POND ALTERNATIVES

PROPOSED ON-SITE BASIN MAPS

B-8

N

0 150 600
Feet

POND RS7-E-2A

BASIN SR-46

POND RS7-E-3

EXIST SR 46

POND RS7-E-2A

ACCESS RD 1

BASIN RS8-E

BEGIN BRIDGE
STA. 1015+85.69

BEGIN BRIDGE
STA. 662+00.00

BASIN RS7-E

END PROJECT SECTION 4B
BEGIN PROJECT SECTION 6
BEGIN CONST. WEKIVA PKWY (429)
STA. 640+00.00

END PROJECT SECTION 4B
BEGIN PROJECT SECTION 6
BEGIN CONST. SERVICE ROAD 2
STA. 987+66.72

1000
1020
1030
1040
1050
1010
990
650

℄ WEKIVA PKWY (SR 429)

WILD LIFE CROSSING 1

BASIN RS7-E-2A

END BRIDGE
STA. 1034+09.60

END BRIDGE
STA. 680+00.00

SMA RS7-E-4

POND RS7-E-5

POND RS7-E-1A

END PROJECT SECTION 4B
BEGIN PROJECT SECTION 6
BEGIN CONST. RAMP Q
STA. 42+00.00

END PROJECT SECTION 4B
BEGIN PROJECT SECTION 6
BEGIN CONST. RAMP P
STA. 31+00.00

BASIN SC1-E

FPC 1

LEGEND

- EXISTING BASIN BOUNDARY FROM ICPR NODAL MAP
- PROP R/W LINE
- EXISTING ON-SITE BASIN USED FOR POND SIZING
- RECOMMENDED POND SITE
- ALTERNATIVE POND SITE
- RECOMMENDED FLOODPLAIN COMPENSATION SITE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE	238275-7-52-01

PROPOSED ON-SITE BASIN MAP (1)

SHEET NO. 10F 5

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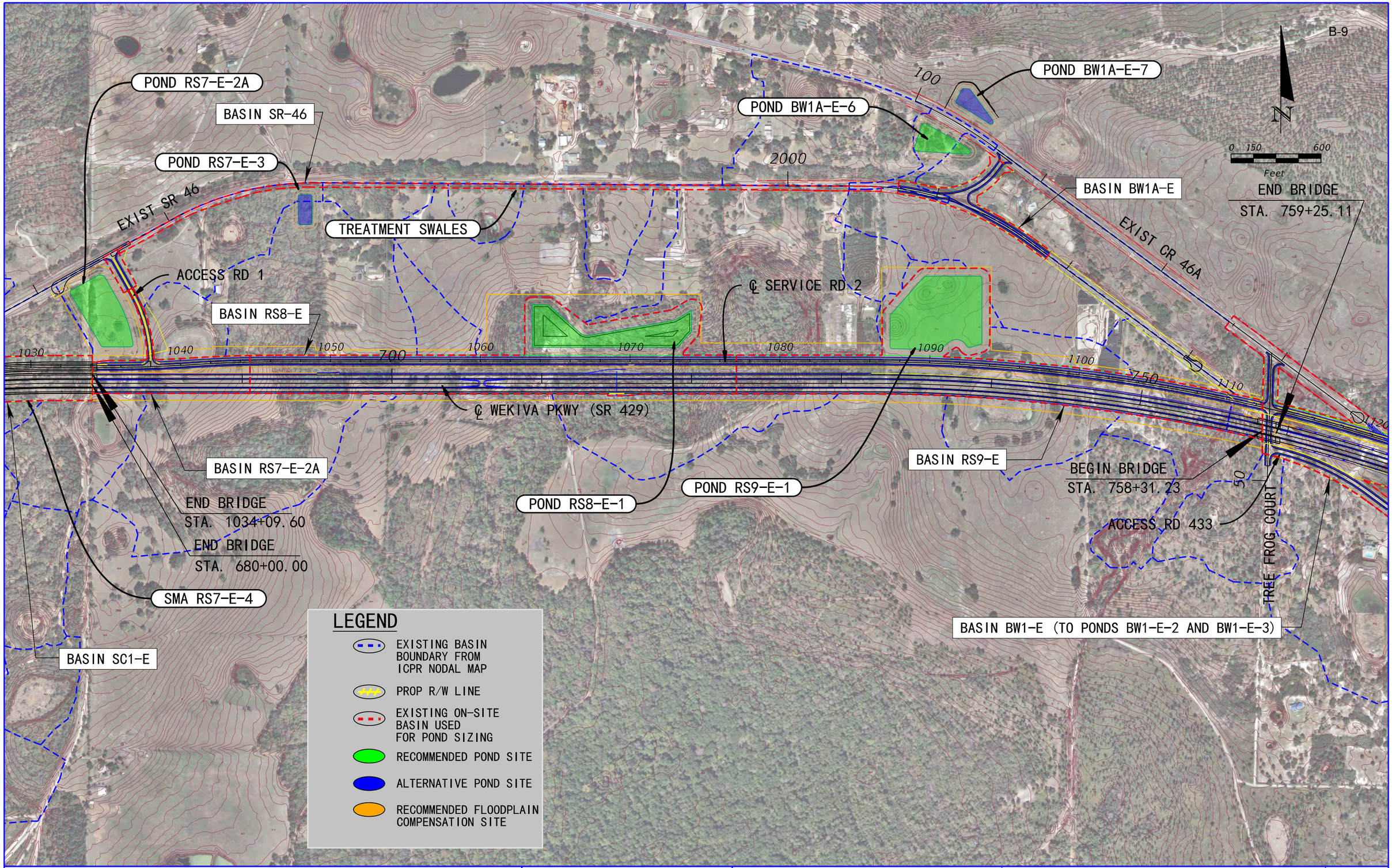

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE	238275-7-52-01

PROPOSED ON-SITE BASIN MAP (2)

SHEET NO. 2 OF 5

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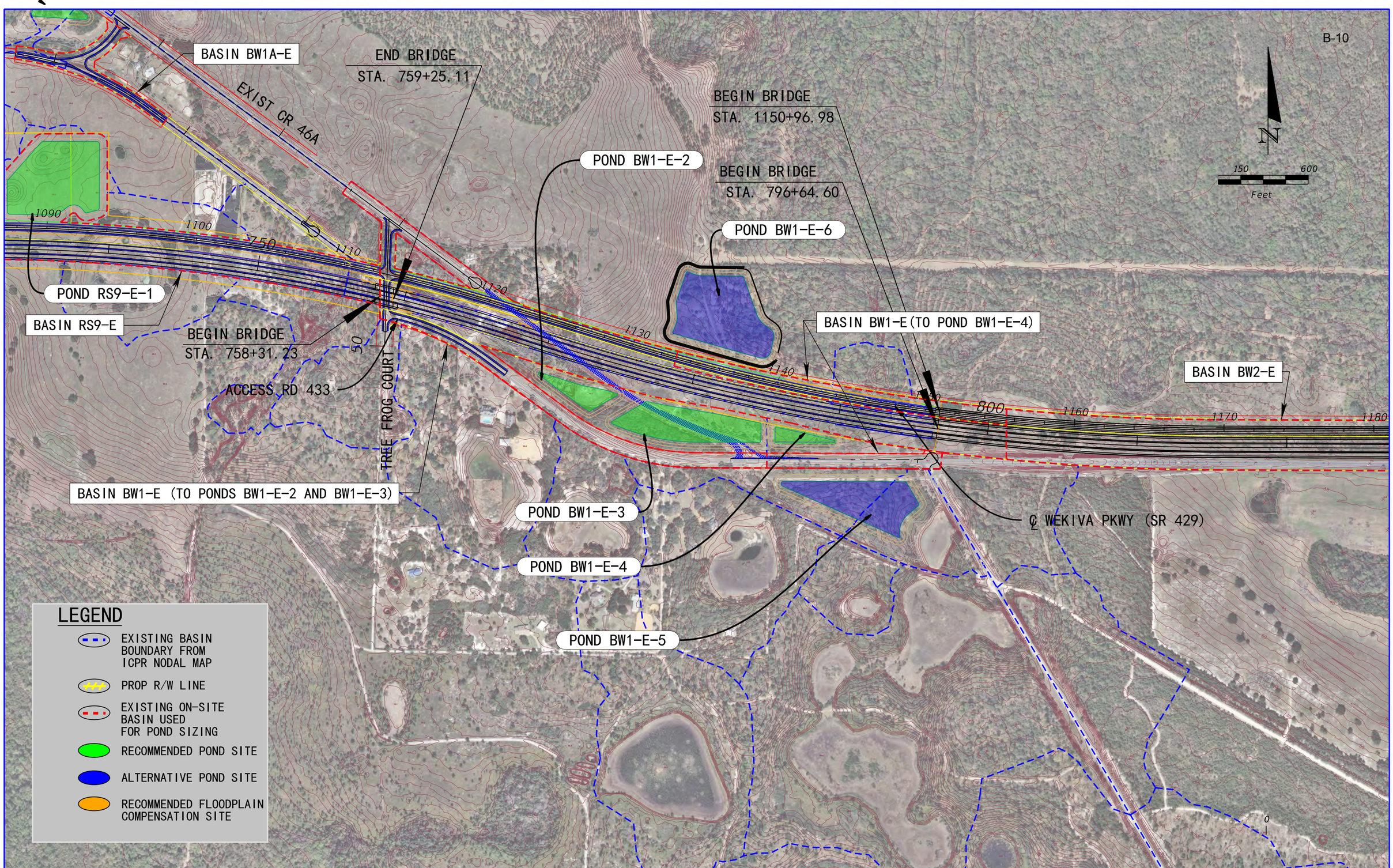

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE	238275-7-52-01

PROPOSED ON-SITE BASIN MAP(3)

SHEET NO. 3 OF 5

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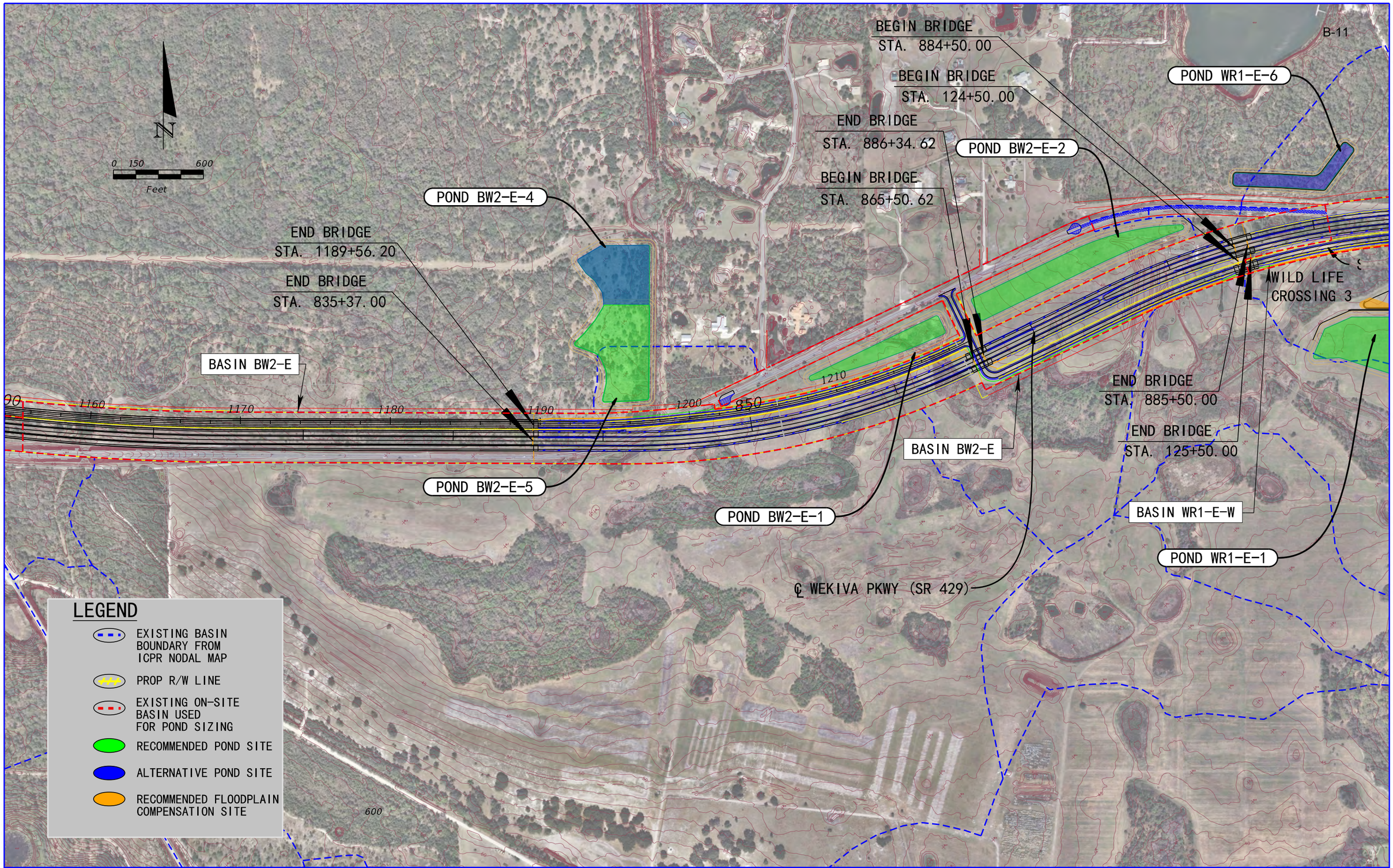

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE	238275-7-52-01

PROPOSED ON-SITE BASIN MAP (4)

SHEET NO. 4 OF 5

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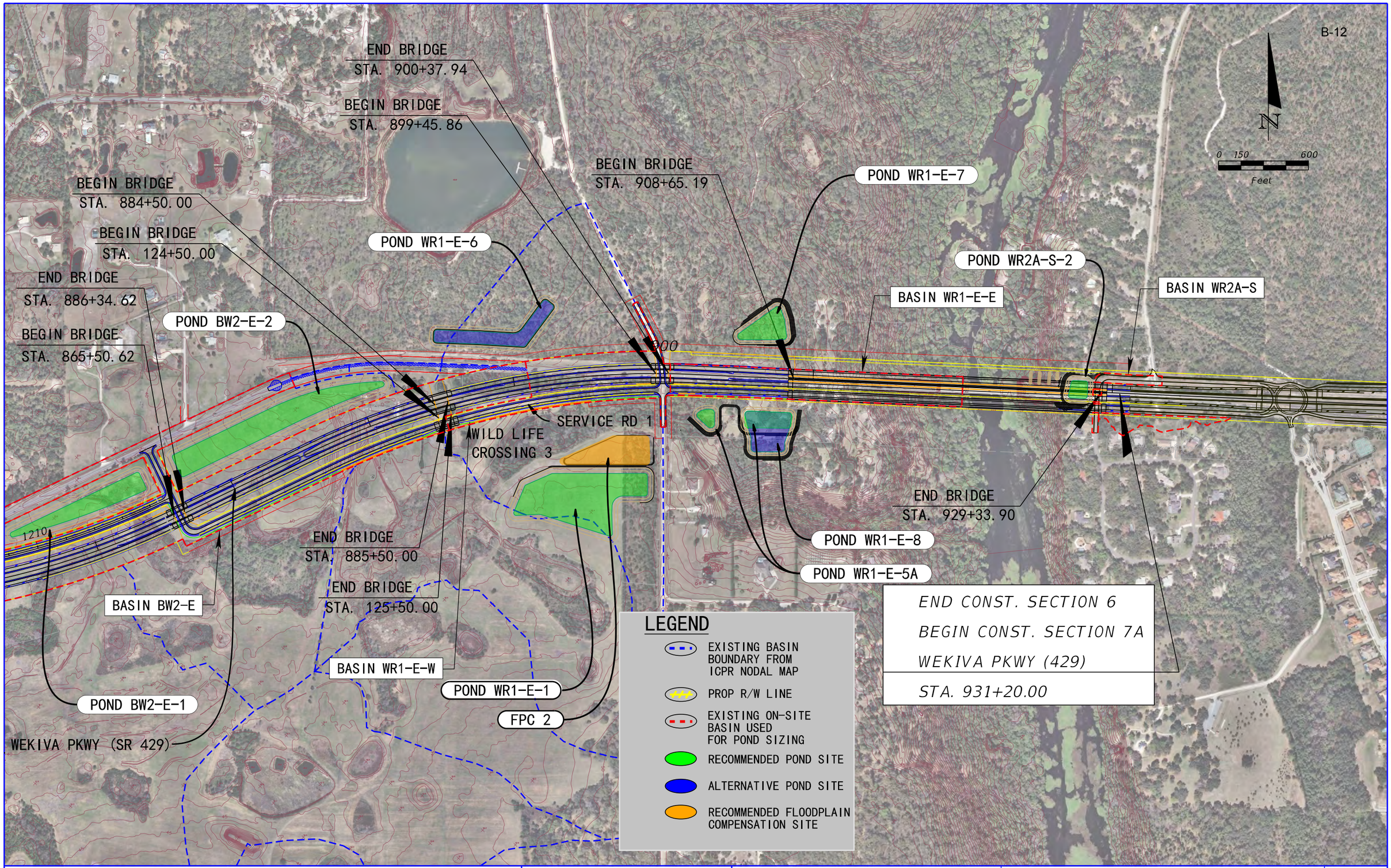


REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE	238275-7-52-01

PROPOSED ON-SITE BASIN MAP (5)

SHEET NO. 5 OF 5

alouaked 8/8/2014 5:22:53 PM X:\431081332O1-D5-Wekiva 6\2382757520I\drainage\PLAN_PROP ROADWAY BASIN MAP05.dgn

BASINS RS7-E/SC1-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**RS7-E**	
POND:	**RS7-E-1A**	
	PRE	**POST**
TOTAL AREA:	**6.03 Ac**	**30.48 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Pasture/grassland/range (grazing) -(good)	D	80	5.01			5.01	401
Imperv. - rds paved open ditch (incl ROW)	D	93		0.78		0.78	73
Woods - (good)	D	77	0.24			0.24	18
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**5.25**	**0.78**	**0.00**	**6.03**	**491.82**

Composite CN = 82
S = 2.261

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Open Space (good) - grass >75%	D	80	12.38			12.38	990
Imperv. - paved parking lots,roofs,drives	D	98		11.13		11.13	1,091
Pond Basin							
Open Space (good) - grass >75%	D	80	2.09			2.09	167
Water Surface	N/A	100			4.88	4.88	488
TOTAL			**14.47**	**11.13**	**4.88**	**30.48**	**2,736.50**

Composite CN = 90
S = 1.139

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	5.34	6.29	2.68	15.97	**13.29**
25YR - 24HR	8.64	6.42	7.41	3.22	18.82	**15.60**
100YR - 24HR	10.60	8.30	9.35	4.17	23.74	**19.57**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	2.54 Ac-Ft
2.5-in x Impervious Area =	2.32 Ac-Ft
Additional 50% treatment for O.F.W. =	1.27 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**3.81 Ac-Ft**

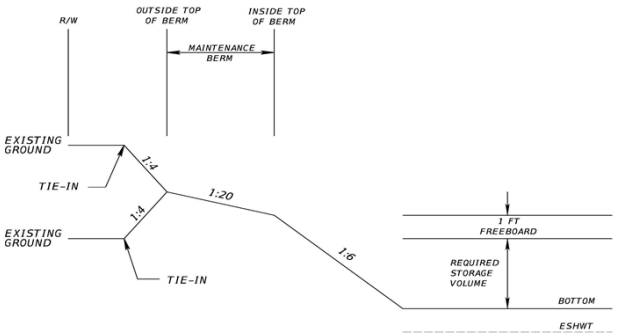
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

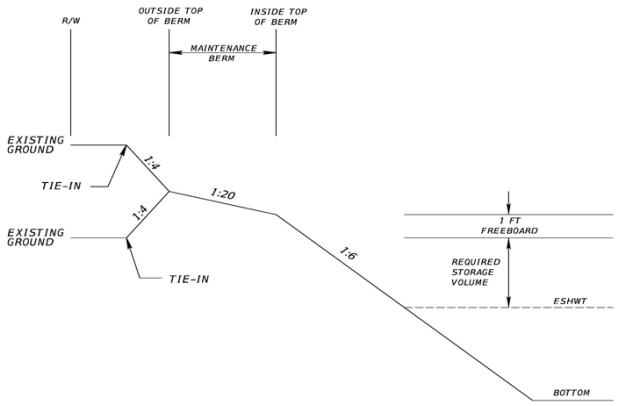
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	58	4.88	575	370	0.00
Max Storage El	**61**	5.69	611	406	**15.87**
Inside Top of Berm	62	5.98	623	418	21.70
Outside Top of Berm	63	6.97	663	458	28.18

Required Storage =	**15.60 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**61.0 ft**	
Required Storage El =	**60.95 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	58	4.86	-	-	0.00	0.00
Inside Top of Berm	62	5.98	5.42	4.0	21.68	21.68
Outside Top of Berm	63	6.97	6.48	1.0	6.48	28.16

Required Storage =	**15.60 ac-ft**
Max Storage El =	**61.0 ft**
Provided Storage El =	**60.88 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN: RS7-E; SC1-E
POND: RS7-E-5

	PRE	POST
TOTAL AREA:	**11.20 Ac**	**46.40 Ac**

* Scenario in which a shallow retention area (RS7-E-4) is not constructed under Wildlife Crossing #1, which was to treat Wildlife Crossing #1.

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Pasture/grassland/range (grazing) -(good)	D	80	5.92			5.92	474
Imperv. - rds paved open ditch (incl ROW)	D	93		1.91		1.91	178
Woods - (good)	D	77	2.54			2.54	196
Woods - (good)	A	30	0.83			0.83	25
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**9.29**	**1.91**	**0.00**	**11.20**	**871.71**

Composite CN = **78**
S = **2.848**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Open Space (good) - grass >75%	D	80	17.08			17.08	1,366
Imperv. - paved parking lots,roofs,drives	D	98		19.09		19.09	1,871
Pond Basin							
Open Space (good) - grass >75%	D	80	2.52			2.52	202
Water Surface	N/A	100			7.71	7.71	771
TOTAL			**19.60**	**19.09**	**7.71**	**46.40**	**4,210.27**

Composite CN = **91**
S = **1.022**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	4.91	6.40	4.58	24.75	**20.16**
25YR - 24HR	8.64	5.97	7.52	5.57	29.10	**23.53**
100YR - 24HR	10.60	7.81	9.47	7.29	36.60	**29.31**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	3.87 Ac-Ft
2.5-in x Impervious Area =	3.98 Ac-Ft
Additional 50% treatment for O.F.W. =	1.99 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**5.97 Ac-Ft**

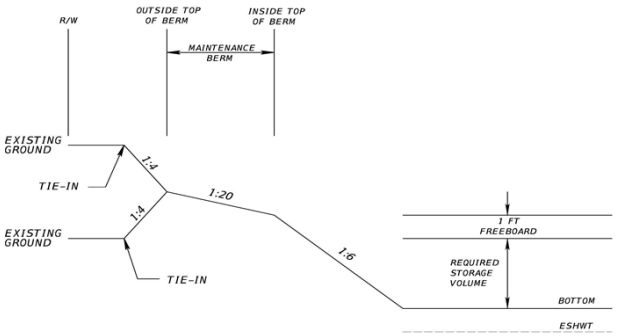
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

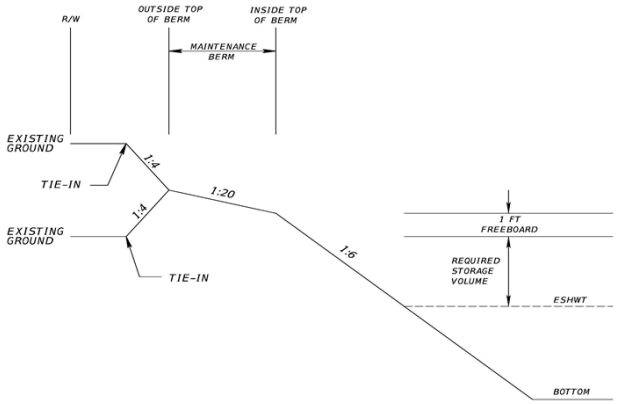
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	58	7.71	600	560	0.00
Max Storage El	**61**	8.70	636	596	**24.62**
Inside Top of Berm	62	9.04	648	608	33.50
Outside Top of Berm	63	10.23	688	648	43.14

Required Storage =	**23.53 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**61.0 ft**	
Required Storage El =	**60.87 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	58	7.73	-	-	0.00	0.00
Inside Top of Berm	62	9.02	8.38	4.0	33.50	33.50
Outside Top of Berm	63	10.16	9.59	1.0	9.59	43.09

Required Storage =	**23.53 ac-ft**
Max Storage El =	**61.0 ft**
Provided Storage El =	**60.81 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**SR-46**	
POND:	**RS7-E-4**	
	PRE	**POST**
TOTAL AREA:	**0.00 Ac**	**0.78 Ac**

* Drainage area for single span of all 3 bridges composin
Wildlife Crossing No. 1. Provides the storage volume require
to completely retain 25-yr/24-hr torm even

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
		0				0.00	0
		0				0.00	0
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Composite CN = #DIV/0!
S = #DIV/0!

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		0.39		0.39	38
Open Space (good) - grass >75%	A	39	0.26			0.26	10
Pond Basin							
Open Space (good) - grass >75%	D	80	0.13			0.13	10
TOTAL			**0.39**	**0.39**	**0.00**	**0.78**	**58.76**

Composite CN = 75
S = 3.274

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
2YR - 24HR	4.60	#DIV/0!	2.16	#DIV/0!	0.14	**0.14**
25YR - 24HR	8.64	#DIV/0!	5.66	#DIV/0!	0.37	**0.37**
100YR - 24HR	10.60	#DIV/0!	7.48	#DIV/0!	0.49	**0.49**

4. Required Water Quality Treatment Volume

Treatment Type	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters	**Yes**
Is basin less than 40% impervious and contain only A soils	**No**
Is treatment pond on-line or off-line	**On-line**

1-in x Total Area =	0.07 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.07 Ac-Ft
Additional 50% treatment for O.F.W. =	0.04 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**0.11 Ac-Ft**

5. Estimated Pond Sizing

Pond Shape =	Rectangular	
Berm Width =	10.0 ft	(for embankment areas)
Pond Side Slope (H:V) =	6	
Berm Slope (H:V) =	20	
Pond Back Slope (H:V) =	6	

For the purposes of this analysis, use a given existing ground elevation to determine dimensions of each retention area. Existing ground elevati
will vary throughout the wildlife crossing, but the dimensions will remain approaximtely equ

Use existing ground el. = 60 ft

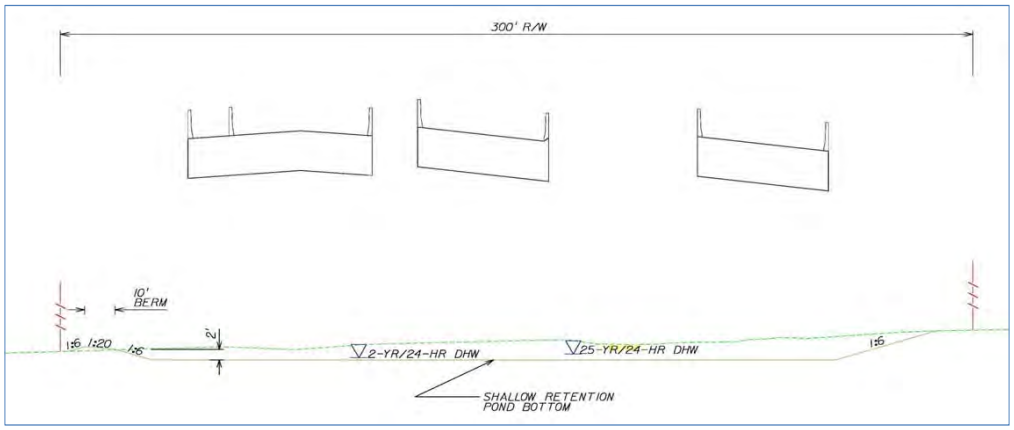
Use inside top of berm el. = 60 ft (matching existing ground

13503.6

Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)	
			Length (ft)	Width (ft)		
Bottom El	58	0.26	225	50	0.00	11250
	58.4	0.29	229.8	54.8	**0.11**	
Max Storage El	**59.05**	0.34	237.6	62.6	**0.31**	14873.76
Inside Top of Berm	60	0.42	249	74	0.68	18426
Outside Top of Berm	61	0.76	289	114	1.27	

Required Storage =	**0.37 ac-ft**	(Max of required treatment and attenuation volume
Max Storage El =	**59.1 ft**	
Required Storage El =	**59.23 ft**	

Based on above calculations, the retention depth for the 2-year storm is appproximately 5" and the retention depth for the 25-year storm is approximately 1



Data from geotechnical borings taken under Wildlife Crossing No. 1:

Boring No.	Station/Offset	ESHGWT Depth (ft)	Base of Aquifer Depth (ft)	measured Kv (ft/day)	estimated Kv (ft/day)	estimated Kh (ft/day)
WL1-HA1	667+00, 0' Rt.	7	13			
WL1-HA2	673+00, 0' Rt.	8	10	20	10	20
WL1-HA3	679+00, 0' Rt.	6	8.5			
USE:		**7**	**8.5***		**10**	**15**

* Use min. base of aquifer encountered to conservatively estimate recovery

Recovery analysis using PONDS v. 3.3:

Existing ground el. =	60	ft (assumed)
Base of aquifer el. =	51.5	ft
ESHGWT el. =	53	ft
Estimated Kv =	10	ft/day (unsaturated vertical infiltration not used in PONDS analysis)
Estimated Kh =	15	ft/day

Recovery results:

2-yr/24-hr storm =	less than	1.00 hrs
25-yr/24-hr storm =	less than	4.80 hrs

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Section 6
Simulation Description:	Shallow retention areas under Wildlife Crossing No. 1
Project Number:	238275-7
Engineer :	JAG
Supervising Engineer:	
Date:	2/20/14

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	51.50
Water Table Elevation, [WT] (ft datum):	53.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	15.00
Fillable Porosity, [n] (%):	20.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day):	10.0
Maximum Area For Unsaturated Infiltration, [Av] (ft^2):	15054.0

Geometry Data

Equivalent Pond Length, [L] (ft):	225.0
Equivalent Pond Width, [W] (ft):	50.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
58.00	11250.0
59.10	15054.0
60.00	18246.0

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Scenario Input Data

Scenario 1 :: 2-yr/24-hr volume (0.11 ac-ft)

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 4792

Initial ground water level (ft datum) 53.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)
0.010	0.080	0.600	0.760	1.500
0.020	0.090	0.700	0.770	2.000
0.030	0.100	0.710	0.780	2.500
0.040	0.200	0.720	0.790	3.000
0.050	0.300	0.730	0.800	3.500
0.060	0.400	0.740	0.900	4.000
0.070	0.500	0.750	1.000	

Scenario 2 :: 25-yr/24-hr volume (0.31 ac-ft)

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 13504

Initial ground water level (ft datum) 53.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)
0.010	0.090	0.800	2.130	2.300
0.020	0.100	0.900	2.140	2.400
0.030	0.200	1.000	2.150	2.500
0.040	0.300	1.500	2.160	3.000
0.050	0.400	2.000	2.170	3.500
0.060	0.500	2.100	2.180	4.000
0.070	0.600	2.110	2.190	
0.080	0.700	2.120	2.200	

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Detailed Results *:: Scenario 1 :: 2-yr/24-hr volume (0.11 ac-ft)*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	798.6667	0.00000	53.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	798.6667	0.00000	58.40052	1.46258	0	4792.000	8.77602	0	U/P
0.240	0.0000	0.00000	58.30075	1.42914	0	4792.000	1252.08900	0	U/P
0.480	0.0000	0.00000	58.20028	1.38895	0	4792.000	2469.51400	0	U/P
0.720	0.0000	0.00000	58.09978	0.68442	0	4792.000	3652.19000	0	U/P
0.960	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
1.200	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
1.440	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
1.680	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
1.920	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
2.160	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
2.400	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
4.800	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
7.200	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
9.600	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
12.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
14.400	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
16.800	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
17.040	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
17.280	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
17.520	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
17.760	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
18.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
18.240	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
18.480	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
18.720	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
18.960	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
19.200	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
21.600	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
24.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
36.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
48.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
60.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
72.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
84.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry
96.000	0.0000	0.00000	----	----	----	4792.000	4792.00000	0	dry

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Summary of Results ***:: Scenario 1 :: 2-yr/24-hr volume (0.11 ac-ft)***

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	53.00		
Maximum	0.002	58.40		
Inflow				
Rate - Maximum - Positive	0.002		798.6667	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			4792.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			4792.0
Infiltration				
Rate - Maximum - Positive	0.002		1.4626	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.720			3652.2
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			4792.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		4792.0
72 Hour Stage and Infiltration Volume	72.000	Dry		4792.0

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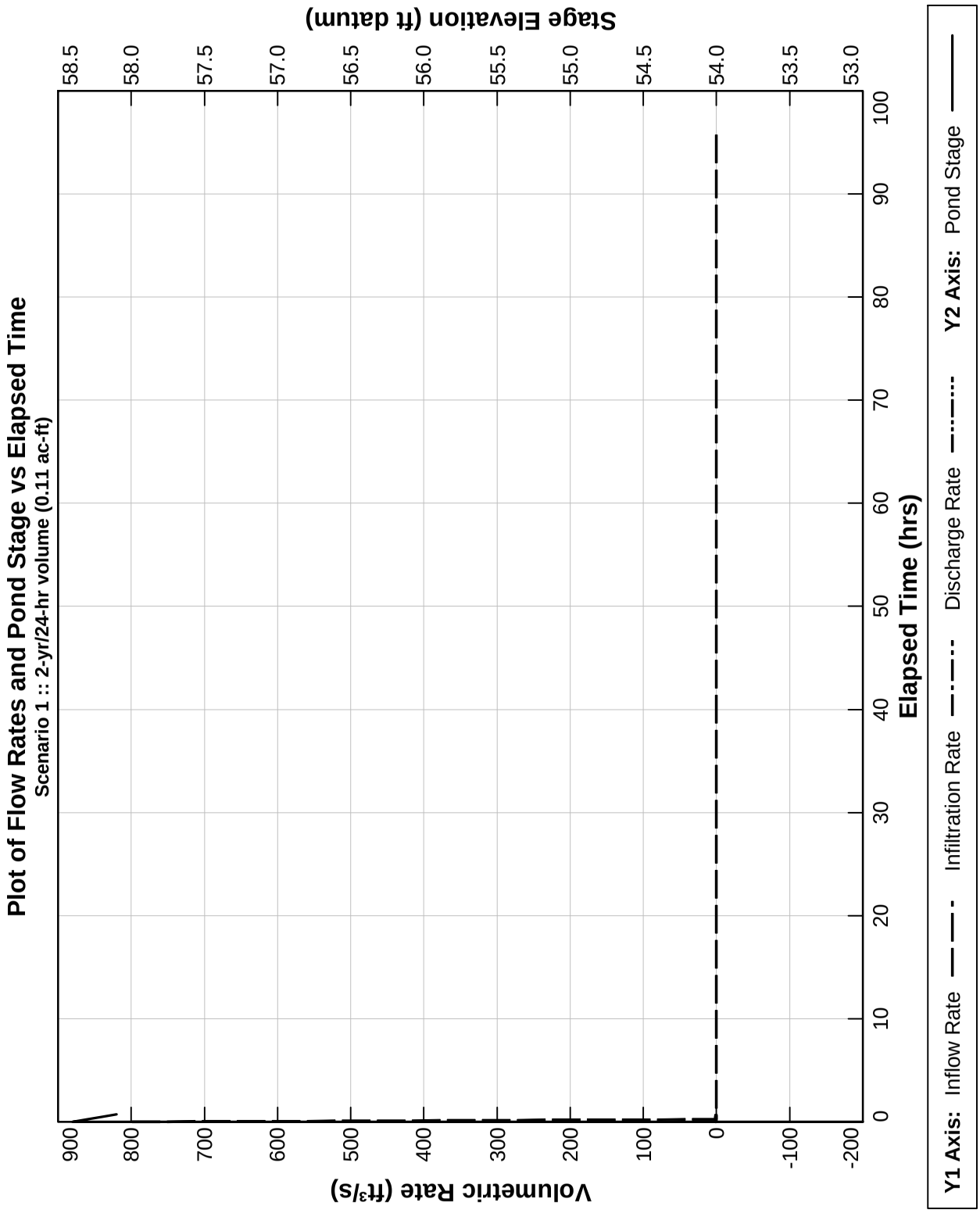

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Detailed Results *:: Scenario 2 :: 25-yr/24-hr volume (0.31 ac-ft)*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	2250.6670	0.00000	53.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	2250.6670	0.00000	59.03484	1.71647	0	13504.000	10.29936	0	U/P
0.240	0.0000	0.00000	58.93515	1.68305	0	13504.000	1471.45800	0	U/P
0.480	0.0000	0.00000	58.83475	1.64289	0	13504.000	2908.27600	0	U/P
0.720	0.0000	0.00000	58.73433	1.60270	0	13504.000	4310.37200	0	U/P
0.960	0.0000	0.00000	58.63391	1.56251	0	13504.000	5677.74100	0	U/P
1.200	0.0000	0.00000	58.53347	1.52231	0	13504.000	7010.38000	0	U/P
1.440	0.0000	0.00000	58.43302	1.48210	0	13504.000	8308.28500	0	U/P
1.680	0.0000	0.00000	58.33256	1.44189	0	13504.000	9571.45200	0	U/P
1.920	0.0000	0.00000	58.23209	1.40168	0	13504.000	10799.88000	0	U/P
2.160	0.0000	0.00000	58.13160	1.36146	0	13504.000	11993.55000	0	U/P
2.400	0.0000	0.00000	58.03110	1.21941	0	13504.000	13152.48000	0	U/P
4.800	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
7.200	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
9.600	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
12.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
14.400	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
16.800	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
19.200	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
21.600	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
24.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
36.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
48.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
50.400	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
50.640	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
50.880	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
51.120	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
51.360	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
51.600	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
51.840	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
52.080	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
52.320	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
52.560	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
52.800	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
55.200	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
57.600	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
60.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
72.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
84.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry
96.000	0.0000	0.00000	----	----	----	13504.000	13504.00000	0	dry

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Summary of Results ***:: Scenario 2 :: 25-yr/24-hr volume (0.31 ac-ft)***

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	53.00		
Maximum	0.002	59.03		
Inflow				
Rate - Maximum - Positive	0.002		2250.6670	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			13504.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			13504.0
Infiltration				
Rate - Maximum - Positive	0.002		1.7165	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	2.400			13152.5
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			13504.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		13504.0
72 Hour Stage and Infiltration Volume	72.000	Dry		13504.0

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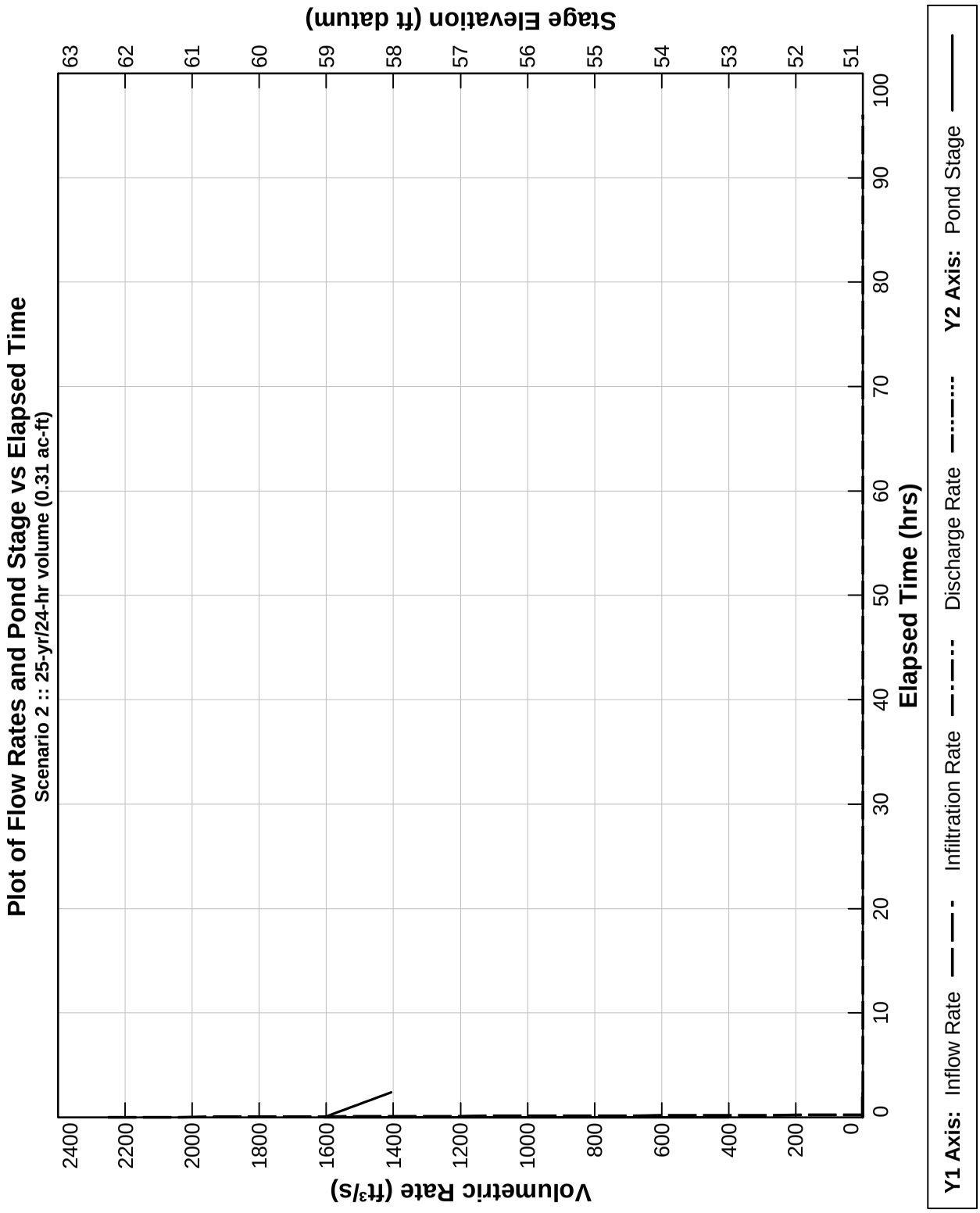


BASIN RS8-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**RS7-E-2A**	
POND:	**RS7-E-2A**	
	PRE	**POST**
TOTAL AREA:	**3.54 Ac**	**10.08 Ac**

* Scenario in which pond RS7-E-2A accepts flow from the western portion of the previously planned RS8-E basin limit.

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Pasture/grassland/range (grazing) -(good)	A	39	0.43			0.43	17
Pasture/grassland/range (grazing) -(good)	D	80	2.52			2.52	202
Woods - (good)	D	77	0.10			0.10	8
Wetland	D	98	0.49			0.49	48
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**3.54**	**0.00**	**0.00**	**3.54**	**274.09**

Composite CN = 77
S = 2.915

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Open Space (good) - grass >75%	D	80	1.37			1.37	110
Imperv. - paved parking lots,roofs,drives	D	98		4.69		4.69	460
Pond Basin							
Open Space (good) - grass >75%	D	80	4.02			4.02	322
TOTAL			**5.39**	**4.69**	**0.00**	**10.08**	**890.76**

Composite CN = 88
S = 1.315

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	4.87	6.12	1.44	5.14	**3.71**
25YR - 24HR	8.64	5.92	7.24	1.75	6.08	**4.34**
100YR - 24HR	10.60	7.76	9.17	2.29	7.70	**5.41**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.84 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.91 Ac-Ft
Additional 50% treatment for O.F.W. =	0.45 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**1.36 Ac-Ft**

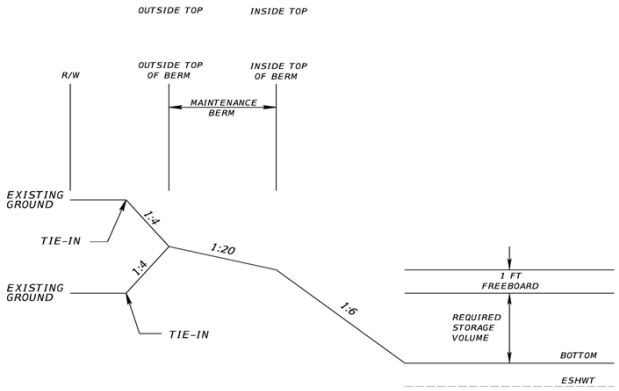
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

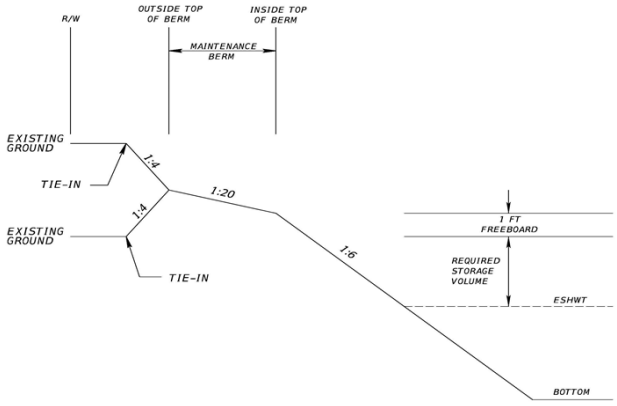
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	55	2.67	430	270	0.00
Max Storage El	**57**	3.06	454	294	**5.73**
Inside Top of Berm	58	3.27	466	306	8.90
Outside Top of Berm	59	4.02	506	346	12.54

Required Storage =	**4.34 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**57.0 ft**	
Required Storage El =	**56.51 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	55	2.67	-	-	0.00	0.00
Inside Top of Berm	58	3.28	2.98	3.0	8.93	8.93
Outside Top of Berm	59	4.00	3.64	1.0	3.64	12.57

Required Storage =	**4.34 ac-ft**
Max Storage El =	**57.0 ft**
Provided Storage El =	**56.46 ft**

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Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Parkway - Section 6
Simulation Description:	PAV Recovery for pond RS7-E-2A
Project Number:	23827575201
Engineer :	Bill Whitegon, PE
Supervising Engineer:	Alex George, PE
Date:	03-24-2014

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	50.00
Water Table Elevation, [WT] (ft datum):	52.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	20.00
Fillable Porosity, [n] (%):	25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day):	10.0
Maximum Area For Unsaturated Infiltration, [Av] (ft^2):	120362.0

Geometry Data

Equivalent Pond Length, [L] (ft):	430.0
Equivalent Pond Width, [W] (ft):	270.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
55.00	116305.0
58.00	142877.0
59.00	174240.0

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Scenario Input Data

Scenario 1 :: PAV Recovery

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 59242

Initial ground water level (ft datum) 52.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)
0.042	0.090	1.500	4.000
0.050	0.100	2.000	
0.060	0.250	2.500	
0.070	0.500	3.000	
0.080	1.000	3.500	

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Detailed Results *:: Scenario 1 :: PAV Recovery*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	9873.6670	0.00000	52.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	9873.6670	0.00000	55.49916	13.93053	0	59242.000	83.58472	0	U/P
1.000	0.0000	0.00000	55.08267	2.29929	0	59242.000	49596.91000	0	U/P
1.200	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
1.440	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
1.680	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
1.920	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
2.160	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
2.400	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
6.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
12.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
24.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
36.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
48.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
60.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
72.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
84.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry
96.000	0.0000	0.00000	----	----	----	59242.000	59242.00000	0	dry

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Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Summary of Results *:: Scenario 1 :: PAV Recovery*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	52.00		
Maximum	0.002	55.50		
Inflow				
Rate - Maximum - Positive	0.002		9873.6670	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			59242.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			59242.0
Infiltration				
Rate - Maximum - Positive	0.002		13.9305	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	1.000			49596.9
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			59242.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	Dry		59242.0
72 Hour Stage and Infiltration Volume	72.000	Dry		59242.0

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Retention Pond Recovery - Refined Method

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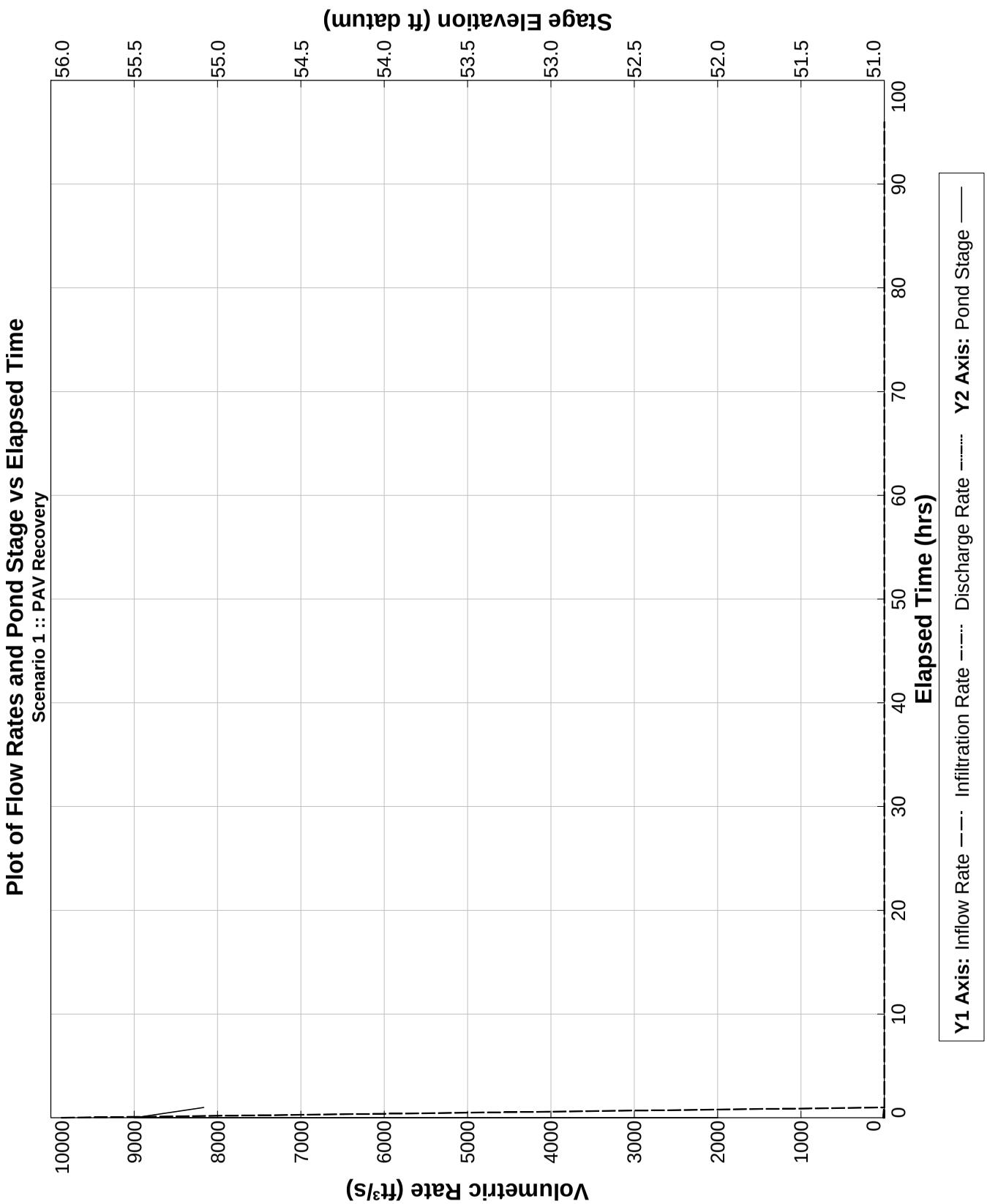


WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**SR-46**	
POND:	**RS7-E-3**	
	PRE	**POST**
TOTAL AREA:	**0.00 Ac**	**4.44 Ac**

* Scenario in which additional treatment is needed to meet pollutant loading criteria within the Rock Springs Run basin. This will be for treatment only, no attenuation.

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
		0				0.00	0
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Composite CN = #DIV/0!
S = #DIV/0!

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		1.83		1.83	180
Imperv. - rds paved open ditch (incl ROW)	D	93	1.63			1.63	151
Pond Basin							
Open Space (good) - grass >75%	D	80	0.98			0.98	78
TOTAL			**2.61**	**1.83**	**0.00**	**4.44**	**409.28**

Composite CN = 92
S = 0.846

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	#DIV/0!	6.57	#DIV/0!	2.43	**0.00**
25YR - 24HR	8.64	#DIV/0!	7.70	#DIV/0!	2.85	**0.00**
100YR - 24HR	10.60	#DIV/0!	9.65	#DIV/0!	3.57	**0.00**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.37 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.38 Ac-Ft
Additional 50% treatment for O.F.W. =	0.19 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**0.56 Ac-Ft**

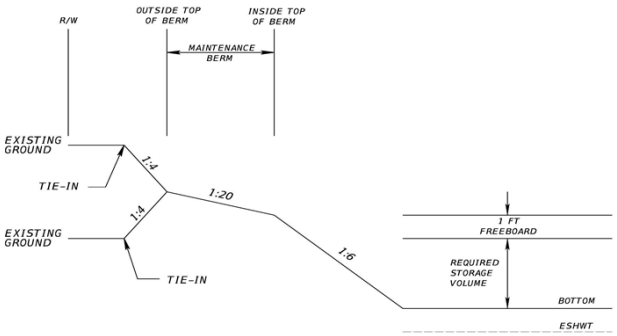
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

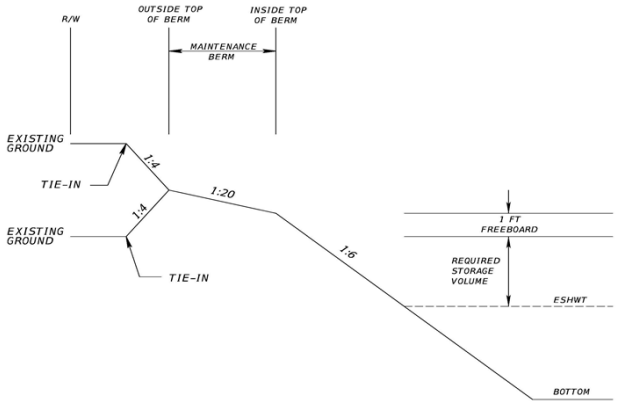
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	52	0.42	178	102	0.00
Max Storage El	**53.5**	0.54	196	120	**0.72**
Inside Top of Berm	54.5	0.63	208	132	1.30
Outside Top of Berm	55.5	0.98	248	172	2.11

Required Storage =	**0.56 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**53.5 ft**	
Required Storage El =	**53.18 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	52	0.42	-	-	0.00	0.00
Inside Top of Berm	54.5	0.63	0.53	2.5	1.31	1.31
Outside Top of Berm	55.5	0.96	0.80	1.0	0.80	2.11

Required Storage =	**0.56 ac-ft**
Max Storage El =	**53.5 ft**
Provided Storage El =	**53.07 ft**

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Project Data

Project Name:	Wekiva Parkway - Section 6
Simulation Description:	PAV Recovery for pond RS7-E-3
Project Number:	23827575201
Engineer :	Bill Whitegon, PE
Supervising Engineer:	Alex George, PE
Date:	02-24-2014

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	48.00
Water Table Elevation, [WT] (ft datum):	49.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	20.00
Fillable Porosity, [n] (%):	25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day):	10.0
Maximum Area For Unsaturated Infiltration, [Av] (ft^2):	31363.0

Geometry Data

Equivalent Pond Length, [L] (ft):	225.0
Equivalent Pond Width, [W] (ft):	140.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
52.00	18295.0
54.50	57063.0

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Scenario Input Data

Scenario 1 :: PAV Recovery

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 31363

Initial ground water level (ft datum) 49.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)
0.042	0.090	1.500	4.000
0.050	0.100	2.000	
0.060	0.250	2.500	
0.070	0.500	3.000	
0.080	1.000	3.500	

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Detailed Results *:: Scenario 1 :: PAV Recovery*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	5227.1670	0.00000	49.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	5227.1670	0.00000	53.15133	3.62996	0	31363.000	21.77986	0	U/P
1.000	0.0000	0.00000	52.75801	3.47055	0	31363.000	13040.02000	0	U/P
1.200	0.0000	0.00000	52.67376	3.36117	0	31363.000	15516.93000	0	U/P
1.440	0.0000	0.00000	52.57282	3.17577	0	31363.000	18339.07000	0	U/P
1.680	0.0000	0.00000	52.47183	2.99453	0	31363.000	21004.66000	0	U/P
1.920	0.0000	0.00000	52.37078	2.63437	0	31363.000	23513.62000	0	U/P
2.160	0.0000	0.00000	52.28334	1.47527	0	31363.000	25556.85000	0	U/S
2.400	0.0000	0.00000	52.26086	0.56167	0	31363.000	26062.88000	0	S
6.000	0.0000	0.00000	52.13884	0.16503	0	31363.000	28673.38000	0	S
12.000	0.0000	0.00000	52.02356	0.07293	0	31363.000	30927.57000	0	S
24.000	0.0000	0.00000	51.75484	0.00504	0	31363.000	31363.00000	0	S
36.000	0.0000	0.00000	51.55679	0.00000	0	31363.000	31363.00000	0	S
48.000	0.0000	0.00000	51.40915	0.00000	0	31363.000	31363.00000	0	S
60.000	0.0000	0.00000	51.29163	0.00000	0	31363.000	31363.00000	0	S
72.000	0.0000	0.00000	51.19416	0.00000	0	31363.000	31363.00000	0	S
84.000	0.0000	0.00000	51.11101	0.00000	0	31363.000	31363.00000	0	S
96.000	0.0000	0.00000	51.03860	----	----	31363.000	31363.00000	0	N.A.

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Summary of Results :: *Scenario 1 :: PAV Recovery*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	49.00		
Maximum	0.002	53.15		
Inflow				
Rate - Maximum - Positive	0.002		5227.1670	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			31363.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			31363.0
Infiltration				
Rate - Maximum - Positive	0.002		3.6300	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	24.000			31363.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			31363.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	51.56		31363.0
72 Hour Stage and Infiltration Volume	72.000	51.19		31363.0

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

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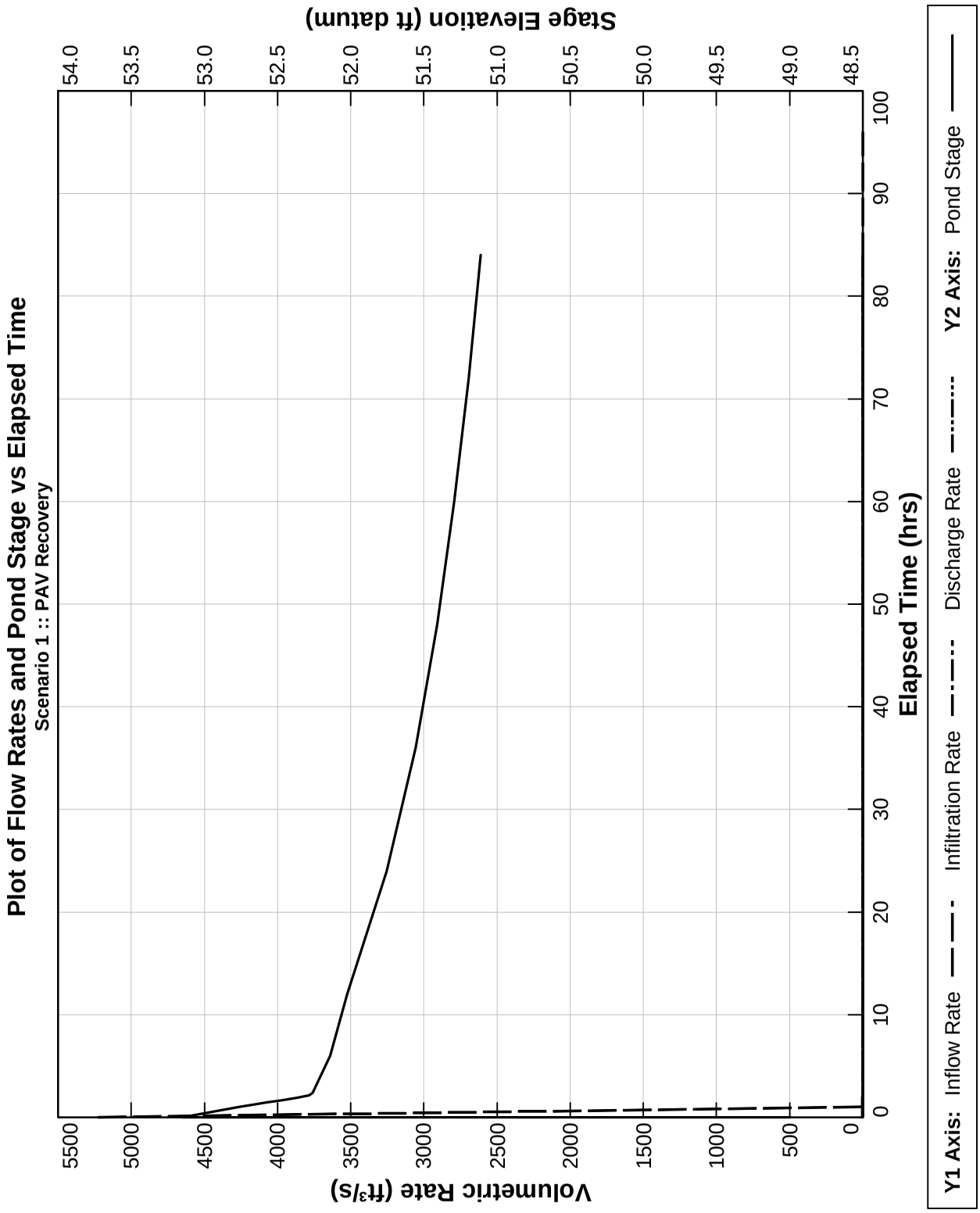


Treatment Swale
Design and Routing

Project:	Wekiva Parkway 6 -- Treatment Swale Option on South Side of SR 46							Designer:	JAG
Basin:	Wildlife crossing	Basin Limits:	Sta 477+50	to	Sta 491+00	Side:	RT	Date:	2/20/2014

Basin Area		CN	Input data in Blue areas only			25-yr/24-hr Rainfall =	8.64 in
Impervious Area =	0.496 ac	CN =98	Kv ft/day (vertical) =	9.00 ft/day	= 0.00010 ft/sec		
Pervious Area =	0.899 ac	CN =39	Kh ft/day (horizontal)=	18.00 ft/day	= 0.00021 ft/sec		
Basin Area =	1.395 ac		Composite CN =	60.0	Safety Factor (SF) =	2	
Treatment Area:		Average Swale Width @ 1.0 ft Deep =	13.00 ft	Length =	1350.00 ft	Infiltration Area (A)=	17550 sq-ft

Infiltration Rate in Treatment Area (cfs) (A*Kv(ft/sec))/SF = 0.914 cfs

Treatment Area Infiltration Volume for ΔT (30 min) = 1645 cu-ft

Runoff Volume (SBUH Method)					Infiltration Volume		
Time (hr.) T	FL Mod SCS Type II Rainfall Ratio P/P_{24}	Rainfall (inches) P	Runoff (inches) R	(ΔT) Runoff Volume (cu-ft) (ΔT = 0.5 hr)	(ΔT) Runoff Volume Infiltrated in Swale (cu-ft)	(ΔT) Excess Runoff Volume in Swale (cu-ft)	Additional Swale Storage Provided
0.0	0.000	0.000	0.000	0	0	0 cu-ft	Additional Storage needed: 0 cu-ft
0.5	0.006	0.052	0.000	0	0	0 cu-ft	
1.0	0.012	0.104	0.000	0	0	0 cu-ft	
1.5	0.019	0.164	0.000	0	0	0 cu-ft	Top Elevation 54.00
2.0	0.025	0.216	0.000	0	0	0 cu-ft	Ditch Bottom Elev. 53.00
2.5	0.032	0.276	0.000	0	0	0 cu-ft	Swale Design
3.0	0.039	0.337	0.000	0	0	0 cu-ft	Side Slope BW Side Slope Grade
3.5	0.047	0.406	0.000	0	0	0 cu-ft	1 : 6 5.0 1 : 2 0.000%
4.0	0.054	0.467	0.000	0	0	0 cu-ft	Swale Length 1350.00 ft
4.5	0.062	0.536	0.000	0	0	0 cu-ft	Swale Depth: 1.00 ft
5.0	0.071	0.613	0.000	0	0	0 cu-ft	Storage Provided 12150 cu-ft
5.5	0.080	0.691	0.000	0	0	0 cu-ft	
6.0	0.089	0.769	0.000	0	0	0 cu-ft	
6.5	0.099	0.855	0.000	0	0	0 cu-ft	
7.0	0.110	0.950	0.000	0	0	0 cu-ft	
7.5	0.122	1.054	0.000	0	0	0 cu-ft	
8.0	0.134	1.158	0.000	0	0	0 cu-ft	
8.5	0.148	1.279	0.000	0	0	0 cu-ft	
9.0	0.164	1.417	0.000	0	0	0 cu-ft	
9.5	0.181	1.564	0.000	0	0	0 cu-ft	
10.0	0.201	1.737	0.000	0	0	0 cu-ft	
10.5	0.226	1.953	0.046	483	483	0 cu-ft	
11.0	0.258	2.229	0.132	619	619	0 cu-ft	
11.5	0.308	2.661	0.293	966	966	0 cu-ft	
12.0	0.607	5.244	1.716	5779	1645	4134 cu-ft	
12.5	0.719	6.212	2.383	2165	1645	4653 cu-ft	
13.0	0.757	6.540	2.621	734	734	3743 cu-ft	
13.5	0.785	6.782	2.799	541	541	2639 cu-ft	
14.0	0.807	6.972	2.940	425	425	1418 cu-ft	
14.5	0.826	7.137	3.064	367	367	140 cu-ft	
15.0	0.842	7.275	3.169	309	309	0 cu-ft	
15.5	0.857	7.404	3.268	290	290	0 cu-ft	
16.0	0.870	7.517	3.354	251	251	0 cu-ft	
16.5	0.882	7.620	3.434	232	232	0 cu-ft	
17.0	0.893	7.716	3.508	213	213	0 cu-ft	
17.5	0.904	7.811	3.582	213	213	0 cu-ft	
18.0	0.913	7.888	3.642	174	174	0 cu-ft	
18.5	0.923	7.975	3.710	193	193	0 cu-ft	
19.0	0.931	8.044	3.764	155	155	0 cu-ft	
19.5	0.940	8.122	3.826	174	174	0 cu-ft	
20.0	0.948	8.191	3.881	155	155	0 cu-ft	
20.5	0.955	8.251	3.929	135	135	0 cu-ft	
21.0	0.962	8.312	3.977	135	135	0 cu-ft	
21.5	0.969	8.372	4.025	135	135	0 cu-ft	
22.0	0.976	8.433	4.073	135	135	0 cu-ft	
22.5	0.983	8.493	4.122	135	135	0 cu-ft	Additional Storage needed: 0 cu-ft
23.0	0.989	8.545	4.163	116	116	0 cu-ft	Total Storage provided: 12150 cu-ft
23.5	0.995	8.597	4.205	116	116	0 cu-ft	Offsite Runoff = 0 cu-ft
24.0	1.000	8.640	4.240	97	97	0 cu-ft	

Treatment Swale
Design and Routing

Project:	Wekiva Parkway 6 -- Treatment Swale Option on South Side of SR 46							Designer:	JAG
Basin:	Wildlife crossing	Basin Limits:	Sta 491+00	to	Sta 509+00	Side:	RT	Date:	2/20/2014

Basin Area		CN	Input data in Blue areas only			25-yr/24-hr Rainfall =	8.64 in
Impervious Area =	0.661 ac	CN =98	Kv ft/day (vertical) =	9.00 ft/day	= 0.00010 ft/sec		
Pervious Area =	1.198 ac	CN =39	Kh ft/day (horizontal)=	18.00 ft/day	= 0.00021 ft/sec		
Basin Area =	1.860 ac		Composite CN =	60.0	Safety Factor (SF) =	2	
Treatment Area:		Average Swale Width @ 1.0 ft Deep =	13.00 ft	Length =	1800.00 ft	Infiltration Area (A)=	23400 sq-ft

Infiltration Rate in Treatment Area (cfs) (A*Kv(ft/sec))/SF = 1.219 cfs

Treatment Area Infiltration Volume for ΔT (30 min) = 2194 cu-ft

Runoff Volume (SBUH Method)					Infiltration Volume		
Time (hr.) T	FL Mod SCS Type II Rainfall Ratio P/P_{24}	Rainfall (inches) P	Runoff (inches) R	(ΔT) Runoff Volume (cu-ft) (ΔT = 0.5 hr)	(ΔT) Runoff Volume Infiltrated in Swale (cu-ft)	(ΔT) Excess Runoff Volume in Swale (cu-ft)	Additional Swale Storage Provided
0.0	0.000	0.000	0.000	0	0	0 cu-ft	Additional Storage needed: 0 cu-ft
0.5	0.006	0.052	0.000	0	0	0 cu-ft	
1.0	0.012	0.104	0.000	0	0	0 cu-ft	
1.5	0.019	0.164	0.000	0	0	0 cu-ft	Top Elevation 54.00
2.0	0.025	0.216	0.000	0	0	0 cu-ft	Ditch Bottom Elev. 53.00
2.5	0.032	0.276	0.000	0	0	0 cu-ft	Swale Design
3.0	0.039	0.337	0.000	0	0	0 cu-ft	Side Slope BW Side Slope Grade
3.5	0.047	0.406	0.000	0	0	0 cu-ft	1 : 6 5.0 1 : 2 0.000%
4.0	0.054	0.467	0.000	0	0	0 cu-ft	Swale Length 1800.00 ft
4.5	0.062	0.536	0.000	0	0	0 cu-ft	Swale Depth: 1.00 ft
5.0	0.071	0.613	0.000	0	0	0 cu-ft	Storage Provided 16200 cu-ft
5.5	0.080	0.691	0.000	0	0	0 cu-ft	
6.0	0.089	0.769	0.000	0	0	0 cu-ft	
6.5	0.099	0.855	0.000	0	0	0 cu-ft	
7.0	0.110	0.950	0.000	0	0	0 cu-ft	
7.5	0.122	1.054	0.000	0	0	0 cu-ft	
8.0	0.134	1.158	0.000	0	0	0 cu-ft	
8.5	0.148	1.279	0.000	0	0	0 cu-ft	
9.0	0.164	1.417	0.000	0	0	0 cu-ft	
9.5	0.181	1.564	0.000	0	0	0 cu-ft	
10.0	0.201	1.737	0.000	0	0	0 cu-ft	
10.5	0.226	1.953	0.046	644	644	0 cu-ft	
11.0	0.258	2.229	0.132	825	825	0 cu-ft	
11.5	0.308	2.661	0.293	1289	1289	0 cu-ft	
12.0	0.607	5.244	1.716	7706	2194	5512 cu-ft	
12.5	0.719	6.212	2.383	2886	2194	6205 cu-ft	
13.0	0.757	6.540	2.621	979	979	4990 cu-ft	
13.5	0.785	6.782	2.799	722	722	3518 cu-ft	
14.0	0.807	6.972	2.940	567	567	1891 cu-ft	
14.5	0.826	7.137	3.064	490	490	187 cu-ft	
15.0	0.842	7.275	3.169	412	412	0 cu-ft	
15.5	0.857	7.404	3.268	387	387	0 cu-ft	
16.0	0.870	7.517	3.354	335	335	0 cu-ft	
16.5	0.882	7.620	3.434	309	309	0 cu-ft	
17.0	0.893	7.716	3.508	283	283	0 cu-ft	
17.5	0.904	7.811	3.582	283	283	0 cu-ft	
18.0	0.913	7.888	3.642	232	232	0 cu-ft	
18.5	0.923	7.975	3.710	258	258	0 cu-ft	
19.0	0.931	8.044	3.764	206	206	0 cu-ft	
19.5	0.940	8.122	3.826	232	232	0 cu-ft	
20.0	0.948	8.191	3.881	206	206	0 cu-ft	
20.5	0.955	8.251	3.929	180	180	0 cu-ft	
21.0	0.962	8.312	3.977	180	180	0 cu-ft	
21.5	0.969	8.372	4.025	180	180	0 cu-ft	
22.0	0.976	8.433	4.073	180	180	0 cu-ft	
22.5	0.983	8.493	4.122	180	180	0 cu-ft	Additional Storage needed: 0 cu-ft
23.0	0.989	8.545	4.163	155	155	0 cu-ft	Total Storage provided: 16200 cu-ft
23.5	0.995	8.597	4.205	155	155	0 cu-ft	Offsite Runoff = 0 cu-ft
24.0	1.000	8.640	4.240	129	129	0 cu-ft	

Treatment Swale
Design and Routing

Project:	Wekiva Parkway 6 -- Treatment Swale Option on South Side of SR 46							Designer:	JAG
Basin:	Wildlife crossing	Basin Limits:	Sta 509+00	to	Sta 528+00	Side:	RT	Date:	2/20/2014

Basin Area		CN	Input data in Blue areas only			25-yr/24-hr Rainfall =	8.64 in
Impervious Area =	0.698 ac	CN =98	Kv ft/day (vertical) =	9.00 ft/day	= 0.00010 ft/sec		
Pervious Area =	1.265 ac	CN =39	Kh ft/day (horizontal)=	18.00 ft/day	= 0.00021 ft/sec		
Basin Area =	1.963 ac		Composite CN =	60.0	Safety Factor (SF) =	2	
Treatment Area:		Average Swale Width @ 1.0 ft Deep =	13.00 ft	Length =	1900.00 ft	Infiltration Area (A)=	24700 sq-ft

Infiltration Rate in Treatment Area (cfs) (A*Kv(ft/sec))/SF = 1.286 cfs

Treatment Area Infiltration Volume for ΔT (30 min) = 2316 cu-ft

Runoff Volume (SBUH Method)					Infiltration Volume		
Time (hr.) T	FL Mod SCS Type II Rainfall Ratio P/P_{24}	Rainfall (inches) P	Runoff (inches) R	(ΔT) Runoff Volume (cu-ft) (ΔT = 0.5 hr)	(ΔT) Runoff Volume Infiltrated in Swale (cu-ft)	(ΔT) Excess Runoff Volume in Swale (cu-ft)	Additional Swale Storage Provided
0.0	0.000	0.000	0.000	0	0	0 cu-ft	Additional Storage needed: 0 cu-ft
0.5	0.006	0.052	0.000	0	0	0 cu-ft	
1.0	0.012	0.104	0.000	0	0	0 cu-ft	
1.5	0.019	0.164	0.000	0	0	0 cu-ft	Top Elevation 54.00
2.0	0.025	0.216	0.000	0	0	0 cu-ft	Ditch Bottom Elev. 53.00
2.5	0.032	0.276	0.000	0	0	0 cu-ft	Swale Design
3.0	0.039	0.337	0.000	0	0	0 cu-ft	Side Slope BW Side Slope Grade
3.5	0.047	0.406	0.000	0	0	0 cu-ft	1 : 6 5.0 1 : 2 0.000%
4.0	0.054	0.467	0.000	0	0	0 cu-ft	Swale Length 1900.00 ft
4.5	0.062	0.536	0.000	0	0	0 cu-ft	Swale Depth: 1.00 ft
5.0	0.071	0.613	0.000	0	0	0 cu-ft	Storage Provided 17100 cu-ft
5.5	0.080	0.691	0.000	0	0	0 cu-ft	
6.0	0.089	0.769	0.000	0	0	0 cu-ft	
6.5	0.099	0.855	0.000	0	0	0 cu-ft	
7.0	0.110	0.950	0.000	0	0	0 cu-ft	
7.5	0.122	1.054	0.000	0	0	0 cu-ft	
8.0	0.134	1.158	0.000	0	0	0 cu-ft	
8.5	0.148	1.279	0.000	0	0	0 cu-ft	
9.0	0.164	1.417	0.000	0	0	0 cu-ft	
9.5	0.181	1.564	0.000	0	0	0 cu-ft	
10.0	0.201	1.737	0.000	0	0	0 cu-ft	
10.5	0.226	1.953	0.046	680	680	0 cu-ft	
11.0	0.258	2.229	0.132	871	871	0 cu-ft	
11.5	0.308	2.661	0.293	1360	1360	0 cu-ft	
12.0	0.607	5.244	1.716	8134	2316	5818 cu-ft	
12.5	0.719	6.212	2.383	3047	2316	6549 cu-ft	
13.0	0.757	6.540	2.621	1034	1034	5267 cu-ft	
13.5	0.785	6.782	2.799	762	762	3714 cu-ft	
14.0	0.807	6.972	2.940	598	598	1996 cu-ft	
14.5	0.826	7.137	3.064	517	517	198 cu-ft	
15.0	0.842	7.275	3.169	435	435	0 cu-ft	
15.5	0.857	7.404	3.268	408	408	0 cu-ft	
16.0	0.870	7.517	3.354	354	354	0 cu-ft	
16.5	0.882	7.620	3.434	326	326	0 cu-ft	
17.0	0.893	7.716	3.508	299	299	0 cu-ft	
17.5	0.904	7.811	3.582	299	299	0 cu-ft	
18.0	0.913	7.888	3.642	245	245	0 cu-ft	
18.5	0.923	7.975	3.710	272	272	0 cu-ft	
19.0	0.931	8.044	3.764	218	218	0 cu-ft	
19.5	0.940	8.122	3.826	245	245	0 cu-ft	
20.0	0.948	8.191	3.881	218	218	0 cu-ft	
20.5	0.955	8.251	3.929	190	190	0 cu-ft	
21.0	0.962	8.312	3.977	190	190	0 cu-ft	
21.5	0.969	8.372	4.025	190	190	0 cu-ft	
22.0	0.976	8.433	4.073	190	190	0 cu-ft	
22.5	0.983	8.493	4.122	190	190	0 cu-ft	Additional Storage needed: 0 cu-ft
23.0	0.989	8.545	4.163	163	163	0 cu-ft	Total Storage provided: 17100 cu-ft
23.5	0.995	8.597	4.205	163	163	0 cu-ft	Offsite Runoff = 0 cu-ft
24.0	1.000	8.640	4.240	136	136	0 cu-ft	

BASIN BW1A-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1A-E**	
POND:	**BW1A-E-6**	
	PRE	**POST**
TOTAL AREA:	**4.11 Ac**	**4.96 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Pasture/grassland/range (grazing) -(good)	A	39	1.30			1.30	51
Pasture/grassland/range (grazing) -(good)	D	80	0.02			0.02	2
Imperv. - rds paved open ditch (incl ROW)	A	83	0.85			0.85	71
Pond Basin							
Woods/Grass combination - (good)	A	32	1.76			1.76	56
Woods/Grass combination - (good)	D	79	0.18			0.18	14
TOTAL			**4.11**	**0.00**	**0.00**	**4.11**	**193.25**

Composite CN = 47
S = 11.245

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		1.23		1.23	121
Open Space (good) - grass >75%	D	80	1.79			1.79	143
Pond Basin							
Open Space (good) - grass >75%	D	80	1.94			1.94	155
Water Surface	N/A	100				0.00	0
TOTAL			**3.73**	**1.23**	**0.00**	**4.96**	**418.59**

Composite CN = 84
S = 1.839

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	1.67	5.67	0.57	2.34	**1.77**
25YR - 24HR	8.64	2.32	6.77	0.79	2.79	**2.00**
100YR - 24HR	10.60	3.56	8.67	1.22	3.58	**2.36**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.41 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.33 Ac-Ft
Additional 50% treatment for O.F.W. =	0.21 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**0.62 Ac-Ft**

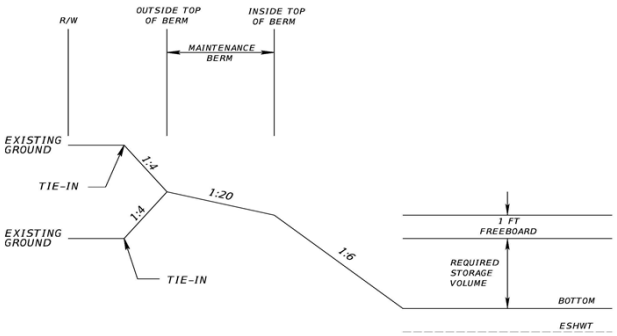
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

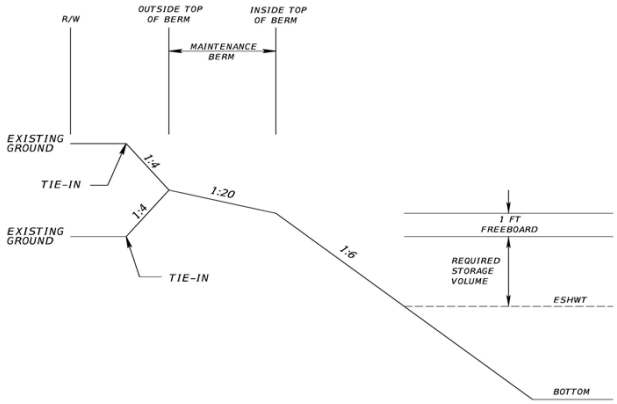
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	50	0.98	352	121	0.00
Max Storage El	**52**	1.25	376	145	**2.23**
Inside Top of Berm	53	1.40	388	157	3.55
Outside Top of Berm	54	1.94	428	197	5.22

Required Storage =	**2.00 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**52.0 ft**	
Required Storage El =	**51.80 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	50	0.98	-	-	0.00	0.00
Inside Top of Berm	53	1.39	1.19	3.0	3.56	3.56
Outside Top of Berm	54	1.91	1.65	1.0	1.65	5.21

Required Storage =	**2.00 ac-ft**
Max Storage El =	**52.0 ft**
Provided Storage El =	**51.69 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1A-E**	
POND:	**BW1A-E-7**	
	PRE	**POST**
TOTAL AREA:	**3.99 Ac**	**4.35 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Pasture/grassland/range (grazing) -(good)	A	39	1.30			1.30	51
Pasture/grassland/range (grazing) -(good)	D	80	0.02			0.02	2
Imperv. - rds paved open ditch (incl ROW)	A	83	0.85	0.49		1.34	111
Pond Basin							
Pasture/grassland/range (grazing) -(good)	D	80	1.33			1.33	106
TOTAL			**3.50**	**0.49**	**0.00**	**3.99**	**269.92**

Composite CN = **68**
S = **4.782**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		1.23		1.23	121
Open Space (good) - grass >75%	D	80	1.79			1.79	143
Pond Basin							
Open Space (good) - grass >75%	D	80	1.33			1.33	106
Water Surface	N/A	100				0.00	0
TOTAL			**3.12**	**1.23**	**0.00**	**4.35**	**370.14**

Composite CN = **85**
S = **1.752**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	3.78	5.74	1.26	2.08	**0.82**
25YR - 24HR	8.64	4.74	6.84	1.57	2.48	**0.91**
100YR - 24HR	10.60	6.45	8.75	2.14	3.17	**1.03**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.36 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.31 Ac-Ft
Additional 50% treatment for O.F.W. =	0.18 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**0.54 Ac-Ft**

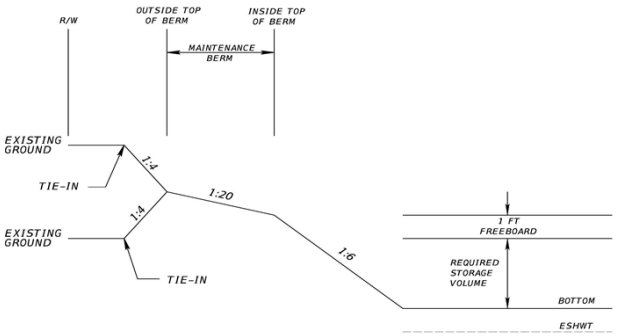
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

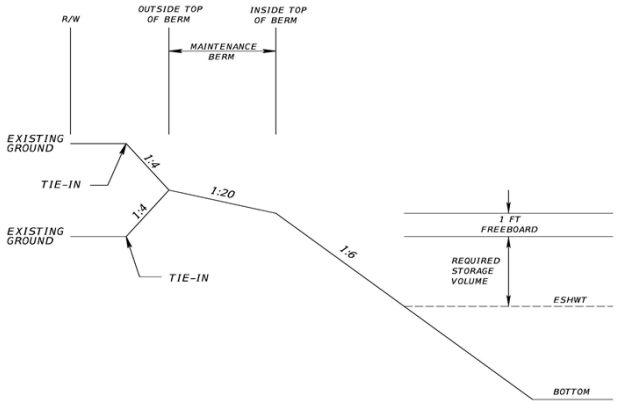
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	47	0.56	273	90	0.00
Max Storage El	**49**	0.78	297	114	**1.34**
Inside Top of Berm	50	0.89	309	126	2.18
Outside Top of Berm	51	1.33	349	166	3.29

Required Storage =	**0.91 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**49.0 ft**	
Required Storage El =	**48.35 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	47	0.56	-	-	0.00	0.00
Inside Top of Berm	50	0.88	0.72	3.0	2.16	2.16
Outside Top of Berm	51	1.30	1.09	1.0	1.09	3.25

Required Storage =	**0.91 ac-ft**
Max Storage El =	**49.0 ft**
Provided Storage El =	**48.26 ft**

BASIN BW1-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1-E**	
POND:	**BW1-E-2 & 3**	
	PRE	**POST**
TOTAL AREA:	**34.40 Ac**	**44.40 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Farmsteads	A	59	3.52			3.52	208
Farmsteads	B	74	2.46			2.46	182
Woods - (good)	A	30	0.23			0.23	7
Woods - (good)	D	77	0.06			0.06	5
Pasture/grassland/range (grazing) -(good)	A	39	2.04			2.04	80
Pasture/grassland/range (grazing) -(good)	D	80	9.87			9.87	790
Imperv. - rds paved open ditch (incl ROW)	A	83		5.04		5.04	418
Imperv. - rds paved open ditch (incl ROW)	B	89		0.75		0.75	67
Imperv. - rds paved open ditch (incl ROW)	D	93		0.54		0.54	50
Residential - 2 acre	A	46	1.08			1.08	50
Residential - 2 acre	B	65	0.28			0.28	18
Pond Basin							
Woods - (good)	A	30	2.13			2.13	64
Woods - (good)	D	77	2.13			2.13	164
Pasture/grassland/range (grazing) -(good)	D	80	2.13			2.13	171
Imperv. - rds paved open ditch (incl ROW)	D	93	2.13			2.13	198
TOTAL			**28.07**	**6.33**	**0.00**	**34.40**	**2,470.72**

Composite CN = 72
S = 3.923

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		18.58		18.58	1,821
Open Space (fair) - grass, 50-75%	D	84	17.29			17.29	1,452
Pond Basin							
Open Space (good) - grass >75%	D	80	3.35			3.35	268
Water Surface	N/A	100			5.18	5.18	518
TOTAL			**20.64**	**18.58**	**5.18**	**44.40**	**4,059.18**

Composite CN = 91
S = 0.938

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	4.24	6.48	12.15	23.98	**11.83**
25YR - 24HR	8.64	5.24	7.61	15.02	28.15	**13.13**
100YR - 24HR	10.60	7.01	9.55	20.10	35.34	**15.24**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	3.70 Ac-Ft
2.5-in x Impervious Area =	3.87 Ac-Ft
Additional 50% treatment for O.F.W. =	1.94 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**5.81 Ac-Ft**

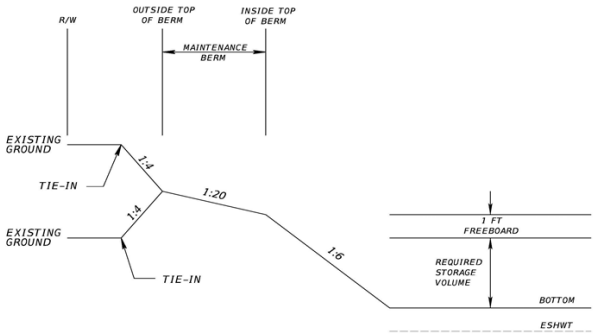
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

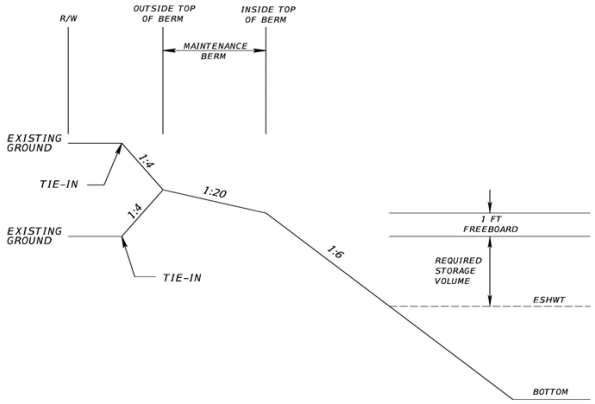
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	42.5	5.18	1555	145	0.00
Max Storage El	**45**	6.37	1585	175	**14.43**
Inside Top of Berm	46	6.86	1597	187	21.04
Outside Top of Berm	47	8.53	1637	227	28.73

Required Storage =	**13.13 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**45.0 ft**	
Required Storage El =	**44.77 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	42.5	5.16	-	-	0.00	0.00
Inside Top of Berm	46	6.86	6.01	3.5	21.04	21.04
Outside Top of Berm	47	8.59	7.73	1.0	7.73	28.76

Required Storage =	**13.13 ac-ft**
Max Storage El =	**45.0 ft**
Provided Storage El =	**44.68 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1-E**	
POND:	**BW1-E-4**	
	PRE	**POST**
TOTAL AREA:	**8.11 Ac**	**9.78 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Woods - (good)	D	77	1.29			1.29	99
Pasture/grassland/range (grazing) -(good)	D	80	3.79			3.79	303
Imperv. - rds paved open ditch (incl ROW)	D	93		1.42		1.42	132
Pond Basin							
Pasture/grassland/range (grazing) -(good)	D	80	1.61			1.61	129
TOTAL			**6.69**	**1.42**	**0.00**	**8.11**	**663.60**

Composite CN = **82**
S = **2.225**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		3.33		3.33	326
Open Space (fair) - grass, 50-75%	D	84	4.84			4.84	407
Pond Basin							
Open Space (good) - grass >75%	D	80	0.97			0.97	78
Water Surface	N/A	100			0.64	0.64	64
TOTAL			**5.81**	**3.33**	**0.64**	**9.78**	**874.76**

Composite CN = **89**
S = **1.183**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	5.36	6.25	3.63	5.09	**1.47**
25YR - 24HR	8.64	6.44	7.37	4.36	6.01	**1.65**
100YR - 24HR	10.60	8.33	9.30	5.63	7.58	**1.95**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	0.82 Ac-Ft
2.5-in x Impervious Area =	0.69 Ac-Ft
Additional 50% treatment for O.F.W. =	0.41 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**1.22 Ac-Ft**

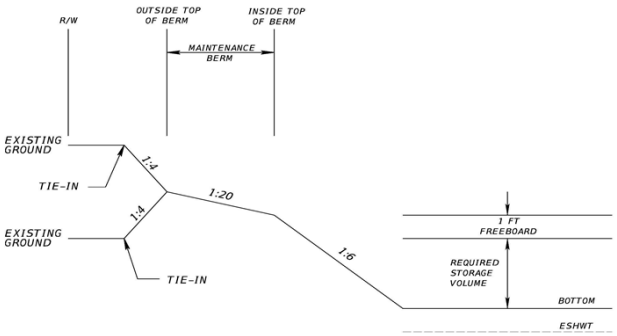
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

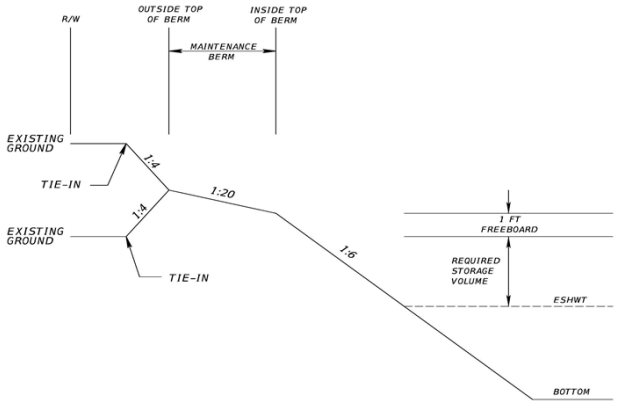
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	40.4	0.64	400	70	0.00
Max Storage El	**42.5**	0.93	425.2	95.2	**1.65**
Inside Top of Berm	43.5	1.08	437.2	107.2	2.65
Outside Top of Berm	44.5	1.61	477.2	147.2	4.00

Required Storage =	**1.65 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**42.5 ft**	
Required Storage El =	**42.50 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	40.4	0.64	-	-	0.00	0.00
Inside Top of Berm	43.5	1.06	0.85	3.1	2.64	2.64
Outside Top of Berm	44.5	1.58	1.32	1.0	1.32	3.96

Required Storage =	**1.65 ac-ft**
Max Storage El =	**42.5 ft**
Provided Storage El =	**42.34 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1-E**	
POND:	**BW1-E-5**	
	PRE	**POST**
TOTAL AREA:	**25.87 Ac**	**42.61 Ac**

* Scenario in which pond sites BW1-E-2 and BW1-E-3 are not viable. This will be used in conjunction with BW1-E-4.

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Farmsteads	A	59	3.52			3.52	208
Farmsteads	B	74	2.46			2.46	182
Woods - (good)	A	30	0.23			0.23	7
Woods - (good)	D	77	0.06			0.06	5
Pasture/grassland/range (grazing) -(good)	A	39	2.04			2.04	80
Pasture/grassland/range (grazing) -(good)	D	80	9.87			9.87	790
Imperv. - rds paved open ditch (incl ROW)	A	83		5.04		5.04	418
Imperv. - rds paved open ditch (incl ROW)	B	89		0.75		0.75	67
Imperv. - rds paved open ditch (incl ROW)	D	93		0.54		0.54	50
Residential - 2 acre	A	46	1.08			1.08	50
Residential - 2 acre	B	65	0.28			0.28	18
Pond Basin							
		0				0.00	0
		0				0.00	0
		0				0.00	0
TOTAL			**19.54**	**6.33**	**0.00**	**25.87**	**1,873.57**

Composite CN = **72**
S = **3.808**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		18.58		18.58	1,821
Open Space (fair) - grass, 50-75%	D	84	17.29			17.29	1,452
Pond Basin							
Open Space (good) - grass >75%	D	80	2.54			2.54	203
Water Surface	N/A	100			4.20	4.20	420
TOTAL			**19.83**	**18.58**	**4.20**	**42.61**	**3,896.39**

Composite CN = **91**
S = **0.936**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	4.31	6.48	9.28	23.02	**13.74**
25YR - 24HR	8.64	5.31	7.61	11.45	27.02	**15.57**
100YR - 24HR	10.60	7.09	9.55	15.29	33.93	**18.63**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	3.55 Ac-Ft
2.5-in x Impervious Area =	3.87 Ac-Ft
Additional 50% treatment for O.F.W. =	1.94 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**5.81 Ac-Ft**

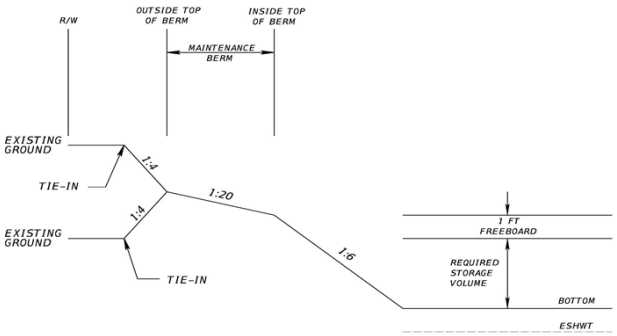
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

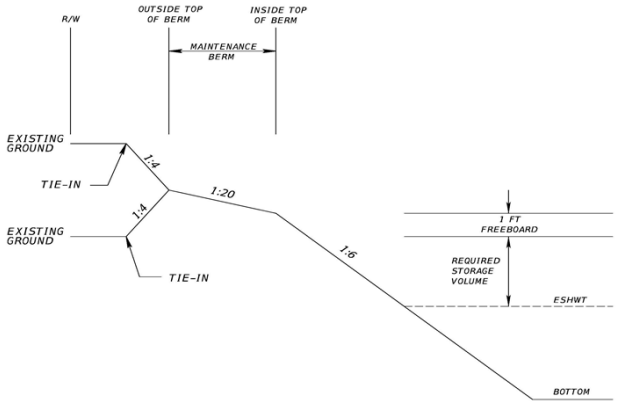
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	41	4.20	875	209	0.00
Max Storage El	**44.5**	5.28	917	251	**16.59**
Inside Top of Berm	45.5	5.61	929	263	22.04
Outside Top of Berm	46.5	6.74	969	303	28.21

Required Storage =	**15.57 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**44.5 ft**	
Required Storage El =	**44.28 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	41	4.19	-	-	0.00	0.00
Inside Top of Berm	45.5	5.59	4.89	4.5	22.01	22.01
Outside Top of Berm	46.5	6.69	6.14	1.0	6.14	28.15

Required Storage =	**15.57 ac-ft**
Max Storage El =	**44.5 ft**
Provided Storage El =	**44.18 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW1-E**	
POND:	**BW1-E-6**	
	PRE	**POST**
TOTAL AREA:	**34.32 Ac**	**52.49 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Farmsteads	A	59	3.52			3.52	208
Farmsteads	B	74	2.46			2.46	182
Woods - (good)	A	30	0.23			0.23	7
Woods - (good)	D	77	0.06			0.06	5
Pasture/grassland/range (grazing) -(good)	A	39	2.04			2.04	80
Pasture/grassland/range (grazing) -(good)	D	80	9.87			9.87	790
Imperv. - rds paved open ditch (incl ROW)	A	83		5.04		5.04	418
Imperv. - rds paved open ditch (incl ROW)	B	89		0.75		0.75	67
Imperv. - rds paved open ditch (incl ROW)	D	93		0.54		0.54	50
Residential - 2 acre	A	46	1.08			1.08	50
Residential - 2 acre	B	65	0.28			0.28	18
Pond Basin							
Pasture/grassland/range (grazing) -(good)	A	39	4.22			4.22	165
Pasture/grassland/range (grazing) -(good)	D	80	4.22			4.22	338
TOTAL			**27.99**	**6.33**	**0.00**	**34.32**	**2,376.21**

Composite CN = 69
S = 4.442

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		21.92		21.92	2,148
Open Space (fair) - grass, 50-75%	D	84	22.12			22.12	1,858
Pond Basin							
Open Space (good) - grass >75%	D	80	2.29			2.29	184
Water Surface	N/A	100			6.15	6.15	615
TOTAL			**24.41**	**21.92**	**6.15**	**52.49**	**4,805.11**

Composite CN = 92
S = 0.923

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	3.95	6.50	11.31	28.41	**17.10**
25YR - 24HR	8.64	4.93	7.62	14.09	33.34	**19.25**
100YR - 24HR	10.60	6.66	9.57	19.06	41.85	**22.79**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	4.37 Ac-Ft
2.5-in x Impervious Area =	4.57 Ac-Ft
Additional 50% treatment for O.F.W. =	2.28 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**6.85 Ac-Ft**

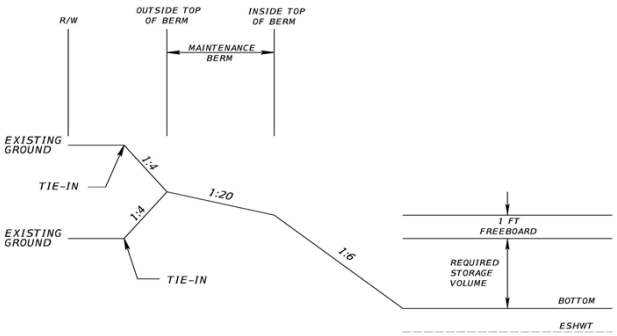
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

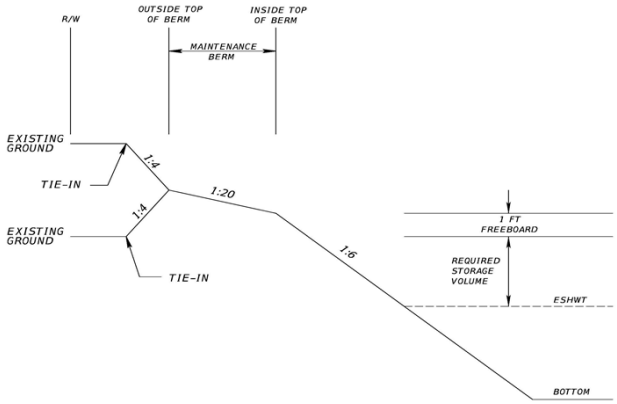
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	32	6.15	605	443	0.00
Max Storage El	**35**	7.05	641	479	**19.80**
Inside Top of Berm	36	7.36	653	491	27.01
Outside Top of Berm	37	8.45	693	531	34.91

Required Storage =	**19.25 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**35.0 ft**	
Required Storage El =	**34.92 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	32	6.15	-	-	0.00	0.00
Inside Top of Berm	36	7.34	6.75	4.0	26.98	26.98
Outside Top of Berm	37	8.41	7.88	1.0	7.88	34.86

Required Storage =	**19.25 ac-ft**
Max Storage El =	**35.0 ft**
Provided Storage El =	**34.85 ft**

Basin BW1-E
Existing Cross Drain Outfall Locations
1"=200'

Outfall point used by Ponds BW1-E-2 and BW1-E-3

Exist. 24" cross drain at Sta. 775+00, Rt, SR 429

Outfall point used by Ponds BW1-E-4 and BW1-E-5

Exist. 30" cross drain at Sta. 787+50, Rt., SR 429

ZONE A

CURVE CL10
P.I.STA.792+27.34
N = 1627952.6874
E = 509142.8828
Δ = 17°43'07"(LT)
R = 15000.00'
T = 2338.03'
L = 4638.73'
P.C.STA.768+89.32
P.T.STA.815+28.04

END R/W PROJECT
℄ SURVEY C.R. 433
P.O.T. STA.562+63.03
N = 1627850.7944
E = 509526.0360
NOTHING FND. OR SET

P.C. STA.768+89.32
P.T.STA.576+05.93
P.C. STA.576+05.93
P.O.T. STA.290+49.28
P.O.C. STA.771+08.19
P.T. STA.1120+69
P.T. STA.1129+55.47
EQUATION: STA.283+67.99 BK. = STA.283+75.80 AH.
℄ SURVEY S.R. 429 (WEKIVA PARKWAY)
℄ SURVEY C.R. 46A
℄ SURVEY S.R. 46
CURVE CL10
CURVE CL2
CURVE CL6
S89°40'40"E
CSX RAILROAD (FORMERLY S.C.L. RR.)
FLORIDA GAS TRANSMISSION COMPANY EASEMENT FL-LN-050.000 PER O.R.B. 2275 PAGE 1183
MONUMENT DATA

BASIN BW2-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW2-E**	
POND:	**BW2-E-1; BW2-E-2; BW2-E-5A**	
	PRE	**POST**
TOTAL AREA:	**67.42 Ac**	**94.09 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Open Space (fair) - grass, 50-75%	D	84	13.43			13.43	1,128
Woods - (good)	D	77	1.04			1.04	80
Pasture/grassland/range (grazing) -(good)	D	80	22.27			22.27	1,782
Imperv. - rds paved open ditch (incl ROW)	A	83		0.21		0.21	17
Imperv. - rds paved open ditch (incl ROW)	D	93		10.86		10.86	1,010
Wetland	D	98	1.10			1.10	108
Pond Basin							
Pasture/grassland/range (grazing) -(good)	D	80	18.51			18.51	1,481
TOTAL			**56.35**	**11.07**	**0.00**	**67.42**	**5,605.94**

Composite CN = 83
S = 2.027

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		39.05		39.05	3,827
Open Space (good) - grass >75%	D	80	36.53			36.53	2,922
Pond Basin							
Open Space (good) - grass >75%	D	80	6.49			6.49	519
Water Surface	N/A	100			12.02	12.02	1,202
TOTAL			**43.02**	**39.05**	**12.02**	**94.09**	**8,470.73**

Composite CN = 90
S = 1.108

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	5.52	6.32	31.00	49.53	**18.53**
25YR - 24HR	8.64	6.61	7.44	37.13	58.33	**21.20**
100YR - 24HR	10.60	8.50	9.38	47.78	73.53	**25.75**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	7.84 Ac-Ft
2.5-in x Impervious Area =	8.14 Ac-Ft
Additional 50% treatment for O.F.W. =	4.07 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**12.20 Ac-Ft**

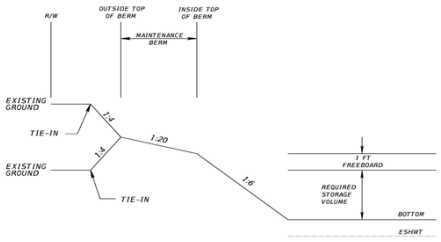
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

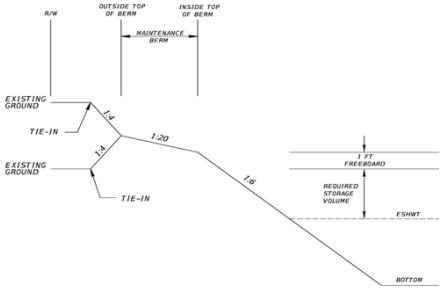
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	30	12.02	3492	150	0.00
Max Storage El	**32**	14.04	3516	174	**26.07**
Inside Top of Berm	33	15.06	3528	186	40.62
Outside Top of Berm	34	18.51	3568	226	57.41

Required Storage =	**21.20 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**32.0 ft**	
Required Storage El =	**31.63 ft**	

5. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Pond BW2-E-1

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	33	2.13	-	-	0.00	0.00
Inside Top of Berm	36	3.00	2.57	3.0	7.70	7.70
Outside Top of Berm	37	4.02	3.51	1.0	3.51	11.21

Service Rd LEOP	**36.72 ft**	(Sta. 1205+00, Service Rd 2)
Exist SR 46 LEOP (Approx.)	**36.5 ft**	
Max Storage El =	**34.5 ft**	
Max Storage Volume =	**3.85 ac-ft**	

Pond BW2-E-2

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	37	4.69	-	-	0.00	0.00
Inside Top of Berm	40	6.02	5.36	3.0	16.07	16.07
Outside Top of Berm	41	7.56	6.79	1.0	6.79	22.86

Service Rd LEOP	**40.62 ft**	(Sta. 102+00, Service Rd 1)
Exist SR 46 LEOP (Approx.)	**40.5 ft**	
Max Storage El =	**38.6 ft**	
Max Storage Volume =	**8.57 ac-ft**	

Pond BW2-E-5A

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	30	5.20	-	-	0.00	0.00
Inside Top of Berm	33	6.08	5.64	3.0	16.92	16.92
Outside Top of Berm	34	7.10	6.59	1.0	6.59	23.51

Service Rd LEOP	**36.72 ft**	(Sta. 1205+00, Service Rd 2)
Exist SR 46 LEOP (Approx.)	**35.0 ft**	
Max Storage El =	**32.0 ft**	
Max Storage Volume =	**11.28 ac-ft**	

Total Storage

Total Required Storage =	**21.20 ac-ft**	(Max of required treatment and attenuation volume)
Total Provided Storage =	**23.70 ac-ft**	(Ponds BW2-E-1, BW2-E-2, BW2-E-5A)

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**BW2-E**	
POND:	**BW2-E-4**	
	PRE	**POST**
TOTAL AREA:	**60.46 Ac**	**87.13 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Open Space (good) - grass >75%	D	80	13.43			13.43	1,074
Woods - (good)	D	77	1.04			1.04	80
Pasture/grassland/range (grazing) -(good)	D	80	22.27			22.27	1,782
Imperv. - rds paved open ditch (incl ROW)	A	83		0.21		0.21	17
Imperv. - rds paved open ditch (incl ROW)	D	93		10.86		10.86	1,010
Wetland	D	98	1.10			1.10	108
Pond Basin							
Pasture/grassland/range (grazing) -(good)	D	80	11.55			11.55	924
TOTAL			**49.39**	**11.07**	**0.00**	**60.46**	**4,995.33**

Composite CN = 83
S = 2.103

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		39.05		39.05	3,827
Open Space (good) - grass >75%	D	80	36.53			36.53	2,922
Pond Basin							
Open Space (good) - grass >75%	D	80	2.99			2.99	239
Water Surface	N/A	100			8.56	8.56	856
TOTAL			**39.52**	**39.05**	**8.56**	**87.13**	**7,844.52**

Composite CN = 90
S = 1.107

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	5.46	6.32	27.50	45.87	**18.37**
25YR - 24HR	8.64	6.54	7.44	32.97	54.02	**21.05**
100YR - 24HR	10.60	8.44	9.38	42.50	68.09	**25.59**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	7.26 Ac-Ft
2.5-in x Impervious Area =	8.14 Ac-Ft
Additional 50% treatment for O.F.W. =	4.07 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**12.20 Ac-Ft**

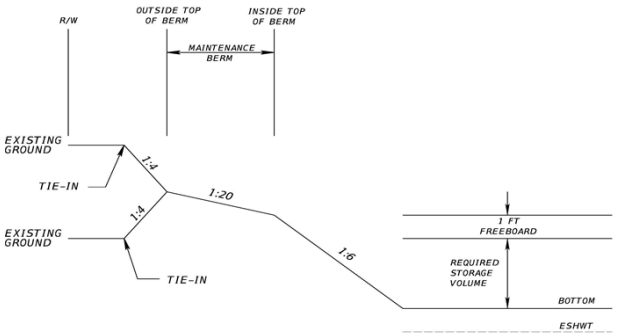
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

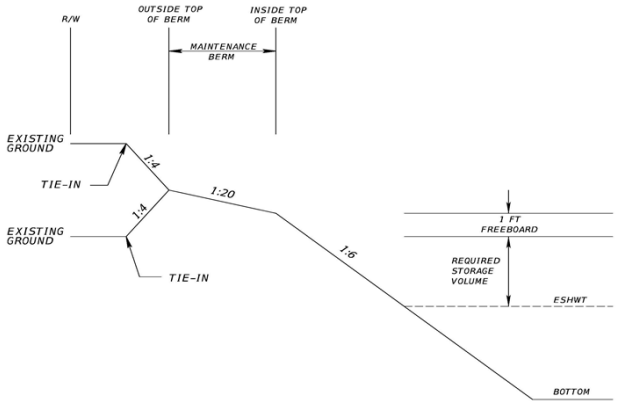
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	30	8.56	1195	312	0.00
Max Storage El	**32.5**	9.62	1225	342	**22.72**
Inside Top of Berm	33.5	10.05	1237	354	32.56
Outside Top of Berm	34.5	11.55	1277	394	43.36

Required Storage =	**21.05 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**32.5 ft**	
Required Storage El =	**32.32 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION

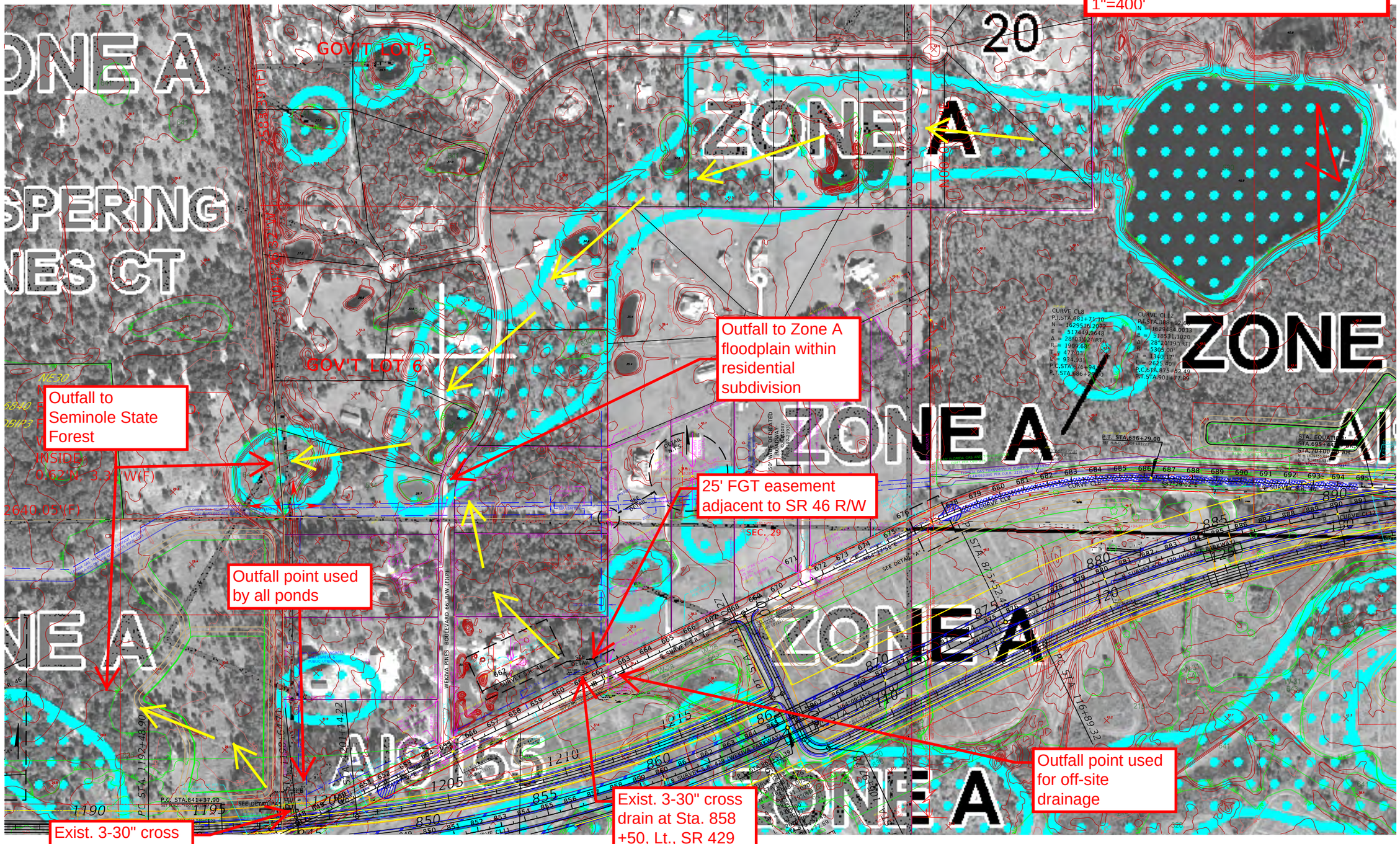


WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	30	8.56	-	-	0.00	0.00
Inside Top of Berm	33.5	10.05	9.31	3.5	32.57	32.57
Outside Top of Berm	34.5	11.52	10.79	1.0	10.79	43.35

Required Storage =	**21.05 ac-ft**
Max Storage El =	**32.5 ft**
Provided Storage El =	**32.26 ft**

Basin BW2-E
Existing Cross Drain Outfall Locations
1"=400'



BASIN WR1-E

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**WR1-E-W & WR1-E-E**	
POND:	**WR1-E-1**	
	PRE	**POST**
TOTAL AREA:	**16.77 Ac**	**25.07 Ac**

* This pond is considered for treatment only of the area (Basin WR1-E-W west of Wekiva River Road and attenuation of the entir WR1-E basin (WR1-E-W and WR1-E-E)

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Woods - (good)	D	77	4.01			4.01	309
Open Space (good) - grass >75%	D	80	3.68			3.68	294
Imperv. - rds paved open ditch (incl ROW)	D	93		1.60		1.60	149
Pond Basin							
Open Space (good) - grass >75%	D	80	3.74			3.74	299
Woods - (good)	D	77	3.74			3.74	288
TOTAL			**15.17**	**1.60**	**0.00**	**16.77**	**1,339.50**

Composite CN = 80
S = 2.523

2a. Proposed Conditions (to be treated)

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		5.38		5.38	527
Open Space (good) - grass >75%	D	80	3.14			3.14	251
Pond Basin							
Open Space (good) - grass >75%	D	80	2.16			2.16	173
Water Surface	N/A	100			5.32	5.32	532
TOTAL			**5.30**	**5.38**	**5.32**	**16.00**	**1,483.69**

Composite CN = 93
S = 0.787

2b. Proposed Conditions (to be attenuated)

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	N/A	98		13.79		13.79	1,351
Open Space (good) - grass >75%	D	80	3.80			3.80	304
Pond Basin							
Open Space (good) - grass >75%	D	80	2.16			2.16	173
Water Surface	N/A	98			5.32	5.32	522
TOTAL			**5.96**	**13.79**	**5.32**	**25.07**	**2,350.02**

Composite CN = 94
S = 0.670

3. Pre/Post Runoff (using data from Table 2b above)

Storm Event	Rainfall Amount (inches)	Runoff, Q = (P-0.2S)^2/(P+0.8S)		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	5.14	6.67	7.19	13.95	**6.76**
25YR - 24HR	8.64	6.21	7.81	8.68	16.31	**7.63**
100YR - 24HR	10.60	8.08	9.75	11.29	20.38	**9.09**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Wet Detention**	
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**	
Is basin less than 40% impervious and contain only A soils?	**N/A**	Not Applicable
Is treatment pond on-line or off-line?	**N/A**	Not Applicable

1-in x Total Area =	1.33 Ac-Ft
2.5-in x Impervious Area =	1.12 Ac-Ft
Additional 50% treatment for O.F.W. =	0.67 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**2.00 Ac-Ft**

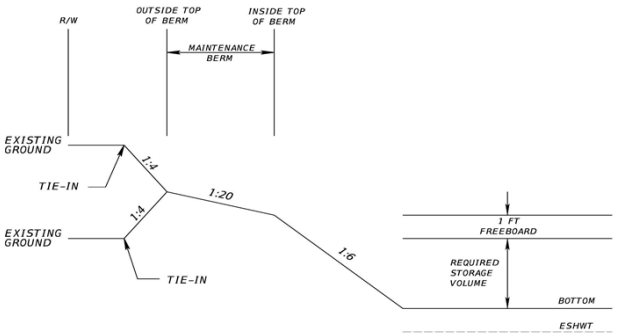
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

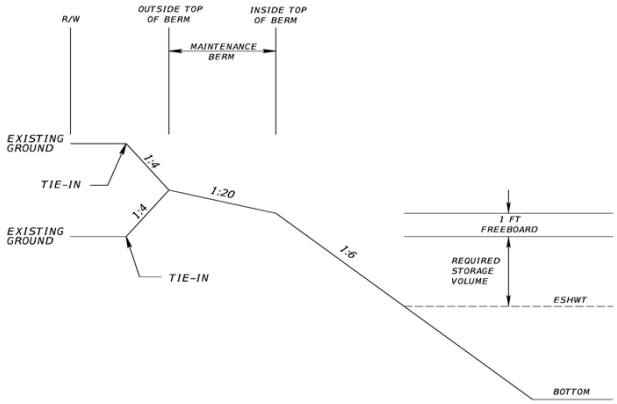
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	38	5.32	906	256	0.00
Max Storage El	**40**	5.98	930	280	**11.30**
Inside Top of Berm	41	6.31	942	292	17.45
Outside Top of Berm	42	7.48	982	332	24.35

Required Storage =	**7.63 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**40.0 ft**	
Required Storage El =	**39.35 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	38	5.32	-	-	0.00	0.00
Inside Top of Berm	41	6.30	5.81	3.0	17.43	17.43
Outside Top of Berm	42	7.45	6.88	1.0	6.88	24.31

Required Storage =	**7.63 ac-ft**
Max Storage El =	**40.0 ft**
Provided Storage El =	**39.31 ft**

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN:	**WR1-E-E**	
POND:	**WR1-E-5A; WR1-E-7**	
	PRE	**POST**
TOTAL AREA:	**0.00 Ac**	**12.70 Ac**

* This pond is considered for treatment only
from Wekiva River Road to the high point of the proposed Wekiva River Bridge

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
						0.00	0
						0.00	0
						0.00	0
Pond Basin							
						0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Composite CN = **#DIV/0!**
S = **#DIV/0!**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		8.41		8.41	824
Open Space (good) - grass >75%	D	80	0.66			0.66	53
Pond Basin							
Open Space (good) - grass >75%	D	80	3.63			3.63	291
Water Surface	N/A	100			0.00	0.00	0
TOTAL			**4.29**	**8.41**	**0.00**	**12.70**	**1,167.78**

Composite CN = **92**
S = **0.880**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	#DIV/0!	6.54	#DIV/0!	6.92	**0.00**
25YR - 24HR	8.64	#DIV/0!	7.67	#DIV/0!	8.12	**0.00**
100YR - 24HR	10.60	#DIV/0!	9.61	#DIV/0!	10.18	**0.00**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	1.06 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	1.41 Ac-Ft
Additional 50% treatment for O.F.W. =	0.70 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**2.11 Ac-Ft**

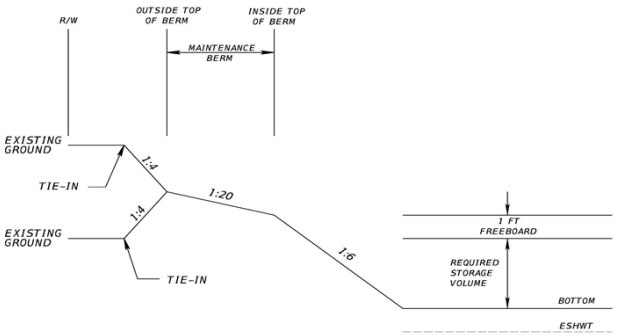
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

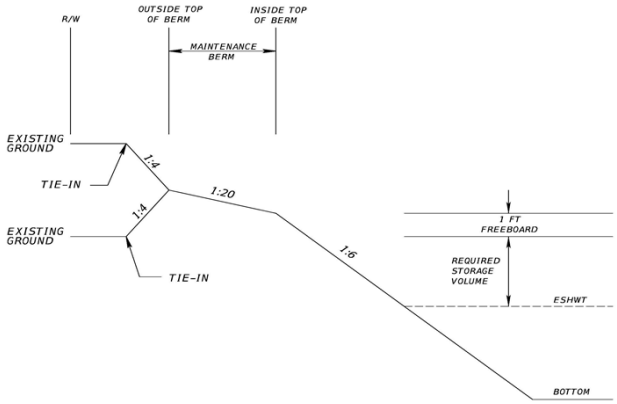
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	38	2.01	951	92	0.00
Max Storage El	**39**	2.30	963	104	**2.15**
Inside Top of Berm	40	2.60	975	116	4.60
Outside Top of Berm	41	3.63	1015	156	7.72

Required Storage =	**2.11 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**39.0 ft**	
Required Storage El =	**38.98 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	38	2.01	-	-	0.00	0.00
Inside Top of Berm	40	2.62	2.32	2.0	4.63	4.63
Outside Top of Berm	41	3.46	3.04	1.0	3.04	7.67

Required Storage =	**2.11 ac-ft**
Max Storage El =	**39.0 ft**
Provided Storage El =	**38.91 ft**

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Section 6 - WR1-E-5A/7
Simulation Description:	WR1-E-5A/7 Recovery
Project Number:	23827575201
Engineer :	Bill Whitegon, PE
Supervising Engineer:	Alex George, PE
Date:	03-24-2014

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	33.50
Water Table Elevation, [WT] (ft datum):	35.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	13.00
Fillable Porosity, [n] (%):	25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day):	6.5
Maximum Area For Unsaturated Infiltration, [Av] (ft^2):	99654.0

Geometry Data

Equivalent Pond Length, [L] (ft):	951.0
Equivalent Pond Width, [W] (ft):	92.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
38.00	87556.0
40.00	114127.0

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Retention Pond Recovery - Refined Method
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Scenario Input Data

Scenario 1 :: WR1-E-5A/7 PAV Recovery

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 91912

Initial ground water level (ft datum) 35.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)
0.100	2.000
0.250	2.500
0.500	3.000
1.000	3.500
1.500	4.000

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Retention Pond Recovery - Refined Method
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Detailed Results *:: Scenario 1 :: WR1-E-5A/7 PAV Recovery*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	15318.6700	0.00000	35.00000	0.00000	0	0.000	0.00000	0	N.A.
0.002	15318.6700	0.00000	38.97684	7.49694	0	91912.000	44.98271	0	U/P
2.400	0.0000	0.00000	38.32650	5.02063	0	91912.000	62616.77000	0	U/P
6.000	0.0000	0.00000	38.08558	1.15212	0	91912.000	84370.57000	0	U/S
12.000	0.0000	0.00000	38.01833	0.19557	0	91912.000	90305.30000	0	S
24.000	0.0000	0.00000	37.79401	0.01860	0	91912.000	91912.00000	0	S
36.000	0.0000	0.00000	37.61182	0.00000	0	91912.000	91912.00000	0	S
48.000	0.0000	0.00000	37.47610	0.00000	0	91912.000	91912.00000	0	S
60.000	0.0000	0.00000	37.36793	0.00000	0	91912.000	91912.00000	0	S
72.000	0.0000	0.00000	37.27806	0.00000	0	91912.000	91912.00000	0	S
84.000	0.0000	0.00000	37.20125	0.00000	0	91912.000	91912.00000	0	S
96.000	0.0000	0.00000	37.13424	----	----	91912.000	91912.00000	0	N.A.

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

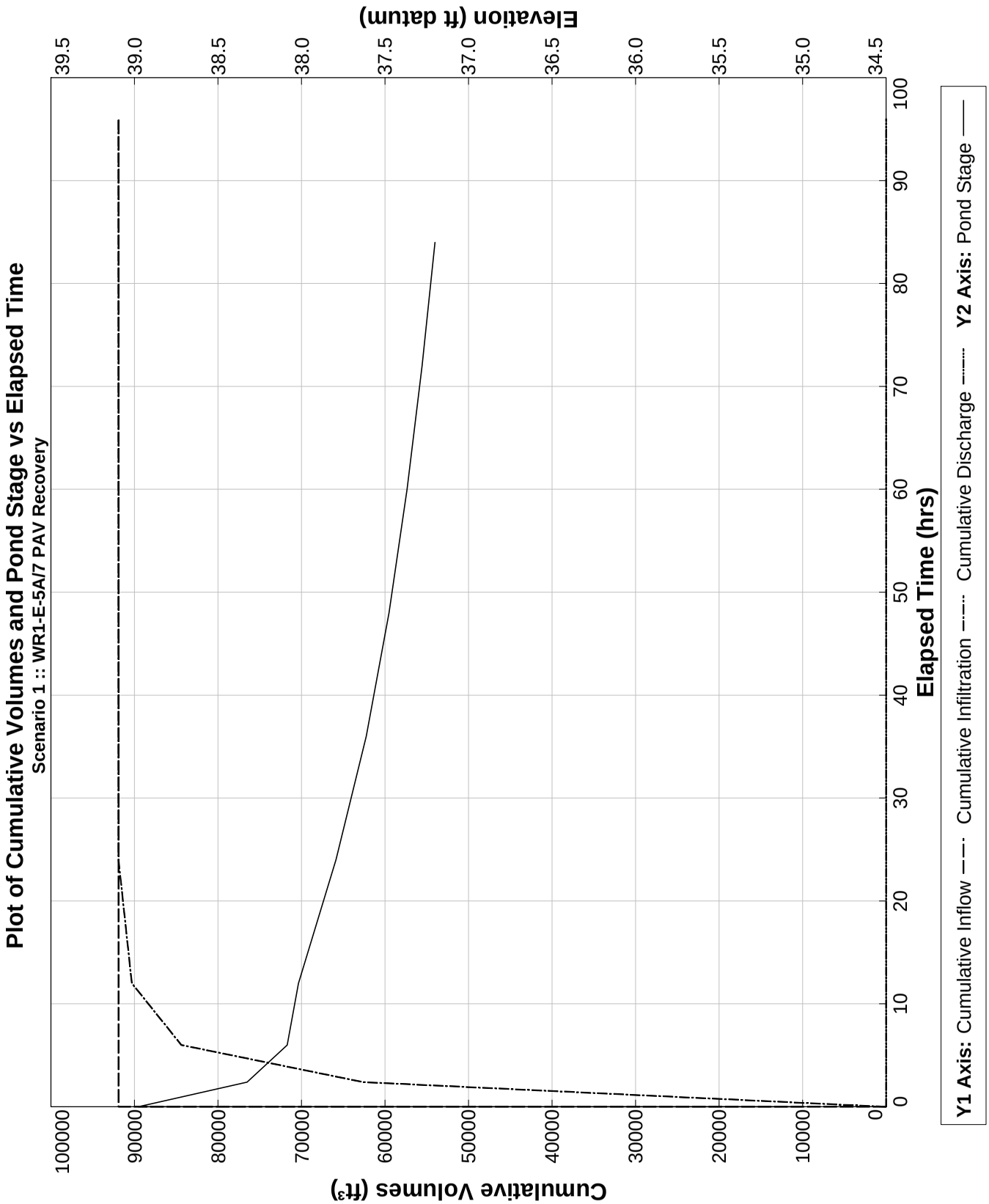
Devo Seereeram, Ph.D., P.E.

Summary of Results :: *Scenario 1 :: WR1-E-5A/7 PAV Recovery*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	35.00		
Maximum	0.002	38.98		
Inflow				
Rate - Maximum - Positive	0.002		15318.6700	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			91912.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			91912.0
Infiltration				
Rate - Maximum - Positive	0.002		7.4969	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	24.000			91912.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			91912.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	37.61		91912.0
72 Hour Stage and Infiltration Volume	72.000	37.28		91912.0

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



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Retention Pond Recovery - Refined Method
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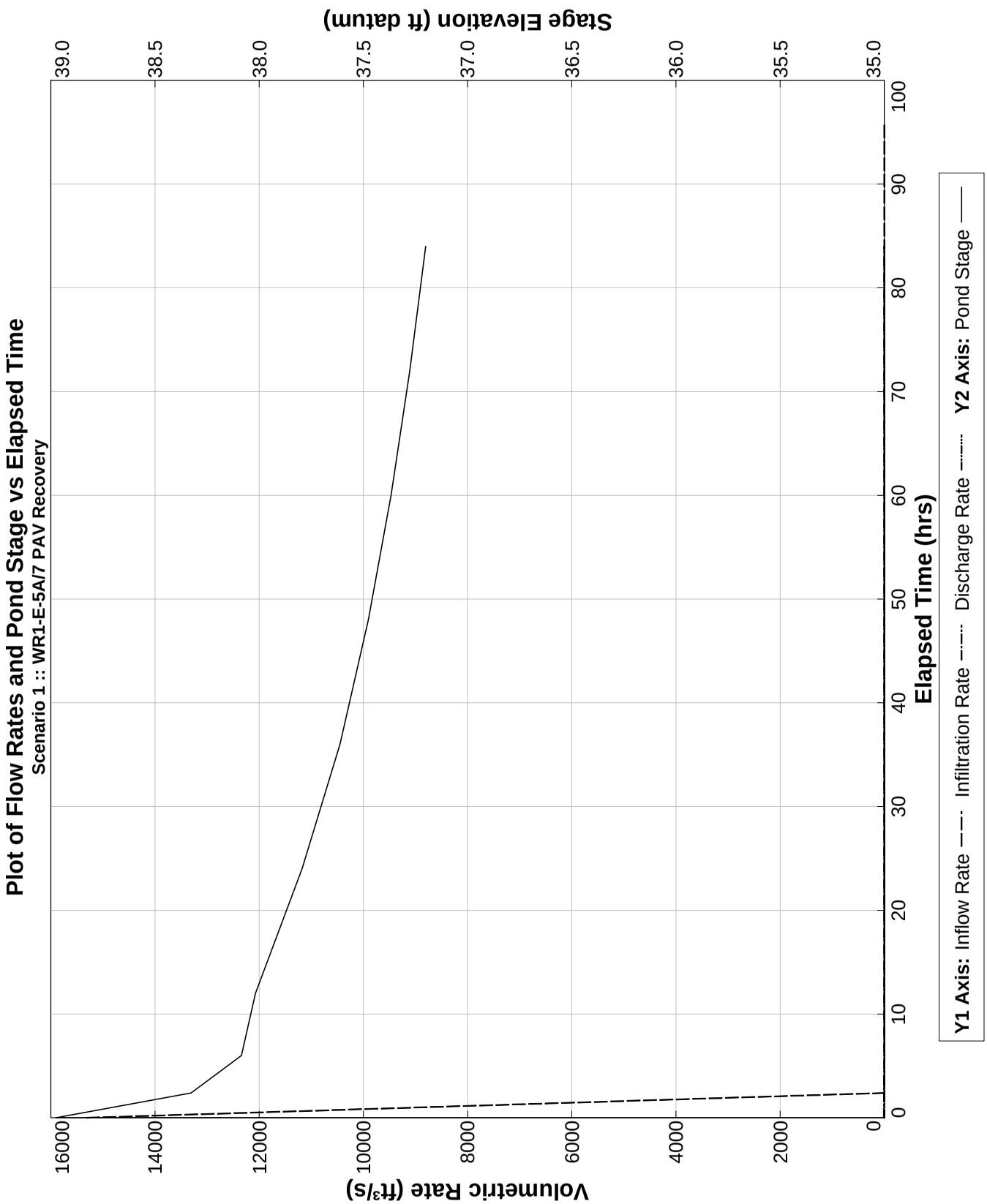


WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN: WR1-E-W
POND: WR1-E-6

	PRE	POST
TOTAL AREA:	**0.00 Ac**	**11.69 Ac**

* This pond is considered for treatment only
of the area west of Wekiva River Road, within the WR1-E basin.

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
						0.00	0
						0.00	0
						0.00	0
Pond Basin							
						0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Composite CN = **#DIV/0!**
S = **#DIV/0!**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		5.38		5.38	527
Open Space (good) - grass >75%	D	80	3.14			3.14	251
Pond Basin							
Open Space (good) - grass >75%	D	80	3.17			3.17	254
Water Surface	N/A	100			0.00	0.00	0
TOTAL			**6.31**	**5.38**	**0.00**	**11.69**	**1,032.21**

Composite CN = **88**
S = **1.327**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	#DIV/0!	6.11	#DIV/0!	5.96	**0.00**
25YR - 24HR	8.64	#DIV/0!	7.23	#DIV/0!	7.04	**0.00**
100YR - 24HR	10.60	#DIV/0!	9.16	#DIV/0!	8.92	**0.00**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.97 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	1.05 Ac-Ft
Additional 50% treatment for O.F.W. =	0.52 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**1.57 Ac-Ft**

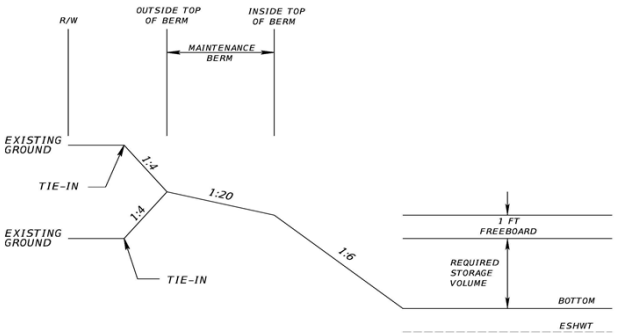
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	20.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	20
Pond Back Slope (H:V) =	4

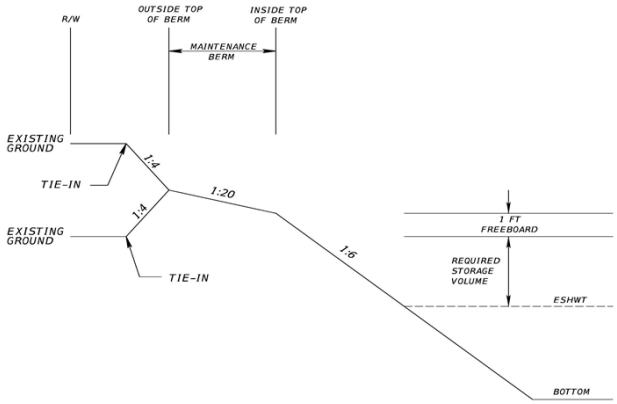
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	46	1.67	876	83	0.00
Max Storage El	**46.9**	1.91	886.8	93.8	**1.61**
Inside Top of Berm	48	2.21	900	107	3.88
Outside Top of Berm	49	3.17	940	147	6.57

Required Storage =	**1.57 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**46.9 ft**	
Required Storage El =	**46.88 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	46	1.67	-	-	0.00	0.00
Inside Top of Berm	48	2.21	1.94	2.0	3.88	3.88
Outside Top of Berm	49	3.15	2.68	1.0	2.68	6.56

Required Storage =	**1.57 ac-ft**
Max Storage El =	**46.9 ft**
Provided Storage El =	**46.81 ft**

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Section 6 - WR1-E-6
Simulation Description:	WR1-E-6 Recovery
Project Number:	23827575201
Engineer :	Bill Whitegon, PE
Supervising Engineer:	Alex George, PE
Date:	03-24-2014

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	40.50
Water Table Elevation, [WT] (ft datum):	43.50
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	13.00
Fillable Porosity, [n] (%):	25.00
Unsaturated Vertical Infiltration Rate, [Iv] (ft/day):	6.5
Maximum Area For Unsaturated Infiltration, [Av] (ft^2):	82272.0

Geometry Data

Equivalent Pond Length, [L] (ft):	876.0
Equivalent Pond Width, [W] (ft):	83.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
46.00	72745.2
48.00	96268.0

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Scenario Input Data

Scenario 1 :: WR1-E-6 PAV

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 68389

Initial ground water level (ft datum) 43.50 (default)

Time After Storm Event (days)	Time After Storm Event (days)
0.100	2.000
0.250	2.500
0.500	3.000
1.000	3.500
1.500	4.000

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Detailed Results *:: Scenario 1 :: WR1-E-6 PAV*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	11398.1700	0.00000	43.50000	0.00000	0	0.000	0.00000	0	N.A.
0.002	11398.1700	0.00000	46.87738	6.18929	0	68389.000	37.13667	0	U/P
2.400	0.0000	0.00000	46.22699	3.83954	0	68389.000	51573.70000	0	U/P
6.000	0.0000	0.00000	46.11551	0.49443	0	68389.000	59908.20000	0	U/S
12.000	0.0000	0.00000	46.04319	0.18876	0	68389.000	65235.76000	0	S
24.000	0.0000	0.00000	45.86256	0.03650	0	68389.000	68389.00000	0	S
36.000	0.0000	0.00000	45.66923	0.00000	0	68389.000	68389.00000	0	S
48.000	0.0000	0.00000	45.52847	0.00000	0	68389.000	68389.00000	0	S
60.000	0.0000	0.00000	45.41811	0.00000	0	68389.000	68389.00000	0	S
72.000	0.0000	0.00000	45.32764	0.00000	0	68389.000	68389.00000	0	S
84.000	0.0000	0.00000	45.25118	0.00000	0	68389.000	68389.00000	0	S
96.000	0.0000	0.00000	45.18513	----	----	68389.000	68389.00000	0	N.A.

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

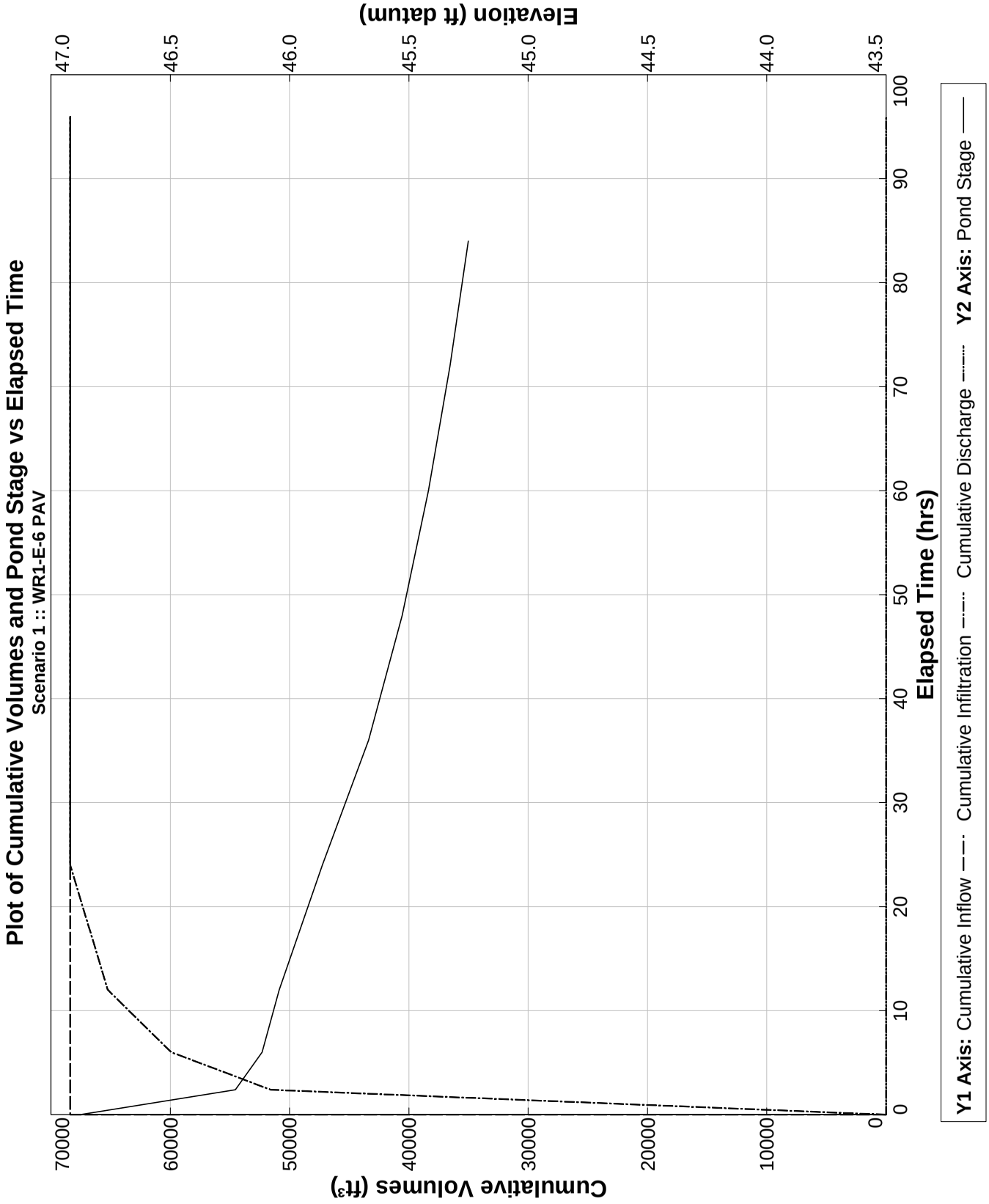
Devo Seereeram, Ph.D., P.E.

Summary of Results :: *Scenario 1 :: WR1-E-6 PAV*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	0.000	43.50		
Maximum	0.002	46.88		
Inflow				
Rate - Maximum - Positive	0.002		11398.1700	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			68389.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			68389.0
Infiltration				
Rate - Maximum - Positive	0.002		6.1893	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	24.000			68389.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			68389.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	45.67		68389.0
72 Hour Stage and Infiltration Volume	72.000	45.33		68389.0

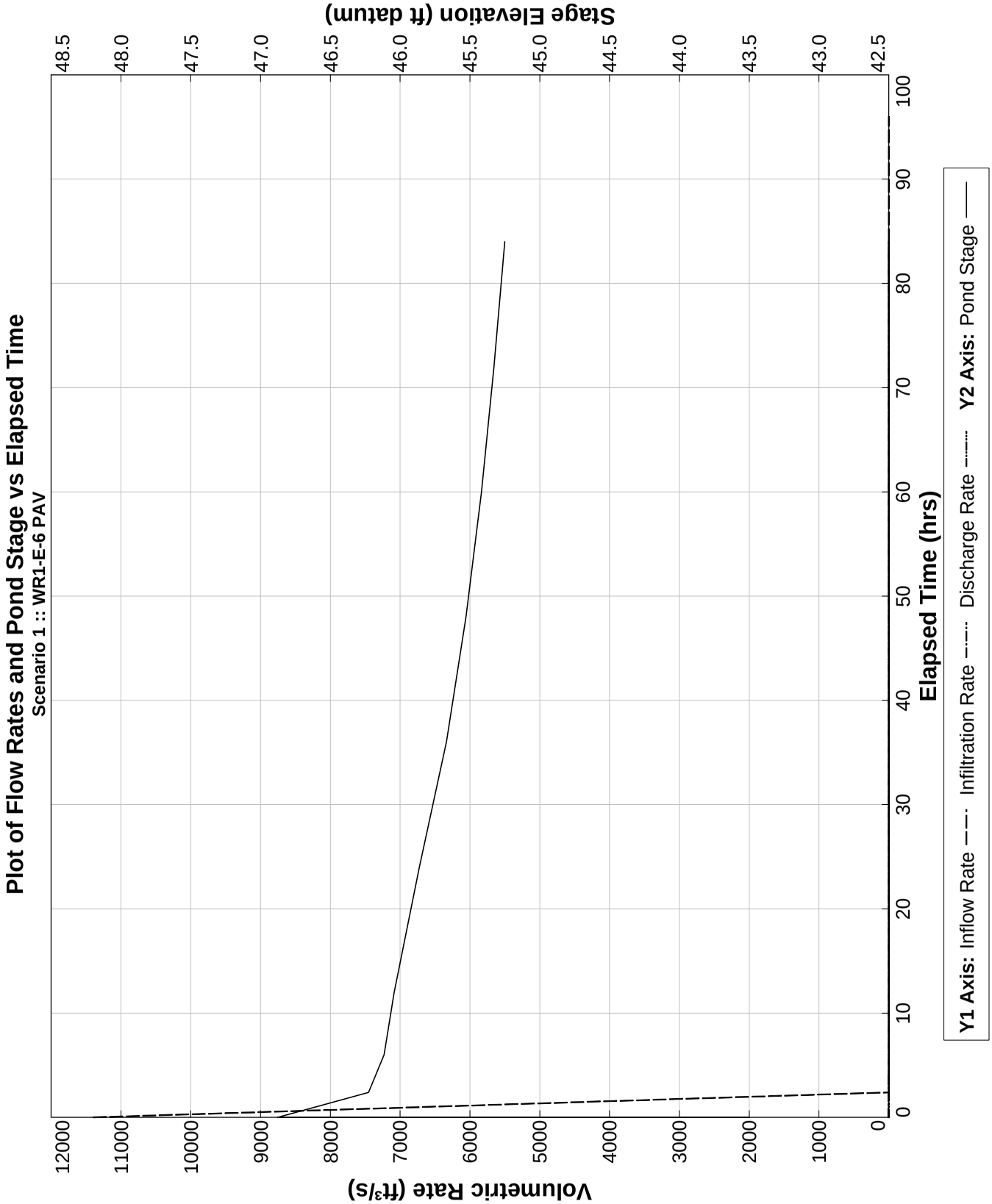
PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



STA. 88+57.36
WEKIVA RIVER RD

BEGIN BRIDGE
STA. 899+45.86

END BRIDGE
STA. 900+37.94

BEGIN BRIDGE
STA. 908+65.19

FLORIDA GAS TRANSMISSION COMPANY
FL-LA-066.000 PER O.R.B. 2275

FLORIDA GAS TRANSMISSION COMPANY
FL-LA-067.000 PER O.R.B. 2275

15' FLORIDA GAS AND TRANSMISSION
ESMT PER ORB 236, PG 351

40' FLORIDA GAS AND TRANSMISSION
ESMT PER ORB 236, PG 353

DRAINAGE EASEMENT

℄ WEKIVA PKWY

Ponds interconnected

Alternate outfall for ponds under proposed Wekiva River bridges (with level spreaders)

Recommended outfall for Ponds WR1-E-7 and WR1-E-5A into existing channel with discharge to the Wekiva River

3252
PARCEL ID
2819290002000011 00

Recommended outfall for Ponds WR1-E-7 and WR1-E-8 (with level spreader) into existing channel with discharge to the Wekiva River

WEKIVA RIVER RD

SERVICE RD 1
STA. 139+66.50 =
STA. 87+47.95
WEKIVA RIVER RD

P7 STA. 901+77.89

SR 46

900

905

910

ALTERNATE POND OUTFALL

BASIN WR2A-S

POND CALCULATIONS

WEKIVA PARKWAY - SECTION 6
PRELIMINARY POND SIZING - TR-55 METHOD

DATE: 3/24/14
REV: 8/7/14
BY: BCW
CK: JAG

BASIN: WR2A-S-2
POND: WR2A-S-2

	PRE	POST
TOTAL AREA:	**0.00 Ac**	**0.97 Ac**

* This pond is considered for treatment only
from the high point of the proposed Wekiva River Bridge to River Oaks Cir

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
						0.00	0
						0.00	0
						0.00	0
Pond Basin							
						0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Composite CN = **#DIV/0!**
S = **#DIV/0!**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Impervious Area (Ac)	Water Surface (Ac)	Area (Ac)	CA
Roadway Basin							
Imperv. - paved parking lots,roofs,drives	D	98		0.56		0.56	55
Open Space (good) - grass >75%	D	80	0.28			0.28	22
Pond Basin							
Open Space (good) - grass >75%	D	80	0.13			0.13	10
TOTAL			**0.41**	**0.56**	**0.00**	**0.97**	**87.68**

Composite CN = **90**
S = **1.063**

3. Pre/Post Runoff

Storm Event	Rainfall Amount (inches)	Runoff, $Q = (P-0.2S)^2/(P+0.8S)$		Volume, V = Q x A		
		Existing (inches)	Proposed (inches)	Existing (ac-ft)	Proposed (ac-ft)	Net Volume (ac-ft)
10YR - 24HR	7.50	#DIV/0!	6.36	#DIV/0!	0.51	**0.00**
25YR - 24HR	8.64	#DIV/0!	7.48	#DIV/0!	0.60	**0.00**
100YR - 24HR	10.60	#DIV/0!	9.42	#DIV/0!	0.76	**0.00**

4. Required Water Quality Treatment Volumes

Treatment Type:	**Dry Retention**
Does system discharge directly to O.F.W. or Class I/II waters?	**Yes**
Is basin less than 40% impervious and contain only A soils?	**No**
Is treatment pond on-line or off-line?	**On-line**

1-in x Total Area =	0.08 Ac-Ft
1.25-in x Impervious + 0.5-in x Total Area =	0.10 Ac-Ft
Additional 50% treatment for O.F.W. =	0.05 Ac-Ft
TOTAL REQUIRED TREATMENT VOLUME =	**0.15 Ac-Ft**

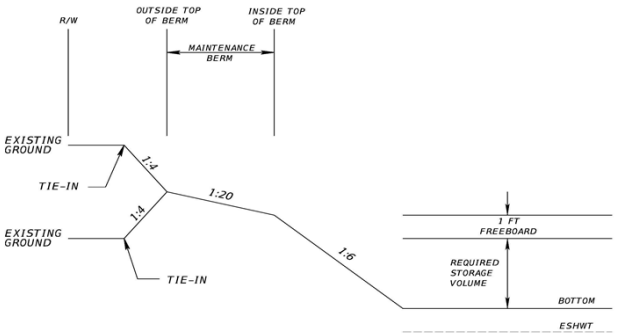
5. Estimated Pond Sizing

Pond Shape =	Rectangular
Berm Width =	15.0 ft
Pond Side Slope (H:V) =	6
Berm Slope (H:V) =	15
Pond Back Slope (H:V) =	6

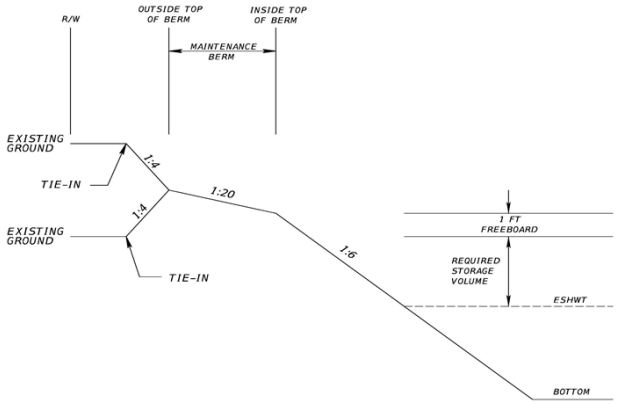
Description	Stage (ft)	Area (ac)	Dimensions		Storage Volume (ac-ft)
			Length (ft)	Width (ft)	
Control El/ Bottom	23	0.24	116	90	0.00
Max Storage El	**25**	0.37	140	114	**0.61**
Inside Top of Berm	26	0.44	152	126	1.01
Outside Top of Berm	27	0.65	182	156	1.55

Required Storage =	**0.15 ac-ft**	(Max of required treatment and attenuation volume)
Max Storage El =	**25.0 ft**	
Required Storage El =	**23.49 ft**	

6. Proposed Pond Design



DRY POND
TYPICAL SECTION



WET POND
TYPICAL SECTION

Description	Stage (ft)	Area (ac)	Avg Area (ac)	Incre Depth (ft)	Incre Storage (ac-ft)	Storage Volume (ac-ft)
Control El/ Bottom	23	0.24	-	-	0.00	0.00
Inside Top of Berm	26	0.43	0.34	3.0	1.01	1.01
Outside Top of Berm	27	0.63	0.53	1.0	0.53	1.54

Required Storage =	**0.15 ac-ft**
Max Storage El =	**25.0 ft**
Provided Storage El =	**23.44 ft**

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Section 6 - WR2A-S-2
Simulation Description:	WR2A-S-2 Recovery
Project Number:	23827575201
Engineer :	Bill Whitegon, PE
Supervising Engineer:	Alex George, PE
Date:	03-24-2014

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	16.00
Water Table Elevation, [WT] (ft datum):	20.50
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	10.00
Fillable Porosity, [n] (%):	25.00

Vertical infiltration was not considered.

Geometry Data

Equivalent Pond Length, [L] (ft):	116.0
Equivalent Pond Width, [W] (ft):	90.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
23.00	10454.4
26.00	18730.8

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Scenario Input Data

Scenario 1 :: WR2A-S-2 PAV

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft^3) 6534

Initial ground water level (ft datum) 20.50 (default)

Time After Storm Event (days)	Time After Storm Event (days)
0.100	2.000
0.250	2.500
0.500	3.000
1.000	3.500
1.500	4.000

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method
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Devo Seereeram, Ph.D., P.E.

Detailed Results *:: Scenario 1 :: WR2A-S-2 PAV*

Elapsed Time	Instantaneous Inflow Rate	Outside Recharge	Stage Elevation	Infiltration Rate	Combined Instantaneous Discharge	Cumulative Inflow	Cumulative Infiltration	Combined Cumulative	
0.000	1089.0000	0.00000	23.00000	0.65766	0	0.000	0.00000	0	N.A.
0.002	1089.0000	0.00000	23.58021	0.65699	0	6534.000	3.94396	0	S
2.400	0.0000	0.00000	23.45087	0.13902	0	6534.000	1539.96400	0	S
6.000	0.0000	0.00000	23.36057	0.06941	0	6534.000	2585.14400	0	S
12.000	0.0000	0.00000	23.26382	0.04494	0	6534.000	3679.93100	0	S
24.000	0.0000	0.00000	23.13246	0.02947	0	6534.000	5124.96100	0	S
36.000	0.0000	0.00000	23.02935	0.01631	0	6534.000	6225.93600	0	S
48.000	0.0000	0.00000	22.82976	0.00357	0	6534.000	6534.00000	0	S
60.000	0.0000	0.00000	22.62824	0.00000	0	6534.000	6534.00000	0	S
72.000	0.0000	0.00000	22.47122	0.00000	0	6534.000	6534.00000	0	S
84.000	0.0000	0.00000	22.34308	0.00000	0	6534.000	6534.00000	0	S
96.000	0.0000	0.00000	22.23537	----	----	6534.000	6534.00000	0	N.A.

PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

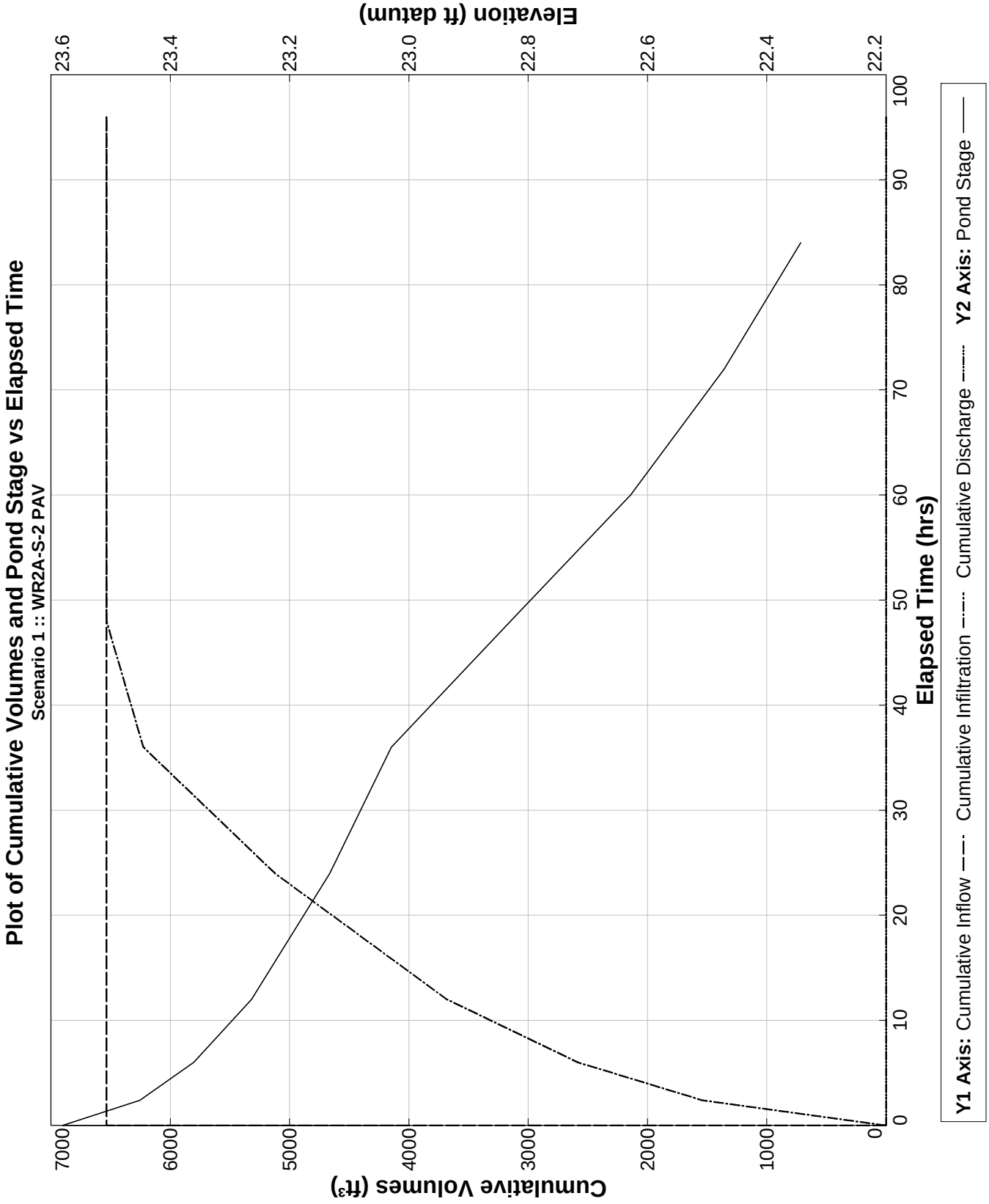
Devo Seereeram, Ph.D., P.E.

Summary of Results *:: Scenario 1 :: WR2A-S-2 PAV*

	Time (hours)	Stage (ft datum)	Rate (ft^3/s)	Volume (ft^3)
Stage				
Minimum	96.000	22.24		
Maximum	0.002	23.58		
Inflow				
Rate - Maximum - Positive	0.002		1089.0000	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	0.002			6534.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			6534.0
Infiltration				
Rate - Maximum - Positive	0.002		0.6570	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	48.000			6534.0
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			6534.0
Combined Discharge				
Rate - Maximum - Positive	None		None	
Rate - Maximum - Negative	None		None	
Cumulative Volume - Maximum Positive	None			None
Cumulative Volume - Maximum Negative	None			None
Cumulative Volume - End of Simulation	96.000			0.0
Discharge Structure 1 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 2 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Discharge Structure 3 - inactive				
Rate - Maximum - Positive	disabled		disabled	
Rate - Maximum - Negative	disabled		disabled	
Cumulative Volume - Maximum Positive	disabled			disabled
Cumulative Volume - Maximum Negative	disabled			disabled
Cumulative Volume - End of Simulation	disabled			disabled
Pollution Abatement:				
36 Hour Stage and Infiltration Volume	36.000	23.03		6225.9
72 Hour Stage and Infiltration Volume	72.000	22.47		6534.0

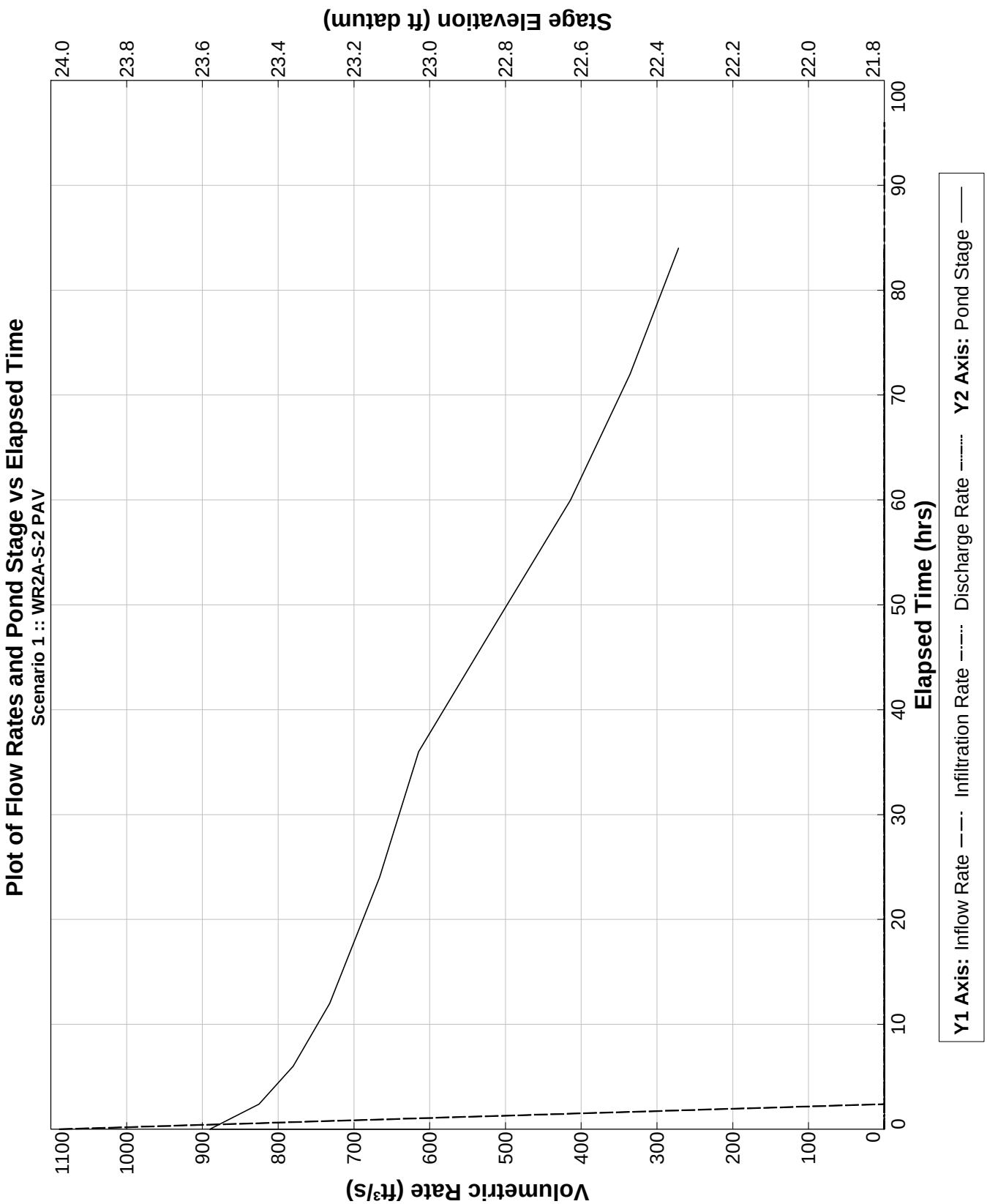
PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



PONDS Version 3.3.0276
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



APPENDIX C

Nutrient Loading Calculations

NUTRIENT LOADING ANALYSIS

ROCK SPRINGS RUN BASIN

SUMMARY

Designed By: BCW
Date: 8/7/2014
Checked By: JAG
Date: 8/7/2014

Subject: Wekiva Parkway - Section 6
Rock Springs Run Basin Nutrient Loading Summary

Total Nitrogen (TN) (kg/yr)

	Basin					
Condition	**RS7-E**	**RS7-E-2A**	**SC1-E**	**RS8-E**	**RS9-E**	**Total**
Existing	3.25	3.07	0.80	15.90	3.48	26.50
Proposed	0.00	1.08	0.00	15.32	3.24	19.64
Difference	-3.25	-1.99	-0.80	-0.58	-0.24	**-6.86**

Total Phosphorous (TP) (kg/yr)

	Basin					
Condition	**RS7-E**	**RS7-E-2A**	**SC1-E**	**RS8-E**	**RS9-E**	**Total**
Existing	0.16	0.15	0.04	0.76	0.17	1.28
Proposed	0.00	0.13	0.00	0.61	0.40	1.14
Difference	-0.16	-0.02	-0.04	-0.15	0.23	**-0.14**

Results: The nutrient removal has been maximized in Basin RS7-E. The nutrient removal for Basins RS8-E and RS9-E is based on the pond design from the Line & Grade (Preliminary) plans.

Based on the results, the proposed pond design does meet net improvement criteria for discharges to the Rock Springs Run basin.

Notes: RS7-E is the runoff from the beginning of the project to Wildlife Crossing #1 and discharges to Pond RS7-E-1A. The pond discharge is assumed to be directed north, to Seminole Creek and away from Rock Springs Run. Therefore, no discharge is assumed.

RS7-E-2A shows the effects of redirecting a portion of basin RS8-E to Pond RS7-E-2A, where it is then discharged to Rock Springs Run.

SC1-E represents Wildlife Crossing #1, which is treated with shallow retention. No discharge is assumed. If shallow retention is not an option, this basin will be combined with basin RS7-E and discharged discharged north to Seminole Creek.

Only the preferred alternatives for each basin are considered for this scenario, i.e. Ponds RS7-E-1A, RS7-E-2A, RS8-E-1, RS9-E-1, and SMA RS7-E-4.

NUTRIENT LOADING ANALYSIS

ROCK SPRINGS RUN BASIN

PONDS NITROGEN AND PHOSPHOROUS CALCULATOR

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 1: Project Data

Node Text: RockSpringsRun.npc

Project Name: Rock Springs Run

Project Description:

Project Number: 23827575201

Engineer: Bill Whitegon

Supervising Engineer: Alex George

Date: 06-03-2014

End Data Section 1

Data Section 2: Global Data

Climate Zone: 2 - Central Florida

Rainfall: 50.7 inches

End Data Section 2

Data Section 3: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: RS8-E Pre-Development Discharge

Input Parameters:

Basin Name = RS8-E

Annual Runoff Coefficient = 11.21046 acre-ft [see data section 4]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 6]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 7]

Results:

Average Annual Nitrogen Load = 15.90208 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.7605345 kg/yr (as total phosphorous)

End Data Section 3

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Data Section 4: Calculate Annual Runoff Volume For A Single Basin

Node Description: Pre-Development Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.0982 [see data section 5]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 27.02 acres

Result:

Average Annual Runoff Volume = 11.21046 acre-ft

End Data Section 4

Data Section 5: Lookup Typical Annual Runoff Coefficient Value

Node Description: Pre-Development Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 78

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.0982

End Data Section 5

Data Section 6: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Pre-Development Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 6

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Nitrogen and Phosphorus Loading Calculator
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Data Section 7: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Pre-Development Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 7

Data Section 8: Single Basin or Multibasin Pond

Node: RS8-E Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Wet Pond With Pretreatment
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	RS8-E	19.24	85	54	Highway
Total		19.24	85	54	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.5106	41.50616	70.14002	8.703506
Total	1.37	0.17	0.5106	41.50616	70.14002	8.703506

Postdevelopment Non-Runoff Contributing Area (acres): 7.78
Postdevelopment Total Area (acres): 27.02

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Efficiency:

Required Nitrogen Removal Efficiency (%) = 77.7899
Required Phosphrous Removal Efficiency (%) = 92.9454

Wet Pond Input Data:

Residence Time (days) = 210
Anoxic Depth Reduction Factor = 1.0

Note to users in St. Johns River Water Management District:

In SJRWMD, the current removal efficiency limit is 64.5% for a permanent pool volume that provides for a WET SEASON residence time of 21 days. If the WET SEASON residence time is 14 days, then the removal efficiency would be 61.5%.

Also note that the Residence Time entered in the Wet Pond input data in this module is the ANNUAL residence time, not the WET SEASON residence time.

Treatment Train Summary Results:

Required Treatment Train Removal Efficiencies			
Parameter	Req. Total Removal Efficiency (%)	Available Wet Pond Efficiency (%)	Required Pretreatment Efficiency (%)
Nitrogen	77.7899	42.85614	61.13301
Phosphorus	92.9454	81.5391	61.78628

Required Permanent Pool Volume of Wet Pond (ac-ft) = 9.125535
Estimated Anoxic Depth of Wet Pond (ft) = 17.86687

Required Design Efficiency of Dry Pond (%) = 61.78628
Required Retention Depth of Dry Pond (inches) = 0.5832092
Required Retention Volume of Dry Pond (ac-ft) = 0.9350787

Wet Pond Properties:

Annual Runoff Reaching Wet Pond (ac-ft) = 15.86105
Required Permanent Pool Volume (ac-ft) = 9.125535
Yearly Phosphorus Load (kg/yr) = 3.325934
Wet Pond Phorphorus Removal Efficiency (%) = 81.5391
Annual Mass of Unremoved Phosphorus (kg/yr) = 0.6139973
Mean Phosphorus Concentration in Pond (µg/l) = 19.92172
Estimated Chlorophyll-a Concentration (mg/m^3) = 9.312296
Estimated Sechi Disk Depth (ft) = 5.776326
Estimated Anoxic Depth (ft) = 17.86687

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Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	41.50616
Annual Discharge Volume (ac-ft)	N.A.	15.86105
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	15.31633
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.6139972
Nitrogen Concentration in Discharge (mg/l)	N.A.	0.7828707
Phosphorus Concentration in Discharge (mg/l)	N.A.	3.138352E-02

Achieved Efficiencies:

Achieved Nitrogen Removal Efficiency (%) = 78.16321
Achieved Phosphorus Removal Efficiency (%) = 92.9454

End Data Section 8

Data Section 9: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: RS9-E Pre-Development Discharge

Input Parameters:

Basin Name = RS9-E

Annual Runoff Coefficient = 2.450711 acre-ft [see data section 10]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 12]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 13]

Results:

Average Annual Nitrogen Load = 3.476344 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.1662599 kg/yr (as total phosphorous)

End Data Section 9

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Nitrogen and Phosphorus Loading Calculator
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Data Section 10: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.015 [see data section 11]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 38.67 acres

Result:

Average Annual Runoff Volume = 2.450711 acre-ft

End Data Section 10

Data Section 11: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 50

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.015

End Data Section 11

Data Section 12: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 12

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Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

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Data Section 13: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 13

Data Section 14: Single Basin or Multibasin Pond

Node: RS9-E Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	RS9-E	31.11	65	38	Highway
Total		31.11	65	38	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.3338	43.87459	74.14236	9.200147
Total	1.37	0.17	0.3338	43.87459	74.14236	9.200147

Postdevelopment Non-Runoff Contributing Area (acres): 7.57
Postdevelopment Total Area (acres): 38.68

Efficiency:

Required Removal Efficiency (%) = 95.628

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 1.876999
Required dry pond retention volume (ac-ft) = 4.86612

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	43.87459
Annual Discharge Volume (ac-ft)	N.A.	1.918198
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	3.241504
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.4022305
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 14

Data Section 15: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: SC1-E Pre-Development Discharge

Input Parameters:

Basin Name = SC1-E

Annual Runoff Coefficient = 0.564291 acre-ft [see data section 16]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 18]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 19]

Results:

Average Annual Nitrogen Load = 0.8004491 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 3.828235E-02 kg/yr (as total phosphorous)

End Data Section 15

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Data Section 16: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.012 [see data section 17]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 11.13 acres

Result:

Average Annual Runoff Volume = 0.564291 acre-ft

End Data Section 16

Data Section 17: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 47

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.012

End Data Section 17

Data Section 18: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 18

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Data Section 19: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 19

Data Section 20: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: RS7-E Pre-Development Discharge

Input Parameters:

Basin Name = RS7-E

Annual Runoff Coefficient = 2.289257 acre-ft [see data section 21]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 23]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 24]

Results:

Average Annual Nitrogen Load = 3.24732 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.1553066 kg/yr (as total phosphorous)

End Data Section 20

Data Section 21: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.0348 [see data section 22]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 15.57 acres

Result:

Average Annual Runoff Volume = 2.289257 acre-ft

End Data Section 21

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Data Section 22: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 62

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.0348

End Data Section 22

Data Section 23: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 23

Data Section 24: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 24

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Data Section 25: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: RS7-E-2A Pre-Development Discharge

Input Parameters:

Basin Name = RS7-E-2A

Annual Runoff Coefficient = 2.167679 acre-ft [see data section 26]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 28]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 29]

Results:

Average Annual Nitrogen Load = 3.074862 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.1470586 kg/yr (as total phosphorous)

End Data Section 25

Data Section 26: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.051 [see data section 27]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 10.06 acres

Result:

Average Annual Runoff Volume = 2.167679 acre-ft

End Data Section 26

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Data Section 27: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 68

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.051

End Data Section 27

Data Section 28: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 28

Data Section 29: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 29

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Data Section 30: Single Basin or Multibasin Pond

Node: RS7-E-2A Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	RS7-E-2A	6.06	80	77	Highway
Total		6.06	80	77	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.649	16.61667	28.08002	3.484381
Total	1.37	0.17	0.649	16.61667	28.08002	3.484381

Postdevelopment Non-Runoff Contributing Area (acres): 4
Postdevelopment Total Area (acres): 10.06

Efficiency:

Required Removal Efficiency (%) = 96.158

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 2.980624
Required dry pond retention volume (ac-ft) = 1.505215

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	16.61667
Annual Discharge Volume (ac-ft)	N.A.	0.6384128
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	1.078835
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.13387
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 30

Data Section 31: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: SR 46 w/RS7-E-3 Pre-Development Discharge

Input Parameters:

Basin Name = SR 46

Annual Runoff Coefficient = 2.082249 acre-ft [see data section 32]

Nitrogen Concentration in Runoff = 1.37 mg/l (as total nitrogen) [see data section 34]

Phosporous Concentration in Runoff = 0.17 mg/l (as total phosphorous) [see data section 35]

Results:

Average Annual Nitrogen Load = 3.51873 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.4366308 kg/yr (as total phosphorous)

End Data Section 31

Data Section 32: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.111 [see data section 33]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 4.44 acres

Result:

Average Annual Runoff Volume = 2.082249 acre-ft

End Data Section 32

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Data Section 33: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 80

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.111

End Data Section 33

Data Section 34: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Highway

Result

Typical Nitrogen Concentration: 1.37 mg/l (as total nitrogen)

End Data Section 34

Data Section 35: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Highway

Result

Typical Phosphorous Concentration: 0.17 mg/l (as total phosphorous)

End Data Section 35

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Data Section 36: Single Basin or Multibasin Pond

Node: SR 46 w/RS7-E-3 Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	SR 46	3.46	80	100	Highway
Total		3.46	80	100	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.809	11.82637	19.98503	2.479894
Total	1.37	0.17	0.809	11.82637	19.98503	2.479894

Postdevelopment Non-Runoff Contributing Area (acres): .98
Postdevelopment Total Area (acres): 4.44

Efficiency:

Required Removal Efficiency (%) = 87.983

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 1.942178
Required dry pond retention volume (ac-ft) = 0.5599946

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	11.82637
Annual Discharge Volume (ac-ft)	N.A.	1.421175
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	2.401601
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.2980089
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 36

Data Section 37: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: SR 46 w/Swales Pre-Development Discharge

Input Parameters:

Basin Name = SR 46

Annual Runoff Coefficient = 2.560604 acre-ft [see data section 38]

Nitrogen Concentration in Runoff = 1.37 mg/l (as total nitrogen) [see data section 40]

Phosporous Concentration in Runoff = 0.17 mg/l (as total phosphorous) [see data section 41]

Results:

Average Annual Nitrogen Load = 4.327088 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.536938 kg/yr (as total phosphorous)

End Data Section 37

Data Section 38: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.111 [see data section 39]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 5.46 acres

Result:

Average Annual Runoff Volume = 2.560604 acre-ft

End Data Section 38

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Data Section 39: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 80

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.111

End Data Section 39

Data Section 40: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Highway

Result

Typical Nitrogen Concentration: 1.37 mg/l (as total nitrogen)

End Data Section 40

Data Section 41: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Highway

Result

Typical Phosphorous Concentration: 0.17 mg/l (as total phosphorous)

End Data Section 41

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Data Section 42: Single Basin or Multibasin Pond

Node: SR 46 w/Swales Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	SR 46	3.46	80	100	Highway
Total		3.46	80	100	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.809	11.82637	19.98503	2.479894
Total	1.37	0.17	0.809	11.82637	19.98503	2.479894

Postdevelopment Non-Runoff Contributing Area (acres): 2
Postdevelopment Total Area (acres): 5.46

Efficiency:

Required Removal Efficiency (%) = 97.6

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 4
Required dry pond retention volume (ac-ft) = 1.153333

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Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	11.82637
Annual Discharge Volume (ac-ft)	N.A.	0.2838328
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	0.4796405
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	5.951743E-02
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 42

NUTRIENT LOADING ANALYSIS

ROCK SPRINGS RUN BASIN

POND RS8-E-1 RESIDENCE TIME

Designed By: BCW
Date: 8/7/2014
Checked By: JAG
Date: 8/7/2014

Subject: WEKIVA PARKWAY - RESIDENCE TIME CALCULATIONS
BASIN RS8-E (STA 680+00 to 723+00)

RUNOFF

Basin Description	Land Use	Area	% DCIA	Non DCIA CN	Runoff Coeff.[1]
Proposed Pavement	Highway	10.43 ac	100%	98	0.809
Proposed Pavement	Highway	2.20 ac	0%	98	0.595
Open Space	Undeveloped	9.55 ac	0%	80	0.111
Pond Surface	Water	4.84 ac	100%	100	0.809

Total Area: 27.02 ac Weighted Coefficients: 0.545

PERMANENT POOL

Description	Elevation	Area	Volume
Control El	38.60 ft	4.84 ac	**11.31 ac-ft**
SHGWT	36.00 ft	3.86 ac	
SHGWT	36.00 ft	3.86 ac	**6.99 ac-ft**
Slope Change Elev.	34.00 ft	3.13 ac	
Slope Change Elev.	34.00 ft	3.13 ac	**17.45 ac-ft**
Pond Bottom Elevation	24.00 ft	0.36 ac	
Total Perm. Pool Volume:			**35.75 ac-ft**

Manual Input PPV:

Annual Runoff Volume:	**62.20 ac-ft/yr**
Permanent Pool Volume:	**35.75 ac-ft**
Average Residence Time:	**210 days**

NUTRIENT LOADING ANALYSIS

ROCK SPRINGS RUN BASIN

POND RS8-E-1 72-HR DRAWDOWN

PONDS Version 3.3.0241
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Project Data

Project Name:	Wekiva Parkway Section 6
Simulation Description:	RS8-E-1
Project Number:	H1135080
Engineer :	ENJ
Supervising Engineer:	JWC
Date:	10-15-2013

Aquifer Data

Base Of Aquifer Elevation, [B] (ft datum):	34.00
Water Table Elevation, [WT] (ft datum):	36.00
Horizontal Saturated Hydraulic Conductivity, [Kh] (ft/day):	10.00
Fillable Porosity, [n] (%):	20.00

Vertical infiltration was not considered.

Geometry Data

Equivalent Pond Length, [L] (ft):	1100.0
Equivalent Pond Width, [W] (ft):	150.0

Ground water mound is expected to intersect the pond bottom

Stage vs Area Data

Stage (ft datum)	Area (ft^2)
36.00	167969.0
37.00	184326.0
38.00	200940.0
38.60	210964.0
39.00	217692.0
40.00	234670.0
40.10	236380.0
41.00	251874.0
42.00	269304.0

PONDS Version 3.3.0241
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.

Scenario Input Data

Scenario 1 :: 492228 ft³ slug load

Hydrograph Type: Slug Load
Modflow Routing: Routed with infiltration

Treatment Volume (ft³) 492228

Initial ground water level (ft datum) 36.00 (default)

Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)	Time After Storm Event (days)
0.100	2.000	5.000	10.000	15.000
0.250	2.500	6.000	11.000	20.000
0.500	3.000	7.000	12.000	25.000
1.000	3.500	8.000	13.000	30.000
1.500	4.000	9.000	14.000	

PONDS Version 3.3.0241
Retention Pond Recovery - Refined Method

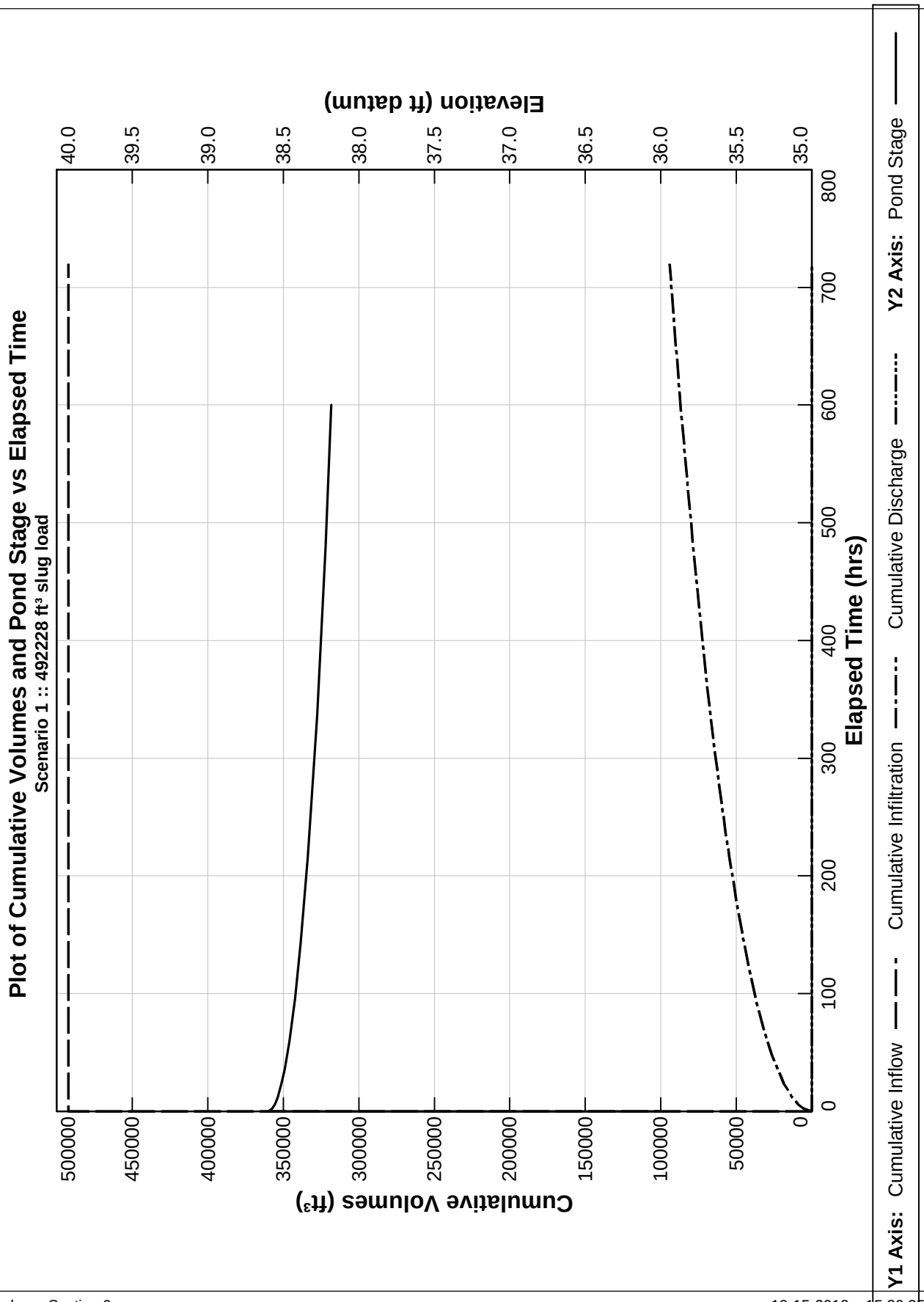
Devo Seereeram, Ph.D., P.E.

Detailed Results *:: Scenario 1 :: 492228 ft³ slug load*

Elapsed Time (hours)	Inflow Rate (ft³/s)	Outside Recharge (ft/day)	Stage Elevation (ft datum)	Infiltration Rate (ft³/s)	Overflow Discharge (ft³/s)	Cumulative Inflow Volume (ft³)	Cumulative Infiltration Volume (ft³)	Cumulative Discharge Volume (ft³)	Flow Type
0.000	82038.0000	0.0000	36.000	0.00000	0.00000	0.0	0.0	0.0	N.A.
0.002	82038.0000	0.0000	38.599	1.72670	0.00000	492228.0	10.4	0.0	S
2.400	0.0000	0.0000	38.574	0.48587	0.00000	492228.0	5335.3	0.0	S
6.000	0.0000	0.0000	38.556	0.25024	0.00000	492228.0	9086.2	0.0	S
12.000	0.0000	0.0000	38.537	0.16517	0.00000	492228.0	13080.8	0.0	S
24.000	0.0000	0.0000	38.511	0.11201	0.00000	492228.0	18508.8	0.0	S
36.000	0.0000	0.0000	38.491	0.09049	0.00000	492228.0	22758.5	0.0	S
48.000	0.0000	0.0000	38.474	0.07739	0.00000	492228.0	26326.8	0.0	S
60.000	0.0000	0.0000	38.459	0.06845	0.00000	492228.0	29445.3	0.0	S
72.000	0.0000	0.0000	38.446	0.06188	0.00000	492228.0	32241.1	0.0	S
84.000	0.0000	0.0000	38.433	0.05680	0.00000	492228.0	34791.7	0.0	S
96.000	0.0000	0.0000	38.422	0.05244	0.00000	492228.0	37148.3	0.0	S
120.000	0.0000	0.0000	38.402	0.04583	0.00000	492228.0	41313.5	0.0	S
144.000	0.0000	0.0000	38.384	0.04160	0.00000	492228.0	45068.3	0.0	S
168.000	0.0000	0.0000	38.367	0.03826	0.00000	492228.0	48502.7	0.0	S
192.000	0.0000	0.0000	38.352	0.03553	0.00000	492228.0	51678.8	0.0	S
216.000	0.0000	0.0000	38.338	0.03325	0.00000	492228.0	54641.6	0.0	S
240.000	0.0000	0.0000	38.324	0.03132	0.00000	492228.0	57424.7	0.0	S
264.000	0.0000	0.0000	38.311	0.02966	0.00000	492228.0	60053.8	0.0	S
288.000	0.0000	0.0000	38.299	0.02820	0.00000	492228.0	62549.1	0.0	S
312.000	0.0000	0.0000	38.288	0.02692	0.00000	492228.0	64926.9	0.0	S
336.000	0.0000	0.0000	38.277	0.02577	0.00000	492228.0	67200.4	0.0	S
360.000	0.0000	0.0000	38.266	0.02462	0.00000	492228.0	69380.6	0.0	S
480.000	0.0000	0.0000	38.221	0.02024	0.00000	492228.0	78699.7	0.0	S
600.000	0.0000	0.0000	38.181	0.01787	0.00000	492228.0	86866.5	0.0	S
720.000	0.0000	0.0000	38.145	----	----	492228.0	94143.6	0.0	N.A.

PONDS Version 3.3.0241
Retention Pond Recovery - Refined Method

Devo Seereeram, Ph.D., P.E.



NUTRIENT LOADING ANALYSIS

ROCK SPRINGS RUN BASIN

DCIA AND CN CALCULATIONS

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**RS7-E**	
POND:	**RS7-E-1A**	
	PRE	**POST**
TOTAL AREA:	**15.57 Ac**	**0.00 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Pasture/grassland/range (grazing) -(good)	A	39	3.24			3.24	3.24	126
Pasture/grassland/range (grazing) -(good)	D	80	3.14			3.14	3.14	251
Imperv. - rds paved open ditch (incl ROW)	A	83			1.01	1.01	1.01	84
Imperv. - rds paved open ditch (incl ROW)	D	93			0.83	0.83	0.83	77
Wetland	D	98	0.39			0.39	0.39	38
Pond Basin								
Woods - (good)	A	30	3.12			3.12	3.12	94
Woods - (good)	D	77	3.85			3.85	3.85	296
TOTAL			**13.73**	**0.00**	**1.83**	**15.57**	**15.57**	**965.91**

% DCIA = **0%**
Non-DCIA CN = **62**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

% DCIA = **#DIV/0!**
Non-DCIA CN = **#DIV/0!**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**SC1-E**	
POND:	**RS7-E-4 (Shallow Retention)**	
	PRE	**POST**
TOTAL AREA:	**11.13 Ac**	**0.00 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Pasture/grassland/range (grazing) -(good)	A	39	0.39			0.39	0.39	15
Imperv. - rds paved open ditch (incl ROW)	D	93			0.56	0.56	0.56	52
Woods - (good)	A	30	6.88			6.88	6.88	206
Woods - (good)	D	77	3.31			3.31	3.31	255
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**10.57**	**0.00**	**0.56**	**11.13**	**11.13**	**528.35**

% DCIA = **0%**
Non-DCIA CN = **47**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

% DCIA = **#DIV/0!**
Non-DCIA CN = **#DIV/0!**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**RS7-E-2A**	
POND:	**RS7-E-2A**	
	PRE	**POST**
TOTAL AREA:	**10.06 Ac**	**6.06 Ac**
		6.06+4

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Pasture/grassland/range (grazing) -(good)	A	39	1.35			1.35	1.35	53
Pasture/grassland/range (grazing) -(good)	D	80	3.85			3.85	3.85	308
Woods - (good)	D	77	0.37			0.37	0.37	29
Wetland	D	98	0.49			0.49	0.49	48
Pond Basin								
Pasture/grassland/range (grazing) -(good)	A	39	1.67			1.67	1.67	65
Pasture/grassland/range (grazing) -(good)	D	80	1.71			1.71	1.71	137
Woods - (good)	A	30	0.02			0.02	0.02	1
Woods - (good)	D	77	0.59			0.59	0.59	46
TOTAL			**10.06**	**0.00**	**0.00**	**10.06**	**10.06**	**685.86**

% DCIA = **0%**
Non-DCIA CN = **68**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	1.37			1.37	1.37	110
Imperv. - paved parking lots,roofs,drives	D	98		4.69		4.69	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**1.37**	**4.69**	**0.00**	**6.06**	**1.37**	**109.60**

% DCIA = **77%**
Non-DCIA CN = **80**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**RS8-E**	
POND:	**RS8-E-1**	
	PRE	**POST**
TOTAL AREA:	**27.02 Ac**	**19.24 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Pasture/grassland/range (grazing) -(good)	D	80	6.99			6.99	6.99	559
Woods - (good)	A	30	0.46			0.46	0.46	14
Woods - (good)	D	77	5.89			5.89	5.89	454
Wetland	D	98	5.90			5.90	5.90	579
Pond Basin								
Pasture/grassland/range (grazing) -(good)	D	80	1.26			1.26	1.26	101
Woods - (good)	A	30	2.59			2.59	2.59	78
Woods - (good)	D	77	2.30			2.30	2.30	177
Wetland	D	98	1.62			1.62	1.62	159
TOTAL			**27.02**	**0.00**	**0.00**	**27.02**	**27.02**	**2,119.98**

% DCIA = **0%**
Non-DCIA CN = **78**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	6.61			6.61	6.61	528
Imperv. - paved parking lots,roofs,drives	D	98		10.43	2.20	12.63	2.20	216
		0				0.00	0.00	0
		0				0.00	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**6.61**	**10.43**	**2.20**	**19.24**	**8.81**	**744.35**

% DCIA = **54%**
Non-DCIA CN = **85**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**RS9-E**	
POND:	**RS9-E-1**	
	PRE	**POST**
TOTAL AREA:	**38.67 Ac**	**31.11 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Pasture/grassland/range (grazing) -(good)	A	39	13.95			13.95	13.95	544
Pasture/grassland/range (grazing) -(good)	D	80	1.22			1.22	1.22	97
Imperv. - rds paved open ditch (incl ROW)	A	83			1.01	1.01	1.01	84
Open Space (poor) - grass < 50%	D	89	2.25			2.25	2.25	200
Woods - (good)	A	30	7.92			7.92	7.92	238
Wetland	D	98	4.75			4.75	4.75	466
Pond Basin								
Pasture/grassland/range (grazing) -(good)	A	39	7.57			7.57	7.57	295
TOTAL			**37.66**	**0.00**	**1.01**	**38.67**	**38.67**	**1,923.87**

% DCIA = **0%**
Non-DCIA CN = **50**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	7.09			7.09	7.09	568
Imperv. - paved parking lots,roofs,drives	D	98		11.94	1.85	13.79	1.85	181
Pasture/grassland/range (grazing) -(good)	A	39	5.69			5.69	5.69	222
Pasture/grassland/range (grazing) -(good)	D	80	0.10			0.10	0.10	8
Imperv. - rds paved open ditch (incl ROW)	A	83			0.62	0.62	0.62	51
Open Space (poor) - grass < 50%	D	89	1.79			1.79	1.79	159
Woods - (good)	A	30	2.03			2.03	2.03	61
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**16.70**	**11.94**	**2.47**	**31.11**	**19.17**	**1,249.90**

% DCIA = **38%**
Non-DCIA CN = **65**

NUTRIENT LOADING ANALYSIS

WEKIVA RIVER BASIN

SUMMARY

Designed By: BCW
Date: 8/7/2014
Checked By: JAG
Date: 8/7/2014

Subject: Wekiva Parkway - Section 6
Wekiva River Basin Nutrient Loading Summary

Total Nitrogen (TN) (kg/yr)

	Basin				
Condition	**WR1-E-W**	**WR1-E-E**	**WR1-E Exist Bridge**	**WR2A-S-2**	**Total**
Existing	12.99	3.02	4.13	0.00	20.14
Proposed	17.01	1.93	0.00	0.24	19.18
Difference	4.02	-1.09	-4.13	0.24	**-0.96**

Total Phosphorous (TP) (kg/yr)

	Basin				
Condition	**WR1-E-W**	**WR1-E-E**	**WR1-E Exist Bridge**	**WR2A-S-2**	**Total**
Existing	0.62	0.14	0.30	0.00	1.06
Proposed	0.50	0.24	0.00	0.03	0.77
Difference	-0.12	0.10	-0.30	0.03	**-0.29**

Results:

The nutrient discharge from the existing bridge was modeled using the Post-Development model input to account for the existing treatment at the bridge since the spreadsheet does not allow for this in the Pre-Development input.

Based on the results, the proposed pond designs meet net improvement criteria for discharges to the Wekiva River basin.

Only the preferred alternatives for each basin are considered for this scenario, i.e. Ponds WR1-E-1, WR1-E-5, and WR1-E-7.

NUTRIENT LOADING ANALYSIS

WEKIVA RIVER BASIN

PONDS NITROGEN AND PHOSPHOROUS CALCULATOR

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 1: Project Data

Node Text: WekivaRiver.npc

Project Name: Wekiva River

Project Description:

Project Number: 23827575201

Engineer: Bill Whitegon

Supervising Engineer: Alex George

Date: 06-03-2014

End Data Section 1

Data Section 2: Global Data

Climate Zone: 2 - Central Florida

Rainfall: 50.7 inches

End Data Section 2

Data Section 3: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: WR1-E-W Pre-Development Discharge

Input Parameters:

Basin Name = WR1-E-W

Annual Runoff Coefficient = 9.159082 acre-ft [see data section 4]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 6]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 7]

Results:

Average Annual Nitrogen Load = 12.9922 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.6213659 kg/yr (as total phosphorous)

End Data Section 3

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 4: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.111 [see data section 5]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 19.53 acres

Result:

Average Annual Runoff Volume = 9.159082 acre-ft

End Data Section 4

Data Section 5: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 80

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.111

End Data Section 5

Data Section 6: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 6

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 7: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 7

Data Section 8: Single Basin or Multibasin Pond

Node: WR1-E-W Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Wet Pond With Pretreatment
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	WR1-E-W	8.52	84	52	Highway
Total		8.52	84	52	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.49304	17.74796	29.99175	3.721604
Total	1.37	0.17	0.49304	17.74796	29.99175	3.721604

Postdevelopment Non-Runoff Contributing Area (acres): 7.45
Postdevelopment Total Area (acres): 15.97

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Efficiency:

Required Nitrogen Removal Efficiency (%) = 0
Required Phosphrous Removal Efficiency (%) = 0

Wet Pond Input Data:

Residence Time (days) = 405
Anoxic Depth Reduction Factor = 1.0

Note to users in St. Johns River Water Management District:

In SJRWMD, the current removal efficiency limit is 64.5% for a permanent pool volume that provides for a WET SEASON residence time of 21 days. If the WET SEASON residence time is 14 days, then the removal efficiency would be 61.5%.

Also note that the Residence Time entered in the Wet Pond input data in this module is the ANNUAL residence time, not the WET SEASON residence time.

Treatment Train Summary Results:

Required Treatment Train Removal Efficiencies			
Parameter	Req. Total Removal Efficiency (%)	Available Wet Pond Efficiency (%)	Required Pretreatment Efficiency (%)
Nitrogen	0	43.28191	0
Phosphorus	0	86.65665	0

Required Permanent Pool Volume of Wet Pond (ac-ft) = 19.69294
Estimated Anoxic Depth of Wet Pond (ft) = 23.63059

Required Design Efficiency of Dry Pond (%) = 0
Required Retention Depth of Dry Pond (inches) = 0
Required Retention Volume of Dry Pond (ac-ft) = 0

Wet Pond Properties:

Annual Runoff Reaching Wet Pond (ac-ft) = 17.74796
Required Permanent Pool Volume (ac-ft) = 19.69294
Yearly Phosphorus Load (kg/yr) = 3.721604
Wet Pond Phorphorus Removal Efficiency (%) = 86.65665
Annual Mass of Unremoved Phosphorus (kg/yr) = 0.4965868
Mean Phosphorus Concentration in Pond (µg/l) = 10.75267
Estimated Chlorophyll-a Concentration (mg/m^3) = 4.849682
Estimated Sechi Disk Depth (ft) = 7.730452
Estimated Anoxic Depth (ft) = 23.63059

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	17.74796
Annual Discharge Volume (ac-ft)	N.A.	17.74796
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	17.01075
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.4965867
Nitrogen Concentration in Discharge (mg/l)	N.A.	0.777038
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.0226837

Achieved Efficiencies:

Achieved Nitrogen Removal Efficiency (%) = 43.28191
Achieved Phosphorus Removal Efficiency (%) = 86.65665

End Data Section 8

Data Section 9: Calculate Annual Nitrogen and Phorphorous Load Generated By A Single Basin

Node Description: WR1-E-E Pre-Development Discharge

Input Parameters:

Basin Name = WR1-E-E

Annual Runoff Coefficient = 2.127625 acre-ft [see data section 10]

Nitrogen Concentration in Runoff = 1.15 mg/l (as total nitrogen) [see data section 12]

Phosporous Concentration in Runoff = 0.055 mg/l (as total phosphorous) [see data section 13]

Results:

Average Annual Nitrogen Load = 3.018045 kg/yr (as total phosphorous)

Average Annual Phosphorous Load = 0.1443413 kg/yr (as total phosphorous)

End Data Section 9

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 10: Calculate Annual Runoff Volume For A Single Basin

Node Description: Calculate Annual Runoff Volume

Input Parameters:

Runoff Coefficient = 0.042 [see data section 11]

Average Annual Rainfall = 50.7 inches [see data section 2]

Basin Area = 11.99 acres

Result:

Average Annual Runoff Volume = 2.127625 acre-ft

End Data Section 10

Data Section 11: Lookup Typical Annual Runoff Coefficient Value

Node Description: Lookup Annual Runoff Coefficient

Input Parameters:

Climate Zone = 2 - Central Florida [see data section 2]

Non-DCIA Curve Number = 65

DCIA = 0 %

Result:

Annual Runoff Coefficient = 0.042

End Data Section 11

Data Section 12: Lookup Typical Nitrogen Concentration in Runoff

Node Description: Lookup Nitrogen Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Nitrogen Concentration: 1.15 mg/l (as total nitrogen)

End Data Section 12

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Data Section 13: Lookup Typical Phosphorous Concentration in Runoff

Node Description: Lookup Phosphorous Concentration

Input Parameter

Land Use: Undeveloped / Rangeland / Forest

Result

Typical Phosphorous Concentration: 0.055 mg/l (as total phosphorous)

End Data Section 13

Data Section 14: Single Basin or Multibasin Pond

Node: WR1-E-E Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	WR1-E-E	9.07	86	89	Highway
Total		9.07	86	89	

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.73952	28.33896	47.88916	5.942451
Total	1.37	0.17	0.73952	28.33896	47.88916	5.942451

Postdevelopment Non-Runoff Contributing Area (acres): 3.46
Postdevelopment Total Area (acres): 12.53

Efficiency:

Required Removal Efficiency (%) = 95.975

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 3.146364
Required dry pond retention volume (ac-ft) = 2.378127

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	28.33896
Annual Discharge Volume (ac-ft)	N.A.	1.140643
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	1.927539
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	0.2391837
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 14

Data Section 15: Single Basin or Multibasin Pond

Node: WR2A-S-2 Post-Development Discharge

Description:

Analysis Type: Specified Reduction In Postdevelopment Nutrient Loading
Pond Type: Dry Pond
Analyze For: Nitrogen and Phosphorus

Climate Data:

Climate zone = 2 - Central Florida
Average annual rainfall depth (inches) = 50.7

Postdevelopment Basins:

Postdevelopment Basin Input Parameters					
Basin	Basin ID	Basin Area (acres)	Curve Number	DCIA (%)	Land Use
1	WR-2A-S-2	.84	80	67	Highway
Total		.84	80	67	

PONDS 3.3
Nitrogen and Phosphorus Loading Calculator
Version 3.3.114

Devo Seereeram, Ph.D., P.E.

Postdevelopment Basin Intermediate Parameters						
Basin	Nitrogen Conc. (mg/l)	Phosphorus Conc. (mg/l)	Runoff Coef.	Annual Runoff Volume (ac-ft/yr)	Annual Nitrogen Load (kg/yr)	Annual Phosphorus Load (kg/yr)
1	1.37	0.17	0.579	2.054871	3.472465	0.4308898
Total	1.37	0.17	0.579	2.054871	3.472465	0.4308898

Postdevelopment Non-Runoff Contributing Area (acres): .13
Postdevelopment Total Area (acres): 0.97

Efficiency:

Required Removal Efficiency (%) = 93

Dry Pond Design Requirements:

Required dry pond retention depth (inches) = 2.146341
Required dry pond retention volume (ac-ft) = 0.1502439

Discharge Summary:

	Predevelopment	Postdevelopment
Annual Runoff Volume (ac-ft)	N.A.	2.054871
Annual Discharge Volume (ac-ft)	N.A.	0.143841
Annual Mass of Discharged Nitrogen (kg/yr)	N.A.	0.2430725
Annual Mass of Discharged Phosphorus (kg/yr)	N.A.	3.016228E-02
Nitrogen Concentration in Discharge (mg/l)	N.A.	1.37
Phosphorus Concentration in Discharge (mg/l)	N.A.	0.17

End Data Section 15

NUTRIENT LOADING ANALYSIS

WEKIVA RIVER BASIN

BASIN WR1-E EXISTING BRIDGE

GENERAL SITE INFORMATION: | GO TO INTRODUCTION PAGE

Blue Numbers = Input data
Red Numbers = Calculated or Carryover

STEP 1: Select the appropriate Meteorological Zone, input the appropriate Mean Annual Rainfall amount and select the type of analysis

NAME OF PROJECT: Wekiva Section 6/Basin WR1-E Existing Bridge

VIEW ZONE MAP

Meteorological Zone (Please use zone map): CLICK ON CELL BELOW TO SELECT — Zone 2

VIEW MEAN ANNUAL RAINFALL

Mean Annual Rainfall (Please use rainfall map): 50.70 Inches

Type of analysis: CLICK ON CELL BELOW TO SELECT — BMP analysis

GO TO WATERSHED

Treatment efficiency (N, P) (leave empty if net improvement or BMP analysis is used): % %

STEP 2: Select the STORMWATER TREATMENT ANALYSIS to begin analyzing Best Management Practices.

Model documentation and example problems.

STORMWATER TREATMENT ANALYSIS

There is a user's manual for the BMPTRAINS model. It can be downloaded from www.stormwater.ucf.edu. The results from the example problems shown in the manual however may not reflect current model results due to ongoing updates of the model.

Systems available for analysis:
Retention Basin with option for calculating effluent concentration
Wet Detention
Exfiltration Trench
Pervious Pavement
Stormwater Harvesting
Underdrain Biofiltration
Greenroof
Rainwater Harvesting
Floating Island with Wet Detention
Vegetated Natural Buffer
Vegetated Filter Strip
Swale
Rain Garden
User Defined BMP

RESET INPUT FOR STORMWATER TREATMENT ANALYSIS

METHODOLOGY FOR CALCULATING REQUIRED TREATMENT

METHODOLOGY FOR

METHODOLOGY FOR WET

METHODOLOGY FOR

METHODOLOGY FOR WATER

WATERSHED CHARACTERISTICS

GO TO STORMWATER TREATEMENT ANALYSIS

Blue Numbers = Input data
Red Numbers = Calculated or Carryover

SELECT CATCHMENT CONFIGURATION

CLICK ON CELL BELOW TO SELECT CONFIGURATION
A - Single Catchment

VIEW CATCHMENT CONFIGURATION

CATCHMENT NO.1 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use:				
with default EMCs: CLICK ON CELL BELOW TO SELECT				
Post-development land use: Highway: TN=1.640 TP=0.220				
with default EMCs	Total			

Total pre-development catchment area: AC
Total post-development catchment or BMP analysis area: 1.01 AC
Pre-development Non DCIA CN:
Pre-development DCIA percentage: %
Post-development Non DCIA CN: 80.00
Post-development DCIA percentage: 100.00 %
Estimated Area of BMP (used for rainfall excess not loadings) AC

OVERWRITE DEFAULT CONCENTRATIONS USING:

	PRE:	POST:
EMC(N):	mg/L	1.370 mg/L
EMC(P):	mg/L	0.170 mg/L

CLICK ON CELL BELOW TO SELECT:
OVERWRITE DEFAULT CONCENTRATIONS

Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**	5.833	kg/year
Post-development Annual Mass Loading - **Phosphorus:**	0.724	kg/year

CATCHMENT NO.2 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use:				
CLICK ON CELL BELOW TO SELECT				
Post-development land use:				
	Total			

Total pre-development catchment area: AC
Total post-development catchment or BMP analysis area: AC
Pre-development Non DCIA CN:
Pre-development DCIA percentage: %
Post-development Non DCIA CN:
Post-development DCIA percentage: %
Estimated Area of BMP (used for rainfall excess not loadings) AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:	POST:
EMC(N):	mg/L	mg/L
EMC(P):	mg/L	mg/L

CLICK ON CELL BELOW TO SELECT:
USE DEFAULT CONCENTRATIONS

Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

CATCHMENT NO.3 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use:				
CLICK ON CELL BELOW TO SELECT				
Post-development land use:				
	Total			

Total pre-development catchment area: AC
Total post-development catchment or BMP analysis area: AC
Pre-development Non DCIA CN:
Pre-development DCIA percentage: %
Post-development Non DCIA CN:
Post-development DCIA percentage: %
Estimated Area of BMP (used for rainfall excess not loadings) AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:	POST:
EMC(N):	mg/L	mg/L
EMC(P):	mg/L	mg/L

CLICK ON CELL BELOW TO SELECT:
USE DEFAULT CONCENTRATIONS

Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

CATCHMENT NO.4 CHARACTERISTICS:

\ If mixed land uses (side calculation)

CLICK ON CELL BELOW TO SELECT	Land use	Area Acres	non DCIA CN	%DCIA
Pre-development land use:				
CLICK ON CELL BELOW TO SELECT				
Post-development land use:				
	Total			

Total pre-development catchment area: AC
Total post-development catchment or BMP analysis area: AC
Pre-development Non DCIA CN:
Pre-development DCIA percentage: %
Post-development Non DCIA CN:
Post-development DCIA percentage: %
Estimated Area of BMP (used for rainfall excess not loadings) AC

OVERWRITE DEFAULT CONCENTRATIONS:

	PRE:	POST:
EMC(N):	mg/L	mg/L
EMC(P):	mg/L	mg/L

CLICK ON CELL BELOW TO SELECT:
USE DEFAULT CONCENTRATIONS

Pre-development Annual Mass Loading - **Nitrogen:**		kg/year
Pre-development Annual Mass Loading - **Phosphorus:**		kg/year
Post-development Annual Mass Loading - **Nitrogen:**		kg/year
Post-development Annual Mass Loading - **Phosphorus:**		kg/year

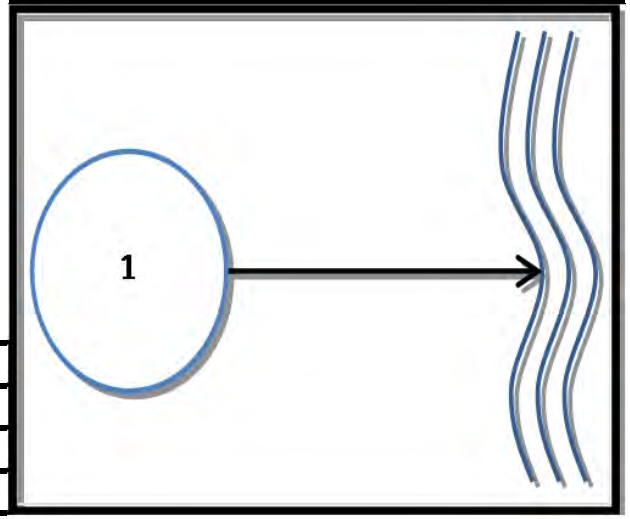
CATCHMENTS AND TREATMENT SUMMARY RESULTS

CALCULATION METHODS:

1. The effectiveness of each BMP in a single catchment is converted to an equivalent capture volume.
2. Certain BMP treatment train combinations have not been evaluated and in practice they are at this time not used, an example is a greenroof following a tree well.
3. If multiple BMPs are used in a single catchment and one of them is detention, then it is assumed to be last in series.

PROJECT TITLE	va Section 6/Basin WR1-E Existing B	Optional Identification	Using Post-Dev for exist treatment	
	Catchment 1:	**Catchment 2:**	**Catchment 3:**	**Catchment 4:**
BMP1	Biofiltration			
BMP2				
BMP3				
Catchment Configuration	A - Single Catchment			

Summary Performance			3/25/2014
Catchment Nitrogen Pre Load	0.00		BMPTRAINS MODEL
Catchment Phosphorus Pre Load	0.00		
Catchment Nitrogen Post Load	5.83		
Catchment Phosphorus Post Load	0.72		
Target Load Reduction (N) %	TBD		
Target Load Reduction (P) %	TBD		
Target Discharge Load, N (kg/yr)			
Target Discharge Load, P (kg/yr)			
Provided Overall Efficiency, N (%):	29		
Provided Overall Efficiency, P (%):	58		
Discharged Load, N (kg/yr & lb/yr):	4.13	9.10	
Discharged Load, P (kg/yr & lb/yr):	0.30	0.66	
Load Removed, N (kg/yr & lb/yr):	1.70	3.75	
Load Removed, P (kg/yr & lb/yr):	0.42	0.93	



NUTRIENT LOADING ANALYSIS

WEKIVA RIVER BASIN

POND WR1-E-1 RESIDENCE TIME

Designed By: BCW
Date: 8/7/2014
Checked By: JAG
Date: 8/7/2014

Subject: WEKIVA PARKWAY - RESIDENCE TIME CALCULATIONS
BASIN WR1-E-1 with WR1-E-5 and 7 (STA 891+00 to 900+45.04)

This scenario analyzes the use of pond WR1-E-1 with pond WR1-E-5 and 7

RUNOFF

Basin Description	Land Use	Area	% DCIA	Non DCIA CN	Runoff Coeff.[1]
Proposed Pavement	Highway	5.37 ac	100%	98	0.809
Open Space	Undeveloped	5.28 ac	0%	80	0.111
Pond Surface	Water	5.32 ac	100%	100	0.809

Total Area: 15.97 ac Weighted Coefficients: 0.578

PERMANENT POOL

Description	Elevation	Area	Volume
Control/Bleeddown Elev.	38.00 ft	5.32 ac	**10.01 ac-ft**
Slope Change Elev.	36.00 ft	4.69 ac	
Slope Change Elev.	36.00 ft	4.69 ac	**33.25 ac-ft**
Pond Bottom Elevation	26.00 ft	1.96 ac	
Total Perm. Pool Volume:			**43.26 ac-ft**

Manual Input PPV:

Annual Runoff Volume:	**39.01 ac-ft/yr**
Permanent Pool Volume:	**43.26 ac-ft**
Average Residence Time:	**405 days**

NUTRIENT LOADING ANALYSIS

WEKIVA RIVER BASIN

DCIA AND CN CALCULATIONS

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**WR1-E-W**	
POND:	**WR1-E-1**	
	PRE	**POST**
TOTAL AREA:	**19.53 Ac**	**8.52 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Imperv. - rds paved open ditch (incl ROW)	D	93			1.97	1.97	1.97	183
Open Space (good) - grass >75%	D	80	3.74			3.74	3.74	299
Woods - (good)	D	77	6.37			6.37	6.37	491
Pond Basin								
Open Space (good) - grass >75%	D	80	6.45			6.45	6.45	516
Woods - (good)	D	77	1.00			1.00	1.00	77
TOTAL			**17.56**	**0.00**	**1.97**	**19.53**	**19.53**	**1,565.76**

% DCIA = **0%**
Non-DCIA CN = **80**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	3.15			3.15	3.15	252
Imperv. - paved parking lots,roofs,drives	D	98		4.40	0.97	5.37	0.97	95
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**3.15**	**4.40**	**0.97**	**8.52**	**4.12**	**346.91**

% DCIA = **52%**
Non-DCIA CN = **84**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**WR1-E-W**	
POND:	**WR1-E-5A; WR1-E-7**	
	PRE	**POST**
TOTAL AREA:	**11.99 Ac**	**9.07 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Imperv. - rds paved open ditch (incl ROW)	A	83			1.26	1.26	1.26	105
Imperv. - rds paved open ditch (incl ROW)	D	93			1.99	1.99	1.99	185
Woods - (good)	A	30	1.77			1.77	1.77	53
Woods - (good)	D	77	1.72			1.72	1.72	132
Woods/Grass combination - (good)	A	32	0.16			0.16	0.16	5
Woods/Grass combination - (good)	D	79	0.16			0.16	0.16	12
Wetland	D	98	1.47			1.47	1.47	144
Pond Basin								
Woods - (good)	A	30	1.46			1.46	1.46	44
Woods - (good)	D	77	0.69			0.69	0.69	53
Woods/Grass combination - (good)	A	32	1.28			1.28	1.28	41
Woods/Grass combination - (good)	D	79	0.02			0.02	0.02	2
TOTAL			**8.74**	**0.00**	**3.25**	**11.99**	**11.99**	**776.63**

% DCIA = **0%**
Non-DCIA CN = **65**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	0.67			0.67	0.67	54
Imperv. - paved parking lots,roofs,drives	D	98		8.09	0.31	8.40	0.31	30
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**0.67**	**8.09**	**0.31**	**9.07**	**0.98**	**83.80**

% DCIA = **89%**
Non-DCIA CN = **86**

WEKIVA PARKWAY - SECTION 6
TMDL ANALYSIS - HYDROLOGY CALCULATIONS

DATE: 8/7/14
REV:
BY: BCW
CK: JAG

BASIN:	**WR2A-S-2**	
POND:	**WR2A-S-2**	
	PRE	**POST**
TOTAL AREA:	**0.00 Ac**	**0.84 Ac**

1. Existing Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

% DCIA = **#DIV/0!**
Non-DCIA CN = **#DIV/0!**

2. Proposed Conditions

Land Cover	Soil Hydrologic Group	CN	Pervious Area (Ac)	Directly Connected Impervious Area (Ac)	Non-Directly Connected Impervious Area (Ac)	Total Area (Ac)	Non-DCIA Total Area (Ac)	Non-DCIA CA
Roadway Basin								
Open Space (good) - grass >75%	D	80	0.28			0.28	0.28	22
Imperv. - paved parking lots,roofs,drives	D	98		0.56		0.56	0.00	0
Pond Basin								
		0				0.00	0.00	0
		0				0.00	0.00	0
		0				0.00	0.00	0
TOTAL			**0.28**	**0.56**	**0.00**	**0.84**	**0.28**	**22.40**

% DCIA = **67%**
Non-DCIA CN = **80**

APPENDIX D

Recharge Calculations

WEKIVA RECHARGE PROTECTION

BASIN ANALYSIS

WEKIVA PARKWAY - SECTION 6
WEKIVA RECHARGE PROTECTION BASIN ANALYSIS

DATE: 8/7/14
BY: BCW
CK: JAG

1. Required Recharge Volume

Basin	Proposed Impervious Over Type "A" Soil (Ac)	Required Recharge Volume (Ac-Ft)
SC1-E	4.73	1.18
RS8-E	1.37	0.34
RS9-E	10.58	2.65
BW1A-E	0.55	0.14
BW1-E	4.11	1.03
BW2-E*	-0.18	-0.05
WR1-E	2.37	0.59
Totals	**23.53**	**5.88**

* There will be a net decrease in impervious area over type A soil from existing to proposed condition.

Total Required Retention Volume for Recharge = 5.88 Ac-Ft

2. Provided Recharge Volume

Basin	Provided Dry Retention Volume (Ac-Ft)
RS7-E-2A	1.36
RS8-E	0.74
RS9-E	3.77
WR1-E-5A/7	2.11
Total	**7.98**

Historic basin storage - 72 hr. recovery

Total Provided Retention Volume for Recharge = 7.98 Ac-Ft

APPENDIX E

Floodplain Calculations

EXISTING CONDITIONS

ICPR NODAL DIAGRAM

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-52-01

SR 429 SECTION 6
ICPR NODAL DIAGRAM (1)

SHEET NO.
1 OF 2

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

J. ALEXANDER GEORGE, P.E.
P.E. LICENSE NUMBER 59006
BCC ENGINEERING, INC.
160 N. WESTMONTE DRIVE, SUITE 2000
ALTAMONTE SPRINGS, FLORIDA 32714
CERTIFICATE OF AUTHORIZATION NO. 7184

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 429	LAKE SEMINOLE	238275-7-52-01

SR 429 SECTION 6
ICPR NODAL DIAGRAM (2)

SHEET NO.
2 OF 2