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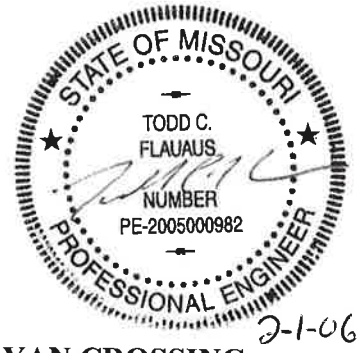

2-1-06

STORMWATER DETENTION ANALYSIS
PREPARED BY: BAX ENGINEERING

A CONVENIENT MART AND FAST FOOD RESTAURANT AT BRYAN CROSSING
BAX PROJECT NO. 03-12276C
April 22, 2005 **Revised** February 1, 2006

INTRODUCTION

The presently undeveloped tract of land lies on the south corner of the intersection of Veterans Memorial Parkway and Bryan Road in O'Fallon Missouri. The overall tract is to be developed into a convenient mart and fast-food restaurant.

This drainage area contains two watersheds, one to the West and one to the East. The West watershed contains a small portion of the current development and most of the future development. The East watershed will take the majority of the runoff from the current development and detain the excess flow with a basin.

The basin has been analyzed for the 15-year 20 minutes design storms and checked for safe passage of the 100-year, 20 minutes design storm under low-flow blocked conditions.

Per the request of the City of O'Fallon the 2, 25 and 100-year 20 minutes design storms have been routed for informational purposes only.

GENERAL SITE AND RUNOFF CALCULATIONS

The pre-developed and post-developed P.I. factors used in the analysis are:

	20 minute storm	**20 minute storm**	**20 minute storm**	**20 minute storm**
	2 year	**15 year**	**25 year**	**100 year**
Imperviousness				
un-developed	1.15	1.87	2.31	2.95
commercial	2.39	3.85	4.75	6.08

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Existing On-Site Runoff

West Watershed

15 year-20 minutes storm:

2.12 ac x 1.87 cfs/ac =	3.96 cfs
15 year-20 minute storm:	3.96 cfs

East Watershed

15 year-20 minutes storm:

1.64 ac x 1.87 cfs/ac =	3.07 cfs
15 year-20 minute storm:	3.07 cfs

Proposed On-Site Runoff

West Watershed

15 year-20 minutes storm:

1.09 ac x 1.87 cfs/ac =	2.04 cfs
15 year-20 minute storm:	2.04 cfs

East Watershed

15 year-20 minutes storm:

0.40 ac x 1.87 cfs/ac =	0.75 cfs
2.27 ac x 3.85 cfs/ac =	8.74 cfs
15 year-20 minute storm:	9.49 cfs

Required Attenuation:

Since the site originally drained to two different watersheds, the majority of the proposed runoff from the West watershed will be redirected to discharge to the East watershed to reduce the runoff to the East watershed. To calculate the required attenuation for each watershed the existing discharge rate will be subtracted from the proposed discharge rate. This will determine the amount of runoff that needs to be detained in the basin for each watershed.

West Watershed

DESIGN STORM	PROPOSED RUNOFF		EXISTING RUNOFF		REQUIRED ATTENUATION
15 year	2.04 cfs	-	3.96 cfs	=	0.00 cfs

15 year-20 minutes storm: 0.00 cfs

East Watershed

DESIGN STORM	PROPOSED RUNOFF		EXISTING RUNOFF		REQUIRED ATTENUATION
15 year	9.49 cfs	-	3.07 cfs	=	6.42 cfs

15 year-20 minute storm: 6.42 cfs

TIME OF CONCENTRATION

Basin I East Watershed

The time of concentration flow path begins at the northeast end of the gas pump canopy and travels west approximately 201 feet overland to CI 107. From there it flows approximately 465 feet via pipe to FE 102 at basin I. Time of concentration is estimated as follows:

Tc = tc1 + tc2

tc1 L=201'
Elevation Difference = 3.48
tc1 (overland) – **0.90 minutes**: see Figure 1

tc2 L=465
Velocity of 7.0 ft./sec.
tc2 (pipe) = 66.42 seconds = **1.11 minutes**

Tc = 0.9 minutes + 1.11 minutes = 2.01 minutes => **Use 2 minutes**

BASIN PEAK INFLOWS:

Inflows to the basin have been estimated from the drainage area map included in the construction plans.

15 year-20 minute storm:

On-Site:				
0-5%	0.40 ac	x	1.87 cfs/ac =	0.75 cfs
100%	1.96 ac	x	3.85 cfs/ac =	7.55 cfs
Off-Site:				
0-5%	0.56 ac	x	1.87 cfs/ac =	1.05 cfs
100%	0.25 ac	x	3.85 cfs/ac =	0.96 cfs
			Total =	10.31 cfs

2 year-20 minute storm:	6.38 cfs
15 year-20 minute storm:	10.31 cfs
25 year-20 minute storm:	12.72 cfs
100 year-20 minute storm:	16.27 cfs

PERMITTED RELEASE RATE:

The Permitted Release Rate for Basin I is determined by subtracting the Required Attenuation from the Basin Inflow as shown below.

Basin I East Watershed

DESIGN STORM	BASIN INFLOW	-	REQUIRED ATTENUATION	=	PERMITTED RELEASE
15 year	10.31 cfs	-	6.42 cfs	=	3.89 cfs

15 year-20 minutes storm: 3.89 cfs

STORM ROUTING CALCULATIONS AND RESULTS:

A computer program, PONDPACK 9.0 was used in routing the 15 year-20 minutes design storm through the basin. As found in the routing calculations, the results are as follows:

20 MIN STORM	PEAK INFLOW	PERMITTED RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2 YR	6.38 cfs	N/A	2.83 cfs	615.46 ft
15 YR	10.31 cfs	3.89 cfs	3.35 cfs	616.61 ft
25 YR	12.72 cfs	N/A	5.66 cfs	617.15 ft
100 YR	16.27 cfs	N/A	13.00 cfs	617.41 ft

CHECK 100 YR OUTFLOW: (low-flow slots blocked)

BASIN I

WEIR FLOW $Q = C \times L \times H (3/2)$

Where 100-YEAR FLOW Q	=	6.27 cfs
C	=	3.0
L	=	1.67 ft
H	=	0.60 ft
Sill	=	617.00 ft
100 yr h/w	=	617.60 ft

OUTFALL STRUCTURE DESIGN

Basin I

The outfall structure proposed to control flow in basin I will consist of a pre-cast 42" structure with an area inlet top. The structure body shall have a 5" wide by 10" high slot cut into it at 612.17 elevation. The sill of the Area Inlet Top shall be at a 517.00 elevation. 67.41' of 24" reinforced concrete pipe will serve as the outfall pipe, having an upper flow line of 610.17 and lower flow line of 609.50. A detail of the structure is included with this report.

SEDIMENT VOLUME CALCULATION:

The basin shall be analyzed to accommodate 2 years of sediment storage.

-The Drainage area to the basin = 3.17 Acres
-Rational Method of runoff coefficient 'c' = 0.6
-Annual sediment storage volume (from figure 2) = 170 ft^3 / Acre
-The sediment volume and storage required =

2 years of sediment storage = 6.29 Acres (150 ft^3 / Acre/year)(2 years)
2 years of sediment storage = 1,077.80 ft^3

To provide for the additional sediment storage the top of the overflow sill well be set at 617.00

Volume between 15-year high water of 616.61 and the overflow sill elevation of 617.00 is 1,715.71 ft^3
1,715.71 ft^3 provided > 1,077.80 ft^3 required

SUMMARY

Basin I

2 year, 20 Minute	615.46 ft
15 Year, 20 Minute H.W.	616.61 ft
25 Year, 20 Minute	617.15 ft
100 Year, 20 Minute	617.41 ft
100 Year, 20 Minute Low Flow Blocked	617.60 ft
Structure	42" manhole w/ AI top
Low Flow Slot	5"w x 10"h opening
Elevation	612.17
Sill Elevation	617.00
Top of Dam	620.00
Freeboard for 100 Year with low flow blocked	2.40'

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POND VOLUME CALCULATIONS

Planimeter scale: 1.00 ft/in

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (cu.ft)	Volume Sum (cu.ft)
612.17	.000	.0000	.0000	0	0
614.00	1746.000	.0401	.0401	1065	1065
616.00	3417.000	.0784	.1746	5070	6135
618.00	5461.000	.1254	.3030	8799	14934
620.00	7750.000	.1779	.4526	13144	28078

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 612.17 ft
Increment = .10 ft
Max. Elev.= 620.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	3	--->	5	617.000	620.000
Orifice-Area	2	--->	5	613.000	620.000
Weir-Rectangular	1	--->	5	612.170	613.000
Culvert-Circular	5	--->	TW	610.170	620.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = 3
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 617.00 ft
Weir Length = 11.67 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Structure ID = 2
Structure Type = Orifice-Area

# of Openings = 1
Invert Elev. = 612.17 ft
Area = .3472 sq.ft
Top of Orifice = 613.00 ft
Datum Elev. = 612.59 ft
Orifice Coeff. = .600

Structure ID = 1
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 612.17 ft
Weir Length = .42 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

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OUTLET STRUCTURE INPUT DATA

Structure ID = 5
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 2.0000 ft
Upstream Invert = 610.17 ft
Dnstream Invert = 609.50 ft
Horiz. Length = 67.41 ft
Barrel Length = 67.41 ft
Barrel Slope = .00994 ft/ft

OUTLET CONTROL DATA...
Mannings n = .0130
Ke = .5000 (forward entrance loss)
Kb = .012411 (per ft of full flow)
Kr = .2000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...
Equation form = 1
Inlet Control K = .0045
Inlet Control M = 2.0000
Inlet Control c = .03170
Inlet Control Y = .6900
T1 ratio (HW/D) = 1.090
T2 ratio (HW/D) = 1.192
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev = 612.35 ft ---> Flow = 15.55 cfs
At T2 Elev = 612.55 ft ---> Flow = 17.77 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

S/N: 321C01B070C1 BAX ENGINEERING
PondPack Ver: Compute Time: Date:

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
612.17	.00	Free Outfall		(no Q: 3,2,1,5)
612.27	.04	Free Outfall	1,5	(no Q: 3,2)
612.37	.11	Free Outfall	1,5	(no Q: 3,2)
612.47	.21	Free Outfall	1,5	(no Q: 3,2)
612.57	.32	Free Outfall	1,5	(no Q: 3,2)
612.67	.44	Free Outfall	1,5	(no Q: 3,2)
612.77	.58	Free Outfall	1,5	(no Q: 3,2)
612.87	.73	Free Outfall	1,5	(no Q: 3,2)
612.97	.89	Free Outfall	1,5	(no Q: 3,2)
613.07	1.16	Free Outfall	2,5	(no Q: 3,1)
613.17	1.27	Free Outfall	2,5	(no Q: 3,1)
613.27	1.38	Free Outfall	2,5	(no Q: 3,1)
613.37	1.48	Free Outfall	2,5	(no Q: 3,1)
613.47	1.57	Free Outfall	2,5	(no Q: 3,1)
613.57	1.65	Free Outfall	2,5	(no Q: 3,1)
613.67	1.74	Free Outfall	2,5	(no Q: 3,1)
613.77	1.82	Free Outfall	2,5	(no Q: 3,1)
613.87	1.89	Free Outfall	2,5	(no Q: 3,1)
613.97	1.96	Free Outfall	2,5	(no Q: 3,1)
614.07	2.03	Free Outfall	2,5	(no Q: 3,1)
614.17	2.10	Free Outfall	2,5	(no Q: 3,1)
614.27	2.17	Free Outfall	2,5	(no Q: 3,1)
614.37	2.23	Free Outfall	2,5	(no Q: 3,1)
614.47	2.29	Free Outfall	2,5	(no Q: 3,1)
614.57	2.35	Free Outfall	2,5	(no Q: 3,1)
614.67	2.41	Free Outfall	2,5	(no Q: 3,1)
614.77	2.47	Free Outfall	2,5	(no Q: 3,1)
614.87	2.52	Free Outfall	2,5	(no Q: 3,1)
614.97	2.58	Free Outfall	2,5	(no Q: 3,1)
615.07	2.63	Free Outfall	2,5	(no Q: 3,1)
615.17	2.68	Free Outfall	2,5	(no Q: 3,1)
615.27	2.74	Free Outfall	2,5	(no Q: 3,1)
615.37	2.79	Free Outfall	2,5	(no Q: 3,1)
615.47	2.84	Free Outfall	2,5	(no Q: 3,1)
615.57	2.88	Free Outfall	2,5	(no Q: 3,1)
615.67	2.93	Free Outfall	2,5	(no Q: 3,1)
615.77	2.98	Free Outfall	2,5	(no Q: 3,1)
615.87	3.03	Free Outfall	2,5	(no Q: 3,1)

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
615.97	3.07	Free Outfall	2,5	(no Q: 3,1)
616.07	3.12	Free Outfall	2,5	(no Q: 3,1)
616.17	3.16	Free Outfall	2,5	(no Q: 3,1)
616.27	3.21	Free Outfall	2,5	(no Q: 3,1)
616.37	3.25	Free Outfall	2,5	(no Q: 3,1)
616.47	3.29	Free Outfall	2,5	(no Q: 3,1)
616.57	3.33	Free Outfall	2,5	(no Q: 3,1)
616.67	3.38	Free Outfall	2,5	(no Q: 3,1)
616.77	3.42	Free Outfall	2,5	(no Q: 3,1)
616.87	3.46	Free Outfall	2,5	(no Q: 3,1)
616.97	3.50	Free Outfall	2,5	(no Q: 3,1)
617.00	3.51	Free Outfall	2,5	(no Q: 3,1)
617.07	4.19	Free Outfall	3,2,5	(no Q: 1)
617.17	6.03	Free Outfall	3,2,5	(no Q: 1)
617.27	8.53	Free Outfall	3,2,5	(no Q: 1)
617.37	11.53	Free Outfall	3,2,5	(no Q: 1)
617.47	14.97	Free Outfall	3,2,5	(no Q: 1)
617.57	18.68	Free Outfall	3,2,5	(no Q: 1)
617.67	22.67	Free Outfall	3,2,5	(no Q: 1)
617.77	26.88	Free Outfall	3,2,5	(no Q: 1)
617.87	31.22	Free Outfall	3,2,5	(no Q: 1)
617.97	35.69	Free Outfall	3,2,5	(no Q: 1)
618.07	42.30	Free Outfall	3,2,5	(no Q: 1)
618.17	42.30	Free Outfall	3,2,5	(no Q: 1)
618.27	42.30	Free Outfall	3,2,5	(no Q: 1)
618.37	42.30	Free Outfall	3,2,5	(no Q: 1)
618.47	42.30	Free Outfall	3,2,5	(no Q: 1)
618.57	42.86	Free Outfall	3,2,5	(no Q: 1)
618.67	42.86	Free Outfall	3,2,5	(no Q: 1)
618.77	43.32	Free Outfall	3,2,5	(no Q: 1)
618.87	43.32	Free Outfall	3,2,5	(no Q: 1)
618.97	43.32	Free Outfall	3,2,5	(no Q: 1)
619.07	44.90	Free Outfall	3,2,5	(no Q: 1)
619.17	44.90	Free Outfall	3,2,5	(no Q: 1)
619.27	44.90	Free Outfall	3,2,5	(no Q: 1)
619.37	45.52	Free Outfall	3,2,5	(no Q: 1)
619.47	45.86	Free Outfall	3,2,5	(no Q: 1)
619.57	45.86	Free Outfall	3,2,5	(no Q: 1)

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
619.67	45.86	Free Outfall		3,2,5 (no Q: 1)
619.77	45.86	Free Outfall		3,2,5 (no Q: 1)
619.87	45.86	Free Outfall		3,2,5 (no Q: 1)
619.97	45.86	Free Outfall		3,2,5 (no Q: 1)
620.00	47.83	Free Outfall		3,2,5 (no Q: 1)

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: H:\PONDPACK\A12000PLUS\12276c\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
WARNING: Missed peak when adding hydrograph...				
ADDLINK 10	HYD QUEUE 10		2	

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	2		7656	2.00	6.38

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	POND 10 IN	2	7465	3.00	6.38

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 2

Peak Discharge =	6.38 cfs
Time to Peak =	3.00 min
HYG Volume =	7465 cu.ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 3.00 min
Time on left represents time for first value in each row.

Time min					
.00	.00	6.38	6.38	6.38	6.38
15.00	6.38	6.38	3.19	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: H:\PONDPACK\A12000PLUS\12276c\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
WARNING: Missed peak when adding hydrograph...				
ADDLINK 10	HYD QUEUE 10		15	

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	15		12373	2.00	10.31

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	POND 10 IN	15	12064	3.00	10.31

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 15

Peak Discharge =	10.31 cfs
Time to Peak =	3.00 min
HYG Volume =	12064 cu.ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 3.00 min
Time on left represents time for first value in each row.

Time min					
.00	.00	10.31	10.31	10.31	10.31
15.00	10.31	10.31	5.16	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: H:\PONDPACK\A12000PLUS\12276c\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
WARNING: Missed peak when adding hydrograph...				
ADDLINK 10	HYD QUEUE 10		25	

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	25		15265	2.00	12.72

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	POND 10 IN	25	14884	3.00	12.72

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 25

Peak Discharge =	12.72 cfs
Time to Peak =	3.00 min
HYG Volume =	14884 cu.ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 3.00 min
Time on left represents time for first value in each row.

Time min					
.00	.00	12.72	12.72	12.72	12.72
15.00	12.72	12.72	6.37	.00	

SUMMARY FOR HYDROGRAPH ADDITION
at Node: POND 10 IN

HYG Directory: H:\PONDPACK\A12000PLUS\12276c\

Upstream Link ID	Upstream Node ID	HYG file	HYG ID	HYG tag
WARNING: Missed peak when adding hydrograph...				
ADDLINK 10	HYD QUEUE 10		100	

INFLOWS TO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	100		19524	2.00	16.27

TOTAL FLOW INTO: POND 10 IN

HYG file	HYG ID	HYG tag	Volume cu.ft	Peak Time min	Peak Flow cfs
	POND 10 IN	100	19036	3.00	16.27

TOTAL NODE INFLOW...
HYG file =
HYG ID = POND 10 IN
HYG Tag = 100

Peak Discharge =	16.27 cfs
Time to Peak =	3.00 min
HYG Volume =	19036 cu.ft

HYDROGRAPH ORDINATES (cfs)
Output Time increment = 3.00 min
Time on left represents time for first value in each row.

Time min					
.00	.00	16.27	16.27	16.27	16.27
15.00	16.27	16.27	8.14	.00	

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\PONDPACK\A12000PLUS\12276c\
Inflow HYG file = NONE STORED - POND 10 IN 2
Outflow HYG file = NONE STORED - POND 10 OUT 2

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = structure

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	612.17 ft
Starting Volume	=	0 cu.ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	3.00 min

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	6.38 cfs	at	3.00 min
Peak Outflow	=	2.83 cfs	at	21.00 min
Peak Elevation	=	615.46 ft		
Peak Storage	=	4426 cu.ft		

MASS BALANCE (cu.ft)

+ Initial Vol	=	0
+ HYG Vol IN	=	7465
- Infiltration	=	0
- HYG Vol OUT	=	7465
- Retained Vol	=	0
Unrouted Vol	=	0 cu.ft (.000% of Outflow Volume)

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\PONDPACK\A12000PLUS\12276c\
Inflow HYG file = NONE STORED - POND 10 IN 15
Outflow HYG file = NONE STORED - POND 10 OUT 15

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = structure

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	612.17 ft
Starting Volume	=	0 cu.ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	3.00 min

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	10.31 cfs	at	3.00 min
Peak Outflow	=	3.35 cfs	at	21.00 min
Peak Elevation	=	616.61 ft		
Peak Storage	=	8382 cu.ft		

MASS BALANCE (cu.ft)

+ Initial Vol	=	0
+ HYG Vol IN	=	12064
- Infiltration	=	0
- HYG Vol OUT	=	12064
- Retained Vol	=	0
Unrouted Vol	=	0 cu.ft (.000% of Outflow Volume)

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\PONDPACK\A12000PLUS\12276c\
Inflow HYG file = NONE STORED - POND 10 IN 25
Outflow HYG file = NONE STORED - POND 10 OUT 25

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = structure

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	612.17 ft
Starting Volume	=	0 cu.ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	3.00 min

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	12.72 cfs	at	3.00 min
Peak Outflow	=	5.66 cfs	at	21.00 min
Peak Elevation	=	617.15 ft		
Peak Storage	=	10692 cu.ft		

MASS BALANCE (cu.ft)

+ Initial Vol	=	0
+ HYG Vol IN	=	14884
- Infiltration	=	0
- HYG Vol OUT	=	14884
- Retained Vol	=	0
Unrouted Vol	=	0 cu.ft (.000% of Outflow Volume)

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\PONDPACK\A12000PLUS\12276c\
Inflow HYG file = NONE STORED - POND 10 IN 100
Outflow HYG file = NONE STORED - POND 10 OUT 100

Pond Node Data = POND 10
Pond Volume Data = POND 10
Pond Outlet Data = structure

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	612.17 ft
Starting Volume	=	0 cu.ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	3.00 min

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	16.27 cfs	at	3.00 min
Peak Outflow	=	13.00 cfs	at	18.00 min
Peak Elevation	=	617.41 ft		
Peak Storage	=	11919 cu.ft		

MASS BALANCE (cu.ft)

+ Initial Vol	=	0
+ HYG Vol IN	=	19036
- Infiltration	=	0
- HYG Vol OUT	=	19036
- Retained Vol	=	0
Unrouted Vol	=	0 cu.ft (.000% of Outflow Volume)

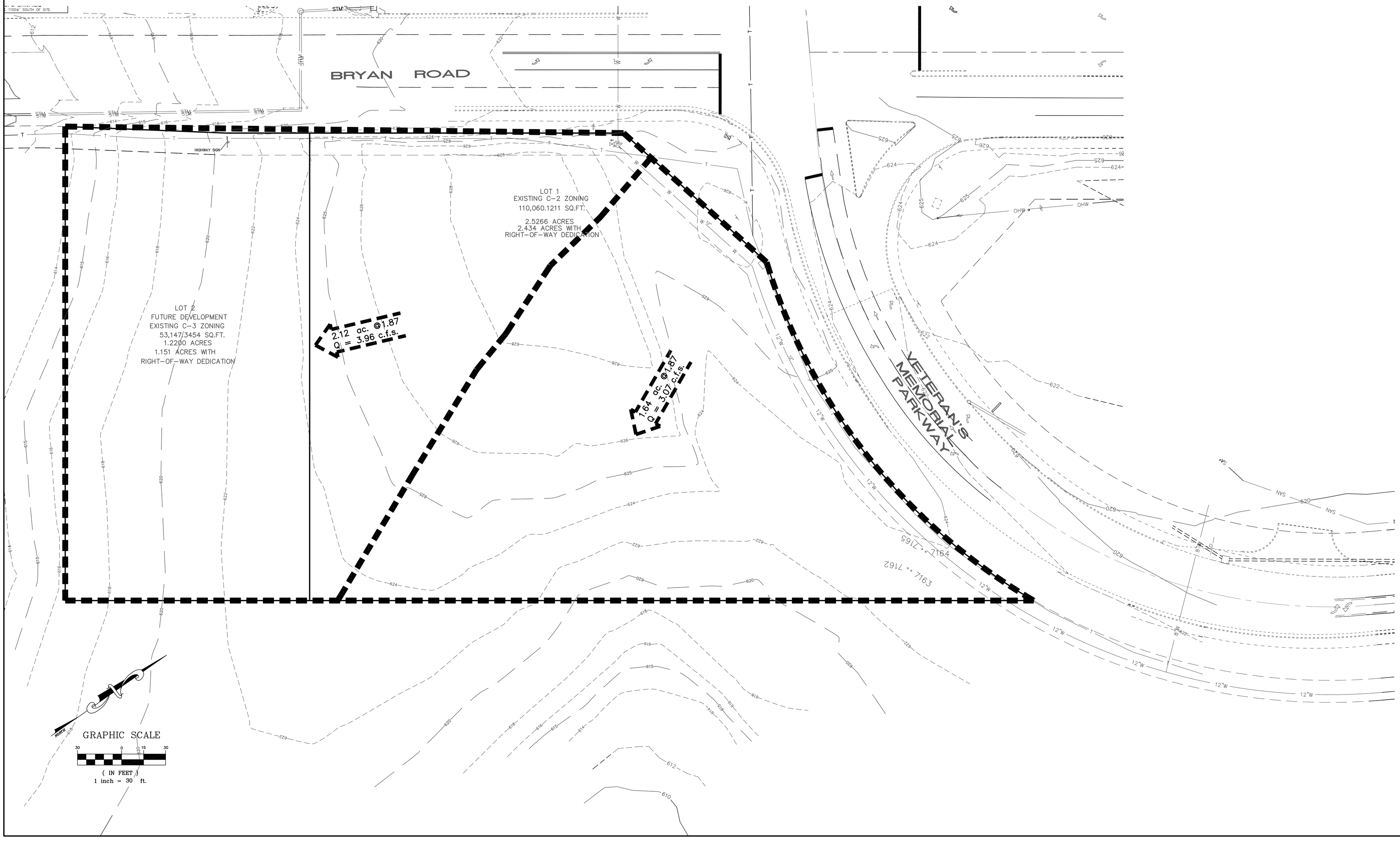
Index of Starting Page Numbers for ID Names

S/N:
PondPack Ver: Compute Time: Date:

PRE DEVLOPED DRAINAGE AREA MAP

THIS SHEET FOR DRAINAGE PURPOSES ONLY AND NOT FOR CONSTRUCTION

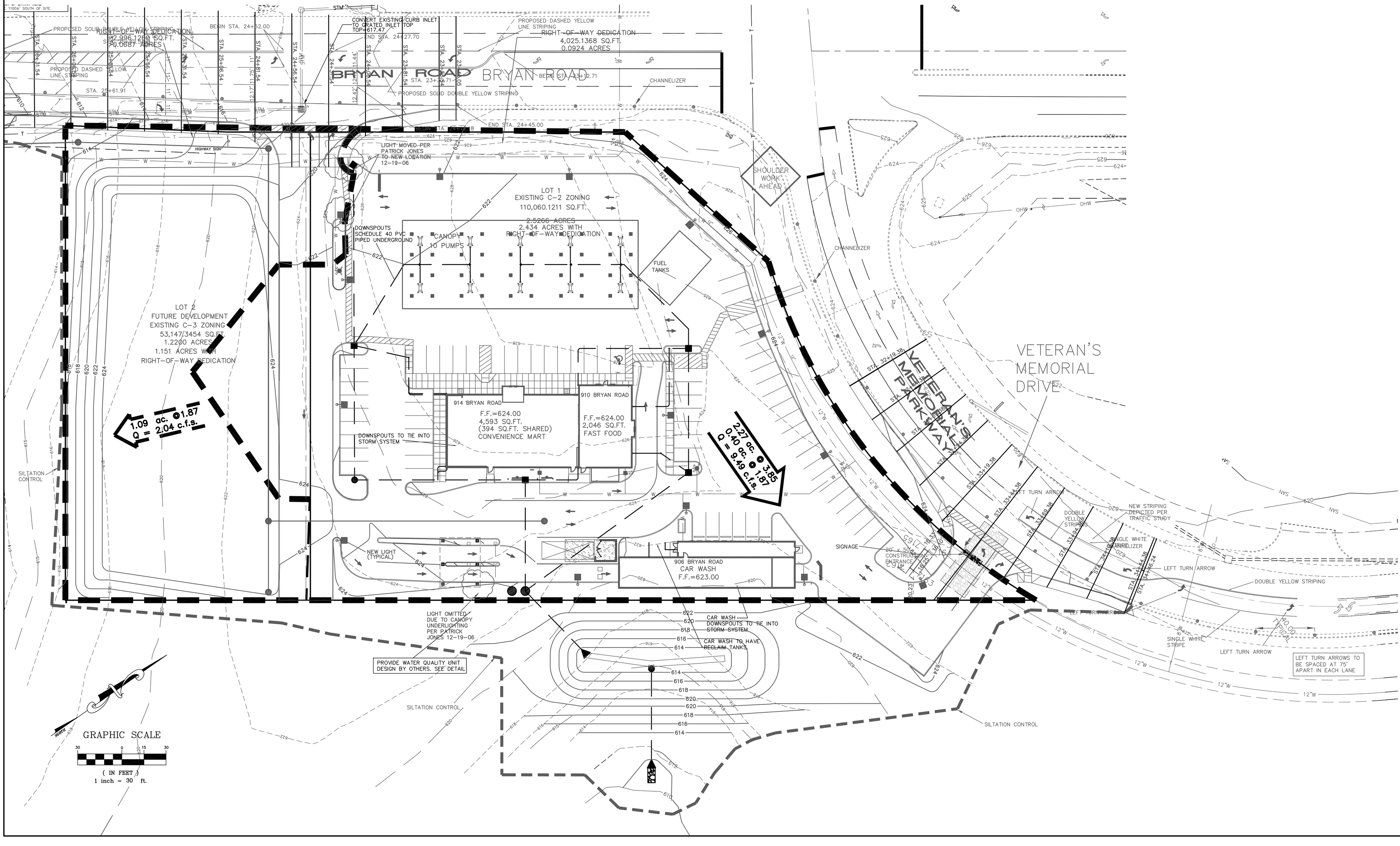
A DRAINAGE AREA MAP FOR
PHILLIPS 66
& JACK IN THE BOX
03-12276C 4-22-05



POST DEVELOPED DRAINAGE AREA MAP

THIS SHEET FOR DRAINAGE PURPOSES ONLY AND NOT FOR CONSTRUCTION

A DRAINAGE AREA MAP FOR
PHILLIPS 66
& JACK IN THE BOX
03-12276C 4-22-05



A DRAINAGE AREA MAP FOR

PHILLIPS 66
& JACK IN THE BOX

03-12276C 4-28-06

6-14-06 CITY COMMENTS
7-5-06 STRIPING CHANGES

THIS SHEET FOR DRAINAGE PURPOSES ONLY AND NOT FOR CONSTRUCTION

BRYAN ROAD

GYALLON BASE MAPS INDICATE EXISTING GUYTARK TO BE LOCATED WEST OF WESTERLY PROPERTY LINE OF SITE AND EAST OF BRYAN ROAD APPROX. 1100± SOUTH OF SITE.

LIGHT MOVED PER PATRICK JONES TO NEW LOCATION 12-19-06

LOT 1
EXISTING C-2 ZONING
110,060.1211 SQ.FT.
2.5266 ACRES
2.434 ACRES WITH RIGHT-OF-WAY DEDICATION

LOT 2
FUTURE DEVELOPMENT
EXISTING C-3 ZONING
53,147/3454 SQ.FT.
1.2200 ACRES
1.151 ACRES WITH RIGHT-OF-WAY DEDICATION

FUEL TANKS

VETERAN'S MEMORIAL PARKWAY

0.49 ac. @ 1.87 Q = 0.92 c.f.s. LIGHT OMITTED DUE TO CANOPY UNDERLIGHTING PER PATRICK JONES 12-19-06

15 YEAR 20 MIN H.W.=616.61
100 YEAR, 20 MIN LOW FLOW BLOCKED H.W.=617.60

GRAPHIC SCALE
30 0 15 30
(IN FEET)
1 inch = 30 ft.

CITY FILE #4704.10, 4704.11

10/18