

Spruce Creek Crossover Subdivision Preliminary Stormwater Report

**June 2025
Revised October 2025**



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Reg. # 46586

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PROPERTY INFORMATION

The proposed project consists of 111 single family homes and community amenities located on two adjacent parcels with a total gross site area of ± 125.77 acres. The property itself is within the jurisdictional boundary of Volusia County and the St. Johns River Water Management District (SJRWMD). The project parcels are bound by the residential neighborhoods of Spruce Creek Farms and A Quiet Place in the Country to the west, north, and south, and bound to the east by the residential neighborhoods The Reserve at Spruce Creek, Lakes at Spruce Creek, Woodside at Spruce Creek, and Spruce Creek Golf Villas Condos. Spruce Creek flows along the western property line which includes a FEMA Regulatory Floodway, a FEMA 100YR Base Flood Elevation (BFE), and a Riparian Habitat zone. Along the path of Spruce Creek there are recorded wetlands and surface waters as well as several isolated wetlands in the project site.

For location reference, please see the Location Map included in Appendix A.

All elevations referenced within this report are part of North American Vertical Datum of 1988 (NAVD88) unless stated otherwise.

PRE-DEVELOPMENT DRAINAGE DISCUSSION

The project site is composed of two parcels; a ± 86.37 -acre parcel encompassing the eastern banks of Spruce Creek (Parcel A), and a ± 39.40 -acre parcel (Parcel B) located on the southeast side of Parcel A.

Parcel A is heavily forested and has various slopes sloping from east to the creek along the western boundary of the parcel. In addition to the stormwater sheet flows across Parcel A, the Woodside at Spruce Creek neighborhood has a series of swales that discharge to Parcel A where the stormwater travels along a ravine and into Spruce Creek. Per the enclosed Wetland Assessment, there are three wetlands located within the confines of Parcel A: W1, W2A, & W2B. Wetland W1 is the wetland body along Spruce Creek and Wetlands W2A and W2B are two adjacent isolated depressional area that accumulate stormwater and eventually overtop to where they discharge to Spruce Creek. Per FEMA FIRM panel #12127C0508J, dated September 29th, 2017, the western boundary of the site along the creek is designated as a Regulatory Floodway, and expands out from there as Zone "AE" with a designated 100YR BFE. The remainder of Parcel A is designated Zone "X", areas of minimal flood hazard.

Parcel B is sparsely forested with large areas of open fields and clusters of trees along the southwest corner of the parcel, in an isolated wetland in the middle of the parcel, and in an isolate wetland in the northeast corner of the parcel. The western third of the parcel is sloped towards the creek, with the middle third sloped towards the isolated wetland, and the eastern third sloped towards the east draining to a wet detention pond located in the adjacent Reserve at Spruce Creek neighborhood. Per the enclosed Wetland Assessment, there are four wetlands located within this parcel; W-A, W-B, W-C, and W-D. W-A is isolated and located at the northwest corner of the parcel. W-B and W-D are two wetlands located in the middle of the property and are interconnected with an existing pipe. These wetlands flow north through a series of interconnected wetlands in the Lakes at Spruce Creek and Reserve at Spruce Creek neighborhoods where it eventually discharges to Spruce Creek. Additionally, W-D is connected to Spruce Creek to the south through a series of existing ditches. W-C is an isolate wetland located on the northeast

corner of the parcel. Per FEMA FIRM panel #12127C0508J, dated September 29th, 2017, Parcel B is designated Zone “X”, areas of minimal flood hazard.

As shown on the pre-development basin map included in Appendix C, the pre-development stormwater model consists of eleven basins. Only pre-development basins which were being modified in the post-development conditions were modeled. Areas that were not being modified such as wetlands being protected and their buffers, riparian habitat areas, the Environmental Systems Corridor and its buffer, or the western side of Parcel A were not modeled and as such, the post-development flows will replicate those in pre-development conditions. Of the eleven pre-development basins, Pre-1, Pre-2, Pre-3, Pre-4, Pre-5, Pre-6, Pre-7, and Pre-8 all directly outfall to Spruce Creek. Additionally, Pre-9 discharges to the Wetland W2A’s and W2B’s depressional area in Parcel A where it then overtops and outfalls to Spruce Creek. Basin Pre-10 discharges to the interconnected Wetlands W-D and W-B in Parcel B. The last basin, Pre-11, is located on the eastern portion of Parcel B and discharges to Wetland W-D and the adjacent detention pond.

The pre-development conditions have been modeled using Stormwise (previously known as Interconnected Ponds and Routing version 4 – ICPR4), and the input data and results can be found in Appendices C-F.

DESIGN CRITERIA

Stormwater management for this site falls under the jurisdiction of SJRWMD and Volusia County. The stormwater design criteria for the system are as follows:

- Building finish floors shall be at least 1-ft above the 100-yr base flood elevation and at least 1-ft above the peak stage of the 100-yr, 24-hr storm event for adjacent ponds.
- Proposed discharge rates to a receiving node shall not exceed the existing rate of runoff in the mean annual (2.33-yr, 24-hr) or 25-yr, 24-hr storm events per SJRWMD.
- A reduction such that the the post-development condition average annual loading of nutrients (TN & TP) does not exceed the pre-development condition nutrient loading per SJRWMD.
- As Spruce Creek is an Outstanding Florida Waterbody (OFW), a 90% reduction of the average annual loading of TP and an 80% reduction in the average annual loading of TN from the proposed project per SJRWMD.

POST-DEVELOPMENT DRAINAGE DISCUSSION

The proposed development is designed to have minimal impacts of the existing wetlands throughout Spruce Creek and adjacent properties, and to improve the stormwater conditions of the project site discharging to Spruce Creek. The project is to be developed in one phase. The FEMA Regulatory Floodway as well as the areas labeled Zone “AE” remain unaltered therefor the proposed development does not affect the current 100YR base flood elevation. In addition, outside of the proposed bridge crossing over the creek, the proposed condition does not alter areas within the Environmental Systems Corridor, the Riparian Habitat area, or the wetlands along Spruce Creek. Two discovered existing surface water

areas as well as several isolated wetlands are proposed to be impacted along the rest of the property and are to be mitigated for stormwater impacts. The stormwater outfall from the adjacent Woodside at Spruce Creek community is to be collected and piped to the eventual outfall of Spruce Creek matching the pre-existing conditions.

As shown in Appendix G, the post-development condition consists of five basins. Basins Post-1, Post-2, and Post-3 outfall to Spruce Creek. Basins Post-4 and Post-5 have split outfalls which outfall to both Spruce Creek and the interconnected Wetlands, Wetland W-D and W-B. The proposed stormwater management systems for these basins maintain existing flow patterns matching the pre-existing conditions and reduce stormwater flows to each of these outfalls. Additionally, the flow to the adjacent stormwater detention pond within the Reserve at Spruce Creek neighborhood has been eliminated allowing for additional stormwater capacity within that pond. To reduce nutrient discharge into Spruce Creek and Wetlands W-D and W-B, each of the basins have been designed using either planted dry retention ponds or planted dry retention ponds / bioswales in conjunction with wet detention ponds. These treatment systems align with Volusia County's Low Impact Development (LID) implementation guidelines.

Consistent with the pre-development modeling, the post-development conditions have been modeled using Stormwise (previously known as Interconnected Ponds and Routing version 4 – ICPR4), and the input data and results can be found in Appendices G-J. A summary comparing the pre-development and post-development flow rates as well as displaying the peak stages of the proposed ponds can be found in Appendix B.

APPENDICES

APPENDIX A: SITE EXHIBITS



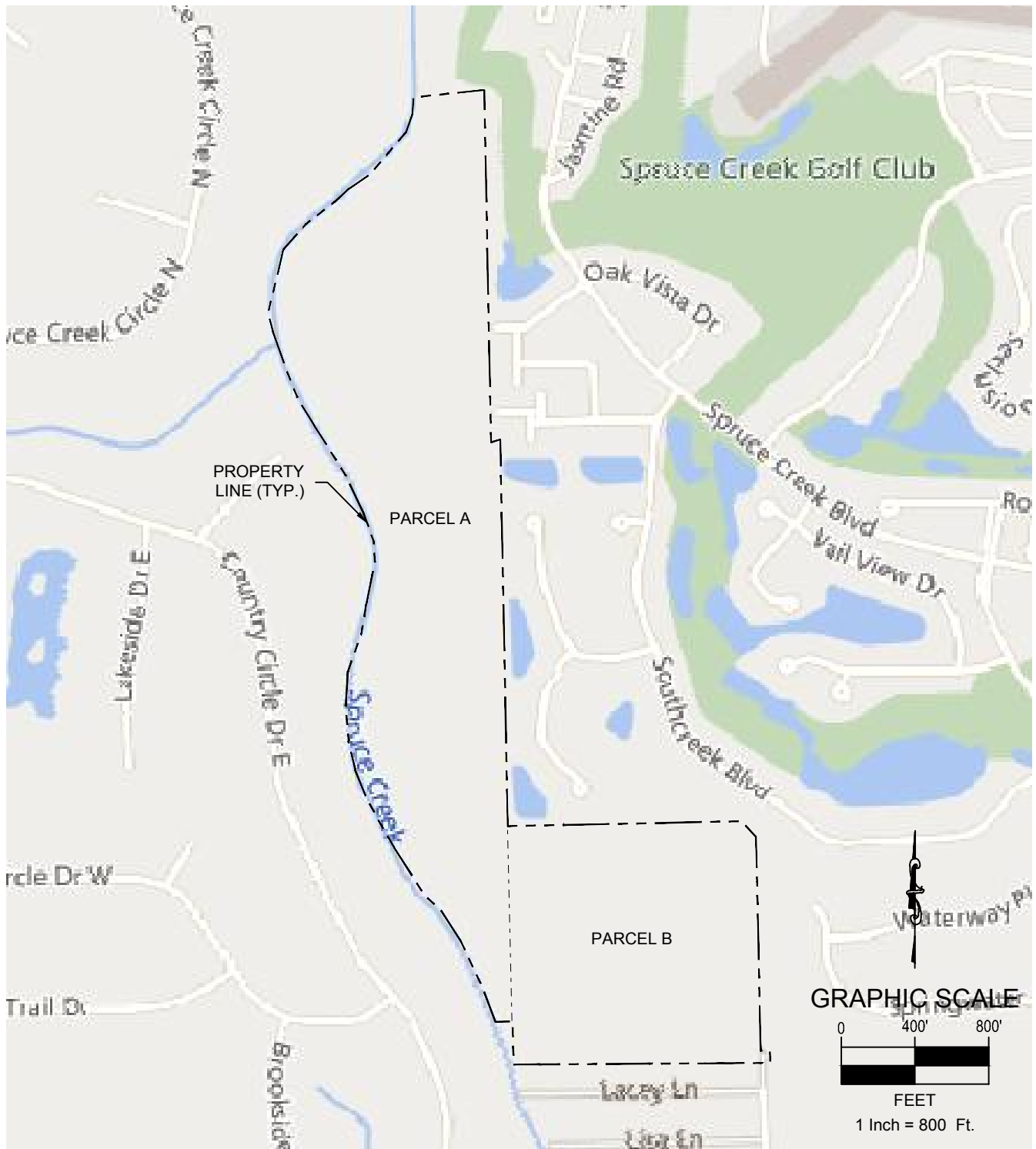
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SPRUCE CREEK CROSSING AERIAL MAP



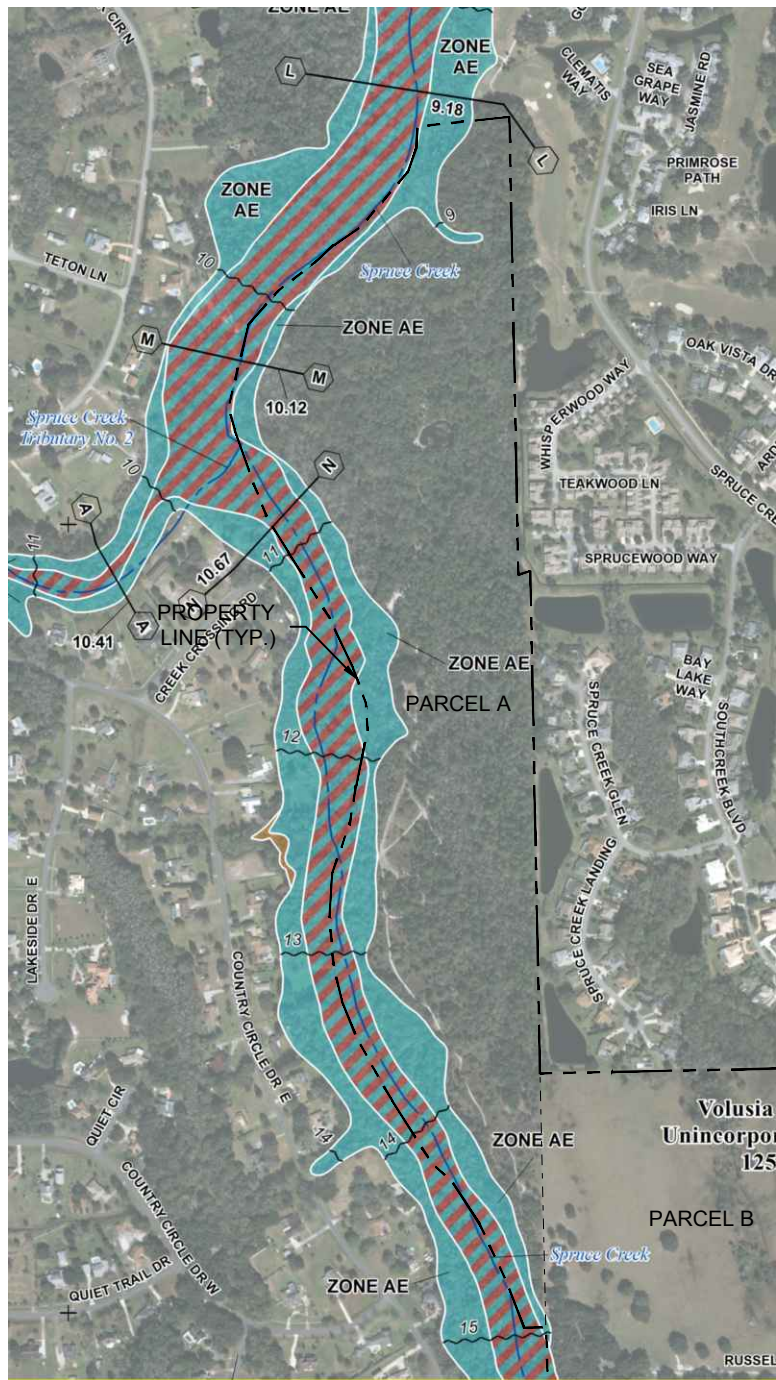
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SPRUCE CREEK CROSSING LOCATION MAP



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING
DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
OTHER AREAS		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes Zone X
GENERAL STRUCTURES		NO SCREEN Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
OTHER FEATURES		Channel, Culvert, or Storm Sewer
		Accredited or Provisionally Accredited Levee, Dike, or Floodwall
OTHER FEATURES		Non-accredited Levee, Dike, or Floodwall
		Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
OTHER FEATURES		Coastal Transect
		Coastal Transect Baseline
OTHER FEATURES		Profile Baseline
		Hydrographic Feature
OTHER FEATURES		Base Flood Elevation Line (BFE)
		Limit of Study
OTHER FEATURES		Jurisdiction Boundary
		Jurisdiction Boundary

SOURCE: FEMA FIRM PANEL 12127C0508J, SEPTEMBER 29, 2017
FEMA FIRM PANEL 12127C0516H, FEBRUARY 19, 2014



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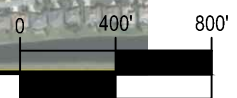
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**SPRUCE CREEK CROSSING
FEMA FIRM MAP**

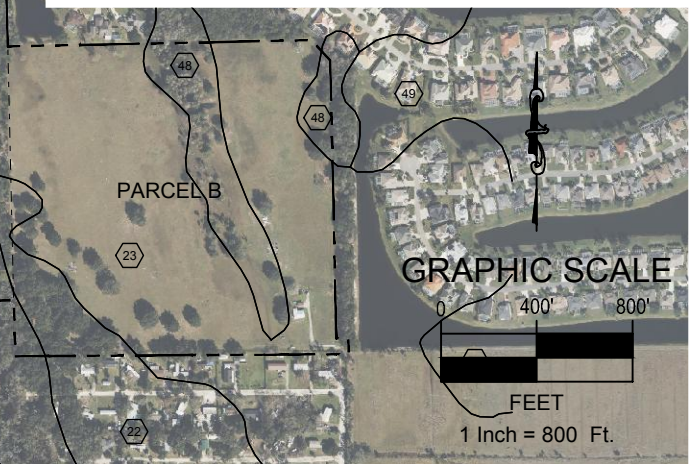
**VOLUSIA COUNTY
UNINCORPORATED AREAS
125155**

GRAPHIC SCALE



SOILS MAP LEGEND

SOILS NUMBER	SOIL NAME & DESCRIPTION	HYDROLOGIC GROUP
8	BASINGER FINE SAND, FREQUENTLY PONDED, 0-1% SLOPES	A/D
13	CASSIA FINE SAND, 0-2% SLOPES	A
17	DAYTONA SAND, 0-5% SLOPES	A
22	ELECTRA FINE SAND, 0-5% SLOPES	A
23	FARMTON FINE SAND	B/D
24	FLUVAQUENTS	D
31	MALABAR FINE SAND	A/D
42	PAOLA FINE SAND, 0-8 % SLOPES	A
48	PLACID FINE SAND, FREQUENTLY PONDED, 0-1% SLOPES	A/D
49	POMONA FINE SAND	A/D
51	POMONA-ST. JOHNS COMPLEX	A/D
61	ST. JOHNS FINE SAND	B/D
63	TAVARES FINE SAND, 0-5% SLOPES	A
66	TOMOKA MUCK, FREQUENTLY PONDED, 0-1% SLOPES	A/D
73	WABASSO-WABASSO, WET, FINE SAND, 0-2% SLOPES	B/D
75	WAUCHULA FINE SAND	A/D



SOURCE: NRCS SOIL RESOURCE REPORT



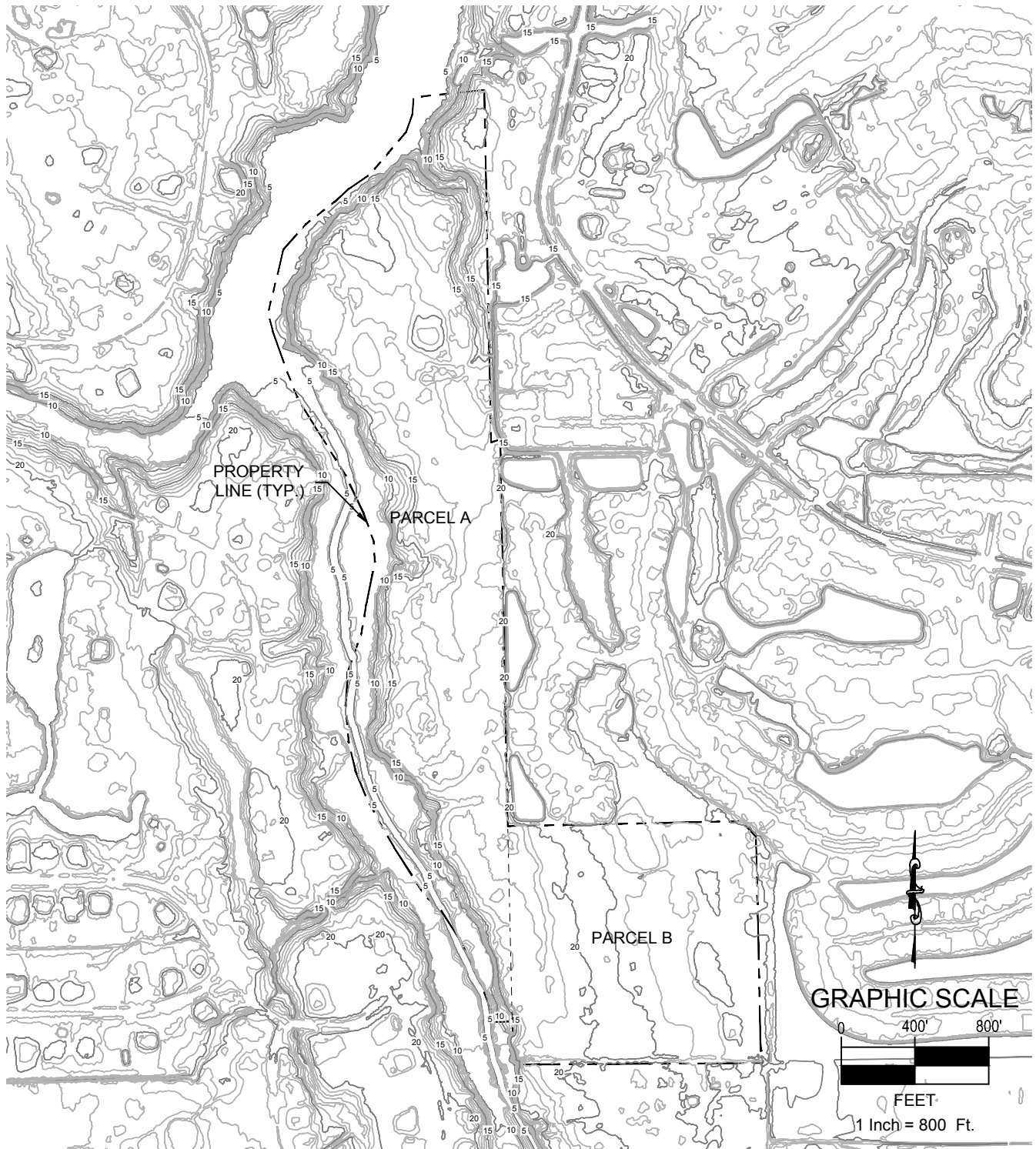
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SPRUCE CREEK CROSSING SOIL MAP



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SPRUCE CREEK CROSSING TOPOGRAPHIC MAP

**APPENDIX B: PRE-DEVELOPMENT VS. POST-DEVELOPMENT
STORMWATER SUMMARY & STAGES**

Spruce Creek
PRE/POST SUMMARY

Analyzed: 9/24/25

Pre v. Post Development Discharge Rate Analysis (Spruce Creek)

Event	Pre (cfs)	Post (cfs)	Diff. (cfs)
25YR-24HR	68.31	18.83	-49.48
Mean Annual	25.75	8.05	-17.70

Note: Refer to Pre- and Post-development ICPR Node Min Max Reports

Pre v. Post Development Discharge Rate Analysis (Wetland W-D & W-B)

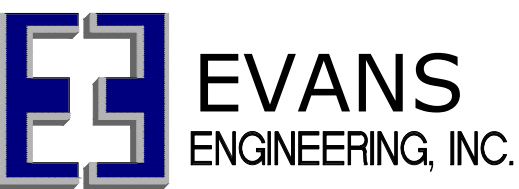
Event	Pre (cfs)	Post (cfs)	Diff. (cfs)
25YR-24HR	30.48	29.83	-0.65
Mean Annual	13.91	0.00	-13.91

Note: Refer to Pre- and Post-development ICPR Node Min Max Reports

Post Development Pond Peak Stage Analysis

Node No.	Peak Stage (Elevation in feet)		
	100YR-24HR	25YR-24HR	Mean Annual
Pond 2 Dry (Top = 18.2)	17.27	16.75	15.90
Pond 2 Wet (Top = 18.2)	17.27	16.75	16.00
Pond 3 Dry (Top = 20.2)	19.19	18.30	17.09
Pond 3 Wet (Top = 20.2)	19.16	18.29	16.13
Pond 4 Dry (Top = 22.2)	21.90	21.22	20.20
Pond 4 Wet (Top = 22.2)	21.89	21.22	19.89
Pond 5 DryA (Top = 22.2)	21.86	21.13	20.20
Pond 5 DryB (Top = 22.2)	21.86	21.13	20.20
Pond 5 Wet (Top = 22.2)	21.85	21.12	19.55

APPENDIX C: PRE-DEVELOPMENT BASIN MAP & ICPR NODE DIAGRAM

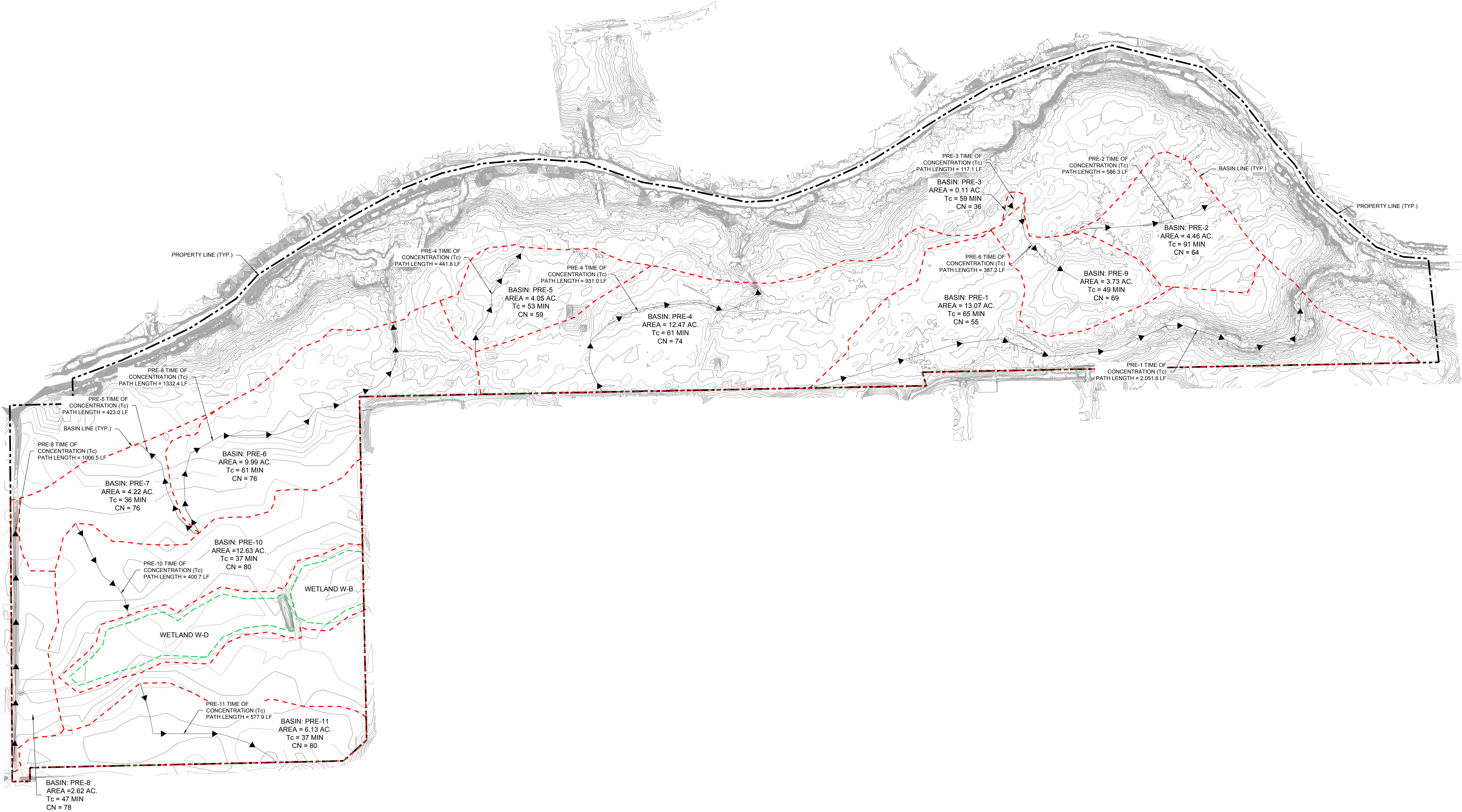


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SPRUCE CREEK CROSSING

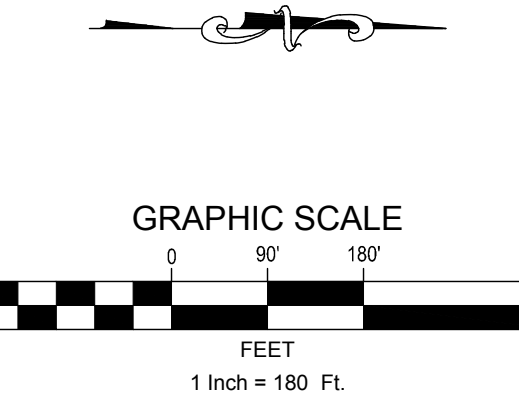
VOLUSIA COUNTY, FLORIDA

PRE-DEVELOPMENT
BASIN MAP



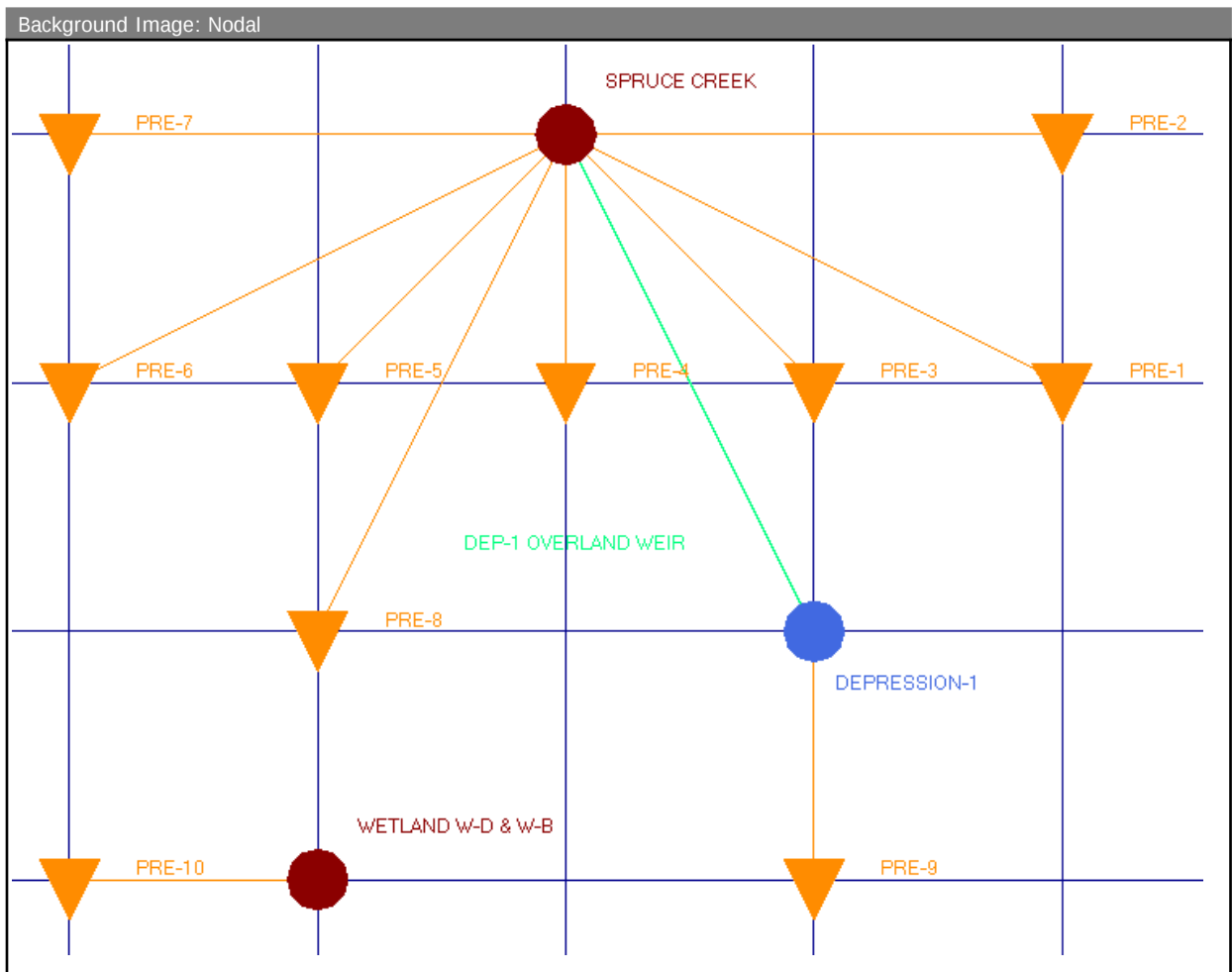
REVISIONS		BY
DATE	NO.	DETAIL

DRAWN BY: LAV	DATE: 03/19/25
CHECKED BY: DLE	JOB #: 37603



SHEET #:
PRE-1

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3:\085\37603 - Volusia County Spruce Creek Crossing\Stormwater\CAD & Exhibits\37603 Spruce Creek Crossing Basin.dwg (PRE-01) Plotted on: Sep 24, 2025 - 12:22pm by Taylor Blumer



APPENDIX D: PRE-DEVELOPMENT HYDROLOGY CALCULATIONS

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-1

Basin CN Calculation Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	mperv. Area (Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Woods)	A	36	7.24	-	260.7
Pervious (Woods)	B/D	79	5.38	-	424.7
Pervious (Woods)	D	79	0.45	-	35.4
TOTAL AREA			13.07	0.00	720.8

CN = 55**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.011
Sheet Flow, min	39.3

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	1951.6
Water course slope, s, ft./ft.	0.006
Avg. V, fps	1.25
Shallow Conc Flow, min	26.0

Tc (min) = 65**Basin - PRE-2**

Basin CN Calculation Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	mperv. Area (Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Woods)	A	36	1.60	-	57.4
Pervious (Woods)	B/D	79	2.87	-	226.7
Pervious (Woods)	D	79	0.00	-	0.0
TOTAL AREA			4.46	0.00	284.1

CN = 64**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.002
Sheet Flow, min	83.8

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	486.3
Water course slope, s, ft./ft.	0.005
Avg. V, fps	1.15
Shallow Conc Flow, min	7.0

Tc (min) = 91

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-3

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Woods)	A	36	0.11	-	3.9
Pervious (Woods)	B/D	79	0.00	-	0.0
Pervious (Woods)	D	79	0.00	-	0.0
TOTAL AREA			0.11	0.00	3.9

CN = 36**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.004
Sheet Flow, min	58.3

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	17.1
Water course slope, s, ft./ft.	0.011
Avg. V, fps	1.70
Shallow Conc Flow, min	0.2

Tc (min) = 59**Basin - PRE-4**

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Woods)	A	36	1.36	-	48.9
Pervious (Woods)	B/D	79	11.11	-	877.7
Pervious (Woods)	D	79	0.00	-	0.0
TOTAL AREA			12.47	0.00	926.7

CN = 74**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.006
Sheet Flow, min	49.9

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	831.0
Water course slope, s, ft./ft.	0.006
Avg. V, fps	1.25
Shallow Conc Flow, min	11.1

Tc (min) = 61

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-5

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	2.07	-	80.7
Pervious (Grassland)	B/D	80	1.98	-	158.1
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			4.05	0.00	238.8

CN = 59**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.007
Sheet Flow, min	47.0

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	323.0
Water course slope, s, ft./ft.	0.002
Avg. V, fps	0.90
Shallow Conc Flow, min	6.0

Tc (min) = 53**Basin - PRE-6**

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Woods)	A	36	0.63	-	22.6
Pervious (Woods)	B/D	79	9.36	-	739.4
Pervious (Woods)	D	79	0.00	-	0.0
TOTAL AREA			9.99	0.00	761.9

CN = 76**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Light)
Manning's n	0.40
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.002
Sheet Flow, min	41.9

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	1232.4
Water course slope, s, ft./ft.	0.004
Avg. V, fps	1.05
Shallow Conc Flow, min	19.6

Tc (min) = 61

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-7

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	0.42	-	16.5
Pervious (Grassland)	B/D	80	3.79	-	303.4
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			4.22	0.00	319.9

CN = 76**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Grass (Dense)
Manning's n	0.24
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.002
Sheet Flow, min	32.0

Shallow Concentrated flow travel time calculator

Surface Desc. ("paved" or "unpaved")	Unpaved
Flow Length, ft.	323.0
Water course slope, s, ft./ft.	0.006
Avg. V, fps	1.25
Shallow Conc Flow, min	4.3

Tc (min) = 36**Basin - PRE-8**

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	0.11	-	4.3
Pervious (Grassland)	A/D	80	0.20	-	16.3
Pervious (Grassland)	B/D	80	2.31	-	184.7
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			2.62	0.00	205.3

CN = 78**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Grass (Dense)
Manning's n	0.24
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.008
Sheet Flow, min	17.1

Shallow Concentrated flow travel time calculator

Surface Desc. ("paved" or "unpaved")	Unpaved
Flow Length, ft.	906.5
Water course slope, s, ft./ft.	0.001
Avg. V, fps	0.50
Shallow Conc Flow, min	30.2

Tc (min) = 47

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-9

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	1.00	-	39.0
Pervious (Grassland)	B/D	80	2.73	-	218.8
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			3.73	0.00	257.7

CN = 69**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.008
Sheet Flow, min	45.8

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	287.2
Water course slope, s, ft./ft.	0.012
Avg. V, fps	1.75
Shallow Conc Flow, min	2.7

Tc (min) = 49**DEPRESSION-1 Stage-Storage:**

Stage	Area	Area	Storage Vol:um.	Storage	Cum. Storage
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
14.5	12,092	0.278	0.00	0.00	0.00
15.0	23,423	0.538	0.20	0.20	8,878.75
15.5	34,564	0.793	0.33	0.54	23,375.50
16.0	51,454	1.181	0.49	1.03	44,880.00
16.25	64,054	1.470	0.33	1.36	59,318.50

Basin - PRE-10

Basin CN Calculation		Hydric	Area	mperv. Area	
Land Use/Vegetation	Group	CN	(Ac.)	(Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	0.00	-	0.0
Pervious (Grassland)	A/D	80	1.05	-	83.8
Pervious (Grassland)	B/D	80	11.58	-	926.2
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			12.63	0.00	1010.0

CN = 80**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Grass (Dense)
Manning's n	0.24
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.002
Sheet Flow, min	30.0

Shallow Concentrated flow travel time calculator

Surface Desc.("paved" or "unpaved")	Unpaved
Flow Length, ft.	300.7
Water course slope, s, ft./ft.	0.003
Avg. V, fps	0.75
Shallow Conc Flow, min	6.7

Tc (min) = 37

Spruce Creek

Pre-Development Basin Hydrology

Analyzed: 9/24/25

Basin - PRE-11**Basin CN Calculation**

Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Imperv. Area (Ac.)	CN * Area
Impervious	-	98	0.00	0.00	0.0
Pond Surface	-	100	0.00	-	0.0
Pervious (Grassland)	A	39	0.00	-	0.0
Pervious (Grassland)	A/D	80	0.96	-	76.9
Pervious (Grassland)	B/D	80	5.17	-	413.7
Pervious (Grassland)	D	80	0.00	-	0.0
TOTAL AREA			6.13	0.00	490.5

CN = 80**Basin Tc Calculation****Sheet Flow travel time calculator**

Surface Desc.	Grass (Dense)
Manning's n	0.24
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.004
Sheet Flow, min	22.3

Shallow Concentrated flow travel time calculator

Surface Desc. ("paved" or "unpaved")	Unpaved
Flow Length, ft.	577.9
Water course slope, s, ft./ft.	0.002
Avg. V, fps	0.65
Shallow Conc Flow, min	14.8

Tc (min) = 37

APPENDIX E: PRE-DEVELOPMENT ICPR INPUT DATA

Simple Basin: PRE-1

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 65.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 13.0700 ac
Curve Number: 55.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-10

Scenario: Scenario1
Node: WETLAND W-D & W-B
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 37.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 12.6300 ac
Curve Number: 80.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-2

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number

Time of Concentration: 91.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.4600 ac
Curve Number: 64.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-3

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 59.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 0.1100 ac
Curve Number: 36.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-4

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 61.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area: 12.4700 ac
Curve Number: 74.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-5

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 53.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.0500 ac
Curve Number: 59.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-6

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 61.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 9.9900 ac
Curve Number: 76.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00

% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-7

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 36.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.2200 ac
Curve Number: 76.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-8

Scenario: Scenario1
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 47.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 2.6200 ac
Curve Number: 78.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: PRE-9

Scenario: Scenario1
 Node: DEPRESSION-1
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 49.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 3.7300 ac
 Curve Number: 69.0
 Ia/S: 0.00
 % Impervious: 0.00
 % DCIA: 0.00
 % Direct: 0.00
 Rainfall Name:

Comment:

Node: DEPRESSION-1

Scenario: Scenario1
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 14.50 ft
 Warning Stage: 18.00 ft
 Alert Stage: 18.00 ft

Stage [ft]	Area [ac]	Area [ft2]
14.50	0.2780	12110
15.00	0.5380	23435
15.50	0.7930	34543
16.00	1.1810	51444
16.25	1.4700	64033

Comment:

Node: SPRUCE CREEK

Scenario: Scenario1
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 5.75 ft
 Warning Stage: 10.00 ft
 Alert Stage: 10.00 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	5.75
0	0	0	72.0000	5.75

Comment:

Node: WETLAND W-D & W-B

Scenario: Scenario1
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 18.75 ft
 Warning Stage: 19.00 ft
 Alert Stage: 19.00 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	18.75
0	0	0	72.0000	18.75

Comment:

Weir Link: DEP-1 OVERLAND WEIR

Scenario: Scenario1
 From Node: DEPRESSION-1
 To Node: SPRUCE CREEK
 Link Count: 1
 Flow Direction: Both
 Damping: 0.0000 ft
 Weir Type: Broad Crested Vertical
 Geometry Type: Trapezoidal
 Invert: 16.12 ft
 Control Elevation: 16.12 ft
 Max Depth: 1.00 ft
 Extrapolation Method: Normal Projection
 Bottom Width: 43.00 ft
 Left Slope: 55.600 (h:v)
 Right Slope: 90.900 (h:v)

Bottom Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Top Clip

Default: 0.00 ft
 Op Table:
 Ref Node:

Discharge Coefficients

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

Comment:

Simulation: 010YR-24HR

Scenario: Scenario1

Run Date/Time: 10/13/2025 1:30:13 PM
 Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set:

Green-Ampt Set:
 Vertical Layers Set:
 Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global
 Opt:

Link Optimizer Tol: 0.0001 ft

Rainfall Name: ~FLMOD
 Rainfall Amount: 7.06 in
 Storm Duration: 24.0000 hr
 Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:

Simulation: 02.3YR-24HR (MEAN ANNUAL)

Scenario: Scenario1

Run Date/Time: 10/13/2025 1:30:42 PM

Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Lookup Tables

Boundary Stage Set:

Unit Hydrograph
Folder:

Extern Hydrograph Set:
Curve Number Set:

Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global
Opt:

Rainfall Name: ~FLMOD
Rainfall Amount: 5.10 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area: 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Simulation: 025YR-24HR

Scenario: Scenario1
Run Date/Time: 10/13/2025 1:31:09 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	72.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global
Opt:

Rainfall Name: ~FLMOD
Rainfall Amount: 8.97 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area: 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Simulation: 100YR-24HR

Scenario: Scenario1
Run Date/Time: 10/13/2025 1:32:10 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight: 0.5 dec
Fact:
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ftIA Recovery Time: 24.0000 hr
Ia/S: 0.20 dec
Smp/Man Basin Rain: Global
Opt:
Rainfall Name: ~FLMOD

Rainfall Amount: 12.40 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

APPENDIX F: PRE-DEVELOPMENT ICPR NODE MAX

Node Max Conditions : Multi Item | (name, sim) [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
DEPRESSIO N-1	02.3YR-24HR (MEAN ANNUAL)	18.00	18.00	15.61	0.0010	2.25	0.00	38350
DEPRESSIO N-1	025YR-24HR	18.00	18.00	16.15	0.0010	6.03	0.80	59234
SPRUCE CREEK	02.3YR-24HR (MEAN ANNUAL)	10.00	10.00	5.75	0.0000	25.75	0.00	0
SPRUCE CREEK	025YR-24HR	10.00	10.00	5.75	0.0000	68.31	0.00	0
WETLAND W-D & W-B	02.3YR-24HR (MEAN ANNUAL)	19.00	19.00	18.75	0.0000	13.91	0.00	0
WETLAND W-D & W-B	025YR-24HR	19.00	19.00	18.75	0.0000	30.48	0.00	0

APPENDIX G: POST-DEVELOPMENT BASIN MAP & ICPR NODE DIAGRAM



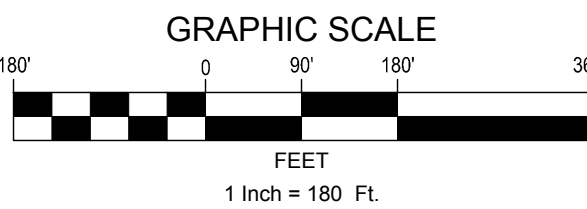
SPRUCE CREEK CROSSING
VOLUSIA COUNTY, FLORIDA

VOLUSIA COUNTY, FLORIDA

POST-DEVELOPMENT BASIN MAP

[illegible]

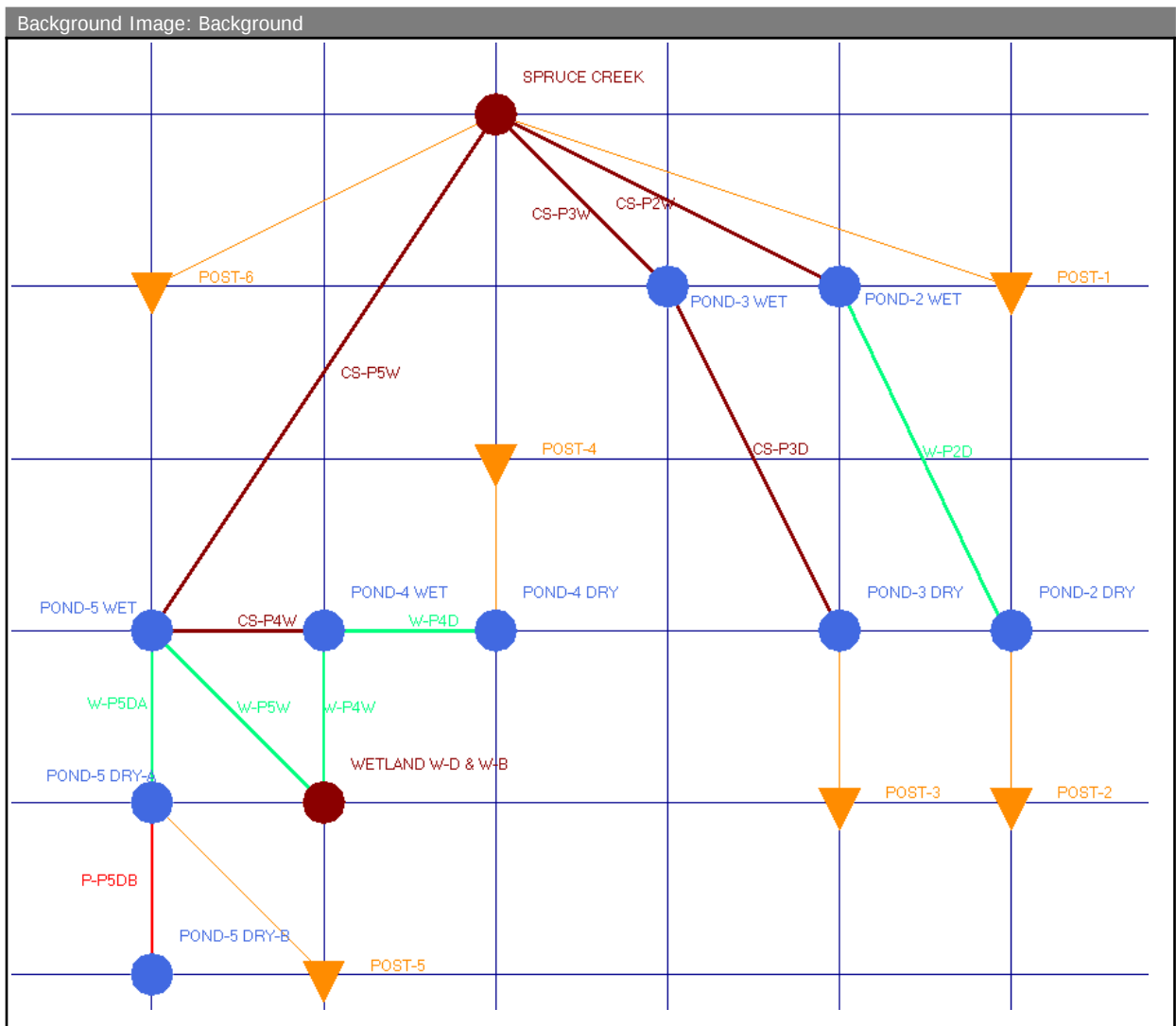
DRAWN BY: LAV	DATE: 03/19/25
CHECKED BY: DLE	JOB #: 37603



SHEET #:

POST-1

\\JORS\37603 - Volusia County Source Creek\Stormwater\CAD & Exhibit\37603 Source Creek Concent PostDay Basins.dwg (POST-DEV) Plotted on: Sep 24 2025 - 12:21am by Taylor Dittmer



APPENDIX H: POST-DEVELOPMENT HYDROLOGY CALCULATIONS

Spruce Creek

Post-Development Basin Hydrology

Analyzed: 9/24/25

Basin - POST 1

Total Basin Area = 4.55 Ac

Post 1 Basin Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Imperv. Area (Ac.)	CN * Area
Pervious	A	39	4.28	-	166.9
Pervious	B/D	80	0.00	-	0.0
Pervious	D	80	0.27	-	21.8
TOTAL AREA			4.55	0.00	188.6

Site impervious percentage = 0.0%

CN = 41

Basin 1 c Calculation

Sheet Flow travel time calculator	
Surface Desc.	Woods (Dense)
Manning's n	0.80
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.021
Sheet Flow, min	30.4

Shallow Concentrated flow travel time calculator	
Surface Desc. ("paved" or "unpaved")	Unpaved
Flow Length, ft.	1070.5
Water course slope, s, ft./ft.	0.008
Avg. V, fps	1.55
Shallow Conc Flow, min	11.5

Time of Concentration = 42

Basin - POST 2

Total Basin Area =		20.89 Ac			
Post 2 Basin				Imperv.	
Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Area (Ac.)	CN * Area
Pervious	A	39	3.53	-	137.8
Pervious	B/D	80	9.84	-	787.5
Pervious	D	80	0.25	-	19.7
*Impervious - ROW (Road, Curb, Sidewalk)	-	98	1.69	1.69	165.4
*Impervious - Lots (Building, Driveway, Patio/Pool)	-	98	2.88	2.88	282.2
*Impervious - Amenity (80% Impervious)	-	98	0.74	0.74	72.3
Pond water surface	-	100	2.70	-	270.1
TOTAL AREA			21.63	5.31	1735.1
Site impervious percentage =		24.5%			
		CN = 80			

- Water Quality Volume Calculations (Wet Detention):**
1. Compute 1 inch of runoff from the total basin area:
= 1 IN x Site Area x (1 FT/12 IN)
= 1.74 AC-FT
2. Compute 2.5 inches times impervious area (excluding water bodies):
= (2.5 IN x Site Impervious Area) x (1 FT/12 IN)
= 1.11 AC-FT
3. The 1 inch of runoff from the total basin area is the greater governing volume:
= 1.74 AC-FT
4. Since the site discharges to the Spruce Creek and this is an Outstanding Florida Water, an additional 50% of water quality is required:
= Governing Volume x 1.5
= 2.61 AC-FT

Pond-2 Dry Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank

Stage elevation in feet	Area Ft²	Area Ac.	Storage Vol AcFt	Cum. Storage AcFt	Cum. Storage Ft³
14.75	190,931	4.383	0.00	0.00	0.00
15.0	192,742	4.425	1.10	1.10	47,959.13
16.0	203,530	4.672	4.55	5.65	246,095.13
16.5	208,449	4.785	2.36	8.01	349,089.88
17.0	215,806	4.954	2.43	10.45	455,153.63
18.0	226,109	5.191	5.07	15.52	676,111.13
18.2	252,307	5.792	1.10	16.62	723,952.73

Permanent Pool Volume

Drainage area =	21.63 Ac.
Runoff coef.:	0.46
Wet season rainfall depth :	31 in.
Minimum residence time :	21 days
Length of wet season =	153 days
Conversion factor =	12 in./ft.
Minimum PPV required =	3.52 AcFt

Actual Residence Time:

Flow rate, AcFt/day=	0.168
Total PPV, AcFt=	14.56
Residence time, days=	87

Pond-2 Wet PPV Calculations:

Pond Stage-Storage from Bottom to NWL / SHGWT

Stage elevation in feet	Area Ft²	Area Ac.	PPV AcFt	Cum. PPV AcFt	Cum. PPV Ft³
10.0	97,439	2.237	0.00	0.00	0.00
11.0	99,876	2.293	2.26	2.26	98,657.50
12.0	102,338	2.349	2.32	4.59	199,764.50
13.0	104,825	2.406	2.38	6.96	303,346.00
14.0	107,338	2.464	2.44	9.40	409,427.50
15.0	112,438	2.581	2.52	11.92	519,315.50
16.0	117,639	2.701	2.64	14.56	634,354.00

Pond-2 Wet Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank

Stage elevation in feet	Area Ft²	Area Ac.	Storage Vol AcFt	Cum. Storage AcFt	Cum. Storage Ft³
16.0	117,639	2.701	0.00	0.00	0.00
16.5	120,278	2.761	1.37	1.37	59,479.25
17.0	125,158	2.873	1.41	2.77	120,838.25
18.0	127,920	2.937	2.90	5.68	247,377.25
18.2	134,949	3.098	0.60	6.28	273,664.15

PAV calculations

Required PAV =	2.61 AcFt
Dry Pond Retention Elevation =	16.50 ft
Storage within Dry Pond =	8.01 AcFt
Wet Pond Detention Elevation =	16.60 ft
Storage within Wet Pond =	1.64 AcFt
Total Detention/Retention Storage =	9.65 AcFt

Time of Concentration = 10 minutes

Basin - POST 3

Total Basin Area =		17.34 Ac			
Post 3 Basin				Imperv.	
Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Area (Ac.)	CN * Area
Pervious	A	39	3.23	-	125.9
Pervious	B/D	80	8.83	-	706.0
Pervious	D	80	0.00	-	0.0
*Impervious - ROW (Road, Curb, Sidewalk)	-	98	1.45	1.45	142.2
*Impervious - Lots (Building, Driveway, Patio/Pool)	-	98	2.98	2.98	292.3
Pond water surface	-	100	0.85	-	84.7
TOTAL AREA			17.34	4.43	1351.2

Site impervious percentage = 25.6%

CN = 78

Water Quality Volume Calculations (Wet Detention):

1. Compute 1 inch of runoff from the total basin area:
- = 1 IN x Site Area x (1 FT/12 IN)
- = 0.00 AC-FT
2. Compute 2.5 inches times impervious area (excluding water bodies):
- = (2.5 IN x Site Impervious Area) x (1 FT/12 IN)
- = 0.92 AC-FT
3. Compute 2.5 inches times impervious area (excluding water bodies) is the greater governing volume:
- = 0.92 AC-FT
4. Since the site discharges to the Spruce Creek and this is an Outstanding Florida Water, an additional 50% of water quality is required:
- = Governing Volume x 1.5
- = 1.38 AC-FT

Pond-3 Dry Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank					
Stage	Area	Area	Storage Vol	Cum. Storage	Cum. Storage
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
15.0	64,095	1.471	0.00	0.00	0.00
16.0	71,118	1.633	1.55	1.55	67,606.50
17.0	78,427	1.800	1.72	3.27	142,379.00
18.0	86,020	1.975	1.89	5.16	224,602.50
19.0	93,874	2.155	2.06	7.22	314,549.50
20.0	101,852	2.338	2.25	9.47	412,412.50
20.2	122,236	2.806	0.51	9.98	434,821.30

Permanent Pool Volume

Drainage area =	17.34 Ac.
Runoff coef.:	0.41
Wet season rainfall depth :	31 in.
Minimum residence time :	21 days
Length of wet season =	153 days
Conversion factor =	12 in./ft.
Minimum PPV required =	2.54 AcFt

Actual Residence Time:

Flow rate, AcFt/day= 0.121

Total PPV, AcFt= 3.11

Residence time, days= 26

Pond-3 Wet PPV Calculations:

Pond Stage-Storage from Bottom to NWL / SHGWT					
Stage	Area	Area	PPV	Cum. PPV	Cum. PPV
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
10.0	17,641	0.405	0.00	0.00	0.00
11.0	19,190	0.441	0.42	0.42	18,415.50
12.0	22,352	0.513	0.48	0.90	39,186.50
13.0	24,711	0.567	0.54	1.44	62,718.00
13.4	25,762	0.591	0.23	1.67	72,812.60
14.0	29,000	0.666	0.38	2.05	89,241.20
15.0	34,598	0.794	0.73	2.78	121,040.20
15.4	36,907	0.847	0.33	3.11	135,341.20

Pond-3 Wet Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank					
Stage	Area	Area	Storage Vol	Cum. Storage	Cum. Storage
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
15.4	36,907	0.847	0.00	0.00	0.00
16.0	40,427	0.928	0.53	0.53	23,200.20
17.0	46,375	1.065	1.00	1.53	66,601.20
18.0	52,424	1.203	1.13	2.66	116,000.70
19.0	58,574	1.345	1.27	3.94	171,499.70
20.0	64,824	1.488	1.42	5.35	233,198.70
20.2	80,889	1.857	0.33	5.69	247,770.00

PAV calculations

Required PAV = 1.38 AcFt

Dry Pond Retention Elevation =	17.00 ft
Storage within Dry Pond =	3.27 AcFt
Wet Pond Detention Elevation =	18.00 ft
Storage within Wet Pond =	2.66 AcFt
Total Detention/Retention Storage =	5.93 AcFt

Time of Concentration = 10 minutes

Basin - POST 4

Total Basin Area =		15.26 Ac			
Post 4 Basin	Hydric		Area	Imperv.	
Land Use/Vegetation	Group	CN	(Ac.)	Area (Ac.)	CN * Area
Pervious	A	39	0.22	-	8.7
Pervious	B/D	80	8.96	-	717.1
Pervious	D	80	0.00	-	0.0
*Impervious - ROW (Road, Curb, Sidewalk)	-	98	2.11	2.11	206.8
*Impervious - Lots (Building, Driveway, Patio/Pool)	-	98	3.19	3.19	312.4
Pond water surface	-	100	0.78	-	77.6
TOTAL AREA			15.26	5.30	1322.6
Site impervious percentage =		34.7%		CN = 87	

- Water Quality Volume Calculations (Wet Detention):
1. Compute 1 inch of runoff from the total basin area:
= 1 IN x Site Area x (1 FT/12 IN)
= 1.27 AC-FT
 2. Compute 2.5 inches times impervious area (excluding water bodies):
= (2.5 IN x Site Impervious Area) x (1 FT/12 IN)
= 1.10 AC-FT
 3. The 1 inch of runoff from the total basin area is the greater governing volume:
= 1.27 AC-FT
 4. Since the site discharges to the Spruce Creek and this is an Outstanding Florida Water, an additional 50% of water quality is required:
= Governing Volume x 1.5
= 1.91 AC-FT

Pond-4 Dry Storage Calculations:					
Pond Stage-Storage from NWL / SHGWT to Top of Bank					
Stage	Area	Area	Storage Vol	Cum. Storage	Cum. Storage
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
18.5	23,479	0.539	0.00	0.00	0.00
19.0	25,088	0.576	0.28	0.28	12,141.75
20.0	28,382	0.652	0.61	0.89	38,876.75
21.0	31,713	0.728	0.69	1.58	68,924.25
22.0	34,378	0.789	0.76	2.34	101,969.75
22.2	41,303	0.948	0.17	2.51	109,537.85

Permanent Pool Volume	
Drainage area =	15.26 Ac.
Runoff coef.:	0.48
Wet season rainfall depth :	31 in.
Minimum residence time :	21 days
Length of wet season =	153 days
Conversion factor =	12 in./ft.
Minimum PPV required =	2.59 AcFt

Actual Residence Time:	
Flow rate, AcFt/day=	0.123
Total PPV, AcFt=	3.43
Residence time, days=	28

Pond-4 Wet PPV Calculations:					
Pond Stage-Storage from Bottom to NWL / SHGWT					
Stage	Area	Area	PPV	Cum. PPV	Cum. PPV
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
10.0	12,018	0.276	0.00	0.00	0.00
11.0	13,745	0.316	0.30	0.30	12,881.50
12.0	15,605	0.358	0.34	0.63	27,556.50
13.0	17,633	0.405	0.38	1.01	44,175.50
14.0	19,715	0.453	0.43	1.44	62,849.50
15.0	21,846	0.502	0.48	1.92	83,630.00
15.5	22,929	0.526	0.26	2.18	94,823.75
16.0	25,129	0.577	0.28	2.45	106,838.25
17.0	29,635	0.680	0.63	3.08	134,220.25
17.5	31,935	0.733	0.35	3.43	149,612.75

Pond-4 Wet Storage Calculations:					
Pond Stage-Storage from NWL / SHGWT to Top of Bank					
Stage	Area	Area	Storage Vol	Cum. Storage	Cum. Storage
elevation in feet	Ft ²	Ac.	AcFt	AcFt	Ft ³
17.5	33,018	0.758	0.00	0.00	0.00
18.0	35,321	0.811	0.39	0.39	17,084.75
19.0	40,004	0.918	0.86	1.26	54,747.25
20.0	44,787	1.028	0.97	2.23	97,142.75
21.0	49,633	1.139	1.08	3.31	144,352.75
22.0	53,785	1.235	1.19	4.50	196,061.75
22.2	64,342	1.477	0.27	4.77	207,874.45

PAV calculations	
Required PAV =	1.91 AcFt
Dry Pond Retention Elevation =	20.00 ft
Storage within Dry Pond =	0.89 AcFt
Wet Pond Detention Elevation =	19.00 ft
Storage within Wet Pond =	1.26 AcFt
Total Detention/Retention Storage =	2.15 AcFt

Time of Concentration = 10 minutes

Basin - POST 5

Total Basin Area =		14.05 Ac				
Post 5 Basin				Imperv.		
Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Area (Ac.)	CN * Area	
Pervious	A	39	0.00	-		0.0
Pervious	A/D	80	1.51	-		120.4
Pervious	B/D	80	8.05	-		644.2
Pervious	D	80	0.00	-		0.0
*Impervious - ROW (Road, Curb, Sidewalk)	-	98	1.52	1.52		148.8
*Impervious - Lots (Building, Driveway, Patio/Pool)	-	98	2.26	2.26		221.7
Pond water surface	-	100	0.71	-		70.9
TOTAL AREA			14.05	3.78		1206.1
Site impervious percentage =		26.9%				
		CN = 86				

- Water Quality Volume Calculations (Dry Retention - On-line):
1. Compute 1 inch of runoff from the total basin area:
= 1 IN x Site Area x (1 FT/12 IN)
= 1.17 AC-FT
 2. Compute 1.25 inches times the impervious area (excluding water bodies) plus 0.5 inches times total basin area:
= (1.25 IN x Site Impervious Area + 0.5 IN x Total Area) x (1 FT/12 IN)
= 0.98 AC-FT
 3. The 1 inch of runoff from the total basin area is the greater governing volume:
= 1.17 AC-FT
 4. Since the site discharges to the Spruce Creek and this is an Outstanding Florida Water, an additional 50% of water quality is required:
= Governing Volume x 1.5
= 1.76 AC-FT

Pond-5 Dry-A Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank

Stage elevation in feet	Area Ft ²	Area Ac.	Storage Vol AcFt	Cum. Storage AcFt	Cum. Storage Ft ³
18.0	9,722	0.223	0.00	0.00	0.00
19.0	13,346	0.306	0.26	0.26	11,534.00
20.0	16,324	0.375	0.34	0.61	26,369.00
21.0	19,472	0.447	0.41	1.02	44,267.00
22.0	22,244	0.511	0.48	1.50	65,125.00
22.2	29,630	0.680	0.12	1.61	70,312.40

Pond-5 Dry-B Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank

Stage elevation in feet	Area Ft ²	Area Ac.	Storage Vol AcFt	Cum. Storage AcFt	Cum. Storage Ft ³
19.0	3,373	0.077	0.00	0.00	0.00
20.0	4,838	0.111	0.09	0.09	4,105.50
21.0	6,536	0.150	0.13	0.22	9,792.50
22.0	8,353	0.192	0.17	0.40	17,237.00
22.2	14,064	0.323	0.05	0.45	19,478.70

Permanent Pool Volume

Drainage area =	14.05 Ac.
Runoff coef.:	0.42
Wet season rainfall depth :	31 in.
Minimum residence time :	21 days
Length of wet season =	153 days
Conversion factor =	12 in./ft.
Minimum PPV required =	2.11 AcFt

Actual Residence Time:

Flow rate, AcFt/day=	0.101
Total PPV, AcFt=	3.49
Residence time, days=	35

Pond-5 Wet PPV Calculations:

Pond Stage-Storage from Bottom to NWL / SHGWT

Stage elevation in feet	Area Ft ²	Area Ac.	PPV AcFt	Cum. PPV AcFt	Cum. PPV Ft ³
10.0	17,344	0.398	0.00	0.00	0.00
11.0	18,428	0.423	0.41	0.41	17,886.00
12.0	19,545	0.449	0.44	0.85	36,872.50
13.0	20,695	0.475	0.46	1.31	56,992.50
14.0	21,878	0.502	0.49	1.80	78,279.00
15.0	23,094	0.530	0.52	2.31	100,765.00
16.0	25,620	0.588	0.56	2.87	125,122.00
17.0	28,264	0.649	0.62	3.49	152,064.00

Pond-5 Wet Storage Calculations:

Pond Stage-Storage from NWL / SHGWT to Top of Bank

Stage elevation in feet	Area Ft ²	Area Ac.	Storage Vol AcFt	Cum. Storage AcFt	Cum. Storage Ft ³
17.0	28,264	0.649	0.00	0.00	0.00
18.0	31,012	0.712	0.68	0.68	29,638.00
19.0	33,860	0.777	0.74	1.43	62,074.00
20.0	36,809	0.845	0.81	2.24	97,408.50
21.0	39,807	0.914	0.88	3.12	135,716.50
22.0	42,336	0.972	0.94	4.06	176,788.00
22.2	48,878	1.122	0.21	4.27	185,909.40

PAV calculations

Required PAV =	1.76 AcFt
Dry Pond Retention Elevation =	20.00 ft
Storage within Dry Pond =	0.70 AcFt
Wet Pond Detention Elevation =	18.75 ft
Storage within Wet Pond =	1.22 AcFt
Total Detention/Retention Storage =	1.92 AcFt

Time of Concentration = 10 minutes

Basin - POST 6

Total Basin Area =		1.10 Ac			
Post 6 Basin Land Use/Vegetation	Hydric Group	CN	Area (Ac.)	Imperv. Area (Ac.)	CN * Area
	A	39	0.17	-	6.5
	B/D	80	0.93	-	74.5
	D	80	0.00	-	0.0
	TOTAL AREA		1.10	0.00	81.0
Site impervious percentage =		0.0%			
		CN =		74	

Basin Tc Calculation

Sheet Flow travel time calculator	
Surface Desc.	Grass (Dense)
Manning's n	0.24
Flow Length, ft.	100.0
2yr/24h rainfall, in.	4.58
Land slope, s, ft./ft.	0.008
Sheet Flow, min	17.1
Shallow Concentrated flow travel time calculator	
Surface Desc. ("paved" or "unpaved")	Unpaved
Flow Length, ft.	888.9
Water course slope, s, ft./ft.	0.001
Avg. V, fps	0.50
Shallow Conc Flow, min	29.6
Time of Concentration = 47	

APPENDIX I: POST-DEVELOPMENT ICPR INPUT DATA

Simple Basin: POST-1

Scenario: Standard Modeling
Node: SPRUCE CREEK
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 42.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0
Area: 4.5500 ac
Curve Number: 41.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: POST-2

Scenario: Standard Modeling
Node: POND-2 DRY
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: UH323
Peaking Factor: 323.0
Area: 20.8900 ac
Curve Number: 80.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: POST-3

Scenario: Standard Modeling
Node: POND-3 DRY
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: UH323
Peaking Factor: 323.0
Area: 17.3400 ac
Curve Number: 78.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: POST-4

Scenario: Standard Modeling
Node: POND-4 DRY
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: UH323
Peaking Factor: 323.0
Area: 15.2600 ac
Curve Number: 87.0
Ia/S: 0.00
% Impervious: 0.00
% DCIA: 0.00
% Direct: 0.00
Rainfall Name:

Comment:

Simple Basin: POST-5

Scenario: Standard Modeling
Node: POND-5 DRY-A
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: UH323
Peaking Factor: 323.0

Area: 14.0500 ac
 Curve Number: 86.0
 Ia/S: 0.00
 % Impervious: 0.00
 % DCIA: 0.00
 % Direct: 0.00
 Rainfall Name:

Comment:

Simple Basin: POST-6

Scenario: Standard Modeling
 Node: SPRUCE CREEK
 Hydrograph Method: NRCS Unit Hydrograph
 Infiltration Method: Curve Number
 Time of Concentration: 47.0000 min
 Max Allowable Q: 0.00 cfs
 Time Shift: 0.0000 hr
 Unit Hydrograph: UH256
 Peaking Factor: 256.0
 Area: 1.1000 ac
 Curve Number: 74.0
 Ia/S: 0.00
 % Impervious: 0.00
 % DCIA: 0.00
 % Direct: 0.00
 Rainfall Name:

Comment:

Node: POND-2 DRY

Scenario: Standard Modeling
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 14.75 ft
 Warning Stage: 18.00 ft
 Alert Stage: 18.20 ft

Stage [ft]	Area [ac]	Area [ft2]
14.75	4.3830	190923
15.00	4.4250	192753
16.00	4.6720	203512
16.50	4.7850	208435
17.00	4.9540	215796
18.00	5.1910	226120

Stage [ft]	Area [ac]	Area [ft2]
18.20	5.7920	252300

Comment:

Node: POND-2 WET

Scenario: Standard Modeling
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 16.00 ft
Warning Stage: 18.00 ft
Alert Stage: 18.20 ft

Stage [ft]	Area [ac]	Area [ft2]
16.00	2.7010	117656
16.50	2.7610	120269
17.00	2.8730	125148
18.00	2.9370	127936
18.20	3.0980	134949

Comment:

Node: POND-3 DRY

Scenario: Standard Modeling
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 15.00 ft
Warning Stage: 20.00 ft
Alert Stage: 20.20 ft

Stage [ft]	Area [ac]	Area [ft2]
15.00	1.4710	64077
16.00	1.6330	71133
17.00	1.8000	78408
18.00	1.9750	86031
19.00	2.1550	93872
20.00	2.3380	101843
20.20	2.8060	122229

Comment:

Node: POND-3 WET

Scenario: Standard Modeling
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 15.40 ft
 Warning Stage: 20.00 ft
 Alert Stage: 20.20 ft

Stage [ft]	Area [ac]	Area [ft2]
15.40	0.8470	36895
16.00	0.9280	40424
17.00	1.0650	46391
18.00	1.2030	52403
19.00	1.3450	58588
20.00	1.4880	64817
20.20	1.8570	80891

Comment:

Node: POND-4 DRY

Scenario: Standard Modeling
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 18.50 ft
 Warning Stage: 22.00 ft
 Alert Stage: 22.20 ft

Stage [ft]	Area [ac]	Area [ft2]
18.50	0.5390	23479
19.00	0.5760	25091
20.00	0.6520	28401
21.00	0.7280	31712
22.00	0.7890	34369
22.20	0.9480	41295

Comment:

Node: POND-4 WET

Scenario: Standard Modeling
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 17.50 ft
 Warning Stage: 22.00 ft
 Alert Stage: 22.20 ft

Stage [ft]	Area [ac]	Area [ft2]
17.50	0.7580	33018
18.00	0.8110	35327
19.00	0.9180	39988
20.00	1.0280	44780
21.00	1.1390	49615
22.00	1.2350	53797
22.20	1.4770	64338

Comment:

Node: POND-5 DRY-A

Scenario: Standard Modeling
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 18.00 ft
Warning Stage: 21.75 ft
Alert Stage: 22.20 ft

Stage [ft]	Area [ac]	Area [ft2]
18.00	0.2230	9714
19.00	0.3060	13329
20.00	0.3750	16335
21.00	0.4470	19471
22.00	0.5110	22259
22.20	0.6800	29621

Comment:

Node: POND-5 DRY-B

Scenario: Standard Modeling
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 19.00 ft
Warning Stage: 21.75 ft
Alert Stage: 22.00 ft

Stage [ft]	Area [ac]	Area [ft2]
19.00	0.0770	3354
20.00	0.1110	4835
21.00	0.1500	6534
22.00	0.1920	8364
22.20	0.3230	14070

Comment:

Node: POND-5 WET

Scenario: Standard Modeling
 Type: Stage/Area
 Base Flow: 0.00 cfs
 Initial Stage: 17.00 ft
 Warning Stage: 22.00 ft
 Alert Stage: 22.20 ft

Stage [ft]	Area [ac]	Area [ft2]
17.00	0.6490	28270
18.00	0.7120	31015
19.00	0.7770	33846
20.00	0.8450	36808
21.00	0.9140	39814
22.00	0.9720	42340
22.20	1.1220	48874

Comment:

Node: SPRUCE CREEK

Scenario: Standard Modeling
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 5.50 ft
 Warning Stage: 15.00 ft
 Alert Stage: 16.00 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	5.50
0	0	0	72.0000	5.50

Comment:

Node: WETLAND W-D & W-B

Scenario: Standard Modeling
 Type: Time/Stage
 Base Flow: 0.00 cfs
 Initial Stage: 18.50 ft
 Warning Stage: 19.00 ft
 Alert Stage: 19.00 ft
 Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	18.50

Year	Month	Day	Hour	Stage [ft]
0	0	0	72.0000	18.50

Comment:

Drop Structure Link: CS-P2W		Upstream Pipe	Downstream Pipe
Scenario:	Standard Modeling	Invert: 13.00 ft	Invert: 12.00 ft
From Node:	POND-2 WET	Manning's N: 0.0130	Manning's N: 0.0130
To Node:	SPRUCE CREEK	Geometry: Circular	Geometry: Circular
Link Count:	1	Max Depth: 2.00 ft	Max Depth: 2.00 ft
Pipe Flow Direction:	Both	Bottom Clip	
Solution:	Combine	Default: 0.00 ft	Default: 0.00 ft
Increments:	0	Op Table:	Op Table:
Pipe Count:	1	Ref Node:	Ref Node:
Damping:	0.0000 ft	Manning's N: 0.0000	Manning's N: 0.0000
Length:	240.00 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 dec		
Energy Switch:	Energy		

Pipe Comment:

Weir Component		
Weir:	1	Bottom Clip
Weir Count:	1	Default: 0.00 ft
Weir Flow Direction:	Both	Op Table:
Damping:	0.0000 ft	Ref Node:
Weir Type:	Sharp Crested Vertical	Top Clip
Geometry Type:	Circular	Default: 0.00 ft
Invert:	16.00 ft	Op Table:
Control Elevation:	16.00 ft	Ref Node:
Max Depth:	0.23 ft	Discharge Coefficients
		Weir Default: 3.200
		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:	Rectangular	Default: 0.00 ft

Invert: 16.60 ft
 Control Elevation: 16.60 ft
 Max Depth: 0.50 ft
 Max Width: 0.50 ft
 Fillet: 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: Horizontal

Geometry Type: Rectangular

Invert: 17.10 ft

Control Elevation: 17.10 ft

Max Depth: 2.00 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:

Drop Structure Link: CS-P3D

Upstream Pipe

Downstream Pipe

Scenario: Standard Modeling

From Node: POND-3 DRY

To Node: POND-3 WET

Link Count: 1

Pipe Flow Direction: Both

Solution: Combine

Increments: 0

Pipe Count: 1

Damping: 0.0000 ft

Length: 446.00 ft

FHWA Code: 0

Entr Loss Coef: 0.00

Exit Loss Coef: 0.00

Bend Loss Coef: 0.12

Bend Location: 0.50 dec

Energy Switch: Energy

Invert: 14.00 ft

Manning's N: 0.0130

Geometry: Circular

Max Depth: 2.50 ft

Invert: 13.40 ft

Manning's N: 0.0130

Geometry: Circular

Max Depth: 2.50 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.0000

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

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.0000

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: 17.00 ft	Op Table:
Control Elevation: 17.00 ft	Ref Node:
Max Depth: 3.00 ft	Discharge Coefficients
Max Width: 4.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:
Weir Comment:	

Drop Structure Comment:

Drop Structure Link: CS-P3W		Upstream Pipe	Downstream Pipe
Scenario: Standard Modeling		Invert: 14.00 ft	Invert: 13.00 ft
From Node: POND-3 WET		Manning's N: 0.0130	Manning's N: 0.0130
To Node: SPRUCE CREEK		Geometry: Circular	Geometry: Circular
Link Count: 1		Max Depth: 1.50 ft	Max Depth: 1.50 ft
Pipe Flow Direction: Both		Bottom Clip	
Solution: Combine		Default: 0.00 ft	Default: 0.00 ft
Increments: 0		Op Table:	Op Table:
Pipe Count: 1		Ref Node:	Ref Node:
Damping: 0.0000 ft		Manning's N: 0.0000	Manning's N: 0.0000
Length: 120.00 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 dec			
Energy Switch: Energy			
Pipe Comment:			

Weir Component	
Weir: 1	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Circular	Default: 0.00 ft
Invert: 15.40 ft	Op Table:
Control Elevation: 15.40 ft	Ref Node:
Max Depth: 0.23 ft	Discharge Coefficients

Weir Default: 3.200
 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: Rectangular	Default: 0.00 ft
Invert: 18.00 ft	Op Table:
Control Elevation: 18.00 ft	Ref Node:
Max Depth: 1.00 ft	Discharge Coefficients
Max Width: 0.25 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment:

Weir Component	
Weir: 3	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 19.00 ft	Op Table:
Control Elevation: 19.00 ft	Ref Node:
Max Depth: 2.00 ft	Discharge Coefficients
Max Width: 3.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment:

Drop Structure Comment:

Drop Structure Link: CS-P4W		Upstream Pipe	Downstream Pipe
Scenario: Standard Modeling		Invert: 17.00 ft	Invert: 15.00 ft
From Node: POND-4 WET		Manning's N: 0.0130	Manning's N: 0.0130
To Node: POND-5 WET		Geometry: Circular	Geometry: Circular
Link Count: 1		Max Depth: 2.00 ft	Max Depth: 2.00 ft
Pipe Flow Direction: Both		Bottom Clip	

Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000	Manning's N:	0.0000	Manning's N:	0.0000
Length:	550.00 ft	Top Clip			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	1.00	Op Table:		Op Table:	
Exit Loss Coef:	0.50	Ref Node:		Ref Node:	
Bend Loss Coef:	0.25	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.50 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component	
Weir:	1
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000
Weir Type:	Sharp Crested Vertical
Geometry Type:	Circular
Invert:	17.50 ft
Control Elevation:	17.50 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:	2
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000
Weir Type:	Sharp Crested Vertical
Geometry Type:	Rectangular
Invert:	19.00 ft
Control Elevation:	19.00 ft
Max Depth:	2.15 ft
Max Width:	2.00 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:	3
Weir Count:	1
Weir Flow Direction:	Both
Damping:	0.0000
Bottom Clip	
Default: 0.00 ft	
Op Table:	
Ref Node:	

Weir Type: Horizontal
 Geometry Type: Rectangular
 Invert: 21.15 ft
 Control Elevation: 21.15 ft
 Max Depth: 2.00 ft
 Max Width: 3.00 ft
 Fillet: 0.00 ft

Top Clip

Default: 0.00 ft

Op Table:

Ref Node:

Discharge Coefficients

Weir Default: 3.200

Weir Table:

Orifice Default: 0.600

Orifice Table:

Weir Comment:

Drop Structure Comment:

Drop Structure Link: CS-P5W

Upstream Pipe

Downstream Pipe

Scenario: Standard Modeling
 From Node: POND-5 WET
 To Node: SPRUCE CREEK
 Link Count: 1
 Pipe Flow Direction: Both
 Solution: Combine
 Increments: 0
 Pipe Count: 1
 Damping: 0.0000 ft
 Length: 400.00 ft
 FHWA Code: 0
 Entr Loss Coef: 1.00
 Exit Loss Coef: 0.50
 Bend Loss Coef: 0.25
 Bend Location: 0.80 dec
 Energy Switch: Energy

Invert: 17.00 ft

Manning's N: 0.0130

Geometry: Circular

Max Depth: 2.00 ft

Invert: 16.50 ft

Manning's N: 0.0130

Geometry: Circular

Max Depth: 2.00 ft

Bottom Clip

Default: 0.00 ft

Op Table:

Ref Node:

Manning's N: 0.0000

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

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: Sharp Crested Vertical

Geometry Type: Circular

Invert: 17.00 ft

Control Elevation: 17.00 ft

Max Depth: 0.35 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	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Sharp Crested Vertical	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 18.75 ft	Op Table:
Control Elevation: 18.75 ft	Ref Node:
Max Depth: 2.45 ft	Discharge Coefficients
Max Width: 3.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment:

Weir Component	
Weir: 3	Bottom Clip
Weir Count: 1	Default: 0.00 ft
Weir Flow Direction: Both	Op Table:
Damping: 0.0000 ft	Ref Node:
Weir Type: Horizontal	Top Clip
Geometry Type: Rectangular	Default: 0.00 ft
Invert: 21.20 ft	Op Table:
Control Elevation: 21.20 ft	Ref Node:
Max Depth: 2.00 ft	Discharge Coefficients
Max Width: 3.00 ft	Weir Default: 3.200
Fillet: 0.00 ft	Weir Table:
	Orifice Default: 0.600
	Orifice Table:

Weir Comment:

Drop Structure Comment:

Pipe Link: P-P5DB	Upstream	Downstream
Scenario: Standard Modeling	Invert: 19.00 ft	Invert: 19.00 ft
From Node: POND-5 DRY-B	Manning's N: 0.0130	Manning's N: 0.0130
To Node: POND-5 DRY-A	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: 112.00 ft	Op Table:	Op Table:
FHWA Code: 0	Ref Node:	Ref Node:
Entr Loss Coef: 1.00	Manning's N: 0.0000	Manning's N: 0.0000
Exit Loss Coef: 0.50	Top Clip	

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

Comment:

Weir Link: W-P2D

Scenario:	Standard Modeling	Bottom Clip	
From Node:	POND-2 DRY	Default:	0.00 ft
To Node:	POND-2 WET	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	Top Clip	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Trapezoidal	Ref Node:	
Invert:	16.50 ft	Discharge Coefficients	
Control Elevation:	16.50 ft	Weir Default:	2.800
Max Depth:	1.50 ft	Weir Table:	
Extrapolation Method:	Normal Projection	Orifice Default:	0.600
Bottom Width:	675.00 ft	Orifice Table:	
Left Slope:	4.000 (h:v)		
Right Slope:	4.000 (h:v)		

Comment:

Weir Link: W-P4D

Scenario:	Standard Modeling	Bottom Clip	
From Node:	POND-4 DRY	Default:	0.00 ft
To Node:	POND-4 WET	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	Top Clip	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Trapezoidal	Ref Node:	
Invert:	20.00 ft	Discharge Coefficients	
Control Elevation:	20.00 ft	Weir Default:	2.800
Max Depth:	2.00 ft	Weir Table:	
Extrapolation Method:	Normal Projection	Orifice Default:	0.600
Bottom Width:	170.00 ft	Orifice Table:	
Left Slope:	4.000 (h:v)		
Right Slope:	4.000 (h:v)		

Comment:

Weir Link: W-P4W

Scenario:	Standard Modeling	Bottom Clip
From Node:	POND-4 WET	Default: 0.00 ft
To Node:	WETLAND W-D & W-B	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Trapezoidal	Ref Node:
Invert:	20.10 ft	Discharge Coefficients
Control Elevation:	20.10 ft	Weir Default: 2.800
Max Depth:	1.90 ft	Weir Table:
Extrapolation Method:	Normal Projection	Orifice Default: 0.600
Bottom Width:	2.50 ft	Orifice Table:
Left Slope:	4.000 (h:v)	
Right Slope:	4.000 (h:v)	

Comment:

Weir Link: W-P5DA

Scenario:	Standard Modeling	Bottom Clip
From Node:	POND-5 DRY-A	Default: 0.00 ft
To Node:	POND-5 WET	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Trapezoidal	Ref Node:
Invert:	20.00 ft	Discharge Coefficients
Control Elevation:	20.00 ft	Weir Default: 2.800
Max Depth:	2.00 ft	Weir Table:
Extrapolation Method:	Normal Projection	Orifice Default: 0.600
Bottom Width:	154.00 ft	Orifice Table:
Left Slope:	4.000 (h:v)	
Right Slope:	4.000 (h:v)	

Comment:

Weir Link: W-P5W

Scenario:	Standard Modeling	Bottom Clip
From Node:	POND-5 WET	Default: 0.00 ft
To Node:	WETLAND W-D & W-B	Op Table:
Link Count:	1	Ref Node:
Flow Direction:	Both	Top Clip
Damping:	0.0000 ft	Default: 0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:
Geometry Type:	Trapezoidal	Ref Node:

Invert: 20.30 ft
 Control Elevation: 20.30 ft
 Max Depth: 1.70 ft
 Extrapolation Method: Normal Projection
 Bottom Width: 2.00 ft
 Left Slope: 4.000 (h:v)
 Right Slope: 4.000 (h:v)

Discharge Coefficients
 Weir Default: 2.800
 Weir Table:
 Orifice Default: 0.600
 Orifice Table:

Comment:

Simulation: 010YR-24HR

Scenario: Standard Modeling
 Run Date/Time: 9/24/2025 11:45:04 AM
 Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set:

Folder:

Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

Time Marching: SAOR	IA Recovery Time: 24.0000 hr
Max Iterations: 6	
Over-Relax Weight 0.5 dec	Ia/S: 0.20 dec
Fact:	
dZ Tolerance: 0.0010 ft	
Max dZ: 1.0000 ft	Smp/Man Basin Rain Global
	Opt:
Link Optimizer Tol: 0.0001 ft	
	Rainfall Name: ~FLMOD
	Rainfall Amount: 7.06 in
	Storm Duration: 24.0000 hr
	Dflt Damping (1D): 0.0050 ft
	Min Node Srf Area 100 ft2
	(1D):
	Energy Switch (1D): Energy

Comment:

Simulation: 02.3YR-24HR (MEAN ANNUAL)

Scenario: Standard Modeling
Run Date/Time: 9/24/2025 12:05:17 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

Output Time Increments

Hydrology

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

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global
Opt:

Rainfall Name: ~FLMOD
Rainfall Amount: 5.10 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area: 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

Simulation: 025YR-24HR

Scenario: Standard Modeling
Run Date/Time: 9/24/2025 12:05:49 PM
Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global
Opt:Rainfall Name: ~FLMOD
Rainfall Amount: 8.97 in

Storm Duration: 24.0000 hr
 Dflt Damping (1D): 0.0050 ft
 Min Node Srf Area 100 ft2
 (1D):
 Energy Switch (1D): Energy

Comment:

Simulation: 100YR-24HR

Scenario: Standard Modeling
 Run Date/Time: 9/24/2025 12:06:34 PM
 Program Version: StormWise 4.08.03

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	36.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	15.0000	0.5000
Max Calculation Time:		15.0000

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

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph
Folder:

Lookup Tables

Boundary Stage Set:
 Extern Hydrograph Set:
 Curve Number Set:

Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

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

IA Recovery Time: 24.0000 hr
Ia/S: 0.20 dec
Smp/Man Basin Rain Global
Opt:
Rainfall Name: ~FLMOD
Rainfall Amount: 12.40 in
Storm Duration: 24.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area 100 ft2
(1D):
Energy Switch (1D): Energy

Comment:

APPENDIX J: POST-DEVELOPMENT ICPR NODE MAX

Node Max Conditions : Multi Item | (name, sim) [Standard Modeling]

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
POND-2 DRY	010YR-24H R	18.00	18.20	16.51	0.0007	76.68	1.66	208570
POND-2 DRY	02.3YR-24H R (MEAN ANNUAL)	18.00	18.20	15.90	0.0005	48.62	0.00	202477
POND-2 DRY	025YR-24H R	18.00	18.20	16.75	0.0005	104.29	8.04	212103
POND-2 DRY	100YR-24H R	18.00	18.20	17.27	0.0006	153.72	89.58	218552
POND-2 WET	010YR-24H R	18.00	18.20	16.10	0.0002	1.66	0.02	118177
POND-2 WET	02.3YR-24H R (MEAN ANNUAL)	18.00	18.20	16.00	0.0000	0.00	0.00	117656
POND-2 WET	025YR-24H R	18.00	18.20	16.75	0.0008	8.04	0.25	122693
POND-2 WET	100YR-24H R	18.00	18.20	17.27	0.0010	89.58	3.14	125888
POND-3 DRY	010YR-24H R	20.00	20.20	17.52	0.0010	60.99	8.64	82360
POND-3 DRY	02.3YR-24H R (MEAN ANNUAL)	20.00	20.20	17.09	0.0010	37.92	1.26	79112
POND-3 DRY	025YR-24H R	20.00	20.20	18.30	0.0009	83.86	23.58	88377
POND-3 DRY	100YR-24H R	20.00	20.20	19.19	0.0010	124.98	28.19	95423
POND-3 WET	010YR-24H R	20.00	20.20	17.51	0.0010	8.64	0.28	49480
POND-3 WET	02.3YR-24H R (MEAN ANNUAL)	20.00	20.20	16.13	0.0005	1.26	0.16	41200
POND-3 WET	025YR-24H R	20.00	20.20	18.29	0.0010	23.58	0.46	54222
POND-3 WET	100YR-24H R	20.00	20.20	19.16	0.0010	28.19	3.32	59562
POND-4 DRY	010YR-24H R	22.00	22.20	20.64	0.0010	63.43	62.92	30507
POND-4 DRY	02.3YR-24H R (MEAN ANNUAL)	22.00	22.20	20.20	0.0010	42.77	42.32	29059
POND-4 DRY	025YR-24H R	22.00	22.20	21.22	0.0010	83.40	79.74	32304
POND-4 DRY	100YR-24H R	22.00	22.20	21.90	0.0010	118.91	82.90	34099
POND-4	010YR-24H	22.00	22.20	20.63	0.0010	62.92	11.32	47837

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
WET	R							
POND-4 WET	02.3YR-24H R (MEAN ANNUAL)	22.00	22.20	19.89	0.0010	42.32	3.51	44261
POND-4 WET	025YR-24H R	22.00	22.20	21.22	0.0010	79.74	22.62	50528
POND-4 WET	100YR-24H R	22.00	22.20	21.89	0.0010	82.90	56.81	53335
POND-5 DRY-A	010YR-24H R	21.75	22.20	20.48	0.0010	57.51	57.21	17934
POND-5 DRY-A	02.3YR-24H R (MEAN ANNUAL)	21.75	22.20	20.20	0.0010	38.47	38.21	17065
POND-5 DRY-A	025YR-24H R	21.75	22.20	21.13	0.0010	75.95	75.30	19833
POND-5 DRY-A	100YR-24H R	21.75	22.20	21.86	0.0010	108.74	84.46	21863
POND-5 DRY-B	010YR-24H R	21.75	22.00	20.48	0.0010	1.86	0.59	5745
POND-5 DRY-B	02.3YR-24H R (MEAN ANNUAL)	21.75	22.00	20.20	0.0010	3.22	0.43	5279
POND-5 DRY-B	025YR-24H R	21.75	22.00	21.13	0.0010	4.64	0.86	6771
POND-5 DRY-B	100YR-24H R	21.75	22.00	21.86	0.0010	7.58	2.12	8102
POND-5 WET	010YR-24H R	22.00	22.20	20.47	0.0010	58.40	12.92	38233
POND-5 WET	02.3YR-24H R (MEAN ANNUAL)	22.00	22.20	19.55	0.0010	38.24	7.26	35469
POND-5 WET	025YR-24H R	22.00	22.20	21.12	0.0010	77.39	24.14	40127
POND-5 WET	100YR-24H R	22.00	22.20	21.85	0.0010	78.21	54.67	41956
SPRUCE CREEK	010YR-24H R	15.00	16.00	5.50	0.0000	14.15	0.00	0
SPRUCE CREEK	02.3YR-24H R (MEAN ANNUAL)	15.00	16.00	5.50	0.0000	8.05	0.00	0
SPRUCE CREEK	025YR-24H R	15.00	16.00	5.50	0.0000	18.84	0.00	0
SPRUCE CREEK	100YR-24H R	15.00	16.00	5.50	0.0000	25.90	0.00	0
WETLAND W-D & W-B	010YR-24H R	19.00	19.00	18.50	0.0000	11.00	0.00	0
WETLAND	02.3YR-24H	19.00	19.00	18.50	0.0000	0.00	0.00	0

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
W-D & W-B	R (MEAN ANNUAL)							
WETLAND W-D & W-B	025YR-24H R	19.00	19.00	18.50	0.0000	29.83	0.00	0
WETLAND W-D & W-B	100YR-24H R	19.00	19.00	18.50	0.0000	92.59	0.00	0

APPENDIX K: NUTRIENT LOADING ANALYSIS (BMPTRAINS)

Complete Report (not including cost) Ver 5.3.2

Project: Luxer Spruce Creek

Date: 9/30/2025 5:18:23 PM

Site and Catchment Information

Analysis: Specified Removal Efficiency

Catchment Name	POST-2	POST-3	POST-4	POST-5
Rainfall Zone	Florida Zone 2	Florida Zone 2	Florida Zone 2	Florida Zone 2
Annual Mean Rainfall	51.50	51.50	51.50	51.50
Pre-Condition Landuse Information				
Landuse	Undeveloped - Upland Hardwood: TN=1.042 TP=0.346	Undeveloped - Upland Hardwood: TN=1.042 TP=0.346	Agricultural - Pasture: TN=3.03 TP=0.593	Agricultural - Pasture: TN=3.03 TP=0.593
Area (acres)	20.89	17.34	15.26	14.05
Rational Coefficient (0-1)	0.05	0.05	0.10	0.11
Non DCIA Curve Number	69.00	69.00	79.00	80.00
DCIA Percent (0-100)	0.00	0.00	0.00	0.00
Nitrogen EMC (mg/l)	1.042	1.042	3.030	3.030
Phosphorus EMC (mg/l)	0.346	0.346	0.593	0.593
Runoff Volume (ac-ft/yr)	4.841	4.019	6.850	6.693
Groundwater N (kg/yr)	0.000	0.000	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000	0.000	0.000
Nitrogen Loading (kg/yr)	6.220	5.163	25.593	25.005
Phosphorus Loading (kg/yr)	2.065	1.714	5.009	4.894
Post-Condition Landuse Information				
Landuse	Low-Density Residential: TN=1.645 TP= 0.27	Low-Density Residential: TN=1.645 TP= 0.27	Low-Density Residential: TN=1.645 TP= 0.27	Low-Density Residential: TN=1.645 TP= 0.27
Area (acres)	20.89	17.34	15.26	14.05

Rational Coefficient (0-1)	0.18	0.12	0.20	0.19
Non DCIA Curve Number	69.00	69.00	79.00	80.00
DCIA Percent (0-100)	16.70	8.40	13.80	10.80
Wet Pond Area (ac)	2.70	0.85	0.78	0.71
Nitrogen EMC (mg/l)	1.645	1.645	1.645	1.645
Phosphorus EMC (mg/l)	0.270	0.270	0.270	0.270
Runoff Volume (ac-ft/yr)	14.077	8.349	12.559	10.683
Groundwater N (kg/yr)	0.000	0.000	0.000	0.000
Groundwater P (kg/yr)	0.000	0.000	0.000	0.000
Nitrogen Loading (kg/yr)	28.552	16.934	25.474	21.668
Phosphorus Loading (kg/yr)	4.686	2.780	4.181	3.556

Catchment Number: 1 Name: POST-2

Project: Luxer Spruce Creek

Date: 9/30/2025

Multiple BMP in Series Design Parameters

BMP in Series Number: 1

BMP Type: Retention

Retention Depth (in) 4.600

Retention Volume (ac-ft) 6.973

BMP in Series Number: 2

BMP Type: Wet Detention

Permanent Pool Volume (ac-ft) 14.560

Permanent Pool Volume (ac-ft) for 31 days residence 1.196

Annual Residence Time (days) 378

Littoral Zone Efficiency Credit

Wetland Efficiency Credit

BMP in Series Number: 3

BMP Type: None

BMP in Series Number: 4

BMP Type: None

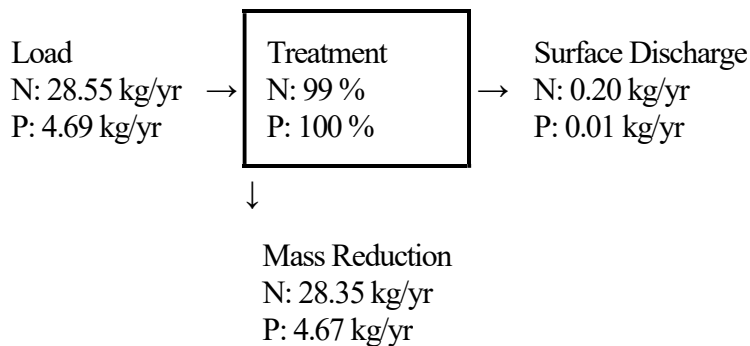
Watershed Characteristics

Catchment Area (acres) 20.89
 Contributing Area (acres) 18.190
 Non-DCIA Curve Number 69.00
 DCIA Percent 16.70
 Rainfall Zone Florida Zone 2
 Rainfall (in) 51.50

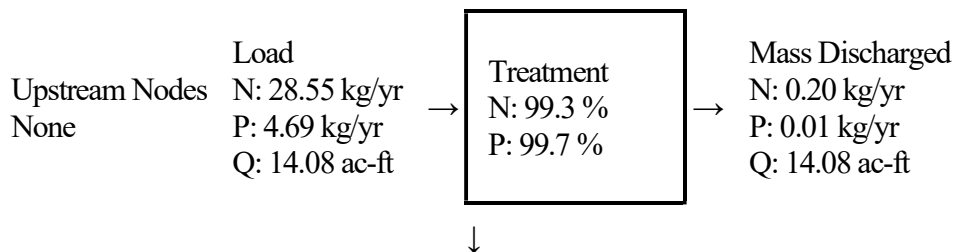
Surface Water Discharge

Required TN Treatment Efficiency (%) 80
 Provided TN Treatment Efficiency (%) 99
 Required TP Treatment Efficiency (%) 90
 Provided TP Treatment Efficiency (%) 100

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Mass Removed
N: 28.35 kg/yr
P: 4.67 kg/yr
Q: 0.00 ac-ft

Catchment Number: 2 Name: POST-3
Project: Luxer Spruce Creek
Date: 9/30/2025

Multiple BMP in Series Design Parameters

BMP in Series Number: 1
BMP Type: Retention
Retention Depth (in) 2.260
Retention Volume (ac-ft) 3.106

BMP in Series Number: 2
BMP Type: Wet Detention
Permanent Pool Volume (ac-ft) 3.110
Permanent Pool Volume (ac-ft) for 31 days residence 0.709
Annual Residence Time (days) 136
Littoral Zone Efficiency Credit
Wetland Efficiency Credit

BMP in Series Number: 3
BMP Type: None

BMP in Series Number: 4
BMP Type: None

Watershed Characteristics

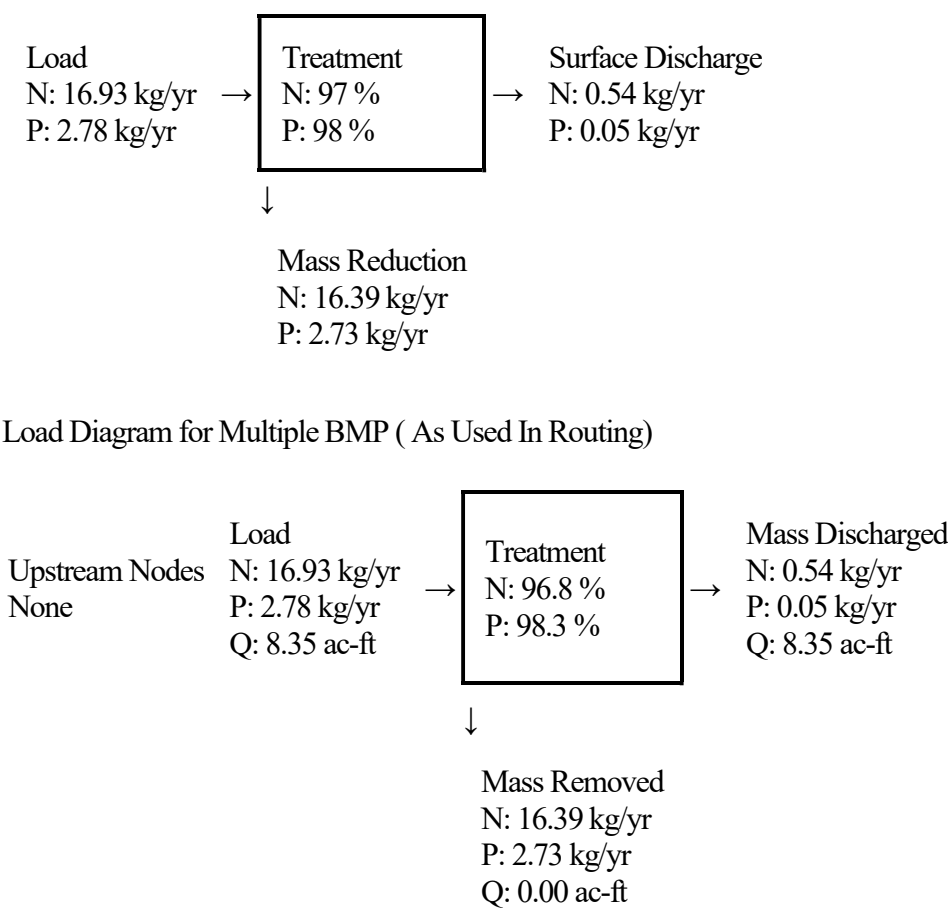
Catchment Area (acres) 17.34
Contributing Area (acres) 16.490
Non-DCIA Curve Number 69.00
DCIA Percent 8.40
Rainfall Zone Florida Zone 2
Rainfall (in) 51.50

Surface Water Discharge

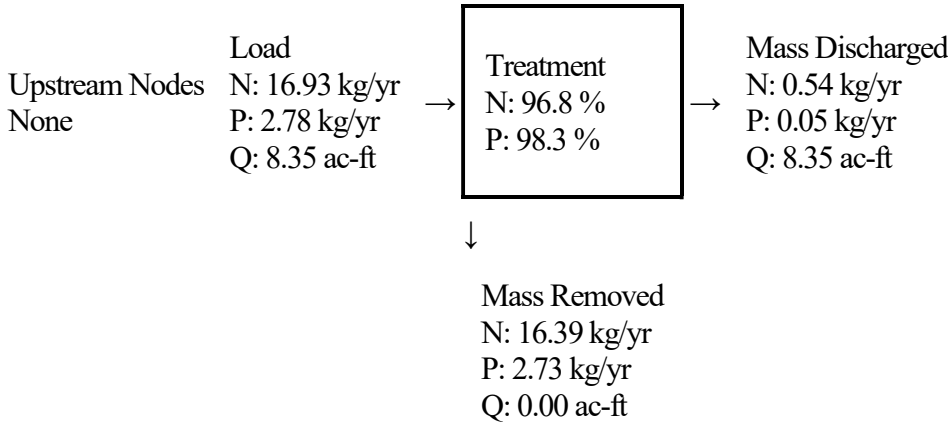
Required TN Treatment Efficiency (%) 80
Provided TN Treatment Efficiency (%) 97

Required TP Treatment Efficiency (%) 90
Provided TP Treatment Efficiency (%) 98

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Catchment Number: 3 Name: POST-4
Project: Luxer Spruce Creek
Date: 9/30/2025

Multiple BMP in Series Design Parameters

BMP in Series Number: 1
BMP Type: Retention
Retention Depth (in) 0.700
Retention Volume (ac-ft) 0.845

BMP in Series Number: 2
BMP Type: Wet Detention
Permanent Pool Volume (ac-ft) 3.430

Permanent Pool Volume (ac-ft) for 31 days residence 1.067
 Annual Residence Time (days) 100
 Littoral Zone Efficiency Credit
 Wetland Efficiency Credit

BMP in Series Number: 3
 BMP Type: None

BMP in Series Number: 4
 BMP Type: None

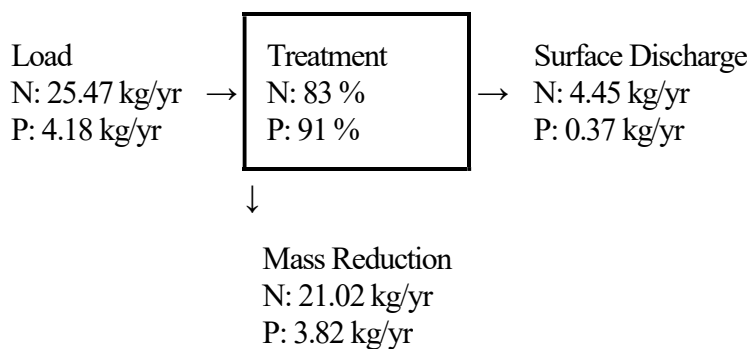
Watershed Characteristics

Catchment Area (acres) 15.26
 Contributing Area (acres) 14.480
 Non-DCIA Curve Number 79.00
 DCIA Percent 13.80
 Rainfall Zone Florida Zone 2
 Rainfall (in) 51.50

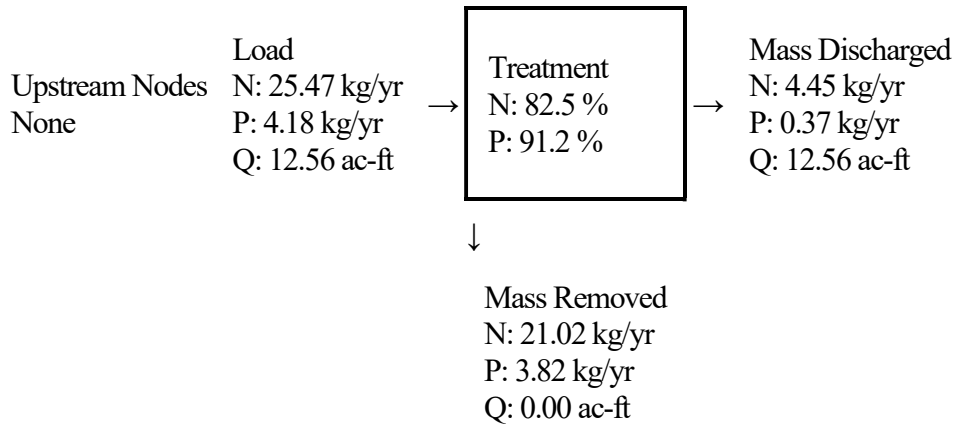
Surface Water Discharge

Required TN Treatment Efficiency (%) 80
 Provided TN Treatment Efficiency (%) 83
 Required TP Treatment Efficiency (%) 90
 Provided TP Treatment Efficiency (%) 91

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Catchment Number: 4 Name: POST-5

Project: Luxer Spruce Creek

Date: 9/30/2025

Multiple BMP in Series Design Parameters

BMP in Series Number: 1

BMP Type: Retention

Retention Depth (in) 0.600

Retention Volume (ac-ft) 0.667

BMP in Series Number: 2

BMP Type: Wet Detention

Permanent Pool Volume (ac-ft) 3.490

Permanent Pool Volume (ac-ft) for 31 days residence 0.907

Annual Residence Time (days) 119

Littoral Zone Efficiency Credit

Wetland Efficiency Credit

BMP in Series Number: 3

BMP Type: None

BMP in Series Number: 4

BMP Type: None

Watershed Characteristics

Catchment Area (acres) 14.05

Contributing Area (acres) 13.340

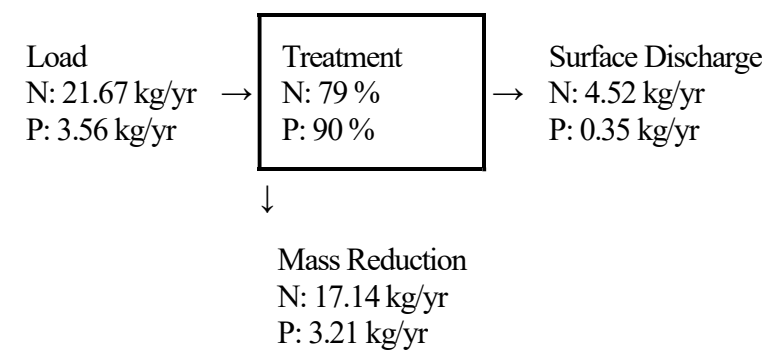
Non-DCIA Curve Number 80.00

DCIA Percent 10.80

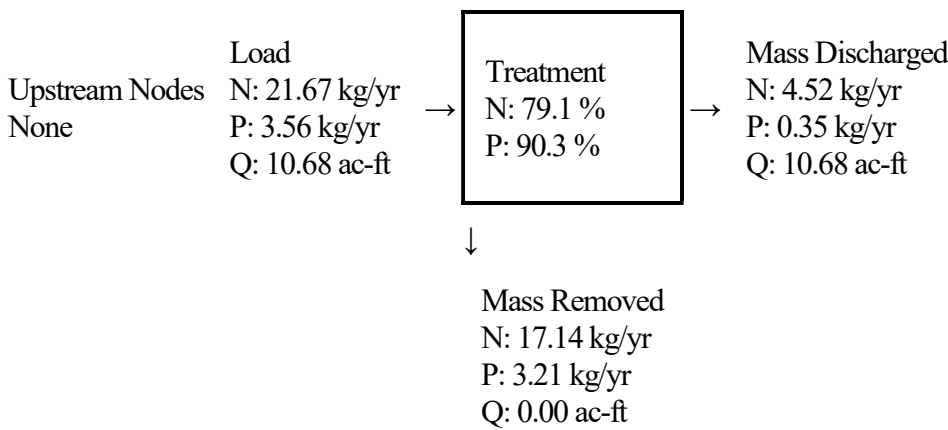
Rainfall Zone Florida Zone 2
Rainfall (in) 51.50

Surface Water Discharge
Required TN Treatment Efficiency (%) 80
Provided TN Treatment Efficiency (%) 79
Required TP Treatment Efficiency (%) 90
Provided TP Treatment Efficiency (%) 90

Load for Multiple BMP in Series



Load Diagram for Multiple BMP (As Used In Routing)



Summary Treatment Report Version: 5.3.2
Project: Luxer Spruce Creek
Analysis Type: Specified Removal
Efficiency
BMP Types:
Catchment 1 - (POST-2) Multiple BMP

Date:9/30/2025
Routing Summary
Catchment 1 Routed to Outlet
Catchment 2 Routed to Outlet

Catchment 2 - (POST-3) Multiple BMP Catchment 3 Routed to Outlet
 Catchment 3 - (POST-4) Multiple BMP Catchment 4 Routed to Outlet
 Catchment 4 - (POST-5) Multiple BMP

Based on % removal values to the nearest percent

Total nitrogen target removal met? Yes

Total phosphorus target removal met? Yes

Summary Report

Nitrogen

Surface Water Discharge

Total N pre load	61.98 kg/yr	
Total N post load	92.63 kg/yr	
Target N load reduction	80 %	
Target N discharge load	18.53 kg/yr	
Percent N load reduction	90 %	
Provided N discharge load	9.72 kg/yr	21.44 lb/yr
Provided N load removed	82.9 kg/yr	182.8 lb/yr

Phosphorus

Surface Water Discharge

Total P pre load	13.682 kg/yr	
Total P post load	15.203 kg/yr	
Target P load reduction	90 %	
Target P discharge load	1.52 kg/yr	
Percent P load reduction	95 %	
Provided P discharge load	.77 kg/yr	1.7 lb/yr
Provided P load removed	14.433 kg/yr	31.825 lb/yr

**APPENDIX L: PROPERTY RAINFALL DATA BASED ON NATIONAL
OCEANIC & ATMOSPHERIC ADMINISTRATION (NOAA) ATLAS 14**



NOAA Atlas 14, Volume 9, Version 2
Location name: Samsula-Spruce Creek, Florida,
USA*
Latitude: 29.069°, Longitude: -81.0565°
Elevation: 17 ft**
* source: ESRI Maps
** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerals](#)

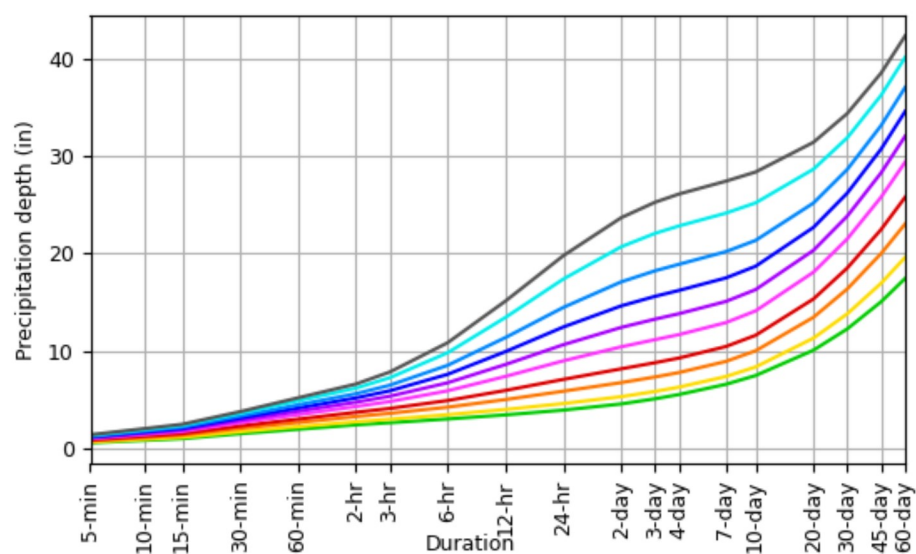
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.546 (0.445-0.664)	0.623 (0.507-0.758)	0.743 (0.603-0.907)	0.837 (0.676-1.03)	0.960 (0.744-1.21)	1.05 (0.796-1.34)	1.13 (0.830-1.49)	1.21 (0.852-1.64)	1.31 (0.885-1.83)	1.38 (0.909-1.98)
10-min	0.800 (0.652-0.973)	0.912 (0.743-1.11)	1.09 (0.883-1.33)	1.23 (0.989-1.50)	1.41 (1.09-1.77)	1.54 (1.16-1.96)	1.66 (1.22-2.18)	1.77 (1.25-2.41)	1.92 (1.30-2.68)	2.02 (1.33-2.89)
15-min	0.975 (0.795-1.19)	1.11 (0.906-1.35)	1.33 (1.08-1.62)	1.50 (1.21-1.84)	1.71 (1.33-2.16)	1.87 (1.42-2.40)	2.02 (1.48-2.66)	2.16 (1.52-2.94)	2.34 (1.58-3.27)	2.46 (1.62-3.53)
30-min	1.48 (1.21-1.80)	1.69 (1.38-2.06)	2.02 (1.64-2.46)	2.28 (1.84-2.79)	2.61 (2.02-3.28)	2.85 (2.16-3.65)	3.08 (2.26-4.06)	3.30 (2.32-4.48)	3.57 (2.41-5.00)	3.75 (2.48-5.39)
60-min	1.94 (1.58-2.35)	2.20 (1.80-2.68)	2.63 (2.14-3.22)	2.98 (2.40-3.66)	3.44 (2.67-4.34)	3.79 (2.88-4.86)	4.12 (3.02-5.44)	4.45 (3.13-6.05)	4.87 (3.29-6.83)	5.17 (3.42-7.42)
2-hr	2.39 (1.96-2.89)	2.72 (2.23-3.29)	3.25 (2.66-3.94)	3.68 (2.99-4.49)	4.27 (3.35-5.37)	4.72 (3.61-6.03)	5.16 (3.82-6.77)	5.60 (3.97-7.58)	6.16 (4.20-8.61)	6.59 (4.38-9.40)
3-hr	2.61 (2.15-3.14)	2.98 (2.45-3.58)	3.58 (2.93-4.32)	4.08 (3.33-4.95)	4.78 (3.77-6.01)	5.34 (4.11-6.81)	5.89 (4.38-7.74)	6.46 (4.61-8.75)	7.23 (4.96-10.1)	7.82 (5.22-11.1)
6-hr	3.00 (2.49-3.58)	3.44 (2.85-4.12)	4.21 (3.48-5.05)	4.89 (4.01-5.90)	5.89 (4.70-7.43)	6.72 (5.23-8.58)	7.58 (5.70-9.96)	8.51 (6.13-11.5)	9.80 (6.78-13.7)	10.8 (7.28-15.3)
12-hr	3.42 (2.85-4.06)	3.98 (3.32-4.73)	4.99 (4.15-5.95)	5.93 (4.90-7.11)	7.37 (5.96-9.32)	8.59 (6.76-11.0)	9.92 (7.52-13.0)	11.4 (8.26-15.4)	13.4 (9.38-18.7)	15.1 (10.2-21.2)
24-hr	3.91 (3.28-4.61)	4.58 (3.85-5.41)	5.85 (4.90-6.93)	7.06 (5.88-8.41)	8.97 (7.33-11.3)	10.6 (8.43-13.6)	12.4 (9.52-16.3)	14.5 (10.6-19.5)	17.4 (12.2-24.1)	19.8 (13.5-27.6)
2-day	4.54 (3.84-5.32)	5.29 (4.47-6.20)	6.73 (5.67-7.92)	8.15 (6.82-9.63)	10.4 (8.59-13.1)	12.4 (9.92-15.8)	14.6 (11.3-19.1)	17.1 (12.6-22.9)	20.7 (14.7-28.5)	23.7 (16.2-32.8)
3-day	5.07 (4.31-5.92)	5.82 (4.94-6.80)	7.31 (6.18-8.56)	8.78 (7.38-10.3)	11.1 (9.24-14.0)	13.3 (10.7-16.8)	15.6 (12.1-20.3)	18.2 (13.5-24.4)	22.1 (15.7-30.3)	25.3 (17.4-34.8)
4-day	5.51 (4.70-6.41)	6.27 (5.34-7.30)	7.77 (6.59-9.08)	9.26 (7.81-10.9)	11.7 (9.70-14.6)	13.8 (11.1-17.5)	16.2 (12.6-21.0)	18.9 (14.1-25.2)	22.8 (16.3-31.3)	26.1 (18.0-35.9)
7-day	6.56 (5.62-7.59)	7.35 (6.29-8.52)	8.91 (7.60-10.3)	10.4 (8.85-12.2)	12.9 (10.8-16.0)	15.1 (12.2-18.9)	17.5 (13.7-22.5)	20.2 (15.1-26.7)	24.1 (17.3-32.9)	27.4 (19.0-37.5)
10-day	7.46 (6.41-8.60)	8.34 (7.16-9.62)	10.0 (8.56-11.6)	11.6 (9.87-13.5)	14.1 (11.8-17.3)	16.3 (13.2-20.3)	18.7 (14.6-23.9)	21.3 (16.0-28.1)	25.2 (18.1-34.1)	28.4 (19.8-38.7)
20-day	10.1 (8.71-11.5)	11.3 (9.78-13.0)	13.4 (11.6-15.5)	15.3 (13.1-17.7)	18.1 (15.1-21.8)	20.3 (16.5-24.8)	22.7 (17.8-28.5)	25.2 (18.9-32.6)	28.7 (20.7-38.3)	31.4 (22.0-42.5)
30-day	12.3 (10.7-14.0)	13.8 (12.0-15.8)	16.4 (14.2-18.7)	18.5 (15.9-21.3)	21.5 (17.9-25.6)	23.8 (19.4-28.9)	26.2 (20.6-32.6)	28.6 (21.5-36.8)	31.9 (23.0-42.2)	34.4 (24.2-46.4)
45-day	15.0 (13.1-17.1)	16.9 (14.8-19.3)	20.0 (17.4-22.8)	22.5 (19.4-25.7)	25.8 (21.5-30.4)	28.3 (23.0-34.0)	30.7 (24.2-37.9)	33.2 (25.0-42.2)	36.3 (26.3-47.6)	38.5 (27.2-51.8)
60-day	17.4 (15.3-19.7)	19.6 (17.2-22.2)	23.0 (20.1-26.2)	25.8 (22.3-29.5)	29.4 (24.5-34.5)	32.0 (26.1-38.3)	34.6 (27.3-42.5)	37.1 (28.0-47.0)	40.1 (29.1-52.5)	42.4 (30.0-56.7)
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.										

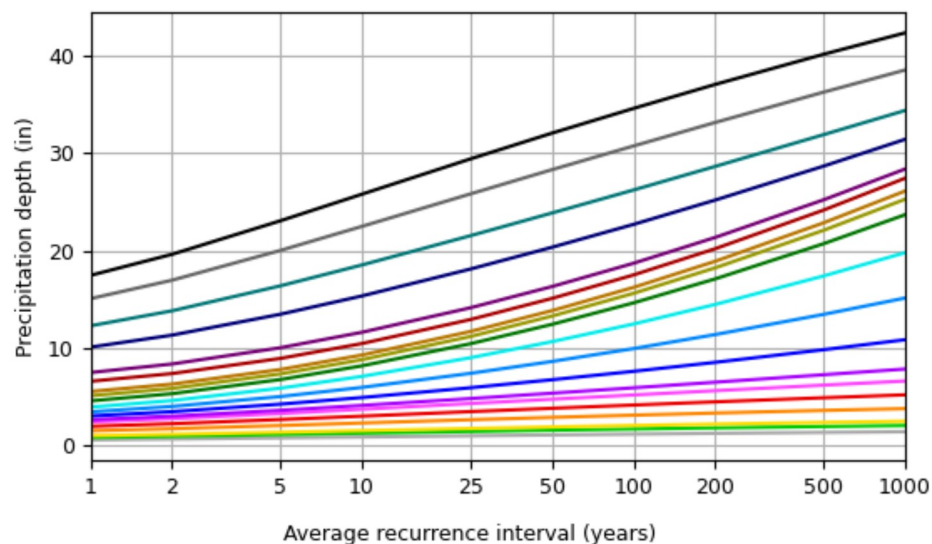
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PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 29.0690°, Longitude: -81.0565°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

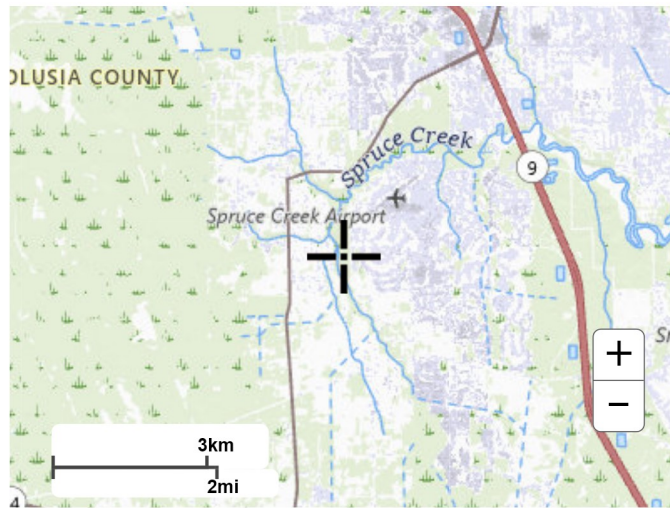


Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

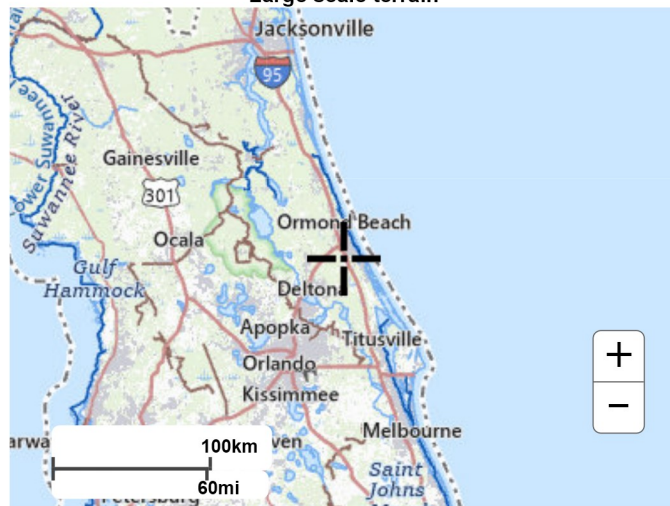
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Maps & aerals

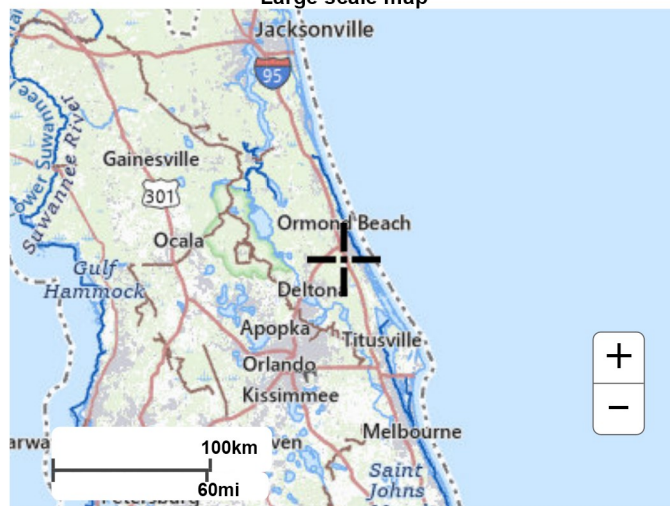
Small scale terrain



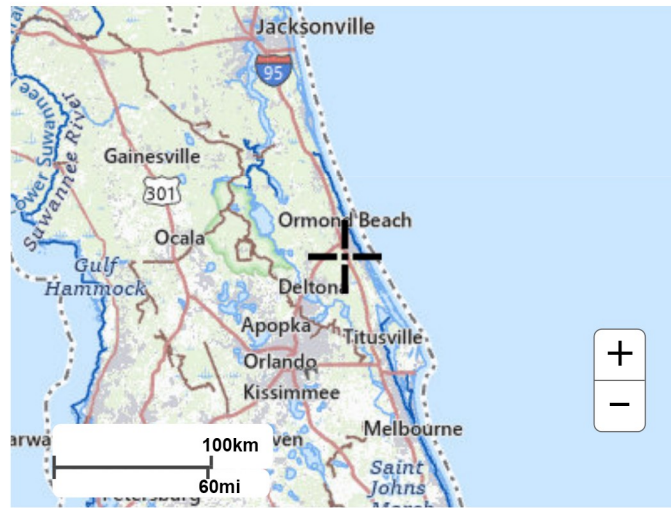
Large scale terrain



Large scale map



Large scale aerial



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**APPENDIX M: SJRMWD TECHNICAL PUBLICATION SJ 91-3 - MEAN
ANNUAL 24-HOUR RAINFALL ISOPLETH MAP**

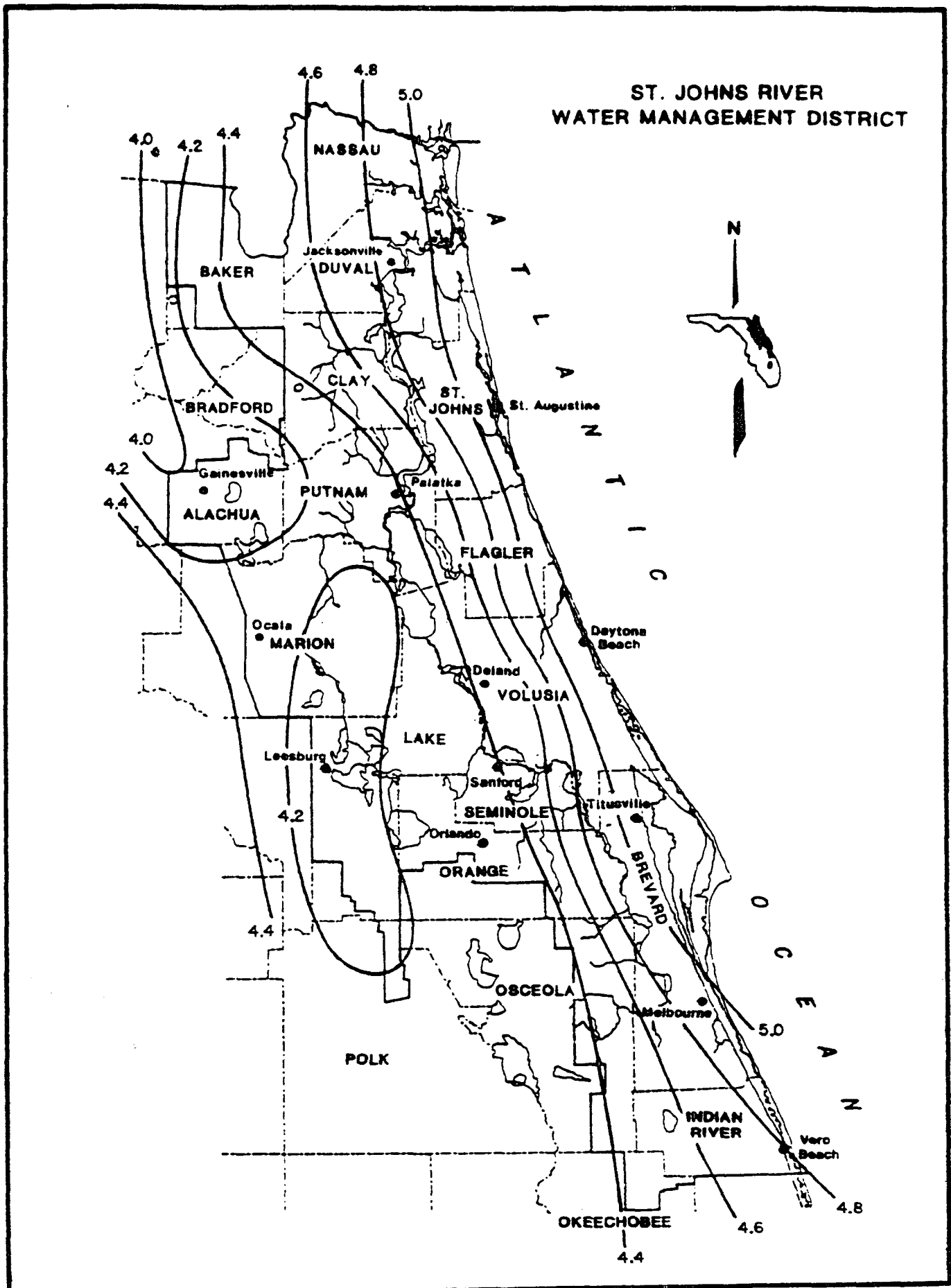


Figure 6. Mean annual 24-hour maximum rainfall for northeast Florida in inches
Source: Rao 1988a