

SURFACE WATER MANAGEMENT CALCULATIONS
for
Margate, FL

Modification to existing permit for changes below. Site areas and SWM requirements are based off of existing permit.

Increase in Building area by 0.96 acres
Increase in Pervious area by 0.45 acres
Decreased Paved area by 1.41 acres
Decrease 4'x6' Exfiltration Trench by 325 L.F.
Increase 4'x8' Exfiltration Trench by 468 L.F.

This sheet utilizes NAVD datum. Conversion from NGVD to NAVD is -1.49 for this site.
Current Permit: SWM2000-035-4 issued on 11/17/2003

1) PROPOSED LAND USE

	PHASE AREA (ACRES)	BUILDINGS (ACRES)	PAVEMENT (ACRES)	PERVIOUS (ACRES)	IMPERVIOUS AREA (ACRES)	% IMPERV.
	17.79	3.32	10.92	3.55	14.24	80.0%
TOTAL	17.79	3.32	10.92	3.55	14.24	80.0%

Retention Area (Under Parking, Minus Deck Support Area Loss of 0.06 acre - No Side Slopes)

Site Area.....	18.56 acres	Dry ret. area (bottom)	2.03 acres
NW 34th Street R/W.....	0.77 acres	Dry ret. Top of bank elev.....	12.68 navd
Net Area.....	17.79 acres	Dry ret. Top of bank area.....	2.03 acres
Building Area.....	3.32 acres	Lost Area in Retention Area Due to Parking Deck Supports	0.06 acre
Roadways/Parking Area.....	10.92 acres	(From Previous Permit)	
Dry Retention Area (Under Parking)...	2.03 acres		
Net Roadway/Parking	8.89 acres		
Green Area.....	3.55 acres		

2) FLOOD AND RAINFALL CRITERIA

RAINFALL

5 year, 1 hour storm.....	3.20 inches
5 year, 1 day storm.....	8.00 inches
10 year, 1 day storm.....	9.50 inches
25 year, 3 day storm.....	16.00 inches
100 year, 3 day storm.....	20.00 inches

FLOOD CRITERIA

Building Floors

FEMA flood criteria (Map Date 8/18/14 NAVD).....	13.00 navd - Zone AE - Assumed Coastal A zone
Minimum required floor elevation	14.00 navd per FBC 2010 Sec 1612.4 / ASCE 24-05
Minimum provided floor elevation(existing buildings)	14.01 navd
Minimum provided floor elevation(proposed buildings)	14.10 navd

3) COMPUTE SOIL STORAGE

Wet season water elev.....	8.01 navd
Ave. groundwater elev.....	8.01 navd

Pervious Component	Area (Ac.)	Ave. Elevation	Area x Elevation
Green	3.55	13.01	46.19
Retention Bottom	2.03	9.01	18.29
Retention sides	0.00	10.85	0.00
Total	5.58		64.48

Ave. site elevation.....	11.55 navd
Depth to water table.....	3.54 ft.
Assuming 25% compaction, available ground storage for depressional soils in green area is.....	8.18 inches
Assuming 25% compaction, available ground storage for depressional soils in retention area is.....	0.45 inches
Storage available in green areas of the site is	2.42 acre ft.
Storage available in retention area of the site is	0.08 acre ft.
Storage available in pervious areas of the site is	2.50 acre ft.
Converting to site wide moisture storage, S	1.68 inches
SCS Curve Number.....	85.6

4) WATER QUALITY REQUIREMENTS

i) Per Existing Permit, Requirement is 15% of Total Area for Wet Retention

Site area.....	18.56 acres
Required detention.....	2.78 acre ft.

ii) Water quality Provided in Exfiltration Trench

Required retention in exfiltration trench.....	2.78 acre ft.	33.41 ac. Inches
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Perc Test #	K Value
Existing	1.77E-04

Average Hydraulic conductivity, K..... 1.77E-04

Trench Design	Existing 4'x6'	Existing & Proposed 4'x8'	Weighted Average
Length of trench provided (lf)	1262	1040	
Percentage of total trench on site	55%	45%	
Lowest RIM Elevation (Discharge)	11.39	11.20	6.30
Minimum top of trench elevation (navd)	10.01	10.51	10.24
Minimum bottom of trench elevation (navd)	6.01	6.51	6.24
Trench width (ft)	6.00	8.00	6.90
Trench height (ft)	4.00	4.00	4.00
Min. Pipe diameter (ft)	1.25	1.25	1.25
Minimum depth to water table (H2) (ft)	5.38	4.69	5.07
Non saturated trench depth (ft)	2.00	2.50	2.23
Saturated trench depth (ft)	2.00	1.50	1.77
Trench storage area (sq. ft.)	6.61	10.61	8.42

Trench length required for retention volume to be exfiltrated in 1 hour:

Length required..... **2284 ft**
 Associated average percolation rate..... 33.69 cfs

Trench length required for 5 year 1 hour storm to be exfiltrated over 1 hour:

Rainfall volume, Q..... 4.74 ac.ft or 56.93 ac.inches
 Length required..... 7783 ft
 Existing length of trench... 2302 l.f.
 Length of trench to be added **0 l.f.**
 Length of trench to be considered under permit conditions..... **2302 l.f.**
 Associated average percolation rate..... 33.96 cfs or 2.81 ac.ft/hr

iv) Water Quality Provided in Dry Retention

Applying 50% credit, retention required..... 1.39 acre ft.
 Therefore the required treatment in dry retention is 1.39 ac.ft
 Corresponding stage is between..... 9.51 and..... 10.01
 Interpolating gives an overflow elevation of..... **9.73**

Since elevation 9.70 < 12.68 (top of dry retention storage), water quality is satisfied by dry retention alone.

5) COMPUTE STAGE STORAGE

Assumptions:

Dry Retention store linearly from.....	9.01 to elevation.....	12.68 then vertically
Roadways/Parking store linearly from.....	11.51 to elevation.....	14.51 then vertically
Green areas store linearly from.....	11.01 to elevation.....	13.51 then vertically
Trench stores linearly from.....	8.01 to elevation.....	10.24 then vertically
Parking Deck stores linearly from.....	13.01 to elevation.....	13.51 then vertically

Storage (acre ft.)

Stage	Dry Retention	Parking Deck	Roadways and Parking	Site Green	Trench	Total	Stage	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.01
8.01	0.00	0.00	0.00	0.00	0.00	0.00	8.01	8.51
8.51	0.00	0.00	0.00	0.00	0.10	0.10	8.51	9.01
9.01	0.00	0.00	0.00	0.00	0.20	0.20	9.01	9.51
9.51	0.96	0.00	0.00	0.00	0.30	1.25	9.51	10.01
10.01	1.97	0.00	0.00	0.00	0.40	2.37	10.01	10.15
10.15	2.25	0.00	0.00	0.00	0.43	2.68	10.15	10.51
10.51	2.99	0.00	0.00	0.00	2.81	5.79	10.51	11.01
11.01	4.00	0.00	0.00	0.00	2.81	6.81	11.01	11.51
11.51	5.02	0.00	0.00	0.18	2.81	8.00	11.51	12.01
12.01	6.03	0.00	0.46	0.71	2.81	10.00	12.01	12.68
12.68	7.39	0.00	2.49	1.98	2.81	14.67	12.68	13.01
13.01	7.39	0.00	4.10	2.84	2.81	17.13	13.01	13.51
13.51	7.39	0.51	7.28	4.44	2.81	22.42	13.51	14.01
14.01	7.39	1.52	11.38	6.21	2.81	29.31	14.01	14.51
14.51	7.39	2.54	16.38	7.99	2.81	37.10	14.51	15.01
15.01	7.39	3.55	21.84	9.76	2.81	45.35	15.01	15.51
15.51	7.39	4.57	27.30	11.54	2.81	53.60	15.51	16.01
16.01	7.39	5.58	32.76	13.31	2.81	61.85	16.01	16.51
16.51	7.39	6.60	38.22	15.09	2.81	70.10	16.51	17.01
17.01	7.39	7.61	43.68	16.86	2.81	78.35	17.01	17.51
17.51	7.39	8.63	49.14	18.64	2.81	86.60	17.51	18.01
18.01	7.39	9.64	54.60	20.41	2.81	94.85	18.01	0.00

6) FLOOD STAGE CRITERIA**100 Year 3 day Storm** (zero discharge)

100 year, 3 day storm	20.00 in.
Runoff	18.11 in.
Volume of runoff	26.85 acre ft.

Corresponding stage is between..... 13.51 and.....

14.01 navd

Interpolating gives an elevation of..... **13.83 navd**
15.32 ngvd