

Preliminary Engineering Assessment (PEA)

**Macky Bluffs Stormwater Pipe Failure
Hurricane Sally
Escambia County
Ferry Pass, FL**

Prepared For:



Board of County Commissioners
Engineering Department
Construction Management Division
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DRMP Project No.: 20-0721.000
December 2020

PRELIMINARY ENGINEERING ASSESSMENT

*Macky Bluffs Stormwater Pipe Failure
DRMP Job No. 20-0721.000*

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	3
2.0	EXISTING CONDITIONS	5
3.0	HYDRAULIC ANALYSIS.....	6
4.0	RECOMMENDATION	6
5.0	OPINION OF PROBABLE COST.....	7

Appendix A	Location Map
Appendix B	Photographs
Appendix C	Hydrology Calculations
Appendix D	ICPR Routings
Appendix E	Storm Tabulations
Appendix F	Macky Bluff Subdivision As-Built Plans & Basin Design and Routing
Appendix G	Temporary Repair Drawing

1.0 EXECUTIVE SUMMARY

On September 16, 2020 Sally made landfall as a Category Two Hurricane near Gulf Shores, Alabama. The hurricane caused extensive wind, flooding and storm surge damage in areas of Escambia County, including Ferry Pass, Florida.

DRMP has been assigned a task to evaluate failure of a 24-inch polyethylene pipe located on Avocet Lane in the Macky Bluffs Subdivision. The location map is shown in **Appendix A**. Escambia County has conducted a video survey of the pipe and determined that it is deficient with cracking and deformation observed. The survey was conducted after Hurricane Sally (weather event), a weather event that saw extreme rainfall and resulted in flood related damage throughout the County.

Although this project is focused on the pipe failure that occurred within Macky Bluffs Subdivision, an accurate analysis cannot be completed without evaluating Ellyson Pit, a borrow pit that impacts the stormwater system and surrounding neighborhoods in a significant storm event. The residents who live on Baywalk Circle experienced flooding due to the overtopping of the borrow pit upstream from their property.

In summary, it is recommended that the existing pipe and structures between E-104 and E-109 be upsized and replaced. Additional manholes should be added to minimize velocities in the system. The preliminary estimate to repair is \$ 240,078.71 and a detailed cost estimate can be found on the following page.

PRELIMINARY ENGINEERING ASSESSMENT

Macky Bluffs Stormwater Pipe Failure
DRMP Job No. 20-0721.000

Macky Bluffs Stormwater Pipe Failure
Preliminary Estimate of Proposed Repairs
FDOT Current 12 Month Moving Statewide Average Unit Pricing
12/23/2020

FDOT Pay Item	Description	Quantity	Unit	Unit Price	Amount
110 11	CLEARING AND GRUBBING (saw cut and removal of asphalt, removal of curb and gutter, and removal of existing pipes and drainage structures)	0.14	AC	\$ 14,990.69	\$ 2,098.70
121 1	EXCAVATION	1856.0	CY	\$ 7.00	\$ 12,992.00
0160 4	TYPE B STABILIZATION	561	SY	\$ 7.93	\$ 4,449.61
0210 19	OPTIONAL BASE, BASE GROUP 01 (match existing base)	684	SY	\$ 17.81	\$ 12,182.04
0334 111	SUPERPAVE ASPHALTIC CONC. TRAFFIC B (match existing asphalt)	49.8	TN	\$ 106.01	\$ 5,283.25
0520 3	VALLEY GUTTER- CONCRETE (or Pensacola Curb can be used)	530	LF	\$ 29.92	\$ 15,857.60
0570 12	PERFORMANCE TURF, SOD	195	SY	\$ 2.78	\$ 542.10
0425 1411	INLETS, CURB TYPE 1-1, <10' (Escambia County Type A Inlet can be used)	2	EA	\$ 6,580.00	\$ 13,160.00
0425 1412	INLETS, CURB TYPE 1-1, >10' (Escambia County Type A Inlet can be used)	1	EA	\$ 7,106.00	\$ 7,106.00
0425 2 72	MANHOLES, J-7, >10'	3	EA	\$ 6,744.56	\$ 20,233.68
0425 2 42	MANHOLES, P-7, >10'	0	EA	\$ -	\$ -
430175124	PIPE CULVERT, OPTIONAL MATERIAL,ROUND, 24"S/CD	48	LF	\$ -	\$ -
430175136	PIPE CULVERT,OPTIONAL MATERIAL,ROUND, 36"S/CD	583	LF	\$ 133.07	\$ 77,579.81
	Mobilization - 10%			\$ 17,148.48	
	MOT - 5%			\$ 8,574.24	
	Contingencies - 25%			\$ 42,871.20	
	Total			\$ 240,078.71	

PRELIMINARY ENGINEERING ASSESSMENT

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2.0 EXISTING CONDITIONS

Escambia County Engineering Division performed infrastructure assessments in late October which indicate multiple deficiencies in the secondary system in the Mack Bluffs Subdivision. Deficiencies included pipe deformation (including shape, broken, or holes), severe cracking, and joint separation.

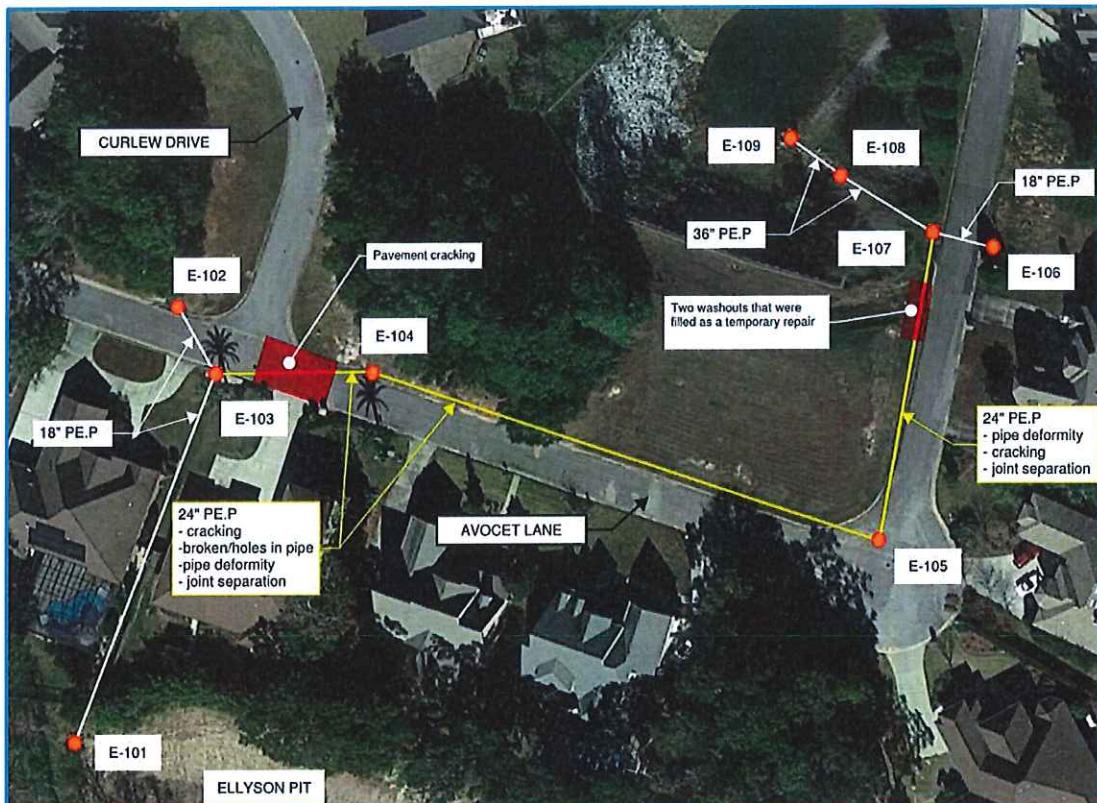


Figure 1. Project area displaying drainage nodes and system deficiencies.

Near the intersection of Avocet Lane and Curlew Drive, there are three (3) inlets. Between these inlets, there is evidence of pavement cracking, an indicator of stabilization failure. 70 linear feet of 24-inch polyethylene pipe (PE.P) runs across the road between E-103 and E-104 and pipe inspections show the integrity of the pipe is compromised.

At the Avocet Lane roundabout, E-105 is a manhole that connects to a curb inlet via 169 linear feet of 24-inch PE.P. Physical indications such as longitudinal cracking and missing pipe material proves this pipe no longer meets the Escambia County Design Standards. It should be noted that along this section of pipe, two washouts occurred which is likely attributed to the pipe failure. Escambia County Road Department made a temporary repair to these areas by using flowable fill to stabilize the area.

The residents of Baywalk Circle experience significant damage caused by the overtopping of Ellyson Pit. Obstructions such as privacy fences were knocked over and decks and patios were washed out as a result. The storm event of April 2014 was the last time this area experienced extensive flooding like this.

Photographs of the existing conditions can be found in **Appendix B**.

3.0 HYDRAULIC ANALYSIS

A preliminary analysis was conducted for the Macky Bluffs stormwater system that provides relief to the Ellyson Pit. Data collected for the ICPR3 and ASAdv3 models came from existing Lidar (2006), as-builts for the system, USGS Websoil Survey and 2019 aerials from the Florida Department of Transportation (FDOT) APlus website.

The preliminary analysis exhibited that the existing stormwater system was undersized for the 25-yr critical duration storm and does not meet the Escambia County Design Standards. The velocities within the sections of pipe that showed signs of deterioration in the pipe inspection video exceeded the FDOT Drainage Design Standards for pipe slopes when flowing full (no more than 15fps).

An additional analysis was also done to determine the proper sizing for the stormwater system. All deficient pipes would need to be increased to a 36-inch pipe with flow line adjustments to decrease the velocities and provide the needed capacity for the system. An additional manhole was also added to the outfall portion into the pond.

Based on our routing model, the Ellyson Pit does not have enough storage to attenuate the contributing basin. The required storage was not explored due to the limitations of the scope.

See **Appendix C, D, E and F** for the Hydrology, ICPR Routings, Storm Tabulation and As-Builts for the Macky Bluff Subdivision.

4.0 RECOMMENDATION

Based on the pipe inspection, field investigations, and hydraulic analysis, it is recommended that the existing pipe be removed and replaced with 36-inch pipe. An additional manhole should be added to the outfall going to the subdivision's pond to aid with velocity reduction in the secondary system.

Based on the condition of the asphalt, we recommend stabilizing and reconstructing the roadway in the section where alligator cracking is present and saw cutting, removing and patching the area after the pipe is replaced.

For the recommendations mentioned above to take place, we recommend that complete Engineering Plans be prepared for the secondary stormwater system replacement that includes a complete survey, hydrology and hydraulic studies and geotechnical borings and

recommendations. This study will confirm the pipes are properly sized and the correct optional pipe material is used. An additional drainage study for Ellyson Pit should be conducted and include a site visit, survey of the pit and nearby drainage infrastructure and geotechnical borings. This study would certify the appropriate size for the contributing area to the storage area and prevent overtopping in the future.

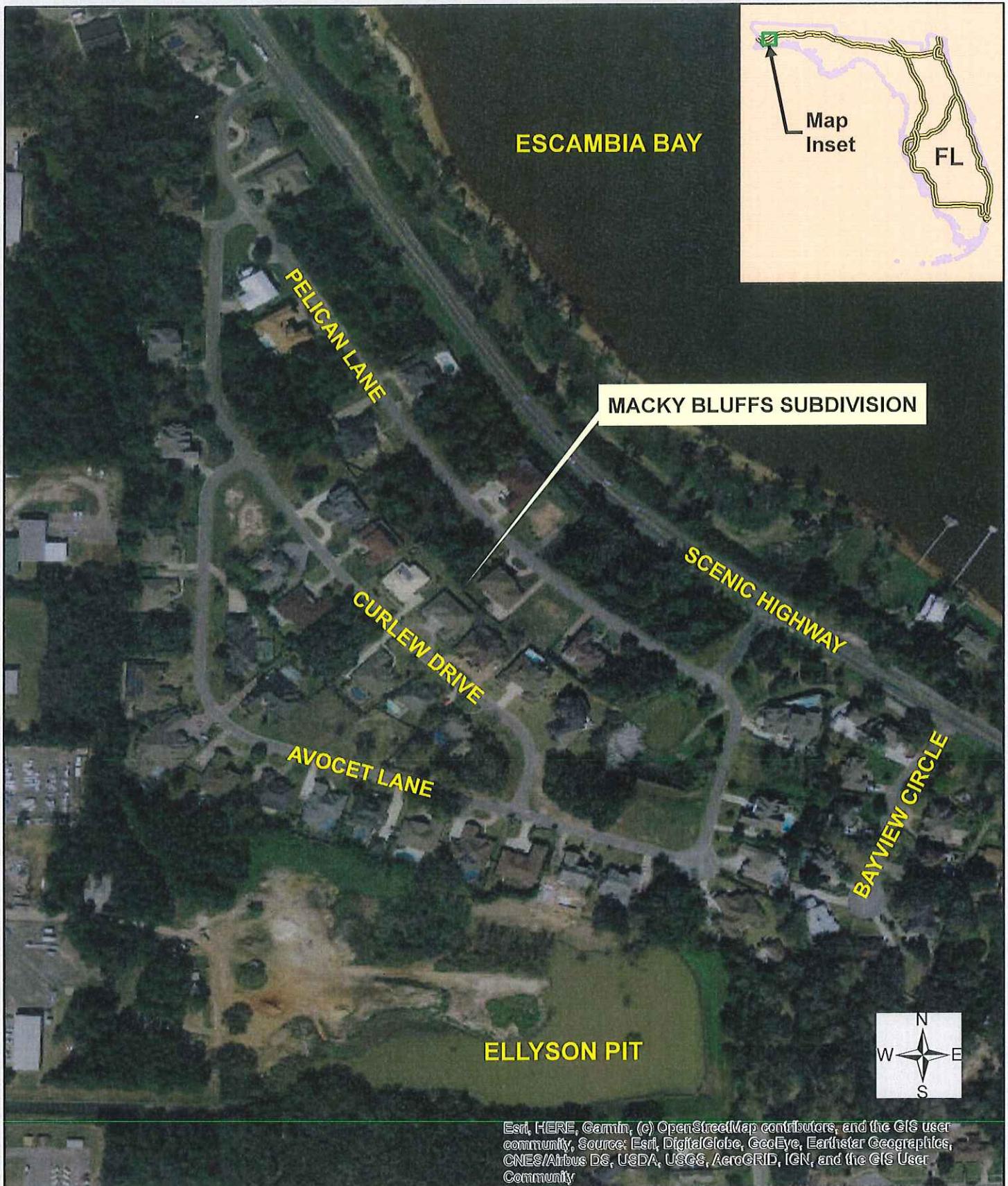
The Temporary Repair Drawing can be found in **Appendix G**.

5.0 OPINION OF PROBABLE COST

The preliminary estimate to repair the pipe failure that occurred in the Macky Bluffs Subdivision, based on the FDOT Current 12 Month Moving Statewide Average Unit Pricing, is \$240,078.71. See **Appendix H** for the Preliminary Estimate to Repair Unit Cost Breakdown.

Appendix A

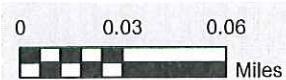
Location Map



1625 Summit Lake Drive, Suite 200
Tallahassee, Florida 32317
December 2020

PROJECT LOCATION MAP

Macky Bluffs Pipe Failure
Escambia County, Florida



Appendix B

Photographs

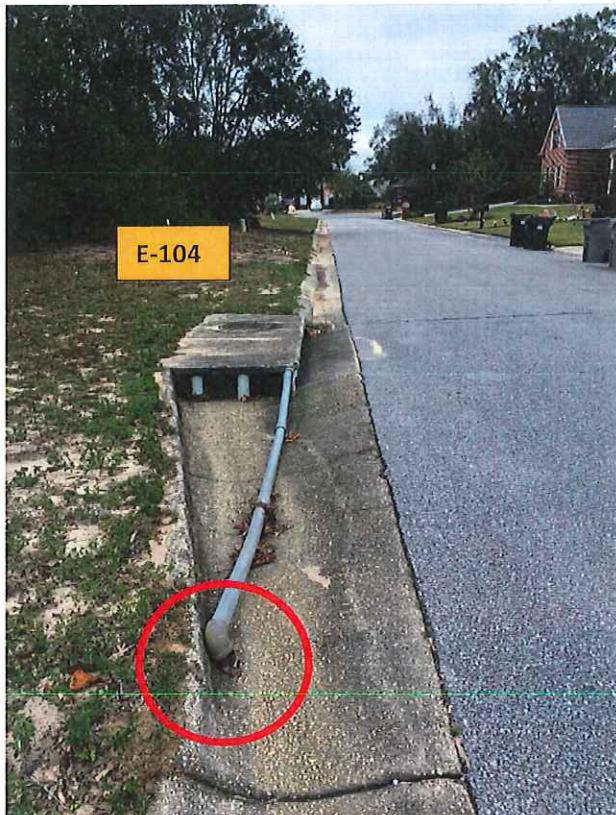


Cracking evident in the pavement between E-103 and E-104.





Crack in the polyethylene pipe between E-103 and E-104 in two locations.
These are photos from the pipe inspection in October.



Example of broken pipe between
E-104 and E-105. This is one of 7
locations in this run.



A couple instances of cracks in the pipe between E-104 and E-105. This is one of 25 locations in this run.



This is a joint separation in the pipe run between E-104 to E-105 near the existing manhole

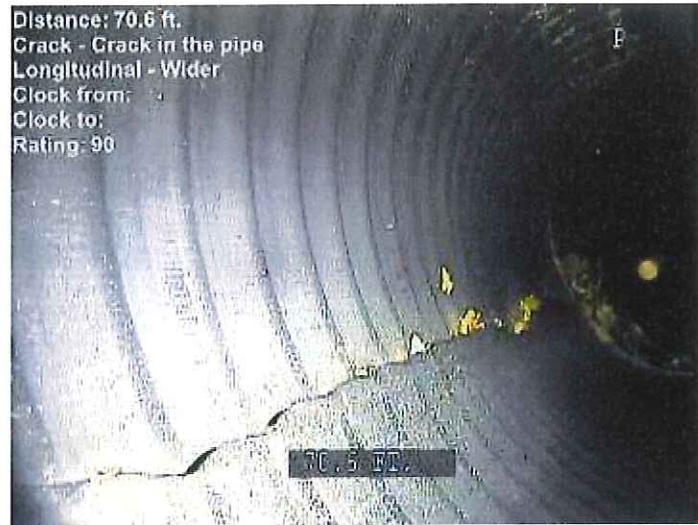
Pipe between E-104 and E-105 showing signs of deformity.



This is existing manhole E-105.



Washouts repaired by Escambia
County Road Department between
E-105 and E-107.



Examples of broken (left) and longitudinal cracks (right) throughout the pipe. There are 2 records of broken pipe and 13 locations of cracking in the approximately 170-ft run of pipe between E-105 and E-107.



Pipe deformation between E-105 and E-107.

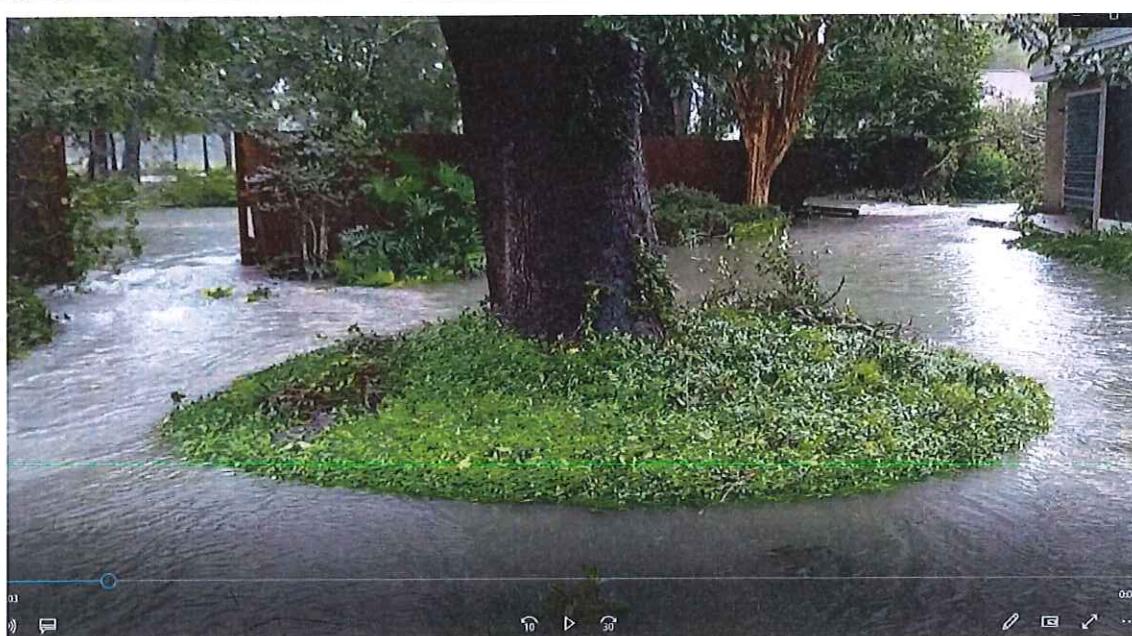
THE FOLLOWING PHOTOS ARE FROM THE RESIDENTS OF BAYVIEW CIRCLE WHO EXPERIENCED FLOODING FROM THE OVERTOPPING OF ELLYSON PIT.



This is a snapshot of the footage submitted by the residents of Bayview Circle. Pictured is Ellyson Pond After it has overtopped.



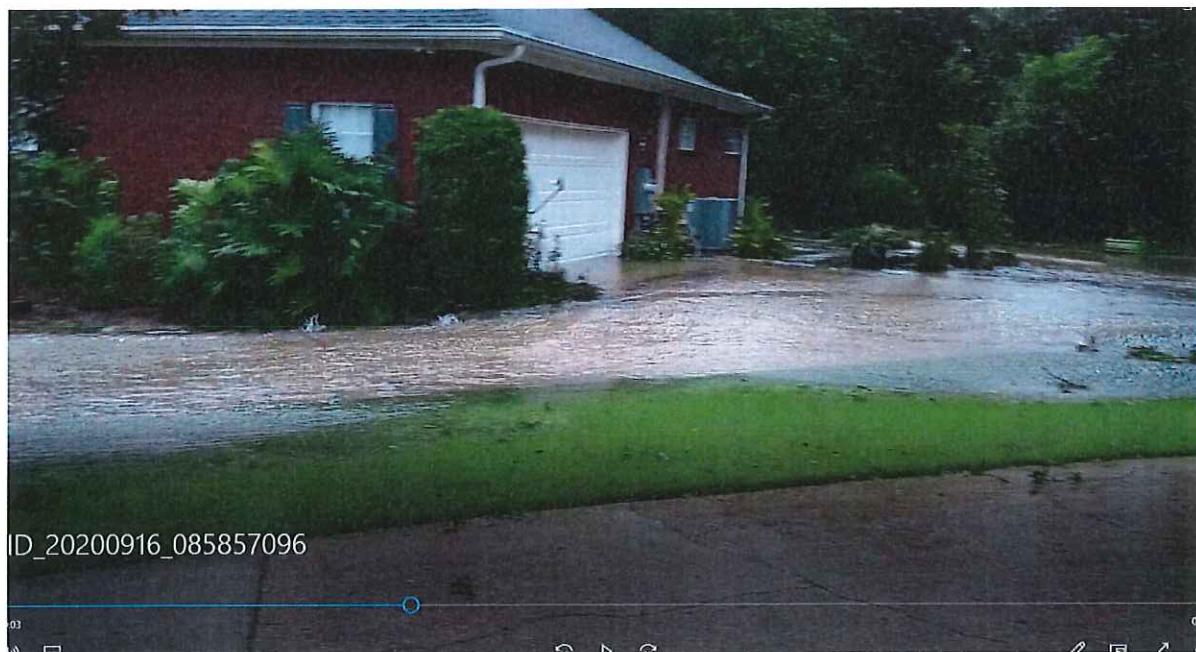
This property is 8800 N 9th Ave, 32514. The spot was estimated to be in the NW area of this property. Stormwater then flows toward 4540 Bayview Circle resident



The first two photos above are the concentrated flow areas flooding enters their property.
The bottom is a different perspective. Note: Ellyson pit is in the distance on the left.



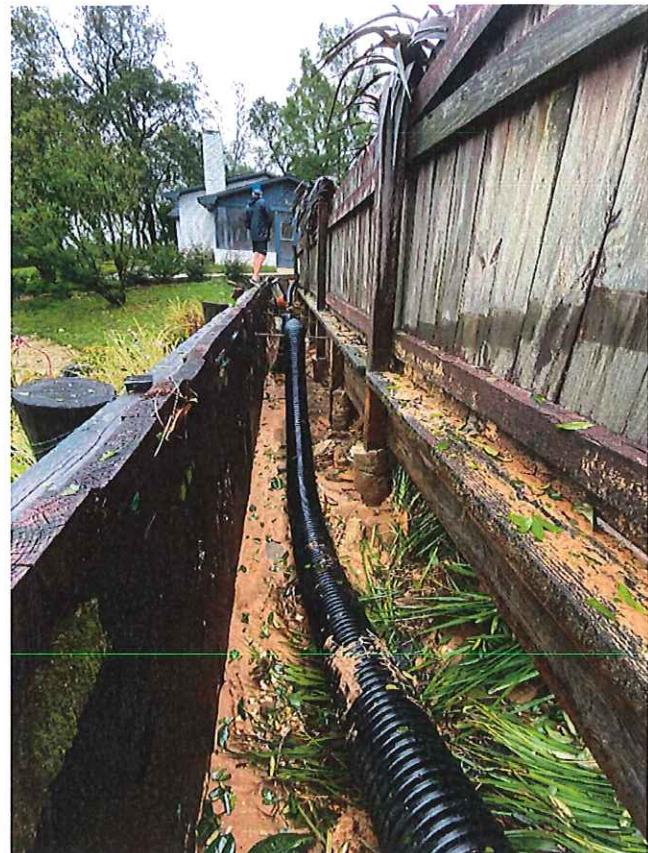
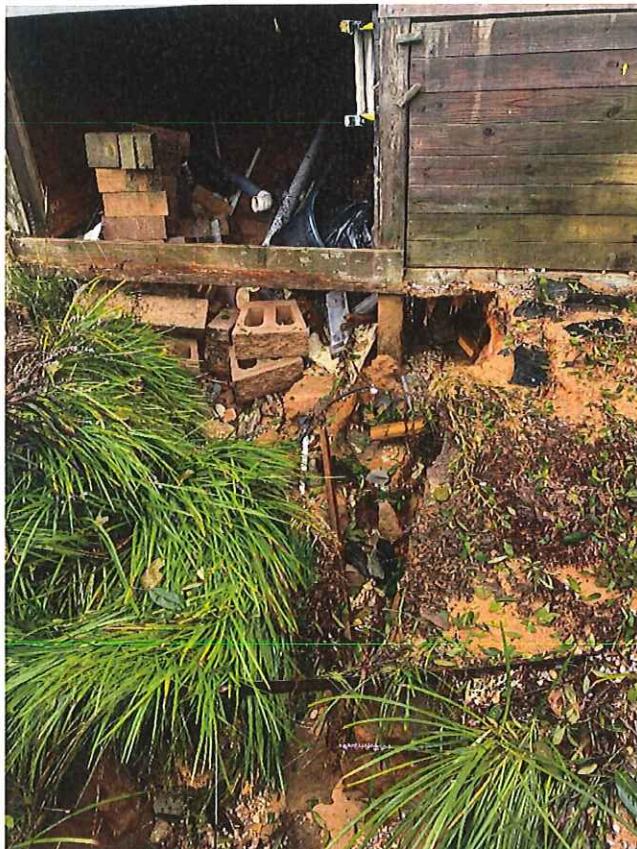
This is the concentrated flow between 4540 and 4545 Bayview Circle.



This is the concentrated flow between 4545 and 4535 Bayview Circle.



Above is a screenshot of a video taken by the resident of 4525 Baywalk Circle. Flow is coming from the right and flowing to the left to Escambia Bay. The high flows combined with elevation change can cause severe erosion if the earth is not protected. Some evidence of erosion is shown below.



Appendix C

Hydrology Calculations



ESCAMBIA BAY

DRAINAGE MAP PIPE FAILURE MACKY BLUFFS

DRAINAGE MAP

IF THIS BAR DOES NOT
MEASURE 1", THIS
COPY OF THIS DOCUMENT
IS NOT TO SCALE

ELLYSON PIT

WIER

ESCAMBIA BAY

MACK BLUFFS POND

Additional area assumed to flow to Macky Bluffs Pond 13.18 AC

S-106 2.26 AC

S-107 0.42 AC

S-104 2.24 AC

S-102 3.59 AC

S-103 5.27 AC

E-101

18' PIPE

136.57 ACRES

Mack Bluffs Contributing Area

P:\Projects\11-0367-000-Olive Road Design\East\2000\image\DRPRSCO_1.mxd

VOLUME

HYDROLOGY

Appendix C

E-102

Station 17+32.00
Contributing Area to E-102

TOTAL AREA: 3.59 Acres

<u>Pre- and Postdevelopment Curve Number</u>					
Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/2 ac. Lots)	A	<u>3.59</u>	0.39	54	<u>193.86</u>
	Total =	<u>3.59</u>			193.86

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)=	100
n=	0.24
US elevation=	98
DS elevation=	97.0
Slope (ft/ft)=	0.010
Intensity (2yr-24hr)	5.9
Time of conc. (hr)=	0.232

CONCENTRATED FLOW

Length (ft)=	932
US elevation=	97.0
DS elevation=	93
Slope (ft/ft)=	0.005
Paved or unpaved =	Paved
Velocity (ft/s)=	1.41
Time of conc. (hr)=	0.183

$$T_c = \frac{0.41}{25} \text{ hrs}$$

E-103 Station 16+93.73 to
Description Contributing Area to E-103
TOTAL AREA: 5.27 Acres

Pre- and Postdevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/2 ac. Lots)	A	5.27	0.39	54	284.58
	Total=	5.27			
CN = 54.0					
C = 0.39					

Time of Concentration - Predevelopment**SHEET FLOW**

Length (ft)= 100
n= 0.40
US elevation= 99
DS elevation= 98.0
Slope (ft/ft)= 0.010
Intensity (2yr-24hr) 5.9
Time of conc. (hr)= 0.348

CONCENTRATED FLOW

Length (ft)= 846
US elevation= 98.0
DS elevation= 92
Slope (ft/ft)= 0.007
Paved or unpaved = Paved
Velocity (ft/s)= 1.71
Time of conc. (hr)= 0.137

<i>Tc</i> =	<i>0.49 hrs</i>
<i>Tc</i> =	<i>29 min</i>

HYDROLOGY

Appendix C

E-104 Station 16+23.15 to
Description Contributing Area to E-104
TOTAL AREA: 2.24 Acres

Pre- and Postdevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/2 ac. Lots)	A	2.24	0.39	54	120.96
Total=		2.24			120.96
CN = 54.0					
C = 0.39					

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)= 100
 n= 0.40
 US elevation= 98.5
 DS elevation= 98.0
 Slope (ft/ft)= 0.005
 Intensity (2yr-24hr) 5.9
 Time of conc. (hr)= 0.460

CONCENTRATED FLOW

Length (ft)= 755
 US elevation= 98.0
 DS elevation= 91
 Slope (ft/ft)= 0.009
 Paved or unpaved = Paved
 Velocity (ft/s)= 1.96
 Time of conc. (hr)= 0.107

$T_c =$	0.57 hrs
$T_c =$	34 min

HYDROLOGY

Appendix C

E-106 Station 11+28.77 to
Description Contributing Area to E-106
TOTAL AREA: 2.26 Acres

Pre- and Postdevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/2 ac. Lots)	A	2.26	0.39	54	122.04
Total=		2.26			
CN = 54.0					
C = 0.39					

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)= 100
 n= 0.40
 US elevation= 95.2
 DS elevation= 94.0
 Slope (ft/ft)= 0.012
 Intensity (2yr-24hr) 5.9
 Time of conc. (hr)= 0.324

CONCENTRATED FLOW

Length (ft)= 666
 US elevation= 94.0
 DS elevation= 74
 Slope (ft/ft)= 0.030
 Paved or unpaved = Paved
 Velocity (ft/s)= 3.52
 Time of conc. (hr)= 0.053

<i>Tc</i> =	0.38 hrs
<i>Tc</i> =	23 min

HYDROLOGY

Appendix C

E-107 Station 11+28.77 to
 Description Contributing Area to E-107
 TOTAL AREA: 0.42 Acres

Pre- and Postdevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Impervious	A	0.12	0.95	98	11.76
Open Space (Good)	A	0.30	0.20	39	11.70
Total=		0.42			23.46
CN = 55.9					
C = 0.41					

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)= 100
 n= 0.40
 US elevation= 93.1
 DS elevation= 90.5
 Slope (ft/ft)= 0.026
 Intensity (2yr-24hr) 5.9
 Time of conc. (hr)= 0.238

CONCENTRATED FLOW

Length (ft)= 398
 US elevation= 90.5
 DS elevation= 74
 Slope (ft/ft)= 0.041
 Paved or unpaved = Paved
 Velocity (ft/s)= 4.14
 Time of conc. (hr)= 0.027

<i>Tc</i> =	0.26 hrs
<i>Tc</i> =	16 min

HYDROLOGY

Appendix C

BORROW PIT Station to
Description Predevelopment
TOTAL AREA: 136.57 Acres

Predevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/3 ac. Lots)	A	9.73	0.43	57	554.61
Open Space (Fair)	A	9.39	0.33	49	460.11
Commercial	A	92.54	0.84	89	8236.06
Woods / Grass (Good)	A	20.94	0.11	32	670.08
Water / Wetlands	A	3.97	1.00	100	397.00
Impervious	A	0.00	0.95	98	0.00
Total=		136.57			10317.86
			CN = 75.5		
			C = 0.67		

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)= 100
n= 0.24
US elevation= 114.1
DS elevation= 113.5
Slope (ft/ft)= 0.006
Intensity (2yr-24hr) 5.9
Time of conc. (hr)= 0.284

CONCENTRATED FLOW

Length (ft)= 1313
US elevation= 113.5
DS elevation= 105
Slope (ft/ft)= 0.006
Paved or unpaved = Paved
Velocity (ft/s)= 1.64
Time of conc. (hr)= 0.223

DITCH FLOW

Length (ft)= 0
Velocity (ft/s)= 1.5 (assumed)
Time of conc. (hr)= 0.00

PIPE FLOW

Length (ft)= 1196
Velocity (ft/s)= 2.5 (assumed)
Time of conc. (hr)= 0.13

<i>Tc</i> =	0.64 hrs
<i>Tc</i> =	38 min

HYDROLOGY

Appendix C

MACKY BLUFFS SUB. Station to
Description Predevelopment of Subdivision
TOTAL AREA: 26.96 Acres

Predevelopment Curve Number

Land Use	HSG	Area (acres)	C	CN	Product (CN)
Residential (1/2 ac. Lots)	A	21.81	0.39	54	1177.74
Water / Wetlands	A	0.00	1.00	100	0.00
Open Space (Good)	A	1.38	0.20	39	53.82
Open Space (Good)	D	0.00	0.25	80	0.00
Woods (Fair)	A	0.00	0.16	36	0.00
Woods (Fair)	D	0.00	0.21	79	0.00
Woods (Good)	A	3.62	0.09	30	108.60
Woods (Good)	C	0.00	0.12	70	0.00
Water / Wetlands	A	0.15	1.00	100	15.00
Residential (1/4 ac. Lots)	A	0.00	0.48	61	0.00
Residential (1/8 ac. Lots)	A	0.00	0.68	77	0.00
Residential (1/8 ac. Lots)	A	0.00	0.68	77	0.00
Residential (1/8 ac. Lots)	A	0.00	0.95	98	0.00
Impervious	A	0.00	0.95	98	0.00
Total=		26.96			1355.16
			CN =	50.3	
			C =	0.34	

Time of Concentration - Predevelopment

SHEET FLOW

Length (ft)= 100
n= 0.01
US elevation= 98
DS elevation= 97.0
Slope (ft/ft)= 0.010
Intensity (2yr-24hr) 5.9
Time of conc. (hr)= 0.020

CONCENTRATED FLOW

Length (ft)= 961
US elevation= 97.0
DS elevation= 92
Slope (ft/ft)= 0.005
Paved or unpaved = Paved
Velocity (ft/s)= 1.47
Time of conc. (hr)= 0.182

DITCH FLOW

Length (ft)= 0
Velocity (ft/s)= 1.5 (assumed)
Time of conc. (hr)= 0.00

PIPE FLOW

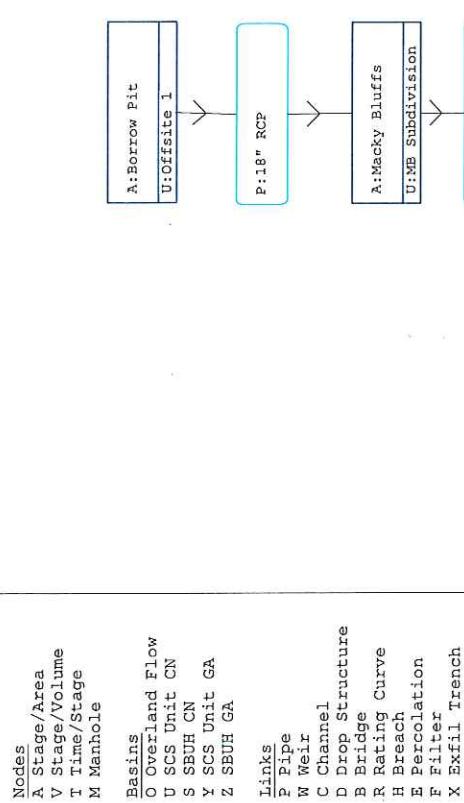
Length (ft)= 656
Velocity (ft/s)= 2.5 (assumed)
Time of conc. (hr)= 0.07

$T_c =$	0.27 hrs
$T_c =$	16 min

Appendix D

ICPR Routings

Appendix D
ICPR Routings



```
=====
Basins =====
=====
Name: MB Subdivision.      Node: Macky Bluffs      Status: Onsite
Group: BASE                Type: SCS Unit Hydrograph CN
Unit Hydrograph: Uh484
Rainfall File:             Peaking Factor: 484.0
Rainfall Amount (in): 0.000
Time of Conc (min): 16.00
Area (ac): 26.960
Time Shift (hrs): 0.00
Curve Number: 50.30
Max Allowable Q (cfs): 999999.000
DCIA (%): 0.00
```

```
=====
Nodes =====
=====
Name: Offsite 1            Node: Borrow Pit       Status: Onsite
Group: BASE                Type: SCS Unit Hydrograph CN
Unit Hydrograph: Uh444
Rainfall File:             Peaking Factor: 484.0
Rainfall Amount (in): 0.000
Time of Conc (min): 38.00
Area (ac): 136.570
Time Shift (hrs): 0.00
Curve Number: 75.50
Max Allowable Q (cfs): 999999.000
DCIA (%): 0.00
```

```
=====
Nodes =====
=====
Name: Borrow Pit           Base Flow (cfs): 0.000
Group: BASE
Type: Stage/Area
Init Stage (ft): 78.000
Warn Stage (ft): 92.000
```

Stage (ft)	Area (ac)
78.000	0.1767
79.000	0.5116
80.000	2.4997
81.000	3.4387
82.000	3.9616
83.000	4.4347
84.000	4.8998
85.000	5.2653
86.000	5.6156
87.000	6.0327
88.000	6.5579
89.000	7.0003
90.000	7.3797
91.000	7.7098
92.000	8.0731
93.000	8.4115
94.000	8.8253
95.000	9.4225

```
=====
Nodes =====
=====
Name: Macky Bluffs         Base Flow (cfs): 0.000
Group: BASE
Type: Stage/Area
Init Stage (ft): 35.000
Warn Stage (ft): 45.000
```

Stage (ft)	Area (ac)
35.000	0.1530
36.000	0.1824
37.000	0.2136
38.000	0.2465
39.000	0.2811
40.000	0.3274
41.000	0.3554
41.250	0.3647
42.000	0.3551
45.000	0.5240

```
Name: TW
Group: BASE
Type: Time/Stage
```

Time (hrs)	Stage (ft)
0.00	0.000
999.00	0.000

```
===== Pipes =====
```

```
Name: 18" RCP
Group: BASE
From Node: Borrow Pit
To Node: Macky Bluffs
Length (ft): 203.00
Count: 1
Friction Equation: Automatic
Solution Algorithm: Most Restrictive
UPSTREAM
Geometry: Circular
Span (in): 18.00
Rise (in): 18.00
Invert (ft): 90.0000
Manning's N: 0.012000
Top Clip (in): 0.0000
Bot Clip (in): 0.0000
DOWNSTREAM
Geometry: Circular
Span (in): 18.00
Rise (in): 18.00
Invert (ft): 88.8400
Manning's N: 0.012000
Top Clip (in): 0.0000
Bot Clip (in): 0.0000
Entrance Loss Coef: 0.00
Exit Loss Coef: 0.50
Bond Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None
```

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

```
===== Weirs =====
```

```
Name: Overflow
Group: BASE
Flow: Both
Type: Vertical: Gravel
Bottom Width (ft): 50.00
Left Side Slope (h/v): 50.00
Right Side Slope (h/v): 50.00
Invert (ft): 92.000
```

Control Elevation(ft): 92.000
Struct Opening Dim(ft): 9999.00
Bottom Clip (ft): 0.000
Top Clip (ft): 0.000
Weir Discharge Coef: 3.200
Orifice Discharge Coef: 0.600

Assumption: 50' weir with .6 slopes (50 H:1'V)

```
Name: Pond Outfall          From Node: Macky Bluffs
Group: BASE                 To Node: TW
Flow: Both                  Count: 1
Type: Horizontal             Geometry: Rectangular
                               
Span (in): 37.70
Rise (in): 75.40
Invert (ft): 41.250
Control Elevation (ft): 41.250
                                TABLE
Bottom Clip (in): 0.000
Top Clip (in): 0.000
Weir Discharge Coef: 3.000
Orifice Discharge Coef: 0.600
```

===== Hydrology Simulations =====

```
Name: 025Y001H
Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y001H.R32
Override Defaults: Yes
Storm Duration (hrs): 1.00
Rainfall File: Fd0t-1
Rainfall Amount (in): 3.88
Time (hrs)      Print Inc (min)
-----  -----
30.000        5.000
-----
```

```
Name: 025Y002H
Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y002H.R32
Override Defaults: Yes
Storm Duration (hrs): 2.00
Rainfall File: Fd0t-2
Rainfall Amount (in): 4.93
Time (hrs)      Print Inc (min)
-----  -----
30.000        5.000
-----
```

```
Name: 025Y004H
Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y004H.R32
Override Defaults: Yes
Storm Duration (hrs): 4.00
Rainfall File: Fd0t-4
Rainfall Amount (in): 6.25
```

Time (hrs)	Print Inc (min)
30.000	5.00

Name:	025Y008H
Filename:	P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\Calculations\ICPR\025Y008H.R32
Override Defaults:	Yes
Storm Duration (hrs):	8.00
Rainfall File:	Fdot-8
Rainfall Amount (in):	8.31
Time (hrs)	Print Inc (min)
30.000	5.00

Name:	025Y024H
Filename:	P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\Calculations\ICPR\025Y024H.R32
Override Defaults:	Yes
Storm Duration (hrs):	24.00
Rainfall File:	Fdot-24
Rainfall Amount (in):	11.50
Time (hrs)	Print Inc (min)
30.000	5.00

Name:	025Y072H
Filename:	P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\Calculations\ICPR\025Y072H.R32
Override Defaults:	Yes
Storm Duration (hrs):	72.00
Rainfall File:	Fdot-24
Rainfall Amount (in):	14.30
Time (hrs)	Print Inc (min)
30.000	5.00

Name:	025Y168H
Filename:	P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\Calculations\ICPR\025Y168H.R32
Override Defaults:	Yes
Storm Duration (hrs):	168.00
Rainfall File:	Fdot-168
Rainfall Amount (in):	16.00
Time (hrs)	Print Inc (min)
99.000	5.00

Name:	025Y240H
Filename:	P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\Calculations\ICPR\025Y240H.R32
Override Defaults:	Yes
Storm Duration (hrs):	240.00
Rainfall File:	Fdot-240
Rainfall Amount (in):	17.10
Time (hrs)	Print Inc (min)
168.000	5.00

```

=====
Routing Simulations =====
=====

Name: 025Y001H Hydrology Sim: 025Y001H
Filename: P:\Projects\20\20-0721.00_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y001H.I32

Executive: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000 End Time (hrs): 1.00
Start Time (hrs): 0.000 Max Calc Time (sec): 60.0000
Min Calc Time (sec): 0.5000 Boundary Flows:

Boundary Stages:
BASE Yes

=====
Hydrology Sim: 025Y002H Hydrology Sim: 025Y002H
Filename: P:\Projects\20\20-0721.00_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y002H.I32

Executive: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000 End Time (hrs): 2.00
Start Time (hrs): 0.000 Max Calc Time (sec): 60.0000
Min Calc Time (sec): 0.5000 Boundary Flows:

Boundary Stages:
BASE Yes

=====
Hydrology Sim: 025Y004H Hydrology Sim: 025Y004H
Filename: P:\Projects\20\20-0721.00_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y004H.I32

Executive: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000 End Time (hrs): 4.00
Start Time (hrs): 0.000 Max Calc Time (sec): 60.0000
Min Calc Time (sec): 0.5000 Boundary Flows:

```

Time (hrs)	Print Inc(min)
4.000	5.000

Group	Run
BASE	Yes

Name: 025Y008H Hydrology Sim: 025Y008H
 Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y008H.T32
 Execute: Yes Restart: No
 Alternative: No
 Max Delta Z(ft): 1.00
 Time Step Optimizer: 10.000
 Start Time (hrs): 0.000
 Min Calc Time (sec): 0.5000
 Boundary Stages:
 Boundary Flows:

Time (hrs)	Print Inc(min)
10.000	5.000

Group	Run
BASE	Yes

Name: 025Y024H Hydrology Sim: 025Y024H
 Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y024H.T32
 Execute: Yes Restart: No
 Alternative: No
 Max Delta Z(ft): 1.00
 Time Step Optimizer: 10.000
 Start Time (hrs): 0.000
 Min Calc Time (sec): 0.5000
 Boundary Stages:
 Boundary Flows:

Time (hrs)	Print Inc(min)
35.000	5.000

Group	Run
BASE	Yes

Name: 025Y072H Hydrology Sim: 025Y072H
 Filename: P:\Projects20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y072H.T32
 Execute: Yes Restart: No
 Alternative: No
 Max Delta Z(ft): 1.00
 Time Step Optimizer: 10.000
 Start Time (hrs): 0.000
 Min Calc Time (sec): 0.5000
 Boundary Stages:
 Boundary Flows:

Max Delta Z (ft):	1.00	Delta Z Factor:	0.00500
Time Step Optimizer:	10.000	End Time (hrs):	80.00
Start Time (hrs):	0.000	Max Calc Time (sec):	60.00000
Min Calc Time (sec):	0.5000	Boundary Flows:	
Boundary Stages:			
Time (hrs)	Print Inc(min)		
80.000	5.0000		
Group	Run		
BASE	Yes		

Name:	025Y168H	Hydrology Sim:	025Y168H
Filename:	P:\Projects\20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y168H.I32		
Execute:	Yes	Restart:	No
Alternative:	No		
Max Delta Z (ft):	1.00	Delta Z Factor:	0.00500
Time Step Optimizer:	10.000	End Time (hrs):	170.00
Start Time (hrs):	0.000	Max Calc Time (sec):	60.00000
Min Calc Time (sec):	0.5000	Boundary Flows:	
Boundary Stages:			
Time (hrs)	Print Inc(min)		
170.000	5.0000		
Group	Run		
BASE	Yes		

Name:	025Y240H	Hydrology Sim:	025Y240H
Filename:	P:\Projects\20\20-0721.000_Escambia_Co-Macky_Bluff_Drainage\Drainage\13-03-Calculations\ICPR\025Y240H.I32		
Execute:	Yes	Restart:	No
Alternative:	No		
Max Delta Z (ft):	1.00	Delta Z Factor:	0.00500
Time Step Optimizer:	10.000	End Time (hrs):	245.00
Start Time (hrs):	0.000	Max Calc Time (sec):	60.00000
Min Calc Time (sec):	0.5000	Boundary Flows:	
Boundary Stages:			
Time (hrs)	Print Inc(min)		
245.000	5.0000		
Group	Run		
BASE	Yes		

Node	Max Printout	Group	Simulation	Max Time Stage hrs	Max stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft ²	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Borrow Pit	BASE	02ZY001H	1.00	82.07	92.00	0.0050	174.434	0.92	323.71	0.00	0.00	0.00
Borrow Pit	BASE	02ZY002H	2.00	85.28	92.00	0.0050	233.707	1.17	316.89	0.00	0.00	0.00
Borrow Pit	BASE	02ZY004H	4.00	87.77	92.00	0.0050	280.448	2.58	275.12	0.00	0.00	0.00
Borrow Pit	BASE	02ZY008H	8.90	90.90	92.00	0.0050	334.618	4.03	359.35	8.90	2.15	0.00
Borrow Pit	BASE	02ZY024H	24.10	93.95	92.00	0.0050	383.567	12.08	132.35	24.10	14.57	0.00
Borrow Pit	BASE	02ZY072H	63.45	94.59	92.00	0.0050	401.708	36.00	58.74	63.45	15.00	0.00
Borrow Pit	BASE	02ZY168H	160.81	96.02	92.00	0.0050	443.121	160.00	62.51	160.81	18.19	0.00
Borrow Pit	BASE	02ZY240H	185.00	96.24	92.00	0.0050	449.478	184.00	77.73	185.00	18.53	0.00
Macky Bluffs	BASE	02ZY001H	1.00	37.88	45.00	0.0041	105.76	0.83	21.80	0.00	0.00	0.00
Macky Bluffs	BASE	02ZY002H	2.00	40.78	45.00	0.0050	151.26	0.92	21.34	0.00	0.00	0.00
Macky Bluffs	BASE	02ZY004H	3.08	41.76	45.00	0.0050	167.95	2.58	25.74	3.08	20.66	0.00
Macky Bluffs	BASE	02ZY008H	4.16	41.95	45.00	0.0050	171.29	4.00	39.62	4.16	33.16	0.00
Macky Bluffs	BASE	02ZY024H	19.06	41.77	45.00	0.0050	168.75	19.00	21.15	19.06	21.08	0.00
Macky Bluffs	BASE	02ZY072H	57.02	41.74	45.00	0.0050	168.06	57.00	19.40	57.02	19.39	0.00
Macky Bluffs	BASE	02ZY168H	160.01	41.88	45.00	0.0050	170.43	160.00	28.37	160.01	28.33	0.00
Macky Bluffs	BASE	02ZY240H	184.01	41.92	45.00	0.0050	171.04	184.00	30.81	184.01	30.75	0.00
Macky Bluffs	BASE	02ZY001H	0.00	0.00	0.00	0.0000	0	0.00	0.00	0.00	0.00	0.00
TW	BASE	02ZY002H	0.00	0.00	0.00	0.0000	0	0.00	0.00	0.00	0.00	0.00
TW	BASE	02ZY004H	0.00	0.00	0.00	0.0000	0	3.08	20.66	0.00	0.00	0.00
TW	BASE	02ZY008H	0.00	0.00	0.00	0.0000	0	4.16	33.06	0.00	0.00	0.00
TW	BASE	02ZY024H	0.00	0.00	0.00	0.0000	0	19.06	21.08	0.00	0.00	0.00
TW	BASE	02ZY072H	0.00	0.00	0.00	0.0000	0	57.02	19.39	0.00	0.00	0.00
TW	BASE	02ZY168H	0.00	0.00	0.00	0.0000	0	160.01	28.33	0.00	0.00	0.00
TW	BASE	02ZY240H	0.00	0.00	0.00	0.0000	0	184.01	30.75	0.00	0.00	0.00

Link Name	Max Stage Group	Printout Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max US Stage ft	Max DS Stage ft	Max Time hrs	Max DS Stage hrs	Max Stage ft
18" RCP	BASE	025Y001H	0.00	0.00	0.000	1.00	82.07	1.00	37.88	
18" RCP	BASE	025Y002H	0.00	0.00	0.000	2.00	85.28	2.00	40.78	
18" RCP	BASE	025Y004H	0.00	0.00	0.000	4.00	87.77	3.08	41.76	
18" RCP	BASE	025Y008H	8.90	2.85	0.014	8.90	90.90	8.90	89.43	
18" RCP	BASE	025Y024H	24.10	14.57	0.019	24.10	93.95	17.17	90.34	
18" RCP	BASE	025Y072H	63.45	15.80	0.018	63.45	94.59	41.16	90.34	
18" RCP	BASE	025Y168H	160.81	18.19	0.016	160.81	96.02	140.17	90.34	
18" RCP	BASE	025Y240H	185.00	18.53	0.026	185.00	96.24	177.11	90.34	

Link Time Series Printout		Time hrs	Q cfs	US HGL ft	ND ft	US HGL Link ft	ND ft	DS HGL ft	ND ft	DS HGL Link ft
18"	RCP	173.34	4.62	91.22	91.22	91.23	91.23	41.50	89.62	89.62
18"	RCP	173.43	4.69	91.23	91.23	91.25	91.25	41.51	89.63	89.63
18"	RCP	173.51	4.77	91.25	91.25	91.26	91.26	41.51	89.64	89.64
18"	RCP	173.59	4.84	91.26	91.26	91.27	91.27	41.51	89.65	89.65
18"	RCP	173.68	4.92	91.27	91.27	91.29	91.29	41.51	89.65	89.65
18"	RCP	173.76	4.99	91.29	91.29	91.30	91.30	41.51	89.66	89.66
18"	RCP	173.84	5.06	91.30	91.30	91.31	91.31	41.51	89.67	89.67
18"	RCP	173.93	5.14	91.31	91.31	91.32	91.32	41.52	89.68	89.68
18"	RCP	174.01	5.21	91.32	91.32	91.34	91.34	41.52	89.69	89.69
18"	RCP	174.09	5.28	91.34	91.34	91.35	91.35	41.52	89.70	89.70
18"	RCP	174.18	5.35	91.35	91.35	91.36	91.36	41.52	89.70	89.70
18"	RCP	174.26	5.43	91.36	91.36	91.37	91.37	41.52	89.71	89.71
18"	RCP	174.34	5.50	91.37	91.37	91.39	91.39	41.53	89.72	89.72
18"	RCP	174.43	5.57	91.39	91.39	91.40	91.40	41.53	89.73	89.73
18"	RCP	174.51	5.64	91.40	91.40	91.41	91.41	41.53	89.73	89.73
18"	RCP	174.59	5.71	91.41	91.41	91.42	91.42	41.53	89.74	89.74
18"	RCP	174.68	5.78	91.42	91.42	91.43	91.43	41.53	89.75	89.75
18"	RCP	174.76	5.85	91.43	91.43	91.45	91.45	41.53	89.75	89.75
18"	RCP	174.84	5.92	91.45	91.45	91.46	91.46	41.54	89.76	89.76
18"	RCP	174.93	5.99	91.46	91.46	91.47	91.47	41.54	89.77	89.77
18"	RCP	175.01	6.05	91.47	91.47	91.48	91.48	41.54	89.78	89.78
18"	RCP	175.09	6.12	91.48	91.48	91.49	91.49	41.54	89.78	89.78
18"	RCP	175.18	6.19	91.49	91.49	91.50	91.50	41.54	89.79	89.79
18"	RCP	175.26	6.26	91.50	91.50	91.52	91.52	41.54	89.80	89.80
18"	RCP	175.34	6.32	91.52	91.52	91.53	91.53	41.54	89.80	89.80
18"	RCP	175.43	6.39	91.53	91.53	91.54	91.54	41.55	89.81	89.81
18"	RCP	175.51	6.45	91.54	91.54	91.55	91.55	41.55	89.82	89.82
18"	RCP	175.59	6.52	91.55	91.55	91.56	91.56	41.55	89.82	89.82
18"	RCP	175.68	6.58	91.56	91.56	91.57	91.57	41.55	89.83	89.83
18"	RCP	175.76	6.65	91.57	91.57	91.58	91.58	41.55	89.84	89.84
18"	RCP	175.84	6.71	91.58	91.58	91.59	91.59	41.55	89.84	89.84
18"	RCP	175.93	6.78	91.60	91.60	91.61	91.61	41.56	89.85	89.85
18"	RCP	176.01	6.84	91.61	91.61	91.62	91.62	41.55	89.86	89.86
18"	RCP	176.09	6.91	91.62	91.62	91.63	91.63	41.55	89.86	89.86
18"	RCP	176.17	6.97	91.63	91.63	91.65	91.65	41.63	89.88	89.88
18"	RCP	176.25	7.07	91.65	91.65	91.67	91.67	41.67	89.89	89.89
18"	RCP	176.34	7.20	91.67	91.67	91.70	91.70	41.69	89.91	89.91
18"	RCP	176.42	7.36	91.70	91.70	91.74	91.74	41.71	89.93	89.93
18"	RCP	176.51	7.57	91.74	91.74	91.77	91.77	41.72	89.96	89.96
18"	RCP	176.58	7.78	91.77	91.77	91.82	91.82	41.72	89.99	89.99
18"	RCP	176.67	8.02	91.82	91.82	91.87	91.87	41.73	90.02	90.02
18"	RCP	176.75	8.26	91.87	91.87	91.92	91.92	41.73	90.05	90.05
18"	RCP	176.83	8.49	91.92	91.92	91.98	91.98	41.74	90.09	90.09
18"	RCP	176.92	8.74	91.98	91.98	92.03	92.03	41.74	90.14	90.14
18"	RCP	177.01	8.98	92.03	92.03	92.08	92.08	41.75	90.21	90.21
18"	RCP	177.09	9.21	92.08	92.08	92.13	92.13	41.75	90.34	90.34
18"	RCP	177.17	9.43	92.13	92.13	92.19	92.19	41.76	90.34	90.34
18"	RCP	177.25	9.65	92.19	92.19	92.25	92.25	41.76	90.34	90.34
18"	RCP	177.34	9.88	92.25	92.25	92.30	92.30	41.76	90.34	90.34
18"	RCP	177.42	10.10	92.30	92.30	92.35	92.35	41.77	90.34	90.34
18"	RCP	177.50	10.30	92.35	92.35	92.41	92.41	41.77	90.34	90.34
18"	RCP	177.59	10.50	92.41	92.41	92.46	92.46	41.78	90.34	90.34
18"	RCP	177.67	10.70	92.46	92.46	92.52	92.52	41.78	90.34	90.34
18"	RCP	177.76	10.91	92.52	92.52	92.57	92.57	41.78	90.34	90.34
18"	RCP	177.84	11.10	92.62	92.62	92.67	92.67	41.79	90.34	90.34
18"	RCP	177.92	11.28	92.67	92.67	92.72	92.72	41.79	90.34	90.34
18"	RCP	178.00	11.46	92.68	92.68	92.73	92.73	41.79	90.34	90.34
18"	RCP	178.08	11.64	92.73	92.73	92.78	92.78	41.80	90.34	90.34
18"	RCP	178.17	11.83	92.84	92.84	92.89	92.89	41.80	90.34	90.34
18"	RCP	178.25	12.00	92.89	92.89	92.94	92.94	41.81	90.34	90.34
18"	RCP	178.34	12.15	92.94	92.94	92.99	92.99	41.81	90.34	90.34
18"	RCP	178.42	12.28	92.94	92.94	93.05	93.05	41.81	90.34	90.34
18"	RCP	178.50	12.41	92.99	92.99	93.10	93.10	41.81	90.34	90.34
18"	RCP	178.59	12.55	93.05	93.05	93.10	93.10	41.81	90.34	90.34
18"	RCP	178.67	12.67							

Assuming the Pond
over tops at elevation
92.0 at a minimum,
this is the flow coming
through the 18" pipe
into the secondary
system in Mack Bluffs

Appendix E

Storm Tabulations

FLORIDA DEPARTMENT OF TRANSPORTATION STORM DRAIN TABULATION FORM

Page: 1

Financial Proj Id DRMP# 20-0721.000
Description: Macky Bluffs Subdivision

County: Escambia
Organization DRMP, INC.

Network: MB1 Existing Conditions
State Road: .
Checked by: BAK

LOCATION OF UPPER END	STR. NO.	TYPE LEN.	AREAS (Ac) C= 0.95 C= 0.20 C= 0.39	SUB- TOTAL (C*A) TOTAL CONC SECT.	TIME OF FLOW (min)	TIME TOTAL (C*A) FLOW (ft.)	TOTAL LOSS (in/hr)	TOTAL BASE SUMM BASE (cfs)	INLET (ft.)	HYDRAULIC GRADE CROWN FLOWLINE UPPER (ft.) LOWER (ft.) FALL (ft.)	HGL CLEAR R (in.) L RISE SPAN (ft.) S	# NOTES & REMARKS ZONE: 1 FREQ. (Yrs): 25 MANNINGS n: 0.0120 TAILW EL (ft): 43.11
16+93.73	221.00 Rt.	E-103	MES	207.00	0.00	0.00	10.00	0.68	8.08	0.00	8.96	8.96
17+32.00	15.00 Lt.	E-103	P-1	48.00	0.00	0.00	25.00	0.18	5.75	1.40	0.00	8.05
16+93.73	15.00 Rt.	E-104	P-1	70.00	0.00	0.00	29.00	0.13	5.39	3.46	0.00	27.59
16+23.15	15.00 Lt.	E-104	P-1	288.00	0.00	0.00	34.00	0.49	5.01	4.33	0.00	30.65
12+97.63	15.00 Rt.	E-105	MH-7	169.00	0.00	0.00	34.49	0.15	4.98	4.33	0.00	30.51
11+28.77	15.00 Rt.	E-107	P-1	28.00	0.00	0.00	23.00	0.16	5.98	0.88	0.00	5.25
11+28.77	15.00 Lt.	E-108	P-1	40.00	0.30	0.30	34.65	0.02	4.97	5.38	0.00	35.70
12+97.63	47.00 Lt.	S-199	MH-7J	40.00	0.00	0.30	34.67	0.00	4.97	5.38	0.00	35.70

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).
Automated Storm sewer Analysis & Design (ASAD), copyright 1992-2007, Hiteshew Engineering Systems, Inc. Ph: (352) 383-4191

Portions of ASAD were developed by Kenneth J. Leeming, P.E. at International Engineering Consultants, Inc.

T60v3FDOT.RPT 7/10/2008

FLORIDA DEPARTMENT OF TRANSPORTATION STORM DRAIN TABULATION FORM

Page: 1

Financial Proj Id DRMP# 20-0721.000
Description: Macky Bluffs Subdivision

County: Escambia
Organization DRMP, INC.

Network: MB1
State Road: .

Date: 12/23/2022C
Date: 12/23/2022C

Proposed Conditions
Designed by VAH
Checked by BAK

LOCATION OF UPPER END	STR. NO.	TYPE OF STR.	LEN. (ft.)	AREAS (Ac) C= 0.95 C= 0.20 C= 0.39	SUB- TOTAL (C*A) (ft.)	TIME OF FLOW SECT. (min)	INTEN- TIAL CONC FLOW (in/hr)	TOTAL FLOW SUM/ BASE (cfs)	TOTAL LOSS FLOW SUM/ BASE (ft.)	HYDRAULIC GRADE CROWN FLOWLINE UPPER R (in.) LOWER FALL (ft.)	HGL CLEAR ELEV. (ft.)	NOTES & REMARKS					
												PIPE SLOPE ACTUAL FULL VEL. % VEL.					
												R (ft.)	L (ft.)	S (ft.)			
E-101		MES	207.00	0.00 0.00 0.00	0.00 0.00 0.00	0.47	8.08	0.00 8.96 8.96	0.00 90.00 -0.98	90.98 91.50 90.00	89.30 89.30 87.80	1.68 1.68 2.20	18.00 18.00 18.00	0.812 1.063 0.150	7.33 11.73 6.64		
16+93.73	221.00 R.L.	S-103	E-102	0.00 0.00 0.00	0.00 0.00 0.00	0.00	25.00	0.18 5.75 1.40	0.00 8.05 8.05	90.16 89.50 89.50	88.92 88.70 88.70	0.24 0.24 0.24	18.00 18.00 18.00	0.501 0.501 0.501	4.56 4.56 4.56		
17+32.00	15.00 Lt.	S-103	P-1	48.00	0.00 0.00 0.00	0.00	23.00	0.11 5.96 0.88	0.00 5.25 5.25	92.14 76.39 76.39	2.98 3.80 3.80	87.20 73.10 73.10	0.80 72.49 72.49	18.00 18.00 18.00	1.667 1.667 1.667	14.69 14.69 14.69	
11+28.77	15.00 R.L.	S-107	E-106	28.00	0.00 0.00 0.00	0.00	23.00	0.11 5.96 0.88	0.00 5.25 5.25	92.14 76.39 76.39	2.98 3.80 3.80	87.20 73.10 73.10	0.80 72.49 72.49	18.00 18.00 18.00	1.667 1.667 1.667	8.31 8.31 8.31	
16+93.73	15.00 R.L.	S-104	P-1	70.00	0.00 0.00 0.00	0.00	29.00	0.30 5.39 3.46	0.00 27.59 27.59	91.55 91.55 91.55	2.63 2.63 2.63	88.92 88.70 88.70	0.32 88.60 88.60	1 1 1	0.357 0.357 0.357	4.26 4.26 4.26	
16+23.15	15.00 Lt.	S-105	P-1	283.00	0.00 0.00 0.00	0.00	34.00	0.40 5.01 4.33	0.00 30.65 30.65	90.44 90.44 90.44	2.36 2.36 2.36	88.60 88.60 88.60	0.10 71.50 71.50	0.10 0.10 0.10	0.150 0.150 0.150	3.85 3.85 3.85	
12+97.63	15.00 R.L.	S-107	MH-7	171.00	0.00 0.00 0.00	0.00	34.40	0.23 4.98 4.33	0.00 30.53 30.53	98.96 98.96 98.96	1.98 1.98 1.98	87.70 87.70 87.70	0.32 86.60 86.60	1 1 1	0.450 0.450 0.450	3.90 3.90 3.90	
11+28.77	15.00 Lt.	S-108	P-1	13.00	0.00 0.00 0.00	0.00	34.63	0.02 4.97 5.38	0.00 35.71 35.71	1.79 1.79 1.79	76.14 11.24 11.24	12.22 12.22 12.22	5.38 5.38 5.38	36.00 36.00 36.00	3.147 3.147 3.147	12.62 12.62 12.62	
12+97.63	36.50 Lt.	S-109	MH-7J	22.00	0.00 0.00 0.00	0.00	34.65	0.04 4.97 5.38	0.00 35.70 35.70	0.75 0.75 0.75	68.50 68.50 68.50	12.22 12.22 12.22	1.99 1.99 1.99	36.00 36.00 36.00	0.059 0.059 0.059	14.41 14.41 14.41	
12+97.63	58.00 Lt.	S-199	MH-7J	15.00	0.00 0.00 0.00	0.00	34.68	0.00 4.96 5.38	0.00 35.69 35.69	1.00 1.00 1.00	56.50 56.50 56.50	9.33 9.33 9.33	44.80 44.80 44.80	0.20 0.20 0.20	36.00 36.00 36.00	0.059 0.059 0.059	9.85 9.85 9.85

Units: ENGLISH

HGL method: Standard FDOT (Jump HGL to pipe crown).

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Portions of ASAD were developed by Kenneth J. Leeming, P.E. at International Engineering Consultants, Inc.

T60v3FDOT.RPT 7/10/2008

Appendix F
Macky Bluff Subdivision As-Built Plans & Basin Design and Routing

CONSTRUCTION PLANS FOR MACKY BLUFF PHASE 2

OWNER / DEVELOPER

STEVENS TRUST C/O MATT STEVENS
4878 N. MAGNOLIA AVE.

CHICAGO, IL. 60640
(773)728-4777

RECEIVED

AS-BUILT
AUGUST 29, 2001

VICINITY MAP

SITE

GENERAL NOTES.

1. THE OWNER OR HIS AGENT SHALL ARRANGE WITH THE COUNTY INSPECTOR AN INSPECTION OF THE DEVELOPMENT UPON COMPLETION AND ANY INTERMEDIATE INSPECTIONS AT (BSO) 555-3434 AS-BUILT CERTIFICATION IS REQUIRED PRIOR TO REQUEST FOR FINAL INSPECTION APPROVAL.
2. THE CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE VARIOUS GOVERNMENTAL APPROVALS AND PERMITS.
3. ALL CONSTRUCTION SHALL COMPLY WITH THE ESCAMBIA COUNTY ENGINEERING DEPARTMENT'S STANDARD SPECIFICATIONS, STANDARD SPECIFICATIONS FOR SANITARY SEWER AND POTABLE WATER AND THE WRITTEN SPECIFICATIONS, WHERE THE VARIOUS SPECIFICATIONS DEVIATE THE MOST STRINGENT SPECIFICATION SHALL PREVAIL.
4. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION. UTILITIES SHOWN ARE PER UTILITY COMPANY RECORDS.
5. ALL SURFACE EXCAVATED MATERIAL IS TO BE RETAINED ON SITE IN THE LOCATIONS AS DIRECTED BY THE ENGINEER.
6. CONTRACTOR SHALL CLEAN OUT ACCUMULATED SILT IN THE STORMWATER BASIN AT END OF CONSTRUCTION WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED.
7. CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS DURING CONSTRUCTION WHICH SHOW AS-BUILT CONDITIONS OF ALL WORK INCLUDING PIPING, DRAINAGE, STRUCTURES, ETC. THESE RECORD DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO REQUESTING A FINAL INSPECTION.
8. ALL WORK WITHIN F.D.O.T. RIGHT OF WAY SHALL BE PERFORMED ACCORDING TO F.D.O.T. REQUIREMENTS.
9. THE OWNER OR HIS AGENT SHALL ARRANGE WITH THE COUNTY INSPECTOR AN INSPECTION OF ALL PHASES OF ROAD CONSTRUCTION 24 HOURS PRIOR TO COMMENCEMENT OF EACH PHASE AT (BSO) 555-3434.
10. WHERE PROVISIONS OF THE CONTRACT CONFLICT THE PROJECT ENGINEERS DECISION SHALL PREVAIL.
11. THE CONTRACTOR SHALL REMOVE ALL DERBI FROM THE SITE TO AN APPROPRIATE DISPOSAL SITE.
12. NOTIFY SUNSHINE UTILITIES 48 HOURS IN ADVANCE PRIOR TO DIGGING WHITHIN RIGHT OF WAY: 1-800-432-4770.
13. ALL ASPECTS OF THE STORMWATER DRAINAGE COMPONENTS AND/OR TRANSPOSITION COMPONENTS SHALL BE COMPLETED PRIOR TO REQUESTING A FINAL INSPECTION.
14. NO DESIGNER OR ENGINEER MAY MAKE ANY CHANGES TO THESE PLANS BY THE CONTRACTOR SHALL BE ALLOWED WITHOUT PRIOR APPROVAL FROM BOTH THE DESIGNER/ENGINEER AND THE ESCAMBIA COUNTY INSPECTOR. ANY DESIGNERS MAY RESULT IN DELAY IN COUNTY ACCEPTANCE.
15. DENSITY TESTING AND ASPHALT CORE SAMPLES WILL BE REQUIRED TO DEMONSTRATE COMPLIANCE WITH COUNTY STANDARDS PRIOR TO FINAL ACCEPTANCE OF ROADWAY IMPROVEMENTS.
16. DENSITY TESTS WILL BE REQUIRED FOR HOPE PIPE INSTALLATIONS DUE TO OPTICAL NATURE OF DEFLECTION WHICH OCCURES DUE TO IMPROVE COMPACTATION (ALSO SEE FOOT 1999 SPEC. 25-3). PRIOR TO ACCEPTANCE A CAMERA TEST IS REQUIRED FOR THE HOPE PIPE TO SATISFY 5% DEFLECTION ALLOWANCE.
17. CONTRACTOR SHALL INSTALL SILTATION CONTROL AS SHOWN AND/OR NOTED ON PLANS IN ACCORDANCE WITH FDEP AND SHALL BE MAINTAINED THROUGH COMPLETION AND STABILIZATION OF DISTURBED AREAS.

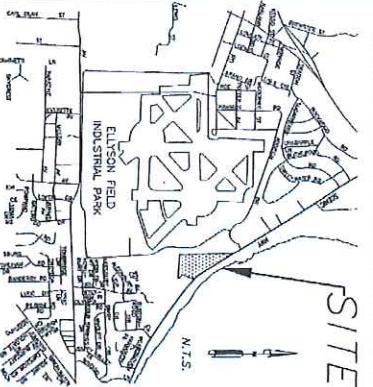
NOTE: THE PROJECT ENGINEER (ENGINEER OF RECORD) SHALL PROMISE TO ESCAMBIA COUNTY "AS BUILT" RECORD DRAWINGS FOR VERIFICATION AND APPROVAL BY ESCAMBIA COUNTY ONE WEEK PRIOR TO REQUESTING A FINAL INSPECTION OR PROVIDE "AS BUILT" CERTIFICATION THAT THE PROJECT CONSTRUCTION ADHERES TO THE PERMITTED PLANS AND SPECIFICATIONS. THE "AS BUILT" CERTIFICATION OR THE "AS BUILT" RECORD DRAWINGS MUST BE SIGNED, SEALED AND DATED BY A REGISTERED FLORIDA PROFESSIONAL ENGINEER.

16. DENSITY TESTS WILL BE REQUIRED FOR HDPE PIPE INSTALLATIONS DUE TO CRITICAL NATURE OF DEFLECTION WHICH OCCURS DUE TO IMPROPER COMPACTION (ALSO SEE 1999 SPEC. 25-8). PRIOR TO ACCEPTANCE A DECOMPRESSION ALLOWANCE SHALL BE TAKEN.

17. CONTRACTOR SHALL INSTALL AND SUSTAIN CONTROL AT THE BEGINNING OF CONSTRUCTION AS SHOWN AND IS REQUIRED ON PLANS IN ACCORDANCE WITH HDPE AND SHALL BE MAINTAINED THROUGH COMPLETION AND STABILIZATION OF DISTURBED AREAS.

Ejehl engineering, inc.
Consulting Engineering Services

49 East Chase Street • Pensacola, Florida 32501
(850) 434-0060 • FAX (850) 434-3020



VICINITY MAP

OVERALL PLAN

MACKY BLUFFS - PHASE II

A SUBDIVISION OF A PORTION OF SECTION 3, TOWNSHIP 1, SOUTH,
RANGE 29, WEST, ESCAMBIA COUNTY, FLORIDA.

**LEGAL DESCRIPTIONS
(OVERALL PARCEL)**

THE CON-TRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF SEEDING CONTROL MEASURES AS REQUIRED AND MAINTENANCE/REPAIRS DURING CONSTRUCTION OF SEEDING CONTROL MEASURES AS REQUIRED TO RETAIN ALL SEEDING AND EROSION ON THE SITE OR DEVELOPMENT.

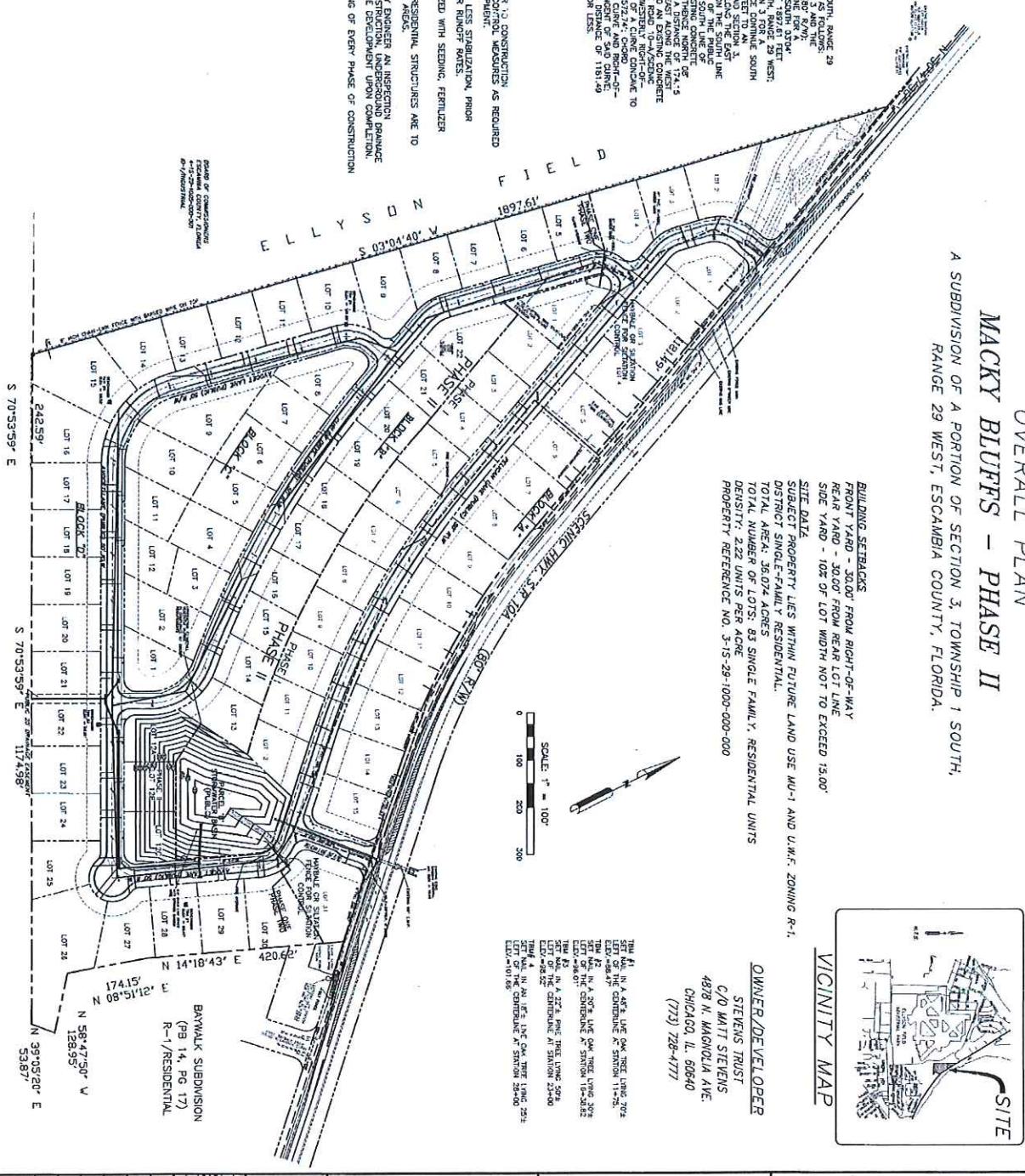
RETENTION/DETENTION AREAS SHALL BE SUBSTANTIALLY COMPLETE, LESS STABILIZATION, PRIOR TO ANY CONSTRUCTION ACTIVITIES THAT MAY INCREASE STORMWATER RUNOFF RATES.

ALL DISTURBED AREAS WHICH ARE NOT PLANTED ARE TO BE STABILIZED WITH SEEDING, FERTILIZER AND MULCH, PROVIDED AND/OR SOIL.

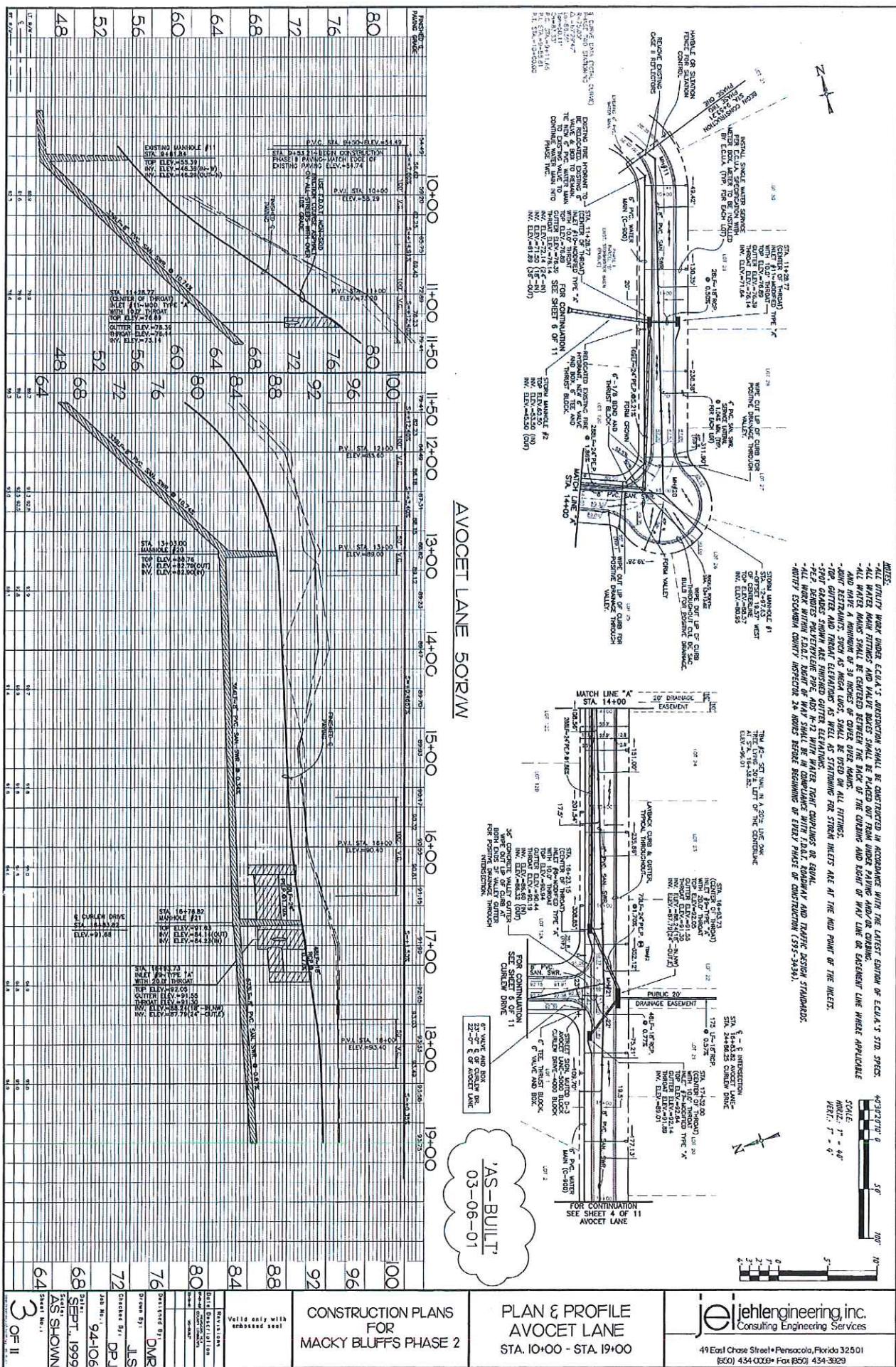
ALL NEW ROAD, DOWNSLOPES, OR GUTTERS FOR FUTURE RESIDENTIAL STRUCTURES ARE TO BE ROUTED TO CARRY ALL SURFACE RUNOFF TO RETENTION/DETENTION AREAS.

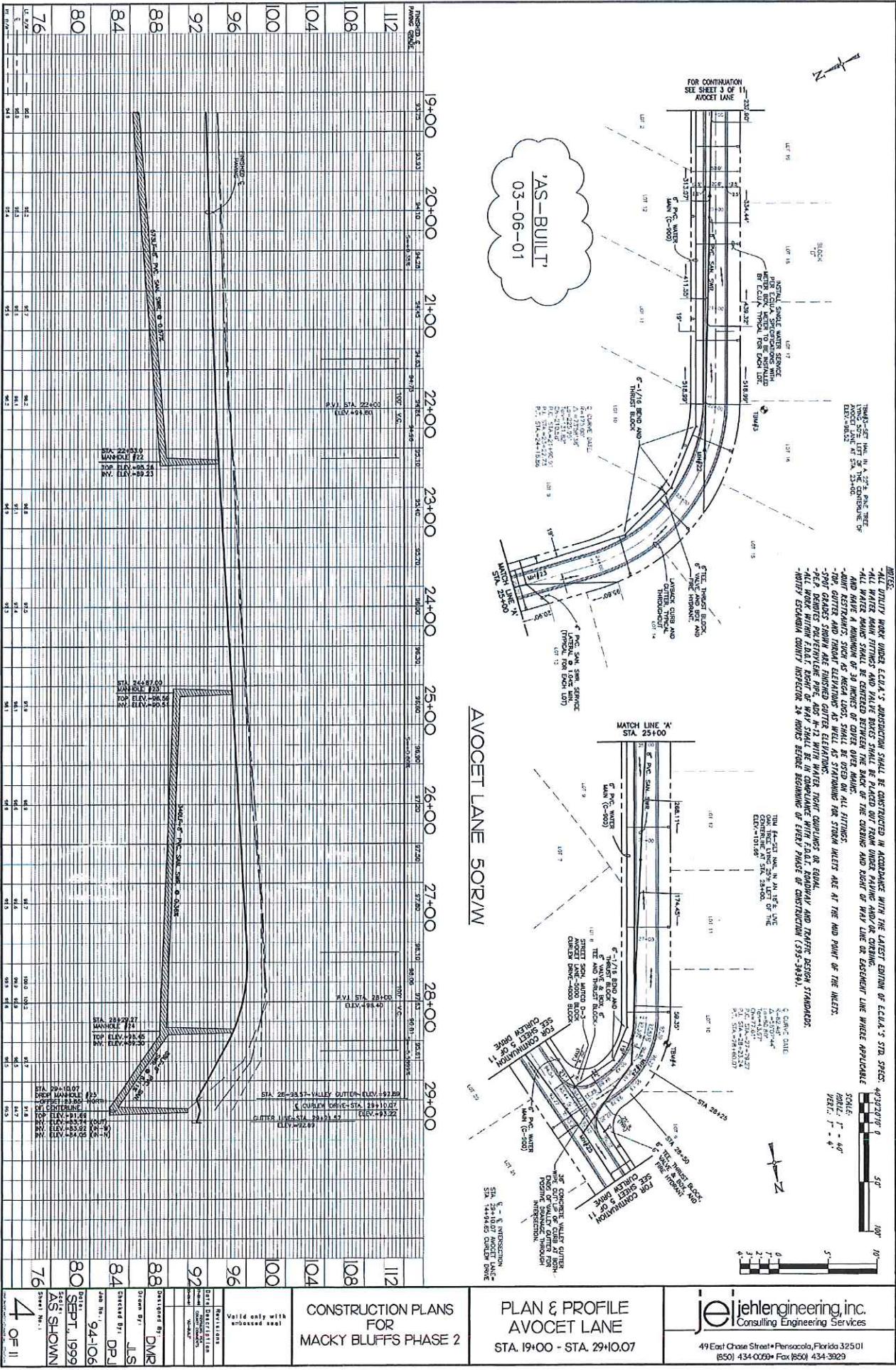
'AS-BUILT'
03-06-01

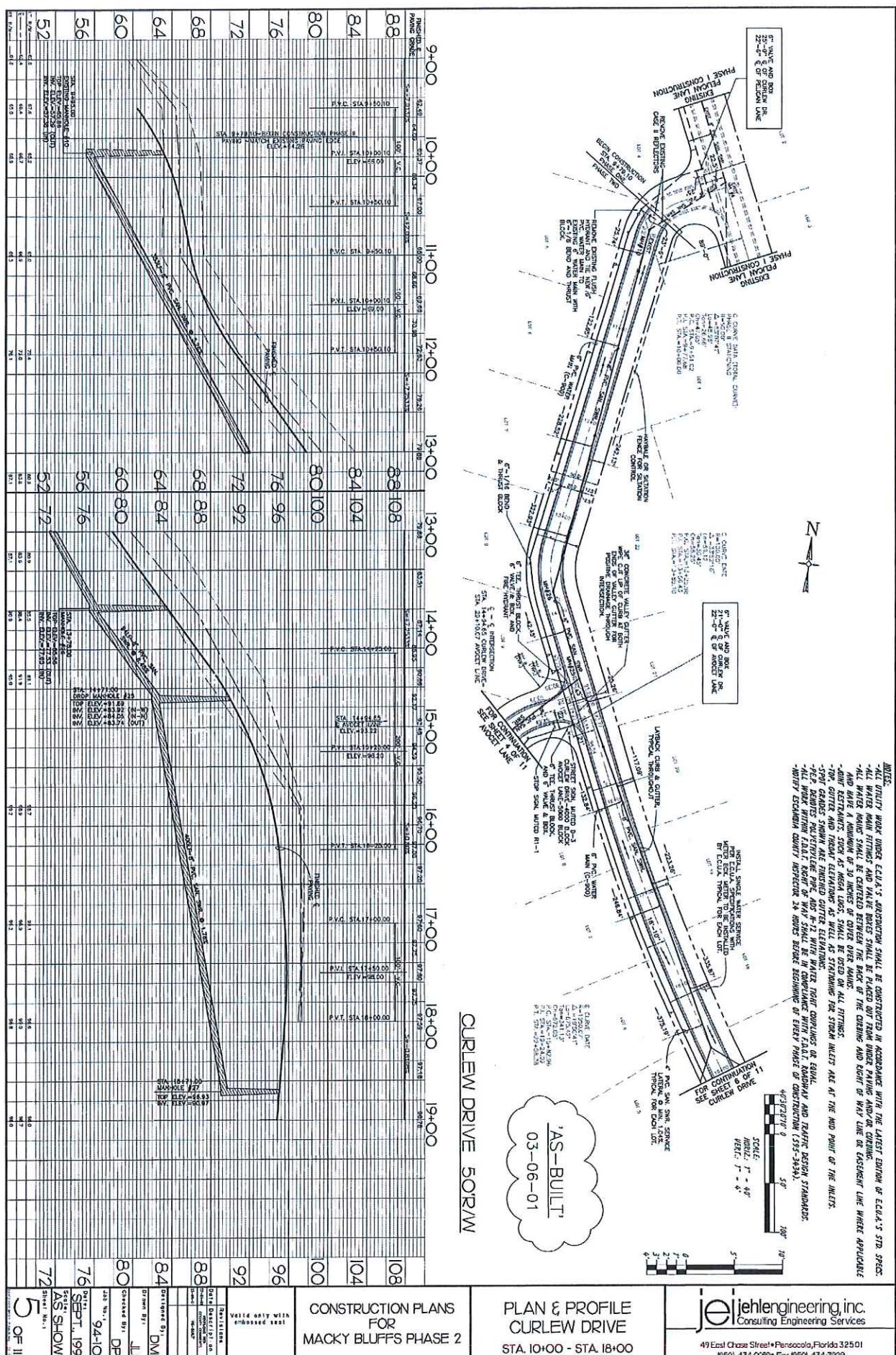
U3-U6-U7



2 OF II	 Jehl Engineering, Inc. Consulting Engineering Services
Sheet No.: 2	CONSTRUCTION PLANS FOR MACKY BLUFF PHASE II
Job No.: 94-106	OVERALL UTILITY PLAN
Date: SEPT., 1999	Valid only with embossed seal
Drawn By: JLS	Revisions Date Description <small>Initials Supervisor Check Revised Accepted Signature</small>
Checked By: DPL	
Approved By: DMR	
Supt. No.: AS SHOWN	







ALL UTILITY WORK UNDER E.C.C.A.'S INSPECTION SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST EDITION OF E.C.C.A.'S STD. SPEC. ALL WATER, MASON, FITTINGS, AND VALVE BOXES SHALL BE PLACED OUT FROM UNDER PAVING AND/OR CURBING. ALL WATER HOSES SHALL BE CENTERED THRU THE BACK OF THE CURBING AND RIGHT OF WAY OR EASEMENT LINE WHERE APPLICABLE.

49 East Chase Street • Pensacola, Florida 32501
(850) 434-0069 • Fax (850) 434-3829

MACKY BLUFF SUBDIVISION

BASIN DESIGN

BASIN ROUTING

→Summary of 2 Year To 100 Year←

→Hydrograph of Critical 25 Year←

→Hydrograph of Critical 100 Year←

→Permeability Results←

4-7-97

POND PROGRAM CALCULATIONS
Copyright R & W Engineering. Inc. 1988

AVERAGE END AREA

STAGE	AREA (AC)
35	.153
36	.1824
37	.2136
38	.2465
39	.2811
40	.3174
41	.3554
41.25	.3647
42	.3951
45	.524

STAGE	STORAGE (AC-FT)
35	0
36	.1677
37	.3657
38	.59575
39	.85955
40	1.1588
41	1.4952
41.25	1.585213
42	1.870138
45	3.248787

= 69043 CF

WEIR STRUCTURE

CREST ELEVATION = 41.25 FEET
WEIR LENGTH = 18.85 FEET
COEFFICIENT = 3

STAGE (FT)	DISCHARGE (CFS)
41.25	0
41.75	19.99344
42.25	56.55
42.75	103.889
43.25	159.9476
43.75	223.5335
44.25	293.8424
44.75	370.2838
45	410.6573

PERC RATE = 3 IN/HR

STAGE (FT)	PERCOLATION (CFS)
35	0

TIME 13:13:31 DATE 04-07-1997

* JEHLE ENGINEERING, INC. *

* 49 East Chase Street *

* Pensacola, Florida 32501 *

* *

* PHONE (904) 434-0059 *

Copyright R & W Engineering, Inc. 1988

* * * ROUTE PROGRAM ver. 2.3 * * *

This Program uses the Suwannee River Water Management District's rainfall distributions, a total rainfall amount entered by the user, and the rational method to compute a runoff hydrograph. The hydrograph is routed through a retention/detention area using the Storage Indication Method.

PROJECT DESCRIPTION:

Macky Bluff Subdivision

Project No. 94-106

for Stevens Trust Inc.

DRAINAGE AREA = 43.6211 ACRES

PRE-DEVELOPED RUNOFF COEFFICIENT = .3

POST-DEVELOPED RUNOFF COEFFICIENT = .4578592

STAGE (FT)	STORAGE (AC FT)	STAGE (FT)	DISCHARGE (CFS)
35.00	0	41.25	0.00
36.00	.1676	41.75	19.99
37.00	.3657	42.25	56.55
38.00	.5957	42.75	103.88
39.00	.8595	43.25	159.94
40.00	1.1588	43.75	223.53
41.00	1.4952	44.25	293.84
41.25	1.5852	44.75	370.28
42.00	1.8701	45.00	410.65
45.00	3.2487		

STAGE (FT)	PERCOLATION (CFS)
35.00	0.00
36.00	0.55
37.00	0.64
38.00	0.74
39.00	0.85

TIME 13:13:32

DATE 04-07-1997

	40.00	0.96
	41.00	1.07
	41.25	1.10
	42.00	1.19
	45.00	1.58

STORM DURATION (YRS)	FREQUENCY	TOTAL RAINFALL (IN)	ALLOWABLE SURFACE DISCHARGE (CFS)	PEAK SURFACE DISCHARGE (CFS)	ALLOWABLE DISCHARGE VOLUME (AC FT)	SURFACE DISCHARGE VOLUME (AC FT)	MAXIMUM STAGE	STORAGE USED (AC FT)
1H	2	2.35	66.1	83.7	2.563	2.180	42.54	2.117
2H	2	3	49.1	74.5	3.272	3.096	42.44	2.072
4H	2	3.6	24.5	34.5	3.926	3.946	41.95	1.851
8H	2	4.4	24.2	28.6	4.798	4.620	41.87	1.820
24H	2	6.2	8.1	11.2	6.761	6.661	41.53	1.692
3D	2	8	5.2	7.1	8.724	6.140	41.43	1.653
7D	2	9.5	3.6	4.2	10.360	3.096	41.36	1.625
10D	2	10.5	4.8	4.4	11.451	5.754	41.36	1.627
1H	5	2.85	80.2	108.9	3.108	2.997	42.79	2.235
2H	5	3.7	60.5	92.7	4.035	4.222	42.63	2.161
4H	5	4.5	30.6	56.5	4.907	5.392	42.25	1.985
8H	5	5.8	31.9	49.8	6.325	6.641	42.16	1.942
24H	5	8	10.5	14.5	8.724	9.551	41.61	1.723
3D	5	9.5	6.2	8.7	10.360	8.600	41.47	1.668
7D	5	11.5	4.4	5.0	12.541	5.601	41.37	1.633
10D	5	12.5	5.7	6.6	13.632	7.843	41.42	1.648
1H	10	3.15	88.6	123.0	3.435	3.488	42.92	2.293
2H	10	4.1	67.1	101.0	4.471	4.867	42.72	2.201
4H	10	5.2	35.4	62.7	5.671	6.521	42.31	2.015
8H	10	6.6	36.3	61.9	7.197	7.879	42.31	2.011
24H	10	9.4	12.3	17.4	10.251	11.809	41.69	1.751
3D	10	11.5	7.5	9.7	12.541	11.775	41.49	1.678

TIME 13:13:34

DATE 04-07-1997

			<i>Q PRE</i>	<i>Q POST</i>				
7D	10	13	4.9	6.8	14.177	7.557	41.42	1.649
10D	10	14	6.4	8.4	15.267	9.187	41.46	1.665
Critical 25yr Event								
1H	25	3.7	104.1	< 144.6	4.035	4.389	43.11	2.382
2H	25	4.8	78.5	114.6	5.235	5.994	42.85	2.259
4H	25	6	40.8	69.6	6.543	7.814	42.39	2.048
8H	25	7.5	41.2	68.9	8.179	9.237	42.38	2.045
24H	25	10.1	13.2	19.0	11.014	12.939	41.72	1.766
3D	25	13.25	8.7	11.3	14.449	14.559	41.53	1.693
7D	25	15	5.7	7.3	16.358	9.945	41.43	1.654
10D	25	16	7.3	10.7	17.448	11.491	41.52	1.687
1H	50	4.2	118.2	170.6	4.580	5.208	43.33	2.483
2H	50	5.5	90.0	126.7	5.998	7.122	42.95	2.308
4H	50	6.9	47.0	74.5	7.525	9.268	42.44	2.072
8H	50	8.6	47.3	76.4	9.379	10.886	42.46	2.081
24H	50	12.2	16.0	23.4	13.304	16.336	41.80	1.793
3D	50	14.25	9.3	12.0	15.540	16.108	41.55	1.699
7D	50	16.5	6.3	7.5	17.994	11.813	41.44	1.656
100yr 10D MAX. STAGE & DISCHARGE								
1H	100	18.5	8.5	13.5	20.175	14.440	41.59	1.714
		4.55	128.0	< 190.3	4.962	5.781	43.49	2.554
2H	100	6	98.1	137.1	6.543	7.928	43.05	2.351
4H	100	7.5	51.0	77.9	8.179	10.236	42.48	2.089
8H	100	9.4	51.7	81.8	10.251	12.086	42.52	2.108
24H	100	13.3	17.4	25.7	14.504	18.117	41.83	1.805
3D	100	15.75	10.3	13.7	17.176	18.529	41.59	1.715
7D	100	18.5	7.0	8.8	20.175	14.594	41.47	1.668
10D	100	20	9.2	14.2	21.811	16.408	41.61	1.720

TIME 13:53:27 DATE 04-07-1997

* JEHLE ENGINEERING, INC. *

* 49 East Chase Street *

* pensacola, Florida 32501 *

*

*

* PHONE (904) 434-0059 *

Copyright R & W Engineering, Inc. 1988

* * * ROUTE PROGRAM ver. 2.3 * * *

This Program uses the Suwannee River Water Management District's rainfall distributions, a total rainfall amount entered by the user, and the rational method to compute a runoff hydrograph. The hydrograph is routed through a retention/detention area using the Storage Indication Method.

PROJECT DESCRIPTION:

Macky Bluff Subdivision

Project No. 94-106

for Stevens Trust Inc.

DRAINAGE AREA = 43.6211 ACRES

PRE-DEVELOPED RUNOFF COEFFICIENT = .3

POST-DEVELOPED RUNOFF COEFFICIENT = .4578592

STAGE (FT)	STORAGE (AC FT)	STAGE (FT)	DISCHARGE (CFS)
35.00	0	41.25	0.00
36.00	.1676	41.75	19.99
37.00	.3657	42.25	56.55
38.00	.5957	42.75	103.88
39.00	.8595	43.25	159.94
40.00	1.1588	43.75	223.53
41.00	1.4952	44.25	293.84
<u>F.D.E.P.</u> → 41.25	<u>1.5852</u>	44.75	370.28
VOLUME 42.00	1.8701	45.00	410.65
MAX. DESIGN VOLUME → 45.00	3.2487		

STAGE (FT)	PERCOLATION (CFS)
35.00	0.00
36.00	0.55
37.00	0.64
38.00	0.74
39.00	0.85

TIME 13:53:29

DATE 04-07-1997

40.00	0.96
41.00	1.07
41.25	1.10
42.00	1.19
45.00	1.58

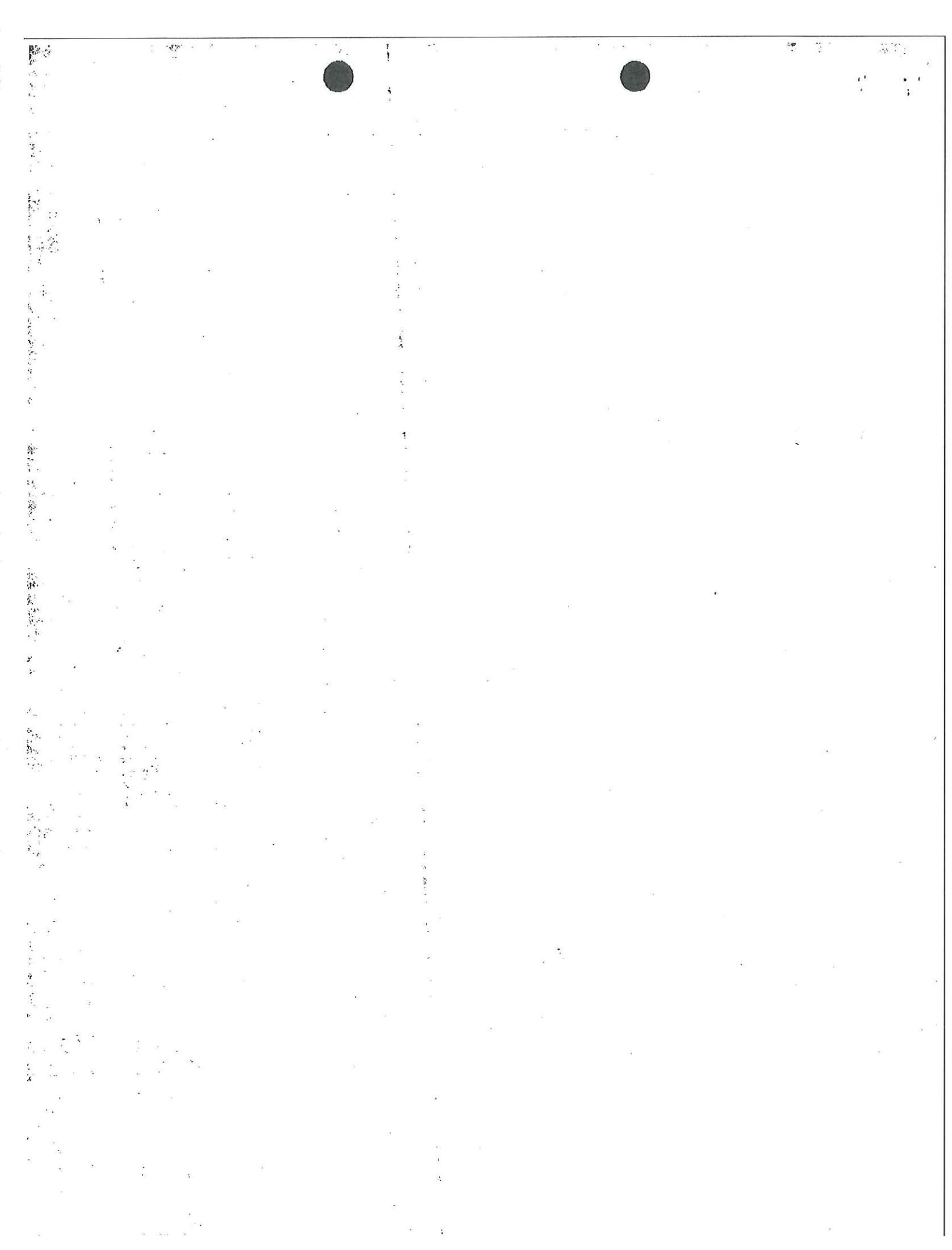
STORM DURATION = 1H

FREQUENCY = 25 YEAR

TOTAL RAINFALL = 3.7 INCHES

TIME (HR)	RAINFALL INTENSITY (IN/HR)	RUNOFF (CFS)	OUTFLOW		STAGE (FT)
			SURFACE DISCHARGE	PERCOLATION (CFS)	
0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.74	14.78	0.00	0.20	35.36
0.20	2.22	44.34	0.00	0.61	36.67
0.30	4.44	88.68	0.00	0.84	38.94
0.40	7.77	155.18	19.00	1.16	41.73
0.50	7.95	158.88	144.06	1.33	43.11
0.60	6.66	133.02	144.62	1.33	43.11
0.70	4.07	81.29	105.68	1.29	42.77
0.80	2.59	51.73	68.34	1.24	42.37
0.90	0.37	7.39	34.61	1.18	41.95
1.00	0.00	0.00	10.55	1.13	41.51
1.10			3.48	1.11	41.34
1.20			0.70	1.10	41.27
1.30			0.00	1.10	41.24
1.40			0.00	1.10	41.21
1.50			0.00	1.09	41.18
1.60			0.00	1.09	41.16
1.70			0.00	1.09	41.13
1.80			0.00	1.08	41.11
1.90			0.00	1.08	41.09
2.00			0.00	1.08	41.06
2.10			0.00	1.07	41.04
2.20			0.00	1.07	41.01
2.30			0.00	1.07	40.99
2.40			0.00	1.07	40.96
2.50			0.00	1.06	40.93
2.60			0.00	1.06	40.91
2.70			0.00	1.06	40.88
2.80			0.00	1.05	40.86
2.90			0.00	1.05	40.83
3.00			0.00	1.05	40.80
3.10			0.00	1.05	40.78
3.20			0.00	1.04	40.75
3.30			0.00	1.04	40.73
3.40			0.00	1.04	40.70
3.50			0.00	1.03	40.68
3.60			0.00	1.03	40.65
3.70			0.00	1.03	40.62

BEGINDRAWDOWNMAX.STAGEF.D.E.P.VOLUME69,051 cu ft



25 yr

TIME 13:53:40

DATE 04-07-1997

25.80	0.00	0.22	35.39
25.90	0.00	0.21	35.38
26.00	0.00	0.21	35.37
26.10	0.00	0.20	35.36
26.20	0.00	0.19	35.35
26.30	0.00	0.19	35.34
26.40	0.00	0.18	35.33
26.50	0.00	0.18	35.33
26.60	0.00	0.17	35.32
26.70	0.00	0.17	35.31
26.80	0.00	0.17	35.30
26.90	0.00	0.16	35.29
27.00	0.00	0.16	35.28
27.10	0.00	0.15	35.28
27.20	0.00	0.15	35.27
27.30	0.00	0.14	35.26
27.40	0.00	0.14	35.26
27.50	0.00	0.14	35.25
27.60	0.00	0.13	35.24
27.70	0.00	0.13	35.24
27.80	0.00	0.13	35.23
27.90	0.00	0.12	35.22
28.00	0.00	0.12	35.22
28.10	0.00	0.12	35.21
28.20	0.00	0.11	35.21
28.30	0.00	0.11	35.20
28.40	0.00	0.11	35.19
28.50	0.00	0.10	35.19
28.60	0.00	0.10	35.18
28.70	0.00	0.10	35.18
28.80	0.00	0.10	35.17
28.90	0.00	0.09	35.17
29.00	0.00	0.09	35.17
29.10	0.00	0.09	35.16
29.20	0.00	0.09	35.16
29.30	0.00	0.08	35.15
29.40	0.00	0.08	35.15
29.50	0.00	0.08	35.14
29.60	0.00	0.08	35.14

VOLUME
RESTORED
28.3 HRS

ALLOWABLE DISCHARGE = 104.10 CFS

PEAK SURFACE DISCHARGE = 144.62 CFS

ALLOWABLE SURFACE DISCHARGE VOLUME = 4.0350 AC. FT.

SURFACE DISCHARGE VOLUME = 4.3887 AC. FT.

MAXIMUM STAGE = 43.11 FT

STORAGE REQUIRED = 2.3817 AC. FT.

TIME 13:33:03

DATE 04-07-1997

40.00	0.96
41.00	1.07
41.25	1.10
42.00	1.19
45.00	1.58

STORM DURATION = 1H
 → FREQUENCY = 100 YEAR
 TOTAL RAINFALL = 4.55 INCHES

TIME (HR)	RAINFALL INTENSITY (IN/HR)	RUNOFF (CFS)	OUTFLOW		STAGE (FT)
			SURFACE DISCHARGE	PERCOLATION (CFS)	
0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.91	18.17	0.00	0.24	35.44
0.20	2.73	54.52	0.00	0.64	37.02
0.30	5.46	109.05	0.00	0.92	39.60
0.40	9.56	190.84	62.34	1.23	42.31
0.50	9.78	195.38	190.30	1.38	43.49
0.60	8.19	163.57	177.28	1.37	43.39
0.70	5.01	99.96	129.21	1.32	42.98
0.80	3.18	63.61	82.28	1.26	42.52
0.90	0.46	9.09	41.33	1.20	42.04
1.00	0.00	0.00	11.83	1.14	41.55
1.10			3.98	1.11	41.35
1.20			0.90	1.10	41.27
BEGIN DRAWDOWN	1.30		0.00	1.10	41.24
	1.40		0.00	1.10	41.21
	1.50		0.00	1.09	41.19
	1.60		0.00	1.09	41.16
	1.70		0.00	1.09	41.14
	1.80		0.00	1.08	41.11
	1.90		0.00	1.08	41.09
	2.00		0.00	1.08	41.06
	2.10		0.00	1.07	41.04
	2.20		0.00	1.07	41.01
	2.30		0.00	1.07	40.99
	2.40		0.00	1.07	40.96
	2.50		0.00	1.06	40.94
	2.60		0.00	1.06	40.91
	2.70		0.00	1.06	40.88
	2.80		0.00	1.05	40.86
	2.90		0.00	1.05	40.83
	3.00		0.00	1.05	40.81
	3.10		0.00	1.05	40.78
	3.20		0.00	1.04	40.76
	3.30		0.00	1.04	40.73
	3.40		0.00	1.04	40.70
	3.50		0.00	1.03	40.68
	3.60		0.00	1.03	40.65
	3.70		0.00	1.03	40.63

MAX. STAGE
 F.D.E.P.
 VOLUME
69,051 cft

100 YR

TIME 13:33:17

DATE 04-07-1997

25.80	0.00	0.22	35.40
25.90	0.00	0.21	35.38
26.00	0.00	0.21	35.37
26.10	0.00	0.20	35.36
26.20	0.00	0.19	35.35
26.30	0.00	0.19	35.34
26.40	0.00	0.18	35.34
26.50	0.00	0.18	35.33
26.60	0.00	0.17	35.32
26.70	0.00	0.17	35.31
26.80	0.00	0.17	35.30
26.90	0.00	0.16	35.29
27.00	0.00	0.16	35.29
27.10	0.00	0.15	35.28
27.20	0.00	0.15	35.27
27.30	0.00	0.14	35.26
27.40	0.00	0.14	35.26
27.50	0.00	0.14	35.25
27.60	0.00	0.13	35.24
27.70	0.00	0.13	35.24
27.80	0.00	0.13	35.23
27.90	0.00	0.12	35.22
28.00	0.00	0.12	35.22
28.10	0.00	0.12	35.21
28.20	0.00	0.11	35.21
28.30	0.00	0.11	35.20
28.40	0.00	0.11	35.20
28.50	0.00	0.10	35.19
28.60	0.00	0.10	35.18
28.70	0.00	0.10	35.18
28.80	0.00	0.10	35.18
28.90	0.00	0.09	35.17
29.00	0.00	0.09	35.17
29.10	0.00	0.09	35.16
29.20	0.00	0.09	35.16
29.30	0.00	0.08	35.15
29.40	0.00	0.08	35.15

VOLUME RESTORED
28.1 H2O

ALLOWABLE DISCHARGE = 128.02 CFS

PEAK SURFACE DISCHARGE = 190.30 CFS

ALLOWABLE SURFACE DISCHARGE VOLUME = 4.9619 AC. FT.

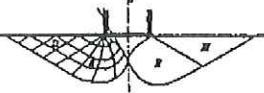
SURFACE DISCHARGE VOLUME = 5.7806 AC. FT.

MAXIMUM STAGE = 43.49 FT

STORAGE REQUIRED = 2.5542 AC. FT.

Larry M. Jacobs & Associates, Inc.

Geotechnical Engineering / Material Testing / Drilling



December 18, 1996

Mr. Don Jehle, P.E.
Jehle Engineering, Inc.
49 East Chase Street
Pensacola, Florida 32501

SUBJECT: Macky Bluffs Subdivision - South Retention Pond
File #96-387

Dear Don:

This letter forwards the results of the 15 foot deep hand auger boring performed in the south retention pond. Figure #1 shows the Boring Location Plan and Figure #2 shows the Log of Boring. The boring was performed at the location you staked.

The boring encountered relatively permeable orange sand with traces of clayey sand from the ground surface to a depth of $6 \pm$ feet underlain by moderately permeable brown slightly silty sand (with seams of clay from 8.0-8.5 feet) to $8.5 \pm$ feet underlain by relatively permeable multicolored sand and slightly silty sand to $10.5 \pm$ feet. From roughly 10.5-12.0 feet, the boring encountered relatively low permeability multicolored silty and clayey sand underlain by relatively permeable red and tan sand to $13 \pm$ feet underlain by relatively low permeability orange/tan silty and clayey sand to the bottom of the 15 foot deep boring.

Five wash #200 sieve tests and one falling head were performed on selected soil samples to evaluate soil permeability. The falling head permeability test was performed on a sample of the orange slightly silty sand encountered from the ground surface to a depth of $6 \pm$ feet below existing grade. The sample, which contained 2.7% fines, had a vertical permeability of 1.2×10^{-2} cm/sec (17 in/hr) at a dry density of $103.0 \text{ lbs}/\text{ft}^3$. Based on the results of the other wash #200 sieve tests, we estimate the permeability of the other sands and slightly silty sands (SP and SP/SM) to be on the order of $5 \times 10^{-3} - 1 \times 10^{-2}$ cm/sec. The brown slightly silty sand (SM/SP) encountered from roughly 6-8 feet below existing grade has an estimated vertical permeability of $5 \times 10^{-4} - 1 \times 10^{-3}$ cm/sec. The silty and clayey sands (SM and SM/SC) have an estimated vertical permeability of 1×10^{-5} cm/sec.

It should be noted that while the orange sand encountered in the test boring from the ground surface to a depth of $6 \pm$ feet is naturally occurring in this area, the fact that no topsoil

Mr. Don Jehle
December 18, 1996
Page 2

or brown slightly silty sand commonly found beneath the topsoil and prior to orange sands was absent in the test boring could be an indication that the soils in this area are not naturally occurring. If it is known that past excavations and/or backfills have occurred in this area, the subsurface conditions encountered in the test boring may not be indicative of the naturally occurring surrounding soils, which would be expected to be somewhat lower in permeability than the surficial orange sands. If this is the case, we recommend drilling an additional test boring(s) to better determine the subsurface conditions present in the proposed pond area.

We hope this letter provides sufficient information for the present. If you have any questions or comments, please feel free to call.

Very truly yours,

LARRY M. JACOBS & ASSOCIATES, INC.



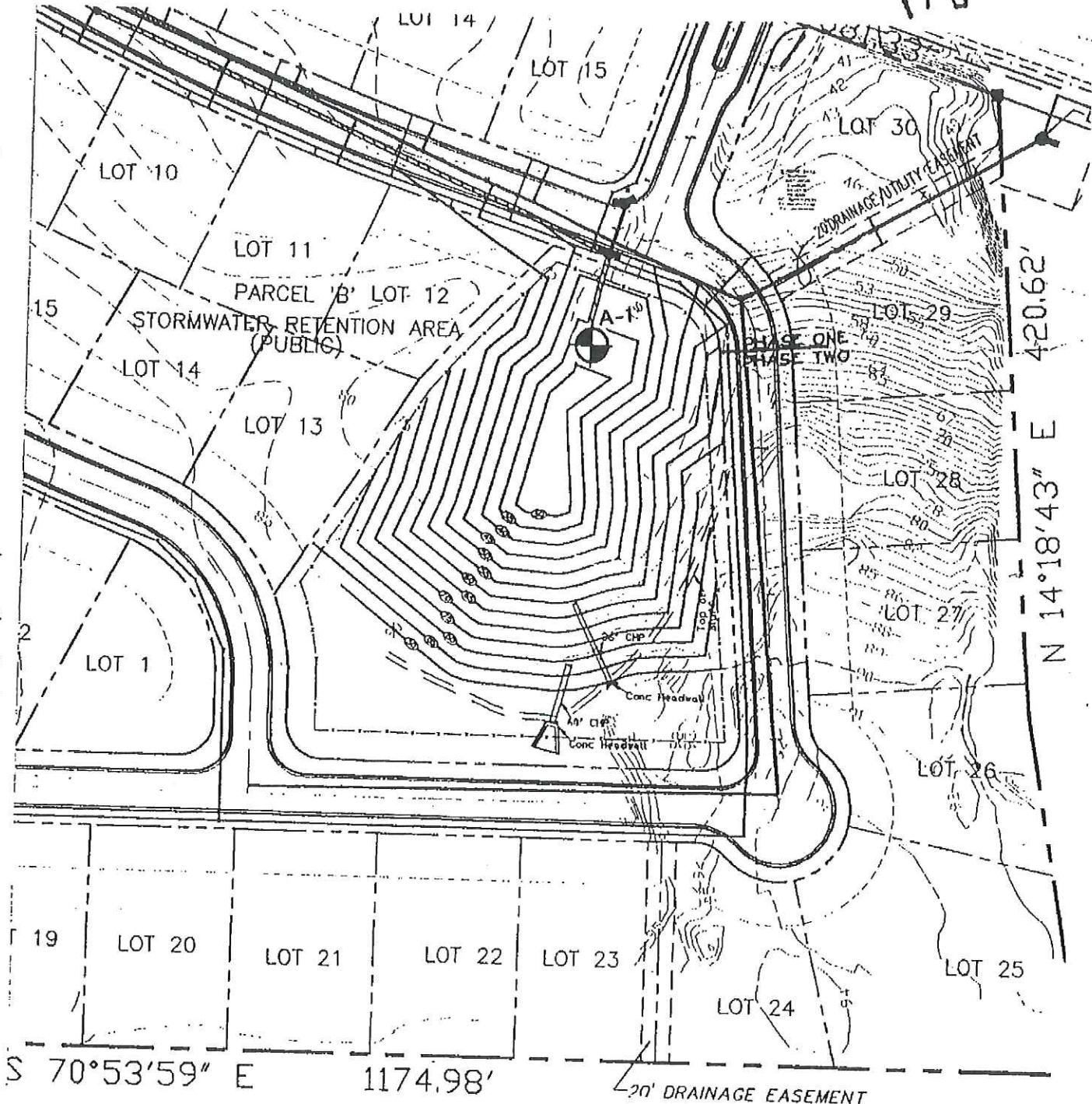
MITCHELL L. SMITH, P.E.
Geotechnical Engineer
Florida Reg. #43416

MLS-49/mls
MACKY3

Attachments

BORING LOCATION PLAN

FIGURE #1



HAND AUGER BORING

BORING LOCATION IS APPROXIMATE

Project: Macky Bluffs Subdivision Retention Pond
Escambia County, Florida

Job: 96-387	Scale: 1"=100'	Date: 12/17/96
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LARRY M. JACOBS & ASSOCIATES, INC. By: PB

OFFICE COMMUNICATION

Department of Planning & Engineering Services

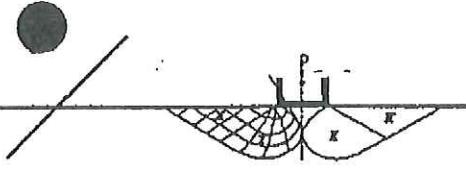
DATE 4/29/97
FROM CHRIS CURR
TO : FILE - MACKY BLUFFS S/LO
COPIES TO
RE: Appeal Post for 25 year design.

SUBJECT
DUE TO LOCATION OF S/LO NEXT TO SCENIC HWY
ESCAMBIA BAY AND THE FACT THAT CROSS
PIPES ARE DESIGNED AND ANALYZED TO HAVE
ADEQUATE CAPACITY FOR FLOOD OVERFLOW, IT
IS AGREABLE WITH ME AND CINDY ANDERSON TO
NOT REQUIRE OPERATOR TO DISCUSS
WITH CINOS 4/29/97. COMMON SENSE ENGINEERING!

Larry M. Jacobs & Associates, Inc.

Geotechnical Engineering / Material Testing / Drilling

328 EAST GADSDEN STREET • PENSACOLA, FLORIDA 32501 • 804/434-0848 • FAX: 804/433-7027



LOG OF BORING

PROJECT:

JOB NO.:

ELEVATION:

BORING NO.: BORING LOG KEY

TYPE BORING:

DATUM:

LOCATION:

DATE:

GR. WATER:

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH	Visual U/S
				N1	Nc		L.L.	P.L.				
		SAND										SP
		SILTY SAND										SM
		SLIGHTLY SILTY SAND										SM/SP or SP/SM
		SILT										ML or MH
		CLAY										CL or CH
		CLAYEY SILTY SAND or SILTY CLAYEY SAND										SM/SC or SC/SM
		PEAT or ORGANICS										PT
		WATER TABLE										
		SAMPLE TAKEN AT THIS DEPTH										
		UD = UNDISTURBED SAMPLE										
		PERCHED WATER										

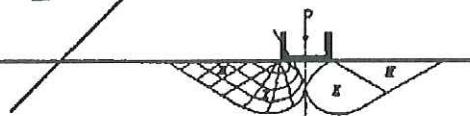
REMARKS: All soil classifications visual unless test results are shown.

Larry M. Jacobs & Associates, Inc.

Geotechnical Engineering / Material Testing / Drilling

328 EAST GADSDEN STREET • PENSACOLA, FLORIDA 32501 • 804/434-0848 • FAX: 804/433-7027

FIGURE #2



LOG OF BORING

PROJECT: Macky Bluffs S/D Ret. Pond
Escambia County, Florida

JOB NO.: 97-387

ELEVATION: N/A

BORING NO.: A-1

TYPE BORING: ASTM-D1452

DATUM: Existing Grade

LOCATION: As per Figure #1

DATE: 12/13/96

GR. WATER: None Encountered
At Time of Boring

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH	Visual U/S
				N1	Nc		L.L.	P.L.				
		Orange sand with traces of clayey sand	1									
5												SP
		Brown slightly silty sand	2									
		Brown silty sand with seams of clay	3									SM+CL
		Orange and red sand	4									SP
10		Purple/light tan slightly silty sand	5									SP/SM
		Multicolored silty sand	6									SM
		Multicolored slightly clayey silty sand	7									SM/SC
		Red and tan sand	8									SP
			9									
		Orange/light tan silty fine sand	10									SM
15		Orange and light tan slightly clayey silty sand	11									SM/SC

— Bag sample taken from 1.0'-3.0':

K_v = 1.2 x 10⁻² cm/sec @ 103.0 pcf

% Fines = 2.7%

REMARKS: All soil classifications visual unless test results are shown.

ESCAMBIA COUNTY, FLORIDA

(49)



(Sheet 54)

Appendix G
Temporary Repair Drawing

