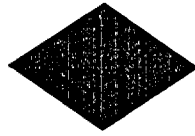




Bound Reports

1720



AMERICAN CIVIL ENGINEERING CO.

207 NORTH MOSS ROAD, SUITE 211 • WINTER SPRINGS, FLORIDA 32708

Telephone: (407) 327-7700 • Fax: (407) 327-0227

STORM WATER MANAGEMENT

REPORT FOR

**HANCOCK VILLAGE
NW CORNER S.R. 50 & HANCOCK ROAD**

STJWMD SUBMITTAL NO. 2
CITY OF CLERMONT SUBMITTAL NO. 1
FDOT SUBMITTAL NO. 1

JULY 1, 2002
REVISED: OCTOBER 16, 2002

PREPARED FOR:

TRYCON, INC.
300 INTERNATIONAL PARKWAY, SUITE 184
HEATHROW, FLORIDA 32746

PREPARED BY:

THOMAS H. SKELTON, P.E.
AMERICAN CIVIL ENGINEERING COMPANY
207 N. MOSS ROAD
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Thomas H. Skelton
OCT 18 2002

RECEIVED

OCT 18 2002

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ALTAMONTE SVC. CTR.

84428-2 -≡

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PROJECT NARRATIVE

PROJECT DESCRIPTION: TO DEVELOP A 7.03 ACRE - 3 LOT COMMERCIAL SUBDIVISION THAT IS LOCATED ON THE NORTHWEST CORNER OF S.R. 50 AND HANCOCK ROAD IN CLERMONT, FLORIDA.

EXISTING CONDITIONS: THE SITE SLOPES FROM NORTHEAST TO SOUTHWEST.

POSITIVE OUTFALL: THE SITE IS DESIGNED TO CONTAIN OUTFALL TO THE SOUTHWEST.

METHODOLOGY: THE SYSTEM WILL BE DESIGNED TO CONTAIN A DRY RETENTION AREA THAT WILL RETAIN THE VOLUME REQUIRED TO INSURE NO NET INCREASE IN POST-DEVELOPMENT LOADINGS WITHIN THE LAKE APOPKA BASIN.

DISCHARGE: THERE WILL BE POSITIVE DISCHARGE TO THE WEST.

CONCLUSIONS: THE POST DEVELOPMENT DISCHARGES ARE DESIGNED TO BE LESS THAN THE PRE DEVELOPED RATES.

PRE VS. POST ANALYSIS

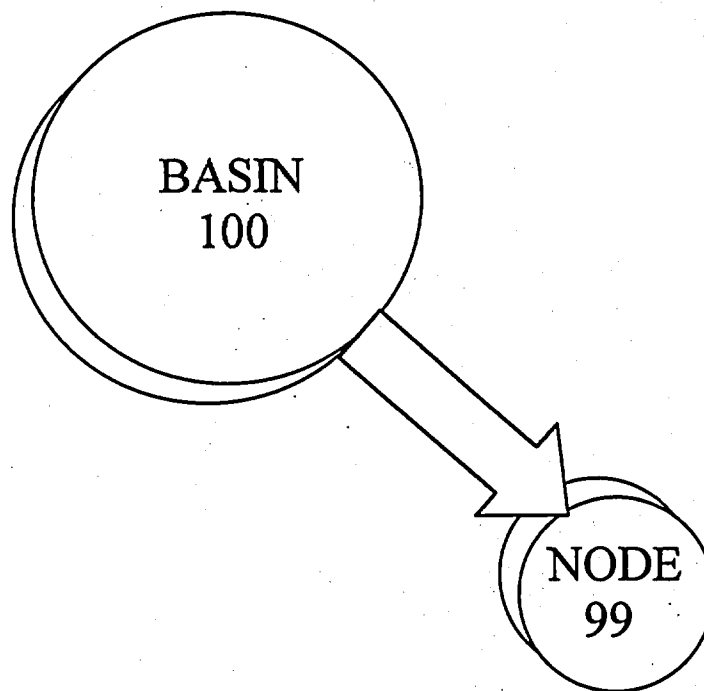
PRE VS POST ANALYSIS

<u>EVENT</u>	<u>Q(ALLOW.)</u> CFS	<u>Q(PROP.)</u> CFS
	SEE SECTION 4	SEE SECTIONS 6
25 YEAR/24 HOUR	8.02	4.09
MEAN ANNUAL	1.25	0.00

**PRE DEVELOPMENT
BASIN ANALYSIS**

PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED HYD. SCHEMATIC:



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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED ANALYSIS:

HYDROGRAPH DATA:

BASIN NO. 100

TOTAL AREA (AC) (7.03 AC ON SITE, 2.55 AC OFF SITE)	<u>9.58 ACRES</u>
PERVIOUS AREA (AC) (7.03 AC ON SITE, 2.55 AC OFF SITE)	<u>9.58 ACRES</u>
IMPERVIOUS AREA (AC)	<u>0.00 ACRE</u>
WATER SURFACE AREA (AC)	<u>0.00 ACRE</u>

SCS SOIL TYPE	<u>CANDLER/ASTATULA</u> <u>HYD. GRP. A</u>
PERVIOUS CN	<u>49</u>
IMPERVIOUS CN	<u>98</u>
WATER SURFACE CN	<u>100</u>
COMPOSITE CN	<u>49</u>

TIME OF CONCENTRATION:

45.6 MINUTES

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED TIME OF CONCENTRATION COMPUTATIONS:
BASED ON SOIL CONSERVATION SERVICE (SCS) TECHNICAL RELEASE 55 (TR-55)

BASIN NUMBER: 100

1. OVERLAND FLOW: $T_1 = [0.007 (nL)^{0.8}] / (P)^{0.5}(s)^{0.4}$

n = MANNING'S ROUGHNESS 0.40
L = FLOW LENGTH (ft) 300
P = 4.75 INCHES
S = SLOPE OF HYD. GR. (ft/ft) 0.027
T₁ = TRAVEL TIME (hr) 0.63 HOUR

2. CONCENTRATED FLOW: T₂ = L/V

L = FLOW LENGTH (ft) 670
V = VELOCITY BASED ON TR55 4.2 FT/S
T₂ = TRAVEL TIME (hr) 0.04 HOUR

3. PIPE FLOW: T₃ = L/V

L = FLOW LENGTH (ft)
V = VEL. IN PIPE, ASSUME 4.0 ft/s
T₂ = TRAVEL TIME (hr) 0.0 HOUR

4. TOTAL TIME OF CONCENTRATION:

$$T_c = T_1 + T_2 + T_3$$

$$T_c = 0.63 + 0.04 + 0.0 = \underline{0.67 \text{ HOUR}}$$

40.2 MIN.

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**PRE DEVELOPMENT
HYDROGRAPHS &
ROUTINGS**

SCSIIMOD
25 YEAR/24 HOUR

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HANCOCK VILLAGE - PRE DEVELOPED - 25 YR/ 24 HR
OCTOBER 15, 2002

BASIN NAME 100
NODE NAME 99

TIME INCREMENT (min) 5.00

RAINFALL FILE SCSIIMOD
RAIN AMOUNT (in) 8.60
STORM DURATION (hrs) 24.00

AREA (ac) 9.58
CURVE NUMBER 49.00
DCIA (%) .00
TC (mins) 40.20
LAG TIME (hrs) .00
BASIN STATUS ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
100	8.02	12.42	2.50	

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HANCOCK VILLAGE - PRE DEVELOPED - MEAN ANNUAL
OCTOBER 15, 2002

BASIN NAME 100
NODE NAME 99

TIME INCREMENT (min) 5.00

RAINFALL FILE MEAN23
RAIN AMOUNT (in) 4.50
STORM DURATION (hrs) 24.00

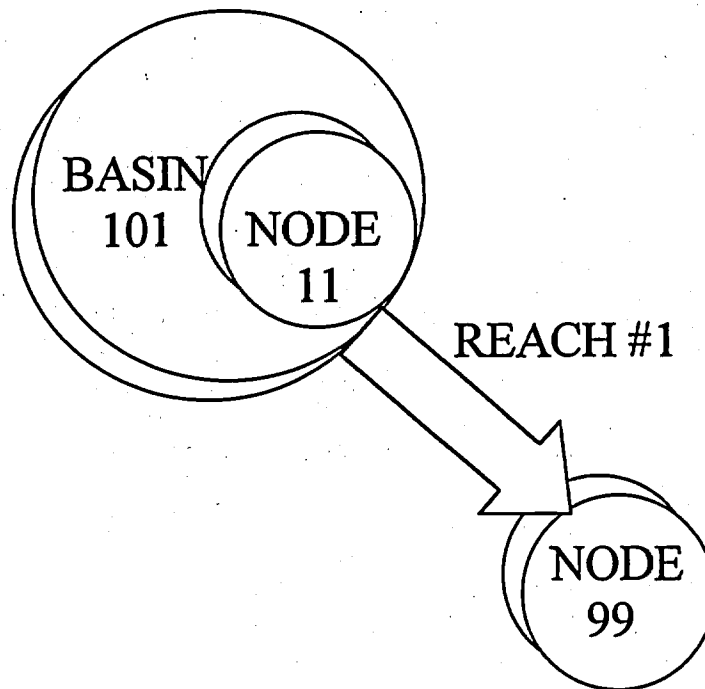
AREA (ac) 9.58
CURVE NUMBER 49.00
DCIA (%) .00
TC (mins) 40.20
LAG TIME (hrs) .00
BASIN STATUS ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
100	1.25	12.50	.46	

**POST DEVELOPMENT
BASIN ANALYSIS**

PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST-DEVELOPED HYD. SCHEMATIC:



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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST-DEVELOPED ANALYSIS:

HYDROGRAPH DATA:

BASIN NO. 101

TOTAL AREA (AC) (7.03 AC ON SITE, 2.55 AC OFF SITE)	<u>9.58 ACRES</u>
PERVIOUS AREA (AC) (2.19 AC ON SITE, 2.55 AC OFF SITE)	<u>4.74 ACRES</u>
IMPERVIOUS AREA (AC)	<u>4.84 ACRE</u>
WATER SURFACE AREA (AC)	<u>0.00 ACRE</u>

SCS SOIL TYPE	<u>CANDLER/ASTATULA</u> <u>HYD. GRP. A</u>
PERVIOUS CN	<u>49</u>
IMPERVIOUS CN	<u>98</u>
WATER SURFACE CN	<u>100</u>
COMPOSITE CN	$[(4.74)(49) + (4.84)(98)] / [9.58]$ <u>73.8</u>

TIME OF CONCENTRATION:

10.0 MINUTES

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST DEVELOPMENT ANALYSIS

SPECIFIC DESIGN CRITERIA:

DRY RETENTION AREA

ON-LINE, FIRST 0.5" OF RUNOFF PLUS 0.5" OF
RUNOFF FROM DRAINAGE AREA OR
1.25" X IMPERVIOUS AREA PLUS AN
ADDITIONAL 0.5" OF RUNOFF FROM
DRAINAGE AREA

WATER QUALITY VOLUME:

$$V_1 = [(0.5'')(9.58 \text{ ACRE})+(0.5'')(9.58 \text{ ACRE})]/(12'' \text{ FT}) \\ = \underline{\underline{0.798 \text{ AC-FT}}}$$

$$V_2 = [(1.25'')(4.84 \text{ ACRE})+(0.5'')(9.58 \text{ ACRE})]/(12'' \text{ FT}) \\ = \underline{\underline{0.903 \text{ AC-FT}}}$$

REQUIRED WATER QUALITY VOLUME:

0.903 AC-FT

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST DEVELOPMENT ANALYSIS

STAGE/STORAGE DATA:

NODE 11

190.00	0.030	-	-	-	-
195.00	0.130	0.080	5.00	0.400	0.400
198.00	0.210	0.170	3.00	0.510	0.910
200.00	0.230	0.220	2.00	0.440	1.350
205.00	0.270	0.250	5.00	1.250	2.600
206.00	0.290	0.280	1.00	0.280	2.880

$$\frac{(205.00 - X)}{(205.00 - 200.00)} = \frac{(2.600 - 2.190)}{(2.600 - 1.350)} \quad X = 203.4(\text{MIN.})$$

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**LAKE APOPKA BASIN
STORMWATER TREATMENT CRITERIA**

**REQUIRED RETENTION VOLUME FOR 80% COVERAGE OF COMMERCIAL
PROPERTY WITH DOMINANT SOIL GROUP 'A' = 4.00" OVER SITE.**

AREA(SITE) = 7.03 ACRES

% IMPERVIOUS = 74.9%

**VOLUME REQUIRED = [(74.9%)/(80.0%) X 4.00"] X (7.03 AC)(12"/FT)
= 2.19 AC-FT**

VOLUME PROVIDED = 2.25 AC-FT

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HANCOCK VILLAGE - POST DEVELOPED - 25 YR/24 HR
 OCTOBER 15, 2002

NODE NAME	NODE TYPE	INI STAGE (ft)	X-COOR (ft)	Y-COOR (ft)	LENGTH (ft)	STAGE (ft)	AREA/TIME (ac)/(hr)
11	AREA	190.000	.000	.000	.000	190.000	.030
						195.000	.130
						198.000	.210
						200.000	.230
						205.000	.270
99	TIME	180.000	.000	.000	.000	180.000	.000
						185.000	240.000

REACH SUMMARY
 =====

INDEX	RCHNAME	FRMNODE	TONODE	REACH TYPE
1	1	11	99	CIRCULAR CULVERT

>>REACH NAME : 1
 FROM NODE : 11
 TO NODE : 99
 REACH TYPE : CIRCULAR CULVERT
 FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
 TURBO SWITCH : OFF

CULVERT DATA :
 SPAN (in): 24.000 RISE (in): 24.000 LENGTH (ft): 60.000
 U/S INVERT (ft): 196.600 D/S INVERT (ft): 196.000 MANNING N: .013
 ENTRNC LOSS: .500 # OF CULVERTS: 1.000

POSITION A : RECTANGULAR RISER SLOT
 CREST EL. (ft): 205.500 CREST LN. (ft): 10.167 OPENING (ft): 999.000
 WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

POSITION B : RECTANGULAR RISER SLOT
 CREST EL. (ft): 203.500 CREST LN. (ft): .500 OPENING (ft): 999.000
 WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

NOTE:

**POST DEVELOPMENT
BASIN ANALYSIS**

SCSIIMOD
25 YEAR/24 HOUR

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HANCOCK VILLAGE - POST DEVELOPED - 25 YR/24 HR
 OCTOBER 15, 2002

BASIN NAME 101
 NODE NAME 11
 TIME INCREMENT (min) 5.00
 RAINFALL FILE SCSIIIMOD
 RAIN AMOUNT (in) 8.60
 STORM DURATION (hrs) 24.00
 AREA (ac) 9.58
 CURVE NUMBER 73.80
 DCIA (%) .00
 TC (mins) 10.00
 LAG TIME (hrs) .00
 BASIN STATUS ONSITE

BASIN QMX (cfs) TMX (hrs) VOL (in) NOTES
 101 35.64 11.92 5.43

NODAL MIN/MAX/TIME CONDITIONS REPORT

NODE ID	PARAMETER	<-- MINIMUMS -->		<-- MAXIMUMS -->	
		VALUE	TIME (hr)	VALUE	TIME (hr)
11	STAGE (ft):	190.00	5.50	205.37	13.25
	VOLUME (af):	.00	5.50	2.70	13.25
	RUNOFF (cfs):	.00	5.50	32.72	12.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	12.25	4.09	13.25
99	STAGE (ft):	180.00	.00	180.50	24.00
	VOLUME (af):	.00	12.25	1.94	24.00
	RUNOFF (cfs):	.00	24.00	.00	24.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	12.25	4.09	13.25
	OUTFLOW (cfs):	.00	24.00	.00	24.00

NODAL MAXIMUM CONDITIONS REPORT

NODE ID	STAGE (ft)	VOLUME (af)	<----- INFLOW ----->			OUTFLOW (cfs)
			RUNOFF (cfs)	OFFSITE (cfs)	OTHER (cfs)	
11	205.37	2.70	32.72	.00	.00	4.09
99	180.50	1.94	.00	.00	4.09	.00

REACH MAXIMUM FLOW REPORT

REACH ID	TIME (hrs)	FLOW (cfs)	FR NODE NAME	STAGE (ft)	TO NODE NAME	STAGE (ft)
1	13.25	4.09	11	205.37	99	180.28

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HANCOCK VILLAGE - POST DEVELOPED - MEAN ANNUAL
 OCTOBER 15, 2002

BASIN NAME 101
 NODE NAME 11
 TIME INCREMENT (min) 5.00
 RAINFALL FILE MEAN23
 RAIN AMOUNT (in) 4.50
 STORM DURATION (hrs) 24.00
 AREA (ac) 9.58
 CURVE NUMBER 73.80
 DCIA (%) .00
 TC (mins) 10.00
 LAG TIME (hrs) .00
 BASIN STATUS ONSITE

BASIN QMX (cfs) TMX (hrs) VOL (in) NOTES
 101 18.72 11.92 1.96

NODAL MIN/MAX/TIME CONDITIONS REPORT
 =====

NODE ID	PARAMETER	<--- MINIMUMS --->		<--- MAXIMUMS --->	
		VALUE	TIME (hr)	VALUE	TIME (hr)
11	STAGE (ft):	190.00	10.25	200.86	24.00
	VOLUME (af):	.00	10.25	1.56	24.00
	RUNOFF (cfs):	.00	10.25	18.38	12.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00
99	STAGE (ft):	180.00	.00	180.50	24.00
	VOLUME (af):	.00	24.00	.00	24.00
	RUNOFF (cfs):	.00	24.00	.00	24.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00

NODAL MAXIMUM CONDITIONS REPORT
 =====

NODE ID	STAGE (ft)	VOLUME (af)	<----- INFLOW ----->			OUTFLOW (cfs)
			RUNOFF (cfs)	OFFSITE (cfs)	OTHER (cfs)	
11	200.86	1.56	18.38	.00	.00	.00
99	180.50	.00	.00	.00	.00	.00

REACH MAXIMUM FLOW REPORT
 =====

REACH ID	TIME (hrs)	FLOW (cfs)	FR NODE NAME	STAGE (ft)	TO NODE NAME	STAGE (ft)
1	.00	.00	11	190.00	99	180.00

**DRAWDOWN/RECOVERY
ANALYSIS**

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

POND NAME/No. : HANCOCK VILLAGE - NODE 11
MANUAL RUNOFF DATA
UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	1305.00 ft ²
Pond Volume between Bottom & DHWL	113256.00 ft ³
Pond Length to Width Ratio (L/W)	5.00
Elevation of Effective Aquifer Base	179.00 ft
Elevation of Seasonal High Groundwater Table	180.00 ft
Elevation of Pond Bottom	190.00 ft
Is there overflow ?	Y
Ave. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.20
Unsaturated Vertical Hydraulic Conductivity	9.63 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	14.45 ft/d
Ave. Effective Storage Coefficient of Soil for Saturated Analysis	0.19
Average Effective Storage Coefficient of Pond	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control-Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	N
Elevation of Barrier Bottom	0.00	0.00	0.00	0.00

MODRET
ELEVATION VS OVERFLOW RELATIONSHIP
V_NOTCH, SHARP & BROAD CRESTED WEIRS
Structure Type : BROAD CRESTED

Crest Elevation	203.50 ft
Crest Length	0.50 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	2.00
Design High Water Level Elevation	205.00 ft

Friday, 1/4/1980

MODRET

TIME - RUNOFF INPUT DATA

Pond Name / No.: HANCOCK VILLAGE - NODE 11

WATER QUALITY VOLUME

STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)	STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)
UNSAT	0.00	0.00	15	24.00	0.00
1	1.00	39335.00	16	24.00	0.00
2	3.00	0.00	17	24.00	0.00
3	4.00	0.00			
4	4.00	0.00			
5	4.00	0.00			
6	4.00	0.00			
7	4.00	0.00			
8	24.00	0.00			
9	24.00	0.00			
10	24.00	0.00			
11	24.00	0.00			
12	24.00	0.00			
13	24.00	0.00			
14	24.00	0.00			

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 0.00	180.000	0.000 *		
			0.00	
0.00	180.000	0.24866		
			0.30462	0.00
1.00	195.064	0.36058		
			0.52847	0.00
4.00	194.309	0.46093		
			0.37088	0.00
8.00	193.601	0.31847		
			0.26606	0.00
12.00	193.094	0.23765		
			0.20925	0.00
16.00	192.695	0.19175		
			0.17425	0.00
20.00	192.362	0.16265		
			0.15105	0.00
24.00	192.074	0.14419		
			0.10304	0.00
48.00	190.895	0.08908		
			0.07512	0.00
72.00	190.036	0.06656		
			0.05800	0.00
96.00	189.372	0.05253		
			0.04707	0.00
120.00	188.833	0.04326		

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			0.03946	0.00
144.00	188.382	0.03656		
			0.03366	0.00
168.00	187.997	0.03141		
			0.02916	0.00
192.00	187.663	0.02734		
			0.02552	0.00
216.00	187.371	0.02405		
			0.02259	0.00
240.00	187.112	0.02139		
			0.02019	0.00
264.00	186.881			

Max. WL : 195.064 @ 1.00 h * Ø RO = Ø INF Max.OVF : 0.000cfs @ 0.0 h

MODRET

TIME - RUNOFF INPUT DATA

Pond Name / No.: HANCOCK VILLAGE - NODE 11

TOTAL VOLUME

STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)	STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)
UNSAT	0.00	0.00	15	24.00	0.00
1	1.00	95832.00	16	24.00	0.00
2	3.00	0.00	17	24.00	0.00
3	4.00	0.00			
4	4.00	0.00			
5	4.00	0.00			
6	4.00	0.00			
7	4.00	0.00			
8	24.00	0.00			
9	24.00	0.00			
10	24.00	0.00			
11	24.00	0.00			
12	24.00	0.00			
13	24.00	0.00			
14	24.00	0.00			

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
00.00 - 0.00	180.000	0.000 *		
			0.00	
0.00	180.000	0.74819		
			0.79973	0.00
1.00	202.311	0.85127		
			1.00590	0.00
4.00	200.872	0.84094		
			0.62099	0.00
8.00	199.688	0.52775		
			0.43452	0.00
12.00	198.859	0.38724		
			0.33996	0.00
16.00	198.211	0.31358		
			0.28720	0.00
20.00	197.663	0.27084		
			0.25448	0.00
24.00	197.178	0.24217		
			0.16830	0.00
48.00	195.252	0.14381		
			0.11933	0.00
72.00	193.886	0.10519		
			0.09106	0.00
96.00	192.844	0.08177		
			0.07249	0.00
120.00	192.015	0.06587		

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			0.05925	0.00
144.00	191.337	0.05431	0.04937	0.00
168.00	190.772	0.04567	0.04197	0.00
192.00	190.292	0.03916	0.03635	0.00
216.00	189.876	0.03412	0.03190	0.00
240.00	189.511	0.03022	0.02855	0.00
264.00	189.184			

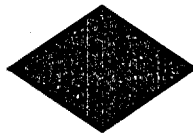
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AMERICAN CIVIL ENGINEERING CO.

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Telephone: (407) 327-7700 • Fax: (407) 327-0227

STORM WATER MANAGEMENT
REPORT FOR

HANCOCK VILLAGE
NW CORNER S.R. 50 & HANCOCK ROAD

STJWMD SUBMITTAL NO. 1
CITY OF CLERMONT SUBMITTAL NO. 1
FDOT SUBMITTAL NO. 1

JULY 1, 2002

PREPARED FOR:

TRYCON, INC.
300 INTERNATIONAL PARKWAY, SUITE 184
HEATHROW, FLORIDA 32746

PREPARED BY:

THOMAS H. SKELTON, P.E.
AMERICAN CIVIL ENGINEERING COMPANY
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WINTER SPRINGS, FL 32708
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PROJECT NARRATIVE

PROJECT DESCRIPTION: TO DEVELOP A 7.03 ACRE - 5 LOT COMMERCIAL SUBDIVISION THAT IS LOCATED ON THE NORTHWEST CORNER OF S.R. 50 AND HANCOCK ROAD IN CLERMONT, FLORIDA.

EXISTING CONDITIONS: THE SITE SLOPES FROM EAST TO WEST.

POSITIVE OUTFALL: THE SITE IS DESIGNED TO CONTAIN OUTFALL TO THE WEST.

METHODOLOGY: THE SYSTEM WILL BE DESIGNED TO CONTAIN A DRY RETENTION AREA.

DISCHARGE: THERE WILL BE POSITIVE DISCHARGE TO THE WEST.

CONCLUSIONS: THE POST DEVELOPMENT DISCHARGES ARE DESIGNED TO BE LESS THAN THE PRE DEVELOPED RATES.

**PRE VS. POST
ANALYSIS**

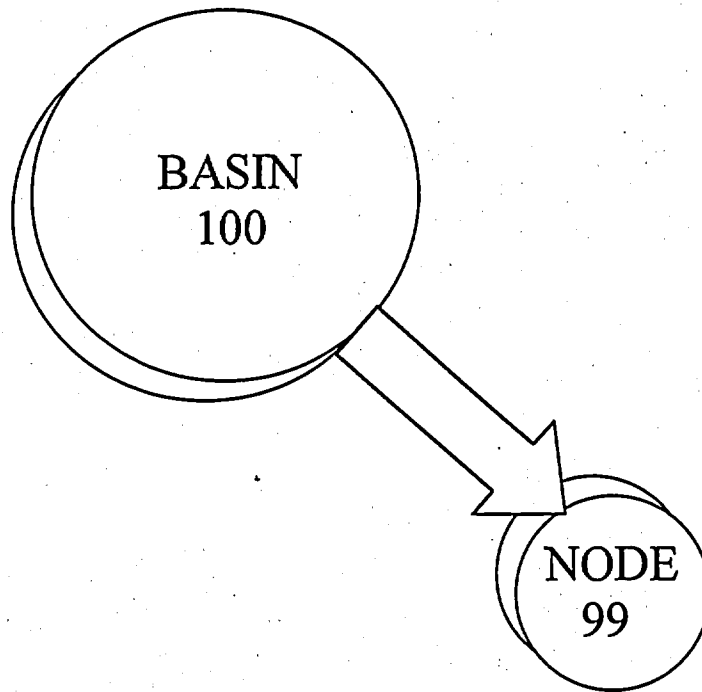
PRE VS POST ANALYSIS

<u>EVENT</u>	<u>Q(ALLOW.)</u> CFS	<u>Q(PROP.)</u> CFS
	SEE SECTION 4	SEE SECTIONS 6
25 YEAR/24 HOUR	5.62	4.46
MEAN ANNUAL	0.87	0.00

**PRE DEVELOPMENT
BASIN ANALYSIS**

PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED HYD. SCHEMATIC:



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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED ANALYSIS:

HYDROGRAPH DATA:

BASIN NO. 100

TOTAL AREA (AC)	<u>7.03 ACRES</u>
PERVIOUS AREA (AC)	<u>7.03 ACRES</u>
IMPERVIOUS AREA (AC)	<u>0.00 ACRE</u>
WATER SURFACE AREA (AC)	<u>0.00 ACRE</u>

SCS SOIL TYPE	<u>CANDLER/ASTATULA</u> <u>HYD. GRP. A</u>
PERVIOUS CN	<u>49</u>
IMPERVIOUS CN	<u>98</u>
WATER SURFACE CN	<u>100</u>
COMPOSITE CN	<u>49</u>

TIME OF CONCENTRATION:

45.6 MINUTES

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

PRE-DEVELOPED TIME OF CONCENTRATION COMPUTATIONS:
BASED ON SOIL CONSERVATION SERVICE (SCS) TECHNICAL RELEASE 55 (TR-55)

BASIN NUMBER: 100

1. OVERLAND FLOW: $T_1 = [0.007 (nL)^{0.8}] / (P)^{0.5} (s)^{0.4}$

n = MANNING'S ROUGHNESS 0.40
L = FLOW LENGTH (ft) 610
P = 4.75 INCHES
S = SLOPE OF HYD. GR. (ft/ft) 0.0688
 T_1 = TRAVEL TIME (hr) 0.76 HOUR

2. CONCENTRATED FLOW: $T_2 = L/V$

L = FLOW LENGTH (ft)
V = VELOCITY BASED ON TR55
 T_2 = TRAVEL TIME (hr) 0.0 HOUR

3. PIPE FLOW: $T_3 = L/V$

L = FLOW LENGTH (ft)
V = VEL. IN PIPE, ASSUME 4.0 ft/s
 T_3 = TRAVEL TIME (hr) 0.0 HOUR

4. TOTAL TIME OF CONCENTRATION:

$$T_c = T_1 + T_2 + T_3$$

$$T_c = 0.76 + 0.0 + 0.0 = \underline{0.76 \text{ HOUR}}$$

45.6 MIN.

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**PRE DEVELOPMENT
HYDROGRAPHS &
ROUTINGS**

SCSIIMOD
25 YEAR/24 HOUR

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HANCOCK VILLAGE - PRE DEVELOPED - 25 YEAR/24 HOUR
JULY 2, 2002

BASIN NAME 100
NODE NAME 99

TIME INCREMENT (min) 5.00

RAINFALL FILE SCSIIMOD
RAIN AMOUNT (in) 8.60
STORM DURATION (hrs) 24.00

AREA (ac) 7.03
CURVE NUMBER 49.00
DCIA (%) .00
TC (mins) 45.00
LAG TIME (hrs) .00
BASIN STATUS ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
100	5.62	12.42	2.50	

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HANCOCK VILLAGE - PRE DEVELOPED - MEAN ANNUAL
JULY 2, 2002

BASIN NAME 100
NODE NAME 99

TIME INCREMENT (min) 5.00

RAINFALL FILE MEAN23
RAIN AMOUNT (in) 4.50
STORM DURATION (hrs) 24.00

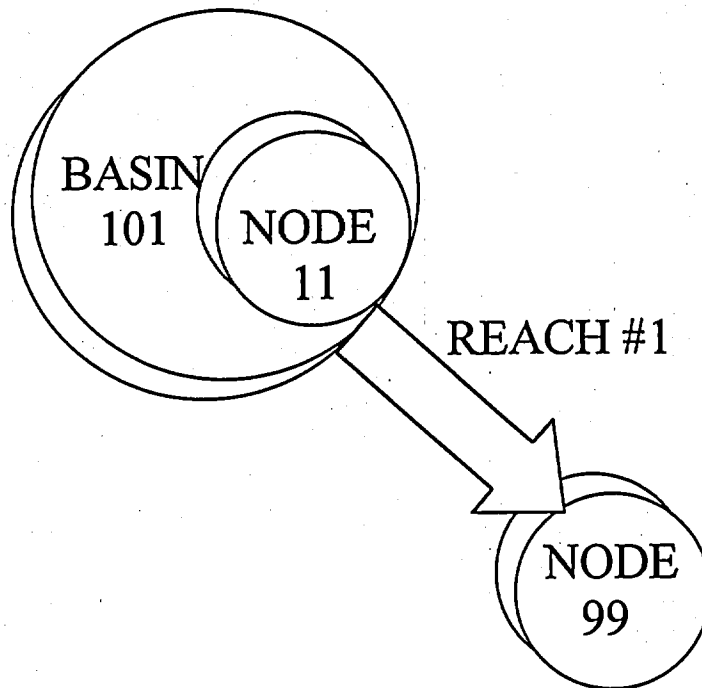
AREA (ac) 7.03
CURVE NUMBER 49.00
DCIA (%) .00
TC (mins) 45.00
LAG TIME (hrs) .00
BASIN STATUS ONSITE

BASIN	QMX (cfs)	TMX (hrs)	VOL (in)	NOTES
100	.87	12.50	.46	

**POST DEVELOPMENT
BASIN ANALYSIS**

PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST-DEVELOPED HYD. SCHEMATIC:



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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST-DEVELOPED ANALYSIS:

HYDROGRAPH DATA:

BASIN NO. 101

TOTAL AREA (AC)	<u>7.03 ACRES</u>
PERVIOUS AREA (AC)	<u>2.11 ACRES</u>
IMPERVIOUS AREA (AC)	<u>4.92 ACRE</u>
WATER SURFACE AREA (AC)	<u>0.00 ACRE</u>

SCS SOIL TYPE	<u>CANDLER/ASTATULA</u> <u>HYD. GRP. A</u>
PERVIOUS CN	<u>49</u>
IMPERVIOUS CN	<u>98</u>
WATER SURFACE CN	<u>100</u>
COMPOSITE CN	$[(2.11)(49) + (4.92)(98)] / [7.03]$ <u>83.3</u>

TIME OF CONCENTRATION:

10.0 MINUTES

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST DEVELOPMENT ANALYSIS

SPECIFIC DESIGN CRITERIA:

DRY RETENTION AREA

ON-LINE, FIRST 0.5" OF RUNOFF OR
1.25" X IMPERVIOUS AREA
PLUS AN ADDITIONAL 0.5" OF
RUNOFF FROM DRAINAGE AREA

WATER QUALITY VOLUME:

$$V_1 = [(0.5'')(7.03 \text{ ACRE}) + (0.5'')(7.03 \text{ ACRE})] / (12'' \text{ FT}) \\ = \underline{\underline{0.586 \text{ AC-FT}}}$$

$$V_2 = [(1.25'')(4.92 \text{ ACRE}) + (0.5'')(7.03 \text{ ACRE})] / (12'' \text{ FT}) \\ = \underline{\underline{0.806 \text{ AC-FT}}}$$

REQUIRED WATER QUALITY VOLUME:

0.806 AC-FT

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PROJECT: HANCOCK VILLAGE
CLERMONT, FLORIDA

POST DEVELOPMENT ANALYSIS

STAGE/STORAGE DATA:

NODE 11

STAGE (ELEV)	AREA (ACRE)	AVE. AREA (ACRE)	DEPTH (FEET)	INCREM. VOLUME (AC-FT)	ACCUM. VOLUME (AC-FT)
193.00	0.054	-	-	-	-
200.00	0.248	0.151	7.00	1.057	1.057
205.00	0.306	0.277	5.00	1.385	2.442
206.00	0.314	0.310	1.00	0.310	2.752

$$\frac{(200.00 - X)}{(200.00 - 193.00)} = \frac{(1.057 - 0.806)}{(1.057 - 0.000)} \quad X = 199.76 \text{ MIN.}$$

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HANCOCK VILLAGE - POST DEVELOPED - 25 YEAR/24 HOUR
 JULY 2, 2002

NODE NAME	NODE TYPE	INI STAGE (ft)	X-COOR (ft)	Y-COOR (ft)	LENGTH (ft)	STAGE (ft)	AREA/TIME (ac)/(hr)
11	AREA	193.000	.000	.000	.000	193.000	.054
						200.000	.248
						205.000	.306
						206.000	.314
99	TIME	180.000	.000	.000	.000	180.000	.000
						185.000	24.000

REACH SUMMARY

=====

INDEX	RCHNAME	FRMNODE	TONODE	REACH TYPE
1	1	11	99	CIRCULAR CULVERT

>>REACH NAME : 1
 FROM NODE : 11
 TO NODE : 99
 REACH TYPE : CIRCULAR CULVERT
 FLOW DIRECTION : POSITIVE AND NEGATIVE FLOWS ALLOWED
 TURBO SWITCH : OFF

CULVERT DATA :
 SPAN (in): 24.000 RISE (in): 24.000 LENGTH (ft): 40.000
 U/S INVERT (ft): 198.200 D/S INVERT (ft): 197.000 MANNING N: .013
 ENTRNC LOSS: .500 # OF CULVERTS: 1.000

POSITION A : RECTANGULAR RISER SLOT
 CREST EL. (ft): 205.000 CREST LN. (ft): 14.000 OPENING (ft): 999.000
 WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

POSITION B : RECTANGULAR RISER SLOT
 CREST EL. (ft): 203.000 CREST LN. (ft): .500 OPENING (ft): 999.000
 WEIR COEF.: 3.200 GATE COEF.: .600 NUMBER OF ELEM.: 1.000

NOTE:

**POST DEVELOPMENT
HYDROGRAPHS &
ROUTINGS**

SCSIIMOD
25 YEAR/24 HOUR

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HANCOCK VILLAGE - POST DEVELOPED - 25 YEAR/24 HOUR
 JULY 2, 2002

BASIN NAME 101
 NODE NAME 11
 TIME INCREMENT (min) 5.00
 RAINFALL FILE SCSIIMOD
 RAIN AMOUNT (in) 8.60
 STORM DURATION (hrs) 24.00
 AREA (ac) 7.03
 CURVE NUMBER 83.30
 DCIA (%) .00
 TC (mins) 10.00
 LAG TIME (hrs) .00
 BASIN STATUS ONSITE
 BASIN QMX (cfs) TMX (hrs) VOL (in) NOTES
 101 30.87 11.92 6.58

NODAL MIN/MAX/TIME CONDITIONS REPORT
 =====

NODE ID	PARAMETER	<-- MINIMUMS -->		<-- MAXIMUMS -->	
		VALUE	TIME (hr)	VALUE	TIME (hr)
11	STAGE (ft):	193.00	3.25	204.98	13.00
	VOLUME (af):	.00	3.25	2.44	13.00
	RUNOFF (cfs):	.00	3.25	28.00	12.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	12.00	4.46	13.00
99	STAGE (ft):	180.00	.00	185.00	24.00
	VOLUME (af):	.00	12.00	1.80	24.00
	RUNOFF (cfs):	.00	24.00	.00	24.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	12.00	4.46	13.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00

NODAL MAXIMUM CONDITIONS REPORT
 =====

NODE ID	STAGE (ft)	VOLUME (af)	<----- INFLOW ----->				OUTFLOW (cfs)
			RUNOFF (cfs)	OFFSITE (cfs)	OTHER (cfs)		
11	204.98	2.44	28.00	.00	.00	4.46	
99	185.00	1.80	.00	.00	4.46	.00	

REACH MAXIMUM FLOW REPORT
 =====

REACH ID	TIME (hrs)	FLOW (cfs)	FR NODE NAME	STAGE (ft)	TO NODE NAME	STAGE (ft)
1	13.00	4.46	11	204.98	99	182.71

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HANCOCK VILLAGE - POST DEVELOPED - MEAN ANNUAL
 JULY 2, 2002

BASIN NAME 101
 NODE NAME 11
 TIME INCREMENT (min) 5.00
 RAINFALL FILE MEAN23
 RAIN AMOUNT (in) 4.50
 STORM DURATION (hrs) 24.00
 AREA (ac) 7.03
 CURVE NUMBER 83.30
 DCIA (%) .00
 TC (mins) 10.00
 LAG TIME (hrs) .00
 BASIN STATUS ONSITE
 BASIN QMX (cfs) TMX (hrs) VOL (in) NOTES
 101 19.95 11.92 2.75

NODAL MIN/MAX/TIME CONDITIONS REPORT

NODE ID	PARAMETER	<-- MINIMUMS -->		<-- MAXIMUMS -->	
		VALUE	TIME (hr)	VALUE	TIME (hr)
11	STAGE (ft):	193.00	8.00	202.01	24.00
	VOLUME (af):	.00	8.00	1.61	24.00
	RUNOFF (cfs):	.00	8.00	18.93	12.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00
99	STAGE (ft):	180.00	.00	185.00	24.00
	VOLUME (af):	.00	24.00	.00	24.00
	RUNOFF (cfs):	.00	24.00	.00	24.00
	OFFSITE (cfs):	.00	24.00	.00	24.00
	OTHER (cfs):	.00	24.00	.00	24.00
	OUTFLOW (cfs):	.00	24.00	.00	24.00

NODAL MAXIMUM CONDITIONS REPORT

NODE ID	STAGE (ft)	VOLUME (af)	<----- INFLOW ----->			OUTFLOW (cfs)
			RUNOFF (cfs)	OFFSITE (cfs)	OTHER (cfs)	
11	202.01	1.61	18.93	.00	.00	.00
99	185.00	.00	.00	.00	.00	.00

REACH MAXIMUM FLOW REPORT

REACH ID	TIME (hrs)	FLOW (cfs)	FR NODE NAME	STAGE (ft)	TO NODE NAME	STAGE (ft)
1	.00	.00	11	193.00	99	180.00

**DRAWDOWN/RECOVERY
ANALYSIS**

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

POND NAME/No. : HANCOCK VILLAGE - NODE 11

MANUAL RUNOFF DATA

UNSATURATED ANALYSIS EXCLUDED

Pond Bottom Area	2355.00 ft ²
Pond Volume between Bottom & DHWL	106375.00 ft ³
Pond Length to Width Ratio (L/W)	3.00
Elevation of Effective Aquifer Base	173.00 ft
Elevation of Seasonal High Groundwater Table	175.00 ft
Elevation of Pond Bottom	193.00 ft
Is there overflow ?	Y
Ave. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.20
Unsaturated Vertical Hydraulic Conductivity	3.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	4.50 ft/d
Ave. Effective Storage Coefficient of Soil for Saturated Analysis	0.19
Average Effective Storage Coefficient of Pond	1.00

Hydraulic Control Features:

	Top	Bottom	Left	Right
Groundwater Control-Y/N	N	N	N	N
Distance to Edge of Pond	0.00	0.00	0.00	0.00
Elevation of Water Level	0.00	0.00	0.00	0.00
Impervious Barrier - Y/N	N	N	N	N
Elevation of Barrier Bottom	0.00	0.00	0.00	0.00

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ELEVATION VS OVERFLOW RELATIONSHIP
V_NOTCH, SHARP & BROAD CRESTED WEIRS
Structure Type : BROAD CRESTED

Crest Elevation	203.00 ft
Crest Length	0.50 ft
Coefficient of Discharge	3.31
Weir Flow Exponent	1.50
Number of Contractions	2.00
Design High Water Level Elevation	205.00 ft

Friday, 1/ 4/1980

MODRET

TIME - RUNOFF INPUT DATA

Pond Name / No.: HANCOCK VILLAGE - NODE 11

STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)	STRESS PERIOD NUMBER	INCREMENT OF TIME (hrs)	VOLUME OF RUNOFF (ft3)
UNSAT	0.00	0.00			
1	1.00	82245.00			
2	3.00	0.00			
3	4.00	0.00			
4	4.00	0.00			
5	4.00	0.00			
6	4.00	0.00			
7	4.00	0.00			
8	24.00	0.00			
9	24.00	0.00			
10	24.00	0.00			
11	24.00	0.00			
12	24.00	0.00			
13	24.00	0.00			
14	24.00	0.00			

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft³)
00.00 - 0.00	175.000	0.000 *		
			0.00	
0.00	175.000	0.10355		
			0.12541	0.00
1.00	202.227	0.14728		
			0.21286	0.00
4.00	201.968	0.25827		
			0.31883	0.00
8.00	201.450	0.33304		
			0.34725	0.00
12.00	200.886	0.33417		
			0.32108	0.00
16.00	200.364	0.30190		
			0.28271	0.00
20.00	199.905	0.26673		
			0.25075	0.00
24.00	199.497	0.24076		
			0.18083	0.00
48.00	197.735	0.15927		
			0.13771	0.00
72.00	196.393	0.12341		
			0.10911	0.00
96.00	195.329	0.09959		
			0.09007	0.00
120.00	194.452	0.08340		

MODRET

SUMMARY OF RESULTS - TABLE FORMAT

Pond Name / No.: HANCOCK VILLAGE - NODE 11

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft ³)
			0.07673	0.00
144.00	193.704	0.07171		
			0.06669	0.00
168.00	193.054	0.06276		
			0.05882	0.00
192.00	192.480			

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