STORMWATER CALCULATIONS

BROOKSIDE @ ORMOND STATION (FKA PLUMERIA AT HUNTER'S RIDGE)

SEPTEMBER 27, 2023

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2023.09.27 09:06:17 -04'00'

Cole T. Buck, State of Florida, Professional Engineer, License No. 88690

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880 Airport Rd. Suite 113
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CA5479

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The site is located North of the Huntington Subdivision and is on the Northwest corner of Airport Road and what will be Iris Branch Blvd. The site consists of 53.163 acres. The limits of development is 50.226 ac. The remaining area will be mostly common open space. In the existing pre-development condition, the site is relatively flat with multiple low spots that lead to detention and ponding on site. A portion of the site discharges to the West into Hull Creek. In proposed post-development conditions, the site is split into 4 basins and 4 ponds that are all interconnected with a 48" equalizer pipe. The post development design discharges from Pond C into Hull Creek with a concrete weir and orifice pipe.

Pre-Development:

Basin	Area	CN	Tc
1	3.64	79	0.604

Discharge for this site will be limited to the pre-development discharge.

Pre-Development Discharge

100-yr, 24-hour	13.19 cfs
25-yr, 24-hour	9.40 cfs
Mean Annual	3.81 cfs

Pre-Development Discharge

100-yr, 24-hour	12.95 cfs
25-yr, 24-hour	7.69 cfs
Mean Annual	2.23 cfs

Post-Development for Site:

Post-Development time of concentration = 10 minutes, CN = 92 (See attached TR55 calculations)
Sidewalks = 28,056 SF
Pavement = 164,249 SF
Lots Based on 65% impervious area = 657,683 SF
Recreation Area = 25,500 SF
Total Impervious area = 875,488 SF = 20.098 ac.
Impervious of pond at NWL = 500,820 SF = 11.50 ac.
Pervious area = 939,493 SF = 21.568 ac. (excludes pond area)

Set NWL at SHWT in wetland = 26.60

Top of Bank elevation = 30.00
NWL elevation = 26.60

Stage Storage Calculations

POND A	
CONTOUR ELEVATION	AREA (AC.)
14.6	4.141
24.6	5.006
26.6	5.368
27	5.479
28	5.665
29	5.853
30	6.043

POND B	
CONTOUR ELEVATION	AREA (AC)
16.6	0.292
24.6	0.641
26.6	0.797
27	0.846
28	0.928
29	1.013
30	1.101

POND C	
CONTOUR ELEVATION	AREA (AC.)
14.6	1.619
24.6	2.503
26.6	2.875
27	2.988
28	3.179
29	3.372
30	3.568

POND D	
CONTOUR ELEVATION	AREA (AC.)
14.6	0.875
24.6	1.993
26.6	2.457
27	2.598
28	2.835
29	3.074
30	3.316

Volume required for treatment is the greater of 1-inch of runoff or 2.5-inches over the impervious area.

Per attached wet detention calculations, the required treatment volume is 4.43 ac-ft plus 50% for discharge to an OFW which equals 6.65 ac-ft.

Based on the stage storage calculations, the weir shall be set at or above elevation 27.39.

The orifice size is 9.12 inches dia.

Following is a pre-development/post-development comparison based on the attached ICPR calculations.

STORM EVENT	PRE-DEV. DISCHARGE	POST-DEV. DISCHARGE	DWH
Mean Annual	2.23 CFS	3.76 CFS	28.17
25-year/24-hour	7.69 CFS	16.92 CFS	29.81
100-year/24-hour	12.95 CFS	27.04 CFS	30.56

Post-Development for Entry Rd.:

Post-Development time of concentration = 10 minutes, CN = 92 (See attached TR55 calculations)
Sidewalks = 7,045 SF = 0.16 ac.
Curb = 5,713 SF = 0.13 ac.
Pavement = 31,860 SF = 0.73 ac.
Total Impervious area = 44,618 SF = 1.02 ac.
Impervious of pond at NWL = 50,454 SF = 1.16ac.
Pervious area = 23,290 SF = 0.53 ac. (excludes pond area)

Set NWL at SHWT in wetland = 25.50

Top of Bank elevation = 31.00
NWL elevation = 25.50

Stage Storage Calculations

POND 1

STAGE	AREA	STORAGE	CUM. VOLUME
25.50	1.44	0	0
26.00	1.51	0.74	0.74
27.00	1.65	1.57	2.31
28.00	1.79	1.72	4.03
29.00	1.93	1.86	5.89
30.00	2.08	2.00	7.89
31.00	2.23	2.15	10.05

Volume required for treatment is the greater of 1-inch of runoff or 2.5-inches over the impervious area.

Per attached wet detention calculations, the required treatment volume is 0.21 ac-ft plus 50% for discharge to an OFW which equals 0.32 ac-ft.

Based on the stage storage calculations, the weir shall be set at or above elevation 26.47.

The orifice size is 2.75 inches dia.

Following is a pre-development/post-development comparison based on the attached ICPR calculations.

STORM EVENT	PRE-DEV. DISCHARGE	POST-DEV. DISCHARGE	DWH
Mean Annual	2.79 CFS	3.81 CFS	27.77
25-year/24-hour	6.47 CFS	9.40 CFS	28.79
100-year/24-hour	8.35 CFS	13.19 CFS	29.40

II. PRE-DEVELOPMENT CONDITIONS

IIa. SOILS - USDA

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81° 10' 27" W
81° 9' 42" W
29° 16' 31" N
29° 16' 6" N
483100
483200
483300
483400
483500
483600
483700
483800
483900
484000
484100
484200
3238500
3238400
3238300
3238200
3238100
3238000
3237900
3237800
8
40
16
40
8
40
8
Airport Road Ext
Soil Map may not be valid at this scale.
Map Scale: 1:5,460 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 250 500 1000 1500
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Flagler County, Florida
Survey Area Data: Version 21, Sep 1, 2022

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

Date(s) aerial images were photographed: Jan 6, 2022—Feb 10, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Hicoria, Riviera, and Gator soils, depressional	13.9	23.1%
16	Malabar fine sand, 0 to 2 percent slopes	11.1	18.3%
40	Pomona fine sand, 0 to 2 percent slopes	35.3	58.5%
Totals for Area of Interest		**60.3**	**100.0%**

IIb. PRE-DEVELOPMENT BASIN MAP

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BASIN 1
3.64 AC.
CN = 79
Tc = 36.24 MIN

COMMON SPACE - TRACT G
64147 SF
1.47 ACRES

ACCESS/DRAINAGE EASEMENT TRACT - F
2400 SF
0.06 ACRES

DRAINAGE TRACT - A
298982 SF
6.86 ACRES

RECREATION AREA - TRACT J
76816 SF
1.76 ACRES

DRAINAGE TRACT - C
219085 SF
5.03 ACRES

MAIL KIOSK - TRACT K
505 SF
0.01 ACRES

MONUMENT SIGN TRACT - L
200 SF
0.00 ACRES

ACCESS/DRAINAGE EASEMENT TRACT - E
2400 SF
0.06 ACRES

DRAINAGE TRACT - B
68226 SF
1.57 ACRES

DRAINAGE TRACT - D
218239 SF
5.01 ACRES

NORTH

60 0 60 120
SCALE: 1"=60'

ALANN ENGINEERING GROUP, INC.
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FAX: (386) 673-3927

BROOKSIDE AT ORMOND STATION
FLAGLER COUNTY, FL
PREDEVELOPMENT BASIN MAP

NO.	DATE	REVISION	BY

DESIGNER	KAB	DRAWN BY	XXX
FILE	2224-1	PROJECT	2224-1
DATE	9-21-23	SCALE	AS NOTED

NOT VALID UNLESS SIGNED AND SEALED
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SHEET
PRE

IIc. PRE-DEVELOPMENT TIME OF CONCENTRATION

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Ormond Station
Plumeria Subdivision
Flagler County, Florida

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
POST DEV	53.16	0.000	91		BASIN 1
PRE DEV 1	3.64	0.604	79		BASIN 1

Total Area: 56.80 (ac)

Ormond Station
Plumeria Subdivision
Flagler County, Florida

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
POST DEV							
					Time of Concentration		<undef>
PRE DEV 1							
SHEET	100	0.0128	0.800				0.596
SHALLOW	51	0.0128	0.050				0.008
					Time of Concentration		.604

Ormond Station
Plumeria Subdivision
Flagler County, Florida

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
POST DEV	Open space; grass cover > 75%	(good)	D	21.567	80
	Paved parking lots, roofs, driveways		D	31.596	98
	Total Area / Weighted Curve Number			53.16	91
PRE DEV 1	Woods - grass combination	(good)	D	3.64	79
	Total Area / Weighted Curve Number			3.64	79

III. POST-DEVELOPMENT CONDITIONS

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III.a. POST-DEVELOPMENT BASIN MAP

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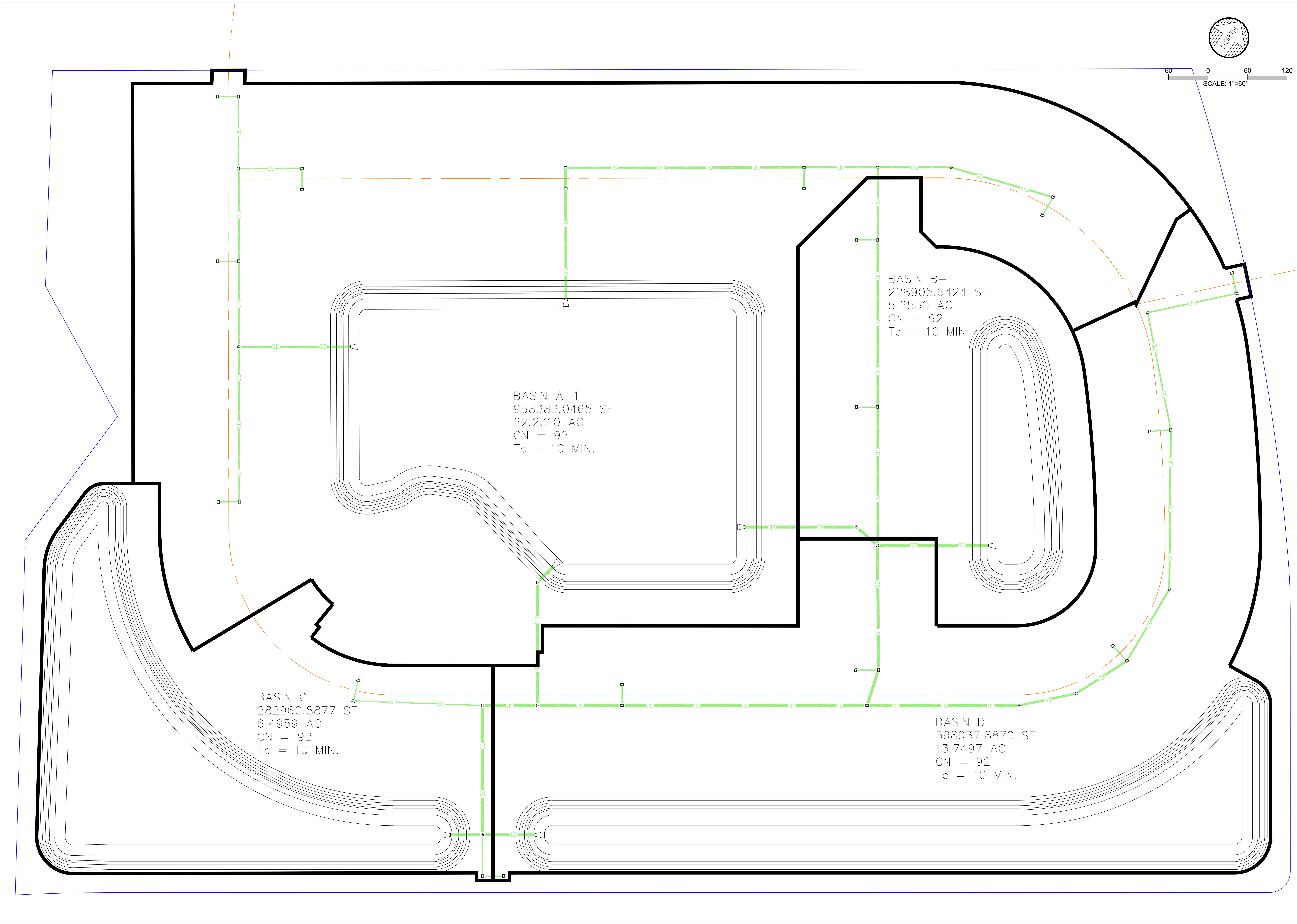

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FAX: (386) 673-3927

BROOKSIDE AT ORMOND STATION
FLAGLER COUNTY, FL
POST DEVELOPMENT MAP

NO.	DATE	REVISION	BY

DESIGNER KAB	FILE 2224-1	DATE 9-21-23
DRAWN BY XXX	PROJECT 2224-1	SCALE AS NOTED

NOT VALID UNLESS SIGNED AND SEALED
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SHEET
POST

III.b. POST-DEVELOPMENT TIME OF CONCENTRATION

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Flagler County, Florida

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POST DEV	53.16	0.000	91		BASIN 1
PRE DEV 1	3.64	0.604	79		BASIN 1

Total Area: 56.80 (ac)

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Plumeria Subdivision
Flagler County, Florida

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
POST DEV							
					Time of Concentration		<undef>
PRE DEV 1							
SHEET	100	0.0128	0.800				0.596
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					Time of Concentration		.604

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Flagler County, Florida

Sub-Area Land Use and Curve Number Details

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POST DEV	Open space; grass cover > 75%	(good)	D	21.567	80
	Paved parking lots, roofs, driveways		D	31.596	98
	Total Area / Weighted Curve Number			53.16	91
PRE DEV 1	Woods - grass combination	(good)	D	3.64	79
	Total Area / Weighted Curve Number			3.64	79

III.c. WET DETENTION CALCULATIONS

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BASIN # 1

TOTAL AREA: 53.16
IMPERVIOUS AREA: 20.10
PERVIOUS AREA: 33.07
PERCENT IMPERVIOUS: 38%

RUNOFF COEFFICIENT: 0.46

NWL 26.60

STAGE/STORAGE:

	STAGE (FT)	AREA (AC)	STORAGE (AC-FT)	CUMULATIVE STOARGE (AC-FT)	CUMULATIVE STORAGE ABOVE ORIFICE
	14.60	6.93	0.00	0.00	
	24.60	10.14	85.35	85.35	
NWL	26.60	11.50	21.64	106.99	0.00
	27.00	11.91	4.68	111.67	4.68
	28.00	12.61	12.26	123.93	16.94
	29.00	13.31	12.96	136.89	29.90
	30.00	14.03	13.67	150.56	43.57

REQ'D TREATMENT VOL.: Area x 1 inch of runoff OR 2.5" x impervious area, whichever is greater
(add 50% to above number for OFW water quality standards)

4.43 OR 4.19

VOLUME REQ'D.= 4.43

6.65 Plus 50% for OFW 2.22

SET CONTROL ELEV.

ORIFICE INVERT: 26.60
WEIR ELEV: 27.39
TREATMENT VOL. DEPTH= 0.79

PERM. POOL VOLUME:

RUNOFF COEFF.= 0.46
2 WEEK RES. TIME: 21 days/153 days

MIN. PERM POOL VOL. = Area x runoff coefficient x wet season rainfall of 30" x 3 week res. Time divided by 12"/'

MIN. PERM POOL VOL = 8.48 AC-FT.

POND VOLUME BELOW
ORIFICE INVERT = 106.99 AC-FT.

SIZE CONTROL STRUCTURE:
Note: volume to draw down is 2.72 ac-ft
DETERMINE ORIFICE SIZE TO DRAWDOWN VOLUME IN 24 - 30 HOURS

A = Q / C(2gh) to 1/2 power

h = (h1 + h2)/2

h1 =	0.79		
h2 =	0.40		
C =	0.60		
g =	32.20		
Q =	treatment volume x 43560 sf/ac x 1/2 x 1/24 hrs x 1hr/3600 sec =		1.68
h =	0.59		
A =	0.45	SQ. FT.	
DIA. OF ORIFICE =	SQ. RT. OF (4A/3.1416) =	0.76	FT.
	OR	9.10	INCHES

MEAN DEPTH OF POND: volume of pond at orifice inv. Divided by area of pond at orifice invert

VOLUME OF POND =	106.99
AREA OF POND =	11.50
MEAN DEPTH OF POND =	9.31

LITTORAL ZONE ALTERNATE:

IN LIEU OF LITTORAL ZONE PLANTINGS ADD 50% PERM. POOL VOLUME:

NORMAL PERM POOL VOL:	8.48
REQ'D VOLUME:	12.71
VOLUME PROVIDED:	106.99

III.d. PRE & POST-DEVELOPMENT ICPR MODEL

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III.d.i. INPUT

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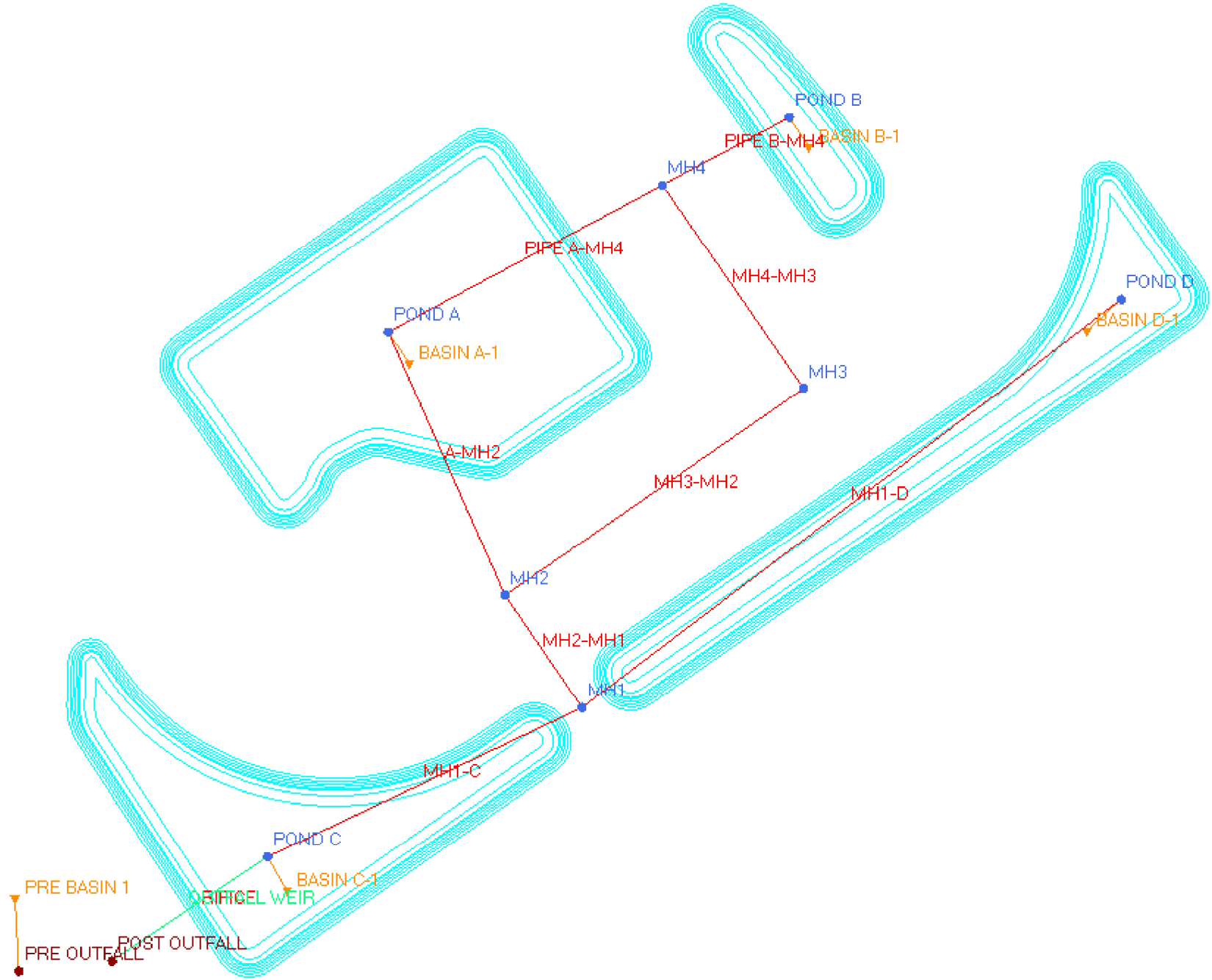
POND B
BASIN B-1
PIPE B-MH4
MH4
PIPE A-MH4
MH4-MH3
POND A
BASIN A-1
MH3
A-MH2
MH3-MH2
POND D
BASIN D-1
MH1-D
MH2
MH2-MH1
MH1
MH1-C
POND C
BASIN C-1
PRE BASIN 1
ORIFICE
WEIR
POST OUTFALL
PRE OUTFALL

Simple Basin: BASIN A-1

Scenario:	Scenario1
Node:	POND A
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH323
Peaking Factor:	323.0
Area:	22.2362 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin: BASIN B-1

Scenario:	Scenario1
Node:	POND B
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH323
Peaking Factor:	323.0
Area:	5.2551 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin: BASIN C-1

Scenario:	Scenario1
Node:	POND C
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr

Unit Hydrograph:	UH323
Peaking Factor:	323.0
Area:	6.4890 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin: BASIN D-1

Scenario:	Scenario1
Node:	POND D
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH323
Peaking Factor:	323.0
Area:	13.7522 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Simple Basin: PRE BASIN 1

Scenario:	Scenario1
Node:	PRE OUTFALL
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	36.2400 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0
Area:	3.6400 ac
Curve Number:	79.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Node: MH1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 18.00 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
18.00	0.0011	48
30.00	0.0011	48

Comment:

Node: MH2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 18.00 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
18.00	0.0011	48
30.00	0.0011	48

Comment:

Node: MH3

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 18.00 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
18.00	0.0011	48
30.00	0.0011	48

Comment:

Node: MH4

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 18.00 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
18.00	0.0011	48
30.00	0.0011	48

Comment:

Node: POND A

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 26.60 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
16.60	4.3095	187720
24.60	5.0061	218064
26.60	5.3682	233839
27.00	5.4787	238650
28.00	5.6646	246749
29.00	5.8528	254948
30.00	6.0433	263248

Comment:

Node: POND B

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 26.60 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
16.60	0.3571	15557
24.60	0.6411	27927
26.60	0.7970	34716
27.00	0.8455	36830
28.00	0.9283	40436
29.00	1.0134	44142
30.00	1.1007	47948

Comment:

Node: POND C

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 26.60 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
16.60	1.7888	77922
24.60	2.5026	109014
26.60	2.8748	125225
27.00	2.9882	130167
28.00	3.1792	138484
29.00	3.3724	146901
30.00	3.5679	155419

Comment:

Node: POND D

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 26.60 ft
Warning Stage: 30.00 ft

Stage [ft]	Area [ac]	Area [ft2]
16.60	1.0930	47612
24.60	1.9931	86820
26.60	2.4573	107039
27.00	2.5983	113182
28.00	2.8352	123503
29.00	3.0744	133923
30.00	3.3160	144445

Comment:

Node: POST OUTFALL

Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs

Initial Stage: 22.50 ft
Warning Stage: 24.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	22.50
0	0	0	12.0000	22.75
0	0	0	24.0000	23.00

Comment:

Node: PRE OUTFALL

Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 22.50 ft
Warning Stage: 23.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	22.50
0	0	0	12.0000	22.75
0	0	0	24.0000	23.00

Comment:

Pipe Link: A-MH2		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	POND A	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH2	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	250.00 ft	Op Table:		Op Table:	
FHWA Code:	5	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: MH1-C		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	MH1	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	POND C	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	56.00 ft	Op Table:		Op Table:	
FHWA Code:	5	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: MH1-D		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	MH1	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	POND D	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	88.00 ft	Op Table:		Op Table:	
FHWA Code:	5	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: MH2-MH1		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	MH2	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH1	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	200.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: MH3-MH2		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	MH3	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH2	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	585.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: MH4-MH3		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	MH4	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH3	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	250.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Pipe Link: ORIFICE		Upstream		Downstream	
Scenario:	Scenario1	Invert:	26.60 ft	Invert:	25.00 ft
From Node:	POND C	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	POST OUTFALL	Geometry: Circular		Geometry: Circular	

Link Count:	1	Max Depth:	0.76 ft	Max Depth:	0.76 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	40.00 ft	Op Table:		Op Table:	
FHWA Code:	6	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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: OUTFALL WEIR

Scenario:	Scenario1	Bottom Clip	
From Node:	POND C	Default:	0.00 ft
To Node:	POST OUTFALL	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:	27.39 ft	Discharge Coefficients	
Control Elevation:	27.39 ft	Weir Default:	3.200
Max Depth:	2.61 ft	Weir Table:	
Extrapolation Method:	Normal Projection	Orifice Default:	0.600
Bottom Width:	0.75 ft	Orifice Table:	
Left Slope:	0.250 (h:v)		
Right Slope:	0.250 (h:v)		

Comment:

Pipe Link: PIPE A-MH4

		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	POND A	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH4	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	225.00 ft	Op Table:		Op Table:	
FHWA Code:	5	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 dec	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: PIPE B-MH4		Upstream		Downstream	
Scenario:	Scenario1	Invert:	20.09 ft	Invert:	20.09 ft
From Node:	POND B	Manning's N:	0.0110	Manning's N:	0.0110
To Node:	MH4	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	4.00 ft	Max Depth:	4.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	173.00 ft	Op Table:		Op Table:	
FHWA Code:	5	Ref Node:		Ref Node:	
Entr Loss Coef:	0.50	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	1.00	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:

Simulation: 100YR24HR	
Scenario:	Scenario1
Run Date/Time:	9/26/2023 12:21:35 PM
Program Version:	ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	30.0000	0.0500
Max Calculation Time:		10.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

Surface Hydraulics

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

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources		Lookup Tables	
Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	
		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 Fact:	0.5 dec		
dZ Tolerance:	0.0001 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0000 ft	Rainfall Name:	~FLMOD
		Rainfall Amount:	12.50 in
Edge Length Option:	Automatic	Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0200 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 25YR24HR

Scenario: Scenario1
Run Date/Time: 9/26/2023 12:23:53 PM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

Hydrology [sec]	Surface Hydraulics

		[sec]
Min Calculation Time:	30.0000	0.0500
Max Calculation Time:		10.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

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	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0001 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0000 ft	Rainfall Name:	~FLMOD
		Rainfall Amount:	9.50 in
Edge Length Option:	Automatic	Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0200 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: MEAN ANNUAL

Scenario: Scenario1
Run Date/Time: 9/26/2023 12:26:04 PM
Program Version: ICPR4 4.07.08

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	30.0000	0.0500
Max Calculation Time:		10.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	5.0000

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 Fact: 0.5 dec
dZ Tolerance: 0.0001 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0000 ft

IA Recovery Time: 24.0000 hr
Smp/Man Basin Rain Opt: Global
Rainfall Name: ~FLMOD

Edge Length Option: Automatic

Rainfall Amount:	5.00 in
Storm Duration:	24.0000 hr
Dflt Damping (1D):	0.0200 ft
Min Node Srf Area (1D):	100 ft2
Energy Switch (1D):	Energy

Comment:

III.d.ii. BASIN RUNOFF SUMMARY

880 Airport Rd. Suite 113
Ormond Beach, FL 32174
CA5479

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Simple Basin Runoff Summary [Scenario1]

Basin Name	Sim Name	Max Flow [cfs]	Time to Max Flow [hrs]	Total Rainfall [in]	Total Runoff [in]	Area [ac]	Equivalent Curve Number	% Imperv	% DCIA
BASIN A-1	100YR24 HR	179.39	12.0333	12.50	11.54	22.2362	92.0	0.00	0.00
BASIN B-1	100YR24 HR	42.40	12.0333	12.50	11.54	5.2551	92.0	0.00	0.00
BASIN C-1	100YR24 HR	52.35	12.0333	12.50	11.54	6.4890	92.0	0.00	0.00
BASIN D-1	100YR24 HR	110.95	12.0333	12.50	11.54	13.7522	92.0	0.00	0.00
PRE BASIN 1	100YR24 HR	13.19	12.3667	12.50	9.79	3.6400	79.0	0.00	0.00
BASIN A-1	25YR24HR	134.91	12.0417	9.50	8.55	22.2362	92.0	0.00	0.00
BASIN B-1	25YR24HR	31.88	12.0417	9.50	8.55	5.2551	92.0	0.00	0.00
BASIN C-1	25YR24HR	39.37	12.0417	9.50	8.55	6.4890	92.0	0.00	0.00
BASIN D-1	25YR24HR	83.44	12.0417	9.50	8.55	13.7522	92.0	0.00	0.00
PRE BASIN 1	25YR24HR	9.40	12.3750	9.50	6.92	3.6400	79.0	0.00	0.00
BASIN A-1	MEAN ANNUAL	67.38	12.0417	5.00	4.10	22.2362	92.0	0.00	0.00
BASIN B-1	MEAN ANNUAL	15.92	12.0417	5.00	4.10	5.2551	92.0	0.00	0.00
BASIN C-1	MEAN ANNUAL	19.66	12.0417	5.00	4.10	6.4890	92.0	0.00	0.00
BASIN D-1	MEAN ANNUAL	41.67	12.0417	5.00	4.10	13.7522	92.0	0.00	0.00
PRE BASIN 1	MEAN ANNUAL	3.81	12.4000	5.00	2.80	3.6400	79.0	0.00	0.00

III.d.iii. OUTPUT

880 Airport Rd. Suite 113
Ormond Beach, FL 32174
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III.d.iii.1. NODE SUMMARY

880 Airport Rd. Suite 113
Ormond Beach, FL 32174
CA5479

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Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
MH1	100YR24HR	30.00	29.37	0.1094	218.83	102.02	598
MH2	100YR24HR	30.00	29.38	0.0510	209.15	83.14	2235
MH3	100YR24HR	30.00	29.39	0.0893	182.28	5.68	1502
MH4	100YR24HR	30.00	29.40	0.1085	217.81	99.24	1156
POND A	100YR24HR	30.00	29.40	0.0000	185.96	210.53	258257
POND B	100YR24HR	30.00	29.40	-0.0002	42.40	108.62	45689
POND C	100YR24HR	30.00	29.35	0.0000	82.91	109.41	149857
POND D	100YR24HR	30.00	29.38	-0.0001	110.95	109.41	137898
POST OUTFALL	100YR24HR	24.00	23.00	0.0000	12.95	0.00	0
PRE OUTFALL	100YR24HR	23.00	23.00	0.0000	13.19	0.00	0
MH1	25YR24HR	30.00	28.76	0.1094	218.83	102.02	598
MH2	25YR24HR	30.00	28.77	0.0510	209.15	83.14	2235
MH3	25YR24HR	30.00	28.77	0.0893	182.28	4.37	1502
MH4	25YR24HR	30.00	28.78	0.1085	217.81	99.24	1156
POND A	25YR24HR	30.00	28.78	0.0000	140.34	210.53	253149
POND B	25YR24HR	30.00	28.79	-0.0002	31.88	108.62	43354
POND C	25YR24HR	30.00	28.74	0.0000	64.13	109.41	144749
POND D	25YR24HR	30.00	28.76	-0.0001	83.44	109.41	131475
POST OUTFALL	25YR24HR	24.00	23.00	0.0000	7.69	0.00	0
PRE OUTFALL	25YR24HR	23.00	23.00	0.0000	9.40	0.00	0
MH1	MEAN ANNUAL	30.00	27.75	0.1094	218.83	102.02	598
MH2	MEAN ANNUAL	30.00	27.76	0.0510	209.15	83.14	2235
MH3	MEAN ANNUAL	30.00	27.76	0.0893	182.28	2.27	1502
MH4	MEAN ANNUAL	30.00	27.77	0.1085	217.81	99.24	1156
POND A	MEAN ANNUAL	30.00	27.77	0.0000	70.46	210.53	244879
POND B	MEAN ANNUAL	30.00	27.77	-0.0002	15.92	108.62	39618
POND C	MEAN ANNUAL	30.00	27.75	0.0000	33.88	109.41	136385
POND D	MEAN ANNUAL	30.00	27.76	-0.0001	41.67	109.41	121015
POST OUTFALL	MEAN ANNUAL	24.00	23.00	0.0000	2.23	0.00	0
PRE OUTFALL	MEAN ANNUAL	23.00	23.00	0.0000	3.81	0.00	0

III.d.iii.2. LINK SUMMARY

880 Airport Rd. Suite 113
Ormond Beach, FL 32174
CA5479

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Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
A-MH2	100YR24HR	107.18	-0.47	-1.47	8.53	9.84	8.95
MH1-C	100YR24HR	33.62	-109.41	2.08	-8.71	-9.87	-9.29
MH1-D	100YR24HR	0.00	-109.41	2.02	-8.71	-10.00	-9.35
MH2-MH1	100YR24HR	15.06	-102.02	-1.55	-8.12	-9.61	-8.63
MH3-MH2	100YR24HR	5.68	-83.14	2.22	-6.62	-8.61	-7.30
MH4-MH3	100YR24HR	99.24	-1.79	-3.83	7.90	9.45	8.43
ORIFICE	100YR24HR	2.96	0.00	-0.01	6.52	9.75	8.13
OUTFALL WEIR	100YR24HR	9.99	0.00	0.00	4.12	4.12	4.12
PIPE A-MH4	100YR24HR	109.41	-6.60	-2.18	8.71	9.23	8.97
PIPE B-MH4	100YR24HR	108.62	-13.80	-3.10	8.64	10.17	9.37
A-MH2	25YR24HR	107.18	-0.47	-1.47	8.53	9.84	8.95
MH1-C	25YR24HR	26.69	-109.41	2.08	-8.71	-9.87	-9.29
MH1-D	25YR24HR	0.00	-109.41	2.02	-8.71	-10.00	-9.35
MH2-MH1	25YR24HR	11.40	-102.02	-1.55	-8.12	-9.61	-8.63
MH3-MH2	25YR24HR	4.37	-83.14	2.22	-6.62	-8.61	-7.30
MH4-MH3	25YR24HR	99.24	-1.79	-3.83	7.90	9.45	8.43
ORIFICE	25YR24HR	2.55	0.00	-0.01	5.62	9.44	7.53
OUTFALL WEIR	25YR24HR	5.14	0.00	0.00	3.49	3.49	3.49
PIPE A-MH4	25YR24HR	109.41	-5.43	-2.18	8.71	9.23	8.97
PIPE B-MH4	25YR24HR	108.62	-13.80	-3.10	8.64	10.17	9.37
A-MH2	MEAN ANNUAL	107.18	-0.47	-1.47	8.53	9.84	8.95
MH1-C	MEAN ANNUAL	14.82	-109.41	2.08	-8.71	-9.87	-9.29
MH1-D	MEAN ANNUAL	0.00	-109.41	2.02	-8.71	-10.00	-9.35
MH2-MH1	MEAN ANNUAL	6.08	-102.02	-1.55	-8.12	-9.61	-8.63
MH3-MH2	MEAN ANNUAL	2.27	-83.14	2.22	-6.62	-8.61	-7.30
MH4-MH3	MEAN ANNUAL	99.24	-1.79	-3.83	7.90	9.45	8.43
ORIFICE	MEAN ANNUAL	1.67	0.00	-0.01	3.68	8.50	6.09
OUTFALL WEIR	MEAN ANNUAL	0.56	0.00	0.00	1.87	1.87	1.87
PIPE A-MH4	MEAN ANNUAL	109.41	-3.08	-2.18	8.71	9.23	8.97
PIPE B-MH4	MEAN ANNUAL	108.62	-13.80	-3.10	8.64	10.17	9.37