STORMWATER MANAGEMENT REPORT

for

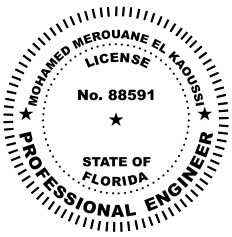
Riviera Beach Truck Facility LTL

1463-1481 Martin Luther King Boulevard
Riviera Beach, Florida 33404

Prepared by

BOHLER

1900 NW Corporate Boulevard, Suite 101E
Boca Raton, FL 33431



c=US, st=Florida, l=Boca Raton, o=BOHLER ENGINEERING FL, LLC, cn=Merouane El Kaoussi, email=melkaoussi@bohlereng.com
2022.02.18 10:18:24 -05'00'

Mohamed Merouane El Kaoussi, P.E.
Florida Professional Engineer License No. 88591

February 17, 2022

Table of Contents

Section 1

Executive Summary

Executive Summary

Site Description

The proposed development is located on a vacant lot located in the City of Riviera Beach, within the General Industrial District (IG) at 1463-1481 Martin Luther King Boulevard, Riviera Beach, Florida 33404. The purpose of this report is to demonstrate the compliance of the proposed Riviera Beach Truck Facility stormwater management system with the local regulatory stormwater design criteria.

Existing Conditions & Hydrology

The site is located south of Martin Luther King Blvd, and adjacent East and South is the railroad. It consists of ±8.97 acres of vegetated areas, including several small to medium-sized trees. There is no direct discharge into any offsite structures. Instead, the site currently sheet flows stormwater onto MLK's blvd under existing conditions at a discharge elevation of approximately 14.67 NAVD.

Proposed Conditions & Hydrology

The proposed development consists of approximately 34,500 sf of shipping, warehouse, and office buildings with associated parking areas and site infrastructure, ponds, and landscaping. In total, these improvements will result in a net impervious area increase of +/-6.97 AC.

The proposed drainage design will operate as a detention system and will be bermed an elevation of 15.50 NAVD which higher than 100yr-3day storm event and higher than Pre-development condition discharge elevation. In the scenario that any storm event occurs, that stages above 15.50 NAVD, runoff will sheet flow onto the MLK's right of way similar to the existing conditions.

The minimum finished floor for the site will be dictated by the 100-year, 72-hour design storm per SFWMD code. Per the attached ICPR outputs, the 100-year, 72-hour storm stages to an elevation of 13.72'. The proposed finished floor for the on-site building is approximately 17.00', which is above the peak stage of 13.72' for the required design storm. The lowest inlet elevation will also be above the 5-year 1hr day storm.

Groundwater Elevation

A seasonal high groundwater elevation of 7.5 was used for the calualtions.

Floodplain

This site is located within flood zone X per FEMA map number 12099C0389F dated 10/5/2017. The FEMA flood map can be found in **Appendix B**.

Vertical Datum

All proposed elevations are based on National American Vertical Datum of 1988 (NAVD 88).

Water Quality

Methodology

A. On-Site Area Summary: Staging Analysis Area Summary

Proposed Land Use	Limits of Development (AC.)	Total Building /Canopy Area (AC.)	Total Pervious Area (AC.)	Total Impervious Area (Excluding Building/Canopy) (AC.)
MLK Distribution Center	8.97	0.79	2.00	6.97

B. Design Criteria

- **WQ =** 2.5" x Percent of Imperviousness
- **WQ =** 1" x Total Area

Whichever is higher, that will be the WQ used for the calculations.

- **WQ = 1.41 Ac-ft (Percentage of Impervious) + 0.71 Ac-Ft (Additional 50% WQ)**
- **Total WQ = 2.12 Ac-Ft.**
- The Required 2.12 Ac-ft of Water Quality is met on-site within the proposed stormwater ponds and swales at elevation **14.09'**

Post-Development Design Storm Peak Stages Summary

Design Storm	Calculated Elevations NAVD	Design Elevation - Ft. (NAVD)	Design Criteria
100-Year / 72-Hour (SFWMD)	13.62'	17.00'	Finished Floor Elevation
25-Year / 72-Hour (SFWMD)	13.33'	15.5'	Berm and Discharge elevation
5-Year / 1-Hour (SFWMD)	11.58'	12.00'	Minimum Inlet Elevation

*On-site detention design will be utilized for this proposed development

Section 2

Location Map

H:\2021\FLB210114\CAD\DRAWINGS\EXHIBITS\FLB210114 - LOC - 0---->LAYOUT: CONCEPT

RIVIERA BEACH TRUCK FACILITY LOCATION MAP

2/16/2022 | REM | FLB210114

BOHLER

1900 NW CORPORATE BOULEVARD
SUITE 101E
BOCA RATON, FLORIDA 33431
Phone: (561) 571-0280
Fax: (561) 571-0281
FLORIDA BUSINESS CERT. OF AUTH. No. 30780

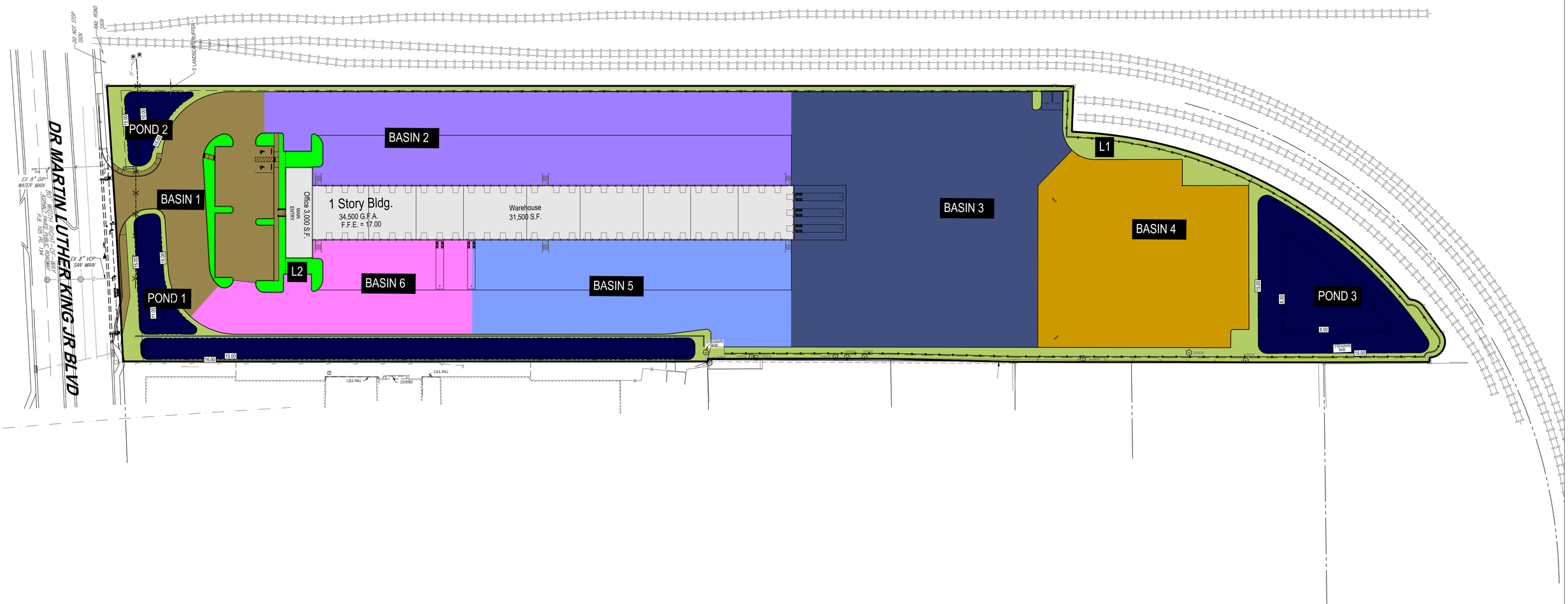
1463-1481 MARTIN LUTHER KING BLVD, RIVIERA BEACH, FL 33404

1000 500 250 0 1000

1"=1000'

Section 3

Drainage Basin Maps



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RIVIERA BEACH TRUCK FACILITY
DRAINAGE BASIN EXHIBIT

1463-1481 MARTIN LUTHER KING BLVD., RIVIERA BEACH, FL 33404 | PLAN REV. 0

2021-12-08 | HMF | FLB200267 | Rev 0

50 25 12.5 0 50
1"= 50'

Section 4

Post-Development Drainage Calculations

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Date: 2/16/2022
Project: Riviera Beach Truck Facility
Project No.: FLB210114

Calculated By: GR/RM
Checked By: CL

Riviera Beach Truck Facility - Stormwater Management

SITE DATA		
Total Site Area (A_T)=	8.97 Acres	100.0%
Total Building (A_B)=	0.79 Acres	8.8%
Total Pavement/Sidewalk (A_I)=	6.18 Acres	68.9%
Total Green (A_P)=	2.00 Acres	22.3%
SOIL STORAGE CALCULATIONS		
Average Pervious Elevation =	14.5 Ft. +/-	NAVD
Seasonal High Water Table	7.50 Ft.	NAVD
Depth to water table=	7.00 Ft.	
Soil Storage Type	Flatwoods	
From SFWMD Manual for to W.T. (Comp S) =	4.05 In.	
Compute overall soil storage for site.=	0.90 In.	
$S=(Comp\ S)x[A_P/A_T]$;		
Compute CN value for site=	92	
$CN=1000/(S+10)$		
COMPUTE 100-Year, 72-Hour Runoff Volume for Proposed Site		
Rainfall (P_{100-72}),	16.00 In.	
$Q_{100-72} = (P_{100-72}-0.2S^2)/(P_{100-72}+0.8S)$ =	14.97 In.	
Compute volume generated by storm		
$V = (P_{100-72}/12)xA_T$ =	11.18 Ac.-Ft.	
COMPUTE 25-Year, 72-Hour Runoff Volume for Proposed Site		
Rainfall (P_{25-72}),	13.20 In.	
$Q_{25-72}= (P_{25-72}-0.2S^2)/(P_{25-72}+0.8S)$ =	12.18 In.	
Compute volume generated by storm		
COMPUTE 5-Year, 1-Hour Runoff Volume for Proposed Site		
Rainfall (P_{5-1}),	3.28 In.	
$Q_{5-1}= (P_{5-1}-0.2S^2)/(P_{5-1}+0.8S)$ =	2.40 In.	
Compute volume generated by storm		
$V = (P_{5-1}/12)xA_T$ =	1.79 Ac.-Ft.	

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Project No.: FLB210114
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Checked By: CL

Riviera Beach Truck Facility - Water Quality

SITE DATA

Total Site Area (A_T)=	8.97 Acres	(100.0%)
Total Building/Canopy (A_B)=	0.79 Acres	(8.8%)
Total Pavement/Sidewalk (A_I)=	6.18 Acres	(68.9%)
Total Green (A_P)=	2.00 Acres	(22.3%)
Total Pond/Lake (A_L)	0.00 Acres	(0.0%)

Compute Water Quality Requirements

-Compute first inch of runoff over entire site

WQ_1 = 1 Inch x A_T x (1 Ft./12 In.)
= 1/12 x 8.97 Acres
= 0.75 Ac.-Ft. or = 8.97 Ac.-In.

-Compute 2.5" x % of Imperviousness

A) Calculate site area for W.Q. Imperviousness
$A_S = A_T-(A_B+A_L)$
= 8.97 - (0.79 + 0)
= 8.18 Acres

B) Calculate Imperviousness Area for W.Q.
$A_{IMP} = A_S-A_P$
= 8.18 - 2
= 6.18 Acres

C) Calculate percent imperviousness
$\%_{IMP} = (A_{IMP} / A_S) \times 100$
= (6.18 / 8.18) x100
= 75.6%

D) Calculate 2.5 inches times the percent imperviousness
$V_{2.5}$ = 2.5 in. x $\%_{IMP}$
= 2.5 in. x 0.756
= 1.89 In.

E) Calculate W.Q. volume required
$WQ_{2.5} = V_{2.5} \times (A_T - A_L)$
= 1.89 x (8.97 - 0)
= 1.41 Ac.-Ft. or = 16.92 Ac.-In.

-Determine W.Q. required for site
WQ= 1.41 Ac.-Ft. or = 16.92 Ac.-In.

Since the 16.92 ac-in is greater than the 8.97 ac-in computed for the first inch of runoff the volume of 16.92 ac-in controls.

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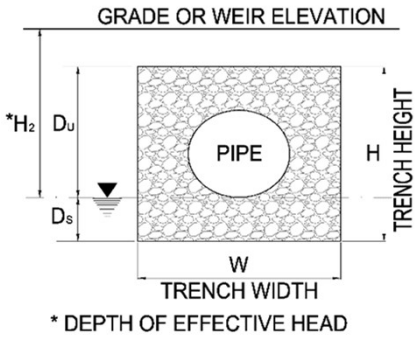
Riviera Beach Truck Facility - Exfiltration Trench Calculations (Quality)

K-Values	
Test Hole #	(cfs/ft^2/ft hd)
P-1	5.90E-04
K_{AVG}	5.90E-04

Trench:



Description of Elevations	Elevations (NAVD)
Grade	12.00
Weir	15.50
Top of Trench	10.00
Seasonal High Water Table	7.50
Bottom of Trench	6.00

Design Parameters

Factor of Safety	2	
Water Quality Runoff (Q_{WQ})	1.89 Inches	
Water Quality Volume (V_{WQ})	16.92 Acre-Inches	
Addition Runoff (Q_{ADD})	1.39 Inches	(3.28 in - Q_{WQ})
Addition Volume (V_{ADD})	12.47 Acre-Inches	
% of WQ Required	50%	Dry/Wet Retention

Trench Properties	
H_2 =	8.00 Ft.
W =	8.0 Ft.
D_u =	2.50 Ft.
D_s =	1.50 Ft.
H = Du + Ds =	4.00 Ft.

$$L = \frac{F.S.[(\%WQ)(V_{WQ})+V_{ADD}]}{K * [(H*W) + (2*H*Du) - Du^2 + (2*H*Ds)] + [1.39 * 10^{-4}] * (W*Du)}$$

Trench Length for Water Quality Requirements:

L_{WQ} = 227 Feet

Additional Trench Length Allowed:

L_{ADD} = 334 Feet

Total Trench Length Allowed (5-year 1-hour):

L_{TOTAL} = 561 Feet

Total Trench Length Provided:

$L_{PROVIDED}$ = 100 Feet

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Date: 2/16/2022
Project: Riviera Beach Truck Facility
Project No: FLB210114

Calculated By: GR/RM
Checked By: CL

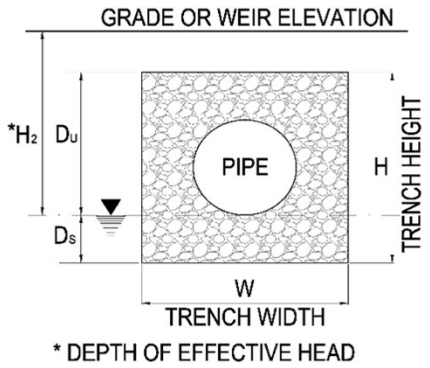
Riviera Beach Truck Facility - Exfiltration Trench Volume Calculations

K-Values†	
Test Hole #	(cfs/ft^2/ft hd)
P-1	5.90E-04
K_{AVG}	5.90E-04

Description of Elevations	Elevations (NAVD)
Grade	12.00
Weir	15.50
Top of Trench	10.00
Seasonal High Water Table	7.50
Bottom of Trench	6.00

Trench Properties	
H_2 =	8.00 Ft.
W =	7.99 Ft.
D_u =	2.50 Ft.
D_s =	1.50 Ft.
H = Du + Ds =	4.00 Ft.

Trench:



V = L x [K x (H2 x W + 2 x H2 x Du) - Du^2 + (2 x H2 x Ds) + (1.39 x 10^-4) x (W x Du)]

Water Quality Treatment Storage Volume

Stage (Ft.)	H_2 (Ft.)	Exfiltrated Volume (Ac.-Ft.)
7.50	0.00	0.00
8.00	0.50	0.07
8.50	1.00	0.16
9.00	1.50	0.25
9.50	2.00	0.34
10.00	2.50	0.43
10.50	3.00	0.52
11.00	3.50	0.61
11.50	4.00	0.70
12.00	4.50	0.79
12.50	5.00	0.88
13.00	5.50	0.96
13.50	6.00	1.05
14.00	6.50	1.14
14.50	7.00	1.23
15.00	7.50	1.32
15.50	8.00	1.41
16.00	8.50	1.50
16.50	9.00	1.59
17.00	9.50	1.68

Water Quantity Treatment Storage Volume
Remaining storage to the 5-year 1-hour storm after WQ

Stage (Ft.)	H2 (Ft.)	Exfiltrated Volume (Ac.-Ft.)	Total Volume Provided (Ac.-Ft.)
7.50	0.00	0.00	0.00
8.00	0.50	0.00	0.08
8.50	1.00	0.00	0.17
9.00	1.50	0.00	0.26
9.50	2.00	0.00	0.34
10.00	2.50	0.00	0.43
10.50	3.00	0.00	0.52
11.00	3.50	0.00	0.61
11.50	4.00	0.00	0.70
12.00	4.50	0.00	0.79
12.50	5.00	0.00	0.88
13.00	5.50	0.00	0.97
13.50	6.00	0.00	1.06
14.00	6.50	0.00	1.15
14.50	7.00	0.00	1.24
15.00	7.50	0.00	1.33
15.50	8.00	0.00	1.42
16.00	8.50	0.00	1.50
16.50	9.00	0.00	1.59
17.00	9.50	0.00	1.68

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Date: 2/16/2022
Project: Riviera Beach Truck Facility
Project No: FLB210114
Calculated By: GR/RM
Checked By: CL

Riviera Beach Truck Facility - Stage Storage

Basin	Retention Area 1 (Slopes)	Retention Area 1 (Bottom)	Retention Area 2 (Slopes)	Retention Area 2 (Bottom)	Retention Area 3 (Slopes)	Retention Area 3 (Bottom)	Retention Area 4 (Slopes)	Retention Area 4 (Bottom)	Landscaping 1	Landscaping 2	Pavement 1	Pavement 2	Pavement 3	Pavement 4	Pavement 5	Pavement 6	Exfiltration	Building	Total Area (Ac.)
Land Type	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	
Area (Acres)	0.11	0.01	0.08	0.01	0.31	0.17	0.11	0.22	0.86175	0.12	0.63	1.30	1.79	1.03	0.86	0.56		0.79	8.97
Storage Type	Sloped	Flat	Sloped	Flat	Sloped	Flat	Sloped	Flat	Sloped	Sloped	Sloped	Sloped	Sloped	Sloped	Sloped	Sloped	Flat	Flat	
Start (Ft.)	11.00	11.00	10.00	10.00	8.50	8.50	15.00	15.00	13.50	15.30	14.40	11.75	11.00	14.50	11.35	11.35	7.50	16.00	
End (Ft.)	15.00	11.00	15.00	10.00	15.00	8.50	16.00	15.00	15.00	15.85	15.20	14.40	14.25	15.25	14.75	14.75	15.50	16.00	
Stage (Ft.)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Storage (Ac-Ft)	Total Storage (Ac-Ft)
7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
9.00	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.35
9.50	0.00	0.00	0.00	0.00	0.02	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.54
10.00	0.00	0.00	0.00	0.00	0.05	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.74
10.50	0.00	0.00	0.00	0.01	0.09	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00	0.96
11.00	0.00	0.00	0.01	0.01	0.15	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.00	1.20
11.50	0.00	0.01	0.02	0.02	0.21	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.70	0.00	1.54
12.00	0.01	0.01	0.03	0.02	0.29	0.59	0.00	0.00	0.00	0.00	0.00	0.02	0.28	0.00	0.05	0.03	0.79	0.00	2.13
12.50	0.03	0.02	0.05	0.03	0.38	0.68	0.00	0.00	0.00	0.00	0.00	0.14	0.62	0.00	0.17	0.11	0.88	0.00	3.09
13.00	0.05	0.02	0.07	0.03	0.48	0.76	0.00	0.00	0.00	0.00	0.00	0.38	1.10	0.00	0.34	0.22	0.97	0.00	4.44
13.50	0.08	0.03	0.10	0.04	0.59	0.84	0.00	0.00	0.00	0.00	0.00	0.75	1.72	0.00	0.58	0.38	1.06	0.00	6.17
14.00	0.12	0.03	0.13	0.04	0.72	0.93	0.00	0.00	0.07	0.00	0.00	1.24	2.48	0.00	0.88	0.58	1.15	0.00	8.37
14.50	0.16	0.04	0.16	0.05	0.85	1.01	0.00	0.00	0.29	0.00	0.00	1.85	3.36	0.00	1.25	0.82	1.24	0.00	11.08
15.00	0.21	0.04	0.20	0.05	1.00	1.10	0.00	0.00	0.65	0.00	0.14	2.50	4.26	0.17	1.67	1.09	1.33	0.00	14.41
15.50	0.26	0.05	0.24	0.06	1.15	1.18	0.01	0.11	1.08	0.00	0.44	3.16	5.16	0.65	2.10	1.37	1.42	0.00	18.43
16.00	0.32	0.05	0.28	0.06	1.31	1.27	0.06	0.22	1.51	0.05	0.76	3.81	6.05	1.16	2.53	1.65	1.42	0.00	22.49
16.50	0.37	0.06	0.32	0.07	1.46	1.35	0.11	0.33	1.94	0.11	1.08	4.46	6.95	1.68	2.95	1.93	1.42	0.00	26.58
17.00	0.42	0.06	0.36	0.07	1.61	1.44	0.17	0.44	2.37	0.17	1.39	5.11	7.85	2.20	3.38	2.21	1.42	0.00	30.67

Simple Basin: BASIN

Scenario:	Scenario1
Node:	POND
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:	8.9700 ac
Curve Number:	92.0
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Node: GROUNDWATER

Scenario:	Scenario1
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	7.50 ft
Warning Stage:	7.50 ft
Boundary Stage:	

Year	Month	Day	Hour	Stage [ft]
9999	0	0	0.0000	7.50

Comment:

Node: OFFSITE

Scenario:	Scenario1
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	7.50 ft
Warning Stage:	7.50 ft
Boundary Stage:	

Year	Month	Day	Hour	Stage [ft]
9999	0	0	0.0000	7.50

Comment:

Node: POND

Scenario: Scenario1
Type: Stage/Volume
Base Flow: 0.00 cfs
Initial Stage: 7.50 ft
Warning Stage: 16.50 ft

Stage [ft]	Volume [ac-ft]	Volume [ft3]
7.50	0.00	0
8.00	0.05	2178
8.50	0.12	5227
9.00	0.27	11761
9.50	0.44	19166
10.00	0.62	27007
10.50	0.81	35284
11.00	1.03	44867
11.50	1.36	59242
12.00	1.95	84942
12.50	2.91	126760
13.00	4.26	185566
13.50	6.00	261360
14.00	8.19	356756
14.50	10.90	474804
15.00	14.24	620294
15.50	18.26	795406
16.00	22.32	972259
16.50	26.40	1149984
17.00	30.49	1328144

Comment:

Percolation Link: PERCOLATION

Scenario: Scenario1
From Node: POND
To Node: GROUNDWATER
Link Count: 1
Flow Direction: Both
Aquifer Base Elevation: -2.50 ft
Water Table Elevation: 7.50 ft
Annual Recharge Rate: 0 ipy
Horizontal Conductivity: 50.000 fpd
Vertical Conductivity: 50.000 fpd
Fillable Porosity: 0.250
Layer Thickness: 2.50 ft

Surface Area Option: Vary Based on Stage/Area Table
Vertical Flow Termination: Horizontal Flow Algorithm
Perimeter 1: 1234.10 ft
Perimeter 2: 3077.90 ft
Perimeter 3: 6585.27 ft
Distance P1 to P2: 50.00 ft
Distance P2 to P3: 450.00 ft
# of Cells P1 to P2: 10
# of Cells P2 to P3: 45

Comment:

Simulation: 100-72

Scenario: Scenario1
Run Date/Time: 2/16/2022 12:04:45 PM
Program Version: ICPR4 4.05.01

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:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
0	0	0	24.0000	5.0000
0	0	0	42.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
0	0	0	24.0000	5.0000
0	0	0	42.0000	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
IA Recovery Time: 24.0000 hr

Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~SFWMD-72
		Rainfall Amount:	16.00 in
Edge Length Option:	Automatic	Storm Duration:	72.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 25-72

Scenario: Scenario1
Run Date/Time: 2/16/2022 12:05:57 PM
Program Version: ICPR4 4.05.01

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:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
0	0	0	24.0000	5.0000
0	0	0	42.0000	15.0000

Surface Hydraulics

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

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	24.0000	5.0000
0	0	0	42.0000	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	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Smp/Man Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~SFWMD-72
		Rainfall Amount:	13.20 in
Edge Length Option:	Automatic	Storm Duration:	72.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 5-1hr

Scenario: Scenario1
Run Date/Time: 2/16/2022 12:07:08 PM
Program Version: ICPR4 4.05.01

General

Run Mode: Normal

Year	Month	Day	Hour [hr]

Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000

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

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
0	0	0	12.0000	5.0000
0	0	0	20.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000
0	0	0	12.0000	5.0000
0	0	0	20.0000	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 Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
Smp/Man Basin Rain Opt: Global
Rainfall Name: ~FDOT-1
Rainfall Amount: 3.28 in
Storm Duration: 1.0000 hr

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

Comment:

Scenario	Sim	Node Name	Maximum Stage [ft]
Scenario1	100-72	POND	13.72
Scenario1	25-72	POND	13.33
Scenario1	5-1hr	POND	11.58

Section 5

Results and Conclusions

Results & Conclusion

The proposed project will comply with SFWMD criteria for water quality and attenuation based on stormwater calculations and analysis. This report includes ICPR4 models (**Section 4**) to simulate the proposed conditions. The site plan proposes roughly 1.01 AC of stormwater pond area with a top of bank elevation of 15.00’ and a bottom elevation between 8.5’ (Pond 3), 10.0’ (Pond 2), and 11.00’ (Pond 1) and approximately 100 LF of 4.0’ deep and 8.0’ wide exfiltration trench. The stormwater calculations in **Section 4** show that the water quality treatment volume is met within the stormwater ponds, exfiltration trench, and swales at elevation 13.0’.

As shown in the ICPR results for the 100-year, 72-hours, and 25-year, 72-hour design storms, the proposed system will adhere to the minimum SFWMD peak stage requirements. Per **Section 4**, the 100-year, 72-hour storm event will control for the finished floor elevation with a peak stage of 13.72’, the 25-year, 72-hour storm event will control for the site berm/control structure with a peak stage at 13.33’ and the 5-year, 1-hour storm event will control for the lowest pavement elevation with a peak stage of 11.58'.

It is the intention of the proposed design to have a finished floor elevation of 17.0’ and a lowest pavement elevation of approximately 12.0’.

Appendix A

SFWMD Rainfall Maps

Appendix C: Isohyetal Maps
from SFWMD Technical Memorandum, *Frequency Analysis of One and Three Day Rainfall Maxima for central and southern Florida*, Paul Trimble, October 1990.

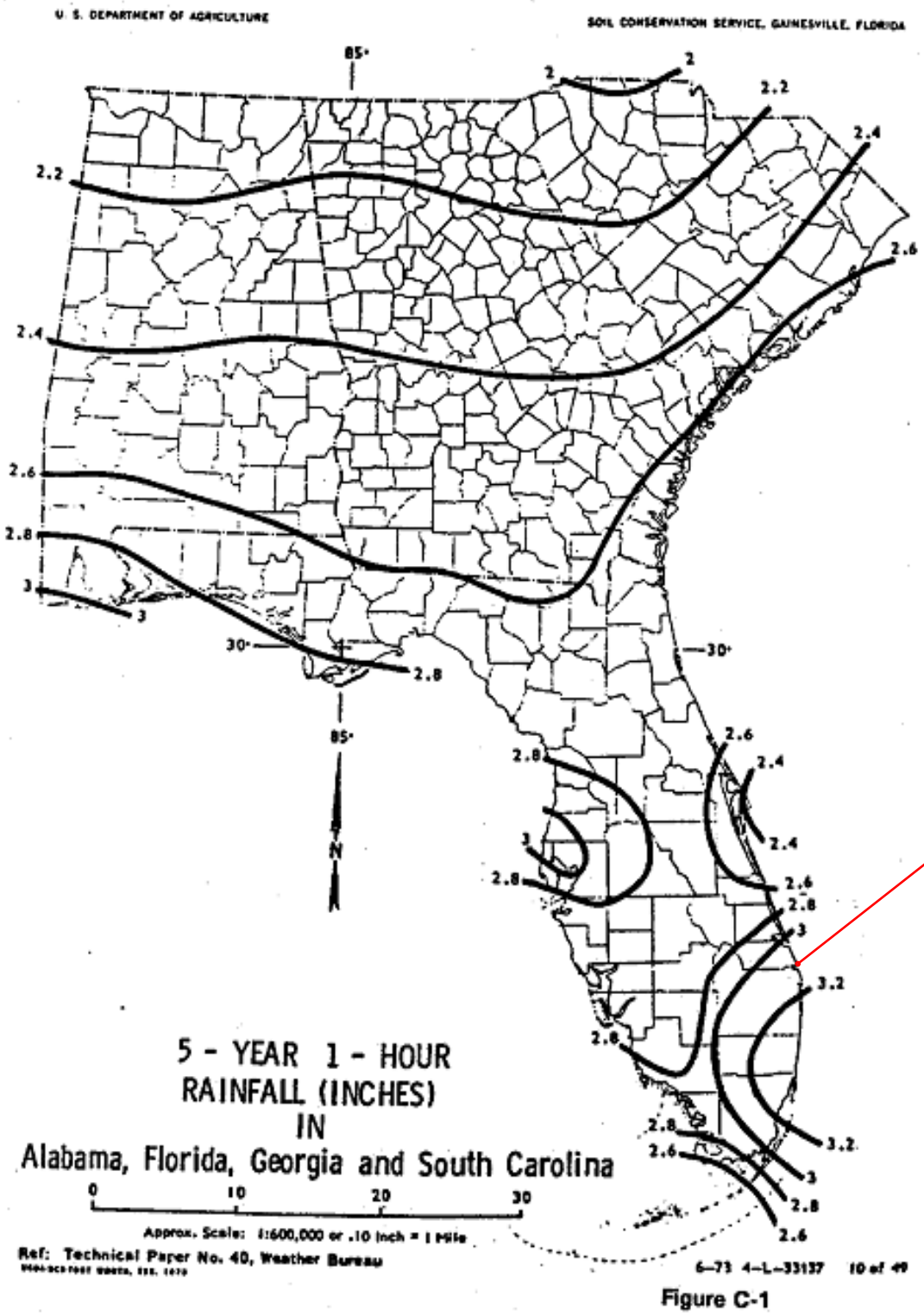


Figure C-1

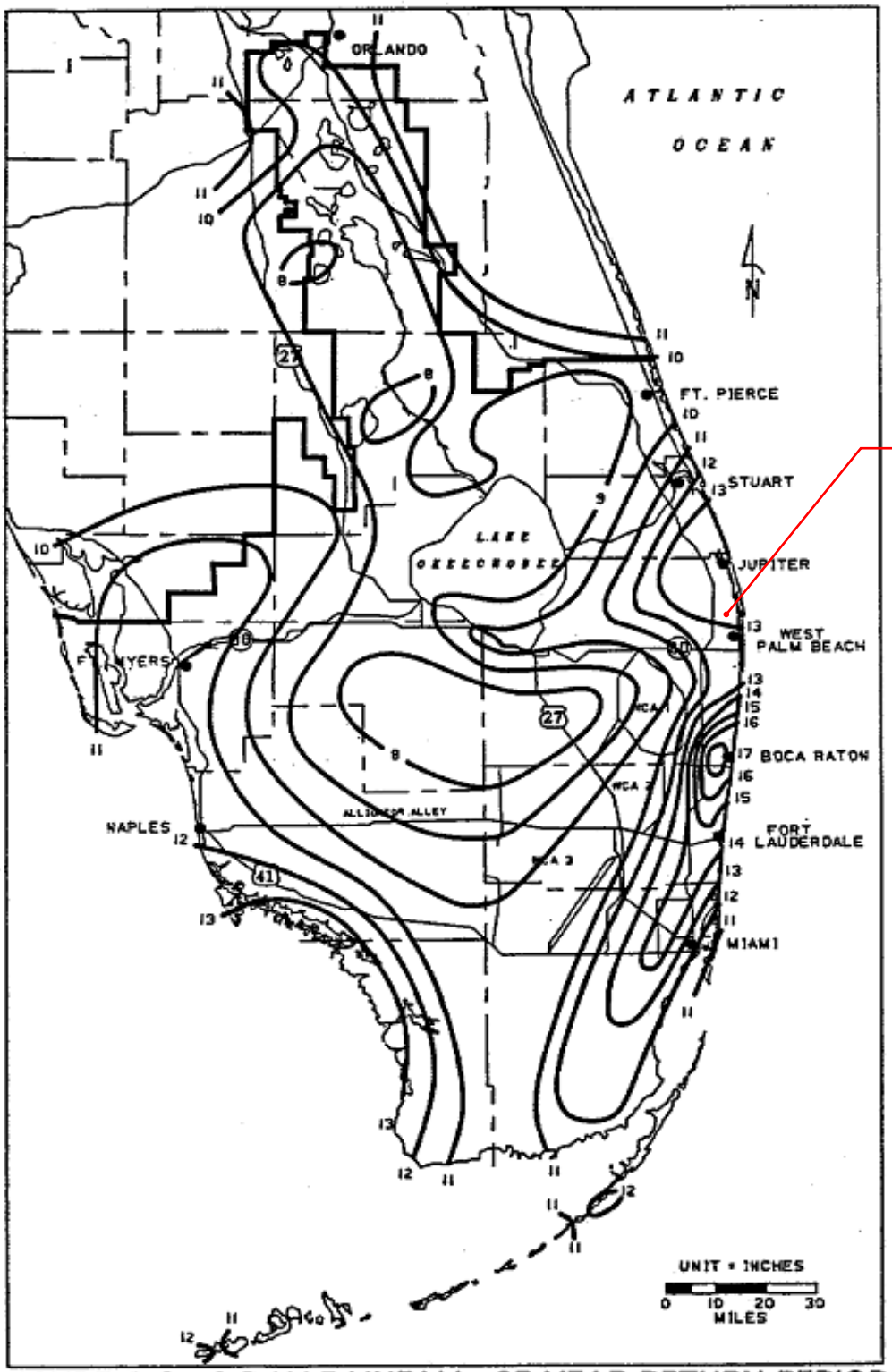


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

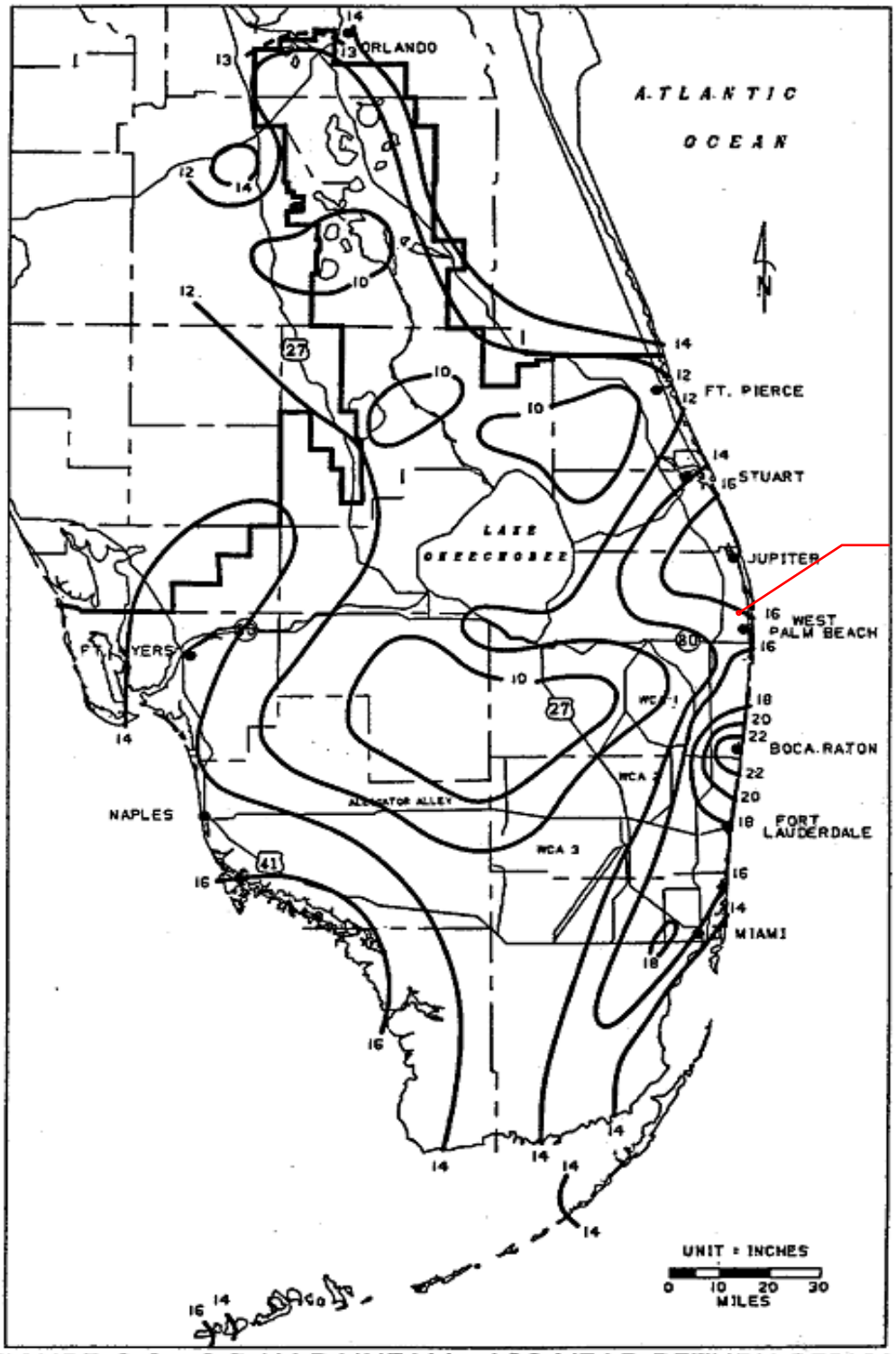


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD

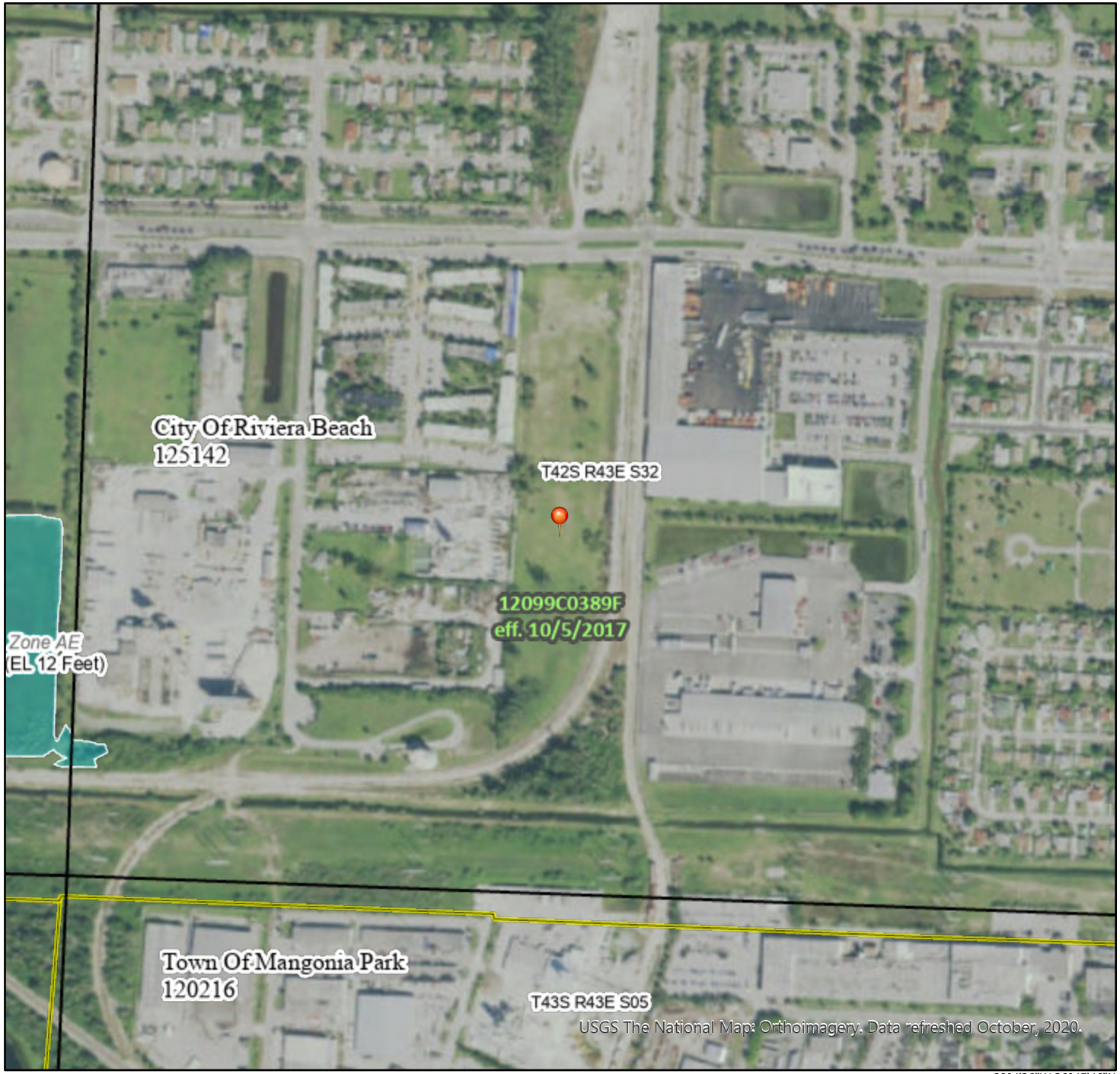
Appendix B

FEMA Flood Insurance Maps

National Flood Hazard Layer FIRMette

FEMA

80°5'3"W 26°46'18"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

80°4'26"W 26°45'46"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 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*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/19/2020 at 5:19 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C

SFWMD Pre-App Meeting Minutes

SFWMD Pre-Application Meeting – Riviera Beach Truck Facility – 1501 Martin Luther King Jr Blvd

Date: 11/03/2021
Project Number: FLB210114
Project Name: Riviera Beach Truck Facility
Client: Easton Group

Attendees: Merouane El Kaoussi – Bohler Engineering
Hannah Freshcorn – Bohler Engineering
David Wilf – Easton Group
C.J. Easton – Easton Group
Dustin Wood – SFWMD
Ellis Benoit – SFWMD
Barbara Conmy – SFWMD
Jose (Joe) Marquez - SFWMD
Morgan Reins – SFWMD Environmental Planning
Alec Dickerson – 2GHO Land Development

Meeting Minutes

- Water Quality
  - Will need to follow the SFWMD criteria (1-in over the entirety of the site or 2.5 times impervious area, whichever is greater)
  - If the site falls into an impaired body of water location:
    - Extra 50% of water quality will be needed
    - Nutrient analysis required to be submitted
    - Utilize the BMP Train's software to evaluate the nutrient removal effectiveness
    - May need to do a net improvement analysis should the site be within an impaired water body
  - Based on high level research on the FDEP GIS map, the site is within two water bodies (ID No. 3242A and 3242) which do not appear to be impaired bodies of water.
- Railroad
  - Will need to manage the off-site runoff but will not need to treat as it would not be within the site.
  - Clearly delineate a plan to manage the runoff from adjacent properties when submitting or the submittal will be incomplete.
  - Manage the existing situation around the railroad locations.
  - Must meet the 25 year 3 day elevation for perimeter berm elevation
- FDOT connection
  - Must follow the allowable discharge rate in the area
  - SFWMD has their own criteria that will need to be accommodated
    - 3.2 discharge rate
  - SFWMD recommended using the previously approved rate as a 'go-by'

- There are downstream convenience limitations on the discharge rate
    - No wetlands on site, therefore, no wetlands permits are necessary
    - A dewatering permit may be required (will be confirmed whenever the full design is created) and can run concurrently with the ERP.
    - A well permit for landscape irrigation will be needed if reclaimed water or potable water is not to be utilized. This can run concurrently with the ERP.

End of Document