

Preliminary Surface Water Management Calculations

Hunters Manor
Pompano Beach, Florida

WGI Project No. 5578.00

Prepared for:



Submitted by:



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DRC

PZ21-12000010

11/03/2021

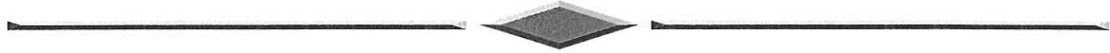
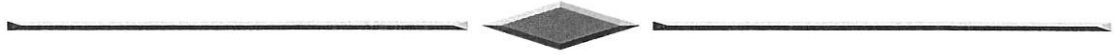


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DRC

PZ21-12000010
11/03/2021



**PRELIMINARY POST-DEVELOPMENT SURFACE WATER MANAGEMENT
CALCULATIONS**

DRC

PZ21-12000010
11/03/2021



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1) SITE DATA:

	<u>ACREAGE</u>
Building	2.60 Ac.
Pavement/Walks	2.10 Ac.
Dry Detention Bottom	0.29 Ac.
Dry Detention Bank	0.66 Ac.
Open Space	3.44 Ac.
TOTAL AREA:	9.09 Ac.

Total Impervious:	4.70
	51.71%
Total Pervious:	4.39
	48.29%

2) STAGE ELEVATIONS: (NAVD)

<u>Percent:</u>	<u>From:</u>	<u>To:</u>
28.6%	12.95	UP
23.1%	11.60	12.50
3.2%	5.50	UP
7.3%	5.50	12.00
37.8%	10.60	12.85
<hr/> 100.0%		
Average Proposed Grade:		11.74
Average Prop. Pervious Grade:		10.87
Control Elevation:		4.50

3) FLOOD AND RAINFALL CRITERIA:

Rainfall:	24 Hour:	72 Hour:	Min. Pavement Grade: (Proposed)
3 Year	6.00 in.	N/A in.	
5 Year	7.00 in.	N/A in.	11.60 NAVD
25 Year	11.00 in.	15.00 in.	Min. Floor Elev. :
100 Year	14.00 in.	18.00 in.	12.95 NAVD

Maximum Available Soil Storage, SFWMD (#):	2	8.18 in. Coastal (1)
		6.75 in. for Flatwoods (2)

Allowable Discharge:	69.2 CSM for Basin:	C-14
	0.98 CFS	



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4) COMPUTE STAGE STORAGE: (ac-ft)

Stage	Pavement/Walks	Dry Detention	Bottom Dry Detention	Bank	Open Space	Total:
4.50	0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00	0.00	0.00	0.00
5.50	0.00	0.00	0.00	0.00	0.00	0.00
6.00	0.00	0.15	0.01	0.00	0.00	0.16
6.50	0.00	0.29	0.05	0.00	0.00	0.34
7.00	0.00	0.44	0.11	0.00	0.00	0.55
7.50	0.00	0.58	0.20	0.00	0.00	0.78
8.00	0.00	0.73	0.32	0.00	0.00	1.04
8.50	0.00	0.87	0.46	0.00	0.00	1.33
9.00	0.00	1.02	0.62	0.00	0.00	1.64
9.50	0.00	1.16	0.81	0.00	0.00	1.97
10.00	0.00	1.31	1.03	0.00	0.00	2.33
10.50	0.00	1.45	1.27	0.00	0.00	2.72
11.00	0.00	1.60	1.54	0.12	0.00	3.25
11.50	0.00	1.74	1.83	0.62	0.00	4.19
12.00	0.19	1.89	2.15	1.50	0.00	5.71
12.50	0.95	2.03	2.48	2.76	0.00	8.21
13.00	2.00	2.18	2.81	4.39	0.00	11.36
13.50	3.05	2.32	3.14	6.11	0.00	14.61
14.00	4.10	2.47	3.47	7.83	0.00	17.85

5) SOIL STORAGE COMPUTATIONS

1. Avg. Depth to Water Table = Avg. Elev - Water Level:

Avg. Elev.	Water Level:	D=(ft.):
11.74	4.50	7.24

2. Soil Storage (S) = Available Soil Storage x Pervious Area/Total Area:

Av. Soil St.	Pervious:	Total (Ac.):	S = (in.):
6.75	4.39	9.09	3.26



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6) WATER QUALITY(Entire Site):

Greater of the following (6A. & 6B.)
Store the first inch for the entire site or the amount
of 2.5 times the percentage of imperviousness.

A. First Inch:

$V = 1 \text{ in.} \times \text{Total Area} \times 1 \text{ ft./12 in.}$:

<u>Total (Ac.):</u>	<u>V = (ac-ft)</u>
9.09	0.76

B. 2.5 Times Percent Impervious:

1. Site Area = Total Area - (Lake Area + Bldg. Area):

<u>Total (Ac.):</u>	<u>Lake:</u>	<u>Bldg.:</u>	<u>Site (Ac.):</u>
9.09	0.00	2.60	6.49

2. Impervious Area = Site Area - Pervious Area:

<u>Site (Ac.):</u>	<u>Pervious:</u>	<u>Imperv.:</u>
6.49	4.39	2.10

3. 2.5 in. x Imperv./Site x (Total Area - Lake Area) x 1 ft./12 in.:

<u>Imperv.:</u>	<u>V=(ac-ft)</u>
2.10	0.61

Therefore, the total required detention is
either the First inch or 2.5 times the percent
impervious, whichever is greater.

The total required detention is:

V(t): 0.76 ac-ft



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C. Actual Detention/Retention Provided:

1. Detention/Retention must be provided within the water quality depth which is to the height of the weir:

Dry Detention Bot	Weir	Water Quality
<u>Elev.</u>	<u>Elevation</u>	<u>Height (ft)</u>
5.50	12.82	7.32

2. Water Quality Volume = Retention Area x Water Quality Height:

Total Ret.	Water Quality	Water Quality
<u>Area (ac):</u>	<u>Height (ft)</u>	<u>Volume (ac-ft)</u>
0.29	7.32	2.12

The provided Water Quality is adequate.

A. 3 Yr.-1 Day Storm Event

1. Rainfall - 1 Day Duration (P):

P24 = 6.00 in.

2. Runoff, Q (in.):

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P24 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
6.00	3.26	3.32

3. Total Runoff Volume, V (ac-ft.):

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft):</u>
3.32	9.09	2.52

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	10.00	10.50
Interpolate Runoff between...	2.33	2.72

Stage: 10.24 NAVD



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B. 5 Yr.-1 Day Storm Event (Minimum Pavement Grade)

Min. Pavement Elevation: 11.60 NAVD

1. Rainfall - 1 Day Duration (P):

P24 = 7.00 in.

2. Runoff, Q (in.):

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P24 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
7.00	3.26	4.19

3. Total Runoff Volume, V (ac-ft.):

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft.):</u>
4.19	9.09	3.18

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	10.50	11.00
Interpolate Runoff between...	2.72	3.25

Stage: 10.93 NAVD



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C. 25Yr.-3 Day Storm Event

1. Rainfall - 1 Day Duration (P):

P24 = 11.00 in.

P72 = 15.00 in.

2. Runoff, Q (in.):

$$Q = \{(P - 0.2 \times S)^2\} / (P + 0.8 \times S)$$

<u>P72 (in.):</u>	<u>S = (in.):</u>	<u>Q (in.):</u>
15.00	3.26	11.69

3. Total Runoff Volume, V (ac-ft.):

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V = (ac-ft.):</u>
11.69	9.09	8.86

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	12.50	13.00
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Interpolate Runoff between...	8.21	11.36
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Stage: 12.60 NAVD



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D. 100 Yr.-3 Day Storm Event

Finished Floor Elevation: 12.95 NAVD

1. Rainfall - 3 Day Duration (P):

$$P72 = P24 \times 1.359$$

P24 = 14.00 in.

P72 = 18.00 in.

2. Runoff, Q (in.):

$$Q = \{(P - 0.2 \times S)^2 / (P + 0.8 \times S)\}$$

<u>P72 (in.):</u>	<u>S (in.):</u>	<u>Q (in.):</u>
18.00	3.26	14.60

3. Total Runoff Volume, V (ac-ft.):

$$V = Q \times \text{Total Area} \times 1 \text{ ft.} / 12 \text{ in.}$$

<u>Q (in.):</u>	<u>Total (Ac.):</u>	<u>V=(ac-ft):</u>
14.60	9.09	11.06

4. From the Stage - Storage Curve, the zero discharge elevation is:

Interpolate Stage between...	12.50	13.00
Interpolate Runoff between...	8.21	11.36

Stage: 12.95 NAVD

The FFE is set to the 100 year - 3 day peak stage