



July 12, 2016

Michael Whellan  
Attorney at Law  
Graves Dougherty Hearon & Moody  
401 Congress Avenue, Suite 2200  
Austin, TX 78701

Re: Austin Oaks PUD - Hypothetical greenfield calculation for detention volume

Dear Michael,

I attach calculations for a hypothetical single pond detention scenario where the existing hydrographs are developed assuming no development on the subject lots and the proposed hydrographs are developed using the PUD development scenario. We routed the developed condition hydrographs through a hypothetical pond with a 40,000 square foot footprint and a 4 foot depth with a suitable outlet structure to reduce the flow to the greenfield rates. The resulting detention volume was calculated to be 150,000 cubic feet. The calculations are attached.

Sincerely,  
URBAN DESIGN GROUP PC



John Noell, PE  
Executive Vice President

No Development Austin Oaks								
Basin	Area	CN <sub>weighted</sub>	Impervious	ToC	Q <sup>2</sup>	Q <sup>10</sup>	Q <sup>100</sup>	
-	ac.	-	%	min.	ft <sup>3</sup> /s	ft <sup>3</sup> /s	ft <sup>3</sup> /s	
A01	6.1	80	0	10	11.8	30.2	54.6	
A02	8.1	80	0	10	15.7	40.2	72.6	
A03	2.6	76	0	10	3.9	11.5	21.9	
A04	6.4	79	0	10	11.7	30.9	56.6	
A05	1.9	80	0	10	3.7	9.4	17.0	
A06	4.6	80	0	10	8.9	22.8	41.2	
A07	1.8	77	0	5	3.6	9.8	18.0	
Total	31.5	Total			59.3	154.8	203.7	281.9

Reduction in Q Due to Lower Impervious Cover								
Basin	Area	CN <sub>weighted</sub>	Impervious	ToC	Q <sup>2</sup>	Q <sup>10</sup>	Q <sup>100</sup>	
-	ac.	-	%	min.	ft <sup>3</sup> /s	ft <sup>3</sup> /s	ft <sup>3</sup> /s	
A01	6.1	91	61	7	21.9	42.1	66.9	
A02	8.1	91	63	6	29.5	56.2	89.1	
A03	2.6	80	27	5	6.2	15.5	27.1	
A04	6.4	92	69	9	22.6	42.5	67.4	
A05	1.9	88	42	6	6.0	12.4	20.4	
A06	4.6	94	78	5	19.4	34.9	53.8	
A07	1.8	77	0	5	3.6	9.8	18.0	
Total	31.5	Total			54.8	146.1	193.7	271.2

No Development		59.3	154.8	203.7	281.9
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Reduction in Q Due to lower Imp and Greenfield Detention		54.8	146.1	193.7	271.2
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Detention Volume for Q reduced to Greenfield Conditions

Typical Detention for Q reduced to Greenfield					
Elevation	Area	Area	Volume	Cum. Vol.	Cum. Vol.
ft.	ft <sup>2</sup>	ac-ft.	ft <sup>3</sup>	ft <sup>3</sup>	ac-ft.
0	40000	0.918	0	0	0
1	40000	0.918	40000	40000	0.918
2	40000	0.918	40000	80000	1.837
3	40000	0.918	40000	120000	2.755
4	40000	0.918	40000	160000	3.673

Typical Detention for Q reduced to Greenfield					
Storm	Stage-Storage		Stage-Storage-Discharge		
	Q <sup>pond in</sup>	Q <sup>pond out</sup>	WSEL	Storage	
	ft <sup>3</sup> /s	ft <sup>3</sup> /s	ft.	ac-ft.	
-	108.2	54.8	1.7	1.52	
2YR	211.3	146.1	2.7	2.51	
10YR	261.2	193.7	3.2	2.90	
25YR	339.9	271.2	3.8	3.45	
100YR					

Outlet		Ele. (ft.)	Dia./Length (ft.)
Weir 1		0.0	9.0
Weir 2		1.7	10.0