

Stormwater Calcs - Elm Estates 203 SW 4th St
Using Rational Method

Pre-development

Calculated Tc values - Drainage Basin 1

$$T_c = \frac{0.83 * L^{.467} * n^{.467}}{S^{.5}} \quad \begin{array}{l} \text{minutes} \\ \text{(Eqn 400-3)} \end{array}$$

L1 = 150 feet
n1 = 0.2 Poor Grass
(n values taken from Table
400-3 of City of Bryant
Drainage Manual)

S1 = 0.017 ft/ft
Z1= 400.300 ft
Z2= 397.75 ft

T_c_{calculated} 13.80 minutes

Tc = 13.80 minutes

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Calculated C values - Drainage Basin

	Area	C ₁₀₀	C ₅₀	C ₂₅	C ₁₀	C ₅	C ₂
Roof & Driveway	0.07	0.97	0.92	0.88	0.83	0.8	0.75
Greenspace	0.77	0.41	0.37	0.34	0.3	0.28	0.25
Total Area =	0.84	0.45	0.41	0.38	0.34	0.32	0.29

(C values taken from Table 400-1 of City of Bryant Drainage Manual)
Concrete/Roof
Fair Condition-Flat, 0-2%

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Calculated C values - Drainage Basin 1

	Area	C ₁₀₀	C ₅₀	C ₂₅	C ₁₀	C ₅	C ₂
Single Family House	0.84	0.7	0.65	0.6	0.5	0.4	0.3
Total Area =	0.84	0.70	0.65	0.60	0.50	0.40	0.30

(C values taken from Page-50 of City of Bryant Drainage Manual)

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Drainage Basin 1											
Q ₁₀₀ =	2.92 CFS	Q ₅₀ =	2.42 CFS	Q ₂₅ =	2.01 CFS	Q ₁₀ =	1.57 CFS	Q ₅ =	1.31 CFS	Q ₂ =	1.01 CFS
c =	0.45	c =	0.41	c =	0.38	c =	0.34	c =	0.32	c =	0.29
i =	7.70 in/hr	i =	7.00 in/hr	i =	6.30 in/hr	i =	5.50 in/hr	i =	4.90 in/hr	i =	4.20 in/hr
A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres
Total	2.92 CFS		2.42 CFS		2.01 CFS		1.57 CFS		1.31 CFS		1.01 CFS

Post-development

Drainage Basin 1A - New Site											
Q ₁₀₀ =	4.53 CFS	Q ₅₀ =	3.82 CFS	Q ₂₅ =	3.18 CFS	Q ₁₀ =	2.31 CFS	Q ₅ =	1.65 CFS	Q ₂ =	1.06 CFS
c =	0.70	c =	0.65	c =	0.60	c =	0.50	c =	0.40	c =	0.30
i =	7.70 in/hr	i =	7.00 in/hr	i =	6.30 in/hr	i =	5.50 in/hr	i =	4.90 in/hr	i =	4.20 in/hr
A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres	A =	0.84 acres

Detention Volume

for Q100		
Cundev=	0.45	
Iundev=	7.70 in/hr	
Cdev=	0.70	
Idev=	7.70 in/hr	
R=	1.90	
A=	0.84 acres	
Tc=	14.00 minutes	
	60 sec/min	
Detention Volume=	1,339	cubic feet

$$R = (Cdev * Idev) - (Cundev * Iundev)$$
$$Detention Volume = R * A * Tc * 60$$

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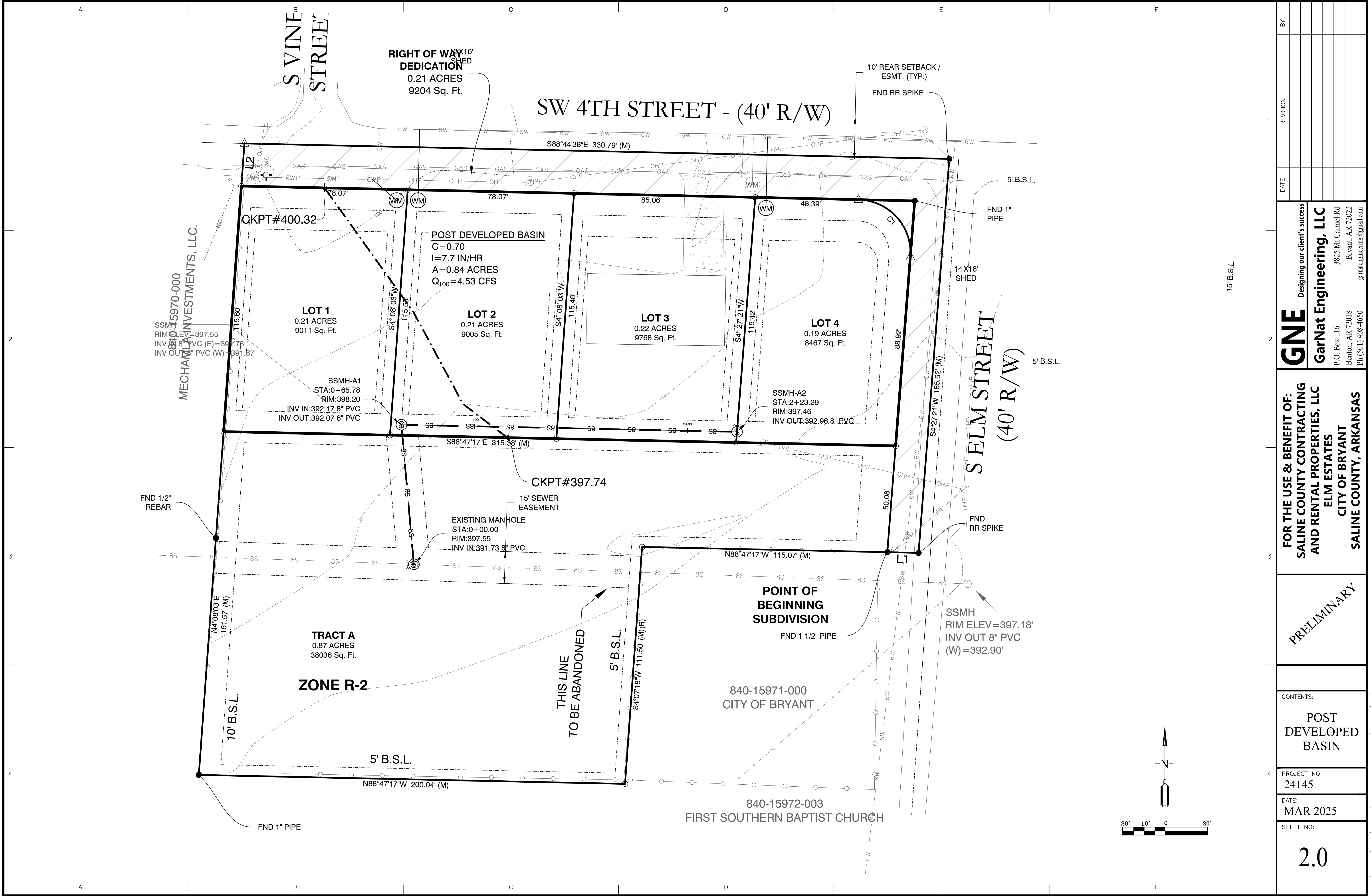
In-Lieu-Fee Calculation

Detention= 1339 cubic feet

In-Lieu Detention (\$10,000/ac-ft) Ratio = Vol (100-yr)/43,560 sq ft /ac

In-Lieu-Fee = 0.030732 ac-ft
= **\$307.32**

Note - \$500 minimum



1	DATE		BY	
	REVISION			
2	Designing our client's success			
	GarNat Engineering, LLC			
	P.O. Box 116 3825 Mt Carmel Rd Benton, AR 72018 Bryant, AR 72022 Ph (501) 408-4650 garnateengineering@gmail.com			
3	FOR THE USE & BENEFIT OF:			
	SALINE COUNTY CONTRACTING AND RENTAL PROPERTIES, LLC			
	ELM ESTATES			
	CITY OF BRYANT			
4	SALINE COUNTY, ARKANSAS			
	PRELIMINARY			
	CONTENTS:			
	POST DEVELOPED BASIN			
PROJECT NO: 24145				
DATE: MAR 2025				
SHEET NO: 2.0				