.18	AVERAGE OF MFR+UNDEVELOPED	0.18	12.24	0.809	0.14562	2.32	0.52	0.33784	0.07572	NO						0.2		
		SMA-15-16	1850		B	68.0	No	2.65	AVERAGE OF MFR+UNDEVELOPED	2.65	180.2	0.051	0.13515	2.32	0.52	0.31355	0.07028	NO								
		SMA-15-16	1210	50' R/W (72%)	B	81.0	Yes	1.91	SINGLE FAMILY RES	1.91	154.71	0.809	1.54519	2.07	0.327	3.19854	0.50528	NO						1.9		
		SMA-15-16	1210		B	81.0	No	3.2	SINGLE FAMILY RES	3.2	259.2	0.1208	0.38656	2.07	0.327	0.80018	0.12641	NO								
		SMA-15-16	1210	60' R/W (77%)	B	83.0	Yes	1.11E+00	SINGLE FAMILY RES	1.11	92.13	0.809	0.89799	2.07	0.327	1.85884	0.29364	NO						1.1		
		SMA-15-16	1210		B	83.0	No	1.5	SINGLE FAMILY RES	1.5	124.5	0.1404	0.2106	2.07	0.327	0.43594	0.06887	NO								
		SMA-15-16	1210	80' R/W (82.5%)	B	85.0	Yes	0.89	SINGLE FAMILY RES	0.89	75.65	0.809	0.72001	2.07	0.327	1.49402	0.23544	NO						0.9		
		SMA-15-16	1210		B	85.0	No	0.93	SINGLE FAMILY RES	0.93	79.05	0.16	0.1488	2.07	0.327	0.30802	0.04866	NO								
		SMA-15-16	1210	Friar's Cove Road (82.5%)	B	85.0	Yes	2.74	SINGLE FAMILY RES	2.74	232.9	0.809	2.21666	2.07	0.327	4.58849	0.72485	NO						2.7		
		SMA-15-16	1210		B	85.0	No	2.89	SINGLE FAMILY RES	2.89	245.65	0.16	0.4624	2.07	0.327	0.95717	0.1512	NO								
		SMA-15-16	1210	Alley (100%)	B	98.0	Yes	0.92	SINGLE FAMILY RES	0.92	90.16	0.809	0.74428	2.07	0.327	1.54066	0.24338	NO						0.9		
		SMA-15-16	1900	Open Space (Good)	B	61.0	No	2.47	UNDEVELOPED	2.47	150.67	0.0324	0.08003	1.288	0.107	0.10308	0.00856	NO								
		SMA-15-16	8370	Water Surface	B	98.0	Yes	7.91	WATER			0.809		0	0			NO						7.9		
		SMA-14	1210	Residential (70%)	A	79.0	Yes	0.05	SINGLE FAMILY RES	0.05	3.95	0.809	0.04045	2.07	0.327	0.08373	0.01323	YES	2.12	0.349	SMA-14	43.3	0.1	25%	81.3	
		SMA-14	1210		A	79.0	No	0.88	SINGLE FAMILY RES	0.88	69.52	0.1046	0.09205	2.07	0.327	0.19054	0.0301	NO								
		SMA-14	1210		B	86.0	Yes	0.93	SINGLE FAMILY RES	0.93	79.98	0.809	0.75237	2.07	0.327	1.55741	0.24602	NO						0.9		
		SMA-14	1210		B	86.0	No	15.61	SINGLE FAMILY RES	15.61	1342.46	0.1764	2.7536	2.07	0.327	5.69996	0.90043	NO								
		SMA-14	1330	Residential (65%)	B	84.0	Yes	0.22	MULTI FAMILY RES	0.22	18.48	0.809	0.17798	2.32	0.52	0.41291	0.09255	NO						0.2		
		SMA-14	1330		B	84.0	No	3.6	MULTI FAMILY RES	3.6	302.4	0.1502	0.54072	2.32	0.52	1.25447	0.28117	NO								
		SMA-14	1210	Residential (60%)	A	73.0	Yes	0.05	SINGLE FAMILY RES	0.05	3.65	0.809	0.04045	2.07	0.327	0.08373	0.01323	NO						0.1		
		SMA-14	1210		A	73.0	No	0.67	SINGLE FAMILY RES	0.67	48.91	0.0702	0.04703	2.07	0.327	0.09736	0.01538	NO								
		SMA-14	1210		B	82.0	Yes	0.07	SINGLE FAMILY RES	0.07	5.74	0.809	0.05663	2.07	0.327	0.11722	0.01852	NO						0.1		
		SMA-14	1210		B	82.0	No	0.96	SINGLE FAMILY RES	0.96	78.72	0.1306	0.12538	2.07	0.327	0.25953	0.041	NO								
		SMA-14	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.75	HIGH INTENSITY COMMERCIAL	0.75	64.5	0.809	0.60675	2.4	0.345	1.4562	0.20933	NO						0.8		
		SMA-14	1400		B	86.0	No	1.12	HIGH INTENSITY COMMERCIAL	1.12	96.32	0.1764	0.19757	2.4	0.345	0.47416	0.06816	NO								
		SMA-14	1850	Park (25%)	B	68.0	Yes	0.21	AVERAGE OF MFR+UNDEVELOPED	0.21	14.28	0.809	0.16989	2.32	0.52	0.39414	0.08834	NO						0.2		
		SMA-14	1850		B	68.0	No	3.17	AVERAGE OF MFR+UNDEVELOPED	3.17	215.56	0.051	0.16167	2.32	0.52	0.37507	0.08407	NO								
		SMA-14	1210	50' R/W (72%)	B	81.0	Yes	2.1	SINGLE FAMILY RES	2.1	170.1	0.809	1.6989	2.07	0.327	3.51672	0.55554	NO						2.1		
		SMA-14	1210		B	81.0	No	3.51E+00	SINGLE FAMILY RES	3.51	284.31	0.1208	0.42401	2												

[illegible]

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
SMA-15-16	81.8	3.01	0.552	60.8	1%	2.10	0.332	79.9	27%
SMA-14	43.3	1.51	0.152	59.0	19%	2.12	0.349	81.3	25%
SMA-13	75.0	2.64	0.443	59.8	2%	1.80	0.301	81.895	32%
SMA-12	77.8	2.31	0.357	57.4	7%	1.83	0.324	80.623	35%

WET DETENTION / MANAGED AQUATIC PLANTS:

4/27/2018 V 8.6

Blue Numbers =
Red Numbers =

Input data
Calculated or Carryover

Also called: FLOATING ISLANDS and includes a wet detention pond:

Fontana (SMA-12-16)

GO TO STORMWATER TREATMENT ANALYSIS

Total pre-development catchment area:
Total post-development catchment area:
Average annual residence time (between 1 and 500 days)
Littoral Zone or other improvements used?*

SMA-15-16	SMA-14	SMA-13	SMA-12	
81.800	43.300	75.000	77.800	ac
81.800	43.300	75.000	77.800	ac
	500.00	500.00	413.00	days
	NO	NO	NO	
				%
	NO	NO	NO	
				%
80.940	57.165	80.865	71.744	%
77.911	73.912	80.785	75.283	%
0.000	43.370	43.370	43.291	%
0.000	87.956	87.956	86.239	%
	NO	NO	NO	
99.720	52.091	106.221	113.997	ac-ft/yr

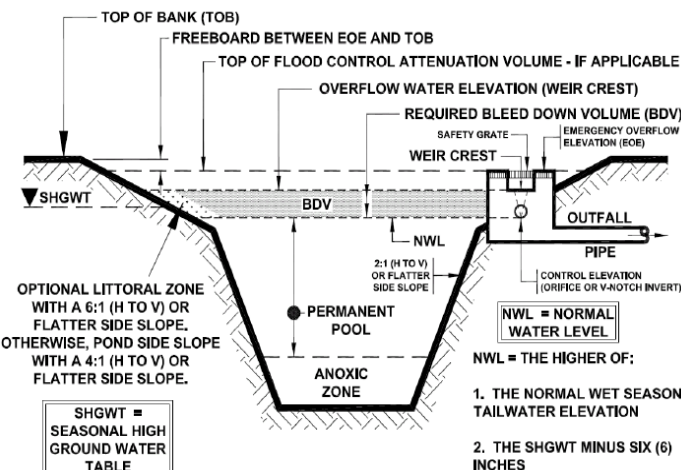
Littoral Zone or other improvement efficiency credit:
Floating Wetland or Mats used in the design:
Floating Wetland or Mats credit:
Total Nitrogen removal required:
Total Phosphorus removal required:
Total Nitrogen removal efficiency:
Total Phosphorus removal efficiency:
Is the wet detention sufficient:
Average annual runoff volume:
* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:

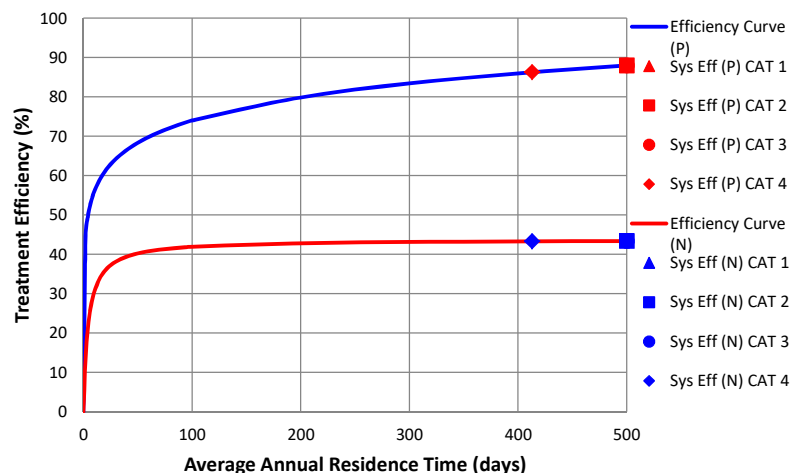
	71.358	145.508	128.989	ac-ft
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REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION.



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft STORMWATER QUALITY APPLICANT'S HANDBOOK dated March 2010, by the Department of Environmental Protection, available at: <http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater>, March 2010

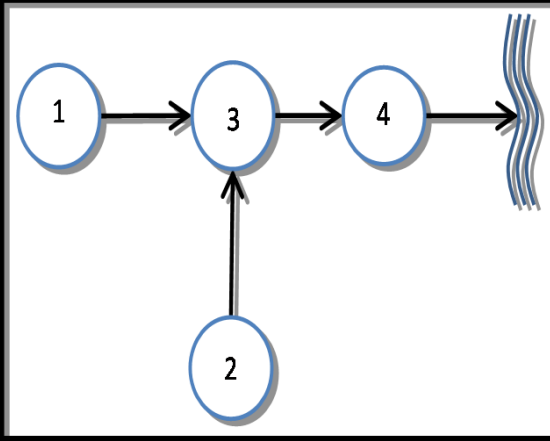


NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased.

Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

User Defined BMP					4/27/2018	V 8.6
USER DEFINED BMP SERVING:		Fontana (SMA-12-16)				
		SMA-15-16	SMA-14	SMA-13	SMA-12	
Your Name of BMP		SMA-15-16				
Contributing catchment area		81.800	43.300	75.000	77.800	ac
Required treatment efficiency (Nitrogen):		80.940	57.165	80.865	71.744	%
Required treatment efficiency (Phosphorus):		77.911	73.912	80.785	75.283	%
Is this a retention, detention, or other system*?		Detention				
If retention, storage depth is:						in
The calculated storage volume is:		0.000	0.000	0.000	0.000	ac-ft
Provided treatment efficiency (Nitrogen):		43.00				%
Provided treatment efficiency (Phosphorus):		87.12				%
* Examples of other systems are dry detention, chemical treatment, and pre-treatment devices						
Enter a short description of BMP below (no more than 200 characters)						
Provided treatment efficiency taken from SMA-15-16						

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-12-16)	Optional Identification		
	SMA-15-16	SMA-14	SMA-13	SMA-12
BMP Name	SMA-15-16	Wet Detention/ MAPs	Wet Detention/ MAPs	Wet Detention/ MAPs
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	K - Mixed-4 Catchment-Series (B)	Treatment Objectives or Target for TN NOT MET TP MET	4/27/2018	
Nitrogen Pre Load (kg/yr)	225.55		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	33.73			
Nitrogen Post Load (kg/yr)	888.02			
Phosphorus Post Load (kg/yr)	148.33			
Target Load Reduction (N) %	75			
Target Load Reduction (P) %	77			
Target Discharge Load, N (kg/yr)	222.00			
Target Discharge Load, P (kg/yr)	34.12			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	87			
Discharged Load, N (kg/yr & lb/yr):	503.98	1110.06		
Discharged Load, P (kg/yr & lb/yr):	18.94	41.72		
Load Removed, N (kg/yr & lb/yr):	384.04	845.89		
Load Removed, P (kg/yr & lb/yr):	129.39	285.00		

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE		5/29/2018	Blue Numbers = Red Numbers =	Input data Calculated or Carryover		
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis				NAME OF PROJECT		HELP Rainfall VIEW ZONE MAP VIEW MEAN ANNUAL RAINFALL GO TO WATERSHED			
				Fontana (SMA-8-10)					
Meteorological Zone (Please use zone map):				CLICK ON CELL BELOW TO SELECT Zone 2					
Mean Annual Rainfall (Please use rainfall map):				49.00 Inches					
Type of analysis: Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):				CLICK ON CELL BELOW TO SELECT Net improvement					
				%					
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.						Model documentation and example problems.			
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP						There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu . The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.			
						RESET INPUT FOR STORMWATER TREATMENT ANALYSIS		METHODOLOGY FOR CALCULATING REQUIRED TREATMENT	
								METHODOLOGY FOR	
								METHODOLOGY FOR	

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers =	Input data	LAND USES/EMC	
				Red Numbers =	Calculated		
SELECT CATCHMENT CONFIGURATION		5/29/2018		CLICK ON CELL BELOW TO SELECT CONFIGURATION		VIEW CATCHMENT CONFIGURATION	
		D - 3 Catchment-Series		GO TO GENERAL SITE INFORMATION PAGE			
For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain Delay [hrs] max delay = 15 hrs. CATCHMENT NO.1 NAME: SMA-8 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data COMINGLING MULTI-LAND USE VIEW AVERAGE ANNUAL VIEW EMC & FLUCCS GO TO GIS LANDUSE DATA							
Pre-development land use: with default EMCs Post-development land use: with default EMCs		Total pre-development catchment area: 33.800 AC Total post-development catchment or for BMP analysis: 33.800 AC Pre-development Non DCIA CN: 55.40 Pre-development DCIA percentage: 2.00 % Post-development Non DCIA CN: 81.70 Post-development DCIA percentage: 24.00 % Estimated BMP Area (No loading from this area) AC		From GIS data 33.8 55.4 2% 81.7 24%			Average annual pre runoff volume: 5.278 ac-ft/year Average annual post runoff volume (note no BMP area): 40.151 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 11.088 kg/year Pre-development Annual Mass Loading - Phosphorus: 1.072 kg/year Post-development Annual Mass Loading - Nitrogen: 102.256 kg/year Post-development Annual Mass Loading - Phosphorus: 16.123 kg/year
CATCHMENT NO.2 NAME: SMA-9 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data		Total pre-development catchment area: 11.100 AC Total post-development catchment or for BMP analysis area: 11.100 AC Pre-development Non DCIA CN: 58.80 Pre-development DCIA percentage: 7.00 % Post-development Non DCIA CN: 82.20 Post-development DCIA percentage: 21.00 % Estimated BMP Area (No loading from this area) AC		From GIS data 11.1 58.8 7% 82.2 21%			Average annual pre runoff volume: 3.752 ac-ft/year Average annual post runoff volume (note no BMP area): 12.455 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 10.391 kg/year Pre-development Annual Mass Loading - Phosphorus: 1.486 kg/year Post-development Annual Mass Loading - Nitrogen: 31.665 kg/year Post-development Annual Mass Loading - Phosphorus: 4.986 kg/year
CATCHMENT NO.3 NAME: SMA-10 CLICK ON CELL BELOW TO SELECT GIS Import Data CLICK ON CELL BELOW TO SELECT GIS Import Data		Total pre-development catchment area: 47.800 AC Total post-development catchment or for BMP analysis area: 47.800 AC Pre-development Non DCIA CN: 57.40 Pre-development DCIA percentage: 14.00 % Post-development Non DCIA CN: 82.40 Post-development DCIA percentage: 24.00 % Estimated BMP Area (no loading from this area) AC		From GIS data 47.8 57.4 14% 82.4 24%			Average annual pre runoff volume: 26.459 ac-ft/year Average annual post runoff volume (note no BMP area): 57.804 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 51.668 kg/year Pre-development Annual Mass Loading - Phosphorus: 5.514 kg/year Post-development Annual Mass Loading - Nitrogen: 149.656 kg/year Post-development Annual Mass Loading - Phosphorus: 23.467 kg/year

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering in a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

GO TO WATERSHED CHARACTERISTICS

[VIEW EMC & FLUCCS](#)

Pre-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCDESC	HYDROGRP	CN	DCIA [Yes/ No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighte
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-8	5100	Streams and Waterways	B	98.0	Yes	0.13	WATER			0.809		0	0			YES	1.70	0.165	SMA-8	33.8	0.1	2%	55.4
		SMA-8	5100	Streams and Waterways	B	98.0	Yes	0.53	WATER			0.809		0	0			NO					0.5		
		SMA-8	2240	Abandoned Citrus Groves	B	58.0	No	7.11	RUDERAL UPLAND PINE*	7.11	412.38	0.0268	0.1905	1.694	0.162	0.3228	0.0309	NO							
		SMA-8	2240	Abandoned Citrus Groves	A	32.0	No	3.37	RUDERAL UPLAND PINE*	3.37	107.84	0.0028	0.0094	1.694	0.162	0.016	0.0015	NO							
		SMA-8	2240	Abandoned Citrus Groves	B	58.0	No	0.16	RUDERAL UPLAND PINE*	0.16	9.28	0.0268	0.0043	1.694	0.162	0.0073	0.0007	NO							
		SMA-8	2240	Abandoned Citrus Groves	B	58.0	No	18.85	RUDERAL UPLAND PINE*	18.85	1093.3	0.0268	0.5052	1.694	0.162	0.8558	0.0818	NO							
		SMA-8	2240	Abandoned Citrus Groves	B	58.0	No	3.47	RUDERAL UPLAND PINE*	3.47	201.26	0.0268	0.093	1.694	0.162	0.1575	0.0151	NO							
		SMA-8	2110	Improved Pastures	B	61.0	No	0.03	PASTURE	0.03	1.83	0.0324	0.001	3.51	0.686	0.0034	0.0007	NO							
		SMA-8	2110	Improved Pastures	B	61.0	No	0.1	PASTURE	0.1	6.1	0.0324	0.0032	3.51	0.686	0.0114	0.0022	NO							
		SMA-9	5100	Streams and Waterways	B	98.0	Yes	0.5	WATER			0.809		0	0			YES	2.25	0.321	SMA-9	11.1	0.5	7%	58.8
		SMA-9	5100	Streams and Waterways	B	98.0	Yes	0.04	WATER			0.809		0	0			NO					0.0		
		SMA-9	5100	Streams and Waterways	B	98.0	Yes	0.15	WATER			0.809		0	0			NO					0.2		
		SMA-9	5100	Streams and Waterways	B	98.0	Yes	0.06	WATER			0.809		0	0			NO					0.1		
		SMA-9	2240	Abandoned Citrus Groves	B	58.0	No	5.64	RUDERAL UPLAND PINE*	5.64	327.12	0.0268	0.1512	1.694	0.162	0.2561	0.0245	NO							
		SMA-9	2240	Abandoned Citrus Groves	B	58.0	No	0.03	RUDERAL UPLAND PINE*	0.03	1.74	0.0268	0.0008	1.694	0.162	0.0014	0.0001	NO							
		SMA-9	2240	Abandoned Citrus Groves	B	58.0	No	1.4	RUDERAL UPLAND PINE*	1.4	81.2	0.0268	0.0375	1.694	0.162	0.0636	0.0061	NO							
		SMA-9	2240	Abandoned Citrus Groves	B	58.0	No	0.52	RUDERAL UPLAND PINE*	0.52	30.16	0.0268	0.0139	1.694	0.162	0.0236	0.0023	NO							
		SMA-9	2240	Abandoned Citrus Groves	B	58.0	No	0	RUDERAL UPLAND PINE*	0	0	0.0268	0	1.694	0.162	0	0	NO							
		SMA-9	2110	Improved Pastures	B	61.0	No	0.87	PASTURE	0.87	53.07	0.0324	0.0282	3.51	0.686	0.0989	0.0193	NO							
		SMA-9	2110	Improved Pastures	B	61.0	No	0.65	PASTURE	0.65	39.65	0.0324	0.0211	3.51	0.686	0.0739	0.0144	NO							
		SMA-9	2110	Improved Pastures	B	61.0	No	1.22	PASTURE	1.22	74.42	0.0324	0.0395	3.51	0.686	0.1387	0.0271	NO							
		SMA-10	6300	Wetland Forested Mixed	B	98.0	Yes	1.3	WETLAND*	1.3	127.4	0.809	1.0517	1.15	0.055	1.2095	0.0578	YES	1.58	0.169	SMA-10	47.8	1.3	14%	57.4
		SMA-10	6300	Wetland Forested Mixed	B	98.0	Yes	0.01	WETLAND*	0.01	0.98	0.809	0.0081	1.15	0.055	0.0093	0.0004	NO					0.0		
		SMA-10	6410	Freshwater Marshes	B	98.0	Yes	3.5	WETLAND*	3.5	343	0.809	2.8315	1.15	0.055	3.2562	0.1557	NO					3.5		
		SMA-10	6410	Freshwater Marshes	B	98.0	Yes	0.19	WETLAND*	0.19	18.62	0.809	0.1537	1.15	0.055	0.1768	0.0085	NO					0.2		
		SMA-10	5100	Streams and Waterways	B	98.0	Yes	0.72	WATER			0.809		0	0			NO					0.7		
		SMA-10	5100	Streams and Waterways	B	98.0	Yes	0.16	WATER			0.809		0	0			NO					0.2		
		SMA-10	5100	Streams and Waterways	B	98.0	Yes	0.37	WATER			0.809		0	0			NO					0.4		
		SMA-10	5100	Streams and Waterways	B	98.0	Yes	0.56	WATER			0.809		0	0			NO					0.6		
		SMA-10	2240	Abandoned Citrus Groves	B	58.0	No	2.01	RUDERAL UPLAND PINE*	2.01	116.58	0.0268	0.0539	1.694	0.162	0.0913	0.0087	NO							
		SMA-10	2240	Abandoned Citrus Groves	B	58.0	No	0.14	RUDERAL UPLAND PINE*	0.14	8.12	0.0268	0.0038	1.694	0.162	0.0064	0.0006	NO							
		SMA-10	2240	Abandoned Citrus Groves	A	32.0	No	4.17	RUDERAL UPLAND PINE*	4.17	133.44	0.0028	0.0117	1.694	0.162	0.0198	0.0019	NO							
		SMA-10	2240	Abandoned Citrus Groves	B	58.0	No	5.76	RUDERAL UPLAND PINE*	5.76	334.08	0.0268	0.1544	1.694	0.162	0.2615	0.025	NO							
		SMA-10	2240	Abandoned Citrus Groves	B	58.0	No	1.26	RUDERAL UPLAND PINE*	1.26	73.08	0.0268	0.0338	1.694	0.162	0.0572	0.0055	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	5.17	PASTURE	5.17	315.37	0.0324	0.1675	3.51	0.686	0.588	0.1149	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	7.35	PASTURE	7.35	448.35	0.0324	0.2381	3.51	0.686	0.8359	0.1634	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	0.72	PASTURE	0.72	43.92	0.0324	0.0233	3.51	0.686	0.0819	0.016	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	1.27	PASTURE	1.27	77.47	0.0324	0.0411	3.51	0.686	0.1444	0.0282	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	0.33	PASTURE	0.33	20.13	0.0324	0.0107	3.51	0.686	0.0375	0.0073	NO							
		SMA-10	2110	Improved Pastures	B	61.0	No	12.79	PASTURE	12.79	780.19	0.0324	0.4144	3.51	0.686	1.4545	0.2843	NO							

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighte
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-8	1210	Residential (70%)	A	79.0	Yes	0.04	SINGLE FAMILY RES	0.04	3.16	0.809	0.0324	2.07	0.327	0.067	0.0106	YES	2.07	0.326	SMA-8	33.8	0.0	24%	81.7
		SMA-8	1210		A	79.0	No	0.65	SINGLE FAMILY RES	0.65	51.35	0.1046	0.068	2.07	0.327	0.1407	0.0222	NO							
		SMA-8	1210		B	86.0	Yes	0.7	SINGLE FAMILY RES	0.7	60.2	0.809	0.5663	2.07	0.327	1.1722	0.1852	NO					0.7		
		SMA-8	1210		B	86.0	No	11.74	SINGLE FAMILY RES	11.74	1009.6	0.1764	2.0709	2.07	0.327	4.2868	0.6772	NO							
		SMA-8	1210	Residential (60%)	A	73.0	Yes	0.1	SINGLE FAMILY RES	0.1	7.3	0.809	0.0809	2.07	0.327	0.1675	0.0265	NO					0.1		
		SMA-8	1210		A	73.0	No	1.32	SINGLE FAMILY RES	1.32	96.36	0.0702	0.0927	2.07	0.327	0.1918	0.0303	NO							
		SMA-8	1210		B	82.0	Yes	0.31	SINGLE FAMILY RES	0.31	25.42	0.809	0.2508	2.07	0.327	0.5191	0.082	NO					0.3		
		SMA-8	1210		B	82.0	No	4.05	SINGLE FAMILY RES	4.05	332.1	0.1306	0.5289	2.07	0.327	1.0949	0.173	NO							
		SMA-8	1210	50' R/W (72%)	A	72.0	Yes	0.15	SINGLE FAMILY RES	0.15	10.8	0.809	0.1214	2.07	0.327	0.2512	0.0397	NO					0.2		
		SMA-8	1210		A	72.0	No	0.26	SINGLE FAMILY RES	0.26	18.72	0.0658	0.0171	2.07	0.327	0.0354	0.0056	NO							
		SMA-8	1210		B	81.0	Yes	1.22	SINGLE FAMILY RES	1.22	98.82	0.809	0.987	2.07	0.327	2.043	0.3227	NO					1.2		
		SMA-8	1210		B	81.0	No	2.04	SINGLE FAMILY RES	2.04	165.24	0.1208	0.2464	2.07	0.327	0.5101	0.0806	NO							
		SMA-8	1210	60' R/W (77%)	B	83.0	Yes	0.71	SINGLE FAMILY RES	0.71	58.93	0.809	0.5744	2.07	0.327	1.189	0.1878	NO					0.7		
		SMA-8	1210		B	83.0	No	0.97	SINGLE FAMILY RES	0.97	80.51	0.1404	0.1362	2.07	0.327	0.2819	0.0445	NO							
		SMA-8	1210	80' R/W (82.5%)	A	78.0	Yes	0.37	SINGLE FAMILY RES	0.37	28.86	0.809	0.2993	2.07	0.327	0.6196	0.0979	NO					0.4		
		SMA-8	1210		A	78.0	No	0.39	SINGLE FAMILY RES	0.39	30.42	0.0982	0.0383	2.07	0.327	0.0793	0.0125	NO							
		SMA-8	1210		B	85.0	Yes	0.02	SINGLE FAMILY RES	0.02	1.7	0.809	0.0162	2.07	0.327	0.0335	0.0053	NO					0.0		
		SMA-8	1210		B	85.0	No	0.03	SINGLE FAMILY RES	0.03	2.55	0.16	0.0048	2.07	0.327	0.0099	0.0016	NO							
		SMA-8	1210	132' R/W (70%)	B	81.0	Yes	1.38	SINGLE FAMILY RES	1.38	111.78	0.809	1.1164	2.07	0.327	2.311	0.3651	NO					1.4		
		SMA-8	1210		B	81.0	No	2.57	SINGLE FAMILY RES	2.57	208.17	0.1208	0.3105	2.07	0.327	0.6426	0.1015	NO							
		SMA-8	1210	Alley (100%)	A	98.0	Yes	0.11	SINGLE FAMILY RES	0.11	10.78	0.809	0.089	2.07	0.327	0.1842	0.0291	NO					0.1		
		SMA-8	1210		B	98.0	Yes	2.80E-01	SINGLE FAMILY RES	0.28	27.44	0.809	0.2265	2.07	0.327	0.4689	0.0741	NO					0.3		
		SMA-8	1900	Open Space (Good)	B	61.0	No	1.54	UNDEVELOPED	1.54	93.94	0.0324	0.0499	1.288	0.107	0.0643	0.0053	NO							
		SMA-8	8370	Water Surface	B	98.0	Yes	2.8	WATER					0	0			NO					2.8		
		SMA-9	1210	Residential (70%)	B	86.0	Yes	0.27	SINGLE FAMILY RES	0.27	23.22	0.809	0.2184	2.07	0.327	0.4522	0.0714	YES	2.06	0.325	SMA-9	11.1	0.3	21%	82.2
		SMA-9	1210		B	86.0	No	4.57	SINGLE FAMILY RES	4.57	393.02	0.1764	0.8061	2.07	0.327	1.6687	0.2636	NO							
		SMA-9	1210	Residential (60%)	B	82.0	Yes	0.19	SINGLE FAMILY RES	0.19	15.58	0.809	0.1537	2.07	0.327	0.3182	0.0503	NO					0.2		
		SMA-9	1210		B	82.0	No	2.38	SINGLE FAMILY RES	2.38	195.16	0.1306	0.3108	2.07	0.327	0.6434	0.1016	NO							
		SMA-9	1210	50' R/W (72%)	B	81.0	Yes	0.23	SINGLE FAMILY RES	0.23	18.63	0.809	0.1861	2.07	0.327	0.3852	0.0608	NO					0.2		
		SMA-9	1210		B	81.0	No	0.39	SINGLE FAMILY RES	0.39	31.59	0.1208	0.0471	2.07	0.327	0.0975	0.0154	NO							
		SMA-9	1210	60' R/W (77%)	B	83.0	Yes	0.41	SINGLE FAMILY RES	0.41	34.03	0.809	0.3317	2.07	0.327	0.6866	0.1085	NO					0.4		
		SMA-9	1210		B	83.0	No	0.56	SINGLE FAMILY RES	0.56	46.48	0.1404	0.0786	2.07	0.327	0.1628	0.0257	NO							
		SMA-9	1210	Alley (100%)	B	98.0	Yes	0.27	SINGLE FAMILY RES	0.27	26.46	0.809	0.2184	2.07	0.327	0.4522	0.0714	NO					0.3		
		SMA-9	1900	Open Space (Good)	B	61.0	No	0.79	UNDEVELOPED	0.79	48.19	0.0324	0.0256	1.288	0.107	0.033	0.0027	NO							
		SMA-9	8370	Water Surface	B	98.0	Yes	0.99	WATER					0	0			NO					1.0		
		SMA-10	1210	Residential (70%)	A	79.0	Yes	0.1	SINGLE FAMILY RES	0.1	7.9	0.809	0.0809	2.07	0.327	0.1675	0.0265	YES	2.10	0.329	SMA-10	47.8	0.1	24%	82.4
		SMA-10	1210		A	79.0	No	1.7	SINGLE FAMILY RES	1.7	134.3	0.1046	0.1778	2.07	0.327	0.3681	0.0581	NO							
		SMA-10	1210		B	86.0	Yes	1.32	SINGLE FAMILY RES	1.32	113.52	0.809	1.0679	2.07	0.327	2.2105	0.3492	NO					1.3		
		SMA-10	1210		B	86.0	No	22.32	SINGLE FAMILY RES	22.32	1919.5	0.1764	3.9372	2.07	0.327	8.1501	1.2875	NO							
		SMA-10	1210	Residential (60%)	A	73.0	Yes	0.1	SINGLE FAMILY RES	0.1	7.3	0.809	0.0809	2.07	0.327	0.1675	0.0265	NO					0.1		
		SMA-10	1210		A	73.0	No	1.27	SINGLE FAMILY RES	1.27	92.71	0.0702	0.0892	2.07	0.327	0.1845	0.0292	NO							
		SMA-10	1210		B	82.0	Yes	0.09	SINGLE FAMILY RES	0.09	7.38	0.809	0.0728	2.07	0.327	0.1507	0.0238	NO					0.1		
		SMA-10	1210		B	82.0	No	1.22	SINGLE FAMILY RES	1.22	100.04	0.1306	0.1593	2.07	0.327	0.3298	0.0521	NO							
		SMA-10	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.93	HIGH INTENSITY COMMERC	0.93	79.98	0.809	0.7524	2.4	0.345	1.8057	0.2596	NO					0.9		
		SMA-10	1400		B	86.0	No	1.4	HIGH INTENSITY COMMERC	1.4	120.4	0.1764	0.247	2.4	0.345	0.5927	0.0852	NO							
		SMA-10	1850	Park (25%)	B	68.0	Yes	0.06	AVERAGE OF MFR+UNDEVELOPED	0.06	4.08	0.809	0.0485	2.32	0.52	0.1126	0.0252	NO					0.1		
		SMA-10	1850		B	68.0	No	0.96	AVERAGE OF MFR+UNDEVELOPED	0.96	65.28	0.051	0.049	2.32	0.52	0.1136	0.0255	NO							
		SMA-10	1210	50' R/W (72%)	A	72.0	Yes	0.11	SINGLE FAMILY RES	0.11	7.92	0.809	0.089	2.07	0.327	0.1842	0.0291	NO					0.1		
		SMA-10	1210		A	72.0	No	0.19	SINGLE FAMILY RES	0.19	13.68	0.0658	0.0125	2.07	0.327	0.0259	0.0041	NO							
		SMA-10	1210		B	81.0	Yes	2.74E+00	SINGLE FAMILY RES	2.74	221.94	0.809	2.2167	2.07	0.327	4.5885	0.7248	NO					2.7		
		SMA-10	1210		B	81.0	No	4.58	SINGLE FAMILY RES	4.58	370.98	0.1208	0.5533	2.07	0.327	1.1453	0.1809	NO							
		SMA-10	1210	60' R/W (77%)	A	74.0	Yes	0.23	SINGLE FAMILY RES	0.23	17.02	0.809	0.1861	2.07	0.327	0.3852	0.0608	NO					0.2		
		SMA-10	1210		A	74.0	No	0.32	SINGLE FAMILY RES	0.32	23.68	0.0746	0.0239	2.07	0.327	0.0494	0.0078	NO							
		SMA-10	1210		B	83.0	Yes	0.22	SINGLE FAMILY RES	0.22	18.26	0.809	0.178	2.07	0.327	0.3684	0.0582	NO					0.2		
		SMA-10	1210		B	83.0	No	0.31	SINGLE FAMILY RES	0.31	25.73	0.1404	0.0435	2.07	0.327	0.0901	0.0142	NO							
		SMA-10	1210	Alley (100%)	A	98.0	Yes	0.15	SINGLE FAMILY RES	0.15	14.7	0.809	0.1214	2.07	0.327	0.2512	0.0397	NO					0.2		
		SMA-10	1210		B	98.0	Yes	0.14	SINGLE FAMILY RES	0.14	13.72	0.809	0.1133	2.07	0.327	0.2344	0.037	NO					0.1		
		SMA-10	1900	Open Space (Good)	B	61.0	No	1.98	UNDEVELOPED	1.98	120.78	0.0324	0.0642	1.288	0.107	0.0826	0.0069	NO							
		SMA-10	8370	Water Surface	B	98.0	Yes	5.34	WATER					0	0			NO					5.3		

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN		DCIA %	TN [mg/L]	TP [mg/L]	DCIA %
SMA-8	33.8	1.70	0.165	55.4		2%	2.07	0.326	81.7
SMA-9	11.1	2.25	0.321	58.8		7%	2.06	0.325	82.2
SMA-10	47.8	1.58	0.169	57.4		14%	2.10	0.329	82.403

WET DETENTION / MANAGED AQUATIC PLANTS: 5/29/2018 V 8.6

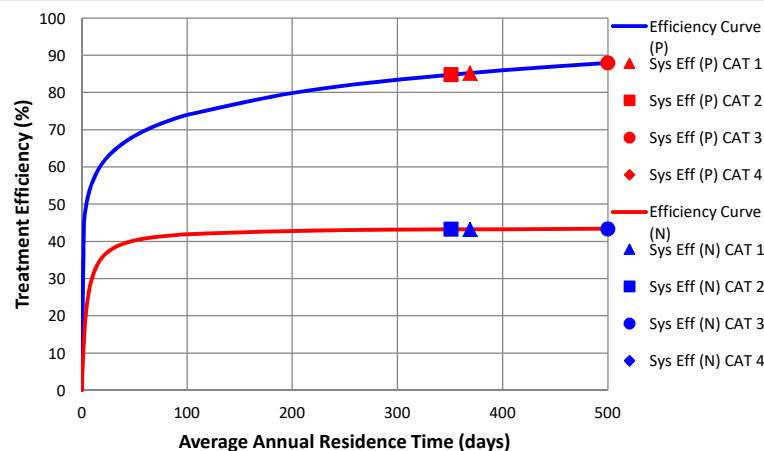
Also called: FLOATING ISLANDS and includes a wet detention pond: Fontana (SMA-8-10)

	SMA-8	SMA-9	SMA-10	Catchment 4	
Total pre-development catchment area:	33.800	11.100	47.800	0.000	ac
Total post-development catchment area:	33.800	11.100	47.800	0.000	ac
Average annual residence time (between 1 and 500 days)	369.00	351.00	500.00		days
Littoral Zone or other improvements used?*	NO	NO	NO		
Littoral Zone or other improvement efficiency credit:					%
Floating Wetland or Mats used in the design:	NO	NO	NO		
Floating Wetland or Mats credit:					%
Total Nitrogen removal required:	89.157	67.185	65.475		%
Total Phosphorus removal required:	93.350	70.194	76.503		%
Total Nitrogen removal efficiency:	43.237	43.211	43.370	0.000	%
Total Phosphorus removal efficiency:	85.235	84.791	87.956	0.000	%
Is the wet detention sufficient:	NO	NO	NO		
Average annual runoff volume:	40.151	12.455	57.804		ac-ft/yr

* pond coverage must follow Regulatory Requirements

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:	40.591	11.977	79.183		ac-ft
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NOTE FOR TREATMENT EFFICIENCY GRAPH:

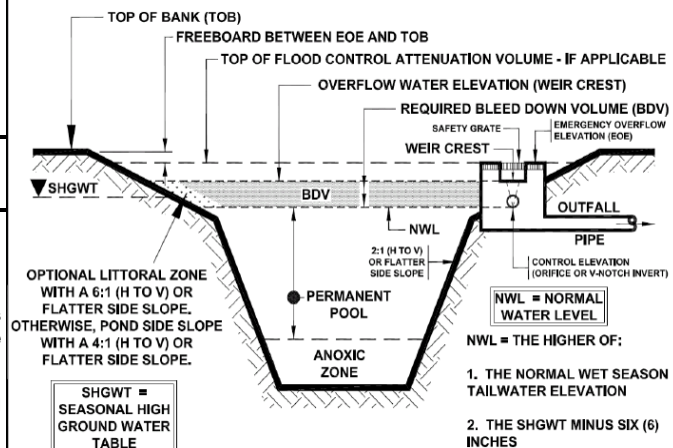
The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

Blue Numbers =
Red Numbers =

Input data
Calculated or Carryover

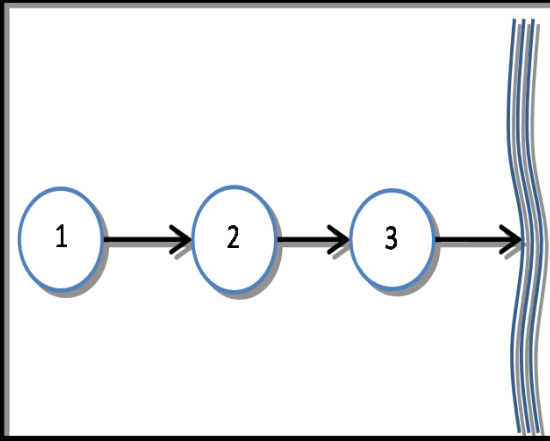
GO TO STORMWATER TREATMENT ANALYSIS

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION.



TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: <http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater>, March 2010

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-8-10)	Optional Identification		
	SMA-8	SMA-9	SMA-10	Catchment 4
BMP Name	Wet Detention/ MAPs	Wet Detention/ MAPs	Wet Detention/ MAPs	
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	D - 3 Catchment-Series	Treatment Objectives or Target for TN NOT MET TP MET	5/29/2018	
Nitrogen Pre Load (kg/yr)	73.15		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	8.07			
Nitrogen Post Load (kg/yr)	283.58			
Phosphorus Post Load (kg/yr)	44.58			
Target Load Reduction (N) %	74			
Target Load Reduction (P) %	82			
Target Discharge Load, N (kg/yr)	73.73			
Target Discharge Load, P (kg/yr)	8.02			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	87			
Discharged Load, N (kg/yr & lb/yr):	160.78		354.13	
Discharged Load, P (kg/yr & lb/yr):	5.93		13.06	
Load Removed, N (kg/yr & lb/yr):	122.80		270.48	
Load Removed, P (kg/yr & lb/yr):	38.65		85.12	

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE	11/5/2018	Blue Numbers = Red Numbers =	Input data Calculated or Carryover
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis			NAME OF PROJECT Fontana (SMA-4-6)		HELP Rainfall VIEW ZONE MAP VIEW MEAN ANNUAL RAINFALL MAP GO TO WATERSHED CHARACTERISTICS	
Meteorological Zone (Please use zone map):			CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):			49.00 Inches			
Type of analysis: Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):			CLICK ON CELL BELOW TO SELECT Net improvement			
			%			
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.		
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.		
				METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY		
				METHODOLOGY FOR RETENTION SYSTEMS		METHODOLOGY FOR WET DETENTION SYSTEMS
				METHODOLOGY FOR GREENROOF SYSTEMS		METHODOLOGY FOR WATER HARVESTING SYSTEMS
RESET INPUT FOR STORMWATER TREATMENT ANALYSIS						

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers = Red Numbers =	Input data Calculated	LAND USES/EMC												
SELECT CATCHMENT CONFIGURATION		11/5/2018		VIEW CATCHMENT CONFIGURATION														
CLICK ON CELL BELOW TO SELECT CONFIGURATION		GO TO GENERAL SITE INFORMATION PAGE																
D - 3 Catchment-Series		OVERWRITE DEFAULT CONCENTRATIONS USING:																
COMINGLING MULTI-LAND USE		VIEW AVERAGE ANNUAL RUNOFF "C" Factor VIEW EMC & FLUCCS GO TO GIS LANDUSE DATA																
For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain Delay [hrs] CATCHMENT NO.1 NAME: SMA-4A-4B <u>max delay = 15 hrs.</u> Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs CLICK ON CELL BELOW TO SELECT GIS Import Data Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 14.820 AC Total post-development catchment or for BMP analysis: 14.820 AC Pre-development Non DCIA CN: 80.00 Pre-development DCIA percentage: 8.00 % Post-development Non DCIA CN: 88.20 Post-development DCIA percentage: 34.00 % Estimated BMP Area (No loading from this area) AC		IMPORT GIS CONCENTRATIONS <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Average annual pre runoff volume:</td> <td style="width: 50%; text-align: right;">10.106 ac-ft/year</td> </tr> <tr> <td>Average annual post runoff volume (note no BMP area):</td> <td style="text-align: right;">25.116 ac-ft/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">32.433 kg/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">5.407 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">64.419 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">10.246 kg/year</td> </tr> </table>					Average annual pre runoff volume:	10.106 ac-ft/year	Average annual post runoff volume (note no BMP area):	25.116 ac-ft/year	Pre-development Annual Mass Loading - Nitrogen:	32.433 kg/year	Pre-development Annual Mass Loading - Phosphorus:	5.407 kg/year	Post-development Annual Mass Loading - Nitrogen:	64.419 kg/year	Post-development Annual Mass Loading - Phosphorus:	10.246 kg/year
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Post-development Annual Mass Loading - Phosphorus:	10.246 kg/year																	
CATCHMENT NO.2 NAME: SMA-5 CLICK ON CELL BELOW TO SELECT GIS Import Data Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 50.300 AC Total post-development catchment or for BMP analysis area: 50.300 AC Pre-development Non DCIA CN: 80.00 Pre-development DCIA percentage: 0.00 % Post-development Non DCIA CN: 90.00 Post-development DCIA percentage: 26.00 % Estimated BMP Area (No loading from this area) AC		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Average annual pre runoff volume:</td> <td style="width: 50%; text-align: right;">22.798 ac-ft/year</td> </tr> <tr> <td>Average annual post runoff volume (note no BMP area):</td> <td style="text-align: right;">80.021 ac-ft/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">75.082 kg/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">9.951 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">204.658 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">32.962 kg/year</td> </tr> </table>					Average annual pre runoff volume:	22.798 ac-ft/year	Average annual post runoff volume (note no BMP area):	80.021 ac-ft/year	Pre-development Annual Mass Loading - Nitrogen:	75.082 kg/year	Pre-development Annual Mass Loading - Phosphorus:	9.951 kg/year	Post-development Annual Mass Loading - Nitrogen:	204.658 kg/year	Post-development Annual Mass Loading - Phosphorus:	32.962 kg/year
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Post-development Annual Mass Loading - Nitrogen:	204.658 kg/year																	
Post-development Annual Mass Loading - Phosphorus:	32.962 kg/year																	
CATCHMENT NO.3 NAME: SMA-6 CLICK ON CELL BELOW TO SELECT GIS Import Data Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 36.400 AC Total post-development catchment or for BMP analysis area: 36.400 AC Pre-development Non DCIA CN: 78.00 Pre-development DCIA percentage: 0.00 % Post-development Non DCIA CN: 87.00 Post-development DCIA percentage: 22.00 % Estimated BMP Area (no loading from this area) AC		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Average annual pre runoff volume:</td> <td style="width: 50%; text-align: right;">14.596 ac-ft/year</td> </tr> <tr> <td>Average annual post runoff volume (note no BMP area):</td> <td style="text-align: right;">48.799 ac-ft/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">55.234 kg/year</td> </tr> <tr> <td>Pre-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">9.201 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Nitrogen:</td> <td style="text-align: right;">127.039 kg/year</td> </tr> <tr> <td>Post-development Annual Mass Loading - Phosphorus:</td> <td style="text-align: right;">22.211 kg/year</td> </tr> </table>					Average annual pre runoff volume:	14.596 ac-ft/year	Average annual post runoff volume (note no BMP area):	48.799 ac-ft/year	Pre-development Annual Mass Loading - Nitrogen:	55.234 kg/year	Pre-development Annual Mass Loading - Phosphorus:	9.201 kg/year	Post-development Annual Mass Loading - Nitrogen:	127.039 kg/year	Post-development Annual Mass Loading - Phosphorus:	22.211 kg/year
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Post-development Annual Mass Loading - Phosphorus:	22.211 kg/year																	

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

[GO TO WATERSHED CHARACTERISTICS](#)

[VIEW EMC & FLUCCS](#)

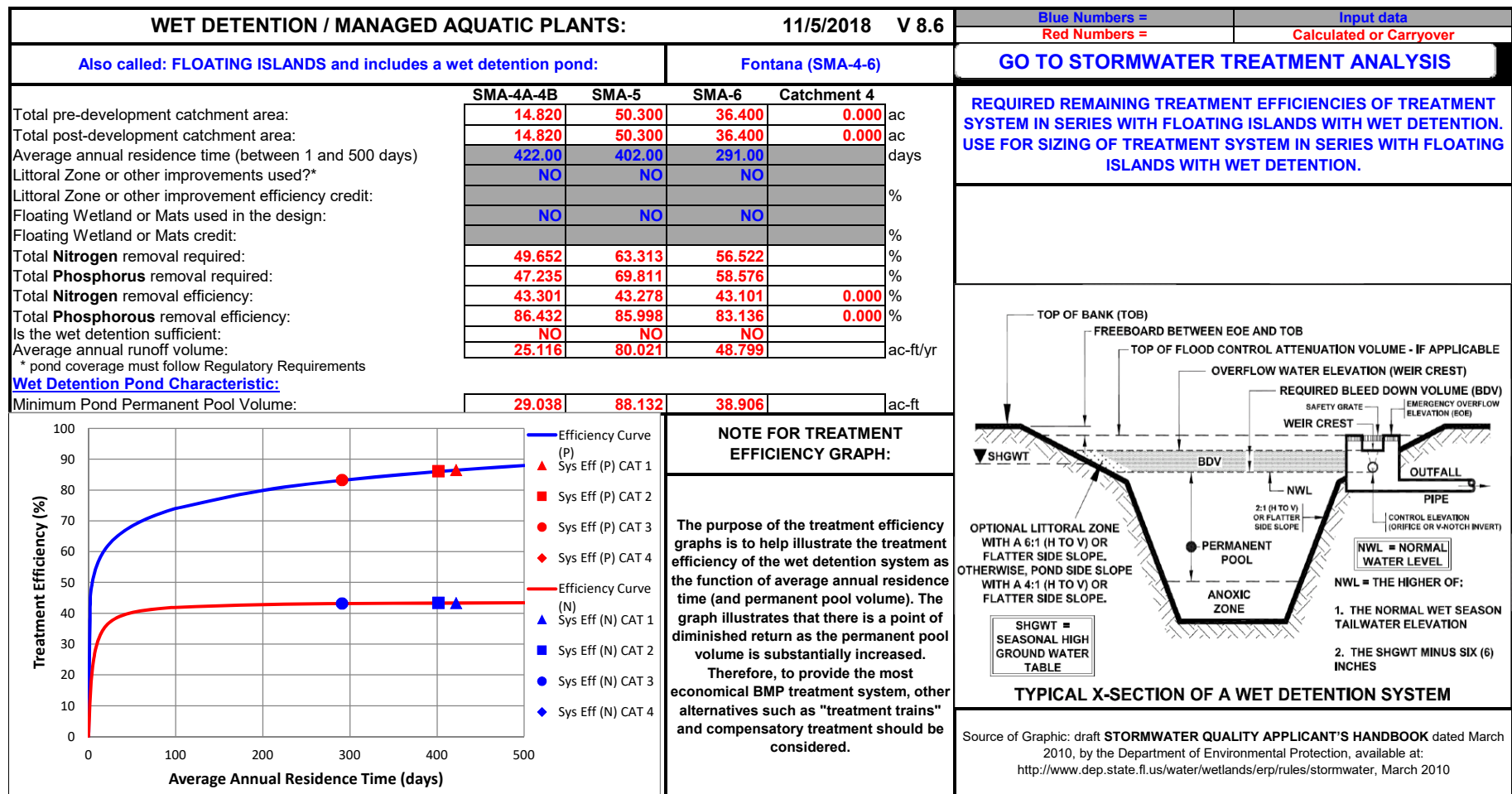
Pre-Development EMC Calculation Table

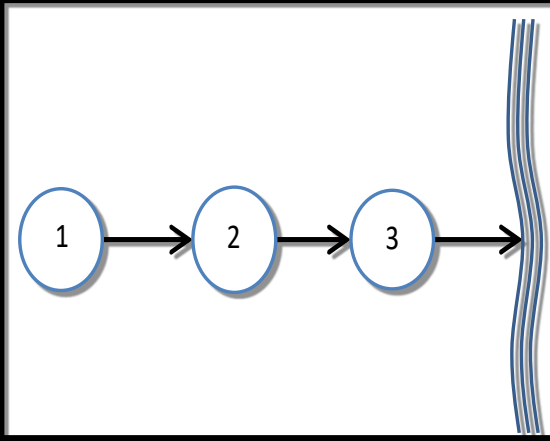
EMC Overwrite		Basin ID	FLUCCSCODE	FLUCDESC	HYDROGRP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] for CN	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-4A-4E	2110	Improved Pastures	D	80.0	No	13.676	PASTURE	13.676	1094.08	0.111	1.51804	3.51	0.686	5.32831	1.04137	YES	2.60	0.434	SMA-4A-4E	14.8		8%	80.0
		SMA-4A-4E	6430	Wet Prairie	D	98.0	Yes	1.13	WET PRAIRIE*	1.13	110.74	0.809	0.91417	1.095	0.015	1.00102	0.01371	NO							
		SMA-5	2210	Citrus Grove	A	80.0	No	0.25	AG - CITRUS	0.25	20	0.111	0.02775	2.24	0.183	0.06216	0.00508	YES	2.67	0.354	SMA-5	50.2		0%	79.9
		SMA-5	2110	Improved Pastures	D	80.0	No	13.69	PASTURE	13.69	1095.2	0.111	1.51959	3.51	0.686	5.33376	1.04244	NO							
		SMA-5	2130	Woodland Pastures	D	78.0	No	3.66	PASTURE	3.66	285.48	0.0982	0.35941	3.51	0.686	1.26154	0.24656	NO							
		SMA-5	2210	Citrus Grove	D	80.0	No	32.38	AG - CITRUS	32.38	2590.4	0.111	3.59418	2.24	0.183	8.05096	0.65773	NO							
		SMA-5	3210	Palmetto Prairies	D	80.0	No	0.261	DRY PRAIRIE*	0.261	20.88	0.111	0.02897	2.025	0.184	0.05867	0.00533	NO							
		SMA-6	2110	Improved Pastures	D	80.0	No	0.02	PASTURE	0.02	1.6	0.111	0.00222	3.51	0.686	0.00779	0.00152	YES	3.07	0.511	SMA-6	1.1		0%	78.0
		SMA-6	2130	Woodland Pastures	D	77.0	No	0.77	PASTURE	0.77	59.29	0.0918	0.07069	3.51	0.686	0.24811	0.04849	NO							
		SMA-6	2210	Citrus Grove	D	80.0	No	0.35	AG - CITRUS	0.35	28	0.111	0.03885	2.24	0.183	0.08702	0.00711	NO							

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCS CODE	FLUCSDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* T _{NEMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-4A-4E	1210	Residential (70%)	D	92.0	Yes	0.13	SINGLE FAMILY RES	0.13	11.96	0.809	0.10517	2.07	0.327	0.2177	0.03439	YES	2.08	0.331	SMA-4A-4E	14.8	0.1	34%	88.2
		SMA-4A-4E	1210		D	92.0	No	2.21	SINGLE FAMILY RES	2.21	203.32	0.3068	0.67803	2.07	0.327	1.40352	0.22172	NO							
		SMA-4A-4E	1210	Residential (60%)	D	90.0	Yes	0.12	SINGLE FAMILY RES	0.12	10.8	0.809	0.09708	2.07	0.327	0.20096	0.03175	NO					0.1		
		SMA-4A-4E	1210		D	90.0	No	1.67	SINGLE FAMILY RES	1.67	150.3	0.242	0.40414	2.07	0.327	0.83657	0.13215	NO							
		SMA-4A-4E	1210	50' R/W (72%)	D	90.0	Yes	0.42	SINGLE FAMILY RES	0.42	37.8	0.809	0.33978	2.07	0.327	0.70334	0.11111	NO					0.4		
		SMA-4A-4E	1210		D	90.0	No	0.71	SINGLE FAMILY RES	0.71	63.9	0.242	0.17182	2.07	0.327	0.35567	0.05619	NO							
		SMA-4A-4E	1210	60' R/W (77%)	D	91.0	Yes	0.54	SINGLE FAMILY RES	0.54	49.14	0.809	0.43686	2.07	0.327	0.9043	0.14285	NO					0.5		
		SMA-4A-4E	1210		D	91.0	No	0.73	SINGLE FAMILY RES	0.73	66.43	0.2744	0.20031	2.07	0.327	0.41465	0.0655	NO							
		SMA-4A-4E	1210	80' R/W (82.5%)	D	92.0	Yes	0.88	SINGLE FAMILY RES	0.88	80.96	0.809	0.71192	2.07	0.327	1.47367	0.2328	NO					0.9		
		SMA-4A-4E	1210		D	92.0	No	0.93	SINGLE FAMILY RES	0.93	85.56	0.3068	0.28532	2.07	0.327	0.59062	0.0933	NO							
		SMA-4A-4E	1400	Civ-Com-Multi (80%)	D	92.0	Yes	0.3	HIGH INTENSITY COMMERCIAL	0.3	27.6	0.809	0.2427	2.4	0.345	0.59248	0.08373	NO					0.3		
		SMA-4A-4E	1400		D	92.0	No	0.45	HIGH INTENSITY COMMERCIAL	0.45	41.4	0.3068	0.13806	2.4	0.345	0.33134	0.04763	NO							
		SMA-4A-4E	1850	Park (25%)	D	84.0	Yes	0.09	AVERAGE OF MFR+UNDEVELOPED	0.09	7.56	0.809	0.07281	2.32	0.52	0.16892	0.03786	NO					0.1		
		SMA-4A-4E	1850		D	84.0	No	1.31	AVERAGE OF MFR+UNDEVELOPED	1.31	110.04	0.1502	0.19676	2.32	0.52	0.45649	0.10232	NO							
		SMA-4A-4E	1900	Open Space (Good)	D	80.0	No	1.74	UNDEVELOPED	1.74	139.2	0.111	0.19314	1.288	0.107	0.24876	0.02067	NO							
		SMA-4A-4E	8370	Water Surface	D	98.0	Yes	2.55	WATER			0.809		0	0			NO					2.6		
		SMA-4A-4E	1210	Alley (100%)	D	98.0	Yes	0.04	SINGLE FAMILY RES	0.04	3.92	0.809	0.03236	2.07	0.327	0.06699	0.01058	NO					0.0		
		SMA-5	1210	Residential (70%)	D	92.0	Yes	0.97	SINGLE FAMILY RES	0.97	89.24	0.809	0.78473	2.07	0.327	1.62439	0.25661	YES	2.07	0.334	SMA-5	50.3	1.0	26%	90.4
		SMA-5	1210		D	92.0	No	16.41	SINGLE FAMILY RES	16.41	1509.72	0.3068	5.03459	2.07	0.327	10.4216	1.64631	NO							
		SMA-5	1330	Residential (65%)	D	91.0	Yes	0.12	MULTI FAMILY RES	0.12	10.92	0.809	0.09708	2.32	0.52	0.22523	0.05048	NO					0.1		
		SMA-5	1330		D	91.0	No	1.85	MULTI FAMILY RES	1.85	168.35	0.2744	0.50764	2.32	0.52	1.17772	0.26397	NO							
		SMA-5	1210	Residential (60%)	A	73.0	Yes	0.01	SINGLE FAMILY RES	0.01	0.73	0.809	0.00809	2.07	0.327	0.01675	0.00265	NO					0.0		
		SMA-5	1210		A	73.0	No	0.11	SINGLE FAMILY RES	0.11	8.03	0.0702	0.00772	2.07	0.327	0.01598	0.00253	NO							
		SMA-5	1210		D	90.0	Yes	0.61	SINGLE FAMILY RES	0.61	54.9	0.809	0.49349	2.07	0.327	1.02152	0.16137	NO					0.6		
		SMA-5	1210		D	90.0	No	7.84	SINGLE FAMILY RES	7.84	705.6	0.242	1.89728	2.07	0.327	3.92737	0.62041	NO							
		SMA-5	1850	Park (25%)	D	84.0	Yes	0.07	AVERAGE OF MFR+UNDEVELOPED	0.07	5.88	0.809	0.05663	2.32	0.52	0.13138	0.02945	NO					0.1		
		SMA-5	1850		D	84.0	No	1.04	AVERAGE OF MFR+UNDEVELOPED	1.04	87.36	0.1502	0.15621	2.32	0.52	0.3624	0.08123	NO							
		SMA-5	1210	50' R/W (72%)	A	72.0	Yes	0.03	SINGLE FAMILY RES	0.03	2.16	0.809	0.02427	2.07	0.327	0.05024	0.00794	NO					0.0		
		SMA-5	1210		A	72.0	No	0.04	SINGLE FAMILY RES	0.04	2.88	0.0658	0.00263	2.07	0.327	0.00545	0.00086	NO							
		SMA-5	1210		D	90.0	Yes	1.34	SINGLE FAMILY RES	1.34	120.6	0.809	1.08406	2.07	0.327	2.244	0.35449	NO					1.3		
		SMA-5	1210		D	90.0	No	2.23	SINGLE FAMILY RES	2.23	200.7	0.242	0.53966	2.07	0.327	1.1171	0.17647	NO							
		SMA-5	1210	60' R/W (77%)	D	91.0	Yes	1.77	SINGLE FAMILY RES	1.77	161.07	0.809	1.43193	2.07	0.327	2.9641	0.46824	NO					1.8		
		SMA-5	1210		D	91.0	No	2.42	SINGLE FAMILY RES	2.42	220.22	0.2744	0.66405	2.07	0.327	1.37458	0.21714	NO							
		SMA-5	1210	80' R/W (82.5%)	D	92.0	Yes	1.64	SINGLE FAMILY RES	1.64	150.88	0.809	1.32676	2.07	0.327	2.74639	0.43385	NO					1.6		
		SMA-5	1210		D	92.0	No	1.72	SINGLE FAMILY RES	1.72	158.24	0.3068	0.5277	2.07	0.327	1.09233	0.17256	NO							
		SMA-5	1210	132' R/W (70%)	D	90.0	Yes	0.95	SINGLE FAMILY RES	0.95	85.5	0.809	0.76855	2.07	0.327	1.5909	0.25132	NO					1.0		
		SMA-5	1210		D	90.0	No	1.76	SINGLE FAMILY RES	1.76	158.4	0.242	0.42592	2.07	0.327	0.88165	0.13928	NO							
		SMA-5	1210	Alley (100%)	A	98.0	Yes	0.06	SINGLE FAMILY RES	0.06	5.88	0.809	0.04854	2.07	0.327	0.10048	0.01587	NO					0.1		
		SMA-5	1210		B	98.0	Yes	1.03	SINGLE FAMILY RES	1.03	100.94	0.809	0.83327	2.07	0.327	1.72487	0.27248	NO					1.0		
		SMA-5	1900	Open Space (Good)	D	80.0	No	1.61	UNDEVELOPED	1.61	128.8	0.111	0.17871	1.288	0.107	0.23018	0.01912	NO							
		SMA-5	8370	Water Surface	B	98.0	Yes	4.64	WATER			0.809		0	0			NO					4.6		
		SMA-6	1210	Residential (70%)	D	92.0	Yes	0.49	SINGLE FAMILY RES	0.49	45.08	0.809	0.39641	2.07	0.327	0.82057	0.12963	YES	2.11	0.369	SMA-6	36.4	0.5	22%	87.4
		SMA-6	1210		D	92.0	No	8.23	SINGLE FAMILY RES	8.23	757.16	0.3068	2.52496	2.07	0.327	5.22668	0.82566	NO							
		SMA-6	1210	Residential (60%)	D	90.0	Yes	0.24	SINGLE FAMILY RES	0.24	21.6	0.809	0.19416	2.07	0.327	0.40191	0.06349	NO					0.2		
		SMA-6	1210		D	90.0	No	3.12	SINGLE FAMILY RES	3.12	280.8	0.242	0.75504	2.07	0.327	1.56293	0.2469	NO							
		SMA-6	1850	Park (25%)	D	84.0	Yes	0.77	AVERAGE OF MFR+UNDEVELOPED	0.77	64.68	0.809	0.62293	2.32	0.52	1.4452	0.32392	NO					0.8		
		SMA-6	1850		D	84.0	No	11.54	AVERAGE OF MFR+UNDEVELOPED	11.54	969.36	0.1502	1.73331	2.32	0.52	4.02127	0.90132	NO							
		SMA-6	1210	50' R/W (72%)	D	90.0	Yes	0.95	SINGLE FAMILY RES	0.95	85.5	0.809	0.76855	2.07	0.327	1.5909	0.25132	NO					1.0		
		SMA-6	1210		D	90.0	No	1.6	SINGLE FAMILY RES	1.6	144	0.242	0.3872	2.07	0.327	0.8015	0.12661	NO							
		SMA-6	1210	60' R/W (77%)	D	91.0	Yes	0.39	SINGLE FAMILY RES	0.39	35.49	0.809	0.31551	2.07	0.327	0.65311	0.10317	NO					0.4		
		SMA-6	1210		D	91.0	No	0.54	SINGLE FAMILY RES	0.54	49.14	0.2744	0.14818	2.07	0.327	0.30672	0.04845	NO							
		SMA-6	1210	80' R/W (82.5%)	D	92.0	Yes	0.81	SINGLE FAMILY RES	0.81	74.52	0.809	0.65529	2.07	0.327	1.35645	0.21428	NO					0.8		
		SMA-6	1210		D	92.0	No	0.85	SINGLE FAMILY RES	0.85	78.2	0.3068	0.26078	2.07	0.327	0.53981	0.08528	NO							
		SMA-6	1210	Alley (100%)	D	98.0	Yes	0.54	SINGLE FAMILY RES	0.54	52.92	0.809	0.43686	2.07	0.327	0.9043	0.14285	NO					0.5		
		SMA-6	1900	Open Space (Good)	D	80.0	No	2.33	UNDEVELOPED	2.33	186.4	0.111	0.25863	1.288	0.107	0.33312	0.02767	NO					4.0		
		SMA-6	8370	Water Surface	D	98.0	Yes	3.97	WATER			0.809		0	0			NO							

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
SMA-4A-4I	14.8	2.60	0.434	80.0	8%	2.08	0.331	88.2	34%
SMA-5	50.2	2.67	0.354	79.9	0%	2.07	0.334	90.4	26%
SMA-6	1.1	3.07	0.511	78.0	0%	2.11	0.369	87.382	22%



CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-4-6)	Optional Identification		
	SMA-4A-4B	SMA-5	SMA-6	Catchment 4
BMP Name	Wet Detention/ MAPs	Wet Detention/ MAPs	Wet Detention/ MAPs	
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	D - 3 Catchment-Series	Treatment Objectives or Target for TN NOT MET TP MET	11/5/2018	
Nitrogen Pre Load (kg/yr)	162.75		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	24.56			
Nitrogen Post Load (kg/yr)	396.12			
Phosphorus Post Load (kg/yr)	65.42			
Target Load Reduction (N) %	59			
Target Load Reduction (P) %	62			
Target Discharge Load, N (kg/yr)	162.41			
Target Discharge Load, P (kg/yr)	24.86			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	85			
Discharged Load, N (kg/yr & lb/yr):	224.89		495.35	
Discharged Load, P (kg/yr & lb/yr):	9.70		21.36	
Load Removed, N (kg/yr & lb/yr):	171.22		377.14	
Load Removed, P (kg/yr & lb/yr):	55.72		122.73	

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE	11/5/2018	Blue Numbers = Red Numbers =	Input data Calculated or Carryover
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis			NAME OF PROJECT Fontana (SMA-2-3)		HELP Rainfall VIEW ZONE MAP VIEW MEAN ANNUAL RAINFALL MAP GO TO WATERSHED CHARACTERISTICS	
Meteorological Zone (Please use zone map):			CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):			49.00 Inches			
Type of analysis: Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):			CLICK ON CELL BELOW TO SELECT Net improvement			
			%			
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.		
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.		
				METHODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY		
				METHODOLOGY FOR RETENTION SYSTEMS		METHODOLOGY FOR WET DETENTION SYSTEMS
				METHODOLOGY FOR GREENROOF SYSTEMS		METHODOLOGY FOR WATER HARVESTING SYSTEMS
RESET INPUT FOR STORMWATER TREATMENT ANALYSIS						

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers = Red Numbers =	Input data Calculated	LAND USES/EMC
SELECT CATCHMENT CONFIGURATION		11/5/2018		VIEW CATCHMENT CONFIGURATION		
CLICK ON CELL BELOW TO SELECT CONFIGURATION		GO TO GENERAL SITE INFORMATION PAGE				
C - 2 Catchment-Parallel		OVERWRITE DEFAULT CONCENTRATIONS USING:				
COMINGLING MULTI-LAND USE		IMPORT GIS CONCENTRATIONS				
VIEW AVERAGE ANNUAL RUNOFF "C" Factor		PRE:				
VIEW EMC & FLUCCS		POST:				
GO TO GIS LANDUSE DATA		EMC(N):				
From GIS data		EMC(P):				
Pre-development land use:		Average annual pre runoff volume:				
with default EMCs		Average annual post runoff volume (note no BMP area):				
Post-development land use:		Pre-development Annual Mass Loading - Nitrogen :				
with default EMCs		Pre-development Annual Mass Loading - Phosphorus :				
Total pre-development catchment area:		Post-development Annual Mass Loading - Nitrogen :				
Total post-development catchment or for BMP analysis:		Post-development Annual Mass Loading - Phosphorus :				
Pre-development Non DCIA CN:		Average annual pre runoff volume:				
Pre-development DCIA percentage:		Average annual post runoff volume (note no BMP area):				
Post-development Non DCIA CN:		Pre-development Annual Mass Loading - Nitrogen :				
Post-development DCIA percentage:		Pre-development Annual Mass Loading - Phosphorus :				
Estimated BMP Area (No loading from this area)		Post-development Annual Mass Loading - Nitrogen :				
CATCHMENT NO.2 NAME:		Post-development Annual Mass Loading - Phosphorus :				
SMA-3		Average annual pre runoff volume:				
CLICK ON CELL BELOW TO SELECT		Average annual post runoff volume (note no BMP area):				
Pre-development land use:		Pre-development Annual Mass Loading - Nitrogen :				
with default EMCs		Pre-development Annual Mass Loading - Phosphorus :				
Post-development land use:		Post-development Annual Mass Loading - Nitrogen :				
with default EMCs		Post-development Annual Mass Loading - Phosphorus :				
Total pre-development catchment area:		Average annual pre runoff volume:				
Total post-development catchment or BMP analysis area:		Average annual post runoff volume (note no BMP area):				
Pre-development Non DCIA CN:		Pre-development Annual Mass Loading - Nitrogen :				
Pre-development DCIA percentage:		Pre-development Annual Mass Loading - Phosphorus :				
Post-development Non DCIA CN:		Post-development Annual Mass Loading - Nitrogen :				
Post-development DCIA percentage:		Post-development Annual Mass Loading - Phosphorus :				
Estimated BMP Area (No loading from this area)		Average annual pre runoff volume:				

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering in a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

GO TO WATERSHED CHARACTERISTICS

VIEW EMC & FLUCCS

Pre-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCSDDESC	HYDROGRP	CN	DCIA [Yes/ No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighte
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-2	2110	Improved Pastures	D	80.0	No	17.6	PASTURE	17.6	1408	0.111	1.9536	3.51	0.686	6.85714	1.34017	YES	3.30	0.628	SMA-2	17.6		1%	80.0
		SMA-2	6172	Mixed Shrubs	D	98.0	Yes	0.23	WET PRAIRIE*	0.23	22.54	0.809	0.18607	1.095	0.015	0.20375	0.00279	NO					0.2		
		SMA-3	2110	Improved Pastures	D	80.0	No	22.29	PASTURE	22.29	1783.2	0.111	2.47419	3.51	0.686	8.68441	1.69729	YES	2.41	0.393	SMA-3	24.9		11%	80.0
		SMA-3	6410	Freshwater Marshes	D	98.0	Yes	2.65	WETLAND*	2.65	259.7	0.809	2.14385	1.15	0.055	2.46543	0.11791	NO					2.7		

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCSDDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighte
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		SMA-2	1210	Residential (70%)	D	92.0	Yes	0.25	SINGLE FAMILY RES	0.25	23	0.809	0.20225	2.07	0.327	0.41866	0.06614	YES	2.04	0.318	SMA-2	17.8	0.3	29%	89.2
		SMA-2	1210		D	92.0	No	4.19	SINGLE FAMILY RES	4.19	385.48	0.3068	1.28549	2.07	0.327	2.66097	0.42036	NO							
		SMA-2	1210	Residential (60%)	D	90.0	Yes	0.33	SINGLE FAMILY RES	0.33	29.7	0.809	0.26697	2.07	0.327	0.55263	0.0873	NO					0.3		
		SMA-2	1210		D	90.0	No	4.26	SINGLE FAMILY RES	4.26	383.4	0.242	1.03092	2.07	0.327	2.134	0.33711	NO							
		SMA-2	1210	50' R/W (72%)	D	90.0	Yes	0.44	SINGLE FAMILY RES	0.44	39.6	0.809	0.35596	2.07	0.327	0.73684	0.1164	NO					0.4		
		SMA-2	1210		D	90.0	No	0.74	SINGLE FAMILY RES	0.74	66.6	0.242	0.17908	2.07	0.327	0.3707	0.05856	NO							
		SMA-2	1210	80' R/W (82.5%)	D	92.0	Yes	1.19	SINGLE FAMILY RES	1.19	109.48	0.809	0.96271	2.07	0.327	1.99281	0.31481	NO					1.2		
		SMA-2	1210		D	92.0	No	1.26	SINGLE FAMILY RES	1.26	115.92	0.3068	0.38657	2.07	0.327	0.8002	0.12641	NO							
		SMA-2	1210	Alley (100%)	D	98.0	Yes	0.61	SINGLE FAMILY RES	0.61	59.78	0.809	0.49349	2.07	0.327	1.02152	0.16137	NO					0.6		
		SMA-2	1900	Open Space (Good)	D	80.0	No	1.87	UNDEVELOPED	1.87	149.6	0.111	0.20757	1.288	0.107	0.26735	0.02221	NO							
		SMA-2	8370	Water Surface	D	98.0	Yes	2.36	WATER			0.809		0	0			NO					2.4		
		SMA-2	1850	Park (25%)	D	84.0	Yes	0.01	AVERAGE OF MFR+UNDEVEL	0.01	0.84	0.809	0.00809	2.32	0.52	0.01877	0.00421	NO					0.0		
		SMA-2	1850	Park (25%)	D	84.0	No	0.08	AVERAGE OF MFR+UNDEVEL	0.08	6.72	0.1502	0.01202	2.32	0.52	0.02788	0.00625	NO							
		SMA-2	1900	Open Space (Good)	D	84.0	No	0.23	UNDEVELOPED	0.23	19.32	0.1502	0.03455	1.288	0.107	0.0445	0.0037	NO							
		SMA-3	1210	Residential (70%)	D	92.0	Yes	0.67	SINGLE FAMILY RES	0.67	61.64	0.809	0.54203	2.07	0.327	1.122	0.17724	YES	2.04	0.319	SMA-3	24.9	0.7	34%	90.2
		SMA-3	1210		D	92.0	No	11.24	SINGLE FAMILY RES	11.24	1034.08	0.3068	3.44843	2.07	0.327	7.13825	1.12764	NO							
		SMA-3	1210	Residential (60%)	D	90.0	Yes	0.12	SINGLE FAMILY RES	0.12	10.8	0.809	0.09708	2.07	0.327	0.20096	0.03175	NO					0.1		
		SMA-3	1210		D	90.0	No	1.57	SINGLE FAMILY RES	1.57	141.3	0.242	0.37994	2.07	0.327	0.78648	0.12424	NO							
		SMA-3	1210	50' R/W (72%)	D	90.0	Yes	1.07	SINGLE FAMILY RES	1.07	96.3	0.809	0.86563	2.07	0.327	1.79185	0.28306	NO					1.1		
		SMA-3	1210		D	90.0	No	1.78	SINGLE FAMILY RES	1.78	160.2	0.242	0.43076	2.07	0.327	0.89167	0.14086	NO							
		SMA-3	1210	60' R/W (77%)	D	91.0	Yes	0.06	SINGLE FAMILY RES	0.06	5.46	0.809	0.04854	2.07	0.327	0.10048	0.01587	NO					0.1		
		SMA-3	1210		D	91.0	No	0.09	SINGLE FAMILY RES	0.09	8.19	0.2744	0.0247	2.07	0.327	0.05112	0.00808	NO							
		SMA-3	1900	Open Space (Good)	D	80.0	No	1.9	UNDEVELOPED	1.9	152	0.111	0.2109	1.288	0.107	0.27164	0.02257	NO							
		SMA-3	8370	Water Surface	D	98.0	Yes	3.79	WATER			0.809		0	0			NO					3.8		
		SMA-3	8370	Water Surface	D	98.0	Yes	2.65	WATER			0.809		0	0			NO					2.7		

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
SMA-2	17.8	3.30	0.628	80.0	1%	2.04	0.318	89.2	29%
SMA-3	24.9	2.41	0.393	80.0	11%	2.04	0.319	90.2	34%

WET DETENTION / MANAGED AQUATIC PLANTS:

11/5/2018 V 8.6

Blue Numbers =
Red Numbers =

Input data
Calculated or Carryover

Also called: FLOATING ISLANDS and includes a wet detention pond:

Fontana (SMA-2-3)

GO TO STORMWATER TREATMENT ANALYSIS

Total pre-development catchment area:
Total post-development catchment area:
Average annual residence time (between 1 and 500 days)
Littoral Zone or other improvements used? *
Littoral Zone or other improvement efficiency credit:
Floating Wetland or Mats used in the design:
Floating Wetland or Mats credit:
Total Nitrogen removal required:
Total Phosphorus removal required:
Total Nitrogen removal efficiency:
Total Phosphorus removal efficiency:
Is the wet detention sufficient:
Average annual runoff volume:
* pond coverage must follow Regulatory Requirements

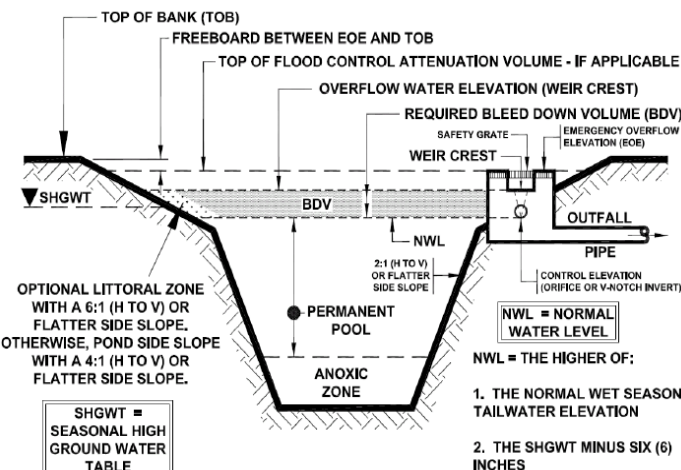
SMA-2	SMA-3	Catchment 3	Catchment 4	
17.810	24.940	0.000	0.000	ac
17.810	24.940	0.000	0.000	ac
385.00	500.00			days
NO	NO			%
NO	NO			%
51.557	48.847			%
40.989	46.728			%
43.258	43.370	0.000	0.000	%
85.613	87.956	0.000	0.000	%
NO	NO			%
28.712	44.239			ac-ft/yr

Wet Detention Pond Characteristic:

Minimum Pond Permanent Pool Volume:

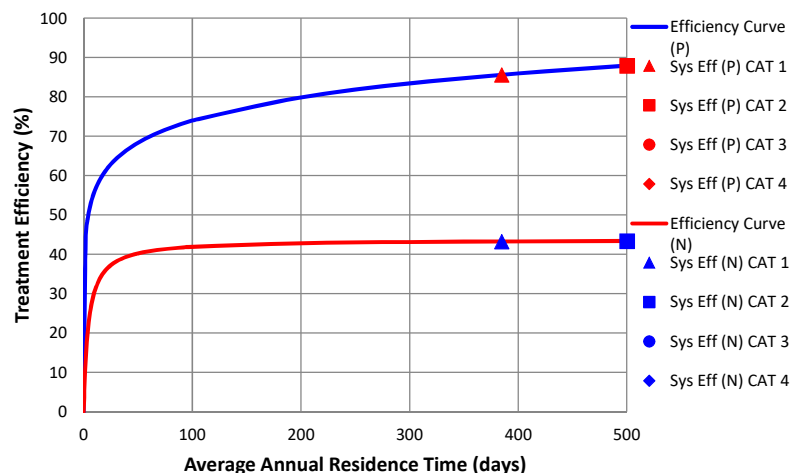
30.285	60.601			ac-ft
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REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION.



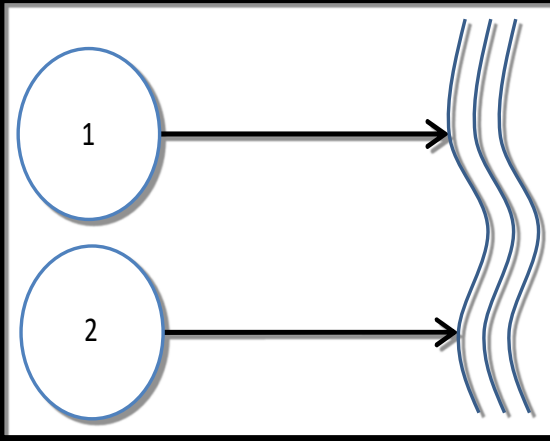
TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft STORMWATER QUALITY APPLICANT'S HANDBOOK dated March 2010, by the Department of Environmental Protection, available at: <http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater>, March 2010



NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased. Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-2-3)	Optional Identification		
	SMA-2	SMA-3	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs	Wet Detention/ MAPs		
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	C - 2 Catchment-Parallel	Treatment Objectives or Target for TN NOT MET TP MET	11/5/2018	
Nitrogen Pre Load (kg/yr)	91.93		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	15.92			
Nitrogen Post Load (kg/yr)	183.54			
Phosphorus Post Load (kg/yr)	28.68			
Target Load Reduction (N) %	50			
Target Load Reduction (P) %	44			
Target Discharge Load, N (kg/yr)	91.77			
Target Discharge Load, P (kg/yr)	16.06			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	87			
Discharged Load, N (kg/yr & lb/yr):	104.02		229.11	
Discharged Load, P (kg/yr & lb/yr):	3.72		8.19	
Load Removed, N (kg/yr & lb/yr):	79.52		175.15	
Load Removed, P (kg/yr & lb/yr):	24.96		54.98	

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE	7/20/2020	Blue Numbers = Red Numbers =	Input data Calculated or Carryover
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis			NAME OF PROJECT Fontana (SMA-1-3&12-16)		HELP Rainfall VIEW ZONE MAP VIEW MEAN ANNUAL RAINFALL MAP GO TO WATERSHED CHARACTERISTICS	
Meteorological Zone (Please use zone map):			CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):			49.00 Inches			
Type of analysis: Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):			CLICK ON CELL BELOW TO SELECT Net improvement			
			%			
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.		
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.		
				METHODODOLOGY FOR CALCULATING REQUIRED TREATMENT EFFICIENCY		
				METHODODOLOGY FOR RETENTION SYSTEMS		METHODODOLOGY FOR WET DETENTION SYSTEMS
				METHODODOLOGY FOR GREENROOF SYSTEMS		METHODODOLOGY FOR WATER HARVESTING SYSTEMS
RESET INPUT FOR STORMWATER TREATMENT ANALYSIS						

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers =	Input data	LAND USES/EMC
SELECT CATCHMENT CONFIGURATION 7/20/2020		CLICK ON CELL BELOW TO SELECT CONFIGURATION		Red Numbers =	Calculated	
		F - Mixed-3 Catchment-2 Series-Parallel (A)		VIEW CATCHMENT CONFIGURATION		
For comingling, the off-site catchment must be upstream. The delay is only for retention BMPs and must be used in hours as measured by the time of concentration at a one inch/hour rain Delay [hrs] CATCHMENT NO.1 NAME: SMA-12-16 max delay = 15 hrs. Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 277.900 AC Total post-development catchment or for BMP analysis: 277.900 AC Pre-development Non DCIA CN: 59.30 Pre-development DCIA percentage: 6.00 % Post-development Non DCIA CN: 80.80 Post-development DCIA percentage: 30.00 % Estimated BMP Area (No loading from this area) AC		COMINGLING MULTI-LAND USE VIEW AVERAGE ANNUAL RUNOFF "C" Factor VIEW EMC & FLUCCS GO TO GIS LANDUSE DATA		GO TO GENERAL SITE INFORMATION PAGE OVERWRITE DEFAULT CONCENTRATIONS USING: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 85.910 ac-ft/year Average annual post runoff volume (note no BMP area): 369.477 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 231.864 kg/year Pre-development Annual Mass Loading - Phosphorus: 34.890 kg/year Post-development Annual Mass Loading - Nitrogen: 880.562 kg/year Post-development Annual Mass Loading - Phosphorus: 147.195 kg/year		
CATCHMENT NO.2 NAME: SMA-2&3 Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 42.750 AC Total post-development catchment or for BMP analysis area: 42.750 AC Pre-development Non DCIA CN: 80.00 Pre-development DCIA percentage: 7.00 % Post-development Non DCIA CN: 89.80 Post-development DCIA percentage: 31.92 % Estimated BMP Area (No loading from this area) AC		From GIS data 277.9 59.3 6% 80.8 30%		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 27.930 ac-ft/year Average annual post runoff volume (note no BMP area): 73.409 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 92.823 kg/year Pre-development Annual Mass Loading - Phosphorus: 16.098 kg/year Post-development Annual Mass Loading - Nitrogen: 184.701 kg/year Post-development Annual Mass Loading - Phosphorus: 28.864 kg/year		
CATCHMENT NO.3 NAME: SMA-1 Pre-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Post-development land use: CLICK ON CELL BELOW TO SELECT GIS Import Data with default EMCs Total pre-development catchment area: 106.330 AC Total post-development catchment or for BMP analysis area: 106.330 AC Pre-development Non DCIA CN: 79.00 Pre-development DCIA percentage: 15.00 % Post-development Non DCIA CN: 88.00 Post-development DCIA percentage: 53.00 % Estimated BMP Area (no loading from this area) AC		From GIS data 106.3 78.9 15% 88.1 53%		OVERWRITE DEFAULT CONCENTRATIONS: PRE: mg/L POST: mg/L EMC(N): mg/L EMC(P): mg/L IMPORT GIS CONCENTRATIONS Average annual pre runoff volume: 91.438 ac-ft/year Average annual post runoff volume (note no BMP area): 228.970 ac-ft/year Pre-development Annual Mass Loading - Nitrogen: 246.791 kg/year Pre-development Annual Mass Loading - Phosphorus: 37.256 kg/year Post-development Annual Mass Loading - Nitrogen: 623.110 kg/year Post-development Annual Mass Loading - Phosphorus: 122.186 kg/year		

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

GO TO WATERSHED CHARACTERISTICS

VIEW EMC & FLUCCS

Pre-Development EMC Calculation Table

EMC Overwrite	Basin ID	FLUCSCODE	FLUCDESC	HYDROGRP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN ^a Area	C	C ^a Area	EMC's Based on		C ^a Area ^a TN _{occ}	C ^a Area ^a TP _{occ}	New Basin?	Subbasin Summary			Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]
	TN [mg/L]	TP [mg/L]											TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]						
	SMA-12-14	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.001344	3.51	0.686	0.00472	0.000921984	YES	2.19	0.329	SMA-12-14	277.9			6%	59.3
	SMA-12-14	2130	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	0.138024	3.51	0.686	0.48446	0.094684464	NO								
	SMA-12-14	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.004352	3.51	0.686	0.01528	0.002985472	NO								
	SMA-12-14	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.000324	3.51	0.686	0.00114	0.000222264	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	15.39	PASTURE	15.39	938.79	0.0324	0.498636	3.51	0.686	1.75021	0.342064296	NO								
	SMA-12-14	2110	Improved Pasture	B	61.0	No	5.6	PASTURE	5.6	341.6	0.0324	0.18144	3.51	0.686	0.63685	0.12446784	NO								
	SMA-12-14	0140	Roads and Highways	B	89.0	No	0.02	HIGHWAY	0.02	1.78	0.2256	0.004512	1.52	0	0.00046	0.0009024	NO								
	SMA-12-14	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.86	WETLAND*	0.86	84.28	0.809	0.69574	1.15	0.055	0.8001	0.0382657	NO						0.9		
	SMA-12-14	2110	Improved Pastures	B	61.0	No	51.02	PASTURE	51.02	3112.22	0.0324	1.653048	3.51	0.686	5.8022	1.133990928	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	3.74	PASTURE	3.74	228.14	0.0324	0.121176	3.51	0.686	0.42533	0.083126736	NO								
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	0.17	WETLAND*	0.17	16.66	0.809	0.13753	1.15	0.055	0.15816	0.00756415	NO						0.2		
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	6.19	WETLAND*	6.19	606.62	0.809	5.00771	1.15	0.055	5.75887	0.27542405	NO						6.2		
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	0.05	WETLAND*	0.05	4.9	0.809	0.04045	1.15	0.055	0.04652	0.00222475	NO						0.1		
	SMA-12-14	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.38	WATER			0.809						NO						0.4		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.07	WATER			0.809			0	0		NO						0.1		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.1	WATER			0.809			0	0		NO						0.1		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	1.17	WATER			0.809			0	0		NO						1.2		
	SMA-12-14	2240	Abandoned Citrus Groves	A	32.0	No	1.96	RUDERAL UPLAND PINE*	1.96	62.72	0.0028	0.005488	1.694	0.162	0.0093	0.0008899056	NO								
	SMA-12-14	2240	Abandoned Citrus Groves	B	58.0	No	4.36	RUDERAL UPLAND PINE*	4.36	252.88	0.0268	0.116848	1.694	0.162	0.19794	0.018929376	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	6.99	PASTURE	6.99	426.39	0.0324	0.226476	3.51	0.686	0.79493	0.155362536	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	1.96	PASTURE	1.96	119.56	0.0324	0.063504	3.51	0.686	0.2229	0.043563744	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	2.63	PASTURE	2.63	160.43	0.0324	0.085212	3.51	0.686	0.29909	0.058455432	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	17.3	PASTURE	17.3	1055.3	0.0324	0.56052	3.51	0.686	1.96743	0.38451672	NO								
	SMA-12-14	2110	Improved Pasture	B	61.0	No	2.25	PASTURE	2.25	137.25	0.0324	0.0729	3.51	0.686	0.25588	0.0500094	NO								
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	0.49	WETLAND*	0.49	48.02	0.809	0.39641	1.15	0.055	0.45587	0.02180255	NO						0.5		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.38	WATER			0.809						NO						0.4		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.75	WATER			0.809			0	0		NO						0.8		
	SMA-12-14	2240	Abandoned Citrus Groves	B	58.0	No	2.17	RUDERAL UPLAND PINE*	2.17	125.86	0.0268	0.058156	1.694	0.162	0.09852	0.009421272	NO								
	SMA-12-14	2240	Abandoned Citrus Groves	B	58.0	No	23.09	RUDERAL UPLAND PINE*	23.09	1339.22	0.0268	0.618812	1.694	0.162	1.04827	0.100247544	NO								
	SMA-12-14	4270	Live Oak	B	55.0	No	2.28	UNDEVELOPED	2.28	125.4	0.022	0.05016	1.288	0.107	0.06461	0.00536712	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	27.27	PASTURE	27.27	2279.57	0.0324	1.210798	3.51	0.686	4.24987	0.830605568	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	6.24	PASTURE	6.24	380.64	0.0324	0.202176	3.51	0.686	0.70964	0.138692736	NO								
	SMA-12-14	2130	Woodland Pasture	B	58.0	No	0.46	PASTURE	0.46	26.68	0.0268	0.012328	3.51	0.686	0.04327	0.008457008	NO								
	SMA-12-14	2110	Improved Pasture	B	61.0	No	0.4	PASTURE	0.4	24.4	0.0324	0.01296	3.51	0.686	0.04549	0.00889056	NO								
	SMA-12-14	2110	Improved Pasture	B	61.0	No	0.04	PASTURE	0.04	2.44	0.0324	0.001296	3.51	0.686	0.00455	0.000889056	NO								
	SMA-12-14	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.12	WATER			0.809			3.51	0.686	0.05231	0.010224144	NO						0.1	
	SMA-12-14	5340	Reservoirs less than 10 acres	B	98.0	Yes	0.25	WATER			0.809			0	0		NO						0.3		
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	0.23	WETLAND*	0.23	22.54	0.809	0.18607	1.15	0.055	0.21398	0.01023385	NO						0.2		
	SMA-12-14	6410	Freshwater Marshes	B	98.0	Yes	0.08	WETLAND*	0.08	7.84	0.809	0.06472	1.15	0.055	0.07443	0.0035596	NO						0.1		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.78	WATER			0.809			0	0		NO						0.8		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	1.02	WATER			0.809			0	0		NO						1.0		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	1.01	WATER			0.809			0	0		NO						1.0		
	SMA-12-14	5100	Streams and Waterways	A	98.0	Yes	0.29	WATER			0.809			0	0		NO						0.3		
	SMA-12-14	5100	Streams and Waterways	B	98.0	Yes	0.75	WATER			0.809			0	0		NO						0.8		
	SMA-12-14	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.57	WETLAND*	0.57	55.86	0.809	0.46113	1.15	0.055	0.5303	0.02536215	NO						0.6		
	SMA-12-14	6400	Vegetated Non-Forested Wetlands	B	98.0	Yes	0.11	WETLAND*	0.11	10.78	0.809	0.08899	1.15	0.055	0.10234	0.00489445	NO						0.1		
	SMA-12-14	2240	Abandoned Citrus Groves	A	32.0	No	1.39	RUDERAL UPLAND PINE*	1.39	44.48	0.0028	0.003892	1.694	0.162	0.00659	0.000630594	NO								
	SMA-12-14	2240	Abandoned Citrus Groves	B	58.0	No	1.19	RUDERAL UPLAND PINE*	1.19	69.02	0.0268	0.033892	1.694	0.162	0.05403	0.005166504	NO								
	SMA-12-14	2240	Abandoned Citrus Groves	A	32.0	No	3.63	RUDERAL UPLAND PINE*	3.63	116.16	0.0028	0.010164	1.694	0.162	0.01722	0.001646568	NO								
	SMA-12-14	2240	Abandoned Citrus Groves	B	58.0	No	20.52	RUDERAL UPLAND PINE*	20.52	1190.16	0.0268	0.549936	1.694	0.162	0.93159	0.089089632	NO								
	SMA-12-14	4270	Live Oak	B	55.0	No	0.01	UNDEVELOPED	0.01	0.55	0.022	0.00022	1.288	0.107	0.00028	0.00002354	NO								
	SMA-12-14	4270	Live Oak	B	55.0	No	4.82	UNDEVELOPED	4.82	265.1	0.022	0.10604	1.288	0.107	0.13658	0.01134628	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	5.66	PASTURE	5.66	345.26	0.0324	0.183304	3.51	0.686	0.64368	0.125801424	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	0.1	PASTURE	0.1	6.1	0.0324	0.00324	3.51	0.686	0.01137	0.00222264	NO								
	SMA-12-14	2110	Improved Pastures	B	61.0	No	0.34	PASTURE	0.34	20.74	0.0324	0.011016	3.51	0.686	0.03867	0.007556976	NO								

Post-Development EMC Calculation Table																										
EMC Override		Basin ID	FLUCCSCODE	FLUCSDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighted]	
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]						
		SMA-12-16	2110	Woodland Pasture	A	39.0	No	0.21	PASTURE	0.21	8.19	0.0064	0.00134	3.51	0.686	0.00472	0.00092	YES	1.93	0.323	SMA-12-16	277.9		30%	80.8	
		SMA-12-16	2110	Improved Pasture	B	61.0	No	4.26	PASTURE	4.26	259.86	0.0324	0.13802	3.51	0.686	0.48446	0.09468	NO								
		SMA-12-16	2130	Woodland Pasture	A	39.0	No	0.68	PASTURE	0.68	26.52	0.0064	0.00435	3.51	0.686	0.01528	0.00299	NO								
		SMA-12-16	2130	Improved Pasture	B	61.0	No	0.01	PASTURE	0.01	0.61	0.0324	0.00032	3.51	0.686	0.00114	0.00022	NO								
		SMA-12-16	1210	Residential (70%)	B	86.0	Yes	0.38	SINGLE FAMILY RES	0.38	32.68	0.809	0.30742	2.07	0.327	0.63636	0.10053	NO						0.4		
		SMA-12-16	1210		B	86.0	No	6.45	SINGLE FAMILY RES	6.45	554.7	0.1764	1.13778	2.07	0.327	2.3552	0.37205	NO								
		SMA-12-16	1210	Residential (60%)	B	82.0	Yes	0.16	SINGLE FAMILY RES	0.16	13.12	0.809	0.12944	2.07	0.327	0.26794	0.04233	NO						0.2		
		SMA-12-16	1210		B	82.0	No	2.01	SINGLE FAMILY RES	2.01	164.82	0.1306	0.26251	2.07	0.327	0.54339	0.08585	NO								
		SMA-12-16	1210	50' R/W (72%)	B	81.0	Yes	0.52	SINGLE FAMILY RES	0.52	42.12	0.809	0.42068	2.07	0.327	0.87081	0.13756	NO					0.5			
		SMA-12-16	1210		B	81.0	No	0.88	SINGLE FAMILY RES	0.88	71.28	0.1208	0.1063	2.07	0.327	0.22005	0.03476	NO								
		SMA-12-16	1210	60' R/W (77%)	B	83.0	Yes	0.43	SINGLE FAMILY RES	0.43	35.69	0.809	0.34787	2.07	0.327	0.72009	0.11375	NO					0.4			
		SMA-12-16	1210		B	83.0	No	0.58	SINGLE FAMILY RES	0.58	48.14	0.1404	0.08143	2.07	0.327	0.16856	0.02663	NO								
		SMA-12-16	1210	Alley (100%)	B	98.0	Yes	0.31	SINGLE FAMILY RES	0.31	30.38	0.809	0.25079	2.07	0.327	0.51914	0.08201	NO					0.3			
		SMA-12-16	1900	Open Space (Good)	B	61.0	No	1.51	UNDEVELOPED	1.51	92.11	0.0324	0.04892	1.288	0.107	0.06301	0.00523	NO								
		SMA-12-16	8370	Water Surface	B	98.0	Yes	2.16	WATER			0.809		0	0			NO					2.2			
		SMA-12-16	1210	Residential (70%)	B	86.0	Yes	1.2	SINGLE FAMILY RES	1.2	103.2	0.809	0.9708	2.07	0.327	2.00956	0.31745	NO					1.2			
		SMA-12-16	1210		B	86.0	No	20.3	SINGLE FAMILY RES	20.3	1745.8	0.1764	3.58092	2.07	0.327	7.4125	1.17096	NO								
		SMA-12-16	1210	Residential (60%)	B	82.0	Yes	0.58	SINGLE FAMILY RES	0.58	47.56	0.809	0.46922	2.07	0.327	0.97129	0.15343	NO						0.6		
		SMA-12-16	1210		B	82.0	No	7.43	SINGLE FAMILY RES	7.43	609.26	0.1306	0.97036	2.07	0.327	2.00864	0.31731	NO								
		SMA-12-16	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.97	HIGH INTENSITY COMMERCIAL	0.97	83.42	0.809	0.78473	2.4	0.345	1.88335	0.27073	NO					1.0			
		SMA-12-16	1400		B	86.0	No	1.46	HIGH INTENSITY COMMERCIAL	1.46	125.56	0.1764	0.25754	2.4	0.345	0.61811	0.08885	NO								
		SMA-12-16	1850	Park (25%)	B	68.0	Yes	0.18	AVERAGE OF MFR+UNDEVELOPED	0.18	12.24	0.809	0.14562	2.32	0.52	0.33784	0.07572	NO					0.2			
		SMA-12-16	1850		B	68.0	No	2.65	AVERAGE OF MFR+UNDEVELOPED	2.65	180.2	0.051	0.13515	2.32	0.52	0.31355	0.07028	NO								
		SMA-12-16	1210	50' R/W (72%)	B	81.0	Yes	1.91	SINGLE FAMILY RES	1.91	154.71	0.809	1.54519	2.07	0.327	3.19854	0.50528	NO					1.9			
		SMA-12-16	1210		B	81.0	No	3.2	SINGLE FAMILY RES	3.2	259.2	0.1208	0.38656	2.07	0.327	0.80018	0.12641	NO								
		SMA-12-16	1210	60' R/W (77%)	B	83.0	Yes	1.11E+00	SINGLE FAMILY RES	1.11	92.13	0.809	0.89799	2.07	0.327	1.85884	0.29364	NO					1.1			
		SMA-12-16	1210		B	83.0	No	1.5	SINGLE FAMILY RES	1.5	124.5	0.1404	0.2106	2.07	0.327	0.43594	0.06887	NO								
		SMA-12-16	1210	80' R/W (82.5%)	B	85.0	Yes	0.89	SINGLE FAMILY RES	0.89	75.65	0.809	0.72001	2.07	0.327	1.49042	0.23544	NO					0.9			
		SMA-12-16	1210		B	85.0	No	0.93	SINGLE FAMILY RES	0.93	79.05	0.16	0.1488	2.07	0.327	0.30802	0.04866	NO								
		SMA-12-16	1210	Friar's Cove Road (82.5%)	B	85.0	Yes	2.74	SINGLE FAMILY RES	2.74	232.9	0.809	2.21666	2.07	0.327	4.58849	0.72485	NO					2.7			
		SMA-12-16	1210		B	85.0	No	2.89	SINGLE FAMILY RES	2.89	245.65	0.16	0.4624	2.07	0.327	0.95717	0.1512	NO								
		SMA-12-16	1210	Alley (100%)	B	98.0	Yes	0.92	SINGLE FAMILY RES	0.92	90.16	0.809	0.74428	2.07	0.327	1.54066	0.24338	NO					0.9			
		SMA-12-16	1900	Open Space (Good)	B	61.0	No	2.47	UNDEVELOPED	2.47	150.67	0.0324	0.08003	1.288	0.107	0.10308	0.00856	NO								
		SMA-12-16	8370	Water Surface	B	98.0	Yes	7.91	WATER			0.809		0	0			NO					7.9			
		SMA-12-16	1210	Residential (70%)	A	79.0	Yes	0.05	SINGLE FAMILY RES	0.05	3.95	0.809	0.04045	2.07	0.327	0.08373	0.01323	NO					0.1			
		SMA-12-16	1210		A	79.0	No	0.88	SINGLE FAMILY RES	0.88	69.52	0.1046	0.09205	2.07	0.327	0.19054	0.0301	NO								
		SMA-12-16	1210		B	86.0	Yes	0.93	SINGLE FAMILY RES	0.93	79.98	0.809	0.75237	2.07	0.327	1.55741	0.24602	NO					0.9			
		SMA-12-16	1210		B	86.0	No	15.61	SINGLE FAMILY RES	15.61	1342.46	0.1764	2.7536	2.07	0.327	5.69996	0.90043	NO								
		SMA-12-16	1330	Residential (65%)	B	84.0	Yes	0.22	MULTI FAMILY RES	0.22	18.48	0.809	0.17798	2.32	0.52	0.41291	0.09255	NO					0.2			
		SMA-12-16	1330		B	84.0	No	3.6	MULTI FAMILY RES	3.6	302.4	0.1502	0.54072	2.32	0.52	1.25447	0.28117	NO								
		SMA-12-16	1210	Residential (60%)	A	73.0	Yes	0.05	SINGLE FAMILY RES	0.05	3.65	0.809	0.04045	2.07	0.327	0.08373	0.01323	NO					0.1			
		SMA-12-16	1210		A	73.0	No	0.67	SINGLE FAMILY RES	0.67	48.91	0.0702	0.04703	2.07	0.327	0.09736	0.01538	NO								
		SMA-12-16	1210		B	82.0	Yes	0.07	SINGLE FAMILY RES	0.07	5.74	0.809	0.05663	2.07	0.327	0.11722	0.01852	NO					0.1			
		SMA-12-16	1210		B	82.0	No	0.96	SINGLE FAMILY RES	0.96	78.72	0.1306	0.12538	2.07	0.327	0.25953	0.041	NO								
		SMA-12-16	1400	Civ-Com-Multi (80%)	B	86.0	Yes	0.75	HIGH INTENSITY COMMERCIAL	0.75	64.5	0.809	0.60675	2.4	0.345	1.4562	0.20933	NO					0.8			
		SMA-12-16	1400		B	86.0	No	1.12	HIGH INTENSITY COMMERCIAL	1.12	96.32	0.1764	0.19757	2.4	0.345	0.47416	0.06816	NO								
		SMA-12-16	1850	Park (25%)	B	68.0	Yes	0.21	AVERAGE OF MFR+UNDEVELOPED	0.21	14.28	0.809	0.16989	2.32	0.52	0.39414	0.08834	NO					0.2			
		SMA-12-16	1850		B	68.0	No	3.17	AVERAGE OF MFR+UNDEVELOPED	3.17	215.56	0.051	0.16167	2.32	0.52	0.37507	0.08407	NO								
		SMA-12-16	1210	50' R/W (72%)	B	81.0	Yes	2.1	SINGLE FAMILY RES	2.1	170.1	0.809	1.6989	2.07	0.327	3.51672	0.55554	NO					2.1			
		SMA-12-16	1210		B	81.0	No	3.51E+00	SINGLE FAMILY RES	3.51	284.31	0.1208	0.42401	2.07	0.327	0.8777	0.13865	NO								
		SMA-12-16																								

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Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
SMA-12-16	277.9	2.19	0.329	59.3	6%	1.93	0.323	80.8	30%
SMA-2-3	42.8	2.69	0.467	80.0	7%	2.04	0.319	89.8	32%
SMA-1	106.3	2.19	0.330	78.9	15%	2.21	0.433	88.114	53%

WET DETENTION / MANAGED AQUATIC PLANTS:		7/20/2020 V 8.6	
Also called: FLOATING ISLANDS and includes a wet detention pond:		Fontana (SMA-1-3&12-16)	
Total pre-development catchment area:	SMA-12-16	SMA-2&3	SMA-1
	277.900	42.750	106.330
Total post-development catchment area:	277.900	42.750	106.330
Average annual residence time (between 1 and 500 days)			430.00
Littoral Zone or other improvements used?*			NO
Littoral Zone or other improvement efficiency credit:			
Floating Wetland or Mats used in the design:			NO
Floating Wetland or Mats credit:			
Total Nitrogen removal required:	73.669	49.744	60.394
Total Phosphorus removal required:	76.297	44.229	69.509
Total Nitrogen removal efficiency:	0.000	0.000	43.309
Total Phosphorous removal efficiency:	0.000	0.000	86.600
Is the wet detention sufficient:			NO
Average annual runoff volume:	369.477	73.409	228.970
* pond coverage must follow Regulatory Requirements			
Wet Detention Pond Characteristic:			
Minimum Pond Permanent Pool Volume:			269.745

NOTE FOR TREATMENT EFFICIENCY GRAPH:

The purpose of the treatment efficiency graphs is to help illustrate the treatment efficiency of the wet detention system as the function of average annual residence time (and permanent pool volume). The graph illustrates that there is a point of diminished return as the permanent pool volume is substantially increased.

Therefore, to provide the most economical BMP treatment system, other alternatives such as "treatment trains" and compensatory treatment should be considered.

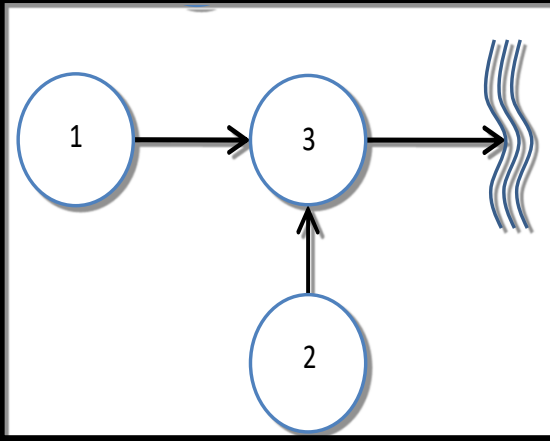
GO TO STORMWATER TREATMENT ANALYSIS

REQUIRED REMAINING TREATMENT EFFICIENCIES OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION. USE FOR SIZING OF TREATMENT SYSTEM IN SERIES WITH FLOATING ISLANDS WITH WET DETENTION.

TYPICAL X-SECTION OF A WET DETENTION SYSTEM

Source of Graphic: draft **STORMWATER QUALITY APPLICANT'S HANDBOOK** dated March 2010, by the Department of Environmental Protection, available at: <http://www.dep.state.fl.us/water/wetlands/erp/rules/stormwater>, March 2010

User Defined BMP					7/20/2020	V 8.6
USER DEFINED BMP SERVING:	Fontana (SMA-1-3&12-16)					
	SMA-12-16	SMA-2&3	SMA-1	Catchment 4		
Your Name of BMP	SMA-12-16	SMA-2-3				
Contributing catchment area	277.900	42.750	106.330	0.000	ac	
Required treatment efficiency (Nitrogen):	73.669	49.744	60.394		%	
Required treatment efficiency (Phosphorus):	76.297	44.229	69.509		%	
Is this a retention, detention, or other system*?	Detention	Detention				
If retention, storage depth is:					in	
The calculated storage volume is:	0.000	0.000	0.000	0.000	ac-ft	
Provided treatment efficiency (Nitrogen):	43.00	43.00			%	
Provided treatment efficiency (Phosphorus):	87.23	87.03			%	
* Examples of other systems are dry detention, chemical treatment, and pre-treatment devices						
Enter a short description of BMP below (no more than 200 characters)						
Provided treatment efficiency taken from SMA-12-16 and SMA-2-3 Discharge Summaries						

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (SMA-1-3&12-16)	Optional Identification		
	SMA-12-16	SMA-2&3	SMA-1	Catchment 4
BMP Name	SMA-12-16	SMA-2-3	Wet Detention/ MAPs	
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	F - Mixed-3 Catchment-2 Series-Parallel (A)	Treatment Objectives or Target for TN NOT MET TP MET	7/20/2020	
Nitrogen Pre Load (kg/yr)	571.48		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	88.24			
Nitrogen Post Load (kg/yr)	1688.37			
Phosphorus Post Load (kg/yr)	298.24			
Target Load Reduction (N) %	66			
Target Load Reduction (P) %	70			
Target Discharge Load, N (kg/yr)	574.05			
Target Discharge Load, P (kg/yr)	89.47			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	87			
Discharged Load, N (kg/yr & lb/yr):	960.60		2115.81	
Discharged Load, P (kg/yr & lb/yr):	38.79		85.44	
Load Removed, N (kg/yr & lb/yr):	727.78		1603.00	
Load Removed, P (kg/yr & lb/yr):	259.45		571.47	

GENERAL SITE INFORMATION:		V 8.6	GO TO INTRODUCTION PAGE		4/27/2018	Blue Numbers =	Input data
		Red Numbers =				Calculated or Carryover	
Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis				NAME OF PROJECT Fontana (OFF-2&W-4)		HELP Rainfall	
						VIEW ZONE MAP	
Meteorological Zone (Please use zone map):				CLICK ON CELL BELOW TO SELECT Zone 2			
Mean Annual Rainfall (Please use rainfall map):				49.00 Inches		VIEW MEAN ANNUAL RAINFALL	
Type of analysis:				CLICK ON CELL BELOW TO SELECT Net improvement			
Treatment efficiency (N, P) (ex 80 70 (no decimal points) use only for specified removal efficiency):				%		GO TO WATERSHED	
Select the STORMWATER TREATMENT ANALYSIS Button below to begin analyzing the effectiveness of Best Management Practices.				Model documentation and example problems.			
STORMWATER TREATMENT ANALYSIS Systems available for analysis: - Retention Basin with option for calculating effluent concentration - Wet Detention - Exfiltration Trench - Pervious Pavement - Stormwater Harvesting - Biofiltration - Greenroof - Rainwater Harvesting - Managed Aquatic Plants Detention - Vegetated Natural Buffer - Vegetated Filter Strip - Swale - Rain Garden - Tree Well - Lined reuse pond - User Defined BMP				There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.			
				METHODOLOGY FOR CALCULATING REQUIRED TREATMENT			
				METHODOLOGY FOR		METHODOLOGY FOR WET	
				METHODOLOGY FOR		METHODOLOGY FOR	
RESET INPUT FOR STORMWATER TREATMENT ANALYSIS							

WATERSHED CHARACTERISTICS V 8.6		GO TO STORMWATER TREATMENT ANALYSIS		Blue Numbers = Red Numbers =	Input data Calculated	LAND USES/EMC
SELECT CATCHMENT CONFIGURATION		4/27/2018		VIEW CATCHMENT CONFIGURATION		
CLICK ON CELL BELOW TO SELECT CONFIGURATION		GO TO GENERAL SITE INFORMATION PAGE				
C - 2 Catchment-Parallel		OVERWRITE DEFAULT CONCENTRATIONS USING:				
COMINGLING MULTI-LAND USE		IMPORT GIS CONCENTRATIONS				
VIEW AVERAGE ANNUAL		PRE:				
VIEW EMC & FLUCCS		POST:				
GO TO GIS LANDUSE DATA		EMC(N):				
From GIS data		EMC(P):				
Average annual pre runoff volume:		5.138 ac-ft/year				
Average annual post runoff volume (note no BMP area):		0.886 ac-ft/year				
Pre-development Annual Mass Loading - Nitrogen :		9.379 kg/year				
Pre-development Annual Mass Loading - Phosphorus :		0.908 kg/year				
Post-development Annual Mass Loading - Nitrogen :		2.263 kg/year				
Post-development Annual Mass Loading - Phosphorus :		0.357 kg/year				

CATCHMENT NO.1 NAME:		OFF-2		OVERWRITE DEFAULT CONCENTRATIONS USING:		
CLICK ON CELL BELOW TO SELECT		IMPORT GIS CONCENTRATIONS				
Pre-development land use:		PRE:				
with default EMCs		POST:				
Post-development land use:		EMC(N):				
with default EMCs		EMC(P):				
Total pre-development catchment area:		5.138 ac-ft/year				
Total post-development catchment or for BMP analysis:		0.886 ac-ft/year				
Pre-development Non DCIA CN:		9.379 kg/year				
Pre-development DCIA percentage:		0.908 kg/year				
Post-development Non DCIA CN:		2.263 kg/year				
Post-development DCIA percentage:		0.357 kg/year				
Estimated BMP Area (No loading from this area)		0.700 AC				

CATCHMENT NO.2 NAME:		W-4		OVERWRITE DEFAULT CONCENTRATIONS USING:		
CLICK ON CELL BELOW TO SELECT		IMPORT GIS CONCENTRATIONS				
Pre-development land use:		PRE:				
with default EMCs		POST:				
Post-development land use:		EMC(N):				
with default EMCs		EMC(P):				
Total pre-development catchment area:		1.493 ac-ft/year				
Total post-development catchment or for BMP analysis:		0.093 ac-ft/year				
Pre-development Non DCIA CN:		2.215 kg/year				
Pre-development DCIA percentage:		0.128 kg/year				
Post-development Non DCIA CN:		0.236 kg/year				
Post-development DCIA percentage:		0.037 kg/year				
Estimated BMP Area (No loading from this area)		0.700 AC				

IMPORT GIS LAND USE DATA

V 8.6

Instructions: The data required for this analysis is as follows; Basin ID, FLUCCSCODE, Soils Hydro Group, CN, and Area. This data is typically derived by using the ArcGIS geoprocessing tool intersect and performing an intersect on the basins of interest, soils polygons, and land use polygons. The resulting attribute table can then be exported to Excel where any final data formatting and processing can be done to get it ready to copy into this spreadsheet. Data must be sorted by Basin ID for this table to work properly. The user can use up to four catchments for this analysis. The user may overwrite any EMC by manually entering a value in the first two columns. All this must be done for both the pre and post development conditions when this tool is used.

Note: Soil hydrologic groups should be single class. For example, A/D would be assigned B, B/D would be assigned C, and C/D would be assigned D. This is due to the fact that this is an annual average analysis and the soils will behave as drained during part of the year and not drained during other parts of the year. To assume D would artificially increase runoff. Additionally, it is recommended that, due to compaction, the soil hydrologic group remain consistent in the pre and post development conditions for these dual class soils.

[GO TO WATERSHED CHARACTERISTICS](#)

[VIEW EMC & FLUCCS](#)

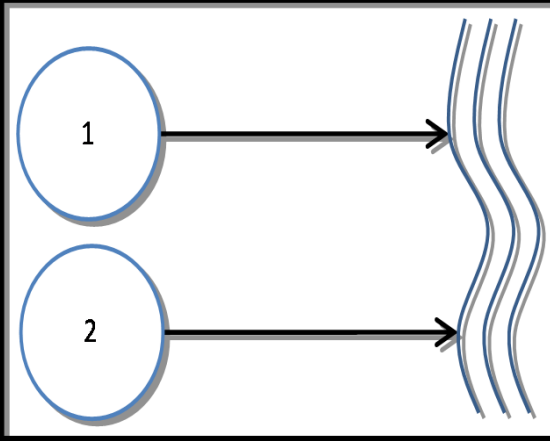
Pre-Development EMC Calculation Table

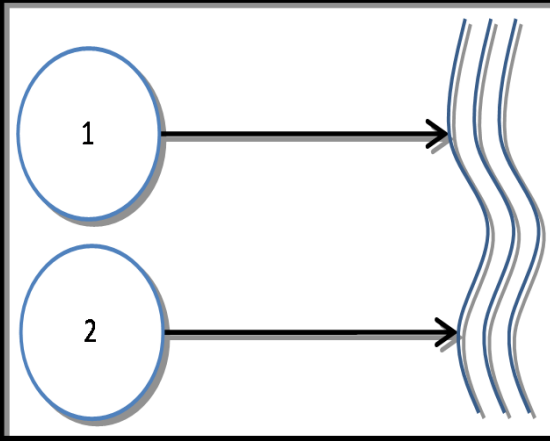
EMC Overwrite		Basin ID	FLUCCSCODE	FLUCSDDESC	HYDROGRP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weight]
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		OFF-2	6410	Freshwater Marshes	B	98.0	Yes	1.32	WETLAND*	1.32	129.36	0.809	1.06788	1.15	0.055	1.22806	0.05873	YES	1.48	0.143	OFF-2	6.7	1.3	20%	61.0
		OFF-2	2110	Improved Pastures	B	61.0	No	3.98	PASTURE	3.98	242.78	0.0324	0.12895	3.51	0.686	0.45262	0.08846	NO							
		OFF-2	2110	Improved Pastures	B	61.0	No	0.07	PASTURE	0.07	4.27	0.0324	0.00227	3.51	0.686	0.00796	0.00156	NO							
		OFF-2	2110	Improved Pastures	B	61.0	No	0.37	PASTURE	0.37	22.57	0.0324	0.01199	3.51	0.686	0.04208	0.00822	NO							
		OFF-2	2110	Improved Pastures	B	61.0	No	0.94	PASTURE	0.94	57.34	0.0324	0.03046	3.51	0.686	0.1069	0.02089	NO							
		W-4	6300	Wetland Forested Mixed	B	98.0	Yes	0.42	WETLAND*	0.42	41.16	0.809	0.33978	1.15	0.055	0.39075	0.01869	YES	1.20	0.069	W-4	0.7	0.4	63%	61.0
		W-4	6300	Wetland Forested Mixed	B	98.0	Yes	0.03	WETLAND*	0.03	2.94	0.809	0.02427	1.15	0.055	0.02791	0.00133	NO					0.0		
		W-4	2110	Improved Pastures	B	61.0	No	0.26	PASTURE	0.26	15.86	0.0324	0.00842	3.51	0.686	0.02957	0.00578	NO							

Post-Development EMC Calculation Table

EMC Overwrite		Basin ID	FLUCCSCODE	FLUCSDDESC	HYDROG RP	CN	DCIA [Yes/No]	Area [acres]	Compressed Land Use	Area [acres] (for CN)	CN*Area	C	C*Area	EMC's Based on		C*Area* TN _{EMC}	C*Area* TP _{EMC}	New Basin?	Subbasin Summary		Basin ID	Basin Area [acres]	DCIA [acres]	DCIA [%]	Basin CN [area weighte
TN [mg/L]	TP [mg/L]													TN [mg/L]	TP [mg/L]				TN [mg/L]	TP [mg/L]					
		OFF-2	1210	Open Space (Good)	B	61.0	No	6.68	SINGLE FAMILY RES	6.68	407.48	0.0324	0.21643	2.07	0.327	0.44801	0.07077	YES	2.07	0.327	OFF-2	6.7		0%	61.0
		W-4	1210	Open Space (Good)	B	61.0	No	0.71	SINGLE FAMILY RES	0.71	43.31	0.0324	0.023	2.07	0.327	0.04762	0.00752	YES	2.07	0.327	W-4	0.7		0%	61.0
										0	0														
										0	0														
										0	0														
										0	0														
										0	0														
										0	0														
										0	0														

Summary									
Basin ID	Basin Area [acres]	Pre-Development				Post-Development			
		TN [mg/L]	TP [mg/L]	CN	DCIA %	TN [mg/L]	TP [mg/L]	CN	DCIA %
OFF-2	6.7	1.48	0.143	61.0	20%	2.07	0.327	61.0	0%
W-4	0.7	1.20	0.069	61.0	63%	2.07	0.327	61.0	0%

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
CALCULATION METHODS: 1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume. 2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well. 3. Wet detention is last when used in a single catchment with other BMPs, except when followed by filtration				
PROJECT TITLE	Fontana (OFF-2&W-4)	Optional Identification		
	OFF-2	W-4	Catchment 3	Catchment 4
BMP Name	Wet Detention/ MAPs	Wet Detention/ MAPs		
BMP Name				
BMP Name				
Surface Water Discharge Summary Performance of Entire Watershed				
Catchment Configuration	C - 2 Catchment-Parallel	Treatment Objectives or Target for TN MET TP MET	4/27/2018	
Nitrogen Pre Load (kg/yr)	11.59		BMPTRAINS MODEL	
Phosphorus Pre Load (kg/yr)	1.04			
Nitrogen Post Load (kg/yr)	2.50			
Phosphorus Post Load (kg/yr)	0.39			
Target Load Reduction (N) %	0			
Target Load Reduction (P) %	0			
Target Discharge Load, N (kg/yr)	2.50			
Target Discharge Load, P (kg/yr)	0.39			
Provided Overall Efficiency, N (%):	43			
Provided Overall Efficiency, P (%):	86			
Discharged Load, N (kg/yr & lb/yr):	1.42			
Discharged Load, P (kg/yr & lb/yr):	0.06			
Load Removed, N (kg/yr & lb/yr):	1.08			
Load Removed, P (kg/yr & lb/yr):	0.34			

CATCHMENTS AND TREATMENT SURFACE DISCHARGE SUMMARY				V 8.6
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Target Load Reduction (P) %	0			
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Provided Overall Efficiency, N (%):	43			
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Load Removed, N (kg/yr & lb/yr):	1.08			
Load Removed, P (kg/yr & lb/yr):	0.34			

LAND USE CATEGORY	Event Mean Concentration (mg/l)	
	TOTAL Nitrogen	TOTAL Phosphorus
AG - CITRUS	2.240	0.183
AG - GENERAL	2.8	0.487
AVERAGE OF MFR+UNDEVELOPED	2.320	0.520
AVERAGE OF SFR + UNDEVELOPED	2.07	0.327
DRY PRAIRIE*	2.025	0.184
HIGH INTENSITY COMMERCIAL	2.4	0.345
HIGHWAY	1.52	0.2
HYDRIC HAMMOCK*	1.288	0.107
INDUSTRIAL	1.2	0.26
LOW DENSITY RES	1.645	0.270
LOW INTENSITY COMMERCIAL	1.130	0.188
MESIC FLATWOODS*	1.090	0.043
MINING	1.180	0.150
MULTI FAMILY RES	2.320	0.520
PASTURE	3.510	0.686
ROW CROPS	2.650	0.593
RUDERAL UPLAND PINE*	1.694	0.162
SCRUBBY FLATWOODS*	1.155	0.027
SFR OR MFR DEPENDING ON UNITS	2.070	0.327
SINGLE FAMILY RES	2.070	0.327
UNDEVELOPED	1.288	0.107
UNDEVELOPED User Defined (overwrite defaults)	0	0
WATER	0	0
WET FLATWOODS*	1.213	0.021
WET PRAIRIE*	1.095	0.015
WETLAND*	1.15	0.055
XERIC HAMMOCK*	1.288	0.107
XERIC SCRUB*	1.288	0.107

GENERAL CATEGORY	GENERAL LAND USE CATEGORIES FOR RUNOFF CHARACTERIZATION DATA
	DESCRIPTION
Low-Density Residential	Rural areas with lot sizes greater than 1 acre or less than one dwelling unit per acre; internal roadways associated with the homes are also included
Single-Family Residential	Typical detached home community with lot sizes generally less than 1 acre and dwelling densities greater than one dwelling unit per acre; duplexes construct on one-third to one-half acre lots are also included in this category; internal roadways associated with the homes are also included
Multi-Family Residential	Residential land use consisting primarily of apartments, condominiums, and cluster-homes; internal roadways associated with the homes are also included
Low-Intensity Commercial	Areas which receive only a moderate amount of traffic volume where cars are parked during the day for extended periods of time; these areas include universities, schools, professional office sites, and small shopping centers; internal roadways associated with the development are also included
High-Intensity Commercial	Land use consisting of commercial areas with high levels of traffic volume and constant traffic moving in and out of the area; includes downtown areas, commercial sites, regional malls, and associated parking lots; internal roadways associated with the development are also included
Industrial	Land uses include manufacturing, shipping and transportation services, sewage treatment facilities, water supply plants, and solid waste disposal; internal roadways associated with the development are also included
Highway	Includes major road systems, such as interstate highways and major arteries and thoroughfares; roadway areas associated with residential, commercial, and industrial land use categories are already included in loading rates for these categories
Agriculture	Includes cattle, grazing, row crops, citrus, and related activities
Open/ Undeveloped	Includes open space, barren land, undeveloped land which may be occupied by native vegetation, rangeland, and power lines; this land does not include golf course areas which are heavily fertilized and managed; golf course areas have runoff characteristics most similar to single-family residential areas
Mining/ Extractive	Includes a wide variety of mining activities for resources such as phosphate, sand, gravel, clay, shell, etc.
Wetlands	Includes a wide range of diverse wetland types, such as hardwood wetlands, cypress stands, grassed wetlands, freshwater marsh, and mixed wetland associations
Open Water/ Lakes	Land use consists of open water and lakes, rivers, reservoirs, and other open waterbodies

LAND USE Descriptions from Harper, 2007

**SUMMARY OF LEVEL III FLUCCS CODE ASSIGNMENTS TO CONSOLIDATED LAND USE CATEGORIES
AND RELATIONSHIP TO LAND USE OPTIONS IN THIS PROGRAM (FDOT REFERENCED)**

FLUCCS CODE	LAND USE DESCRIPTION	GENERAL/ CONSOLIDATED LAND USE	EMC LAND USE I.D. NUMBER
1100	Residential, Low-Density-Less than two dwelling units/acre	Low-Density Residential	LOW DENSITY RES
1110	Fixed Single Family Units	Low-Density Residential	SINGLE FAMILY RES
1180	Residential, Rural < or = 0.5 dwelling units/acre	Low-Density Residential	LOW DENSITY RES
1190	Low-Density Under Construction	Low-Density Residential	LOW DENSITY RES
1200	Residential, Medium-Density (Two-five dwelling units per acre)	Medium-Density Residential	SFR OR MFR DEPENDING ON UNITS
1210	Fixed Single Family Units	Medium-Density Residential	SINGLE FAMILY RES
1290	Medium-Density Under Construction	Medium-Density Residential	SFR OR MFR DEPENDING ON UNITS
1300	Residential, High-Density	High-Density Residential	MULTI FAMILY RES
1310	Fixed Single Family Units	High-Density Residential	SINGLE FAMILY RES
1320	Mobile Home Units	High-Density Residential	MULTI FAMILY RES
1330	Residential, High-Density; Multiple Dwelling Units, Low Rise <Two stories or	High-Density Residential	MULTI FAMILY RES
1340	Residential, High-Density; Multiple Dwelling Units, High Rise <Three stories	High-Density Residential	MULTI FAMILY RES
1350	Residential, High-Density; Mixed Units <Fixed and mobile Homes>	High-Density Residential	MULTI FAMILY RES
1390	High-Density Under Construction	High-Density Residential	MULTI FAMILY RES
1400	Commercial and Services	Commercial	HIGH INTENSITY COMMERCIAL
1410	Retail Sales and Services	Commercial	HIGH INTENSITY COMMERCIAL
1420	Wholesale Sales and Services <Excluding warehouses associated with industrial use>	Commercial	LOW INTENSITY COMMERCIAL
1430	Professional Services	Commercial	LOW INTENSITY COMMERCIAL
1440	Cultural and Entertainment	Commercial	LOW INTENSITY COMMERCIAL
1450	Tourist Services	Commercial	HIGH INTENSITY COMMERCIAL
1460	Oil and Gas Storage(except industrial use or manufacturing)	Industrial	INDUSTRIAL
1470	Mixed Commercial and Services	Commercial	LOW INTENSITY COMMERCIAL
1480	Cemeteries	Recreational 1	AVERAGE OF SFR + UNDEVELOPED
1490	Commercial and Services Under	Commercial	LOW INTENSITY COMMERCIAL
1500	Industrial Under Construction	Industrial	INDUSTRIAL
1510	Food Processing	Industrial	INDUSTRIAL
1520	Timber Processing	Industrial	INDUSTRIAL
1530	Mineral Processing	Industrial	INDUSTRIAL
1540	Oil and Gas Processing	Industrial	INDUSTRIAL
1550	Other Light Industrial	Industrial	INDUSTRIAL
1560	Other Heavy Industrial	Industrial	INDUSTRIAL
1561	Ship Building and Repair	Industrial	INDUSTRIAL
1562	Pre-stressed concrete plants	Industrial	INDUSTRIAL
1590	Industrial Under Construction	Industrial	INDUSTRIAL
1600	Extractive	Mining	MINING
1610	Strip Mines	Mining	MINING

1611	Clays	Mining	MINING
1620	Sand and Gravel Pits	Mining	MINING
1632	Limerock or dolomite quarries	Mining	MINING
1633	Phosphate quarries	Mining	MINING
1650	Reclaimed Land	Mining	MINING
1660	Holding Ponds	Mining	MINING
1700	Institutional (Educational, religious, health and military facilities)	Institutional	LOW INTENSITY COMMERCIAL
1710	Educational Facilities	Institutional	LOW INTENSITY COMMERCIAL
1720	Religious	Institutional	LOW INTENSITY COMMERCIAL
1730	Military	Institutional	LOW INTENSITY COMMERCIAL
1740	Medical and Health Care	Institutional	LOW INTENSITY COMMERCIAL
1750	Governmental	Institutional	LOW INTENSITY COMMERCIAL
1770	Other Institutional	Institutional	LOW INTENSITY COMMERCIAL
1780	Commercial Child Care	Institutional	LOW INTENSITY COMMERCIAL
1790	Institutional Under Construction	Institutional	LOW INTENSITY COMMERCIAL
1800	Recreational	Recreational 1	AVERAGE OF SFR + UNDEVELOPED
1810	Swimming Beach	Open	UNDEVELOPED
1820	Golf Course	Recreational 1	AVERAGE OF SFR + UNDEVELOPED
1830	Race Tracks(horse, dog, car, motorcycle)	Recreational 2	AVERAGE OF MFR+UNDEVELOPED
1840	Marinas and Fish Camps	Recreational 1	AVERAGE OF MFR+UNDEVELOPED
1850	Parks and Zoos	Recreational 2	AVERAGE OF MFR+UNDEVELOPED
1860	Community Recreational Facilities	Recreational 2	AVERAGE OF MFR+UNDEVELOPED
1870	Stadiums (not associated with high schools, colleges, or universities)	Recreational 2	AVERAGE OF MFR+UNDEVELOPED
1890	Other Recreational(Riding stables, go-cart tracks, skeet ranges, etc)	Recreational 2	AVERAGE OF MFR+UNDEVELOPED
1900	Open Land	Open	UNDEVELOPED
1920	Inactive Land with street patterns but without structures	Open	UNDEVELOPED
2110	Improved Pasture	Pasture	PASTURE
2120	Unimproved Pastures	Pasture	PASTURE
2130	Woodland Pasture	Pasture	PASTURE
2140	Row Crops	Row Crops	ROW CROPS
2150	Field Crops	Row Crops	ROW CROPS
2160	Mixed Crops	Row Crops	ROW CROPS
2200	Tree Crops	Citrus	AG - CITRUS
2210	Citrus groves	Citrus	AG - CITRUS
2220	Fruit Orchards	Citrus	AG - CITRUS
2240	Abandoned tree crops	Ruderal	RUDERAL UPLAND PINE*
2300	Feeding Operations	Agriculture	AG - GENERAL
2310	Cattle Feeding Operations	Agriculture	AG - GENERAL
2320	Poultry feeding operations	Agriculture	AG - GENERAL
2340	Other feeding operations	Agriculture	AG - GENERAL
2400	Nurseries and Vineyards	Agriculture	AG - GENERAL
2410	Tree nurseries	Agriculture	AG - GENERAL
2420	Sod farms	Agriculture	AG - GENERAL
2430	Ornamentals	Agriculture	AG - GENERAL
2431	Shade ferns	Agriculture	AG - GENERAL
2432	Hammock ferns	Agriculture	AG - GENERAL
2450	Floriculture	Agriculture	AG - GENERAL
2500	Specialty Farms	Agriculture	AG - GENERAL
2510	Horse Farms	Agriculture	AG - GENERAL
2520	Dairies	Agriculture	AG - GENERAL
2540	Aquaculture	Industrial	INDUSTRIAL
2590	Other Specialty Farms	Agriculture	AG - GENERAL
2600	Other Open Lands - Rural	Open	UNDEVELOPED

2610	Fallow cropland	Open	UNDEVELOPED
3100	Herbaceous Dry Prairie	Dry Prairie	DRY PRAIRIE*
3200	Shrub and Brushland	Scrub	SCRUBBY FLATWOODS*
3210	Palmetto Prairies	Dry Prairie	DRY PRAIRIE*
3211	Palmetto-Oak Shrubland	Dry Prairie	DRY PRAIRIE*
3212	Dry Prairie	Dry Prairie	DRY PRAIRIE*
3220	Coastal Strand	Dry Prairie	DRY PRAIRIE*
3300	Mixed Rangeland	Dry Prairie	DRY PRAIRIE*
4110	Pine flatwoods	Wet Flatwoods	WET FLATWOODS*
4111	Mesic longleaf pine flatwoods	Upland Flatwoods	MESIC FLATWOODS*
4112	Scrubby Pine flatwoods	Upland Flatwoods	MESIC FLATWOODS*
4113	Hydric pine flatwoods	Wet Flatwoods	WET FLATWOODS*
4120	Longleaf pine - xeric oak	Upland Mixed	RUDERAL UPLAND PINE*
4130	Sand pine	Scrub	XERIC SCRUB*
4140	Upland Mixed Forest	Undeveloped	UNDEVELOPED
4200	Upland Hardwood Forest	Upland Flatwoods	MESIC FLATWOODS*
4210	Xeric oak	Xeric Hammock	XERIC HAMMOCK*
4220	Brazilian Pepper	Ruderal	RUDERAL UPLAND PINE*
4260	Tropical Hardwood Hammock	Wet Flatwoods	WET FLATWOODS*
4270	Maritime Hammock	Undeveloped	UNDEVELOPED
4271	Coastal Temperate Hammock	Undeveloped	UNDEVELOPED
4272	Prairie Hammock	Undeveloped	UNDEVELOPED
4275	Red Cedar- Cabbage Palm Hammock	Undeveloped	UNDEVELOPED
4280	Cabbage palm	Wet Flatwoods	WET FLATWOODS*
4300	Upland Hardwood Forests Continued	Undeveloped	UNDEVELOPED
4321	Xeric Oak Scrub	Xeric Hammock	XERIC HAMMOCK*
4322	Xeric Hammock	Xeric Hammock	XERIC HAMMOCK*
4340	Hardwood Conifer Mixed	Upland Flatwoods	MESIC FLATWOODS*
4370	Australian pine	Xeric Hammock	XERIC HAMMOCK*
4400	Tree Plantations	Upland Mixed	UPLAND MIXED FOREST*
4410	Coniferous pine	Xeric Hammock	XERIC HAMMOCK*
4430	Forest regeneration	Ruderal	RUDERAL UPLAND PINE*
5100	Streams and waterways	Water	WATER
5120	Channelized waterways, canals	Water	WATER
5200	Lakes	Water	WATER
5201	Pond	Water	WATER
5250	Marshy Lakes	Water	WATER
5300	Reservoirs	Water	WATER
5330	Reservoirs larger >10 <100 acres	water	WATER
5400	Bays and estuaries	Water	WATER
5410	Embayments opening directly to the Gulf or	Water	WATER
5430	Enclosed saltwater ponds within a salt	Water	WATER
5474	Spoil islands/coastal islands	Open	UNDEVELOPED
5500	Major Springs	Water	WATER
5600	Slough Waters	water	WATER
5710	Atlantic Ocean	Water	WATER
6110	Bay swamps	Wetland	WETLAND*
6120	Mangrove swamp	Wetland	WETLAND*
6150	Lowland Harwdood Forest/Swamp	Wetland	WETLAND*
6151	Willow Swamp	Wetland	WETLAND*
6152	Red Maple Swamp	Wetland	WETLAND*
6153	Shrub Swamp	Wetland	WETLAND*
6170	Mixed wetland hardwoods	Wetland	WETLAND*
6172	Mixed Shrubs	Wet Prairies	WET PRAIRIE*
6181	Cabbage palm hammock	Hydric Hammock	HYDRIC HAMMOCK*
6182	Cabbage palm savannah	Hydric Hammock	HYDRIC HAMMOCK*
6200	Wetland Coniferous Forest	Wetland	WETLAND*

6210	Cypress	Wetland	WETLAND*
6220	Pond pine	Wetland	WETLAND*
6250	Hydric pine flatwoods	Mesic Flatwoods	MESIC FLATWOODS*
6300	Wetland Forested Mixed	Wetland	WETLAND*
6400	Freshwater marshes	Wetland	WETLAND*
6410	Freshwater marshes	Wetland	WETLAND*
6411	Sawgrass marsh	Wetland	WETLAND*
6412	Cattail marsh	Wetland	WETLAND*
6414	Graminoid marsh	Wetland	WETLAND*
6416	Flag marsh	Wetland	WETLAND*
6420	Saltwater marshes	Wetland	WETLAND*
6423	Low salt marsh	Wetland	WETLAND*
6424	High salt marsh	Wetland	WETLAND*
6430	Wet prairies	Wet Prairies	WET PRAIRIE*
6440	Emergent aquatic vegetation	Wetland	WETLAND*
6460	Mixed scrub-shrub wetland	Wetland	WETLAND*
6500	Non-vegetated Wetland	Wetland	WETLAND*
6510	Tidal creek	Wetland	WETLAND*
7100	Beaches other than swimming beaches	Open	UNDEVELOPED
7200	Sand other than beaches	Open	UNDEVELOPED
7340	Exposed rocks	Open	UNDEVELOPED
7400	Disturbed land	Open	UNDEVELOPED
7410	Rural land in transition without positive indicators of intended activity	Open	UNDEVELOPED
7420	Borrow areas	Water	WATER
7430	Spoil areas	Open	UNDEVELOPED
8100	Transportation	Transportation	HIGHWAY
8110	Airports	Institutional	LOW INTENSITY COMMERCIAL
8115	Grass Airports	Recreational 1	AVERAGE OF SFR + UNDEVELOPED
8120	Railroads	Open	UNDEVELOPED
8130	Bus and truck terminals	Commercial	HIGH INTENSITY COMMERCIAL
8140	Roads and Highways	Transportation	HIGHWAY
8150	Port facilities	Commercial	HIGH INTENSITY COMMERCIAL
8160	Canals and Locks	Commercial	LOW INTENSITY COMMERCIAL
8180	Auto parking facilities - when not directly related to other land uses	Commercial	LOW INTENSITY COMMERCIAL
8191	Highways	Transportation	HIGHWAY
8200	Communications	Industrial	INDUSTRIAL
8220	Communication Facilities	Industrial	INDUSTRIAL
8300	Utilities	Industrial	INDUSTRIAL
8310	Electrical power facilities	Industrial	INDUSTRIAL
8320	Electrical power transmission lines	Open	UNDEVELOPED
8330	Water supply plants	Industrial	INDUSTRIAL
8340	Sewage Treatment	Industrial	INDUSTRIAL
8350	Solid waste disposal	Industrial	INDUSTRIAL
8360	Other treatment ponds	Industrial	INDUSTRIAL
8370	Surface Water Collection Basin	Water	WATER
8390	Utilities under construction	Industrial	INDUSTRIAL
9999	(blank)	Open	UNDEVELOPED

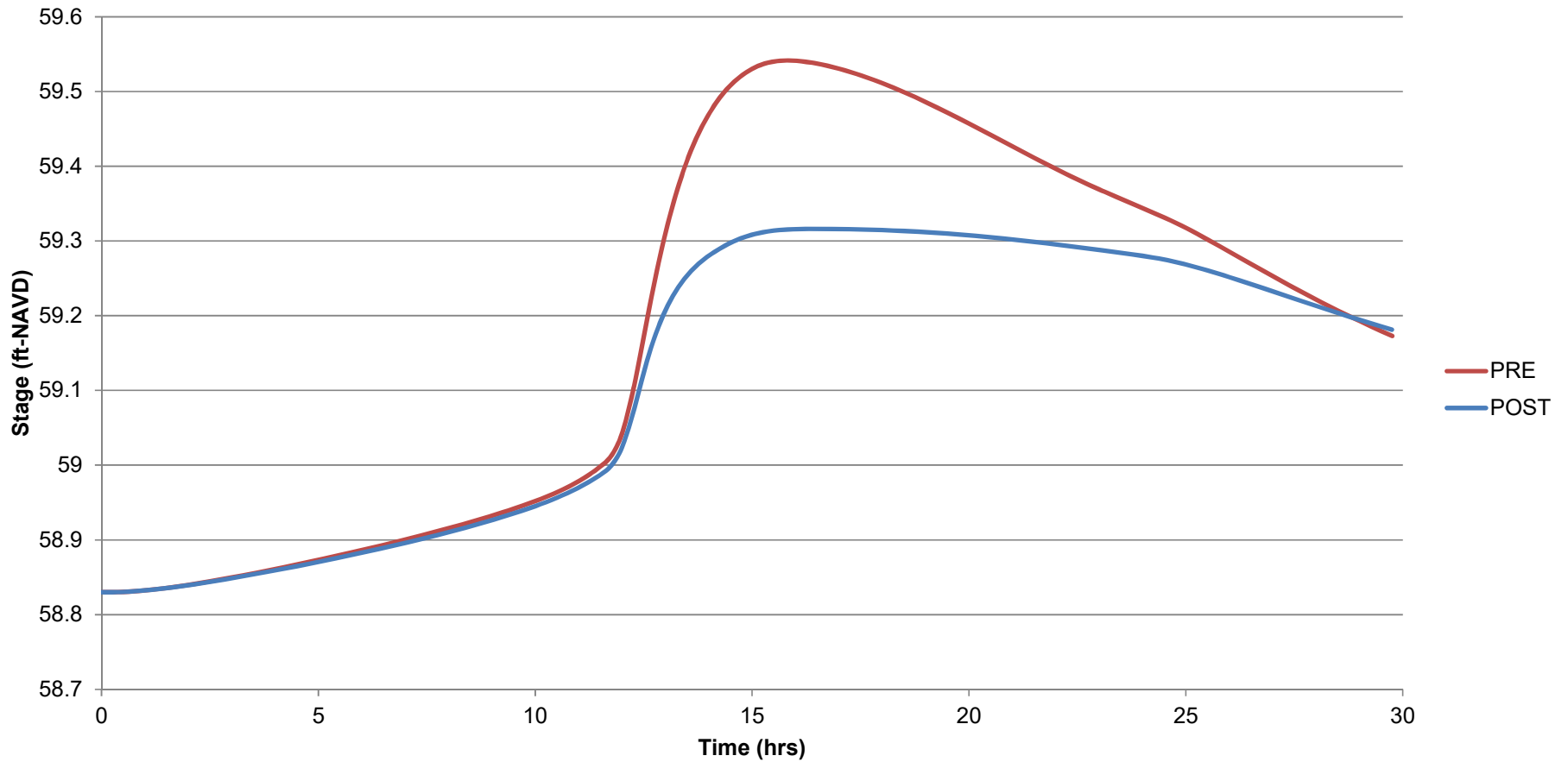
* CAN ALWAYS USE THE GENERAL UNDEVELOPED/RANGELAND/FOREST EMCS INSTEAD and check with the reviewing agency for concurrence on the selected values.



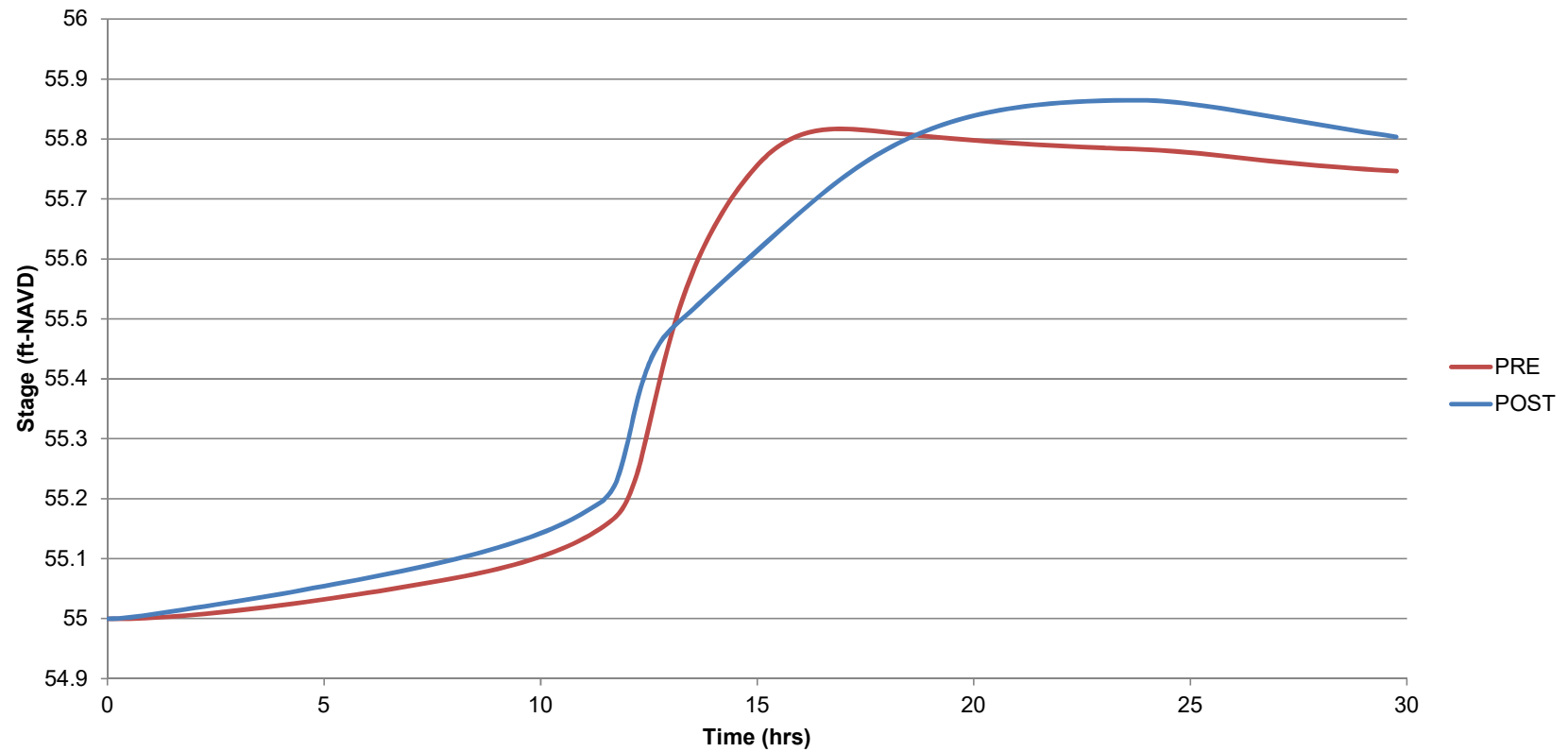
APPENDIX E

WETLAND HYDROLOGY

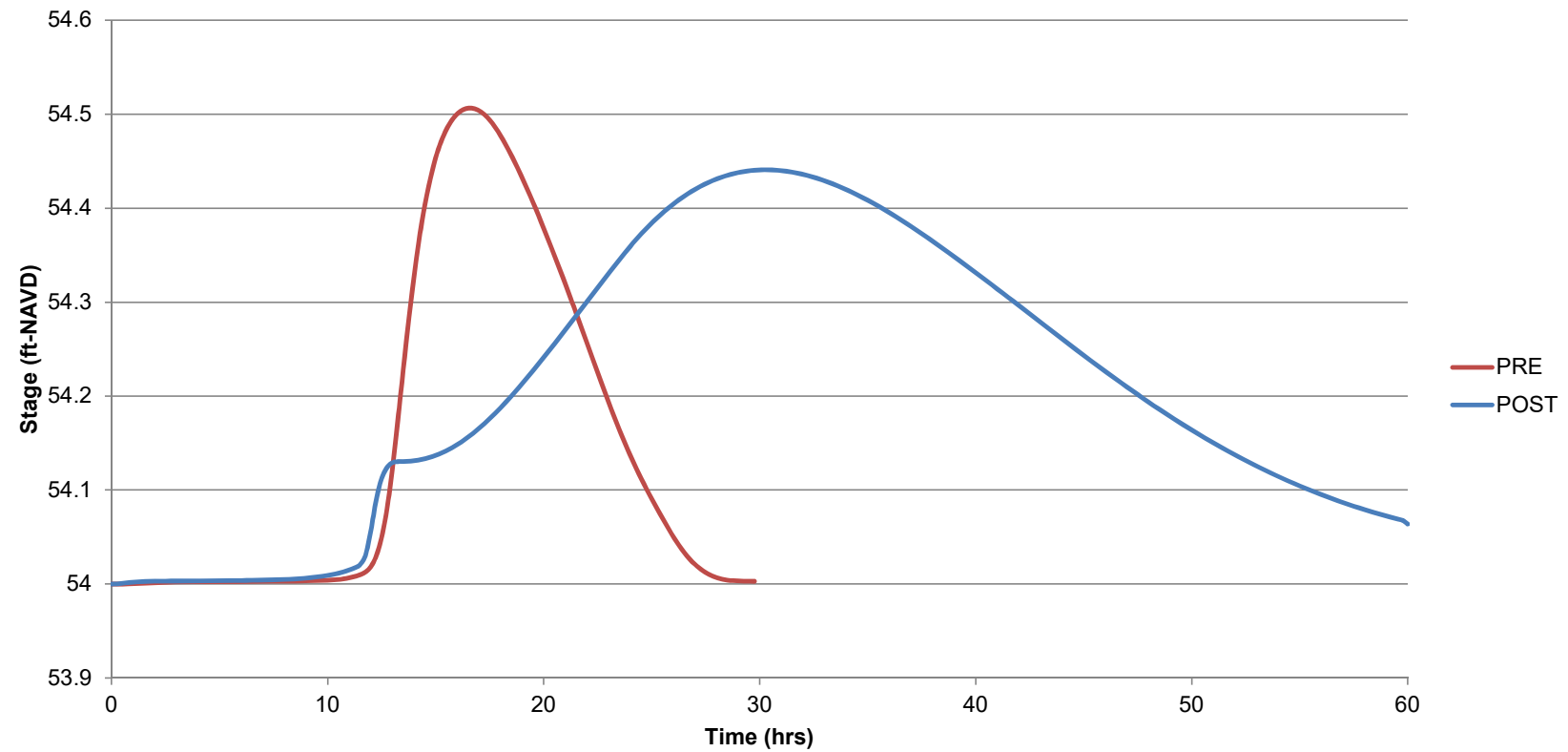
Wetland Time-Stage Graph Wetland W-4



**Wetland Time-Stage Graph
Wetland W-11**



Wetland Time-Stage Graph Wetland W-14



Fontana
Lake-Wetland Separation Table

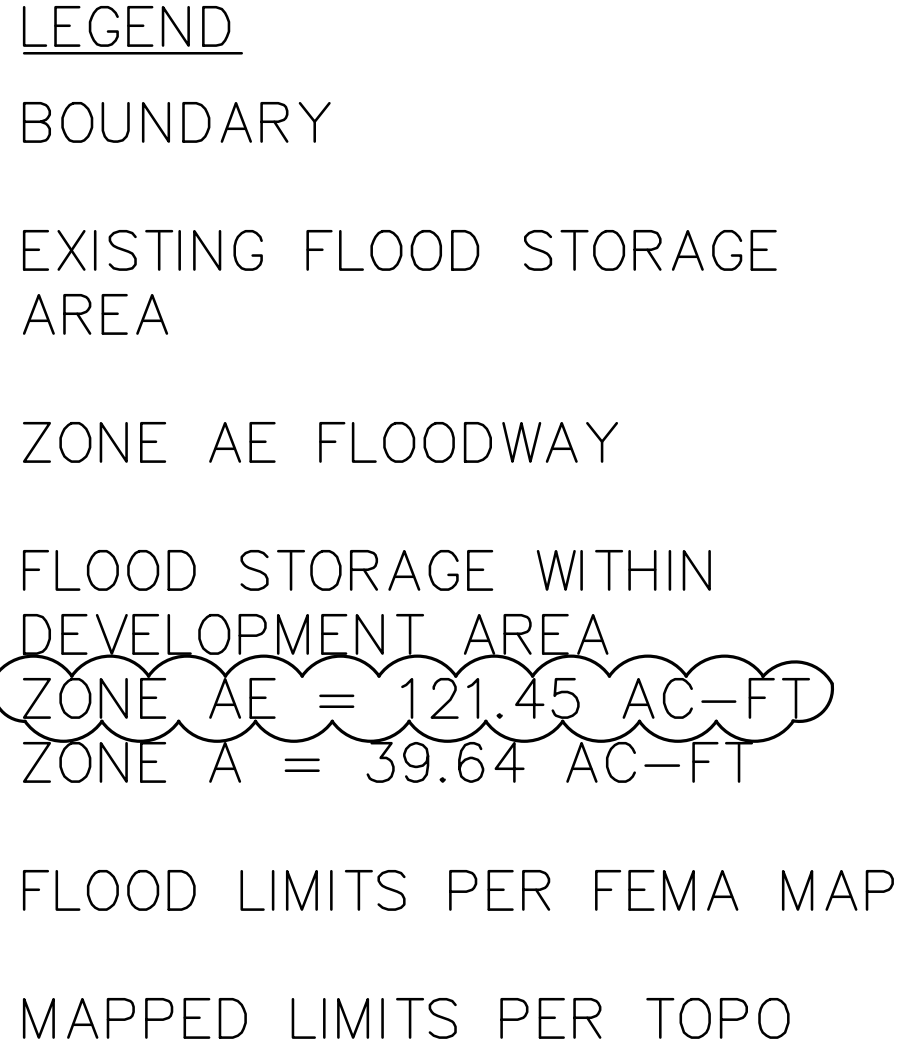
Date: 6/12/2018
By: ACC
Chk: JCN
Rev: 10/18/2018

Wetland Name	Wetland SHWL Elevation (ft-NAVD)	Average Wet Season Elevation (ft-NAVD)	Adjacent Pond ID	Pond DNW (ft-NAVD)	Separation distance (ft)	Gradient (ft/ft)
W-11	55.87	54.87	SMA-2	54.25	345	0.002



APPENDIX F

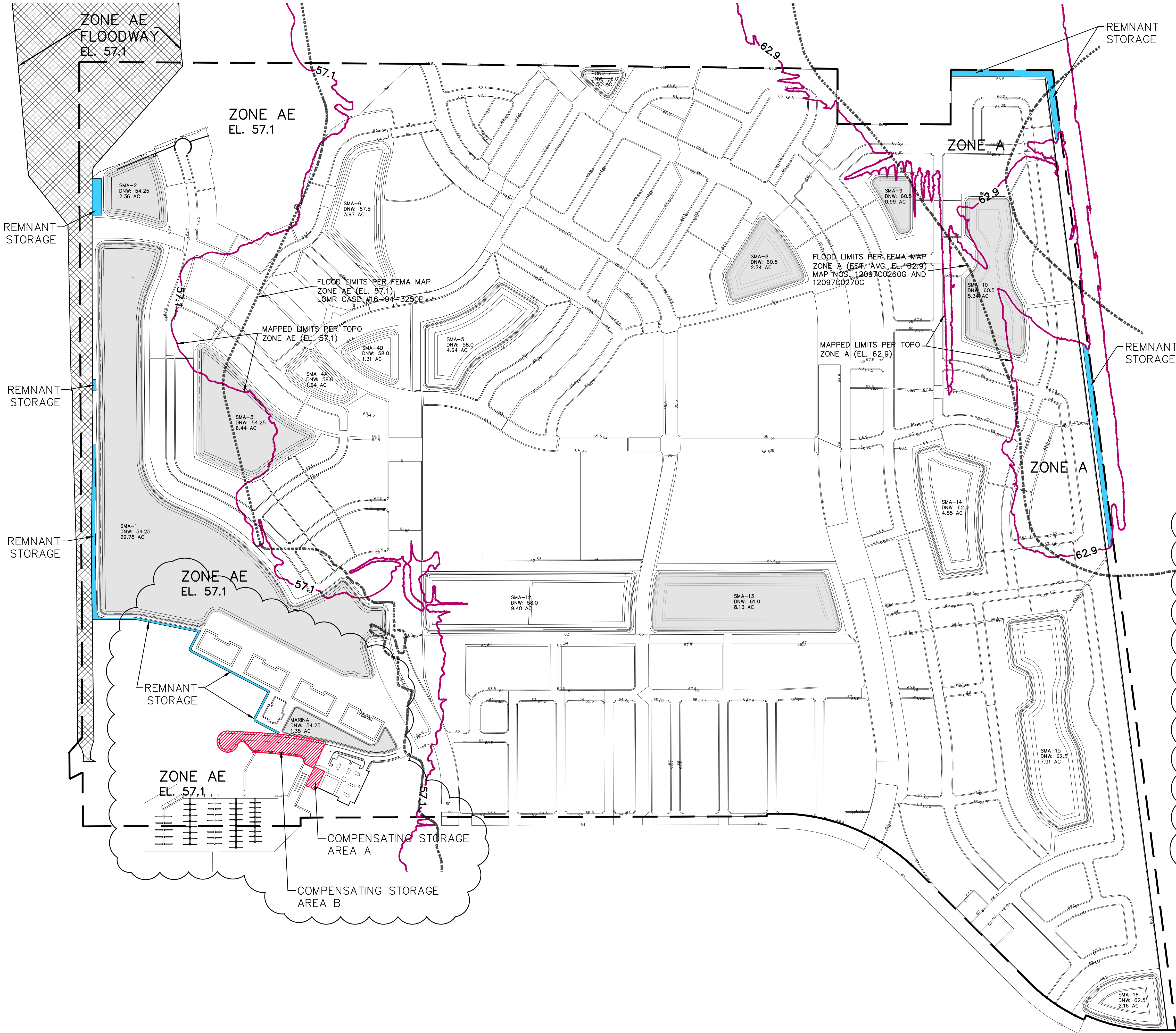
COMPENSATING STORAGE



GENERAL NOTES:

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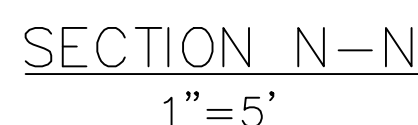
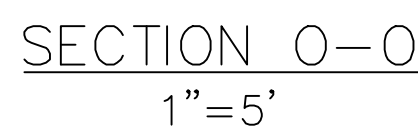
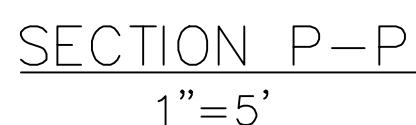
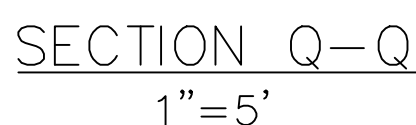
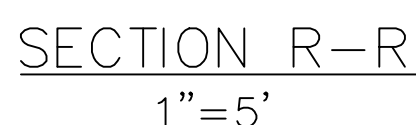
LEGEND

- BOUNDARY
- ZONE AE FLOODWAY
- FLOOD LIMITS PER FEMA MAP
- MAPPED LIMITS PER TOPO
- PROPOSED FLOOD STORAGE WITHIN DEVELOPMENT AREA
STORMWATER PONDS
ZONE AE = 118.40 AC-FT
ZONE A = 38.93 AC-FT
- REMNANT STORAGE WITHIN DEVELOPMENT AREA BEHIND BACK SLOPE
ZONE AE = 1.38 AC-FT
ZONE A = 2.35 AC-FT
- COMPENSATING STORAGE AREA A
ZONE AE = 0.14 AC-FT
- COMPENSATING STORAGE AREA B (BOAT PARKING STORAGE)
ZONE AE = 2.24 AC-FT

ZONE AE TOTAL STORAGE = 122.16 AC-FT
ZONE A TOTAL STORAGE = 41.28 AC-FT

GENERAL NOTES:
1. THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.

DRAWING 13189-XCOMP	FONTANA OSCEOLA COUNTY, FL COMPENSATING STORAGE EXHIBIT PROPOSED STORAGE	DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS 2800 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4088 CERTIFICATE OF AUTHORIZATION NO. 68	JAMES C. NIUGENT FLORIDA P.E. No. 57553 DATE: _____	NO.	DATE	REVISIONS	CHK.
				1	6/5/2018	REVISED PROPOSED STORAGE PER SFMD COMMENTS	
				2	10/9/2018	REVISED PER SFMD COMMENTS	
				3	10/19/2018	UPDATED MULTI-USE ROAD, SMA1, 2, 4 AND 6	
				4	07/20	UPDATED TO ADD MARINA	

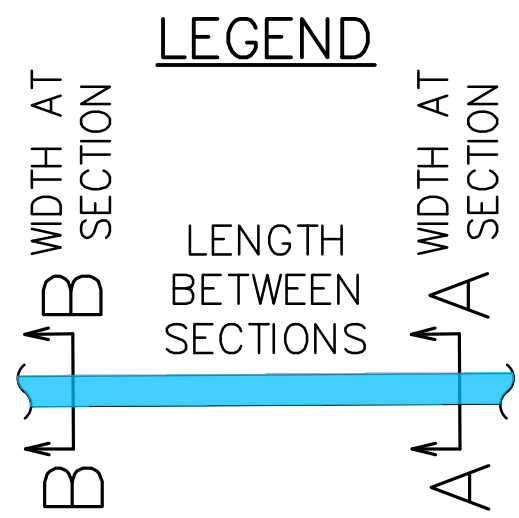
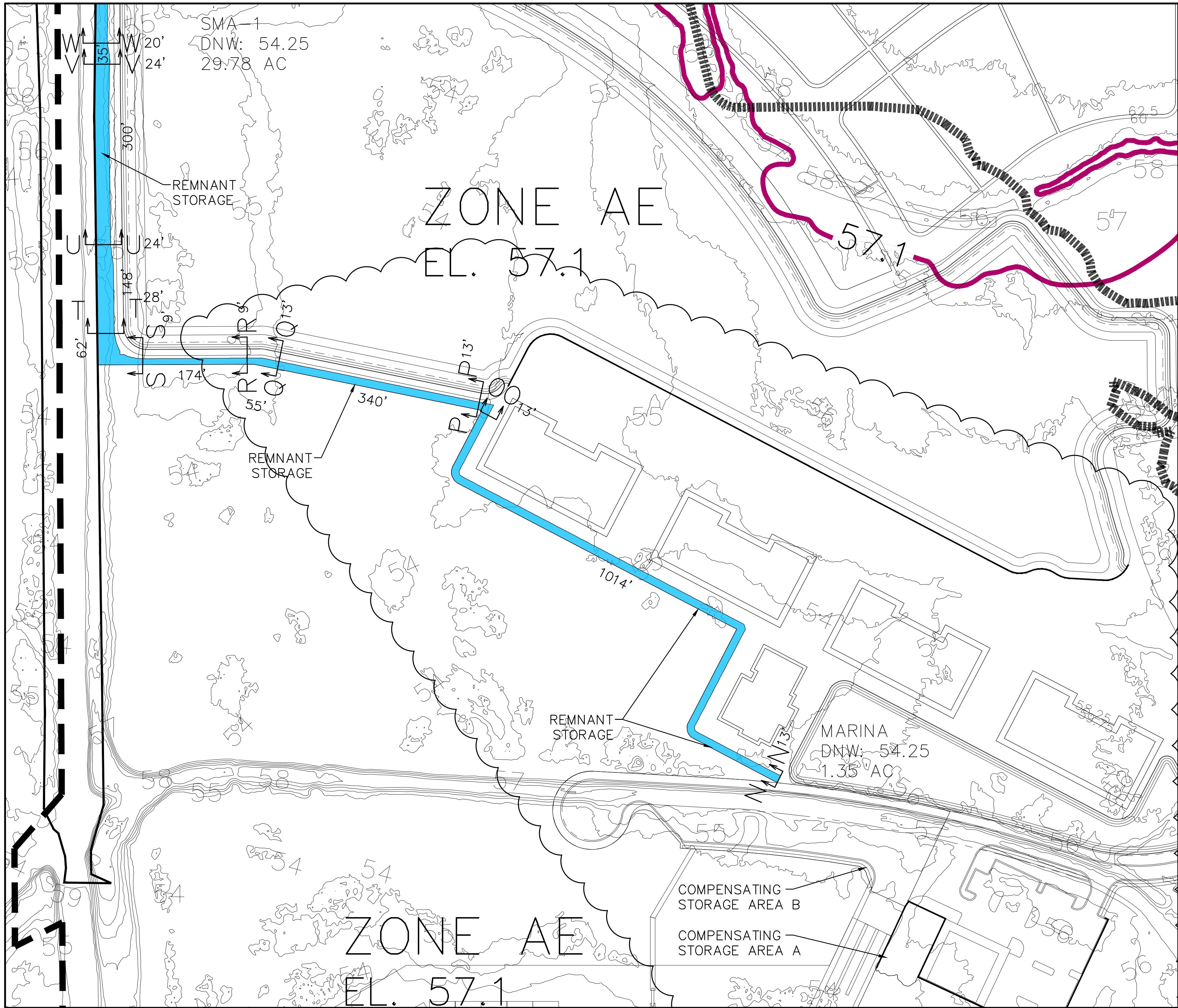
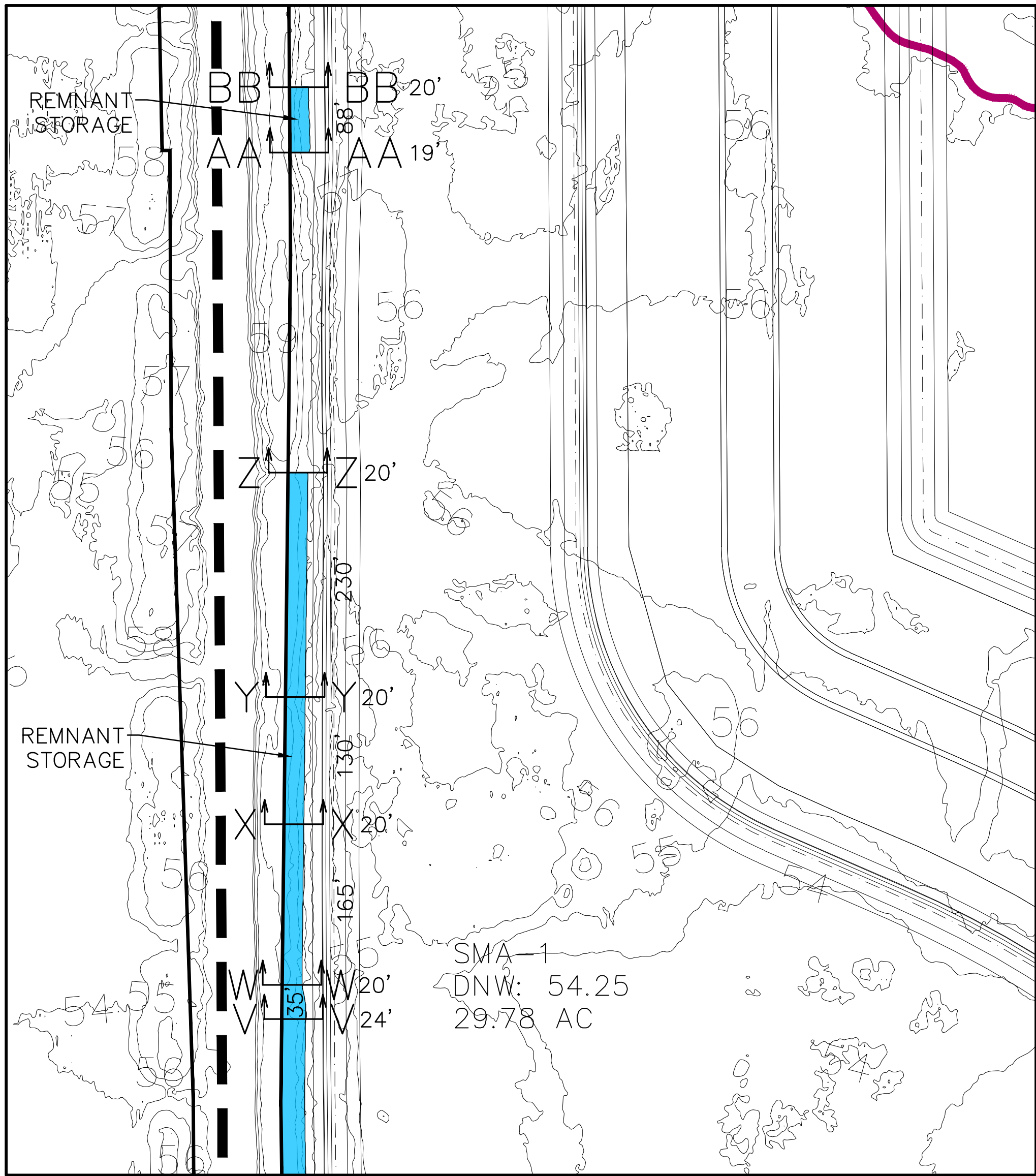
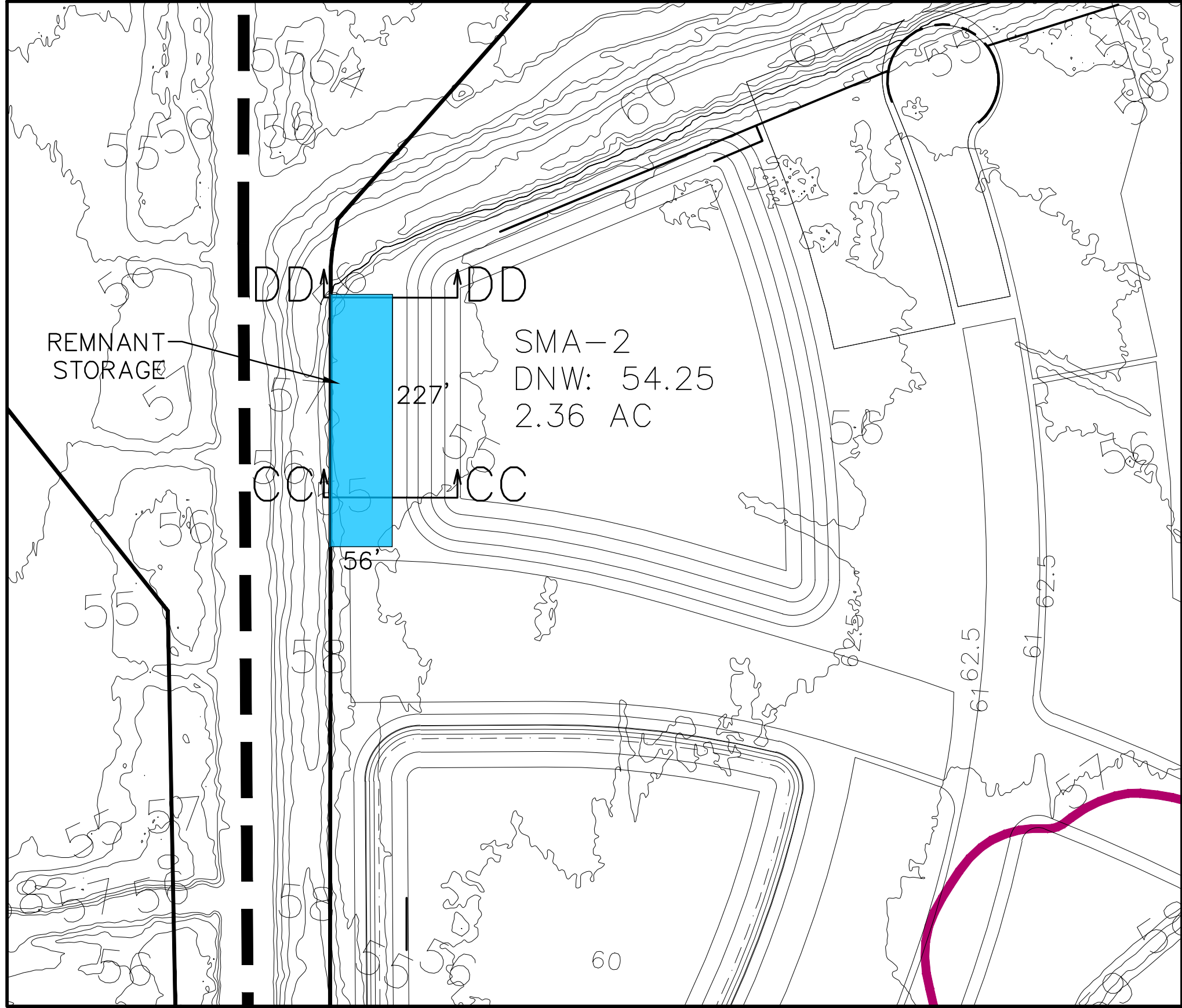


GENERAL NOTES:

1. THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
2. ALL ELEVATIONS ARE IN NAVD88 DATUM.

[illegible]

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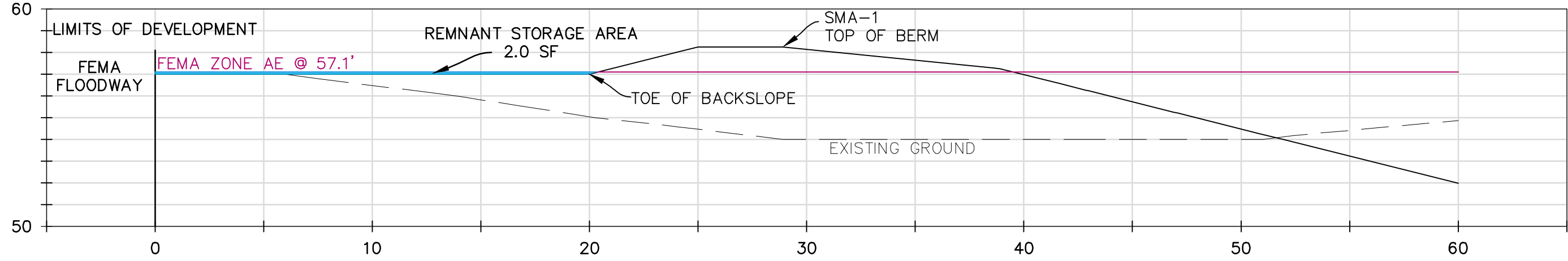


GENERAL NOTES:

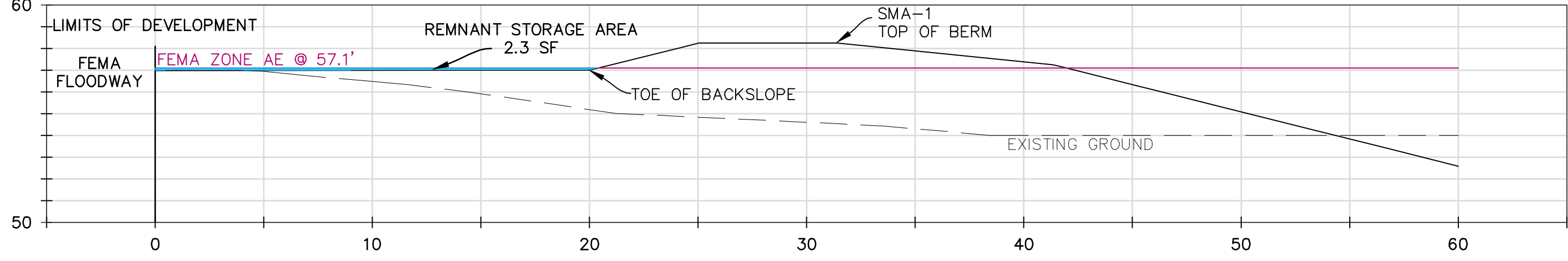
- THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
- ALL ELEVATIONS ARE IN NAVD88 DATUM.

DRAWING 13189-XCOMP	FONTANA OSCEOLA COUNTY, FL ZONE AE REMNANT STORAGE BEHIND BACKSLOPE	DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS 2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4068 CERTIFICATE OF AUTHORIZATION NO. 68	PLANNERS SURVEYORS JAMES C. NUGENT FLORIDA P.E. No. 57553	DESIGNED BY	ACC	CHECKED BY	JCN	DATE	6/4/2018	SCALE	1"=100'	JOB NUMBER	13189	NO.	DATE	REVISIONS	CHK.
				DRAWN BY	ACC												
SHEET 3A OF 7																	

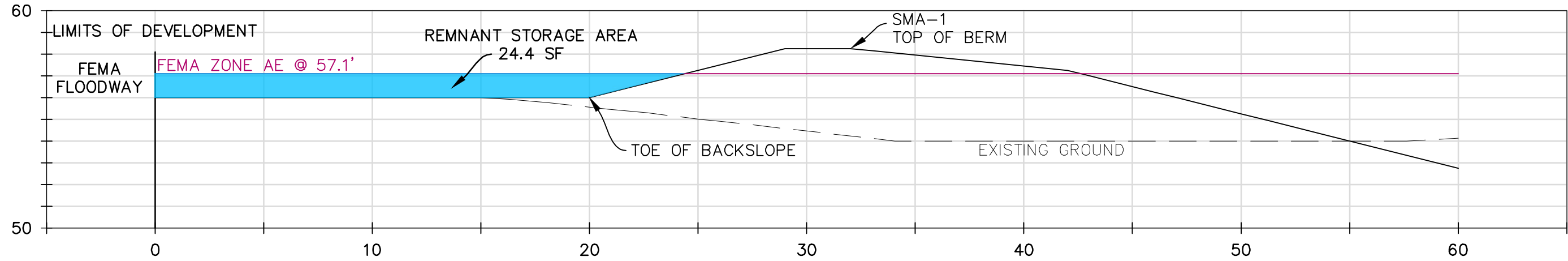
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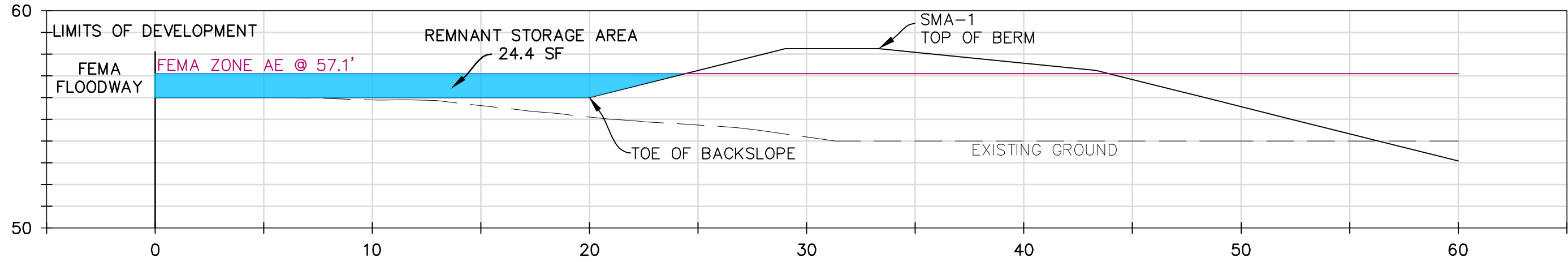
SECTION X-X
1"=5'



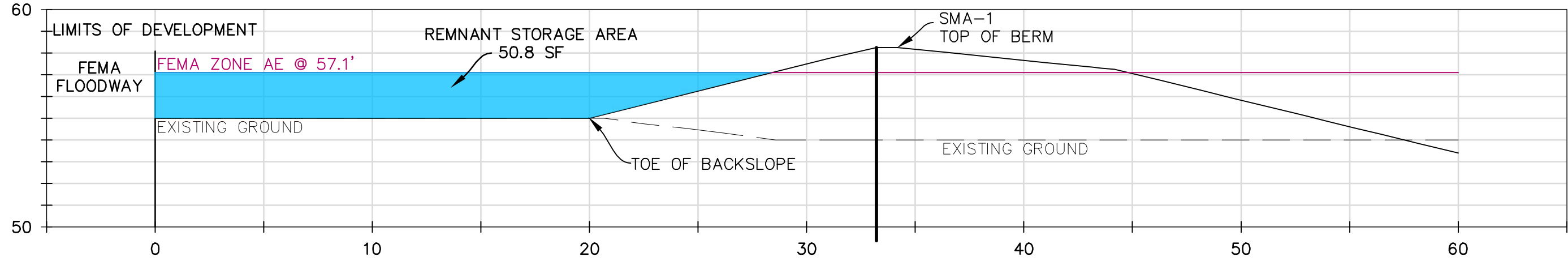
SECTION W-W
1"=5'



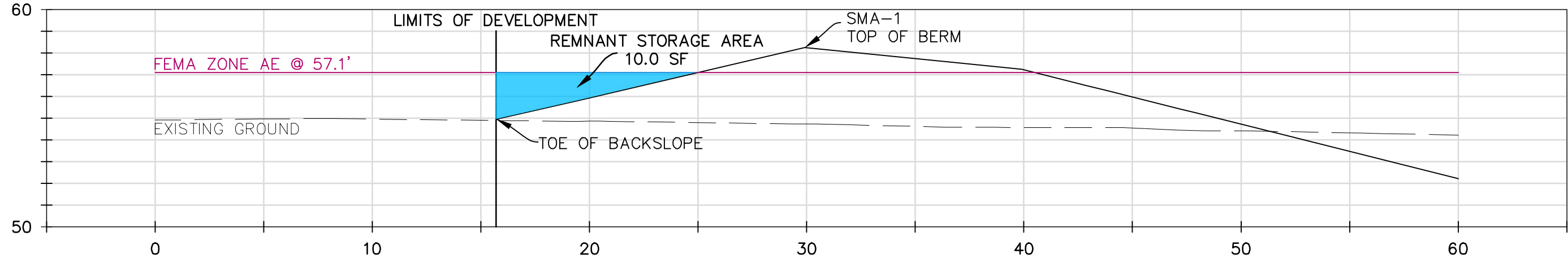
SECTION V-V
1"=5'



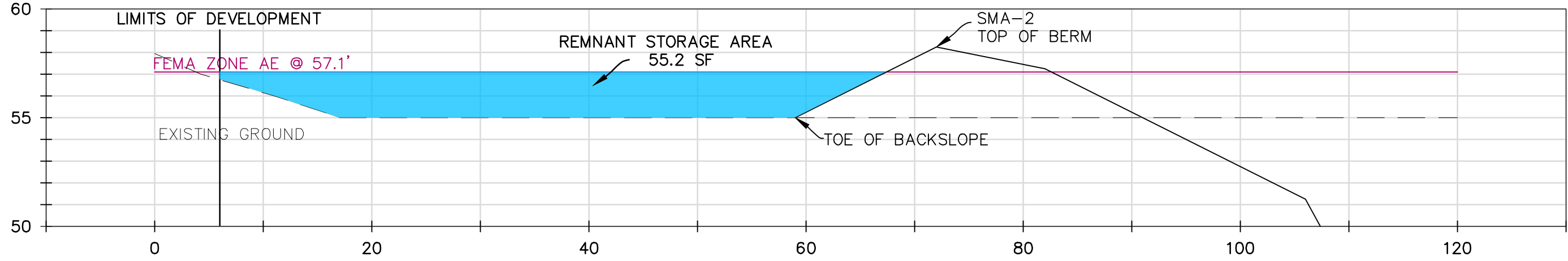
SECTION U-U
1"=5'



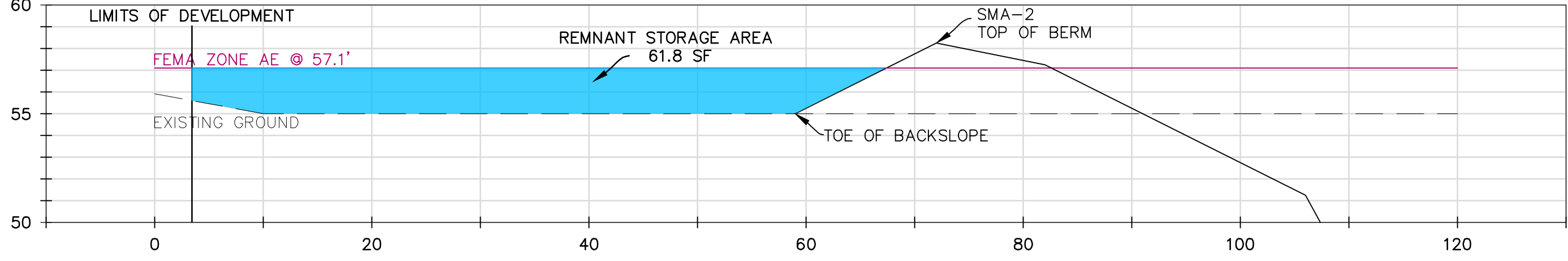
SECTION T-T
1"=5'



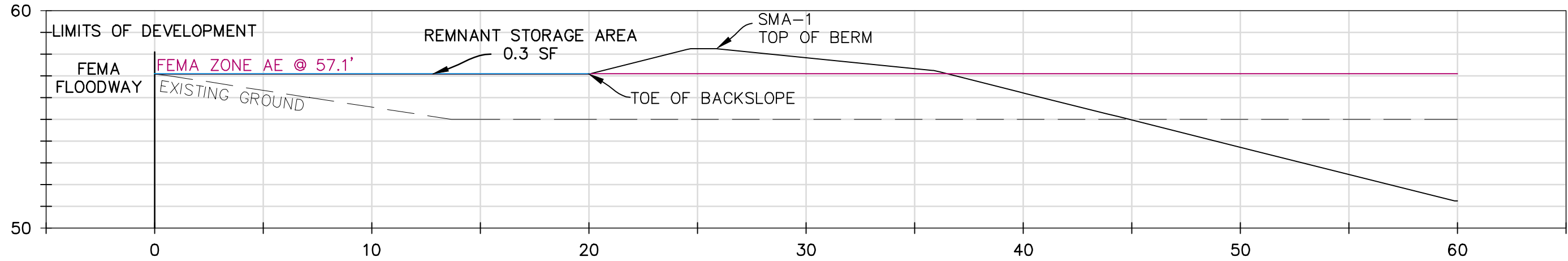
SECTION S-S
1"=5'



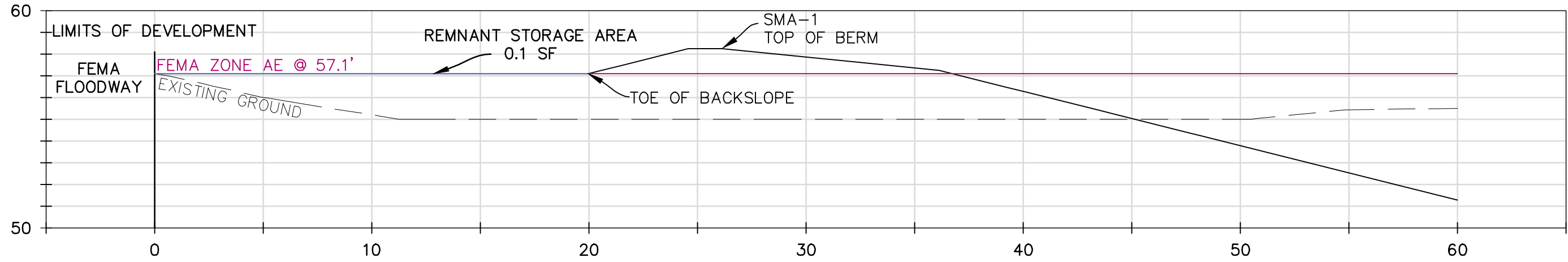
SECTION DD-DD
1"=10'



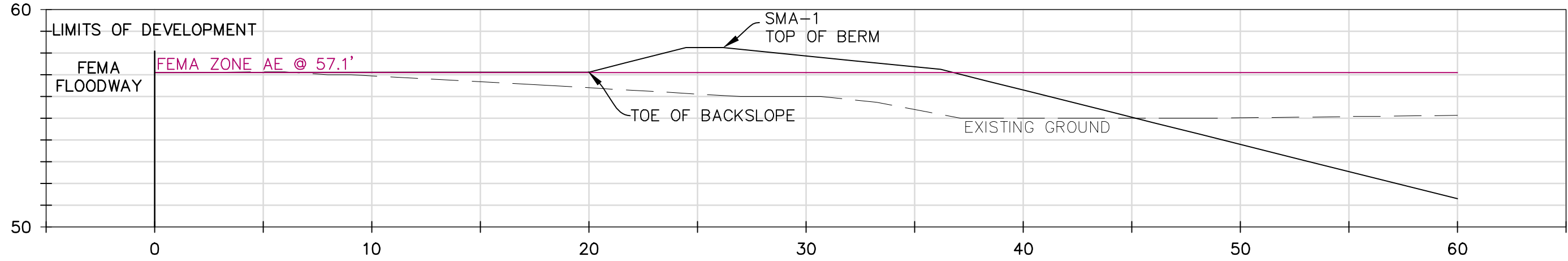
SECTION CC-CC
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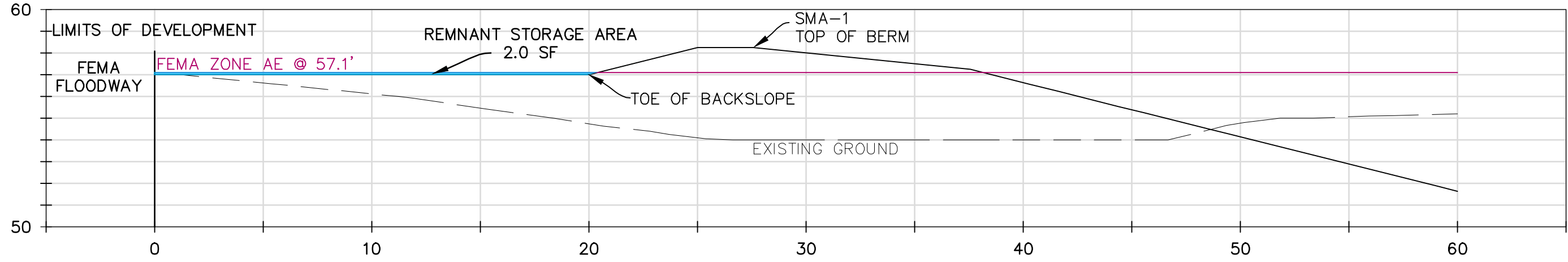
SECTION BB-BB
1"=5'



SECTION AA-AA
1"=5'



SECTION Z-Z
1"=5'



SECTION Y-Y
1"=5'

- GENERAL NOTES:
- THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
 - ALL ELEVATIONS ARE IN NAVD88 DATUM.

DRAFTING 13189-XCOMP		SHEET 4 OF 7		FONTANA OSCEOLA COUNTY, FL ZONE AE REMNANT STORAGE BEHIND BACKSLOPE		DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS 2800 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4088 CERTIFICATE OF AUTHORIZATION NO. 68		JAMES C. NUGENT FLORIDA P.E. No. 57553 DATE: _____		NO. _____ DATE: _____		3 10/16/18 UPDATED MULTI-USE ROAD, SMA1, 2, 4 AND 6 2 10/07/18 REVISED PER SFMMD COMMENTS 1 06/05/18 ADDED SHEET PER SFMMD REVISIONS		CHK.	
DESIGNED BY ACC		CHECKED BY JCN		DATE 6/4/2018		SCALE AS SHOWN		JOB NUMBER 13189							

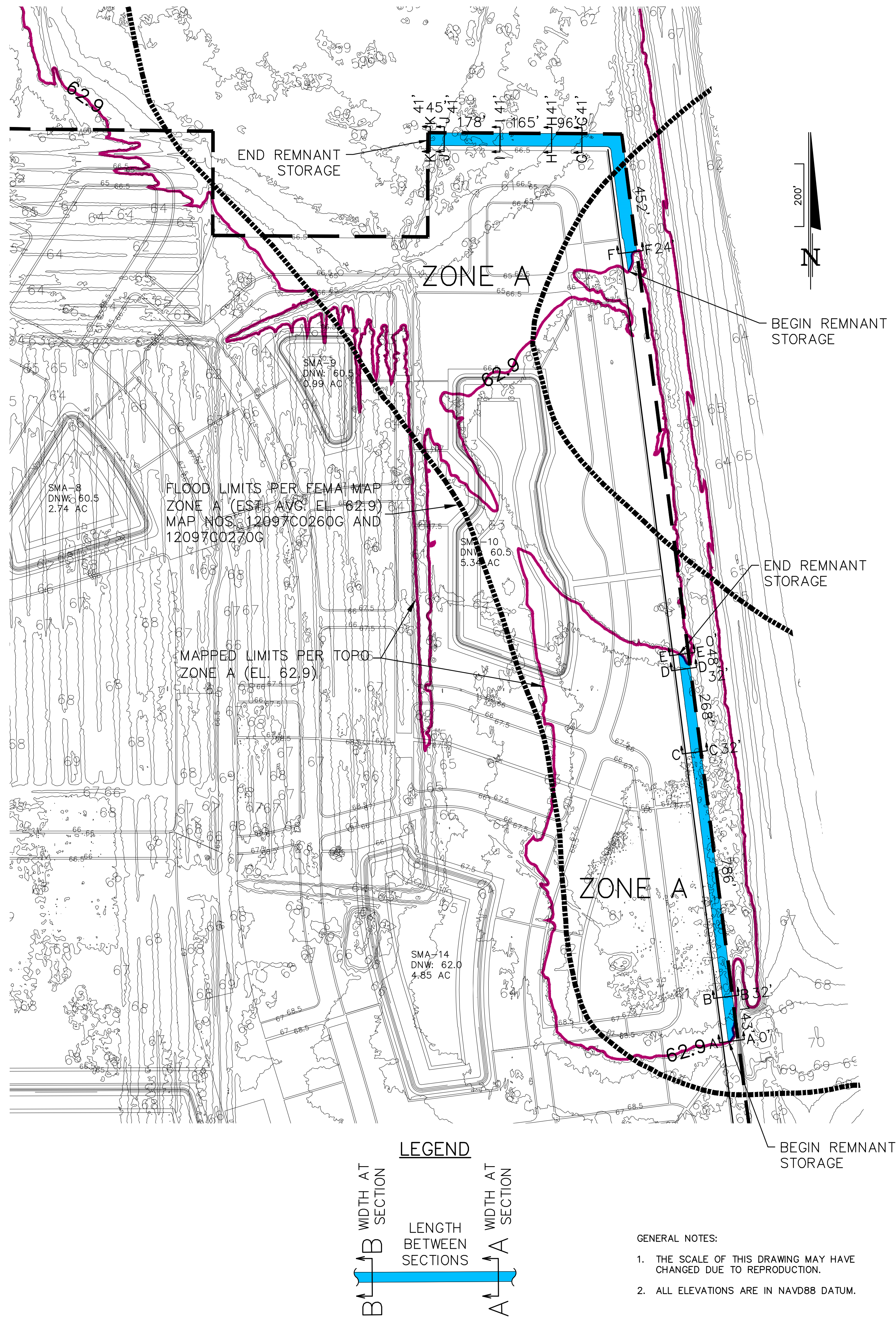
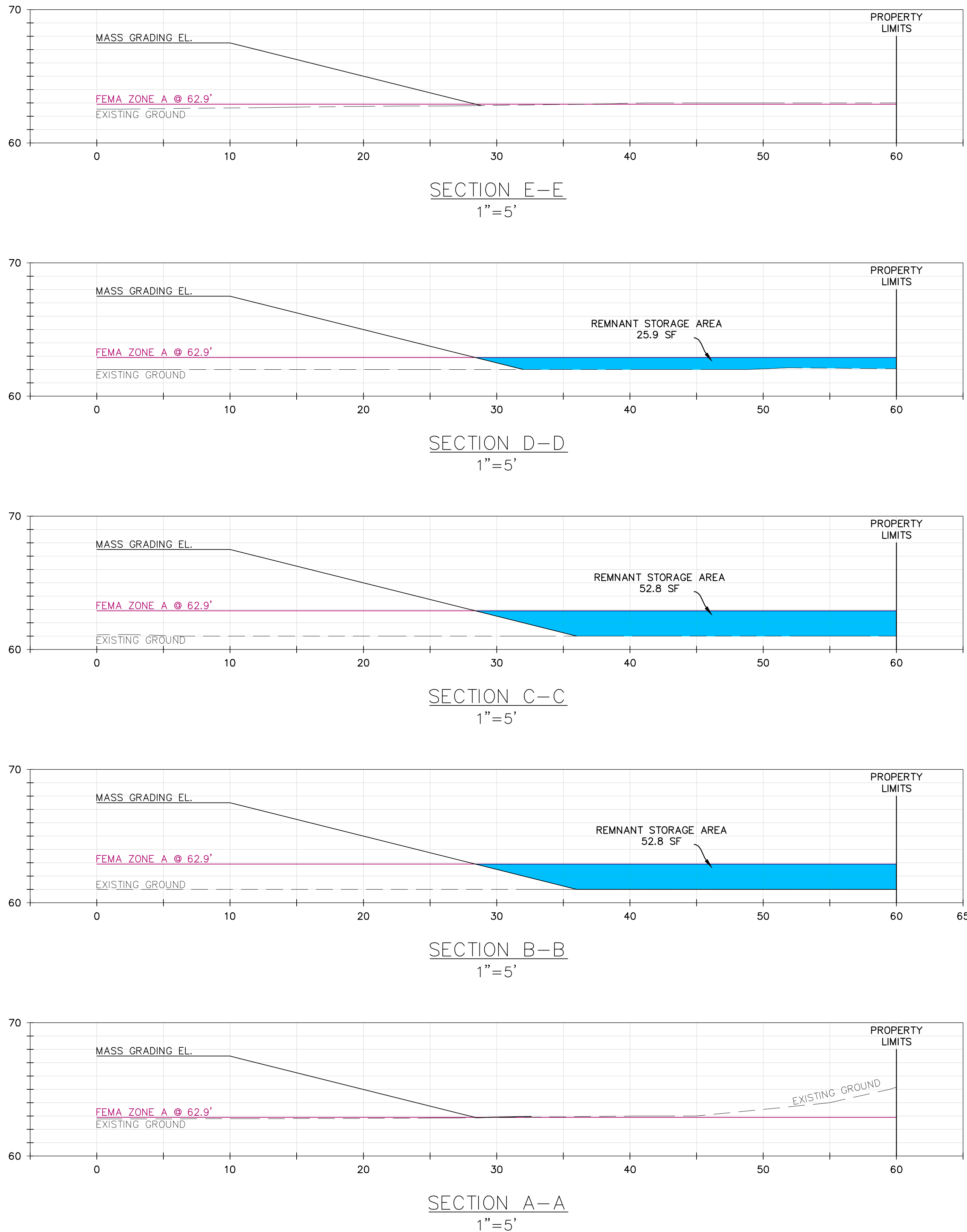
	REMNANT STORAGE AREA	LENGTH BETWEEN SECTIONS	REMNANT STORAGE BETWEEN SECTIONS	REMNANT STORAGE BETWEEN SECTIONS
SECTION NAME	(SF)	(FT)	(CU FT)	(AC-FT)
SECTION N-N	19.1			
SECTION O-O	19.1	1014	19,367.4	0.44
SECTION P-P	20.2			
SECTION Q-Q	20.2	340	6,868.0	0.16
SECTION R-R	10.0	55	830.5	0.02
SECTION S-S	10.0	174	1,740.0	0.04
SECTION T-T	50.8	62	1,884.8	0.04
SECTION U-U	24.4	148	5,564.8	0.13
SECTION V-V	24.4	300	7,320.0	0.17
SECTION W-W	2.3	35	467.3	0.01
SECTION X-X	2.0	165	2,178.0	0.05
SECTION Y-Y	2.0	130	279.5	0.01
SECTION Z-Z	0	230	230.0	0.01
SECTION AA-AA	0.1			
SECTION BB-BB	0.3	88	17.6	0.00
SECTION CC-CC	61.8			
SECTION DD-DD	55.2	227	13,279.5	0.30
		TOTAL:	60,027.4	1.38

GENERAL NOTES:

1. THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
2. ALL ELEVATIONS ARE IN NAVD88 DATUM.

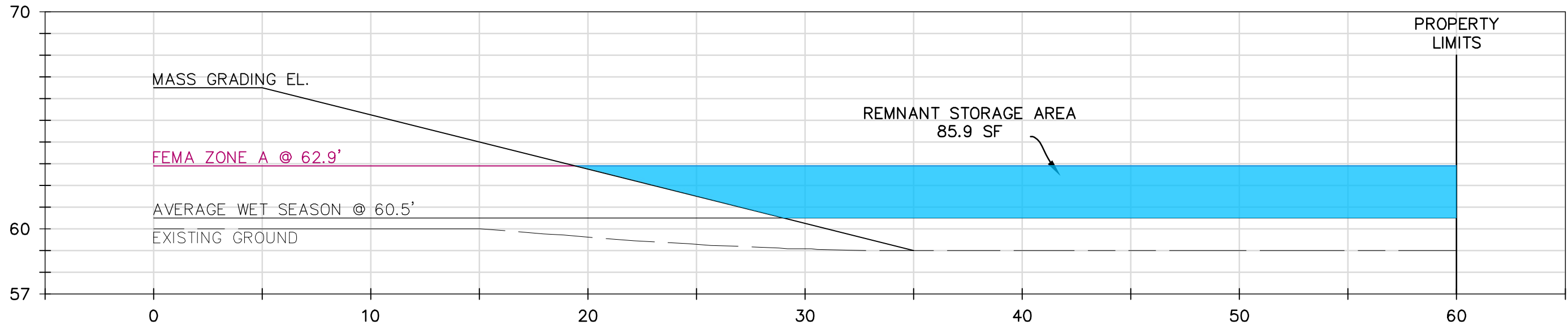
[illegible]

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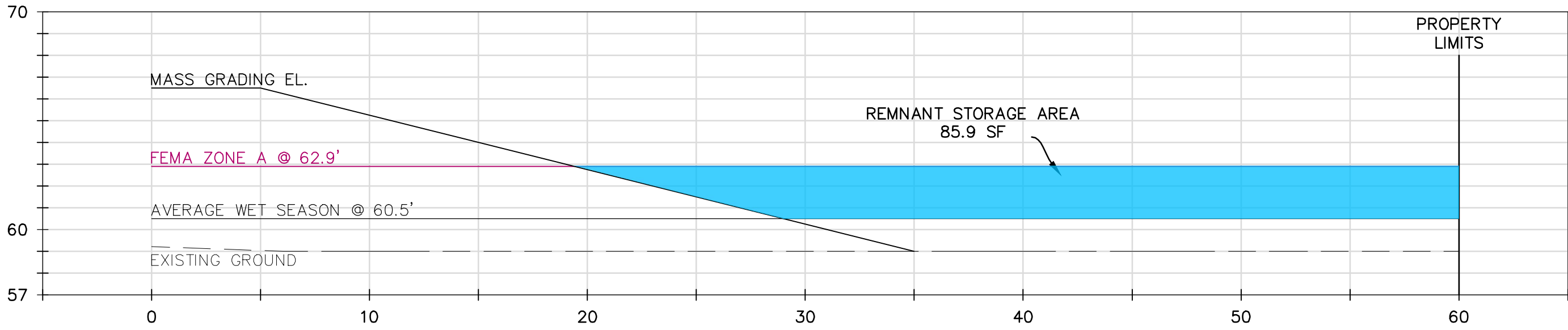


DRAWING 13189-XCOMP		FONTANA OSCEOLA COUNTY, FL ZONE A REMNANT STORAGE BEHIND BACKSLOPE		DONALD W. MCINTOSH ASSOCIATES, INC. ENGINEERS 2200 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4088 CERTIFICATE OF AUTHORIZATION NO. 68		JAMES C. NUGENT FLORIDA P.E. No. 57553 DATE: _____		2 08/07/18 REVISED PER SFMD COMMENTS 1 06/05/18 ADDED SHEET PER SFMD COMMENTS NO. DATE		CHK.
SHEET 6 OF 7				DESIGNED BY ACC		CHECKED BY JCN		JOB NUMBER 13189		DATE
				SCALE AS SHOWN		DATE 6/4/2018				

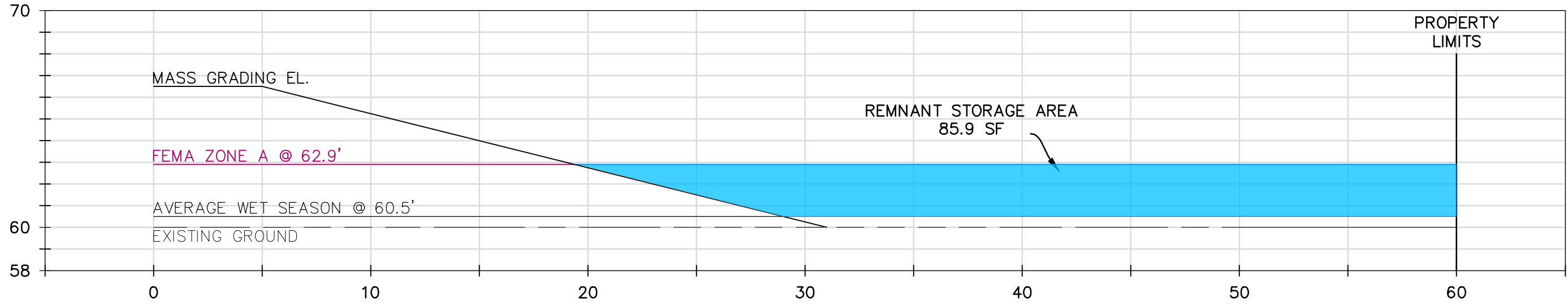
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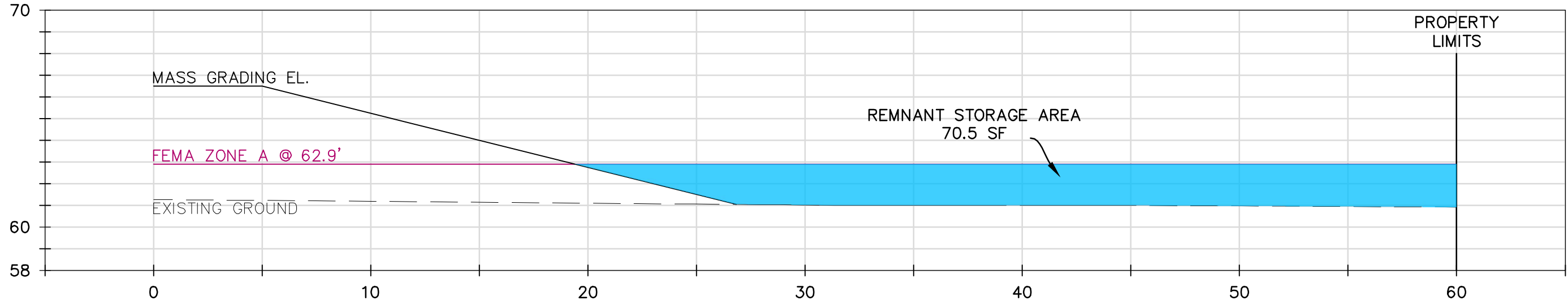
SECTION J-J
1"=5'



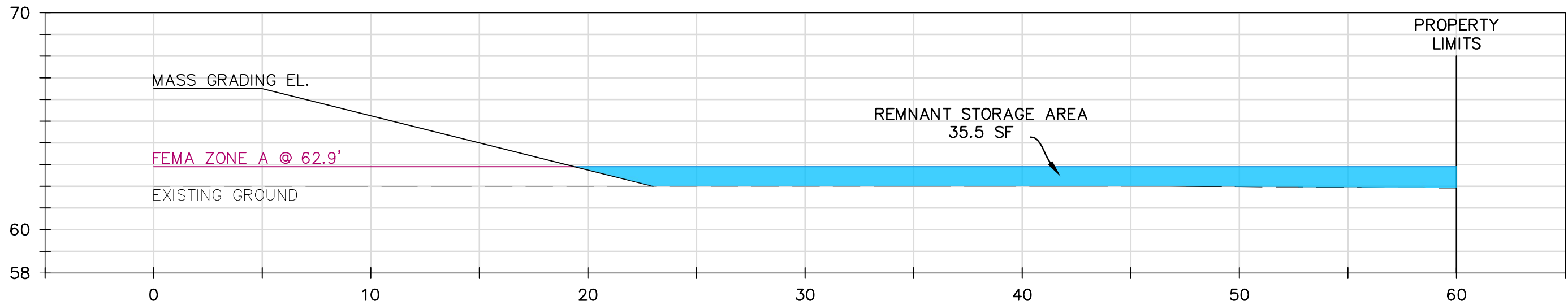
SECTION K-K
1"=5'



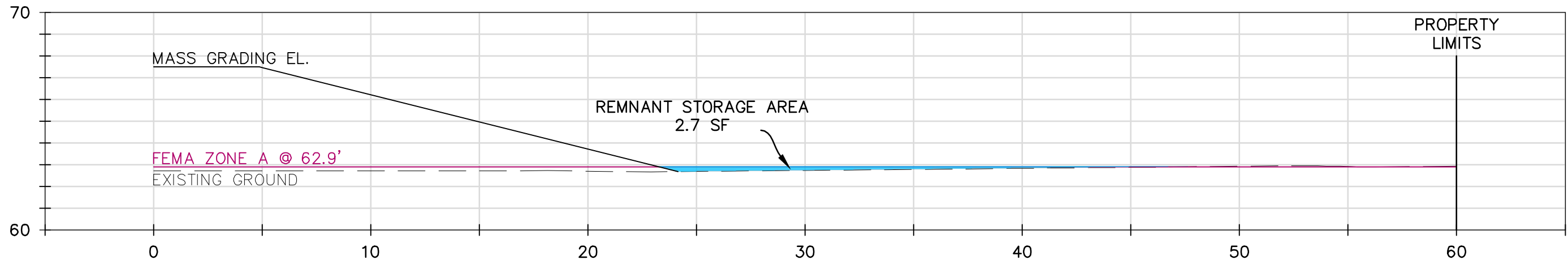
SECTION I-I
1"=5'



SECTION H-H
1"=5'



SECTION G-G
1"=5'



SECTION F-F
1"=5'

	REM-NANT STORAGE AREA (SF)	LENGTH BETWEEN SECTIONS (FT)	REM-NANT STORAGE BETWEEN SECTIONS (CU FT)	REM-NANT STORAGE BETWEEN SECTIONS (AC-FT)
SECTION A-A	0			
SECTION B-B	52.8	143	3,775.2	0.09
SECTION C-C	52.8	786	41,500.8	0.95
SECTION D-D	25.9	268	10,545.8	0.24
SECTION E-E	0	48	621.6	0.01
SECTION F-F	2.7	452	8,633.2	0.20
SECTION G-G	35.5	96	5,088.0	0.12
SECTION H-H	70.5	165	12,903.0	0.30
SECTION I-I	85.9	178	15,290.2	0.35
SECTION J-J	85.9	45	3,865.5	0.09
SECTION K-K	85.9			
		TOTAL:	102,223.3	2.35

- GENERAL NOTES:
- THE SCALE OF THIS DRAWING MAY HAVE CHANGED DUE TO REPRODUCTION.
 - ALL ELEVATIONS ARE IN NAVD88 DATUM.

DRAWING
13189-XCOMP

FONTANA

OSCEOLA COUNTY, FL

ZONE A REMNANT STORAGE BEHIND BACKSLOPE

ENGINEERS

PLANNERS

SURVEYORS

DONALD W. MCINTOSH ASSOCIATES, INC.

2800 PARK AVENUE NORTH, WINTER PARK, FL 32789 407.644.4068

CERTIFICATE OF AUTHORIZATION NO. 88

JAMES C. NUGENT

FLORIDA P.E. No. 57553

DATE: _____

DESIGNED BY

ACC

CHECKED BY

JCN

DATE

6/4/2018

SCALE

AS SHOWN

JOB NUMBER

13189

REVISED PER SFMD COMMENTS

ADDED SHEET PER SFMD COMMENTS

REVISIONS

NO.

DATE

CHK.

2

08/07/18

1

06/05/18

7

OF

7

SHEET

7

Fontana**Compensating Storage Calculations - Existing Storage**

Date: 6/5/2018

By: ACC

Chk: JCN

Rev: 6/26/2020

FEMA Flood Zone:	ZONE AE
Base Flood Elevation (BFE):	57.1'

AWS = Average Wet Season

ArcMap Output¹

Dataset	Plane_Height	Reference	Z_Factor	Area_2D (sqft)	Area_3D (sqft)	Volume (cu ft)
..pStor\CompStor.gdb\ZONEAEAreas	54.25	BELOW	1	481735.7216	481782.7398	116838.4831
..pStor\CompStor.gdb\ZONEAEAreas	57.1	BELOW	1	3675494.555	3676733.027	5407057.338

Stage (ft - NAVD)	Area (ac)	Volume to Ground (ac-ft)	
54.25	11.06	2.68	AWS
57.1	84.41	124.13	BFE

Existing Storage between 57.1' and 54.25' = 121.45 ac-ft

FEMA Flood Zone:	ZONE A
Base Flood Elevation (BFE):	62.9'

ArcMap Output¹

Dataset	Plane_Height	Reference	Z_Factor	Area_2D (sqft)	Area_3D (sqft)	Volume (cu ft)
..mpStor\CompStor.gdb\ZONEAAreas	60.5	BELOW	1	88022.26096	88087.53753	46415.32784
..mpStor\CompStor.gdb\ZONEAAreas	62.9	BELOW	1	1412884.091	1413535.566	1773153.104

Stage (ft - NAVD)	Area (ac)	Volume to Ground (ac-ft)	
60.5	2.02	1.07	AWS
62.9	32.45	40.71	BFE

Existing Storage between 62.9' and 60.5' = 39.64 ac-ft

¹Values were calculated using ArcGIS ArcMap (version 10.5) made by ESRI. The Surface Volume tool within the 3D Analyst Toolbox was used. The volume is the difference between a plane and a surface. Please see <http://pro.arcgis.com/en/pro-app/tool-reference/3d-analyst/surface-volume.htm> for more details.

Fontana
Compensating Storage Calculations - Proposed Storage

Date: 6/5/2018

By: ACC

Chk: JCN

Rev: 6/26/2020

FEMA Flood Zone:	ZONE AE
Base Flood Elevation (BFE):	57.1'
Existing Storage:	121.45 ac-ft
Comp Storage Ponds:	SMA-1,2,3, Marina

DNW = Design Normal Water

AWS = Average Wet Season

Pond Data					
Stage (ft - NAVD)	SMA-1 Area (ac)	SMA-2 Area (ac)	SMA-3 Area (ac)	MARINA Area (ac)	Volume (ac-ft)
54.25	29.78	2.36	6.44	1.35	0.00
55.25	30.43	2.48	6.65	1.50	40.49
56.25	31.08	2.60	6.86	1.65	82.12
57.10	31.63	2.70	7.05	1.79	118.40
57.25	31.73	2.72	7.08	1.81	124.89
58.25	33.35	3.04	7.64		167.67

DNW/AWS

BFE

Outside Top of Berm for Marina

Outside Top of Berm

Pond Storage Provided @ 57.1' = 118.40 ac-ft

ZONE AE Remnant Storage behind Backslope from Cross Sections = 1.38 ac-ft

ZONE AE Storage Area A = 0.14 ac-ft

ZONE AE Storage Area B = 2.24 ac-ft

Total Proposed Storage between 57.1' and 54.25' = 122.16 ac-ft

FEMA Flood Zone:	ZONE A
Base Flood Elevation (BFE):	62.9'
Existing Storage:	39.64 ac-ft
Comp Storage Ponds:	SMA-8,9,10,13

Pond Data					
Stage (ft - NAVD)	SMA-8 Area (ac)	SMA-9 Area (ac)	SMA-10 Area (ac)	SMA-13 Area (ac)	Volume (ac-ft)
60.5	2.74	0.99	5.34		0.00
61.0	2.80	1.03	5.45	8.13	4.59
61.5	2.87	1.07	5.56	8.26	13.38
62.5	3.00	1.16	5.78	8.51	31.49
62.9	3.05	1.20	5.87	8.62	38.93
63.5	3.13	1.25	6.01	8.77	50.31
64.5	3.38	1.49	6.59	9.23	70.23
65	3.55			9.56	78.68

DNW/AWS

DNW/AWS (SMA-13)

BFE

Outside Top of Berm (SMA-9, 10)

Outside Top of Berm (SMA-8, 13)

Pond Storage Provided @ 62.9' = 38.93 ac-ft

ZONE A Remnant Storage behind Backslope from Cross Sections = 2.35 ac-ft

Total Proposed Storage between 62.9' and 60.5' = 41.28 ac-ft