313 / 315 Osceola Street

Osceola Street, Stuart FL 34994

Project No. 1956



<u>Drainage Statement</u>:

The Project Location is vacant and currently no permit for the site is on file with the South Florida Water Management District. Proposed Water Quality and Quantity for the site will be provided in exfiltration trenches that will be installed under the parking areas in accordance with City of Stuart Land Development Code Section 3.01.03.F.11. Storm water discharge will drain to the exfiltration system / control structure in the lower level and ultimately into the adjacent St. Lucie River, as it currently discharges. The required water quality treatment into the St. Lucie River is 0.08 Ac-Ft. The required attenuation for the 25-year-3-day storm event is 0.42 Acre-Feet. The exfiltration system will treat and store 0.52 Acre-Feet prior to discharging into the St. Lucie River.

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CAPTEC Engineering, Inc.
313 / 315 Osceola Street
Project No. 1956 **Drainage Calculations**

Site Data

Calculate Basin Area

Total Site Area	=	***0.58 Ac.***
Wetland Area	=	***0.00 Ac.***
Non Contributing Site Area	=	***0.00 Ac.***
Total Proposed Developed Basin Area	=	***0.58 Ac.***

Calculate Impervious Area

Total Impervious Area	=	***0.44 Ac.***
Other Misc. Impervious Areas	=	***0.00 Ac.***
Lake	=	***0.00 Ac.***
Total Impervious Area	=	***0.44 Ac.***
Total Pervious Area	=	***0.15 Ac.***

Calculate CN

The proposed DCIA area	=	***0.00 Ac.***
Remaining Site Area	=	***0.58 Ac.***

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Soil Storage[1]

Depth to Water Table		~	***4.00 Ft.***
Soil Storage (4.0 depth to Water Table) for	Coastal	=	***10.90 In.***
Compaction Reduction (25%) For Developed Area		=	***8.18 In.***
Pervious Area (Developed)		=	***0.15 Ac.***
S = 8.18 * (Dev. Perv. / 0.58)		=	***2.04 In.***

1.) South Florida Water Management District Environmental Resource Permit Applicants Handbook Volume II Effectie October, 2013 Appendix C pages A-12 to A-19

Design Storm (Zero Discharge)

3 Yr. - 1 Day P = ***4.20***
V=(((4.2-.2*2.04)^2)/(4.2+.8*2.04))*1'/12"*0.58 = ***0.12 Ac.-Ft.***

5 Yr. - 1 Day P = ***5.50***
V=(((5.5-.2*2.04)^2)/(5.5+.8*2.04))*1'/12"*0.58 = ***0.18 Ac.-Ft.***

10 Yr. - 1 Day P = ***6.50***
V=(((6.5-.2*2.04)^2)/(6.5+.8*2.04))*1'/12"*0.58 = ***0.22 Ac.-Ft.***

10 Yr. - 3 Day P = ***9.10***
V=(((9.1-.2*2.04)^2)/(9.1+.8*2.04))*1'/12"*0.58 = ***0.34 Ac.-Ft.***

25 Yr. - 1 Day P = ***7.80***
V=(((7.8-.2*2.04)^2)/(7.8+.8*2.04))*1'/12"*0.58 = ***0.28 Ac.-Ft.***

25 Yr. - 3 Day P = ***10.80***
V=(((10.8-.2*2.04)^2)/(10.8+.8*2.04))*1'/12"*0.58 = ***0.42 Ac.-Ft.***

100 Yr. - 1 Day P = ***10.00***
V=(((10.0-.2*2.04)^2)/(10.0+.8*2.04))*1'/12"*0.58 = ***0.38 Ac.-Ft.***

100 Yr. - 3 Day P = ***13.00***
V=(((13.0-.2*2.04)^2)/(13.0+.8*2.04))*1'/12"*0.58 = ***0.52 Ac.-Ft.***

Water Quality Storage

South Florida Water Management District

1.) Required Water Quality Treatment Volume

a) First inch of runoff
Va = 0.58 * 1 In. * (1 Ft./12 In.) = ***0.05 Ac.-Ft.***

b) Runoff from 2.5 * % net impervious
Runoff = 2.5 * (Impervious Area)/(Basin-Bldg. Area-Lake Area)
= 2.5 * (0.00 / (0.58 - 0.44 - 0.00)) = ***0.00 In.***
Vb (sfwmd) = (0.58) * 0.00 * (1 Ft./12 In.) = ***0.00 Ac.-Ft.***

c) Since Va > Vb (sfwmd) the water quality volume required = ***0.05 Ac.-Ft.***

d) Discharge is to the St. Lucie River, the required Volume (150%) = ***0.08 Ac.-Ft.***

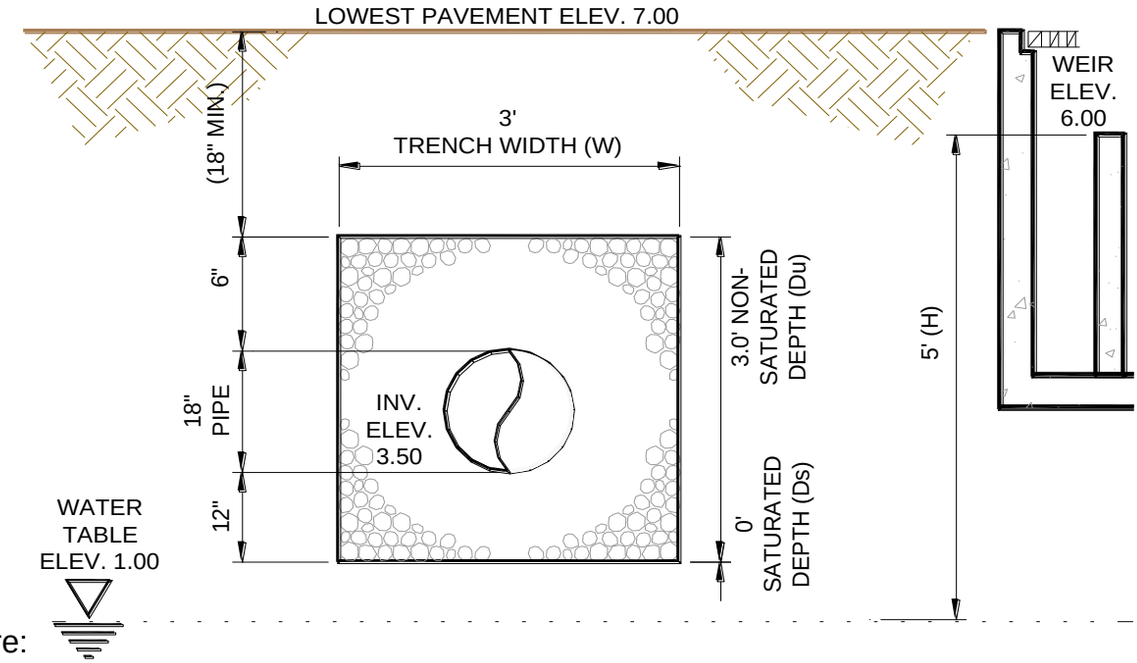
2.) Provided Water Quality Treatment Volume

Wet Retention (Exfiltration) * = ***0.52 Ac.-Ft.*** 100% Required = ***0.52 Ac.-Ft.***

Total Provided: ***0.52 Ac.-Ft.***

Exfiltration Design

a) ** $V = L * (k * (H*W + 2*H*D_U - D_U*D_U + 2*H*D_S) + (0.000139*W*D_U)) / FS$



Where:

V = Volume (Ac.-In.)

FS = Factor of Safety	=	***2.00***
L = Length of Exfiltration (FT.)	=	***160.00 Ft.***
k = Hydraulic Conductivity (cfs/Ft^2-Ft-Hd) *	=	***1.04E-03***
H = Water Table Depth	=	***5.00 Ft.***
W = Width of Trench	=	***3.00 Ft.***
D_U = Unsaturated Depth	=	***3.00 Ft.***
D_S = Saturated Depth	=	***0.00 Ft.***

V = 160 * (0.001040 * (5*3 + 2*5*3 - 3^2 + 2*5*0) + (0.000139*3*3)) = ***6.19 Ac.-In.***

Exfiltration Trench Volume Provided: = ***6.19 Ac.-In.***

= ***0.52 Ac.-Ft.***

** Note: See Exfiltration Test in Appendix A - Geotechnical Report.