PRELIMINARY STORM WATER MANAGEMENT CALCULATIONS
FOR

1220 10th STREET

Lake Park, Florida
MMA #24-004

May 22, 2024
Revised:
N/A

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TODD N. McLEOD LICENSE No. 69188 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by
Todd McLeod
Date: 2024.05.22
14:25:12 -04'00'

TODD N. MCLEOD, P.E.
Florida License No. 69188

5/22/2024
Date

PRELIMINARY STORM WATER MANAGEMENT CALCULATIONS

Engineer: TNM
Project Name: 1220 10th STREET
Date: 05/22/24
Project #: MMA #24-004
Revised: N/A

LAND USE BREAKDOWN

EXISTING

Site Area = 2.74 ac
Basin Area = 2.74 ac

		Acres	%	Grading From	Grading To
Impervious Area					
	ExistingBuilding	0.46 ac	(17%)	13.18	
	Pavement & Concrete	1.20 ac	(44%)	10.70	13.00
Pervious Area					
	Green Space	1.08 ac	(39%)	10.50	14.00
Subtotal Impervious Areas		1.66 ac	(61%)		
Subtotal Pervious Areas		1.08 ac	(39%)		

Find Curve Number:

Avg. Pervious Ground El. = 12.25
Control Elevation = 7.00
Depth to Water Table = 5.25
Soil Type = Coastal

Soil Storage Table

(SFWMD's Vol. IV, Basis of Review, page E-2)

Depth to W.T. (ft)	Coastal Storage (in)	Flatwoods Storage (in)	Depression Storage (in)
1.0	0.6	0.6	0.6
2.0	2.5	2.5	2.1
3.0	6.6	5.4	4.4
4.0	10.9	9.0	6.8

Pervious Area = 1.08 ac
Storage from Table = 8.18 in (w/ 25% compaction)
Available Soil Storage = 0.74 af
Soil Moisture Storage (S) = 3.22 in
Curve Number = **76**

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LAND USE BREAKDOWN

PROPOSED

Site Area = 2.74 ac
Basin Area = 2.74 ac

		Acres	%	Grading From	Grading To
Impervious Area					
	Building	0.66 ac	(24%)	13.20	
	Pavement	1.10 ac	(40%)	10.70	13.00
Pervious Area					
	Green Space	0.92 ac	(34%)	10.50	14.00
	Dry Retention Bottom	0.02 ac	(1%)	8.50	
	Retention Banks	0.04 ac	(1%)	8.50	11.50
Subtotal Impervious Areas		1.76 ac	(64%)		
Subtotal Pervious Areas		0.98 ac	(36%)		

Find Curve Number:

Avg. Pervious Ground El. = 12.08
Control EL. = 7.00
Depth to Water Table = 5.08
Soil Type = Coastal

Soil Storage Table

(SFWMD's Vol. IV, Basis of Review, page E-2)

Depth to W.T. (ft)	Coastal Storage (in)	Flatwoods Storage (in)	Depression Storage (in)
1.0	0.6	0.6	0.6
2.0	2.5	2.5	2.1
3.0	6.6	5.4	4.4
4.0	10.9	9.0	6.8

Pervious Area = 0.98 ac
Storage from Table = 8.18 in (w/ 25% compaction)
Avail Soil Storage = 0.67 af
Soil Moisture Storage (S) = 2.92 in
Curve Number = **77**

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STAGE -STORAGE CALCULATIONS

PROPOSED

Starting Stage	**7.00**
Ending Stage	**13.50**
Stage Increment	**0.50**

Name	**Pavement**	**Green Space**	**Dry Retention Bottom**	**Retention Banks**	**Trench**
Area	1.10	0.92	0.02	0.04	0.21 (AF)
Start Elev	10.70	10.50	8.50	8.50	7.00
End Elev	13.00	14.00	0.00	11.50	10.50

Stage Feet NAVD	Linear Storage Ac-ft	Linear Storage Ac-ft	Vert Storage Ac-ft	Linear Storage Ac-ft	Linear Storage Ac-ft	Total Storage Ac-ft
7.00	0.00	0.00	0.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	0.00	0.03	0.03
8.00	0.00	0.00	0.00	0.00	0.06	0.06
8.50	0.00	0.00	0.00	0.00	0.09	0.09
9.00	0.00	0.00	0.01	0.00	0.12	0.13
9.50	0.00	0.00	0.02	0.01	0.15	0.18
10.00	0.00	0.00	0.03	0.02	0.18	0.23
10.50	0.00	0.00	0.04	0.03	0.21	0.28
11.00	0.02	0.03	0.05	0.04	0.21	0.36
11.50	0.15	0.13	0.06	0.06	0.21	0.61
12.00	0.40	0.30	0.07	0.08	0.21	1.06
12.50	0.77	0.53	0.08	0.10	0.21	1.69
13.00	1.27	0.82	0.09	0.12	0.21	2.51
13.50	1.82	1.18	0.10	0.14	0.21	3.45

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RUNOFF (ZERO DISCHARGE) CALCULATIONS

Soil Moisture Storage (S_{exist})	3.22 in	
Soil Moisture Storage (S_{prop})	2.92 in	
25 Year, 3 Day Rainfall Amount (P):	13.0 in	Figure C-8
100 Year, 3 Day Rainfall Amount (P):	15.5 in	Figure C-9

PRE/POST RUNOFF: 25-YEAR, 3-DAY RUNOFF CALCULATIONS:

Existing:

Q = (P-(0.2XS))2 / (P+(0.8*S))

= 9.8 in

Volume = Q x Site Area x 1'/12"

= 9.8 in X 2.74 X 1'/12" = **2.24 AF**

Proposed:

Q = (P-(0.2XS))2 / (P+(0.8*S))

= 10.0 in

Volume = Q x Site Area x 1'/12"

= 10.0 in X 2.74 X 1'/12" = **2.29 AF**

Pre- vs. Post- = 0.06 AF of storage required

0.33 AF Provided at Elev. 11.5 Ft NAVD

FINISHED FLOORS: 100-YEAR, 3-DAY RUNOFF CALCULATIONS:

Proposed:

Q = (P-(0.2XS))2 / (P+(0.8*S))

= 12.5 in

Volume = Q x Site Area x 1'/12"

= 12.5 in X 2.74 X 1'/12" = **2.85 AF**

2.90 AF Provided at Elev. 13.20 Ft NAVD

Storm Event	Rainfall (in)	Peak Stage (ft-NAVD)	Peak Discharge (cfs)	Design Criteria	Prop Stage (ft-NAVD)
25-yr, 3-day =	13.0	12.85	N/A	Allowable Discharge / Pre vs. Post	N/A
100-yr, 3-day =	15.5	13.15	n/a	Finished Floors	13.20

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WATER QUALITY CALCULATIONS

1-inch Over the Project Area

(Treated Volume) 1-inch * 1-ft/12-in * 2.74 (PROJECT AREA (AC)) = **0.23** (TREATED VOLUME) ac-ft

2.5-inches Times the Percent Impervious

(Site Area) 2.74 (PROJECT AREA (AC)) - (0.00 (LAKES (AC)) + 0.66 (ROOFS (AC))) = 2.08 (SITE AREA) ac

(Impervious Area) 2.08 (SITE AREA (AC)) - 0.98 (PERVIOUS AREA (AC)) = 1.10 (IMPERVIOUS AREA) ac

(% Impervious) IMPERVIOUS AREA * 100% / SITE AREA (AC) = 52.88%

(2.5-in * % Imp.) 2.5-inches * 52.88% (PERCENT IMPERVIOUS) = 1.32 (INCHES TO BE TREATED) in

(Treated Volume) 1.32 (TREATED (IN)) * 1-ft/12-in * 2.74 (PROJECT AREA - LAKES (AC)) = **0.31** (TREATED VOLUME) ac-ft

THEREFORE 2.5-INCHES X %IMP GOVERNS

Required WQ Treatment = 0.31 ac-ft

Provided WQ Treatment (Via Exfil Trench & Retention @ EL. 11.5) = 0.33 ac-ft

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EXFILTRATION TRENCH DESIGN: ONSITE

(All elevations shown in NAVD 1988 datum)

Minimum Ground Elevation = 12.00

Weir Elevation = 11.50

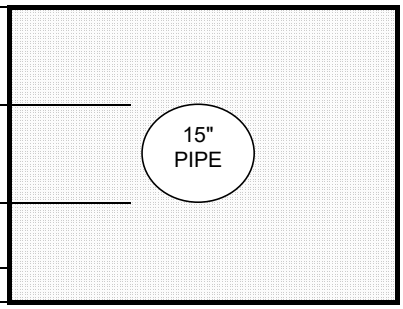
Trench Top Elevation = 10.50

Pipe Overt Elevation = 9.25

Pipe Invert Elevation = 8.00

CWE (Per Soils Report) = 7.00

Trench Bottom Elevation = 7.00



Standard Formula

$V = L*(K(H_2*W+2*H_2*Du-Du^{\wedge 2}+2*H_2*Ds)+(1.39*10^{\wedge -4})*W*Du)$

<=== INPUT ONLY IN GRAY CELLS

L_{WQ}	Length of Trench Provided for Water Quality	190
W	Trench Width (feet)	6
K	Hydraulic Conductivity (cfs/ft^2-ft.head)	2.24E-04
H_2	Depth to Water Table (feet)	4.5
Du	Non Saturated Trench Depth (feet)	3.5
Ds	Saturated Trench Depth (feet)	0

V_{WQ} Volume Treated (acre-in) **2.52**

V_{WQ} Volume Treated (acre-ft) **0.21**