

RECEIVED

DEC 17 2018

BY:

Project Name:
777 PROPERTIES - PHASE 1
Post-Development

SHEET NO. 1 of 1
DATE 12/11/2018
PROJECT No.:
Designed By: LRC
Checked By:

Project Location

Margate, Florida

DRAINAGE AREA

		SQ. FT.	ACRES
Impervious Area	(A _i)	69,828	1.60
Pervious Area	(A _p)	26,735	0.61
Total Drainage Area	(A _t)	96,563	2.22

SFWM EXFILTRATION TRENCH REQUIREMENTS

Percent Impervious = 72.3%

1" of Runoff = 2.22 (ac-in)

2.5 inches X Percent Impervious = 4.01 (ac-in)

Volume of WQ Treatment Volume required (V_{wq}) = 4.01 (ac-in)
1.81 (inches)

Additional WQ Volume (V_{add}) = 0.00 (ac-in)
0.0 (inches)

Total Volume Treated by Trench = V_{wq} + V_{add} = 1.81 (inches)
(Max allowed 3.28 inches)

Safety Factor (SF) = 2.0 (Minimum 2.0)

Percent Water Quality Reduction (%WQ) = 50%
(50% for wet or dry retention)

TRENCH DATA - SELFCONTAINED SYSTEM

Trench Width	W	6.5	(feet)
Hydraulic Conductivity	K	1.0429E-04	(cfs/ft ² -ft head)
Control Elevation	CE	5.00	(ft-NAVD)
Weir Crest Elevation	EL _{weir}	7.50	(ft-NAVD)
Top Elevation of Trench	EL _{top}	7.50	(ft-NAVD)
Bottom Elevation of Trench	EL _{bot}	-3.00	(ft-NAVD)
Pipe Diameter	D	18	(inches)
Pipe Invert	P _{inv}	5.0	(ft-NAVD)
Head on Saturated Surface = EL _{inv} - CE =	H ₂	2.50	(feet)
Unsaturated Trench Depth = EL _{top} - CE =	D _u	2.50	(feet)
Saturated Trench Depth = CE - EL _{bot} =	D _s	8.00	(feet)

Is Du > Ds NO
Is W < 2*(Du + Ds) YES

NOTES: Gray Cells is where data is required, and blue Cells is where data is calculated.

SFWM EXFILTRATION TRENCH EQUATIONS AND TRENCH LENGTH

If D_u > D_s or W < 2(D_u + D_s) then Eq 1 Applies. If not, Eq 2 Applies.

$$\text{Equation 1: } L_1 = \frac{FS [(\%WQ)(V_{wq}) + V_{add}]}{K(H_2W + 2H_2D_u - D_u^2 + 2H_2D_s) + (1.39E-04)WD_u}$$

Trench Length Required for Eq 1 = L₁ 456.6 (feet)

$$\text{Equation 2: } L_2 = \frac{FS [(\%WQ)(V_{wq}) + V_{add}]}{K(2H_2D_u - D_u^2 + 2H_2D_s) + (1.39E-04)WD_u}$$

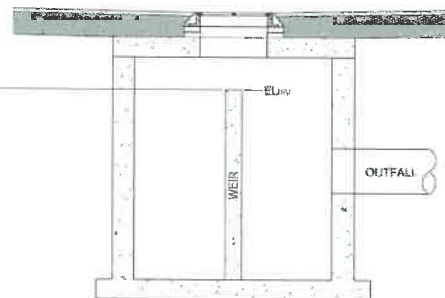
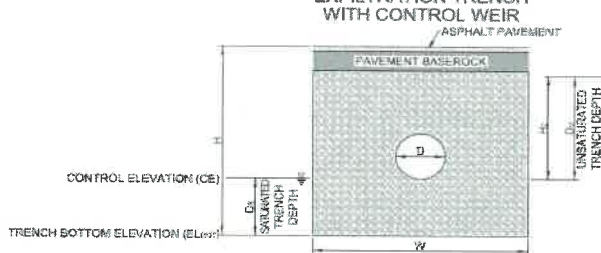
Trench Length Required for Eq 2 = L₂ 565.9 (feet)

Trench Length Required = L_{REQ} 456.6 (feet)

Trench Length Provided = L_{PRO} 666.0 (feet)

Safety Factor Provided = SF_{PRO} 2.92

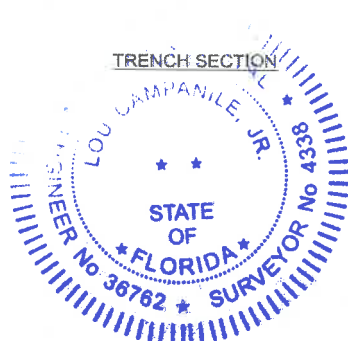
EXFILTRATION TRENCH WITH CONTROL WEIR



TRENCH SECTION

CONTROL STRUCTURE

12/11/18



JOHN B. SMITH ENGINEERS, INC.

DRAINAGE CALCULATIONS

PROJECT INFORMATION

NAME 777 & 767 BUILDINGS – PHASE II DATE August 2017
 (aka The Forest Office Park)

COUNTY BROWARD SEC 1 TWP 49 S RGE 41 E

S.F.W.M.D. DRAINAGE DIVIDE C-14 Canal

LOCAL DISTRICT Broward

CITY Margate

TOTAL AREA	19.97	ACRES	
BUILDINGS	1.67	ACRES	8.4 %
PARKING	6.01	ACRES	30 %
LANDSCAPE	12.29	ACRES	61.6%

PROJECT CRITERIA

MINIMUM ROAD ELEVATION:	10.0
100 YEAR FLOOD ELEVATION:	11.5
AVERAGE HWL ELEVATION:	5.5

100 YEAR - 3 DAY RAINFALL	18.5	INCHES
25 YEAR - 3 DAY RAINFALL	14.0	INCHES
10 YEAR - 1 DAY RAINFALL	NA	INCHES

ALLOWABLE DISCHARGE - "Q" NA

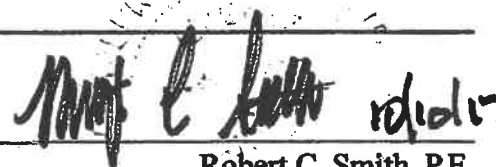
Q = _____ CSM

= 11.5 Per SFWMD Permit CFS

A = _____

640 AC. SQ. MILE

= _____



Robert C. Smith, P.E.
 Professional Engineer No. 31177
 State of Florida

JOHN B. SMITH ENGINEERS, INC.

SEWAGE CALCULATION

PROJECT INFORMATION

NAME: W. & J. BUILDING - PHASE II
 (aka The Forest Gate)
 COUNTY: BROWARD SEC: 1 TWP: 48 S RGS: 4 E
 S.W.M.D. DRAINAGE DISTRICT: 0-15 (Miami)
 LOCAL DISTRICT: Broward
 CITY: Miami

USE	AREA	PER CAPITA
RESIDENTIAL	100	100
COMMERCIAL	100	100
INDUSTRIAL	100	100

PROJECT DATA

MINIMUM ROAD ELEVATION:	100
100 YEAR FLOOD ELEVATION:	100
4 YEAR FLOOD ELEVATION:	100

10 YEAR - 1 DAY RAINFALL	10	INCHES
25 YEAR - 1 DAY RAINFALL	10	INCHES
100 YEAR - 1 DAY RAINFALL	10	INCHES

ALLOWABLE DISCHARGE - "Q" NA

$$Q = \frac{A}{100} \times \frac{100}{100} = \frac{A}{100}$$

100 YEAR - 1 DAY RAINFALL = 10 INCHES
 25 YEAR - 1 DAY RAINFALL = 10 INCHES
 100 YEAR - 1 DAY RAINFALL = 10 INCHES

JOHN B. SMITH ENGINEERS, INC.
777 & 767 BUILDINGS

SOIL STORAGE: "S"

PERCENTAGE PERVIOUS =	NA	Acres	+	NA	Acres
	Landscape		+	Swales	

TOTAL PROJECT =	ACRES
-----------------	-------

AVERAGE FINISH GRADE ELEVATION 10.5

AVERAGE HWL ELEVATION (-) 5.5

= 5'

"S" = 9.0 Inches X 75% X 61.6 % Pervious
 = 4.16 Inches

STORAGE VOLUMES

	100 YEAR		25 YEAR	
3 DAY RAINFALL	18.5	Inches	14.0	Inches
"S" SOIL STORAGE	(-) 4.16	Inches	(-) 4.16	Inches
TOTAL	= 14.34	Inches	= 9.84	Inches

ELEVATION
FROM STAGE
STORAGE

100 YEAR 14.34 INCHES X 19.97 AC. = 23.86 AC.-FT. 11.31
 12 TOTAL PROJECT

25 YEAR 9.84 INCHES X 19.97 AC. = 16.38 AC.-FT. 10.35
 12 TOTAL PROJECT

JOHN B. SMITH ENGINEERS, INC.
WATER QUALITY

777 & 767 BUILDINGS

RETAIN GREATER OF TWO:

1. **FIRST INCH OF RUNOFF:** Developed area (19.97 acres) and Undeveloped (6.5 acres):

$$\frac{1 \text{ INCH}}{12} \times \frac{13.47}{\text{TOTAL PROJECT}} \text{ AC.} = \underline{1.12} \text{ AC. - FT.}$$

2. **2.5 INCHES X THE IMPERVIOUS AREAS PERCENTAGE (%):**

A. IMPERVIOUS AREA PERCENTAGE

$$\frac{13.47}{\text{TOTAL PROJECT}} \text{ AC.} - \left(\frac{-}{\text{LAKES}} \text{ AC.} + \frac{1.67}{\text{BUILDING}} \text{ AC.} \right)$$

$$= \frac{11.8}{\text{TOTAL}} \text{ AC.}$$

$$\left(\frac{6.0}{\text{PARKING}} \text{ AC.} + \frac{-}{\text{ROADS}} \text{ AC.} \right) / \frac{11.8}{\text{TOTAL}} \text{ AC.}$$

$$= \underline{51} \% \text{ IMPERVIOUS}$$

$$\frac{2.5 \text{ INCHES}}{12} \times \underline{51} \% \text{ IMPERVIOUS} \times \left(\frac{13.47}{\text{TOTAL PROJECT}} \text{ AC.} - \frac{-}{\text{LAKE}} \text{ AC.} \right)$$

$$= \underline{1.43} \text{ AC. - FT.}$$

$$= \underline{\hspace{2cm}} \text{ AC. - FT.} \times 75\% \quad (\text{DRY DETENTION})$$

$$= \underline{\hspace{2cm}} \text{ AC. - FT.} \times 50\% \quad (\text{RETENTION})$$

$$\text{REQUIRED RETENTION/DETENTION} = \underline{1.43} \text{ AC. - FT.}$$

3. **FIRST 1/2"**

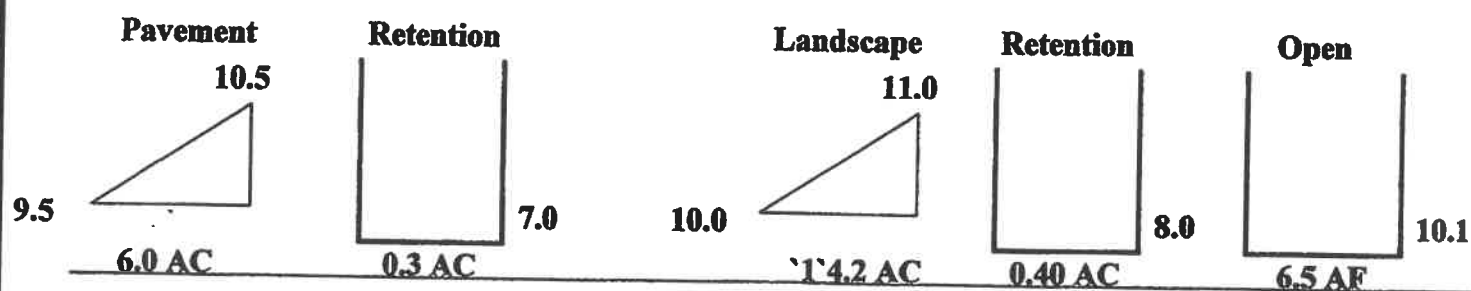
$$\frac{13.47}{\text{TOTAL PROJECT}} \text{ AC.} \times 0.5/12 = \underline{0.65} \text{ AC. - FT.}$$

JOHN B. SMITH ENGINEERS, INC.
250 SW 6TH PLACE
POMPANO BEACH, FL 33060

777 & 767 BUILDINGS

STAGE - STORAGE

POST DEVELOPMENT



ELEV.						TOTAL
8.0	-	0.30	-	-	-	0.3
9.0	-	0.60	-	-	-	1.0
9.5	-	0.75	-	0.4	-	1.35
10.0	0.75	0.90	-	0.6	-	2.45
10.5	3.0	1.05	-	0.8	-	2.6
11.0	6.0	1.20	2.1	1.0	2.6	9.7
11.5	9.0	1.35	4.2	1.2	5.85	18.45
			6.3	1.4	9.1	27.15

JOHN B. SMITH ENGINEERS, INC.

250 S.W. 6th PLACE
POMPANO BEACH, FL 33060

777 & 767 BUILDINGS

STAGE - DISCHARGE

 $11.5 \text{ CFS @ } 25\% / 30\text{AY} = \text{ELEV. } 10.4$ $1/2" \text{ PRETREATMENT} = 0.65 \text{ AF} = \text{ELEV } 8.5 \pm$
 $= 1.9 \pm$

ELEV.	CFS
8.5	0
9.0	3.0
9.5	6.0
10.0	9.0
10.4	11.5

Registered Engineer No. 31177
State of Florida

DRAINAGE BASIN C-14 RECEIVING BODY C-14 via City of Margate
canal system

RUN OFF FORMULA $Q = ((7B/\text{sqftA}) + 54)A$ ALLOWABLE DISCHARGE 23 CFS ~~40~~ 11.5
20 AC

REQUIRED DETENTION 4.9 AC-FT
DETENTION METHOD Dry detention
RETENTION/DETENTION PROVIDED 11.6 AC-FT

FLOOD PROTECTION

LOCAL ROAD CRITERIA	10	YEAR, 24	HOUR
FLOOD CONTOUR	11.5	FEET NGVD	<u>10.0</u>
MINIMUM ROAD GRADE *	N/A	FEET NGVD	
PARKING LOT CRITERIA	5	YEAR, 1	HOUR STORM
FLOOD CONTOUR	10.2	FEET NGVD	
MINIMUM PARKING LOT GRADE	10.5	FEET NGVD	<u>4.3</u>
Basin Design Frequency	25	YEAR, 72	HOUR STORM
FLOOD CONTOUR	11.0	FEET NGVD	<u>10.4</u>
DESIGN DISCHARGE	22	CFS	
100 YEAR FLOOD			
FLOOD CONTOUR	13.0	FEET NGVD	<u>11.5</u>
MINIMUM FLOOR ELEVATION	13.5	FEET NGVD	
FIA FLOOD ELEVATION	N/A	FEET NGVD	

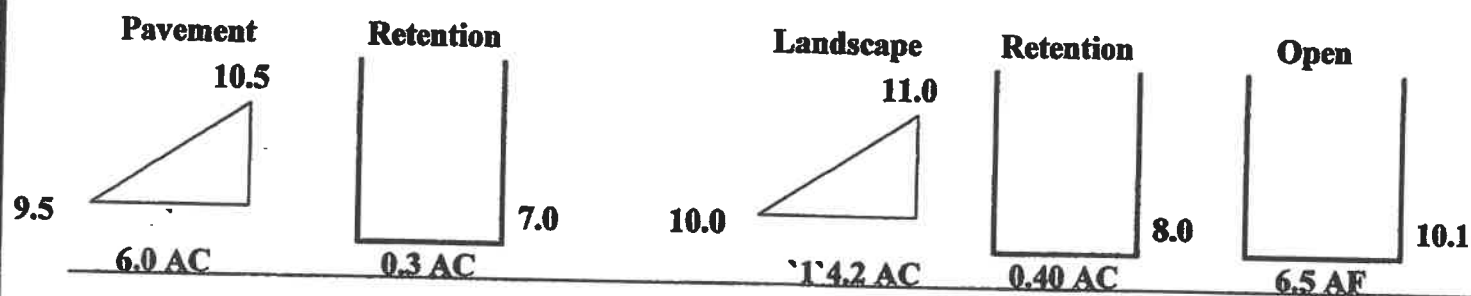
* Construction plans for the residential area not available at this time.

JOHN B. SMITH ENGINEERS, INC.
250 SW 6TH PLACE
POMPANO BEACH, FL 33060

777 & 767 BUILDINGS

STAGE - STORAGE

POST DEVELOPMENT



ELEV.						TOTAL
8.0	-	0.30	-	-	-	0.3
9.0	-	0.60	-	0.4	-	1.0
9.5	-	0.75	-	0.6	-	1.35
10.0	0.75	0.90	-	0.8	-	2.45
10.5	3.0	1.05	2.1	1.0	2.6	9.7
11.0	6.0	1.20	4.2	1.2	5.85	18.45
11.5	9.0	1.35	6.3	1.4	9.1	27.15