6. WATER QUALITY

A minimum of one-half inch of dry pre-treatment will be provided. The SFWMD requires water quality treatment of the first inch of runoff over the entire project site or 2.5-inches times the percent imperviousness, whichever is greater. In addition, due to the ultimate discharge to an impaired water body, SFWMD requires that 150% of the required water quality volume be provided prior to discharge. Martin County requires water quality treatment for 3-inches times the percent imperviousness. Water quality will be provided to meet both agency's criteria. Detailed calculations have been provided in Appendix D.

The previous approvals for this project site from Martin County, SFWMD and FDOT did not require nutrient removal. However, additional treatment volume has been provided for nutrient removal based on a net improvement (with a maximum of 90%) pre-construction vs. post-construction analysis. The target removal efficiency for Nitrogen is 77.7% and Phosphorus is 90.0%. The required nutrient loading removal will be met through the on-site dry retention areas and existing lake. Detailed calculations and results of this analysis can be found in Appendix D.

7. PEAK RATE ATTENTUATION

The existing FDOT drainage ditch along the west side of US Highway 1, adjacent to the project site is the receiving body for this project. According to SFWMD Permit No. 43-00405-S, the allowable discharge for the project is 6 cfs for the 25-year 72-hour storm event.

The proposed control structure was used to limit the discharge from the site and to route the 10-year 24-hour and 25-year 72-hour storm events, which were used to check the critical on-site design elevations of pavement and perimeter berm, respectively. The finished floor elevation was designed based on zero discharge for the 100-year 72-hour storm event. The ICPR inputs and results for post-development conditions are in Appendix E.

The on-site wet season water table has been assumed at elevation 12.0' NAVD. During the modeling the existing lake and wetland have their initial stages set to the control elevation, 13.00' and 13.02' respectfully. There is no storage credit given for the volumes between the wet season water table and the control elevations.

The following rainfall events were assigned:

Description	Storm Event	Rainfall (Inches)
Pavement Elevation	10-year 24-hour	7.5
Perimeter Berm Elevation	25-year 72-hour	12.5
Finished Floor Elevation	100-year 72-hour	15.0

8. ANALYSIS AND RESULTS

8.1 Required Treatment Volumes

Water quality will be provided in the on-site dry retention areas and existing on-site lake.

Overall Required Volumes	Volume (ac-ft)
SFWMD	
Dry Pretreatment	0.68
1" Over Project Area	1.36
2.5" Times Percent Imperviousness	2.27
Controlling Volume	**2.11**
Controlling Volume x 150%	**3.17**
Martin County	
3.0" Times Percent Imperviousness	**2.73**

8.2 Dry Pre-Treatment

The total dry pre-treatment volume required is 0.68 ac-ft. The total dry pre-treatment volume provided by Dry Retention Area No. 1, Dry Retention Area No. 2 and the Future Dry Retention Area for Lot 4 is 1.60 ac-ft. Therefore, the dry pre-treatment requirement will be achieved for the overall master system.

Description	Elevation (ft, NAVD)	Volume (ac-ft)
Dry Retention Area No. 1	14.25	0.82
Dry Retention Area No. 2	14.10	0.15
Future Dry Retention Area for Lot 4	14.25	0.62
Total Dry Pre-Treatment Volume:		***1.59***

8.3 SFWMD Water Quality

The total water quality volume required by SFWMD is 3.17 ac-ft. SFWMD allows 100% water quality credit for "retention" and "dry detention". Therefore, the total water quality volume provided by the proposed dry retention areas is 1.59 ac-ft and by the existing on-site lake is 2.41 ac-ft. Therefore, the water quality requirement will be achieved for the overall master system.

Description	Elevation (ft, NAVD)	Volume (ac-ft)
Dry Retention Area No. 1 (Retention Credit)	13.40	0.23
Dry Retention Area No. 1 (Detention Credit)	14.25	0.59
Dry Retention Area No. 2 (Retention Credit)	13.50	0.06
Dry Retention Area No. 2 (Detention Credit)	14.10	0.09
Future Dry Ret for Lot 4 (Retention Credit)	13.40	0.18
Future Dry Ret for Lot 4 (Detention Credit)	14.25	0.44
Existing Lake (Retention Credit)	13.26	1.18
Existing Lake (Detention Credit)	14.43	1.23
Total Volume Provided:		***4.00***

8.4 Martin County Water Quality

The total water quality volume required by Martin County is 2.73 ac-ft. Martin County allows 100% water quality credit for "dry and wet retention", 75% credit for "dry detention" and 50% credit for "wet detention". Therefore, the total water quality volume provided by the proposed dry retention areas is 1.31 ac-ft (retention and detention credits) and by the existing on-site lake is 1.79 ac-ft (retention and detention credits). Therefore, the water quality requirement will be achieved for the overall master system.

Description	Elevation (ft, NAVD)	Volume (ac-ft)
Dry Retention Area No. 1 (Retention Credit)	13.40	0.23
Dry Retention Area No. 1 (Detention Credit)	14.25	0.44
Dry Retention Area No. 2 (Retention Credit)	13.50	0.06
Dry Retention Area No. 2 (Detention Credit)	14.10	0.07
Future Dry Ret for Lot 4 (Retention Credit)	13.40	0.18
Future Dry Ret for Lot 4 (Detention Credit)	14.25	0.33
Existing Lake (Retention Credit)	13..26	1.18
Existing Lake (Detention Credit)	14.43	0.61
Total Volume Provided:		***3.10***

8.5 Nutrient Removal

The following nutrient removal is provided through the on-site dry retention areas and the existing on-site lake:

Nutrient to be Removed	Required (%)	Provided (%)
Total Nitrogen	77.7	84.7
Total Phosphorus	90.0	92.5

8.6 Flood Protection

The following information is based on the stormwater calculations:

Description	Design Criteria	Permitted Allowable Peak Discharge (cfs)	Post-Dev. Peak Discharge (cfs)	Previous Permitted Elevation (ft, NGVD)	Previous Permitted Elevation (ft, NAVD)	Calculated Elevation (ft, NAVD)	Design Elevation (ft, NAVD)
Pavement Elevation	10-year 24-hour	-	4.81	-	-	varies	varies
Perimeter Berm Elevation	25-year 72-hour	6	5.88	16.9	15.44	15.58	15.60
Finished Floor Elevation	100-year 72-hour (Zero Discharge)	0	0	18.0	16.54	16.31	17.00
Existing Finished Floor Elevation	100-year 72-hour (Zero Discharge)	0	0	18.0	16.54	16.31	16.54*

**Note: This is the existing permitted elevation for the Existing Office.*

8.7 Recovery Analysis

Martin County requires that projects recovery half of their treatment volume within 5 days and recovery 90% of 25-year 3-day storm event in 12 days. In the flood protection models the existing lake and wetland retention volumes were ignored and initial stages were set at the control elevation. A recovery analysis has been provided in Appendix E that provides assurance that the recovery of the stormwater treatment areas is achieved.

9. LEGAL POSITIVE OUTFALL

Legal positive outfall exists on-site, since the site currently discharges to the FDOT roadway stormwater system. The SFWMD previously issued a permit for the site with an allowable discharge of 6 cfs for the 25-year 72-hour storm event. The post-development peak discharge for the 25-year 72-hour storm event is 5.88 cfs for the project.

10. CONCLUSION

In summary, the proposed improvements meet all current development criteria for the project site as required by the Martin County, SFWMD and FDOT. Water treatment and attenuation will be provided in the proposed dry retention areas and on-site exiting lake prior to discharging to the wetland. The proposed stormwater management system will retain the 25-year 72-hour storm event on-site. No negative impacts are anticipated due to the implementation of the proposed Mariner Village stormwater system.

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APPENDIX A

Project Information and Maps


Site Location
Site Location Map
Mariner Village

Hydrologic Soil Group—Martin County, Florida
(Mariner Village)

MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

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

Soil Survey Area: Martin County, Florida
Survey Area Data: Version 17, Sep 17, 2018

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

Date(s) aerial images were photographed: Feb 14, 2015—May 8, 2015

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Waveland and Immokalee fine sands	A/D	20.4	75.6%
13	Placid and Basinger fine sands, depressional	A/D	6.6	24.4%
Totals for Area of Interest			27.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

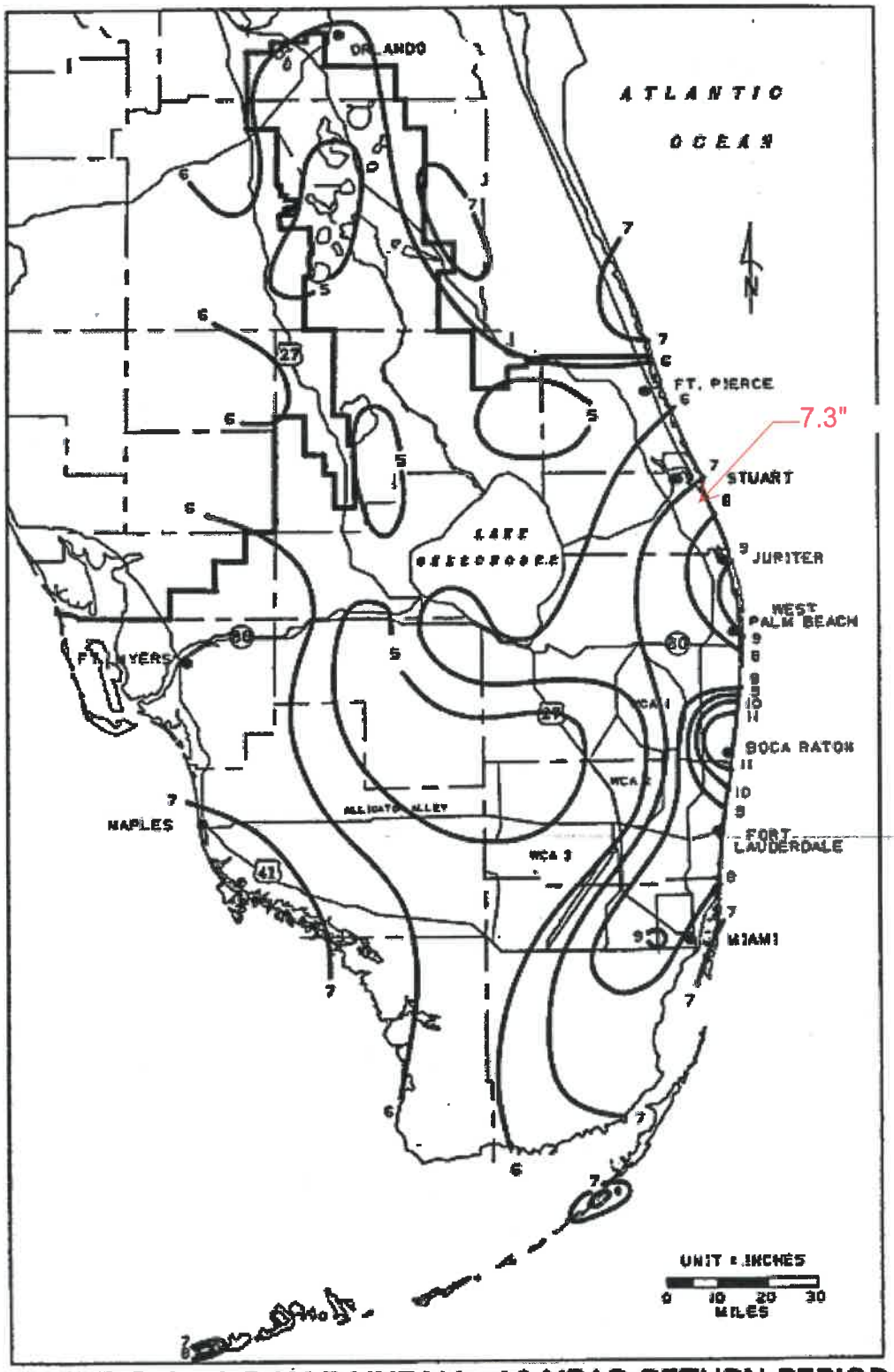


FIGURE C-4. 1-DAY RAINFALL: 10-YEAR RETURN PERIOD

588

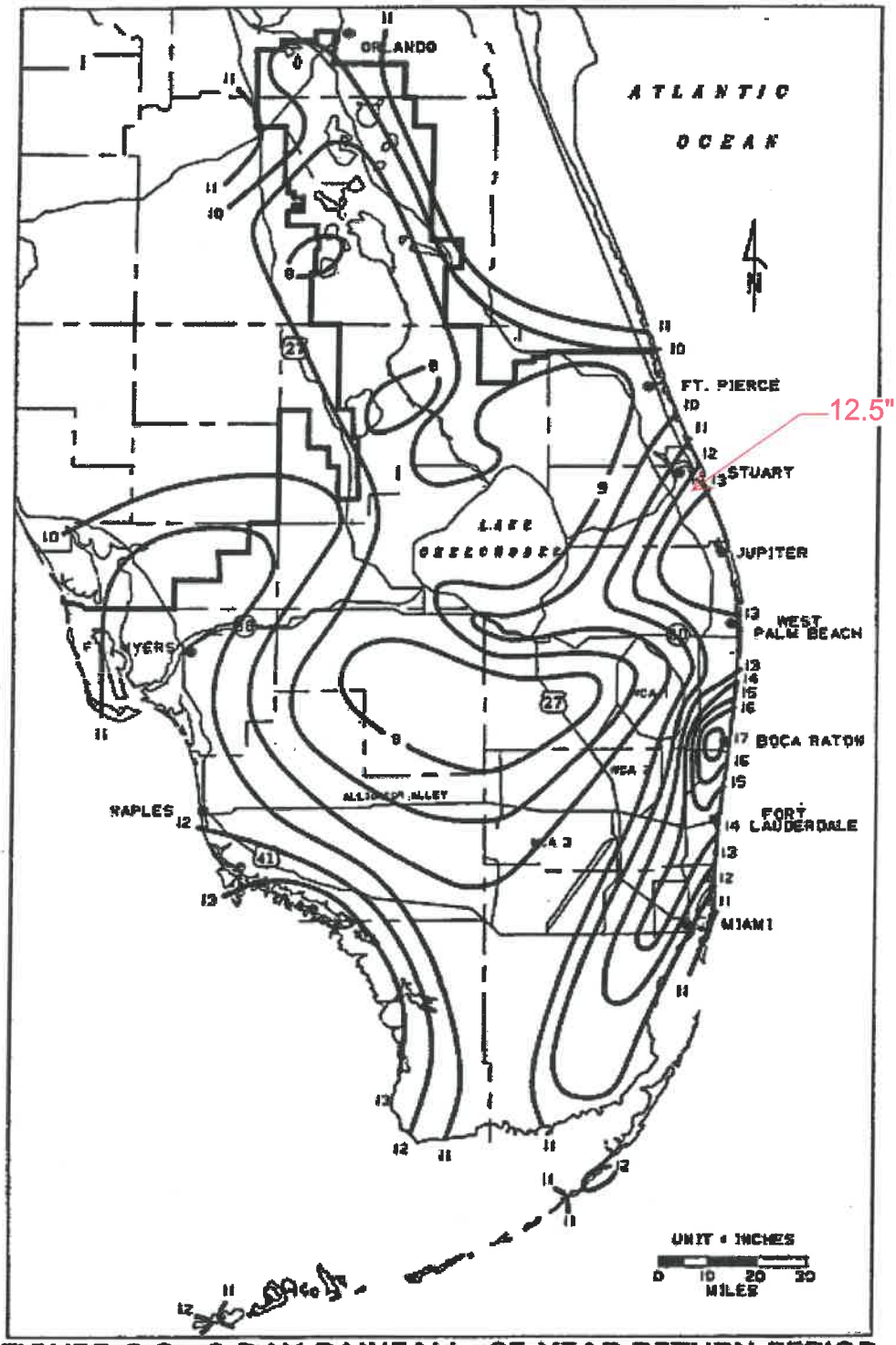


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

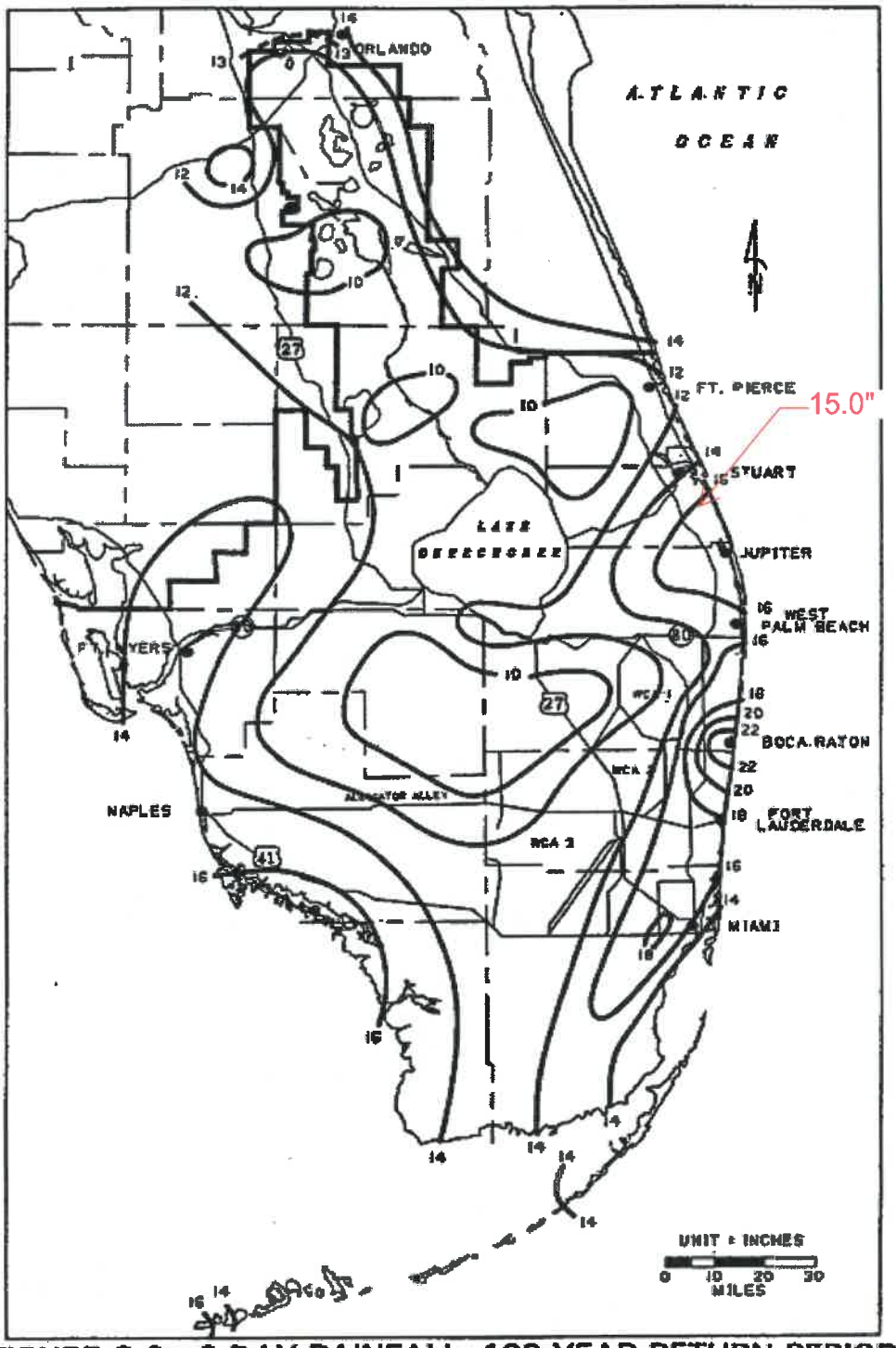
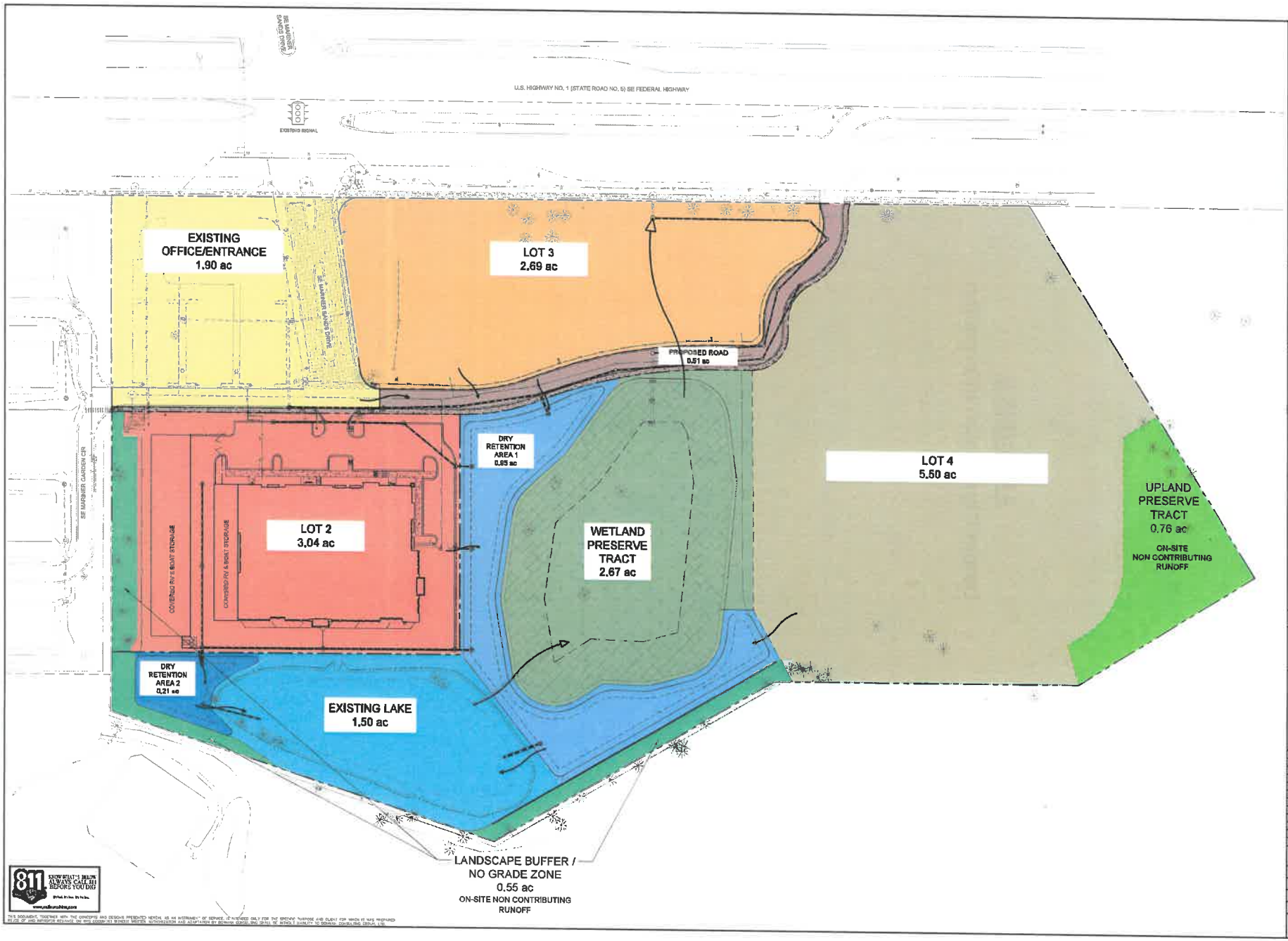


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD



811 KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG

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MARINER VILLAGE SQUARE PUD
LOT 2 - BEE SAFE STORAGE
RUNOFF EXHIBIT
MARTIN COUNTY FLORIDA

PROJECT NO
010318-02-004

"THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY HOWARD BOWMAN ON THE DATE ADJACENT TO THE SEAL. PRINTED COPIES OF THE DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES."

PLAN STATUS

DATE	DESCRIPTION
LL DESIGN	GC/JB DRAWN	CMB CHKD

SCALE AS SHOWN
JOB No. 010318-02-004
DATE 07/30/2019
FILE No. EXHIBIT
SHEET R1

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APPENDIX B

Datum Conversion Information

Questions concerning the VERTCON process may be mailed to _NGS

Latitude: 27.1190

Longitude: 080.1841

NGVD 29 height: 10.0 ft

Datum shift(NAVD 88 minus NGVD 29): -1.463 feet

Converted to NAVD 88 height: 8.537 feet

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APPENDIX C

Excerpts from Previous Permit

SURFACE WATER MANAGEMENT EVALUATION

APPLICATION NUMBER 05306-D DATE: November 6, 1987

PROJECT NAME: Mariner Village Square

LOCATION: Martin COUNTY

SECTION 31 ,TOWNSHIP 38 SOUTH, RANGE 42 EAST

PROJECT AREA 20.3 ACRES DRAINAGE AREA 20.3 ACRES

FACILITIES:

1. EXISTING: U.S Highway 1 and an associated swale system is located adjacent to the east side of this site.

2. PROPOSED: A 20.3-acre commercial development with a system of drop inlets and storm water piping to direct runoff to 2.4 acres of on-site lakes and a vegetated preserve area. Outfall from the site is to the road side swale along the west side of U.S. Highway 1 via a control structure located in the most easterly lake.

The outfall structure will consist of 1-82 degree V-notch weir with an invert at elevation 15.6 feet NGVD, 1-4" high by 6" wide rectangular orifice with an invert at elevation 15.0 feet NGVD and 38 LF of 24" diameter RCP culvert leading to the swale along U.S. Highway 1. Eventual outfall is to the Manatee Pocket.

3. PROPOSED THIS PHASE: Phase I (4.1 acres) will consist of a bank and office complex to be located at the northeast corner of the site, construction of the water management areas and installation of the outfall structure.

DRAINAGE BASIN Manatee Pocket RECEIVING BODY U.S. Highway 1
Roadside swale

RUN OFF FORMULA Pre- vs Post-Development ALLOWABLE DISCHARGE 6 CFS

REQUIRED DETENTION 2.3 AC-FT
DETENTION METHOD on-site lakes
DETENTION PROVIDED 2.4 AC-FT

FLOOD PROTECTION		
LOCAL ROAD CRITERIA	N/A	YEAR, N/A HOUR STORM
FLOOD CONTOUR	N/A	FEET NGVD
MINIMUM ROAD GRADE	N/A	FEET NGVD
PARKING LOT CRITERIA	5	YEAR, 1 HOUR STORM
FLOOD CONTOUR	15.8	FEET NGVD
MINIMUM PARKING LOT GRADE	16.6	FEET NGVD
BASIN DESIGN FREQUENCY	25	YEAR, 72 HOUR STORM
FLOOD CONTOUR	16.9	FEET NGVD
DESIGN DISCHARGE	6	CFS
100 YEAR FLOOD		
FLOOD CONTOUR	17.6	FEET NGVD
MINIMUM FLOOR ELEVATION	18.0	FEET NGVD
FIA FLOOD ELEVATION	N/A	FEET NGVD

APPENDIX D

Site Calculations

AREA/LAND USE CALCULATIONS

ON-SITE AREAS CONTRIBUTING TO THE STORMWATER SYSTEM

Description	Area		Percentage
	(SF)	(Acres)	
Existing Office	**82,966**	**1.90**	**100%**
Impervious Area	**65,712**	**1.51**	**79%**
Buildings	8,250	0.19	10%
Pavement	31,449	0.72	38%
Existing Entrance	26,013	0.60	31%
Pervious Area	**17,254**	**0.40**	**21%**
Open Space	17,254	0.40	21%

Description	Area		Percentage
	(SF)	(Acres)	
Lot 2 (Bee Safe Storage)	**132,450**	**3.04**	**100%**
Impervious Area	**103,132**	**2.37**	**78%**
Buildings	38,475	0.88	29%
Pavement	52,124	1.20	39%
Covered Pavement	12,533	0.29	9%
Pervious Area	**29,318**	**0.67**	**22%**
Open Space	29,318	0.67	22%

Description	Area		Percentage
	(SF)	(Acres)	
Proposed Road	**22,356**	**0.51**	**100%**
Impervious Area	**22,356**	**0.51**	**100%**
Pavement	22,356	0.51	100%
Pervious Area	**0**	**0.00**	**0%**
Open Space	0	0.00	0%

Description	Area		Percentage
	(SF)	(Acres)	
Existing Lake	**65,211**	**1.50**	**100%**
Impervious Area	**38,767**	**0.89**	**59%**
Existing Lake	38,767	0.89	59%
Pervious Area	**26,444**	**0.61**	**41%**
Exsting Lake Bank	8,119	0.19	12%
Lake Open Space	18,325	0.42	28%

AREA/LAND USE CALCULATIONS

Description	Area		Percentage
	(SF)	(Acres)	
Dry Retention Areas	**50,761**	**1.17**	**100%**
Impervious Area	**0**	**0.00**	**0%**
Pavement	0	0.00	0%
Pervious Area	**50,761**	**1.17**	**100%**
Dry Retention Area No. 1	41,579	0.95	82%
Dry Retention Area No. 2	9,182	0.21	18%

Description	Area		Percentage
	(SF)	(Acres)	
Wetland Preserve Tract	**116,247**	**2.67**	**100%**
Impervious Area	**39,130**	**0.90**	**34%**
Wetland	39,130	0.90	34%
Pervious Area	**77,117**	**1.77**	**66%**
Wetland Buffer	49,367	1.13	42%
Wetland Open space	27,750	0.64	24%

Description	Area		Percentage
	(SF)	(Acres)	
Lot 3	**117,032**	**2.69**	**100%**
Impervious Area	**93,626**	**2.15**	**80%**
Buildings	16,095	0.37	14%
Pavement	77,531	1.78	66%
Pervious Area	**23,406**	**0.54**	**20%**
Open Space	23,406	0.54	20%

Description	Area		Percentage
	(SF)	(Acres)	
Lot 4	**239,525**	**5.50**	**100%**
Impervious Area	**191,619**	**4.40**	**80%**
Buildings	39,325	0.90	16%
Pavement	152,294	3.50	64%
Pervious Area	**47,906**	**1.10**	**20%**
Future Dry Retention Area	28,743	0.66	12%
Open Space	19,163	0.44	8%

AREA/LAND USE CALCULATIONS

ON-SITE AREAS NOT CONTRIBUTING TO THE STORMWATER SYSTEM

Description	Area		Percentage
	(SF)	(Acres)	
Upland Preserve Tract	**33,000**	**0.76**	**100%**
Impervious Area	**0**	**0.00**	**0%**
Pavement	0	0.00	0%
Pervious Area	**33,000**	**0.76**	**100%**
Open Space	33,000	0.76	100%

Description	Area		Percentage
	(SF)	(Acres)	
Landscape Buffer Area	**23,961**	**0.55**	**100%**
Impervious Area	**0**	**0.00**	**0%**
Pavement	0	0.00	0%
Pervious Area	**23,961**	**0.55**	**100%**
Open Space	23,961	0.55	100%

CURVE NUMBER AND TIME OF CONCENTRATION

Name	Total Area (acres)	Pervious Area (acres)	Pervious CN	Impervious Area (acres)	Impervious CN	Weighted CN
On-Site						
Existing Office/Entrance	1.90	0.40	74	1.51	98	93.0
Proposed Road	0.51	0.00	74	0.51	98	98.0
Lot 2 (Bee Safe Storage)	3.04	0.67	74	2.37	98	92.7
Lot 3	2.69	0.54	74	2.15	98	93.2
Lot 4	5.50	1.10	74	4.40	98	93.2
Existing Lake	1.50	0.61	74	0.89	98	88.3
Dry Retention Area No. 1	0.95	0.95	74	0.00	98	74.0
Dry Retention Area No. 2	0.21	0.21	74	0.00	98	74.0
Wetland Preserve Tract	2.67	1.77	74	0.90	98	82.1
Upland Preserve Tract*	0.76	0.76	74	0.00	98	74.0
Landscape Buffer Area*	0.55	0.55	74	0.00	98	74.0
Total	**20.28**	**7.56**		**12.73**		

** Noncontributing area*

STAGE/STORAGE COMPUTATIONS

Existing Office

	Pavement	Open
Area (ac)	1.32	0.40
	L	L
Starting Elev (ft)	15.10	14.00
Ending Elev (ft)	16.70	16.70

Stage NAVD	Linear Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
14.00	0.000	0.000	0.000
14.50	0.000	0.018	0.018
15.00	0.000	0.073	0.073
15.50	0.066	0.165	0.231
16.00	0.334	0.293	0.627
16.50	0.808	0.458	1.266
17.00	1.468	0.656	2.124
17.50	2.127	0.855	2.982
18.00	2.787	1.053	3.839

STAGE/STORAGE COMPUTATIONS

Lot 2 (Bee Safe Storage)

	Pavement	Open
Area (ac)	1.20	0.67
	L	L
Starting Elev (ft)	15.10	14.00
Ending Elev (ft)	17.00	16.50

Stage NAVD	Linear Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
14.00	0.000	0.000	0.000
14.50	0.000	0.034	0.034
15.00	0.000	0.135	0.135
15.50	0.050	0.303	0.353
16.00	0.255	0.538	0.794
16.50	0.617	0.841	1.459
17.00	1.137	1.178	2.315
17.50	1.735	1.514	3.249
18.00	2.333	1.851	4.184

STAGE/STORAGE COMPUTATIONS

Proposed Road

Pavement

Area (ac)	0.51
	L
Starting Elev (ft)	15.10
Ending Elev (ft)	16.50

Stage NAVD	Linear Storage ac-ft	Total Storage ac-ft
15.10	0.000	0.000
15.60	0.046	0.046
16.10	0.183	0.183
16.60	0.440	0.440
17.10	0.697	0.697
17.60	0.953	0.953
18.10	1.210	1.210
18.60	1.466	1.466
19.10	1.723	1.723

STAGE/STORAGE COMPUTATIONS

Existing Lake

	Exist. Lake Bank	Exist. Lake Bottom	Open
Area (ac)	0.19	0.89	0.42
	L	V	L
Starting Elev (ft)	12.00	12.00	14.00
Ending Elev (ft)	14.50		15.50

Stage NAVD	Linear Storage ac-ft	Vertical Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft	
12.00	0.000	0.000	0.000	0.000	
12.50	0.009	0.445	0.000	0.454	
13.00	0.037	0.890	0.000	0.927	**Wet Retention Provided for*
13.26	0.059	1.121	0.000	1.181	*WQ and Nutrient Calculations*
13.50	0.084	1.335	0.000	1.419	
14.00	0.149	1.780	0.000	1.929	**Wet Detention Provided for*
14.43	0.220	2.163	0.026	2.409	*WQ and Nutrient Calculations*
14.50	0.233	2.225	0.035	2.493	
15.00	0.326	2.670	0.140	3.136	
15.50	0.419	3.115	0.316	3.850	
16.00	0.513	3.560	0.526	4.598	
16.50	0.606	4.005	0.736	5.347	
17.00	0.699	4.450	0.947	6.095	
17.50	0.792	4.895	1.157	6.844	
18.00	0.885	5.340	1.367	7.592	

Wet Retention Provided = 1.18 ac-ft at Elev = 13.26 ft, NAVD

Wet Detention Provided = 1.23 ac-ft at Elev = 14.43 ft, NAVD

STAGE/STORAGE COMPUTATIONS

Dry Retention Area No. 1

	Dry Retention Bank	Dry Retention Bottom
Area (ac)	0.37	0.58
	L	V
Starting Elev (ft)	13.00	13.00
Ending Elev (ft)	16.00	

Stage NAVD	Linear Storage ac-ft	Vertical Storage ac-ft	Total Storage ac-ft	
13.00	0.000	0.000	0.000	
13.40	0.000	0.233	0.233	*Dry Retention Provided for WQ and Nutrient Calculations
13.50	0.015	0.291	0.307	
14.00	0.062	0.583	0.645	
14.25	0.097	0.729	0.825	*Dry Detention Provided for WQ Calculations
14.50	0.139	0.874	1.014	
15.00	0.248	1.166	1.413	
15.50	0.387	1.457	1.844	
16.00	0.558	1.748	2.306	
16.50	0.743	2.040	2.783	
17.00	0.929	2.331	3.261	
17.50	1.115	2.623	3.738	
18.00	1.301	2.914	4.215	

Dry Retention Provided = 0.23 ac-ft at Elev = 13.40 ft, NAVD

Dry Detention Provided = 0.59 ac-ft at Elev = 14.25 ft, NAVD

STAGE/STORAGE COMPUTATIONS

Dry Retention Area No. 2

	Dry Retention Bank	Dry Retention Bottom
Area (ac)	0.09	0.12
	L	V
Starting Elev (ft)	13.00	13.00
Ending Elev (ft)	16.00	

Stage NAVD	Linear Storage ac-ft	Vertical Storage ac-ft	Total Storage ac-ft	
13.00	0.000	0.000	0.000	
13.50	0.004	0.060	0.064	*Dry Retention Provided for WQ and Nutrient Calculations
14.00	0.015	0.121	0.136	
14.10	0.018	0.133	0.151	*Dry Detention Provided for WQ Calculations
14.50	0.034	0.181	0.215	
15.00	0.060	0.241	0.301	
15.50	0.094	0.301	0.395	
16.00	0.135	0.362	0.497	
16.50	0.180	0.422	0.602	
17.00	0.225	0.482	0.708	
17.50	0.271	0.543	0.813	
18.00	0.316	0.603	0.919	

Dry Retention Provided = 0.06 ac-ft at Elev = 13.50 ft, NAVD

Dry Detention Provided = 0.09 ac-ft at Elev = 14.10 ft, NAVD

STAGE/STORAGE COMPUTATIONS

Wetland Preserve Tract

	Wetland Buffer	Wetland	Open	
Area (ac)	1.13	0.90	0.64	
	L	V	L	
Starting Elev (ft)	12.00	12.00	14.00	
Ending Elev (ft)	14.00		16.25	

Stage NAVD	Linear Storage ac-ft	Vertical Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
12.00	0.000	0.000	0.000	0.000
12.50	0.071	0.449	0.000	0.520
13.00	0.283	0.898	0.000	1.182
13.50	0.637	1.347	0.000	1.985
14.00	1.133	1.797	0.000	2.930
14.50	1.700	2.246	0.035	3.981
15.00	2.267	2.695	0.142	5.103
15.50	2.833	3.144	0.319	6.296
16.00	3.400	3.593	0.566	7.559
16.50	3.967	4.042	0.885	8.894
17.00	4.533	4.492	1.203	10.228
17.50	5.100	4.941	1.522	11.562
18.00	5.667	5.390	1.840	12.897

STAGE/STORAGE COMPUTATIONS

Lot 3

	Pavement	Open
Area (ac)	1.78	0.54
	L	L
Starting Elev (ft)	15.10	14.00
Ending Elev (ft)	17.00	17.00

Stage NAVD	Linear Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
14.00	0.000	0.000	0.000
14.50	0.000	0.022	0.022
15.00	0.000	0.090	0.090
15.50	0.075	0.201	0.276
16.00	0.379	0.358	0.738
16.50	0.918	0.560	1.478
17.00	1.691	0.806	2.497
17.50	2.581	1.075	3.655
18.00	3.471	1.343	4.814

STAGE/STORAGE COMPUTATIONS

Lot 4

	Pavement	Open
Area (ac)	3.50	0.44
	L	L
Starting Elev (ft)	15.15	14.00
Ending Elev (ft)	17.00	17.00

Stage NAVD	Linear Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
14.00	0.000	0.000	0.000
14.50	0.000	0.018	0.018
15.00	0.000	0.073	0.073
15.50	0.116	0.165	0.281
16.00	0.683	0.293	0.976
16.50	1.722	0.458	2.180
17.00	3.234	0.660	3.894
17.50	4.982	0.880	5.862
18.00	6.730	1.100	7.830

STAGE/STORAGE COMPUTATIONS

Future Dry Retention Area for Lot 4

	Dry Retention Bank	Dry Retention Bottom
Area (ac)	0.21	0.45
	L	V
Starting Elev (ft)	13.00	13.00
Ending Elev (ft)	16.00	

Stage NAVD	Linear Storage ac-ft	Vertical Storage ac-ft	Total Storage ac-ft	
13.00	0.000	0.000	0.000	
13.40	0.006	0.179	0.185	**Dry Retention Provided for WQ and Nutrient Calculations*
13.50	0.009	0.224	0.233	
14.00	0.035	0.449	0.484	
14.25	0.055	0.561	0.616	**Dry Detention Provided for WQ Calculations*
14.50	0.079	0.673	0.752	
15.00	0.141	0.897	1.038	
15.50	0.220	1.122	1.342	
16.00	0.317	1.346	1.663	
16.50	0.422	1.570	1.993	
17.00	0.528	1.795	2.323	
17.50	0.633	2.019	2.653	
18.00	0.739	2.243	2.983	

Dry Retention Provided = 0.19 ac-ft at Elev = 13.40 ft, NAVD

Dry Detention Provided = 0.43 ac-ft at Elev = 14.25 ft, NAVD

WATER QUALITY CALCULATIONS

WATER QUALITY CALCULATIONS PER SFWMD

Criteria 1 = 1/2 inch of Runoff Over the Project Site:

Dry Pre-Treatment Volume:
(Does not include Wetland Preserve Tract or Non-Contributing Areas)

1/2 inch x 1-ft/12-in x 16.31 (Project Area (acres)) = 0.68 (Dry Pre-treatment Volume) ac-ft

Per SFWMD, Water Quality shall be provided to meet Critera 2 or 3, whichever is greater:
Criteria 2 = 1 inch of Runoff Over the Project Site:

WQ Treatment Volume:
(Does not include Wetland Preserve Tract or Non-Contributing Areas)

1 inch x 1-ft/12-in x 16.31 (Project Area (acres)) = 1.36 (WQ Treatment Volume) ac-ft

Criteria 3 = 2.5 Inches Times the Percent Impervious:

Site Area for WQ:
(Does not include Non-Contributing Areas)

18.97 (Project Area (acres)) - (0.89 (Lakes WSWT Area (acres)) + 2.67 (Wetlands (acres)) + 2.34 (Roofs (acres))) = 13.07 (Site Area for WQ) acres

Impervious Area for WQ:

13.07 (Site Area for WQ (acres)) - 4.48 (Pervious Area (acres)) = 8.59 (Impervious Area for WQ) acres

Percent Imperviousness for WQ:

Impervious Area for WQ / Site Area for WQ = 8.59 / 13.07 = 65.7%

2.5-in x % Impervious:

2.5 Inches x 65.7% (Percent Impervious) = 1.64 inches

Treated Volume:

1-ft/12-in x 1.64 (Inches to be Treated (inches)) x (18.97 (Project Area (acres)) - 0.89 (Lakes WSWT Area (acres)) - 2.67 (Wetlands (acres))) = 2.11 (Treated Volume) ac-ft

Controlling SFWMD Water Quality Volume = 2.11 ac-ft

150% Water Quality Volume Required for Discharge into an Impaired Water Body = 3.17 ac

WATER QUALITY CALCULATIONS

WATER QUALITY CALCULATIONS PER MARTIN COUNTY

Criteria = 3.0 Inches Times the Percent Impervious:

Site Area for WQ:
(Does not include Non-Contributing Areas)

18.97 (Project Area (acres)) - (0.89 (Lakes WSWT Area (acres)) + 2.67 (Wetlands (acres)) + 0.00 (Preserve (acres))) = 15.42 (Site Area for WQ) acres

Impervious Area for WQ:

15.42 (Site Area for WQ (acres)) - 4.48 (Pervious Area (acres)) = 10.94 (Impervious Area for WQ) acres

Percent Imperviousness for WQ:

Impervious Area for WQ / Site Area for WQ = 10.94 / 15.42 = 70.9%

3.0-in x % Impervious:

3.0 Inches x 70.9% (Percent Impervious) = 2.13 inches

Treated Volume:

1-ft/12-in x 2.13 (Inches to be Treated (inches)) x (18.97 (Project Area (acres)) - 0.89 (Lakes WSWT Area (acres)) - 2.67 (Wetlands (acres))) = 2.73 (Treated Volume) ac-ft

Required Martin County Water Quality Volume = 2.73 ac-ft

WATER QUALITY TREATMENT PROVIDED

WATER QUALITY PROVIDED TO MEET SFWMD CRITERIA

Dry Pretreatment Required	=	0.68 Ac-ft
Dry Retention Provided	=	0.48 Ac-ft
Dry Detention Provided	=	1.11 Ac-ft
Remaining Dry Pre-Treatment Volume Required	=	0.00 Ac-ft
Total Water Quality Required	=	3.17 Ac-ft
Dry Retention WQ Volume Provided	=	0.48 Ac-ft
Dry Retention WQ Credit	=	100%
Dry Retention WQ Volume Credit	=	0.48 Ac-ft
Remaining Water Quality Volume Required	=	2.68 Ac-ft
Dry Detention WQ Volume Provided	=	1.11 Ac-ft
Dry Detention WQ Credit	=	100%
Dry Detention WQ Volume Credit	=	1.11 Ac-ft
Remaining Water Quality Volume Required	=	1.57 Ac-ft
Wet Retention WQ Volume Provided	=	1.18 Ac-ft
Wet Retention WQ Credit	=	100%
Wet Retention WQ Volume Credit	=	1.18 Ac-ft
Remaining Water Quality Volume Required	=	0.39 Ac-ft
Wet Detention WQ Volume Provided	=	1.23 Ac-ft
Wet Detention WQ Credit	=	100%
Wet Detention WQ Volume Credit	=	1.23 Ac-ft
Remaining Water Quality Volume Required	=	0.00 Ac-ft

The total Water Quality Volume to meet SFWMD Criteria has been provided.

WATER QUALITY TREATMENT PROVIDED

WATER QUALITY PROVIDED TO MEET MARTIN COUNTY CRITERIA

Total Water Quality Required	=	2.73 Ac-ft
Dry Retention WQ Volume Provided	=	0.48 Ac-ft
Martin County Dry Retention WQ Credit	=	100%
Dry Retention WQ Volume Credit	=	0.48 Ac-ft
Remaining Water Quality Volume Required	=	2.25 Ac-ft
Dry Detention WQ Volume Provided	=	1.11 Ac-ft
Martin County Dry Detention WQ Credit	=	75%
Dry Detention WQ Credit	=	0.83 Ac-ft
Remaining Water Quality Volume Required	=	1.42 Ac-ft
Wet Retention WQ Volume Provided	=	1.18 Ac-ft
Martin County Wet Retention WQ Credit	=	100%
Wet Retention WQ Volume Credit	=	1.18 Ac-ft
Remaining Water Quality Volume Required	=	0.24 Ac-ft
Total Wet Detention Volume Provided	=	1.23 Ac-ft
Martin County Wet Detention WQ Credit	=	50%
Wet Detention WQ Credit	=	0.61 Ac-ft
Remaining Water Quality Volume Required	=	0.00 Ac-ft

The total Water Quality Volume to meet Martin County Criteria has been provided.

PERMANENT POOL CALCULATIONS

Post-Development Existing Lake

	EL -4.0	EL 0.0	EL 0.0	EL 4.0	EL 4.0	EL 8.0	EL 8.0	NWL 12.0
Area (ac)	0.08	0.26	0.26	0.45	0.45	0.65	0.65	0.89
	V	L	V	L	V	L	V	L
ing Elev (ft)	-4.00	-4.00	0.00	0.00	4.00	4.00	8.00	8.00
ing Elev (ft)	0.00	0.00	4.00	4.00	8.00	8.00	12.00	12.00

Stage NAVD	Vertical Storage ac-ft	Linear Storage ac-ft	Linear Storage ac-ft	Vertical Storage ac-ft	Vertical Storage ac-ft	Linear Storage ac-ft	Vertical Storage ac-ft	Linear Storage ac-ft	Total Storage ac-ft
-4.00	0.00	0.00							0.00
-3.00	0.08	0.03							0.11
-2.00	0.15	0.13							0.28
-1.00	0.23	0.29							0.52
0.00	0.31	0.51	0.00	0.00					0.82
1.00			0.26	0.06					0.31
2.00			0.51	0.22					0.74
3.00			0.77	0.50					1.27
4.00			1.03	0.89	0.00	0.00			1.92
5.00					0.45	0.08			0.53
6.00					0.89	0.32			1.22
7.00					1.34	0.73			2.07
8.00					1.78	1.30	0.00	0.00	3.08
9.00							0.65	0.11	0.76
10.00							1.30	0.44	1.74
11.00							1.95	1.00	2.95
12.00							2.60	1.78	4.38

Total Permanent Pool Volume = 10.199 ac-ft

NUTRIENT CALCULATIONS

GENERAL INFORMATION

Meteorological Zone = 5 *(Figure 4-3 and Table 4-23)*
Mean Annual Rainfall = 57 in/year *(Figure 3-2)*

FORMULAS

Total Annual Runoff Volume (ac-ft/yr) = C Value x Mean Annual Rainfall (in/yr) x Area (acres) x 1 ft/12 in
Annual Pollutant Load (EMC) = Total Annual Runoff Volume x Pre-Load
Treatment Train Efficiency = $Eff_{TOT} = Eff_1 + (1 - Eff_1) \times Eff_2$

PRE-DEVELOPMENT CONDITIONS

Land Use

Site-Pre (Total)	=	20.28	acres	(On-site Area)
Existing Office/Entrance	=	1.90	acres	*(Existing Phase 1 Development)*
Wetland Preserve Tract	=	2.03	acres	*(Wetland & Buffer Area)*
Upland preserve Tract	=	0.76	acres	*(Non contributing area)*
Existing Lake Area 1	=	0.29	acres	*(Existing Lake Area to be filled)*
Existing Lake Area 2	=	0.89	acres	*(Existing Lake Area to remain)*
Total Contributing Site (Pre)	=	14.41	acres	*(On-Site Contributing Area)*
DCIA %	=	8.2%	(***)	

Ground Cover and Soil Type

Site-Pre = Und - Scrubby Flatwoods
HSG = B
Non-DCIA CN = 74
Annual C Value = 0.172 *(App C: Using Meteorological Zone, CN & DCIA values)*

Total Annual Pre-Development Runoff Volume

Total Annual Runoff Volume (ac-ft/yr) = C Value x Mean Annual Rainfall (in/yr) x Area (acres) x 1 ft/12 in

$$= 0.172 \times \frac{57 \text{ in}}{\text{yr}} \times 14.41 \text{ ac} \times \frac{1 \text{ ft}}{12 \text{ in}} = 11.757 \text{ ac-ft/yr}$$

NUTRIENT CALCULATIONS

Annual Pre-Development Loadings

TN Pre-Load = 1.155 mg/L *(BMP 2020)*
TP Pre-Load = 0.027 mg/L *(BMP 2020)*

Total Nitrogen Pre-Load = Total Annual Runoff Volume (ac-ft/yr) x TN Pre-Load (mg/L)

$$= \frac{11.757\ \text{ac-ft}}{\text{yr}} \times \frac{1.155\ \text{mg}}{\text{L}} \times \frac{43560\ \text{ft}^2}{\text{ac}} \times \frac{7.48\ \text{gal}}{\text{ft}^3} \times \frac{3.785\ \text{L}}{\text{gal}} \times \frac{1\ \text{kg}}{1\text{E+}06\ \text{mg}}$$

TN Pre-Load = 16.747 kg/yr

Total Phosphorus Pre-Load = Total Annual Runoff Volume (ac-ft/yr) x TP Pre-Load (mg/L)

$$= \frac{11.757\ \text{ac-ft}}{\text{yr}} \times \frac{0.027\ \text{mg}}{\text{L}} \times \frac{43560\ \text{ft}^2}{\text{ac}} \times \frac{7.48\ \text{gal}}{\text{ft}^3} \times \frac{3.785\ \text{L}}{\text{gal}} \times \frac{1\ \text{kg}}{1\text{E+}06\ \text{mg}}$$

TP Pre-Load = 0.391 kg/yr

NUTRIENT CALCULATIONS

POST DEVELOPMENT CONDITIONS

Land Use

Site-Pre (Total)	=	20.28	acres	(On-site Area)
Existing Office/Entrence	=	1.90	acres	*(Existing Phase 1 Development)*
Wetland Preserve Tract	=	2.03	acres	*(Wetland & Buffer Area)*
Upland Preserve Tract	=	0.76	acres	*(Non contributing Preserve area)*
Site Post Lake Area	=	0.89	acres	*(Existing Lake Area)*
Total Contributing Site (Post)	=	14.70	acres	*(On-Site Contributing Area)*
DCIA %	=	90%		

Ground Cover and Soil Type

Site-Pre	=	Low-intensity Commercial
HSG	=	B
Non-DCIA CN	=	74
Annual C Value	=	0.739 *(App C: Using Meteorological Zone, CN & DCIA values)*

Total Annual Post-Development Runoff Volume

Total Annual Runoff Volume (ac-ft/yr) = C Value x Mean Annual Rainfall (in/yr) x Area (acres) x 1 ft/12 in

$$= 0.7386 \times \frac{57 \text{ in}}{\text{yr}} \times 14.70 \text{ ac} \times \frac{1 \text{ ft}}{12 \text{ in}}$$

$$= 51.568 \text{ ac-ft/yr}$$

Annual Post-Development Loadings

TN Post-Load	=	1.18 mg/L	*(Table 4-17)*
TP Post-Load	=	0.179 mg/L	*(Table 4-17)*

Total Nitrogen Post-Load = Total Annual Runoff Volume (ac-ft/yr) x TN Pre-Load (mg/L)

$$= \frac{51.568 \text{ ac-ft}}{\text{yr}} \times \frac{1.180 \text{ mg}}{\text{L}} \times \frac{43560 \text{ ft}^2}{\text{ac}} \times \frac{7.48 \text{ gal}}{\text{ft}^3} \times \frac{3.785 \text{ L}}{\text{gal}} \times \frac{1 \text{ kg}}{1E+06 \text{ mg}}$$

TN Post-Load = 75.045 kg/yr

Total Phosphorus Post-Load = Total Annual Runoff Volume (ac-ft/yr) x TP Pre-Load (mg/L)

$$= \frac{51.568 \text{ ac-ft}}{\text{yr}} \times \frac{0.179 \text{ mg}}{\text{L}} \times \frac{43560 \text{ ft}^2}{\text{ac}} \times \frac{7.48 \text{ gal}}{\text{ft}^3} \times \frac{3.785 \text{ L}}{\text{gal}} \times \frac{1 \text{ kg}}{1E+06 \text{ mg}}$$

TP Post-Load = 11.384 kg/yr

NUTRIENT CALCULATIONS

TOTAL REQUIRED TREATMENT EFFICIENCY

Note that the required nutrient removal efficiency is based on "net improvement", with a maximum requirement of 90%.

Target Load Reduction, N = 77.7% → Max N Post Load = 16.75 kg/yr, Mass N Reduction = 58.30 kg/yr
Target Load Reduction, P = 90.0% → Max P Post Load = 1.14 kg/yr, Mass P Reduction = 10.25 kg/yr

ESTIMATE REQUIRED RETENTION DEPTH FOR THE SITE

Using the post-development information *(App D: Using Meteorological Zone, CN & DCIA values):*

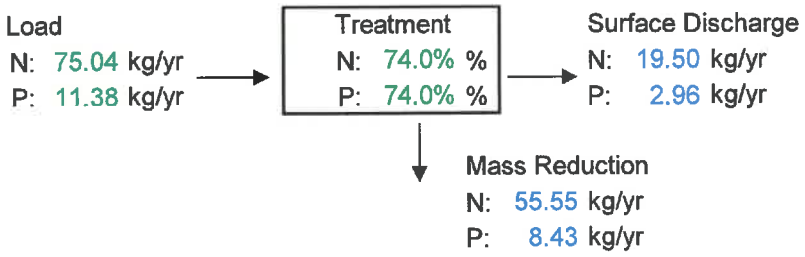
DCIA % = 90%
Non-DCIA CN = 74
Retention Depth = 2.50 inches at 88.7% % removal efficiency
Retention Depth = 2.75 inches at 90.4% % removal efficiency
Required Retention Depth = 2.69 inches at 90.0% % removal efficiency
= 3.29 ac-ft of retention needed

CONTRIBUTING BMPs

Retention

Wet Retention = 1.181 ac-ft *(At Control Elevation)*
Dry Retention Area No. 1 = 0.233 ac-ft *(At Control Elevation)*
Dry Retention Area No. 2 = 0.064 ac-ft *(At Control Elevation)*
Future Dry Ret for Lot 4 = 0.185 ac-ft *(At Control Elevation)*

Total Site Retention = 1.663 ac-ft = 1.36 inches of retention over the site
Retention Depth = 1.25 inches at 71.7% % removal efficiency *(App D: Using Meteorological Zone, CN & DCIA values)*
Retention Depth = 1.50 inches at 77.0% % removal efficiency *(App D: Using Meteorological Zone, CN & DCIA values)*
Required Retention Depth = 1.36 inches at 74.0% % removal efficiency *(Eff_1)*



NUTRIENT CALCULATIONS

Wet Retention Pond

PPV = 10.20 ac-ft
RO = 51.57 ac-ft/yr

$$\text{Detention Time (Td)} = \frac{\text{PPV}}{\text{RO}} \times \frac{365 \text{ days}}{1 \text{ year}} = \frac{10.20}{51.57} \times \frac{365}{1} = 72.19 \text{ days}$$

$$\text{\% Removal N} = \frac{43.75 \times \text{Td}}{(4.38 + \text{Td})} = \left(\frac{43.75}{4.38 + 72.19} \times 72.19\right) = 41.2 \%$$

$$\text{\% Removal P} = 40.13 + 6.372 \times \ln(\text{Td}) + 0.213 \times (\ln(\text{Td}))^2$$

$$= 40.13 + 6.372 \times \ln(72.19) + 0.213 \times \ln(72.19)^2 = 71.3 \%$$

TN Eff = 41.2% % Removal (Eff_{2N})
TP Eff = 71.3% % Removal (Eff_{2P})

Load
N: 19.50 kg/yr
P: 2.96 kg/yr

→ Treatment
N: 41.2% %
P: 71.3% %

→ Surface Discharge
N: 11.45 kg/yr
P: 0.85 kg/yr

↓ Mass Reduction
N: 8.04 kg/yr
P: 2.11 kg/yr

Treatment Train Efficiency

$$\text{N Eff}_{TOT} = \text{Eff}_1 + (1 - \text{Eff}_1) \times \text{Eff}_{2N}$$

$$= \frac{74.0\%}{100} + \left(1 - \frac{74.0\%}{100}\right) \times \frac{41.2\%}{100}$$

N Eff_{TOT} = 84.7 %

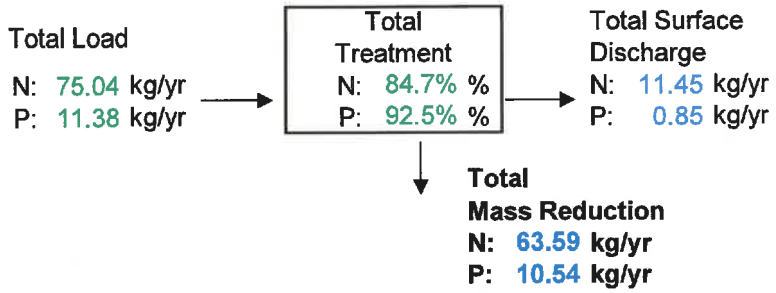
$$\text{P Eff}_{TOT} = \text{Eff}_1 + (1 - \text{Eff}_1) \times \text{Eff}_{2P}$$

$$= \frac{74.0\%}{100} + \left(1 - \frac{74.0\%}{100}\right) \times \frac{71.3\%}{100}$$

P Eff_{TOT} = 92.5 %

NUTRIENT CALCULATIONS

LOAD FOR MULTIPLE BMPs IN SERIES



RESULTS SUMMARY

Item	Nitrogen	Phosphorus	
Target Efficiency	77.7%	90.0%	
Overall Provided Treatment Efficiency	**84.7%**	**92.5%**	***EFFICIENCY REQUIREMENTS MET***
Target Load Reduction	58.30 kg/yr	10.25 kg/yr	
Mass Reduction Provided	**63.59 kg/yr**	**10.54 kg/yr**	***LOAD REDUCTIONS MET***

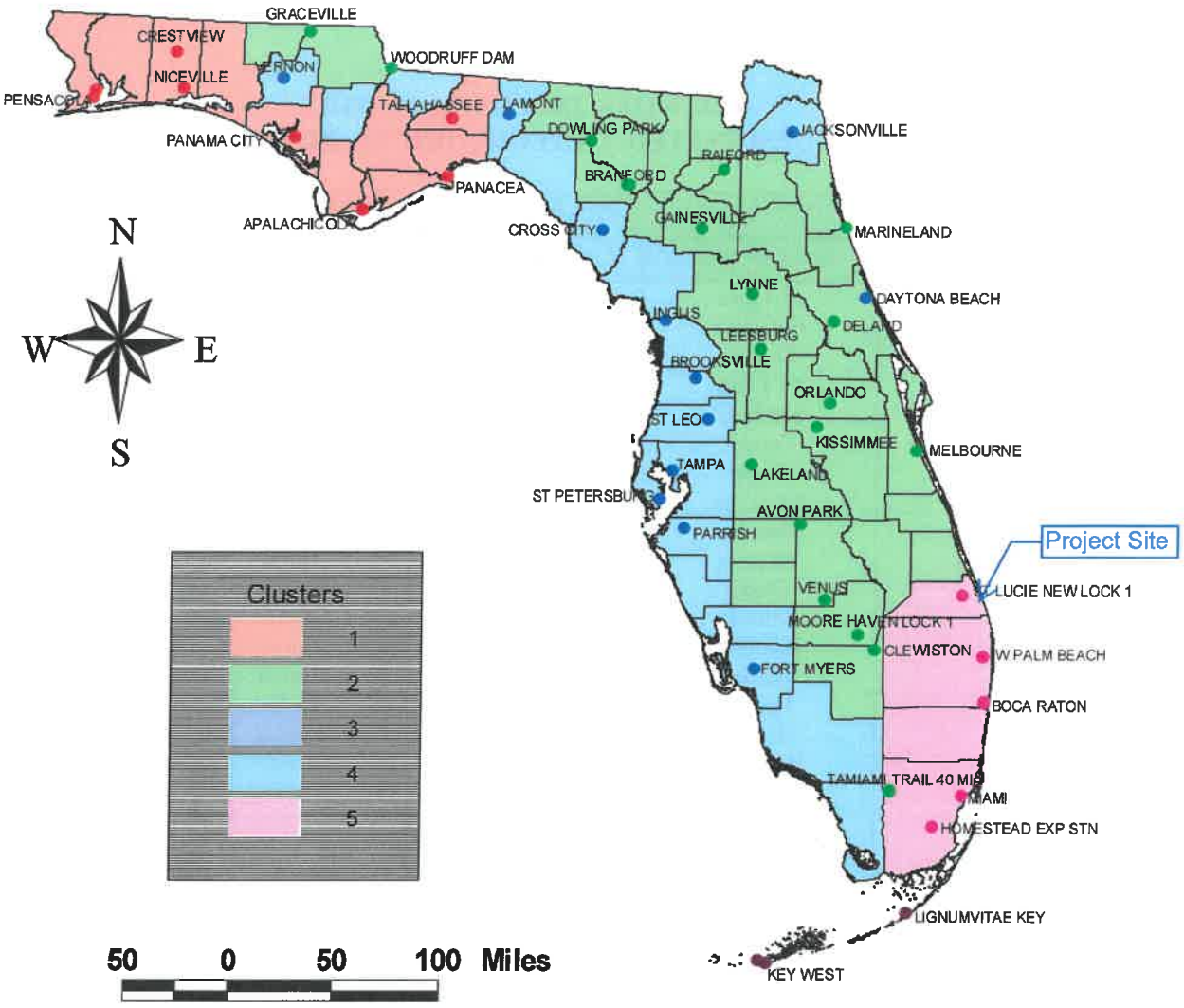


Figure 4-3. Meteorological Zones Identified Using Cluster Analysis.

Unfortunately, not all counties in Florida have long-term meteorological monitoring sites with hourly data. For purposes of designating meteorological zones, counties without a monitoring site were grouped according to the meteorological characteristics of adjacent counties with monitoring sites. The resulting zones appear to be relatively intuitive with respect to meteorological processes. The cluster groupings only have two apparent outliers, Daytona Beach and Tamiami Trail, which appear out of place. However, in a data set containing 45 points, an analysis conducted at a 95% probability level would be expected to have approximately 2-3 outlier values. A listing of counties included in each meteorological zone is given in Table 4-23.

TABLE 4-23

COUNTIES INCLUDED IN THE DESIGNATED METEORLOGICAL ZONES

ZONE				
1	2	3	4	5
Okaloosa	St. Lucie	Monroe	Washington	Martin
Liberty	Columbia		Manatee	Broward
Bay	DeSoto		Levy	Miami-Dade
Wakulla	St. Johns		Pasco	Palm Beach
Leon	Seminole		Pinellas	
Santarosa	Sumter		Lee	
Gulf	Flagler		Hillsborough	
Franklin	Suwannee		Hernando	
Escambia	Gadsden		Sarasota	
Walton	Gilchrist		Duval	
	Glades		Dixie	
	Calhoun		Collier	
	Hamilton		Citrus	
	Hardee		Charlotte	
	Hendry		Taylor	
	Union		Nassau	
	Highlands		Jefferson	
	Putnam		Monroe	
	Holmes			
	Indian River			
	Jackson			
	Volusia			
	Lafayette			
	Lake			
	Polk			
	Brevard			
	Bradford			
	Baker			
	Madison			
	Osceola			
	Marion			
	Orange			
	Clay			
	Okeechobee			
	Alachua			

A summary of mean runoff coefficients for each cluster as a function of land use and hydrologic soil group is given in Table 4-24. The values summarized in this table reflect the mean runoff coefficients for each land use and hydrologic soil group and each meteorological monitoring site included in each of the five clusters. The values summarized in Table 4-24 reflect differences in runoff coefficients as a result of frequency distributions of common rain events only. This analysis does not include variability in rainfall depth throughout the State which must be multiplied times the mean runoff coefficients to obtain an estimate of annual runoff volume.

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Reference from Harper 2007 Report

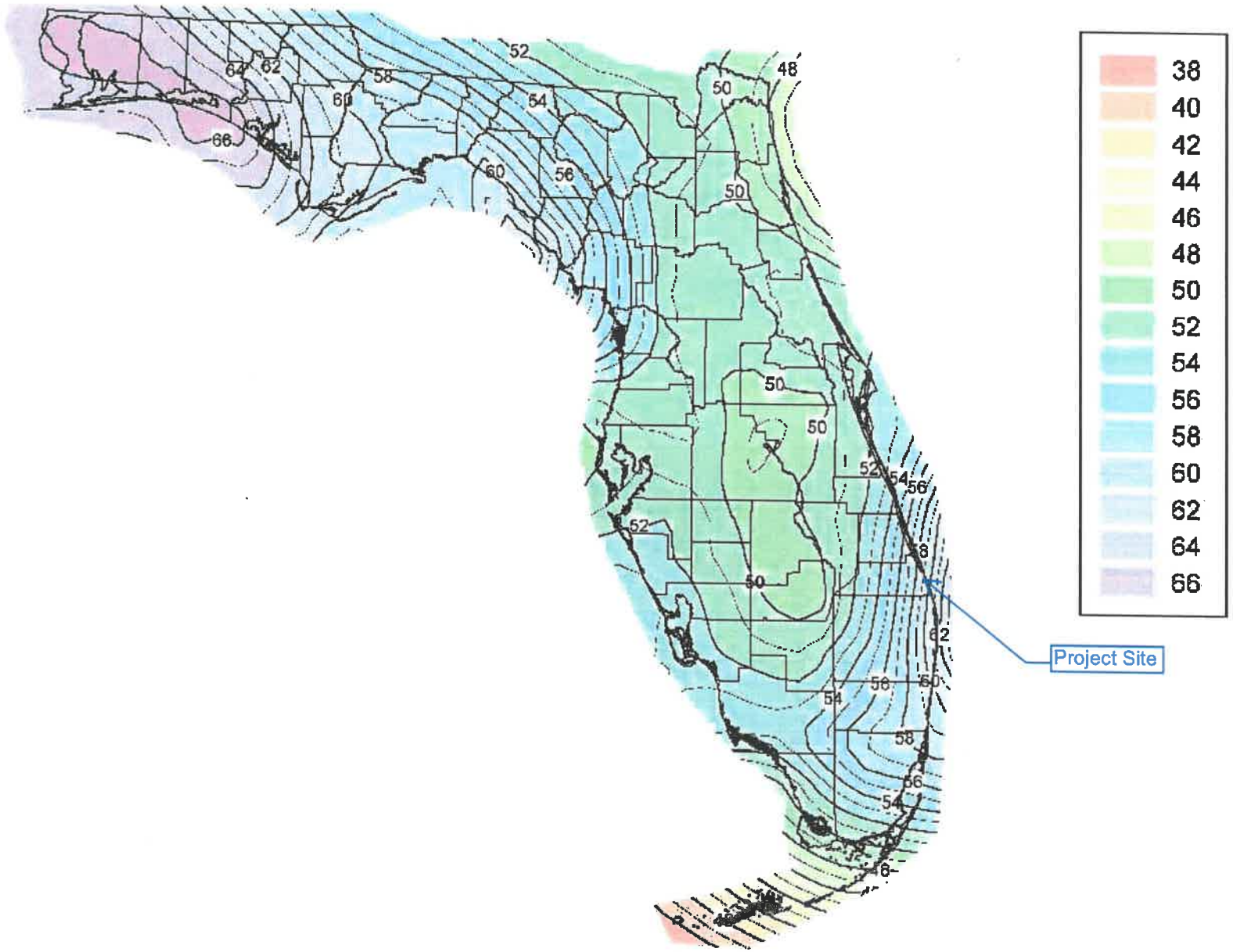


Figure 3-2. Isopleths of Mean Annual Precipitation in Florida from 1971-2000.

Reference from Harper 2007 Report, Appendix C

Zone 5

Mean Annual Runoff Coefficients (C Values) as a Function of DCIA Percentage and Non-DCIA Curve Number (CN)

NDCIA CN	Percent DCIA																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	0.008	0.048	0.088	0.128	0.168	0.208	0.248	0.288	0.328	0.368	0.408	0.448	0.488	0.528	0.568	0.608	0.648	0.688	0.728	0.768	0.808
35	0.012	0.052	0.092	0.132	0.171	0.211	0.251	0.291	0.331	0.370	0.410	0.450	0.490	0.529	0.569	0.609	0.649	0.689	0.728	0.768	0.808
40	0.018	0.057	0.097	0.136	0.176	0.215	0.255	0.294	0.334	0.373	0.413	0.452	0.492	0.531	0.571	0.611	0.650	0.690	0.729	0.769	0.808
45	0.025	0.064	0.103	0.142	0.182	0.221	0.260	0.299	0.338	0.377	0.417	0.456	0.495	0.534	0.573	0.612	0.651	0.691	0.730	0.769	0.808
50	0.034	0.072	0.111	0.150	0.189	0.227	0.266	0.305	0.343	0.382	0.421	0.460	0.498	0.537	0.576	0.614	0.653	0.692	0.731	0.769	0.808
55	0.044	0.082	0.121	0.159	0.197	0.235	0.273	0.312	0.350	0.388	0.426	0.464	0.502	0.541	0.579	0.617	0.655	0.693	0.732	0.770	0.808
60	0.057	0.095	0.132	0.170	0.207	0.245	0.282	0.320	0.357	0.395	0.433	0.470	0.508	0.545	0.583	0.620	0.658	0.695	0.733	0.770	0.808
65	0.073	0.110	0.147	0.183	0.220	0.257	0.294	0.330	0.367	0.404	0.441	0.477	0.514	0.551	0.588	0.624	0.661	0.698	0.735	0.771	0.808
70	0.093	0.129	0.165	0.201	0.236	0.272	0.308	0.344	0.379	0.415	0.451	0.486	0.522	0.558	0.594	0.629	0.665	0.701	0.737	0.772	0.808
75	0.120	0.155	0.189	0.223	0.258	0.292	0.327	0.361	0.395	0.430	0.464	0.498	0.533	0.567	0.602	0.636	0.670	0.705	0.739	0.774	0.808
80	0.157	0.189	0.222	0.254	0.287	0.319	0.352	0.385	0.417	0.450	0.482	0.515	0.547	0.580	0.613	0.645	0.678	0.710	0.743	0.775	0.808
85	0.209	0.239	0.269	0.299	0.329	0.359	0.389	0.419	0.449	0.479	0.509	0.538	0.568	0.598	0.628	0.658	0.688	0.718	0.748	0.778	0.808
90	0.292	0.318	0.343	0.369	0.395	0.421	0.447	0.472	0.498	0.524	0.550	0.576	0.602	0.627	0.653	0.679	0.705	0.731	0.756	0.782	0.808
95	0.445	0.464	0.482	0.500	0.518	0.536	0.554	0.572	0.590	0.609	0.627	0.645	0.663	0.681	0.699	0.717	0.736	0.754	0.772	0.790	0.808
98	0.614	0.624	0.633	0.643	0.653	0.662	0.672	0.682	0.692	0.701	0.711	0.721	0.730	0.740	0.750	0.760	0.769	0.779	0.789	0.798	0.808

MASS LOADING METHODOLOGY:

What is mass loading?

Mass loading is the product of concentration and runoff volume. The typical measurement units used are kilograms per year or pounds per year. The typical units for concentration are milligrams per liter. Runoff volume is yearly average and expressed usually in acre-feet or million gallons. Mass Loading is calculated as an average annual loading, thus average annual runoff and average annual concentrations are used.

How is mass loading calculated?

Average annual loading is calculated as the product of the average Event Mean Concentration (EMC) and the average annual runoff. The EMC will vary with the land use. The average annual runoff varies with the average annual rainfall and the land use characteristics. The land use characteristics are defined by the directly connected impervious area (DCIA) and the rainfall excess from the non-directly connected impervious area. The non-directly connected impervious area (NDCIA) is defined by the composite curve number (CCN) for that area. The curve number (CN) for each NDCIA is weighted by the annual runoff to calculate the CCN.

The annual runoff calculations are based on long term simulations (greater than 25 years) using the DCIA and the CCN for the NDCIAs. These have been reported for 5 meteorological areas (defined by common rainfall inter event dry periods) as shown in support data files on this worksheet. One-hundred Sixty (160) rainfall stations (111 in the state) were used to generate annual runoff for stated land use conditions. Tables for the percentage of runoff for combinations of the CN for NDCIA and DCIA were developed and reported by Harper and Baker (2007), Evaluation of Current Stormwater Design Criteria within the State of Florida, Final Report submitted to the Florida Department of Environmental Protection (FDEP) for Agreement SO108. Another source of information is found in a draft rule developed by a FDEP task force and published in 2010. Both of these publications are reproduced here as Harper Methodology and Draft Rule.

How is average annual runoff calculated?

The annual runoff is the fraction of rainfall resulting from all storm events during the simulation years divided by the number of years. This is expressed in units of inches over the catchment. In more familiar units of measurement, inches is multiplied by the catchment area (acres) and divided by 12 inches per foot to express the average annual runoff in units of acre-feet.

The average annual runoff coefficients (fraction of rainfall) are viewed using the support data found on the "watershed characteristics page, adjacent to the Annual C printout data. When the CN and the DCIA are not in 5 unit increments, a linear interpolation method is used to calculate the value. The average annual runoff is calculated from each rational C table by a "look up" method. An example of average annual runoff fractions for a meteorological region is:

Rational C Values for Florida Zone 1

	Percent Directly Connected Impervious Area																				
NDCIA	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	0.006	0.048	0.090	0.132	0.175	0.217	0.259	0.301	0.343	0.386	0.428	0.470	0.512	0.554	0.596	0.639	0.681	0.723	0.765	0.807	0.849
35	0.009	0.051	0.093	0.135	0.177	0.219	0.261	0.303	0.345	0.387	0.429	0.471	0.513	0.555	0.597	0.639	0.681	0.723	0.765	0.807	0.849
40	0.014	0.056	0.098	0.139	0.181	0.223	0.265	0.307	0.348	0.390	0.432	0.474	0.515	0.557	0.599	0.641	0.682	0.724	0.766	0.808	0.849
45	0.020	0.062	0.103	0.145	0.186	0.228	0.269	0.311	0.352	0.394	0.435	0.476	0.518	0.559	0.601	0.642	0.684	0.725	0.767	0.808	0.849
50	0.029	0.070	0.111	0.152	0.193	0.234	0.275	0.316	0.357	0.398	0.439	0.480	0.521	0.562	0.603	0.644	0.685	0.726	0.767	0.808	0.849
55	0.039	0.079	0.120	0.161	0.201	0.242	0.282	0.323	0.363	0.404	0.444	0.485	0.525	0.566	0.606	0.647	0.687	0.728	0.768	0.809	0.849
60	0.052	0.092	0.132	0.172	0.212	0.252	0.291	0.331	0.371	0.411	0.451	0.491	0.531	0.570	0.610	0.650	0.690	0.730	0.770	0.810	0.849
65	0.069	0.108	0.147	0.186	0.225	0.264	0.303	0.342	0.381	0.420	0.459	0.498	0.537	0.576	0.615	0.654	0.693	0.732	0.771	0.810	0.849
70	0.092	0.130	0.167	0.205	0.243	0.281	0.319	0.357	0.395	0.433	0.471	0.508	0.546	0.584	0.622	0.660	0.698	0.736	0.774	0.812	0.849
75	0.121	0.158	0.194	0.230	0.267	0.303	0.340	0.376	0.412	0.449	0.485	0.522	0.558	0.595	0.631	0.667	0.704	0.740	0.777	0.813	0.849
80	0.162	0.196	0.230	0.265	0.299	0.334	0.368	0.402	0.437	0.471	0.506	0.540	0.574	0.609	0.643	0.678	0.712	0.746	0.781	0.815	0.849
85	0.220	0.252	0.283	0.315	0.346	0.378	0.409	0.441	0.472	0.503	0.535	0.566	0.598	0.629	0.661	0.692	0.724	0.755	0.787	0.818	0.849
90	0.312	0.339	0.366	0.393	0.419	0.446	0.473	0.500	0.527	0.554	0.581	0.608	0.634	0.661	0.688	0.715	0.742	0.769	0.796	0.823	0.849
95	0.478	0.496	0.515	0.533	0.552	0.571	0.589	0.608	0.626	0.645	0.664	0.682	0.701	0.719	0.738	0.757	0.775	0.794	0.812	0.831	0.849
98	0.656	0.666	0.676	0.685	0.695	0.705	0.714	0.724	0.734	0.743	0.753	0.763	0.772	0.782	0.792	0.801	0.811	0.821	0.830	0.840	0.849

What are Event Mean Concentration (EMC) data?

EMCs are available for each land use and they are found in support information and are listed once a land use is picked. Also a user defined value is permitted. An example of the EMCs are:

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 RESIDENTIAL	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)	User input	User input
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

TABLE 4-17

SUMMARY OF LITERATURE-BASED RUNOFF CHARACTERIZATION DATA FOR GENERAL LAND USE CATEGORIES IN FLORIDA

LAND USE CATEGORY	TYPICAL RUNOFF CONCENTRATION (mg/l)						
	TOTAL N	TOTAL P	BOD	TSS	COPPER	LEAD	ZINC
Low-Density Residential[1]	1.61	0.191	4.7	23.0	0.008[4]	0.002[4]	0.031[4]
Single-Family	2.07	0.327	7.9	37.5	0.016	0.004	0.062
Multi-Family	2.32	0.520	11.3	77.8	0.009	0.006	0.086
Low-Intensity Commercial	1.18	0.179	7.7	57.5	0.018	0.005	0.094
High-Intensity Commercial	2.40	0.345	11.3	69.7	0.015	--	0.160
Light Industrial	1.20	0.260	7.6	60.0	0.003	0.002	0.057
Highway	1.64	0.220	5.2	37.3	0.032	0.011	0.126
Agricultural							
Pasture	3.47	0.616	5.1	94.3	--	--	--
Citrus	2.24	0.183	2.55	15.5	0.003	0.001	0.012
Row Crops	2.65	0.593	--	19.8	0.022	0.004	0.030
General Agriculture[2]	2.79	0.431	3.8	43.2	0.013	0.003	0.021
Undeveloped / Rangeland / Forest	1.15	0.055	1.4	8.4	--	--	--
Mining / Extractive	1.18	0.15	7.6[3]	60.0[3]	0.003[3]	0.002[3]	0.057[3]

1. Average of single-family and undeveloped loading rates
2. Mean of pasture, citrus, and row crop land uses
3. Runoff concentrations assumed equal to industrial values for these parameters
4. Value assumed to be equal to 50% of single-family concentration

The mean runoff characteristics summarized in Table 4-17 are recommended for use in general runoff characterization and loading studies within the State of Florida. However, in areas where more site-specific runoff characterization information is available, the site-specific data should be used instead of the generalized data summarized in Table 4-17.

Several assumptions were made in assigning runoff concentrations to provide a more complete database for the general land use categories. First, runoff characterization data was not available for copper, lead, or zinc in low-density residential land uses in the literature. Therefore, to provide estimates of runoff characteristics for these parameters, typical concentrations of copper, lead, and zinc in low-density residential areas are assumed to be equal to 50% of the mean values listed for single-family residential. Heavy metal concentrations were also not available for copper, lead, or zinc for mining/extractive land uses. As a result, runoff concentrations for these parameters in mining/extractive areas are assumed to be similar to concentrations observed in industrial areas. Pollutant contributions from mining activities are generated primarily from the movement of trucks and automobiles along access roads into and out of the site, as well as parking lots and garages. These activities are very similar to those occurring in industrial areas.

Reference from Harper 2007 Report, Appendix D

Mean Annual Mass Removal Efficiencies for 1.25-inches of Retention for Zone 5

NDCIA	Percent DCIA																			
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	95.1	96.1	96.0	95.4	94.5	93.3	91.9	90.4	88.7	86.9	85.1	83.3	81.5	79.7	77.8	76.1	74.4	72.7	71.1	69.5
35	92.3	94.2	94.5	94.2	93.4	92.4	91.1	89.7	88.2	86.5	84.8	83.0	81.2	79.5	77.7	76.0	74.3	72.6	71.1	69.5
40	89.3	92.0	92.8	92.8	92.2	91.3	90.2	88.9	87.5	85.9	84.3	82.6	80.9	79.2	77.5	75.8	74.2	72.6	71.0	69.5
45	86.5	89.8	90.9	91.2	90.9	90.1	89.2	88.0	86.7	85.3	83.8	82.2	80.6	78.9	77.3	75.7	74.1	72.5	71.0	69.5
50	83.8	87.5	88.9	89.5	89.3	88.8	88.0	87.0	85.8	84.5	83.1	81.7	80.2	78.6	77.0	75.5	73.9	72.4	71.0	69.5
55	81.2	85.1	86.8	87.5	87.5	87.2	86.6	85.8	84.8	83.7	82.4	81.1	79.7	78.2	76.7	75.3	73.8	72.3	70.9	69.5
60	78.6	82.7	84.6	85.4	85.6	85.5	85.1	84.5	83.7	82.7	81.6	80.4	79.1	77.8	76.4	75.0	73.6	72.2	70.9	69.5
65	76.4	80.3	82.2	83.1	83.6	83.7	83.5	83.1	82.4	81.6	80.7	79.6	78.5	77.2	76.0	74.7	73.4	72.1	70.8	69.5
70	74.3	77.7	79.7	80.8	81.5	81.7	81.7	81.4	80.9	80.3	79.5	78.7	77.7	76.6	75.4	74.3	73.1	71.9	70.7	69.5
75	72.4	75.4	77.3	78.5	79.2	79.6	79.7	79.6	79.3	78.8	78.2	77.5	76.7	75.8	74.8	73.8	72.7	71.7	70.6	69.5
80	70.8	73.3	75.1	76.2	76.9	77.4	77.6	77.6	77.4	77.1	76.7	76.2	75.5	74.8	74.0	73.2	72.3	71.4	70.5	69.5
85	69.8	71.6	72.9	73.9	74.6	75.0	75.3	75.4	75.4	75.2	75.0	74.6	74.1	73.6	73.0	72.4	71.7	71.0	70.3	69.5
90	69.2	70.3	71.1	71.8	72.3	72.6	72.9	73.0	73.1	73.1	72.9	72.7	72.5	72.2	71.8	71.4	71.0	70.5	70.0	69.5
95	68.9	69.3	69.7	70.0	70.2	70.4	70.5	70.6	70.7	70.7	70.7	70.7	70.6	70.5	70.4	70.3	70.1	69.9	69.7	69.5
98	69.4	69.5	69.6	69.6	69.7	69.7	69.8	69.8	69.8	69.8	69.8	69.8	69.8	69.8	69.7	69.7	69.7	69.6	69.6	69.5

Mean Annual Mass Removal Efficiencies for 1.50-inches of Retention for Zone 5

NDCIA	Percent DCIA																			
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	96.3	97.1	97.0	96.5	95.9	95.0	93.9	92.8	91.5	90.2	88.7	87.2	85.7	84.1	82.6	81.1	79.5	78.0	76.5	75.1
35	93.9	95.4	95.6	95.4	95.0	94.2	93.2	92.2	91.0	89.7	88.3	86.9	85.4	83.9	82.4	81.0	79.5	78.0	76.5	75.1
40	91.3	93.5	94.1	94.2	93.9	93.3	92.4	91.5	90.4	89.2	87.9	86.5	85.1	83.7	82.3	80.8	79.4	77.9	76.5	75.1
45	88.8	91.5	92.5	92.8	92.7	92.2	91.5	90.6	89.6	88.6	87.4	86.1	84.8	83.4	82.0	80.6	79.2	77.8	76.4	75.1
50	86.4	89.6	90.8	91.3	91.4	91.0	90.4	89.7	88.8	87.9	86.8	85.6	84.4	83.1	81.8	80.4	79.1	77.7	76.4	75.1
55	84.2	87.5	89.0	89.7	89.8	89.6	89.2	88.6	87.9	87.1	86.1	85.0	83.9	82.7	81.5	80.2	78.9	77.6	76.3	75.1
60	81.9	85.4	87.1	87.9	88.2	88.1	87.9	87.4	86.9	86.2	85.3	84.4	83.3	82.2	81.1	79.9	78.7	77.5	76.3	75.1
65	80.0	83.4	85.1	86.0	86.4	86.5	86.4	86.1	85.7	85.1	84.4	83.6	82.7	81.7	80.7	79.6	78.5	77.4	76.2	75.1
70	78.3	81.3	83.0	84.0	84.5	84.8	84.8	84.7	84.4	83.9	83.4	82.7	81.9	81.1	80.2	79.3	78.2	77.2	76.1	75.1
75	76.6	79.3	80.9	81.9	82.6	83.0	83.1	83.1	82.9	82.6	82.2	81.6	81.0	80.4	79.6	78.8	77.9	77.0	76.0	75.1
80	75.3	77.4	78.9	79.9	80.6	81.1	81.3	81.4	81.3	81.1	80.8	80.4	80.0	79.5	78.9	78.2	77.5	76.7	75.9	75.1
85	74.4	76.0	77.2	78.0	78.7	79.1	79.4	79.5	79.5	79.5	79.3	79.1	78.8	78.4	78.0	77.5	76.9	76.3	75.7	75.1
90	73.9	74.9	75.7	76.3	76.8	77.1	77.4	77.6	77.7	77.7	77.7	77.6	77.4	77.2	76.9	76.6	76.3	75.9	75.5	75.1
95	74.0	74.4	74.7	75.0	75.2	75.4	75.6	75.7	75.8	75.9	75.9	75.9	75.9	75.8	75.7	75.6	75.5	75.4	75.2	75.1
98	74.8	74.9	75.0	75.0	75.1	75.1	75.1	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.2	75.1	75.1	75.1

Reference from Harper 2007 Report, Appendix D

Mean Annual Mass Removal Efficiencies for 2.25-inches of Retention for Zone 5

NDCIA	Percent DCIA																			
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	98.2	98.7	98.6	98.5	98.1	97.6	97.1	96.5	95.9	95.1	94.3	93.5	92.6	91.7	90.7	89.7	88.7	87.7	86.6	85.6
35	97.0	97.7	97.8	97.7	97.5	97.0	96.6	96.1	95.4	94.7	94.0	93.2	92.4	91.5	90.6	89.6	88.6	87.6	86.6	85.6
40	95.3	96.5	96.9	96.8	96.6	96.3	96.0	95.5	95.0	94.3	93.6	92.9	92.1	91.3	90.4	89.5	88.5	87.6	86.6	85.6
45	93.6	95.2	95.7	95.8	95.7	95.6	95.3	94.9	94.4	93.9	93.2	92.6	91.8	91.0	90.2	89.3	88.4	87.5	86.5	85.6
50	91.9	93.7	94.5	94.7	94.8	94.8	94.6	94.3	93.8	93.3	92.8	92.1	91.5	90.7	90.0	89.1	88.3	87.4	86.5	85.6
55	90.1	92.2	93.2	93.6	93.8	93.9	93.8	93.5	93.2	92.7	92.2	91.7	91.1	90.4	89.7	88.9	88.1	87.3	86.5	85.6
60	88.6	90.8	91.9	92.5	92.8	92.9	92.9	92.7	92.4	92.0	91.6	91.1	90.6	90.0	89.4	88.7	88.0	87.2	86.4	85.6
65	87.2	89.4	90.6	91.3	91.7	91.9	91.9	91.8	91.6	91.3	90.9	90.6	90.1	89.6	89.0	88.4	87.8	87.1	86.3	85.6
70	86.0	88.1	89.3	90.1	90.6	90.8	90.8	90.8	90.6	90.4	90.2	89.9	89.5	89.1	88.6	88.1	87.5	86.9	86.3	85.6
75	85.1	87.0	88.1	88.8	89.3	89.5	89.6	89.7	89.6	89.6	89.4	89.1	88.9	88.5	88.2	87.7	87.2	86.7	86.2	85.6
80	84.5	85.8	86.8	87.5	87.9	88.2	88.4	88.6	88.6	88.6	88.5	88.3	88.1	87.9	87.6	87.3	86.9	86.5	86.1	85.6
85	83.8	84.8	85.6	86.1	86.6	87.0	87.2	87.4	87.5	87.5	87.5	87.5	87.4	87.2	87.0	86.8	86.5	86.3	85.9	85.6
90	83.5	84.2	84.7	85.2	85.6	85.8	86.1	86.2	86.4	86.5	86.5	86.5	86.5	86.5	86.4	86.3	86.1	86.0	85.8	85.6
95	83.9	84.2	84.5	84.7	84.9	85.1	85.2	85.3	85.4	85.5	85.6	85.6	85.7	85.7	85.7	85.7	85.7	85.7	85.6	85.6
98	84.9	85.0	85.1	85.1	85.2	85.2	85.3	85.3	85.4	85.4	85.4	85.5	85.5	85.5	85.5	85.5	85.6	85.6	85.6	85.6

Mean Annual Mass Removal Efficiencies for 2.50-inches of Retention for Zone 5

NDCIA	Percent DCIA																			
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	98.6	98.9	98.9	98.8	98.6	98.2	97.7	97.2	96.7	96.0	95.3	94.6	93.9	93.1	92.3	91.4	90.6	89.6	88.7	87.8
35	97.6	98.1	98.3	98.2	98.0	97.6	97.2	96.8	96.3	95.7	95.0	94.4	93.7	92.9	92.1	91.3	90.5	89.6	88.7	87.8
40	96.2	97.1	97.4	97.4	97.3	97.0	96.7	96.3	95.9	95.3	94.7	94.1	93.4	92.7	92.0	91.2	90.4	89.5	88.7	87.8
45	94.7	96.0	96.5	96.5	96.5	96.3	96.0	95.8	95.4	94.9	94.3	93.8	93.2	92.5	91.8	91.0	90.3	89.5	88.6	87.8
50	93.2	94.8	95.3	95.6	95.6	95.5	95.4	95.2	94.8	94.4	93.9	93.4	92.8	92.2	91.6	90.9	90.1	89.4	88.6	87.8
55	91.6	93.4	94.2	94.5	94.7	94.7	94.7	94.5	94.2	93.9	93.4	93.0	92.5	91.9	91.3	90.7	90.0	89.3	88.5	87.8
60	90.1	92.0	93.0	93.5	93.8	93.9	93.9	93.8	93.5	93.2	92.9	92.5	92.0	91.6	91.0	90.4	89.8	89.2	88.5	87.8
65	88.9	90.8	91.8	92.4	92.8	93.0	93.1	93.0	92.8	92.6	92.3	92.0	91.6	91.2	90.7	90.2	89.6	89.1	88.4	87.8
70	87.8	89.6	90.7	91.4	91.8	92.1	92.1	92.1	92.0	91.8	91.6	91.4	91.1	90.7	90.3	89.9	89.4	88.9	88.4	87.8
75	86.9	88.6	89.6	90.3	90.8	91.0	91.1	91.1	91.1	91.0	90.9	90.7	90.5	90.2	89.9	89.5	89.2	88.7	88.3	87.8
80	86.4	87.7	88.6	89.2	89.6	89.9	90.0	90.1	90.2	90.2	90.1	90.0	89.8	89.7	89.4	89.2	88.9	88.5	88.2	87.8
85	85.9	86.9	87.5	88.0	88.4	88.7	88.9	89.1	89.2	89.3	89.3	89.2	89.2	89.1	88.9	88.8	88.6	88.3	88.1	87.8
90	85.6	86.2	86.7	87.1	87.5	87.8	88.0	88.1	88.3	88.4	88.4	88.4	88.4	88.4	88.4	88.3	88.2	88.1	87.9	87.8
95	86.1	86.4	86.6	86.8	87.0	87.1	87.3	87.4	87.5	87.6	87.7	87.7	87.8	87.8	87.8	87.8	87.8	87.8	87.8	87.8
98	87.1	87.2	87.2	87.3	87.3	87.4	87.4	87.5	87.5	87.6	87.6	87.6	87.7	87.7	87.7	87.7	87.7	87.8	87.8	87.8

Reference from Harper 2007 Report, Appendix D

Mean Annual Mass Removal Efficiencies for 2.75-inches of Retention for Zone 5

NDCIA	Percent DCIA																		
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	98.9	99.1	99.1	99.1	98.9	98.6	98.2	97.8	97.3	96.7	96.2	95.5	94.9	94.2	93.5	92.8	92.0	91.2	90.4	89.6
35	98.1	98.5	98.6	98.6	98.4	98.1	97.7	97.4	96.9	96.4	95.9	95.3	94.7	94.1	93.4	92.7	91.9	91.2	90.4	89.6
40	97.0	97.7	97.9	97.9	97.8	97.5	97.2	96.9	96.5	96.1	95.6	95.0	94.5	93.9	93.2	92.5	91.8	91.1	90.3	89.6
45	95.6	96.7	97.1	97.1	97.1	96.9	96.6	96.4	96.1	95.7	95.2	94.7	94.2	93.6	93.0	92.4	91.7	91.0	90.3	89.6
50	94.3	95.6	96.1	96.3	96.3	96.2	96.0	95.8	95.6	95.3	94.9	94.4	93.9	93.4	92.8	92.2	91.6	91.0	90.3	89.6
55	92.9	94.4	95.0	95.3	95.4	95.4	95.4	95.3	95.1	94.8	94.4	94.0	93.6	93.1	92.6	92.1	91.5	90.9	90.2	89.6
60	91.6	93.2	93.9	94.3	94.6	94.7	94.7	94.6	94.5	94.2	93.9	93.6	93.2	92.8	92.3	91.8	91.3	90.8	90.2	89.6
65	90.3	92.0	92.8	93.4	93.7	93.9	94.0	93.9	93.8	93.6	93.4	93.1	92.8	92.4	92.0	91.6	91.1	90.6	90.1	89.6
70	89.3	90.9	91.8	92.4	92.8	93.1	93.2	93.2	93.1	93.0	92.8	92.6	92.3	92.0	91.7	91.3	90.9	90.5	90.1	89.6
75	88.5	89.9	90.9	91.5	91.9	92.2	92.3	92.4	92.3	92.2	92.1	92.0	91.8	91.6	91.3	91.0	90.7	90.4	90.0	89.6
80	88.1	89.2	90.0	90.6	91.0	91.2	91.4	91.5	91.5	91.5	91.4	91.4	91.3	91.1	90.9	90.7	90.5	90.2	89.9	89.6
85	87.8	88.6	89.2	89.6	90.0	90.2	90.4	90.5	90.6	90.7	90.7	90.7	90.7	90.6	90.5	90.3	90.2	90.0	89.8	89.6
90	87.5	88.0	88.4	88.8	89.1	89.3	89.5	89.7	89.8	89.9	90.0	90.0	90.0	90.0	90.0	89.9	89.9	89.8	89.7	89.6
95	87.9	88.2	88.4	88.6	88.7	88.9	89.0	89.1	89.2	89.3	89.4	89.4	89.5	89.5	89.5	89.6	89.6	89.6	89.6	89.6
98	88.9	88.9	89.0	89.0	89.1	89.1	89.2	89.2	89.3	89.3	89.4	89.4	89.4	89.5	89.5	89.5	89.5	89.5	89.6	89.6

Mean Annual Mass Removal Efficiencies for 3.00-inches of Retention for Zone 5

NDCIA	Percent DCIA																		
CN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
30	99.1	99.3	99.3	99.2	99.1	98.9	98.6	98.2	97.8	97.3	96.8	96.3	95.7	95.1	94.5	93.8	93.2	92.5	91.8	91.0
35	98.4	98.8	98.9	98.8	98.7	98.5	98.2	97.8	97.5	97.0	96.6	96.1	95.5	94.9	94.4	93.7	93.1	92.4	91.7	91.0
40	97.5	98.1	98.3	98.3	98.2	98.0	97.7	97.4	97.1	96.7	96.3	95.8	95.3	94.8	94.2	93.6	93.0	92.4	91.7	91.0
45	96.4	97.3	97.6	97.6	97.6	97.4	97.2	96.9	96.7	96.4	96.0	95.5	95.1	94.6	94.0	93.5	92.9	92.3	91.7	91.0
50	95.2	96.3	96.7	96.9	96.9	96.8	96.6	96.4	96.2	96.0	95.6	95.2	94.8	94.3	93.9	93.4	92.8	92.2	91.6	91.0
55	94.0	95.3	95.8	96.0	96.1	96.1	96.0	95.9	95.7	95.5	95.2	94.9	94.5	94.1	93.6	93.2	92.7	92.2	91.6	91.0
60	92.8	94.1	94.8	95.1	95.3	95.4	95.4	95.3	95.2	95.0	94.8	94.5	94.1	93.8	93.4	93.0	92.5	92.1	91.6	91.0
65	91.7	93.0	93.8	94.2	94.5	94.6	94.7	94.7	94.6	94.5	94.3	94.0	93.8	93.5	93.1	92.8	92.4	91.9	91.5	91.0
70	90.7	92.0	92.8	93.3	93.7	93.9	94.0	94.1	94.0	93.9	93.8	93.6	93.3	93.1	92.8	92.5	92.2	91.8	91.4	91.0
75	89.9	91.1	91.9	92.5	92.9	93.2	93.3	93.3	93.3	93.3	93.2	93.0	92.9	92.7	92.5	92.3	92.0	91.7	91.4	91.0
80	89.4	90.5	91.2	91.7	92.1	92.3	92.5	92.6	92.6	92.6	92.5	92.5	92.4	92.3	92.1	92.0	91.8	91.5	91.3	91.0
85	89.3	90.0	90.5	90.9	91.3	91.5	91.6	91.8	91.8	91.9	91.9	91.9	91.9	91.8	91.7	91.6	91.5	91.4	91.2	91.0
90	89.1	89.6	89.9	90.2	90.5	90.7	90.9	91.0	91.1	91.2	91.3	91.3	91.3	91.4	91.3	91.3	91.3	91.2	91.1	91.0
95	89.5	89.7	89.9	90.0	90.2	90.3	90.4	90.5	90.6	90.7	90.8	90.8	90.9	90.9	91.0	91.0	91.0	91.0	91.0	91.0
98	90.3	90.4	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.8	90.8	90.8	90.9	90.9	90.9	90.9	91.0	91.0	91.0	91.0

Bowman
CONSULTING

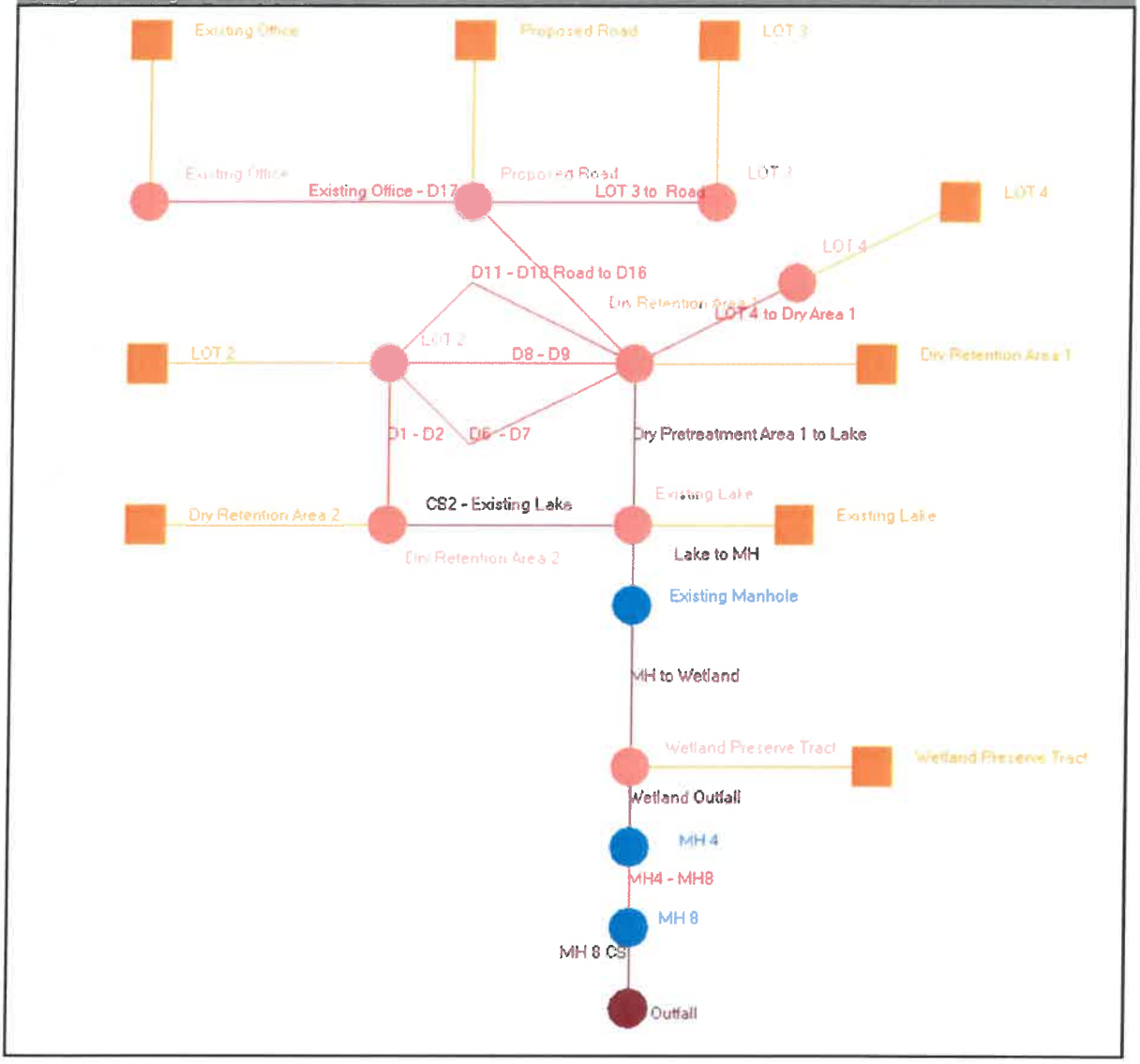
APPENDIX E

ICPR Input and Routings

Scenario	Sim	Node Name	Maximum Stage [ft]	Maximum Total Inflow Rate [cfs]	Maximum Total Outflow Rate [cfs]
Zero	100y72h	Dry Retention Area 1	16.31	37.11	15.29
Zero	100y72h	Dry Retention Area 2	16.31	8.98	6.12
Zero	100y72h	Existing Lake	16.31	31.17	11.26
Zero	100y72h	Existing Manhole	16.32	11.26	11.24
Zero	100y72h	Existing Office	16.31	12.54	4.41
Zero	100y72h	LOT 2	16.31	20.05	9.68
Zero	100y72h	LOT 3	16.31	17.76	6.92
Zero	100y72h	LOT 4	16.31	32.05	13.37
Zero	100y72h	MH 4	16.32	2.67	2.67
Zero	100y72h	MH 8	16.31	1.86	0.37
Zero	100y72h	Outfall	13.50	0.00	0.00
Zero	100y72h	Proposed Road	16.31	13.87	11.72
Zero	100y72h	Wetland Preserve Tract	16.31	28.80	5.28
Routing	10y24h	Dry Retention Area 1	15.02	41.01	31.75
Routing	10y24h	Dry Retention Area 2	15.02	20.01	19.32
Routing	10y24h	Existing Lake	14.96	45.31	17.78
Routing	10y24h	Existing Manhole	14.49	17.78	17.77
Routing	10y24h	Existing Office	15.04	8.03	6.09
Routing	10y24h	LOT 2	15.02	20.94	19.35
Routing	10y24h	LOT 3	15.04	11.39	9.03
Routing	10y24h	LOT 4	15.14	20.89	16.29
Routing	10y24h	MH 4	14.42	4.81	4.81
Routing	10y24h	MH 8	13.67	4.81	4.81
Routing	10y24h	Outfall	13.35	4.81	0.83
Routing	10y24h	Proposed Road	15.03	17.06	19.50
Routing	10y24h	Wetland Preserve Tract	14.48	20.31	4.81
Routing	25y72h	Dry Retention Area 1	15.55	39.65	21.52
Routing	25y72h	Dry Retention Area 2	15.55	11.52	8.87
Routing	25y72h	Existing Lake	15.52	37.28	19.25

Scenario	Sim	Node Name	Maximum Stage [ft]	Maximum Total Inflow Rate [cfs]	Maximum Total Outflow Rate [cfs]
Routing	25y72h	Existing Manhole	15.47	19.27	19.51
Routing	25y72h	Existing Office	15.56	10.42	5.23
Routing	25y72h	LOT 2	15.55	16.76	10.75
Routing	25y72h	LOT 3	15.55	14.76	8.24
Routing	25y72h	LOT 4	15.58	26.68	15.56
Routing	25y72h	MH 4	15.45	7.99	5.90
Routing	25y72h	MH 8	14.39	5.90	5.88
Routing	25y72h	Outfall	13.50	5.88	0.83
Routing	25y72h	Proposed Road	15.55	16.01	17.11
Routing	25y72h	Wetland Preserve Tract	15.46	32.44	8.97

Background Image: Master Post



Simulation: 10y24h

Scenario: Routing
Run Date/Time: 12/2/2019 6:13:08 PM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	48.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.5000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: Site
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Impervious
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight 0.5 dec

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False

Fact:			
dZ Tolerance:	0.0050 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft	OF Region Rain Opt:	No Rainfall
Link Optimizer Tol:	0.0000 ft	Rainfall Name:	~FLMOD
		Rainfall Amount:	7.30 in
Edge Length Option:	Automatic	Storm Duration:	24.0000 hr
Dflt Damping (2D):	0.0000 ft	Dflt Damping (1D):	0.0000 ft
Min Node Srf Area (2D):	100 ft2	Min Node Srf Area (1D):	100 ft2
Energy Switch (2D):	Energy	Energy Switch (1D):	Energy

Comment:

Simulation: 25y72h

Scenario: Routing
Run Date/Time: 12/2/2019 6:13:31 PM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.5000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: Site
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Impervious
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:
Conductivity Set:
Leakage Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0050 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0000 ft
Edge Length Option: Automatic
Dflt Damping (2D): 0.0000 ft
Min Node Srf Area (2D): 100 ft2
Energy Switch (2D): Energy

IA Recovery Time: 24.0000 hr
ET for Manual Basins: False
Smp/Man Basin Rain Opt: Global
OF Region Rain Opt: No Rainfall
Rainfall Name: ~SFWMD-72
Rainfall Amount: 12.50 in
Storm Duration: 72.0000 hr
Dflt Damping (1D): 0.0000 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Manual Basin: Dry Retention Area 1

Scenario: Routing
Node: Dry Retention Area 1
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number

Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.6100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.6100	Dry Pretreatment Area	A			

Comment:

Manual Basin: Dry Retention Area 2

Scenario: Routing
Node: Dry Retention Area 2
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.2100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.2100	Dry Pretreatment Area	A			

Comment:

Manual Basin: Existing Lake

Scenario: Routing
Node: Existing Lake
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.5000 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.5000	Existing Lake	D			

Comment:

Manual Basin: Existing Office

Scenario: Routing
Node: Existing Office
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.9000 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.9000	Existing Office	A			

Comment: Existing office parcel and Existing Acess

Manual Basin: LOT 2

Scenario: Routing
Node: LOT 2
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 3.0400 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
3.0400	Storage	A			

Comment:

Manual Basin: LOT 3

Scenario: Routing
Node: LOT 3
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number

Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 2.6900 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
2.6900	Future Development 1	A			

Comment:

Manual Basin: LOT 4

Scenario: Routing
Node: LOT 4
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.8400 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
4.8400	Future Development 2	A			

Comment:

Manual Basin: Proposed Road

Scenario: Routing
Node: Proposed Road
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.5100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.5100	Road (Phase 3)	A			

Comment:

Manual Basin: Wetland Preserve Tract

Scenario: Routing
Node: Wetland Preserve Tract
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 2.6700 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
2.6700	Wetland	D			

Comment:

Impervious: Impervious [Set]

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
Dry Pretreatment Area	0.00	0.00	0.00	0.000	0.000
Existing Lake	0.00	0.00	0.00	0.000	0.000
Existing Office	0.00	0.00	0.00	0.000	0.000
Future Development 1	0.00	0.00	0.00	0.000	0.000
Future Development 2	0.00	0.00	0.00	0.000	0.000
Road (Phase 3)	0.00	0.00	0.00	0.000	0.000
Storage	0.00	0.00	0.00	0.000	0.000
Wetland	0.00	0.00	0.00	0.000	0.000

Curve Number: Site [Set]

Land Cover Zone	Soil Zone	Curve Number [dec]
Dry Pretreatment Area	A	84.0
Existing Lake	D	88.3
Existing Office	A	93.0
Future Development 1	A	93.2

Land Cover Zone	Soil Zone	Curve Number [dec]
Future Development 2	A	95.8
Landscape BufferArea	A	84.0
Preserve	A	84.0
Road (Phase 3)	A	98.0
Storage	A	92.7
Wetland	D	82.1

Node: Dry Retention Area 1

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 9.50 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
13.00	0.00	0
13.50	0.50	21824
14.00	1.06	46043
14.50	1.67	72745
15.00	2.34	101887
15.50	3.06	133424
16.00	3.84	167445
16.50	4.65	202685
17.00	5.46	237925
17.50	6.27	273165
18.00	7.08	308361

Comment: This area is the combination of Dry Retention Area 1 and Lot 4 Future Dry Retention Area

Node: Dry Retention Area 2

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 8.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
13.00	0.00	0
13.50	0.06	2788
14.00	0.14	5924
14.50	0.22	9365
15.00	0.30	13112
15.50	0.40	17206
16.00	0.50	21649

Stage [ft]	Volume [ac-ft]	Volume [ft3]
16.50	0.60	26223
17.00	0.71	30840

Comment:

Node: Existing Lake

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 13.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
12.00	0.00	0
12.50	0.45	19776
13.00	0.93	40380
13.50	1.42	61812
14.00	1.93	84027
14.50	2.49	108595
15.00	3.14	136604
15.50	3.85	167706
16.00	4.60	200289
16.50	5.35	232915
17.00	6.10	265498
17.50	6.84	298125
18.00	7.59	330708

Comment:

Node: Existing Manhole

Scenario: Routing
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 9.29 ft
Warning Stage: 0.00 ft

Comment:

Node: Existing Office

Scenario: Routing

Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 11.12 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.02	784
15.00	0.07	3180
15.50	0.23	10062
16.00	0.63	27312
16.50	1.27	55147
17.00	2.12	92521

Comment:

Node: LOT 2

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 8.20 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.03	1481
15.00	0.14	5881
15.50	0.35	15377
16.00	0.79	34587
16.50	1.46	63554
17.00	2.32	100841
17.50	3.25	141526
18.00	4.18	182255

Comment:

Node: LOT 3

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 10.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.50	0.02	958
15.00	0.09	3920
15.50	0.28	12023
16.00	0.74	32147
16.50	1.48	64382
17.00	2.50	108769
17.50	3.66	159212
18.00	4.81	209698

Comment:

Node: LOT 4

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 10.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.02	784
15.00	0.07	3180
15.50	0.28	12240
16.00	0.98	42515
16.50	2.18	94961
17.00	3.89	169623
17.50	5.86	255349
18.00	7.83	341075

Comment:

Node: MH 4

Scenario: Routing
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 10.35 ft
Warning Stage: 0.00 ft

Comment:

Node: MH 8

Scenario: Routing
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 10.11 ft
Warning Stage: 0.00 ft

Comment:

Node: Outfall

Scenario: Routing
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 12.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	12.60
0	0	0	4.0000	12.70
0	0	0	8.0000	12.80
0	0	0	12.0000	12.90
0	0	0	24.0000	13.10
0	0	0	62.0000	13.50
0	0	0	72.0000	13.00
0	0	0	96.0000	12.80

Comment:

Node: Proposed Road

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 9.70 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
15.10	0.00	0
15.60	0.05	2004
16.10	0.18	7971
16.60	0.44	19166
17.10	0.70	30361
17.60	0.95	41513
18.10	1.21	52708

Stage [ft]	Volume [ac-ft]	Volume [ft3]
18.60	1.47	63859
19.10	1.72	75054

Comment:

Node: Wetland Preserve Tract

Scenario: Routing
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 13.02 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
12.00	0.00	0
12.50	0.52	22651
13.00	1.18	51488
13.50	1.99	86467
14.00	2.93	127631
14.50	3.98	173412
15.00	5.10	222287
15.50	6.30	274254
16.00	7.56	329270
16.50	8.89	387423
17.00	10.23	445532
17.50	11.56	503641
18.00	12.90	561793

Comment:

Drop Structure Link: CS2 - Existing Lake

Scenario: Routing
From Node: Dry Retention Area 2
To Node: Existing Lake
Link Count: 1
Flow Direction: Both
Solution: Combine
Increments: 10
Pipe Count: 1
Damping: 0.0000 ft
Length: 80.00 ft
FHWA Code: 0
Entr Loss Coef: 0.00
Exit Loss Coef: 0.00

Upstream Pipe		Downstream Pipe	
Invert:	10.00 ft	Invert:	8.00 ft
Manning's N:	0.0110	Manning's N:	0.0110
Geometry: Circular		Geometry: Circular	
Max Depth:	2.00 ft	Max Depth:	2.00 ft
Bottom Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000
Top Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000

Bend Loss Coef: 0.00
Bend Location: 0.00 ft
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:	14.60 ft
Control Elevation:	14.60 ft
Max Depth:	3.00 ft
Max Width:	9.00 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:

Weir Component

Weir:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	13.50 ft
Control Elevation:	13.50 ft
Max Depth:	0.25 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:

Weir Component

Weir:	3
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	14.10 ft
Control Elevation:	14.10 ft
Max Depth:	0.50 ft
Max Width:	3.00 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:

Drop Structure Comment:

Pipe Link: D1 - D2		Upstream		Downstream	
Scenario:	Routing	Invert:	8.20 ft	Invert:	8.00 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area	Geometry: Circular		Geometry: Circular	
	2	Max Depth:	3.00 ft	Max Depth:	3.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Positive	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	15.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: D11 - D10		Upstream		Downstream	
Scenario:	Routing	Invert:	9.70 ft	Invert:	9.50 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area	Geometry: Circular		Geometry: Circular	
	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	16.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: D6 - D7		Upstream		Downstream	
Scenario:	Routing	Invert:	9.70 ft	Invert:	9.50 ft

From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	17.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: D8 - D9		Upstream		Downstream	
Scenario:	Routing	Invert:	9.70 ft	Invert:	9.50 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	1.25 ft	Max Depth:	1.25 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	16.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Momentum	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Drop Structure Link: Dry Pretreatment Area 1 to Lake		Upstream Pipe		Downstream Pipe	
		Invert:	9.00 ft	Invert:	7.00 ft
Scenario:	Routing	Manning's N:	0.0120	Manning's N:	0.0120
From Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	3.00 ft	Max Depth:	3.00 ft
To Node:	Existing Lake	Bottom Clip			
Link Count:	1	Default:	0.00 ft	Default:	0.00 ft
Flow Direction:	Both	Op Table:		Op Table:	
Solution:	Combine	Ref Node:		Ref Node:	
Increments:	10	Manning's N:	0.0000	Manning's N:	0.0000
Pipe Count:	1	Top Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	47.00 ft	Op Table:		Op Table:	

FHWA Code:	0	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00				
Bend Loss Coef:	0.00				
Bend Location:	0.00 ft				
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:	14.60 ft
Control Elevation:	14.60 ft
Max Depth:	3.00 ft
Max Width:	9.00 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:

Weir Component

Weir:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	13.40 ft
Control Elevation:	13.40 ft
Max Depth:	0.25 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:

Weir Component

Weir:	3
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	14.25 ft
Control Elevation:	14.25 ft
Max Depth:	0.50 ft

Bottom Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Top Clip

Default:	0.00 ft
Op Table:	
Ref Node:	

Discharge Coefficients

Max Width:	3.00 ft		
Fillet:	0.00 ft	Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Drop Structure Comment:

Pipe Link: Existing Office - D17		Upstream		Downstream	
Scenario:	Routing	Invert:	11.12 ft	Invert:	11.09 ft
From Node:	Existing Office	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Proposed Road	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:	105.00 ft	Op Table:		Op Table:	
FHWA Code:	0	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	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:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: LOT 3 to Road		Upstream		Downstream	
Scenario:	Routing	Invert:	10.00 ft	Invert:	10.00 ft
From Node:	LOT 3	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Proposed Road	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:	50.00 ft	Op Table:		Op Table:	
FHWA Code:	0	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	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:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: LOT 4 to Dry Area 1		Upstream		Downstream	
Scenario:	Routing	Invert:	10.00 ft	Invert:	11.00 ft
From Node:	LOT 4	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Positive	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	51.71 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Drop Structure Link: Lake to MH		Upstream Pipe		Downstream Pipe	
Scenario:	Routing	Invert:	10.50 ft	Invert:	9.68 ft
From Node:	Existing Lake	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Existing Manhole	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	10	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	55.00 ft	Top Clip			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 ft				
Energy Switch:	Energy				
Pipe Comment:					

Weir Component		Bottom Clip	
Weir:	1	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Horizontal	Default:	0.00 ft
Geometry Type:	Rectangular	Op Table:	
Invert:	14.43 ft	Ref Node:	
Control Elevation:	14.43 ft	Discharge Coefficients	
Max Depth:	3.00 ft	Weir Default:	3.200
Max Width:	4.00 ft		

Fillet:	0.00 ft		
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

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:	Circular	Default:	0.00 ft
Invert:	13.26 ft	Op Table:	
Control Elevation:	13.26 ft	Ref Node:	
Max Depth:	0.33 ft	**Discharge Coefficients**	
		Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Drop Structure Comment:

Drop Structure Link: MH 8 CS

		Upstream Pipe		**Downstream Pipe**	
Scenario:	Routing	Invert:	12.19 ft	Invert:	11.68 ft
From Node:	MH 8	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Outfall	**Geometry: Circular**		**Geometry: Circular**	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Flow Direction:	Both	**Bottom Clip**			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	10	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	22.00 ft	**Top Clip**			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
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
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	12.00 ft
Control Elevation:	12.00 ft
Max Depth:	1.00 ft
Max Width:	1.25 ft
Fillet:	0.00 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: MH to Wetland		Upstream Pipe		Downstream Pipe	
Scenario:	Routing	Invert:	8.85 ft	Invert:	9.29 ft
From Node:	Wetland Preserve Tract	Manning's N:	0.0120	Manning's N:	0.0120
		Geometry: Circular		Geometry: Circular	
To Node:	Existing Manhole	Max Depth:	3.00 ft	Max Depth:	3.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Solution:	Combine	Op Table:		Op Table:	
Increments:	10	Ref Node:		Ref Node:	
Pipe Count:	1	Manning's N:	0.0000	Manning's N:	0.0000
Damping:	0.0000 ft	Top Clip			
Length:	65.00 ft	Default:	0.00 ft	Default:	0.00 ft
FHWA Code:	0	Op Table:		Op Table:	
Entr Loss Coef:	0.00	Ref Node:		Ref Node:	
Exit Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Loss Coef:	0.00				
Bend Location:	0.00 ft				
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:	13.16 ft
Control Elevation:	13.16 ft
Max Depth:	3.00 ft
Max Width:	4.00 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:

Drop Structure Comment:

Pipe Link: MH4 - MH8		Upstream		Downstream	
Scenario:	Routing	Invert:	10.35 ft	Invert:	10.11 ft
From Node:	MH 4	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH 8	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	505.00 ft	Op Table:		Op Table:	
FHWA Code:	0	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	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:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: Road to D16		Upstream		Downstream	
Scenario:	Routing	Invert:	7.70 ft	Invert:	9.50 ft
From Node:	Proposed Road	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area	Geometry: Circular		Geometry: Circular	
	1	Max Depth:	2.50 ft	Max Depth:	2.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Positive	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	21.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Drop Structure Link: Wetland Outfall	Upstream Pipe	Downstream Pipe

Scenario:	Routing	Invert:	8.27 ft	Invert:	10.30 ft
From Node:	Wetland Preserve Tract	Manning's N:	0.0110	Manning's N:	0.0011
		Geometry: Circular		Geometry: Circular	
To Node:	MH 4	Max Depth:	2.50 ft	Max Depth:	2.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Solution:	Combine	Op Table:		Op Table:	
Increments:	10	Ref Node:		Ref Node:	
Pipe Count:	1	Manning's N:	0.0000	Manning's N:	0.0000
Damping:	0.0000 ft	Top Clip			
Length:	82.00 ft	Default:	0.00 ft	Default:	0.00 ft
FHWA Code:	0	Op Table:		Op Table:	
Entr Loss Coef:	0.00	Ref Node:		Ref Node:	
Exit Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Loss Coef:	0.00				
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:	13.02 ft	Op Table:	
Control Elevation:	13.02 ft	Ref Node:	
Max Depth:	1.49 ft	Discharge Coefficients	
Max Width:	2.75 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

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:	14.82 ft	Op Table:	
Control Elevation:	14.82 ft	Ref Node:	
Max Depth:	1.49 ft	Discharge Coefficients	
Max Width:	2.75 ft	Weir Default:	3.200
Fillet:	0.00 ft	Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component	
Weir:	3
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Rectangular
Invert:	14.42 ft
Control Elevation:	14.42 ft
Max Depth:	1.49 ft
Max Width:	2.75 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:

Drop Structure Comment:

Simulation: 100y72h

Scenario: Zero
Run Date/Time: 12/2/2019 6:14:29 PM
Program Version: ICPR4 4.05.02

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	96.0000

	Hydrology [sec]	Surface Hydraulics [sec]	Groundwater [sec]
Min Calculation Time:	60.0000	0.5000	900.0000
Max Calculation Time:		30.0000	

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Groundwater

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	360.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Reference ET Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: Site
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: Impervious
Roughness Set:
Crop Coef Set:
Fillable Porosity Set:

Conductivity Set:	
Leakage Set:	

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6	ET for Manual Basins:	False
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0050 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft	OF Region Rain Opt:	No Rainfall
Link Optimizer Tol:	0.0000 ft	Rainfall Name:	~SFWMD-72
		Rainfall Amount:	15.00 in
Edge Length Option:	Automatic	Storm Duration:	72.0000 hr
Dflt Damping (2D):	0.0000 ft	Dflt Damping (1D):	0.0000 ft
Min Node Srf Area (2D):	100 ft2	Min Node Srf Area (1D):	100 ft2
Energy Switch (2D):	Energy	Energy Switch (1D):	Energy

Comment:

Manual Basin: Dry Retention Area 1

Scenario:	Zero
Node:	Dry Retention Area 1
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	1.6100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.6100	Dry Pretreatment Area	A			

Comment:

Manual Basin: Dry Retention Area 2

Scenario:	Zero
Node:	Dry Retention Area 2
Hydrograph Method:	NRCS Unit Hydrograph

Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.2100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.2100	Dry Pretreatment Area	A			

Comment:

Manual Basin: Existing Lake

Scenario: Zero
Node: Existing Lake
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.5000 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.5000	Existing Lake	D			

Comment:

Manual Basin: Existing Office

Scenario: Zero
Node: Existing Office
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 1.9000 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
1.9000	Existing Office	A			

Comment: Existing office parcel and Existing Acess

Manual Basin: LOT 2

Scenario: Zero
Node: LOT 2
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 3.0400 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
3.0400	Storage	A			

Comment:

Manual Basin: LOT 3

Scenario: Zero
Node: LOT 3
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 2.6900 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
2.6900	Future Development 1	A			

Comment:

Manual Basin: LOT 4

Scenario: Zero
Node: LOT 4
Hydrograph Method: NRCS Unit Hydrograph

Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.8400 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
4.8400	Future Development 2	A			

Comment:

Manual Basin: Proposed Road

Scenario: Zero
Node: Proposed Road
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.5100 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
0.5100	Road (Phase 3)	A			

Comment:

Manual Basin: Wetland Preserve Tract

Scenario: Zero
Node: Wetland Preserve Tract
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 10.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 2.6700 ac

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name	Crop Coefficient Zone	Reference ET Station
2.6700	Wetland	D			

Comment:

Impervious: Impervious [Set]

Land Cover Zone	% Impervious	% DCIA	% Direct	Ia Impervious [in]	Ia Pervious [in]
Dry Pretreatment Area	0.00	0.00	0.00	0.000	0.000
Existing Lake	0.00	0.00	0.00	0.000	0.000
Existing Office	0.00	0.00	0.00	0.000	0.000
Future Development 1	0.00	0.00	0.00	0.000	0.000
Future Development 2	0.00	0.00	0.00	0.000	0.000
Road (Phase 3)	0.00	0.00	0.00	0.000	0.000
Storage	0.00	0.00	0.00	0.000	0.000
Wetland	0.00	0.00	0.00	0.000	0.000

Curve Number: Site [Set]

Land Cover Zone	Soil Zone	Curve Number [dec]
Dry Pretreatment Area	A	84.0
Existing Lake	D	88.3
Existing Office	A	93.0
Future Development 1	A	93.2
Future Development 2	A	95.8
Landscape BufferArea	A	84.0
Preserve	A	84.0
Road (Phase 3)	A	98.0
Storage	A	92.7
Wetland	D	82.1

Node: Dry Retention Area 1

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 9.50 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
13.00	0.00	0
13.50	0.50	21824

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	1.06	46043
14.50	1.67	72745
15.00	2.34	101887
15.50	3.06	133424
16.00	3.84	167445
16.50	4.65	202685
17.00	5.46	237925
17.50	6.27	273165
18.00	7.08	308361

Comment: This area is the combination of Dry Retention Area 1 and Lot 4 Future Dry Retention Area

Node: Dry Retention Area 2

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 8.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
13.00	0.00	0
13.50	0.06	2788
14.00	0.14	5924
14.50	0.22	9365
15.00	0.30	13112
15.50	0.40	17206
16.00	0.50	21649
16.50	0.60	26223
17.00	0.71	30840

Comment:

Node: Existing Lake

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 13.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
12.00	0.00	0
12.50	0.45	19776
13.00	0.93	40380
13.50	1.42	61812

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	1.93	84027
14.50	2.49	108595
15.00	3.14	136604
15.50	3.85	167706
16.00	4.60	200289
16.50	5.35	232915
17.00	6.10	265498
17.50	6.84	298125
18.00	7.59	330708

Comment:

Node: Existing Manhole

Scenario: Zero
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 9.29 ft
Warning Stage: 0.00 ft

Comment:

Node: Existing Office

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 11.12 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.02	784
15.00	0.07	3180
15.50	0.23	10062
16.00	0.63	27312
16.50	1.27	55147
17.00	2.12	92521

Comment:

Node: LOT 2

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 8.20 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.03	1481
15.00	0.14	5881
15.50	0.35	15377
16.00	0.79	34587
16.50	1.46	63554
17.00	2.32	100841
17.50	3.25	141526
18.00	4.18	182255

Comment:

Node: LOT 3

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 10.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.02	958
15.00	0.09	3920
15.50	0.28	12023
16.00	0.74	32147
16.50	1.48	64382
17.00	2.50	108769
17.50	3.66	159212
18.00	4.81	209698

Comment:

Node: LOT 4

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 10.00 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.00	0.00	0
14.50	0.02	784
15.00	0.07	3180
15.50	0.28	12240
16.00	0.98	42515
16.50	2.18	94961
17.00	3.89	169623
17.50	5.86	255349
18.00	7.83	341075

Comment:

Node: MH 4

Scenario: Zero
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 10.35 ft
Warning Stage: 0.00 ft

Comment:

Node: MH 8

Scenario: Zero
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 10.11 ft
Warning Stage: 0.00 ft

Comment:

Node: Outfall

Scenario: Zero
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 12.00 ft
Warning Stage: 0.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	12.60
0	0	0	4.0000	12.70
0	0	0	8.0000	12.80
0	0	0	12.0000	12.90
0	0	0	24.0000	13.10
0	0	0	62.0000	13.50
0	0	0	72.0000	13.00
0	0	0	96.0000	12.80

Comment:

Node: Proposed Road

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 9.70 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
15.10	0.00	0
15.60	0.05	2004
16.10	0.18	7971
16.60	0.44	19166
17.10	0.70	30361
17.60	0.95	41513
18.10	1.21	52708
18.60	1.47	63859
19.10	1.72	75054

Comment:

Node: Wetland Preserve Tract

Scenario: Zero
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 13.02 ft
Warning Stage: 0.00 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
12.00	0.00	0
12.50	0.52	22651
13.00	1.18	51488
13.50	1.99	86467
14.00	2.93	127631

Stage [ft]	Volume [ac-ft]	Volume [ft3]
14.50	3.98	173412
15.00	5.10	222287
15.50	6.30	274254
16.00	7.56	329270
16.50	8.89	387423
17.00	10.23	445532
17.50	11.56	503641
18.00	12.90	561793

Comment:

Drop Structure Link: CS2 - Existing Lake

Scenario:	Zero
From Node:	Dry Retention Area 2
To Node:	Existing Lake
Link Count:	1
Flow Direction:	Both
Solution:	Combine
Increments:	10
Pipe Count:	1
Damping:	0.0000 ft
Length:	80.00 ft
FHWA Code:	0
Entr Loss Coef:	0.00
Exit Loss Coef:	0.00
Bend Loss Coef:	0.00
Bend Location:	0.00 ft
Energy Switch:	Energy

Upstream Pipe

Invert:	10.00 ft
Manning's N:	0.0110
Geometry:	Circular
Max Depth:	2.00 ft
Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000
Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000

Downstream Pipe

Invert:	8.00 ft
Manning's N:	0.0110
Geometry:	Circular
Max Depth:	2.00 ft
Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000
Top Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000

Pipe Comment:

Weir Component

Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Rectangular
Invert:	14.60 ft
Control Elevation:	14.60 ft
Max Depth:	3.00 ft
Max Width:	9.00 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:

Weir Component	
Weir:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	13.50 ft
Control Elevation:	13.50 ft
Max Depth:	0.25 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:

Weir Component	
Weir:	3
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	14.10 ft
Control Elevation:	14.10 ft
Max Depth:	0.50 ft
Max Width:	3.00 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:

Drop Structure Comment:

Pipe Link: D1 - D2	
Scenario:	Zero
From Node:	LOT 2
To Node:	Dry Retention Area 2
Link Count:	1
Flow Direction:	Positive
Damping:	0.0000 ft
Length:	15.00 ft
FHWA Code:	0
Entr Loss Coef:	0.00
Exit Loss Coef:	0.00

Upstream	
Invert:	8.20 ft
Manning's N:	0.0110

Geometry: Circular	
Max Depth:	3.00 ft

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000

Top Clip	
Default:	0.00 ft

Downstream	
Invert:	8.00 ft
Manning's N:	0.0110

Geometry: Circular	
Max Depth:	3.00 ft

Bottom Clip	
Default:	0.00 ft
Op Table:	
Ref Node:	
Manning's N:	0.0000

Top Clip	
Default:	0.00 ft

Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: D11 - D10		Upstream		Downstream	
Scenario:	Zero	Invert:	9.70 ft	Invert:	9.50 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	16.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: D6 - D7		Upstream		Downstream	
Scenario:	Zero	Invert:	9.70 ft	Invert:	9.50 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	Dry Retention Area 1	Geometry: Circular		Geometry: Circular	
		Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	17.00 ft	Ref Node:		Ref Node:	
FHWA Code:	0	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: D8 - D9		Upstream		Downstream	
Scenario:	Zero	Invert:	9.70 ft	Invert:	9.50 ft
From Node:	LOT 2	Manning's N:	0.0110	Manning's N:	0.0110

To Node:	Dry Retention Area 1
Link Count:	1
Flow Direction:	Both
Damping:	0.0000 ft
Length:	16.00 ft
FHWA Code:	0
Entr Loss Coef:	0.00
Exit Loss Coef:	0.00
Bend Loss Coef:	0.00
Bend Location:	0.00 ft
Energy Switch:	Momentum

Geometry: Circular		Geometry: Circular	
Max Depth:	1.25 ft	Max Depth:	1.25 ft
Bottom Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000
Top Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Drop Structure Link: Dry Pretreatment Area 1 to Lake

Scenario:	Zero
From Node:	Dry Retention Area 1
To Node:	Existing Lake
Link Count:	1
Flow Direction:	Both
Solution:	Combine
Increments:	10
Pipe Count:	1
Damping:	0.0000 ft
Length:	47.00 ft
FHWA Code:	0
Entr Loss Coef:	0.00
Exit Loss Coef:	0.00
Bend Loss Coef:	0.00
Bend Location:	0.00 ft
Energy Switch:	Energy

Upstream Pipe		Downstream Pipe	
Invert:	9.00 ft	Invert:	7.00 ft
Manning's N:	0.0120	Manning's N:	0.0120
Geometry: Circular		**Geometry: Circular**	
Max Depth:	3.00 ft	Max Depth:	3.00 ft
Bottom Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000
Top Clip			
Default:	0.00 ft	Default:	0.00 ft
Op Table:		Op Table:	
Ref Node:		Ref Node:	
Manning's N:	0.0000	Manning's N:	0.0000

Pipe Comment:

Weir Component

Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000 ft
Weir Type:	Horizontal
Geometry Type:	Rectangular
Invert:	14.60 ft
Control Elevation:	14.60 ft
Max Depth:	3.00 ft
Max Width:	9.00 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:	