A NEW FACILITY FOR: CUSTOM ADVERTISING

DRAINAGE CALCULATIONS – SUMMARY

10/6/2022

DESCRIPTION OF PROJECT

Custom Advertising is an approximately 15.45 Acre development located in the City of Bryant, Arkansas at the north Portion of I-30 N Frontage Rd. There is a ridge that runs through the site creating four main drainage basins. Basin 3 will be detained in a ditch located in the east of the site. The detention of the basin will be detained by a 19 ft. wide ditch. Basin 1 and 2 will not be detained. Basin 4 runs to west of the site and in-lieu-fee provided for this basin.

Stormwater Calculations were prepared with the intent to comply with the City of Bryant's Drainage Code. The primary intent of this analysis is to produce a drainage system adequately sized to convey post development runoff while attenuating post development discharge levels equal to or less than pre development flows.

Hydraulic calculations were made using the Rational Method. Design frequencies were analyzed for 2, 5, 10, 25, 50, and 100 year return periods.

These calculations are divided into the following sections:

Summary of Drainage Basins

Summary of Pipes

Detention Summary

Appendices

Exhibit A – Pre-Development Drainage Basins

Exhibit B – Post-Development Drainage Basins

A NEW FACILITY FOR: CUSTOM ADVERTISING

DRAINAGE CALCULATIONS – SUMMARY

10/6/2022

SUMMARY OF DRAINAGE BASINS

PRE-DEVELOPMENT CONDITIONS

The existing site contains four drainage basins. The existing site is a mixture of grass and clay soil with moderate slopes. Basin 1 drains to the south western side of the property, basin 2 drains to the south eastern side of the property, basin 3 drains to the north eastern side of the property and basin 4 drains to the south side of the property.

POST-DEVELOPMENT CONDITIONS

As previously described, this site is being developed into a commercial office. Slopes range from 2% to 6%. Runoff from the developed areas of basin 3 collects by a ditch and finally detained in the eastern corner of the property. Runoff from basin 1, 2 and 4 will not be captured.

SUMMARY OF PIPES

All pipes used in this project are HDPE. Therefore, a manning's of 0.012 was used on all pipes in the analysis.

DETENTION BASIN 1 SUMMARY

The ditch storage in these calculations detains flows from the basin 3. The ditch storage is located in the eastern portion of the property. The ditch storage is made of 300 linear feet of 1' concrete bottom trickle channel and has a volume of 4,800 cf. A concrete control structure is constructed on the east side of the ditch. This control structure uses a slotted weir to limit the discharge through the structure to that of the 2, 5, 10, 25, 50, and 100-year pre-development flow. The ditch storage is designed to hold the 100-year storm event.

POND

840-12204-000
JIMMY R BUCHANAN

410

POND

-006

AER

420

SHED

BASIN 2
PRE-BASIN
C=0.50
I=9.40 IN/HR
A= 3.77 ACRES
Q_{100}= 17.67 CFS

I-30 FRONTAGE ROAD

BASIN 3
PRE-BASIN
C=0.52
I=8.80 IN/HR
A= 6.13 ACRES
Q_{100}= 27.92 CFS

0-05787-006
DON &
YNNE BAER

GUEST
HOUSE

RESIDENCE

420

410

ORTH
INE

BARN

430

BASIN 1
PRE-BASIN
C=0.52
I=9.50 IN/HR
A= 2.84 ACRES
Q_{100}= 13.97 CFS

7-005
&
IOMAS

SW1/4 SE1/4
SEC.15-T1S-R14W

430

840-12207-000
BRYANT MCCAULEY, LLC.

BASIN 4
PRE-BASIN
C=0.51
I=9.10 IN/HR
A= 2.71 ACRES
Q_{100}= 12.58 CFS

840-12206-000
BRADY & APPIE
LEWIS

787-002
CAMBRE
RON

NW1/4 NE1/4
SEC.22-T1S-R14W

.B.

1141

15.43 ACRES

PART OF THE NORTHWEST QU
TOWNSHIP 1 SOUTH, RANGE 1
BEGINNING AT A FOUND 2" ALU
THE SAID NW1/4 NE1/4;
THENCE S87°35'42"E - 880.50 F
WHICH FALLS IN AN EXISTING
THENCE LEAVING SAID NORTH
THENCE S4°31'01'W - 502.04 FE

BY	REVISION	DATE

GNE Designing our client's success
GarNat Engineering, LLC
P.O. Box 116 Benton, AR 72018
3825 Mt Carmel Rd Bryant, AR 72022
Ph (501) 408-4650
garnatengineering@gmail.com

A NEW FACILITY FOR:
CUSTOM ADVERTTISING
JIMMY PARKER
BRYANT, AR

CONTENTS:
PRE
DRAINAGE
BASIN

PROJECT NO:
21069

DATE:
JULY 2021

SHEET NO:
1

Plot date: 7/30/2021 - 3:56 PM - Jimmy Parker Drawing Name: C:\Projects\2021 Projects\21069 JIMMY PARKER\Drawings\21069 Drainage Basin.dwg

POND

840-12204-000
JIMMY R BUCHANAN

POND

I-30 FRONTAGE ROAD

30.0'
30.0'
149.0'
80.0'
30.0'

100.0'
80.0'

BASIN 2
POST-BASIN
C=0.95
I=10.0 IN/HR
A= 0.80 ACRES
Q_{100}=7.60 CFS

BASIN 3
POST-BASIN
C=0.75
I=10.0 IN/HR
A= 1.39 ACRES
Q_{100}=10.37 CFS

R25.0'

149.0'
80.0'

80.0'

BASIN 4
POST-BASIN
C=0.76
I=10.0 IN/HR
A= 1.74 ACRES
Q_{100}=13.16 CFS

EX. OFFICE BUILDING
4125 SQ. FT.
FF=430.6

BASIN 1
POST-BASIN
C=0.75
I=10.0 IN/HR
A= 1.25 ACRES
Q_{100}=9.34 CFS

EX. GRAPHIC SHOP BUILDING
1800 SQ. FT.
FF=430.6

EX. SHOP BUILDING
11920 SQ. FT.
FF=430.6

EX. SHOP BUILDING
11920 SQ. FT.
FF=430.6

PARCEL ID:
840-12207-000
OWNER:
BRYANT MCCAULEY LLC
ADRESS:
PO BOX 6
BRYANT, AR 72089
S22-T01S-R14W

840-12207-000
BRYANT MCCAULEY, LLC.

PARCEL ID:
840-05787-005
OWNER:
THOMAS JAMES MORSEY
& BONNIE REVOCABLE TRUST.
ADRESS:
21830 SOUTH SOMERSET DR
S15-T01S-R14W

SW1/4 NE1/4
SEC.15-T1S-R14W

BASIN 5
POST-BASIN
C=0.76
I=10.0 IN/HR
A= 1.74 ACRES
Q_{100}=13.16 CFS

840-12206-000
BRADY & APPIE
LEWIS

PARCEL ID:
840-12206-00
OWNER:
LEWIS BRADY & APPIE
TRUSTEES C/O GLENN LEWIS
ADRESS:
23532 I-30
S22-T01S-R14W

NW1/4 NE1/4
SEC.22-T1S-R14W

PARCEL ID:
840-05787-002
OWNER:
PEXRON CHAD WILLIAM &
CAMBRE CARSON
ADRESS:
775 CORRAL CIRCLE
S22-T01S-R14W

EXISITNG
25' UTILITY
EASEMENT

15.43 ACRES

PART OF THE NORTHWEST QUAR
TOWNSHIP 1 SOUTH, RANGE 14
BEGINNING AT A FOUND 2" ALUM
THE SAID NW1/4 NE1/4;
THENCE S87°35'42"E - 880.50 FEE
WHICH FALLS IN AN EXISTING PO
THENCE LEAVING SAID NORTH L
THENCE S4°31'01'W - 502.04 FEE

N

60' 30' 0 60'

BY	REVISION	DATE

GNE Designing our client's success

GarNat Engineering, LLC
P.O. Box 116
Benton, AR 72018
3825 Mt Carmel Rd
Bryant, AR 72022
garnatengineering@gmail.com
Ph (501) 408-4650

A NEW FACILITY FOR:
CUSTOM ADVERTTISING
JIMMY PARKER
BRYANT, AR

CONTENTS:
POST DRAINAGE BASIN

PROJECT NO:
21069

DATE:
JULY 2021

SHEET NO:
2

a:\Projects\2021 Projects\21069 23728 - 30 N. Jimmy Parker\Drawings\Civil\Drawings\SHEET 2\21069 Drainage Basin -2.dwg, 8/3/2021 2:36:16 PM, Jimmy Parker

Stormwater Calcs - 23738 I-30 N
Using Rational Method

Pre-development

Calculated Tc values - Drainage Basin 1

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	220	feet	L1 =	465	feet
n1 =	0.033	Gravel	n1 =	0.035	Streams on plain, more stones & weeds
S1 =	0.036	ft/ft	S1 =	0.036	ft/ft
$I_{assumed}$ =	6.90	inches	$I_{assumed}$ =	6.90	inches
$Tc_{calculated}$	230	seconds	$Tc_{calculated}$	374	seconds
$Tc_{calculated}$	3.84	minutes	$Tc_{calculated}$	6.23	minutes

Tc =	10.07	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	6.90	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
Use Tc =	**10.00**	minutes	

I - 100 yr =	8.2
I - 50 yr =	7.6
I - 25 yr =	6.90
I - 10 yr =	6
I - 5 yr =	5.5
I - 2 yr =	4.7

Calculated Tc values - Drainage Basin 2

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	100	feet	L1 =	500	feet
n1 =	0.15	Sheet flow	n1 =	0.045	Grass, some weeds
S1 =	0.033	ft/ft	S1 =	0.033	ft/ft
$I_{assumed}$ =	6.00	inches	$I_{assumed}$ =	6.00	inches
$Tc_{calculated}$	386	seconds	$Tc_{calculated}$	493	seconds
$Tc_{calculated}$	6.44	minutes	$Tc_{calculated}$	8.21	minutes

Tc =	14.65	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	6.00	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
Use Tc =	**14.50**	minutes	

I - 100 yr =	7.5
I - 50 yr =	6.8
I - 25 yr =	6.00
I - 10 yr =	5.5
I - 5 yr =	4.9
I - 2 yr =	4.2

Calculated Tc values - Drainage Basin 3

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	829	feet	
n1 =	0.045	Grass, some weeds	
S1 =	0.034	ft/ft	
$I_{assumed}$ =	6.80	inches	
$Tc_{calculated}$	630	seconds	
$Tc_{calculated}$	10.51	minutes	
Tc =	10.51	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	6.80	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
Use Tc =	**10.50**	minutes	

I - 100 yr =	8.1
I - 50 yr =	7.4
I - 25 yr =	6.80
I - 10 yr =	6
I - 5 yr =	5.4
I - 2 yr =	4.7

Calculated Tc values - Drainage Basin 4

$$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}} \text{ seconds}$$

L1 =	491	feet	
n1 =	0.045	Grass, some weeds	
S1 =	0.028	ft/ft	
$I_{assumed}$ =	7.70	inches	
$Tc_{calculated}$	464	seconds	
$Tc_{calculated}$	7.73	minutes	
Tc =	7.73	minutes	Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I =	7.70	inches	i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
Use Tc =	**7.70**	minutes	

I - 100 yr =	9.1
I - 50 yr =	8.8
I - 25 yr =	7.70
I - 10 yr =	6.9
I - 5 yr =	6.1
I - 2 yr =	5.2

Stormwater Calcs - 23738 I-30 N
Using Rational Method

Post-development

Calculated Tc values - Drainage Basin 1

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	220	feet	L1 =	465	feet
n1 =	0.033	Gravel	n1 =	0.035	Streams on plain, more stones & weeds
S1 =	0.035	ft/ft	S1 =	0.036	ft/ft
$I_{assumed}$ =	6.90	inches	$I_{assumed}$ =	6.90	inches
$Tc_{calculated}$	232	seconds	$Tc_{calculated}$	374	seconds
$Tc_{calculated}$	3.87	minutes	$Tc_{calculated}$	6.23	minutes

Tc = 10.10 minutes — Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I = 6.90 inches — i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc = **10.00** minutes

I_{100} =	8.2	Inches	I_{10} =	6.0	Inches
I_{50} =	7.5	Inches	I_5 =	5.5	Inches
I_{25} =	6.9	Inches	I_2 =	4.7	Inches

Calculated Tc values - Drainage Basin 2

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	100	feet	L1 =	500	feet
n1 =	0.15	Sheet Flow	n1 =	0.035	Streams on plain, more stones & weeds
S1 =	0.033	ft/ft	S1 =	0.033	ft/ft
$I_{assumed}$ =	6.30	inches	$I_{assumed}$ =	6.30	inches
$Tc_{calculated}$	379	seconds	$Tc_{calculated}$	416	seconds
$Tc_{calculated}$	6.32	minutes	$Tc_{calculated}$	6.93	minutes

Tc = 13.24 minutes — Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I = 6.30 inches — i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc = **13.20** minutes

I_{100} =	7.8	Inches	I_{10} =	5.8	Inches
I_{50} =	7	Inches	I_5 =	5.0	Inches
I_{25} =	6.3	Inches	I_2 =	4.3	Inches

Calculated Tc values - Drainage Basin 3

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	170	feet	L1 =	285	feet	L1 =	175	feet
n1 =	0.033	Gravel	n1 =	0.035	Streams on plain, more stones &	n1 =	0.02	Earth, straight and uniform ditch
S1 =	0.058	ft/ft	S1 =	0.058	ft/ft	S1 =	0.01	ft/ft
$I_{assumed}$ =	6.80	inches	$I_{assumed}$ =	6.80	inches	$I_{assumed}$ =	6.80	inches
$Tc_{calculated}$	172	seconds	$Tc_{calculated}$	243	seconds	$Tc_{calculated}$	220	seconds
$Tc_{calculated}$	2.87	minutes	$Tc_{calculated}$	4.05	minutes	$Tc_{calculated}$	3.66	minutes

Tc = 10.58 minutes — Tc for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual
I = 6.80 inches — i for 25-yr Storm from Exhibit 400-1 of Bryant Drainage Manual

Use Tc = **10.50** minutes

I_{100} =	8.1	Inches	I_{10} =	6.0	Inches
I_{50} =	7.4	Inches	I_5 =	5.4	Inches
I_{25} =	6.8	Inches	I_2 =	4.7	Inches

Calculated Tc values - Drainage Basin 4

$Tc = \frac{56 * L^{.6} * n^{.6}}{i^{.4} * S^{.3}}$ seconds

L1 =	491	feet
n1 =	0.045	Grass, some weeds
S1 =	0.028	ft/ft
$I_{assumed}$ =	7.70	inches
$Tc_{calculated}$	463	seconds
$Tc_{calculated}$	7.72	minutes

Tc = 7.72 minutes
I = 7.70 inches

Use Tc = **7.70** minutes

I_{100} =	9.1	Inches	I_{10} =	6.9	Inches
I_{50} =	8.8	Inches	I_5 =	6.1	Inches
I_{25} =	7.7	Inches	I_2 =	5.2	Inches

Stormwater Calcs - 23738 I-30 N
using Rational Method

Pre-development

Calculated C values - Drainage Basin 1

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Bryant Drainage Manual)
Roof	0.02	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Asphalt	0.03	0.95	0.9	0.86	0.81	0.77	0.73	Developed - Asphaltic -Table 400-2
Grass	2.79	0.51	0.48	0.44	0.41	0.38	0.35	Undeveloped - Pasture/Range - Average, 2-7% - Table 400-2
Total	**2.84**	**0.52**	**0.49**	**0.45**	**0.42**	**0.39**	**0.36**	

Calculated C values - Drainage Basin 2

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Bryant Drainage Manual)
Roof	0.14	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Asphalt	0.21	0.95	0.9	0.86	0.81	0.77	0.73	Developed - Asphaltic -Table 400-2
Grass	3.42	0.51	0.48	0.44	0.41	0.38	0.35	Undeveloped - Pasture/Range - Average, 2-7% - Table 400-2
Total	**3.77**	**0.50**	**0.47**	**0.43**	**0.40**	**0.37**	**0.35**	

Calculated C values - Drainage Basin 3

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Bryant Drainage Manual)
Roof	0.10	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Grass	6.03	0.51	0.48	0.44	0.41	0.38	0.35	Undeveloped - Pasture/Range - Average, 2-7% - Table 400-2
Total	**6.13**	**0.52**	**0.49**	**0.45**	**0.42**	**0.39**	**0.36**	

Calculated C values - Drainage Basin 4

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	
								(C values taken from Bryant Drainage Manual)
Grass	2.71	0.51	0.48	0.44	0.41	0.38	0.35	Undeveloped - Pasture/Range - Average, 2-7% - Table 400-2
Total	**2.71**	**0.51**	**0.48**	**0.44**	**0.41**	**0.38**	**0.35**	

Stormwater Calcs - 23738 I-30 N
using Rational Method

Post-development

Calculated C values - Drainage Basin 1

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	(C values taken from Bryant Drainage Manual)
Concrete/Roof	0.41	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Grass	1.57	0.46	0.42	0.39	0.35	0.32	0.29	Developed - Good Condition (larger than 75% cover of the area) - Average, 2 to 7% - Table 400-2
Gravel	0.81	0.65	0.55	0.50	0.35	0.30	0.25	Streets - Gravel -Table 2.2 City of Little Rock Drainage Manual
Total	**2.79**	**0.59**	**0.53**	**0.49**	**0.42**	**0.38**	**0.35**	

Calculated C values - Drainage Basin 2

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	(C values taken from Bryant Drainage Manual)
Concrete/Roof	0.11	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Grass	2.24	0.46	0.42	0.39	0.35	0.32	0.29	Developed - Good Condition (larger than 75% cover of the area) - Average, 2 to 7% - Table 400-2
Gravel	0.39	0.65	0.55	0.50	0.35	0.30	0.25	Streets - Gravel -Table 2.2 City of Little Rock Drainage Manual
Asphalt	0.20	0.95	0.90	0.86	0.81	0.77	0.73	Developed - Asphaltic - Table 400-2
Total	**2.94**	**0.54**	**0.49**	**0.45**	**0.40**	**0.37**	**0.33**	

Calculated C values - Drainage Basin 3

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	(C values taken from Bryant Drainage Manual)
Concrete/Roof	1.34	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Asphalt	0.25	0.95	0.90	0.86	0.81	0.77	0.73	Developed - Asphaltic - Table 400-2
Grass	2.83	0.46	0.42	0.39	0.35	0.32	0.29	Developed - Good Condition (larger than 75% cover of the area) - Average, 2 to 7% - Table 400-2
Gravel	2.33	0.65	0.55	0.50	0.35	0.30	0.25	Streets - Gravel -Table 2.2 City of Little Rock Drainage Manual
Total	**6.74**	**0.64**	**0.58**	**0.54**	**0.46**	**0.42**	**0.38**	

Calculated C values - Drainage Basin 4

	Area	C_{100}	C_{50}	C_{25}	C_{10}	C_5	C_2	(C values taken from Bryant Drainage Manual)
Concrete/Roof	0.35	0.97	0.92	0.88	0.83	0.8	0.75	Developed - Concrete/Roof -Table 400-2
Gravel	1.81	0.65	0.55	0.50	0.35	0.30	0.25	Streets - Gravel -Table 2.2 City of Little Rock Drainage Manual
Grass	0.81	0.46	0.42	0.39	0.35	0.32	0.29	Developed - Good Condition (larger than 75% cover of the area) - Average, 2 to 7% - Table 400-2
Total	**2.97**	**0.64**	**0.56**	**0.51**	**0.41**	**0.36**	**0.32**	

Stormwater Calcs -23738 I-30 N
using Rational Method

Pre-development

Drainage Basin 1

Q_{100} = 12.06 CFS	Q_{50} = 10.52 CFS	Q_{25} = 8.77 CFS	Q_{10} = 7.11 CFS	Q_5 = 6.05 CFS	Q_2 = 4.76 CFS
c = 0.52	c = 0.49	c = 0.45	c = 0.42	c = 0.39	c = 0.36
i= 8.20 in/hr	i= 7.60 in/hr	i= 6.90 in/hr	i= 6.00 in/hr	i= 5.50 in/hr	i= 4.70 in/hr
A= 2.84 acres	A= 2.84 acres	A= 2.84 acres	A= 2.84 acres	A= 2.84 acres	A= 2.84 acres

Drainage Basin 2

Q_{100} = 14.10 CFS	Q_{50} = 12.04 CFS	Q_{25} = 9.77 CFS	Q_{10} = 8.35 CFS	Q_5 = 6.92 CFS	Q_2 = 5.47 CFS
c = 0.50	c = 0.47	c = 0.43	c = 0.40	c = 0.37	c = 0.35
i= 7.50 in/hr	i= 6.80 in/hr	i= 6.00 in/hr	i= 5.50 in/hr	i= 4.90 in/hr	i= 4.20 in/hr
A= 3.77 acres	A= 3.77 acres	A= 3.77 acres	A= 3.77 acres	A= 3.77 acres	A= 3.77 acres

Drainage Basin 3

Q_{100} = 25.70 CFS	Q_{50} = 22.10 CFS	Q_{25} = 18.64 CFS	Q_{10} = 15.33 CFS	Q_5 = 12.81 CFS	Q_2 = 10.27 CFS
c = 0.52	c = 0.49	c = 0.45	c = 0.42	c = 0.39	c = 0.36
i= 8.10 in/hr	i= 7.40 in/hr	i= 6.80 in/hr	i= 6.00 in/hr	i= 5.40 in/hr	i= 4.70 in/hr
A= 6.13 acres	A= 6.13 acres	A= 6.13 acres	A= 6.13 acres	A= 6.13 acres	A= 6.13 acres

Drainage Basin 4

Q_{100} = 12.58 CFS	Q_{50} = 11.45 CFS	Q_{25} = 9.18 CFS	Q_{10} = 7.67 CFS	Q_5 = 6.28 CFS	Q_2 = 4.93 CFS
c = 0.51	c = 0.48	c = 0.44	c = 0.41	c = 0.38	c = 0.35
i= 9.10 in/hr	i= 8.80 in/hr	i= 7.70 in/hr	i= 6.90 in/hr	i= 6.10 in/hr	i= 5.20 in/hr
A= 2.71 acres	A= 2.71 acres	A= 2.71 acres	A= 2.71 acres	A= 2.71 acres	A= 2.71 acres
Total 64.44 CFS	56.11 CFS	46.36 CFS	38.46 CFS	32.05 CFS	25.44 CFS

Post-development

Drainage Basin 1

Q_{100} = 13.50 CFS	Q_{50} = 11.12 CFS	Q_{25} = 9.51 CFS	Q_{10} = 7.04 CFS	Q_5 = 5.90 CFS	Q_2 = 4.54 CFS
c = 0.59	c = 0.53	c = 0.49	c = 0.42	c = 0.38	c = 0.35
i= 8.20 in/hr	i= 7.50 in/hr	i= 6.90 in/hr	i= 6.00 in/hr	i= 5.50 in/hr	i= 4.70 in/hr
A= 2.79 acres	A= 2.79 acres	A= 2.79 acres	A= 2.79 acres	A= 2.79 acres	A= 2.79 acres

Drainage Basin 2

Q_{100} = 12.33 CFS	Q_{50} = 10.06 CFS	Q_{25} = 8.43 CFS	Q_{10} = 6.81 CFS	Q_5 = 5.38 CFS	Q_2 = 4.20 CFS
c = 0.54	c = 0.49	c = 0.45	c = 0.40	c = 0.37	c = 0.33
i= 7.80 in/hr	i= 7.00 in/hr	i= 6.30 in/hr	i= 5.80 in/hr	i= 5.00 in/hr	i= 4.30 in/hr
A= 2.94 acres	A= 2.94 acres	A= 2.94 acres	A= 2.94 acres	A= 2.94 acres	A= 2.94 acres

Drainage Basin 3

Q_{100} = 35.21 CFS	Q_{50} = 29.02 CFS	Q_{25} = 24.86 CFS	Q_{10} = 18.69 CFS	Q_5 = 15.46 CFS	Q_2 = 12.15 CFS
c = 0.64	c = 0.58	c = 0.54	c = 0.46	c = 0.42	c = 0.38
i= 8.10 in/hr	i= 7.40 in/hr	i= 6.80 in/hr	i= 6.00 in/hr	i= 5.40 in/hr	i= 4.70 in/hr
A= 6.74 acres	A= 6.74 acres	A= 6.74 acres	A= 6.74 acres	A= 6.74 acres	A= 6.74 acres

Drainage Basin 4

Q_{100} = 17.19 CFS	Q_{50} = 14.59 CFS	Q_{25} = 11.77 CFS	Q_{10} = 8.33 CFS	Q_5 = 6.60 CFS	Q_2 = 4.94 CFS
c = 0.64	c = 0.56	c = 0.51	c = 0.41	c = 0.36	c = 0.32
i= 9.10 in/hr	i= 8.80 in/hr	i= 7.70 in/hr	i= 6.90 in/hr	i= 6.10 in/hr	i= 5.20 in/hr
A= 2.97 acres	A= 2.97 acres	A= 2.97 acres	A= 2.97 acres	A= 2.97 acres	A= 2.97 acres
Total 78.22 CFS	64.78 CFS	54.57 CFS	40.87 CFS	33.35 CFS	25.82 CFS

Detention Volume

Pond-1
for Q100

Cundev=	0.52	
Iundev=	8.20	in/hr
Cdev=	0.59	
Idev=	8.20	in/hr
R=	0.592	
A=	2.79	acres
Tc=	10.00	minutes
	60	sec/min
Detention Volume=	991	cubic feet

Pond-2
for Q100

Cundev=	0.50	
Iundev=	7.50	in/hr
Cdev=	0.54	
Idev=	7.80	in/hr
R=	0.453	
A=	2.94	acres
Tc=	13.20	minutes
	60	sec/min
Detention Volume=	1056	cubic feet

Pond-3
for Q100

Cundev=	0.52	
Iundev=	8.10	in/hr
Cdev=	0.64	
Idev=	8.10	in/hr
R=	1.031	
A=	6.74	acres
Tc=	10.50	minutes
	60	sec/min
Detention Volume=	4,378	cubic feet

Pond-4
for Q100

Cundev=	0.51	
Iundev=	9.10	in/hr
Cdev=	0.64	
Idev=	9.10	in/hr
R=	1.146	
A=	2.97	acres
Tc=	7.70	minutes
	60	sec/min
Detention Volu	1,572	cubic feet

Stormwater Calcs - 23738 I-30 N
using Rational Method
Ditch Detention Volume

Required Detention Volume = 4378.204 cft

Ditch Bottom	1	ft
Ditch Height	3	ft
Ditch Slope	3	:1
Ditch Top	19	ft
Ditch Cross Sectional Area	30	sft

EAST Side

Ditch Length	320	ft
Ditch Volume	4800	cft

Total Volume = 4837.5 cft

Required Detention Volume = 0 cft

Ditch Bottom	0	ft
Ditch Height	0.5	ft
Ditch Slope	3	:1
Ditch Top	3	ft
Ditch Cross Sectional Area	0.75	sft

EAST Side

Ditch Length	100	ft
Ditch Volume	37.5	cft

Stormwater Calcs - 23738 I-30 N
using Rational Method
Weir-1 Sizing

Storm Event	Flow (cfs)
Q2 - Pre	10.27
Q10 - Pre	15.33
Q25 - Pre	18.64
Q100 - Pre	25.70
Q2 - Post	12.15
Q10 - Post	18.69
Q25 - Post	24.86
Q100 - Post	35.21

Rectangular Weir

Q100

Q (cfs)	**CLH^1.5**		
C	**2.5**		
L	**1.917**	23	INCHES
H	**3**		
Q (cfs)	**24.90**		

Q25

Q (cfs)	**CLH^1.5**		
C	**2.5**		
L	**1.917**	23	INCHES
H	**2.4**		
Q (cfs)	**17.82**		

Q10

Q (cfs)	**CLH^1.5**		
C	**2.5**		
L	**1.917**	23	INCHES
H	**2.1**		
Q (cfs)	**14.58**		

Q2

Q (cfs)	**CLH^1.5**		
C	**2.5**		
L	**1.917**	23	INCHES
H	**1.6**		
Q (cfs)	**9.70**		