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Bound Reports

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Attached is a re-scanned document because

of notations and/or highlights

Heart House Community Church

Lake County, Florida

Stormwater Calculations

prepared by:

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Contract No. 061108.0000
November 2007

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BOOTH, ERN, STRAUGHAN & HIOTT, INC.
350 North Sinclair Avenue
Tavares, Florida 32778

NOV 06 2007

Charles C. Hiott, P.E. #54813

Stormwater Report
for
Heart House Ministries

Introduction

The project has a project area of 3.920 acres which consist of the construction of a building, parking lot, and a stormwater system. The project also has offsite drainage of 2.622 acres. Therefore the total drainage acreage for the project is 6.542 acres. The project is located south of Johns Lake Road and east of Hancock Road in Section 33, Township 22 south, Range 26 east.

The proposed development is comprised of 1 basin (P-1). The existing condition E-1 has a drainage area of 6.542 acres and drains towards the north edge of the property. In the proposed condition, basin P-1 has a drainage area of 6.542 acres (1.814 Ac. impervious), which consists of a parking lot, building, sidewalk, and a stormwater system. The stormwater for this project will be retained using a retention pond.

This application is for a 40C-42 permit, as the project is less than 40 acres, and has less than 12 acres total impervious. The requirement for 40C-42 is for the pond to hold the pollution abatement volume and to recover that volume in 72 hours, and for the total pond volume to recover in 14 days.

Since the pond holds the pollution abatement volume, and recovers in the stated timeframe, the criteria has been met. The recovery calculations were performed using the program PONDS Version 2.26.

The soils map shows Candler sand (AtB, AtD, SCS Type A) onsite. The project is not located within a 100 year flood zone (12069C0565D). There are no wetlands onsite.

Water Quality Requirement

Under the regulation for dry ponds, the required pollution abatement volume for the project area is ½ inch of runoff over the entire drainage area, or 1.25 inches times the impervious area (which ever is greater) plus ½ inch of runoff over the entire drainage area.

Dry Retention Basin P-1

The pollution abatement volume will be provided in the retention pond.

The pollution abatement volume required by St. Johns River Water Management District is:

Total area	= 6.542 Ac.
Pervious area	= 4.728 Ac.
Impervious area	= 1.814 Ac.
(0.5"/12"/ft)*6.542	= 0.273 Ac-Ft
OR	
(1.25"/12"/ft)*1.814	= 0.189 Ac-Ft
OR	
(2.00"/12/ft)*6.542	= 1.090 Ac-Ft (for Lake Apopka Criteria)

Impervious Area
Parking = 1.337 acres
Building = 0.455 acres
Sidewalk = 0.022 acres
Total Impervious = 1.814 acres

Therefore, St. Johns River Water Management District pollution abatement volume required is = 1.090 Ac-Ft = 47,480 Cu.Ft.
Volume Provided = 1.096 Ac-Ft = 47,742 Cu.Ft.

Pollution Abatement Volume Recovery occurs in 0.66 days, or 15.82 hours.
Full Volume Recover occurs in 0.66 days.

Storage

Pond P-1	Stage (Ft)	Area (Ac)	Vol (Ac-ft)	Cu.Vol (Ac-ft)
	206	0.127 ✓	0	0
	207	0.164	0.146	0.146
	208	0.207 ✓	0.186	0.332
	209	0.256	0.232	0.564
	210	0.310 ✓	0.283	0.847
	210.75	0.354	0.249	1.096 ✓
	211	0.368	0.090	1.186

DIC

CN = (98(1.814) + 39(4.728)/6.542 = 55.36 ✓

probably late 80s

Site-Specific Pre-/Post- Pollutant Loading Analysis

Existing Condition	Land Use	Soil Type	Total P Loading (kg/ac-yr)		Basin Acreage (acres)		Inflow Mass Loading (kg/yr)	Treatment System	Inches of Retention Over Basin Area (inches)	Pollutant Removal Efficiency (%)	Outflow Mass Loading (kg/yr)
Basin 1	GROVE	HSG A	0.007	X	2.62	=	0.02				0.02
Basin 2	GROVE	HSG A	0.007	X	3.92	=	0.03				0.03
Basin 3											
Basin 4							0.01				
Basin 5		OPEN	0.004				0.02				
Basin 6											
Basin 7											
Basin 8											
Basin 9											
Basin 10											
					6.54		0.05				0.05

Proposed Condition	Land Use	Soil Type	Total P Loading (kg/ac-yr)		Basin Acreage (acres)		Inflow Mass Loading (kg/yr)	Treatment System	Inches of Retention Over Basin Area (inches)	Pollutant Removal Efficiency (%)	Outflow Mass Loading (kg/yr)
Basin 1											
Basin 2											
Basin 3	SFR 40%	HSG A	0.25	X	6.54	=	1.64	Dry Retention	2.00	97	0.05
Basin 4											
Basin 5											
Basin 6											
Basin 7											
Basin 8											
Basin 9											
Basin 10											
					6.54		1.64				0.05

≈ 4000 sf.

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Written By Devo Seereeram, Ph.D., P.E.
And Robert D. Casper

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Retention Pond Recovery Analysis

I. Job Information

Job Name: HEART HOUSE COMMUNITY CURCH (TREATMENT)
Engineer: CCH
Date: 10-02-07

II. Input Data

Equivalent Pond Length, [L] (ft):	160.00
Equivalent Pond Width, [W] (ft):	35.00
Pond Bottom Elevation, [PB] (ft above datum):	206.00
Porosity Of Material Within Pond, [p] (%):	100.00
Base Of Aquifer Elevation, [B] (ft above datum):	180.00
Water Table Elevation, [WT] (ft above datum):	181.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day)	18.50
Fillable Porosity of Aquifer, [n] (%):	20.00
Vertical Unsaturated Infiltration, [Iv] (ft/day):	8.00
Runoff Volume, [V] (cubic feet)	47480.00
Percent Recovery Of Runoff Volume, [PV] (%)	100.00

III. Results

UNSATURATED FLOW

Recovery Time From Unsaturated Flow, [T1] (days):	0.6250
Recovered Volume From Unsaturated Flow, [V1] (ft^3):	28000.00

SATURATED FLOW

Recovery Time From Saturated Flow, [T2] (days):	0.0342
Recovered Volume From Saturated Flow, [V2] (ft^3):	19480.00
Maximum Radius Of Influence, [R] (ft):	18.20
Maximum Driving Head, [Hmax] (ft):	28.479
Minimum Driving Head, [Hmin] (ft):	25.000

TOTAL

Total Recovery Time, [T] (days):	0.6592
Total Recovered Volume, [V] (ft^3):	47480.00

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Retention Pond Recovery Analysis

I. Job Information

Job Name: HEART HOUSE COMMUNITY CURCH (TOTAL)
Engineer: CCH
Date: 10-02-07

111634-1X

II. Input Data

Equivalent Pond Length, [L] (ft):	160.00
Equivalent Pond Width, [W] (ft):	35.00
Pond Bottom Elevation, [PB] (ft above datum):	206.00
Porosity Of Material Within Pond, [p] (%):	100.00
Base Of Aquifer Elevation, [B] (ft above datum):	180.00
Water Table Elevation, [WT] (ft above datum):	181.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day)	18.50
Fillable Porosity of Aquifer, [n] (%):	20.00
Vertical Unsaturated Infiltration, [Iv] (ft/day):	8.00
Runoff Volume, [V] (cubic feet)	47742.00
Percent Recovery Of Runoff Volume, [PV] (%)	100.00

III. Results

UNSATURATED FLOW

Recovery Time From Unsaturated Flow, [T1] (days):	0.6250
Recovered Volume From Unsaturated Flow, [V1] (ft^3):	28000.00

SATURATED FLOW

Recovery Time From Saturated Flow, [T2] (days):	0.0351
Recovered Volume From Saturated Flow, [V2] (ft^3):	19742.00
Maximum Radius Of Influence, [R] (ft):	18.43
Maximum Driving Head, [Hmax] (ft):	28.525
Minimum Driving Head, [Hmin] (ft):	25.000

TOTAL

Total Recovery Time, [T] (days):	0.6601
Total Recovered Volume, [V] (ft^3):	47742.00