Bryant Development and Review Committee Meeting

Boswell Municipal Complex - City Hall Conference Room

210 SW 3rd Street

Date: October 31, 2024 - **Time:** 9:00 AM

Call to Order

Old Business

New Business

1. 104 Rich Street - Conditional Use Permit - Accessory Structure

Steven Wise - Requesting Approval for CUP for Accessory Structure that exceeds 25% Sqft of the Primary Structure

- 0924-APP-01.pdf

2. Cornerstone Montessori Christian Academy - 4910 Springhill Rd - Waiver

Hope Consulting - Requesting Waiver on Half Street Improvements until Permanent Building is built.

- 0923-LTR-01.pdf

3. Hillcrest Addition Subdivision - 3927 Springhill Road

Tim Lemons - Requesting Recommendation for Preliminary Plat Approval

- 0890-DRN-05.pdf
- 0890-DRN-06.pdf
- 0890-PLN-05.pdf
- 0890-RSP-03.pdf
- 0890-RSP-04.pdf
- Drainage Report - revised oct 29 2024.pdf
- Hillcrest Addition - Revised Oct 29 2024.pdf

Staff Approved

4. Window World of Little Rock - 511 Boone Road - Sign Permit

Zach Black - Requesting Sign Permit Approval - STAFF APPROVED

- 92925-SGNAPP-01.pdf

5. Willow & Grace Boutique - 307 Progress Way Ste 700-800 - Sign Permit

L Graphics - Requesting Sign Permit Approval - STAFF APPROVED

- 92920-SGNAPP-01.pdf

6. Bryant Mail and Print Center - 5313 HWY 5 Ste 305 - Sign Permit

L Graphics - Requesting Sign Permit Approval - STAFF APPROVED

- 92921-SGNAPP-01.pdf

Permit Report

Adjournments

City of Bryant, Arkansas
Community Development
210 SW 3rd Street Bryant, AR 72022
501-943-0943

Conditional Use Permit Application

Applicants are advised to read the Conditional Use Permit section of Bryant Zoning Code prior to completing and signing this form. The Zoning Code is available at www.cityofbryant.com under the Planning and Community Development tab.

Date: 10/20/2024

Applicant or Designee:

Name Steven Wise
Address 104 RICH ST
Phone (501) 350-1410
Email Address: Steven.Wise@lrsd.org

Project Location:

Property Address 104 RICH STREET BRYANT, AR 72022
Parcel Number _____
Zoning Classification _____

Property Owner (If different from Applicant):

Name SAME
Phone _____
Address _____
Email Address _____

Additional Information:

Legal Description (Attach description if necessary)
104 RICH ST

Description of Conditional Use Request (Attach any necessary drawings or images)
Installation of awning to cover RV & Boat (see attached)

Proposed/Current Use of Property RESIDENTIAL

Application Checklist

Requirements for Submission

- ☐ Letter stating request of Conditional Use and reasoning for request
- ☐ Completed Conditional Use Permit Application
- ☐ Submit Conditional Use Permit Application Fee ($125)
- ☐ Submit Copy of completed Public Notice
- ☐ Publication: Public Notice shall be published at least one (1) time fifteen (15) days prior to the public hearing at which the variance will be heard. Once published please provide a proof of publication to the Community Development office.
- ☐ Posting of Property: The city shall provide a sign to post on the property involved for the fifteen (15) consecutive days leading up to Public hearing. One (1) sign is required for every two hundred (200) feet of street frontage.
- ☐ Submit eight (8) Copies of the Development Plan (Site Plan) showing:
  - Location, size, and use of buildings/signs/land or improvements
  - Location, size, and arrangement of driveways and parking. Ingress/Egress
  - Existing topography and proposed grading
  - Proposed and existing lighting
  - Proposed landscaping and screening
  - Use of adjacent properties
  - Scale, North Arrow, Vicinity Map
  - Additional information that may be requested by the administrative official due to unique conditions of the site.

Once the application is received, the material will be reviewed to make sure all the required information is provided. The applicant will be notified if additional information is required. The application will then go before the Development and Review Committee (DRC) for a recommendation to the Planning Commission. A public hearing will be held at this meeting for comments on the Conditional Use. After the public hearing, the Planning Commission will make a decision on the use.

Note: that this is not an exhaustive guideline regarding the Conditional Use Permit Process. Additional information is available in the Bryant Zoning Ordinance.

READ CAREFULLY BEFORE SIGNING

I Steven Wise, do hereby certify that all information contained within this application is true and correct. I further certify that the owner of the property authorizes this proposed application. I understand that I must comply with all City Codes and that it is my responsibility to obtain all necessary permits required.

TO:

City of Bryant, Arkansas

FROM:

Steven Wise, EdD

104 Rich Street

Bryant, Arkansas 72022

(501) 350-1410

steven.wise@lrsd.org

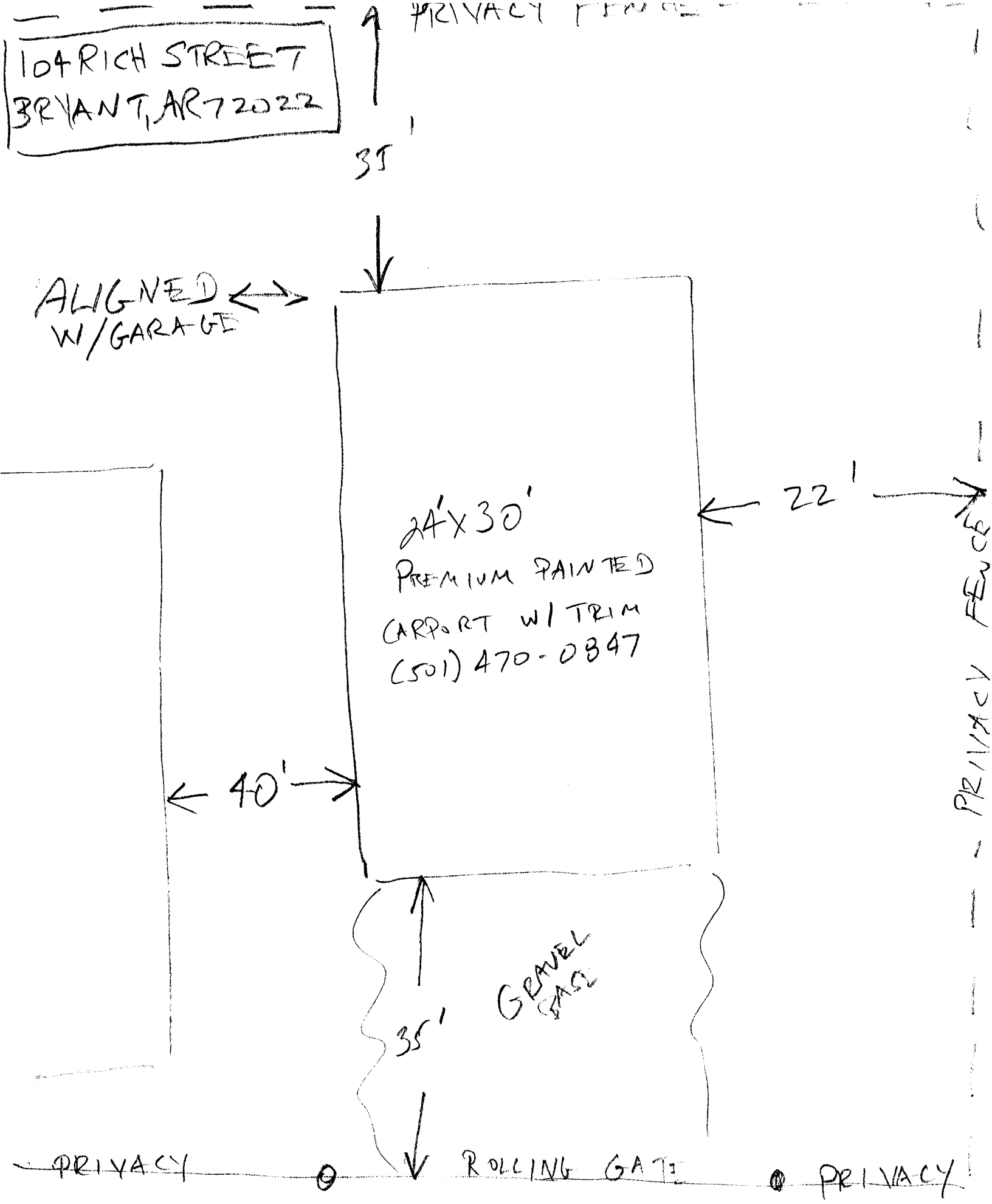
RE: Conditional Use Permit Application

Please seriously consider the attached permit for a high quality accessory structure to cover and protect my 30 ft travel trailer and boat from damages. My previous travel trailer was destroyed by falling limbs from my neighbor's large trees. I am relocating my new trailer to behind my privacy fence and installing an aesthetically pleasing awning matching the color of my house to protect my investment. I am scheduled for a major upgrade to my house in the next month and I am dedicated to improving the properties along Rich Street. Please help me keep the Heart of Bryant beating.

Thank you.

Steven Wise

Lifetime Resident


104 RICH STREET
BRYANT, AR 72022
PRIVACY FENCE
35'
ALIGNED W/GARAGE
24'X30'
PREMIUM PAINTED
CARPORT W/TRIM
(501) 470-0847
22'
40'
PRIVACY FENCE
GRAVEL
35'
PRIVACY
ROLLING GATE
PRIVACY



104 Rich Street

Bryant, Arkansas 72022

Owner: Steven Wise



104 Rich Street

Bryant, Arkansas 72022

Owner: Steven Wise

HOPE CONSULTING

129 North Main Street, Benton, Arkansas 72015
(t) 501-315-2626 (e) www.HopeConsulting.com

October 18, 2024

Colton Leonard
City of Bryant
210 Southwest Third St., Bryant, AR 72022

RE: Cornerstone Montessori School (Parcel # 840-06480-002)

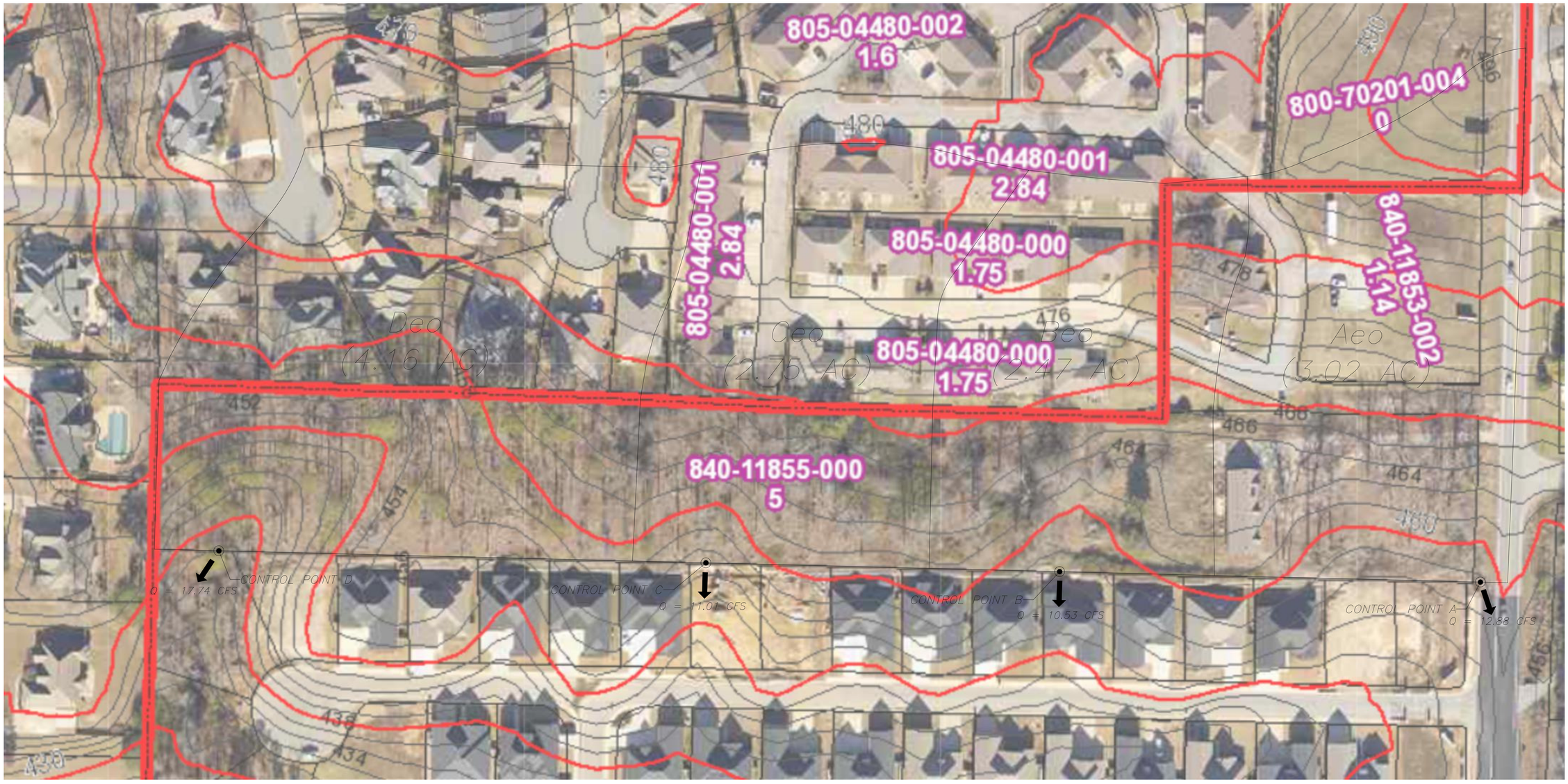
Dear Mr. Leonard,

On behalf of our client, please accept this request letter for a waiver for a delay in the ½ street improvements and trail. At this time a temporary structure has been built in an effort to quickly continue operations of this school. In the future the school has plans to build a permanent school on this property. Our request would be to delay the ½ street improvements and trail construction until the permanent school is built.

Sincerely,



Jonathan Hope
Hope Consulting, Inc
jonathan@hopeconsulting.com



ALL FLOWRATES – 25 YR STORM EVENT

0' 50' 100' 150'
SCALE: 1" = 50'

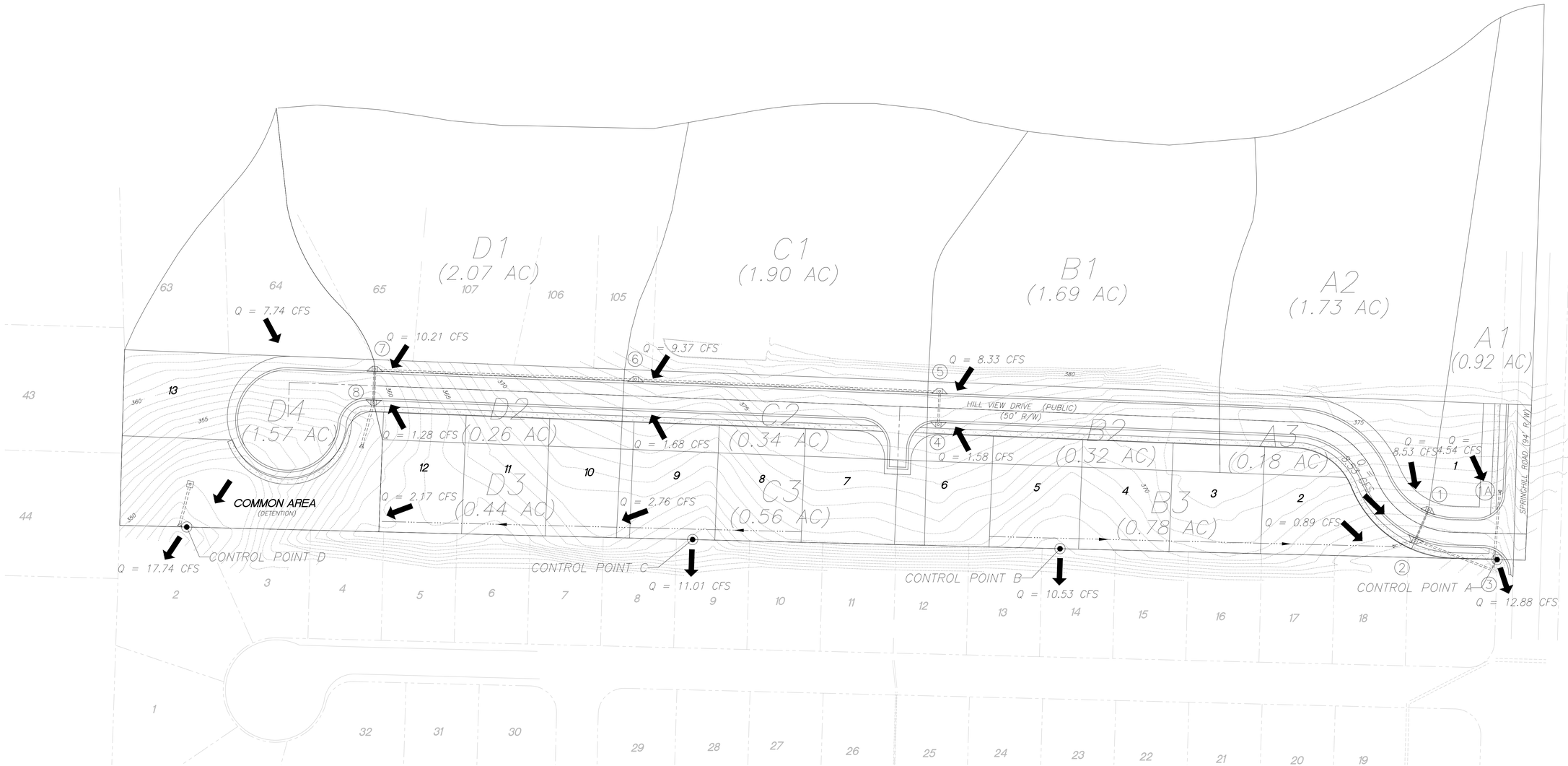
LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 843-3081 • Fax (501) 941-0959
ENGINEERING + SURVEYING
WATER • SEWER • TRANSPORTATION • SUBDIVISIONS

DRAINAGE MAP – PRECONSTRUCTION
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By

Project No.: 24-018
Date: OCTOBER 22, 2024
File: Drainage Precon
Scale: 1" = 50'
Sheet: 1 of 1
Drawn By: B. Judd



⑥ – DRAINAGE STRUCTURE #

ALL FLOWRATES – 25 YR STORM EVENT

0' 50' 100' 150'

SCALE: 1" = 50'

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 843-5081 • Fax (501) 941-0959
ENGINEERING + SURVEYING
WATER • SEWER • TRANSPORTATION • SUBDIVISIONS

DRAINAGE MAP – POST CONSTRUCTION
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By

Project No. 24-018
Date: OCTOBER 22, 2024
File: Drainage Post Con
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 1 of 1

Drainage Report

For

Hillcrest Addition

Springhill Road
Bryant, Arkansas

Revised: October 21, 2024

Prepared By:

Lemons Engineering Consultants, Inc.
204 West Cherry Street
Cabot, Arkansas 72023
(501) 605-7565
arstrep43@gmail.com

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Project Information

Project Title:	Hillcrest Addition
Project Description:	13 lot single family development located on the West side of Springhill Road, North of and adjacent to Hurricane Gardens, Bryant, Arkansas (address: 3927 Springhill Road)
Owner/Developer:	Springhill – Hwy 5 Development, LLC 816 East Oak Street Conway, Arkansas 72032
Engineer of Record:	Lemons Engineering Consultants, Inc. Tim Lemons, PE 204 Cherry Street Cabot, Arkansas 72023 (501) 605-7565

General Information

This proposed development shall include 13 single family lots. This property is essentially the Northern Most tract of land within the city limits of Bryant as it presently exist. The property to the North of the subject site is developed with duplex style residential structures existing outside the City limits of Bryant. The property to the South is an established subdivision (Hurricane Gardens). The property drains North to South. There have been several reports of drainage issues by the residents of Hurricane Gardens. At present, the drainage from the subject property, and that to the north of the subject property, flows onto Hurricane Gardens. No detention exists on the property located north of the subject property.

The objectives of this report are as follows:

1) Determine the estimated increase in runoff due to the development of Hillcrest Addition.
2) Provide design computations for a detention facility to bring the runoff from said tract to pre-construction rate.
3) Based on comments expressed by the residents, divert as much flow as possible away from the rear of the Northern most lots within Hurricane Gardens. As previously stated, the majority of the property to the North of Hurricane Gardens flows into the rear of the Northern most lots, creating an issue for the property owners.
4) Size the infrastructure in the development using the City's Drainage Code.
5) Compare the estimated Pre and Post flowrates at specific control points to show that the overall runoff from Hillcrest is at or less than the pre-construction flowrate.

The control points (A-D) to be used in this analysis are shown on the following vicinity map, and throughout this report.

Project Vicinity Map



Source: ARCOUNTYDATA.com

Hydrological Computations

For this analysis, we will use the Rational Method in determining culvert sizes, culvert capacity computations, and other related issues on site. The total watershed size for this development is estimated at 12.40 acres. Attention is called to the Watershed Map included in this report. As per the Rational Method, the following equation is used:

Q = C x I x A, where:
- Q = Flowrate (cfs)
- C = Runoff Coefficient
- I = Intensity (from tables)
- A = area (acres)

The selection of the appropriate intensity is based on the estimated time of concentration (tc).

Determination of Runoff Coefficients "C"

In determining the Pre Construction C, we must consider the property to the North that is developed, and discharging onto the subject property. The C factor for Pre and Post Conditions are based on Table 400-1 "Runoff Coefficients for Surface Types" as provided in the Bryant Drainage Manual. A factored (weighted) value of C is determined in the following tables:

Pre Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	0.19	0.29	4.59	0.41
5	0.8	3.04	0.32	4.73	0.8	0.19	0.32	4.59	0.44
10	0.83	3.04	0.35	4.73	0.83	0.19	0.35	4.59	0.47
25	0.88	3.04	0.39	4.73	0.88	0.19	0.39	4.59	0.52
50	0.92	3.04	0.42	4.73	0.92	0.19	0.42	4.59	0.55
100	0.97	3.04	0.46	4.73	0.97	0.19	0.46	4.59	0.59

C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

Post Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	1.81	0.29	3.07	0.47
5	0.8	3.04	0.32	4.73	0.8	1.81	0.32	3.07	0.50
10	0.83	3.04	0.35	4.73	0.83	1.81	0.35	3.07	0.53
25	0.88	3.04	0.39	4.73	0.88	1.81	0.39	3.07	0.58
50	0.92	3.04	0.42	4.73	0.92	1.81	0.42	3.07	0.61
100	0.97	3.04	0.46	4.73	0.97	1.81	0.46	3.07	0.66

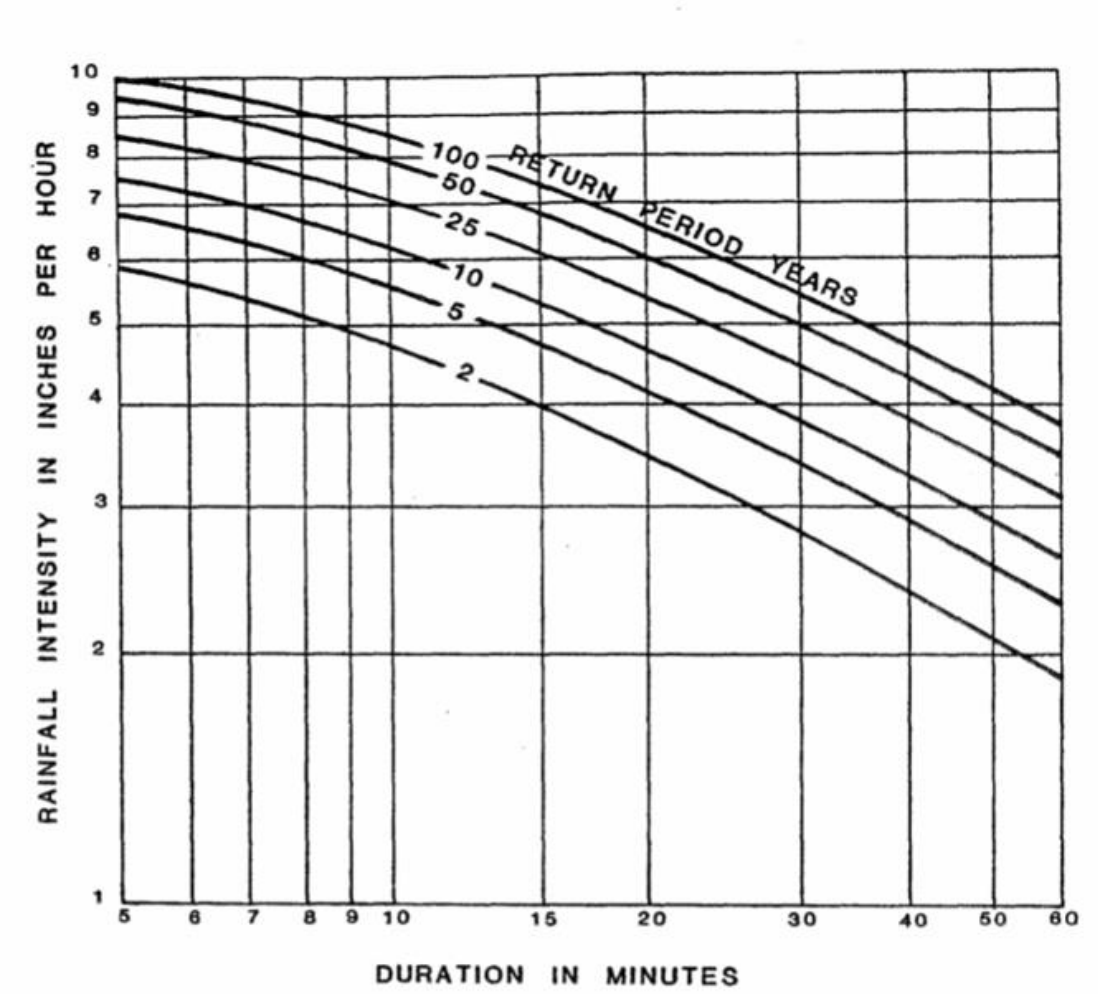
C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

The above variable values will be used in designing the Detention Facility. For culvert design, we will use the Post C values for the 25 year storm.

Determination of Intensity Values “I”

For this analysis, we will use the Intensity – Duration - Frequency Chart from the Little Rock Drainage Manual. Whereas the calculated value of I shall be used for Detention, we will use a tc (time of concentration) of 5 min for the culverts to also provide a conservative value.



INTENSITY - DURATION - FREQUENCY

LITTLE ROCK

SOURCE : HYDRO 35 & T.P. No. 40

Drainage Map (Pre-Construction)



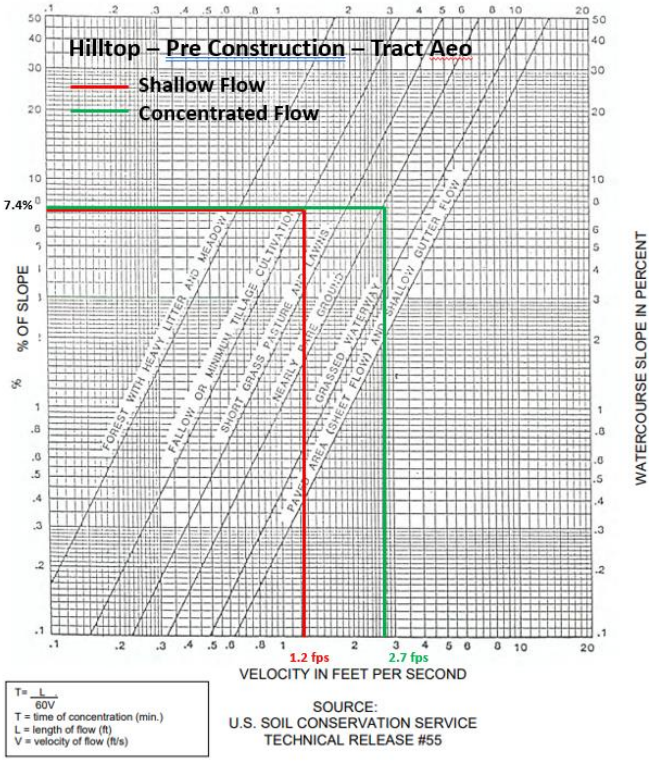
See attached map for additional information

Pre Construction Flowrates – Control Points

The estimated Pre Construction Flowrate for each Control Point is estimated as follows. These values will be used to compare to the Post Construction Flowrate later in this report:

Control Point A

The time of concentration is determined as follows:



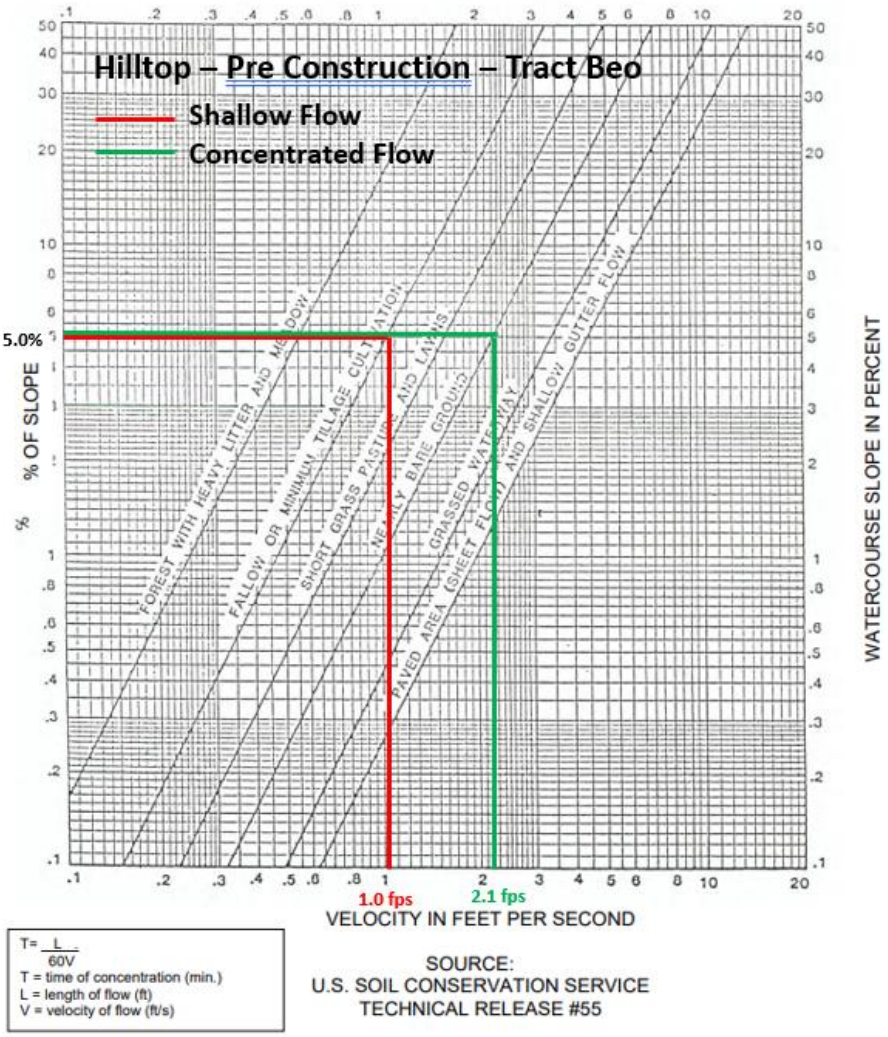
$$tc = ((300)/(60)(1.2)) + ((300)/(60)(2.7)) = 6 \text{ min}$$

Flowrates for various Storm Events (Control Point A):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6	5.6	3.02	6.93
5	0.44	6	6.6	3.02	8.77
10	0.47	6	7.3	3.02	10.36
25	**0.52**	**6**	**8.2**	**3.02**	**12.88**
50	0.55	6	9.2	3.02	15.28
100	0.59	6	9.8	3.02	17.46

Control Point B

The time of concentration is determined as follows:



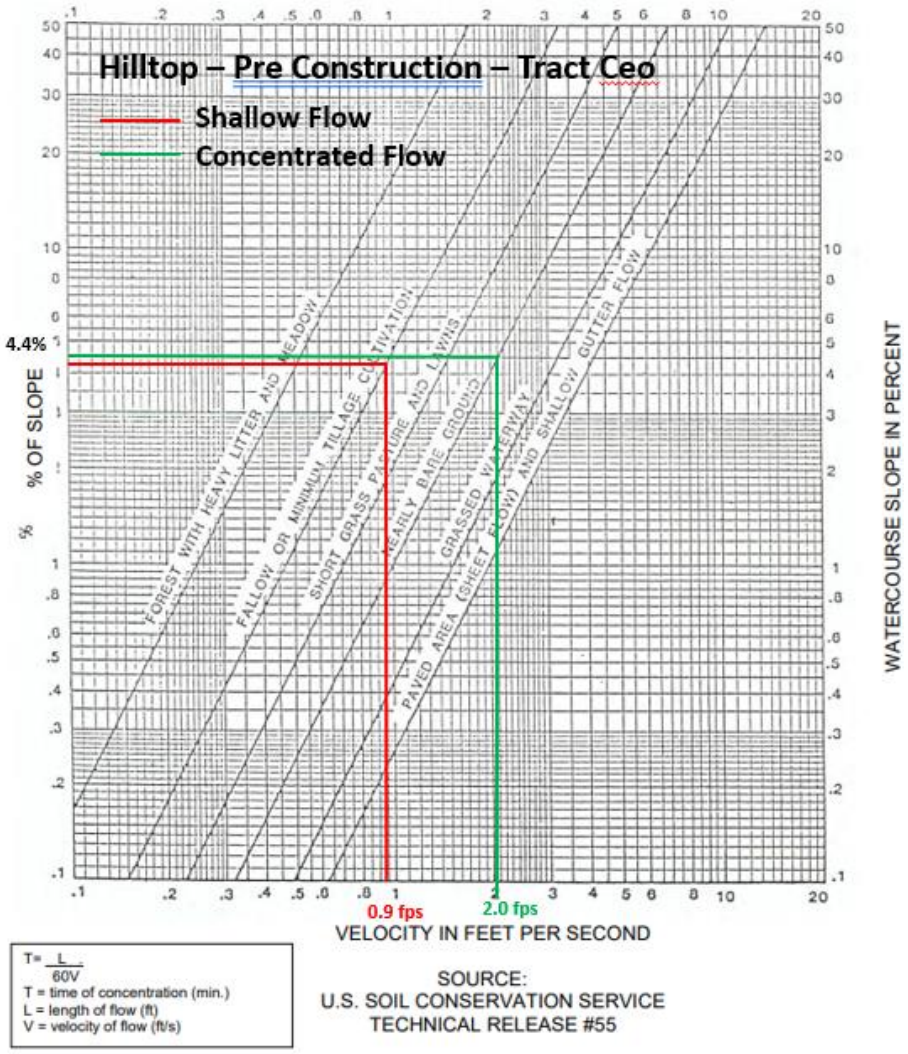
tc = ((300)/(60)(1.0)) + ((200)/(60)(2.1)) = 6.5 min

Flowrates for various Storm Events (Control Point B):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	2.47	5.67
5	0.44	6.5	6.6	2.47	7.17
10	0.47	6.5	7.3	2.47	8.47
25	**0.52**	**6.5**	**8.2**	**2.47**	**10.53**
50	0.55	6.5	9.2	2.47	12.50
100	0.59	6.5	9.8	2.47	14.28

Control Point C

The time of concentration is determined as follows:



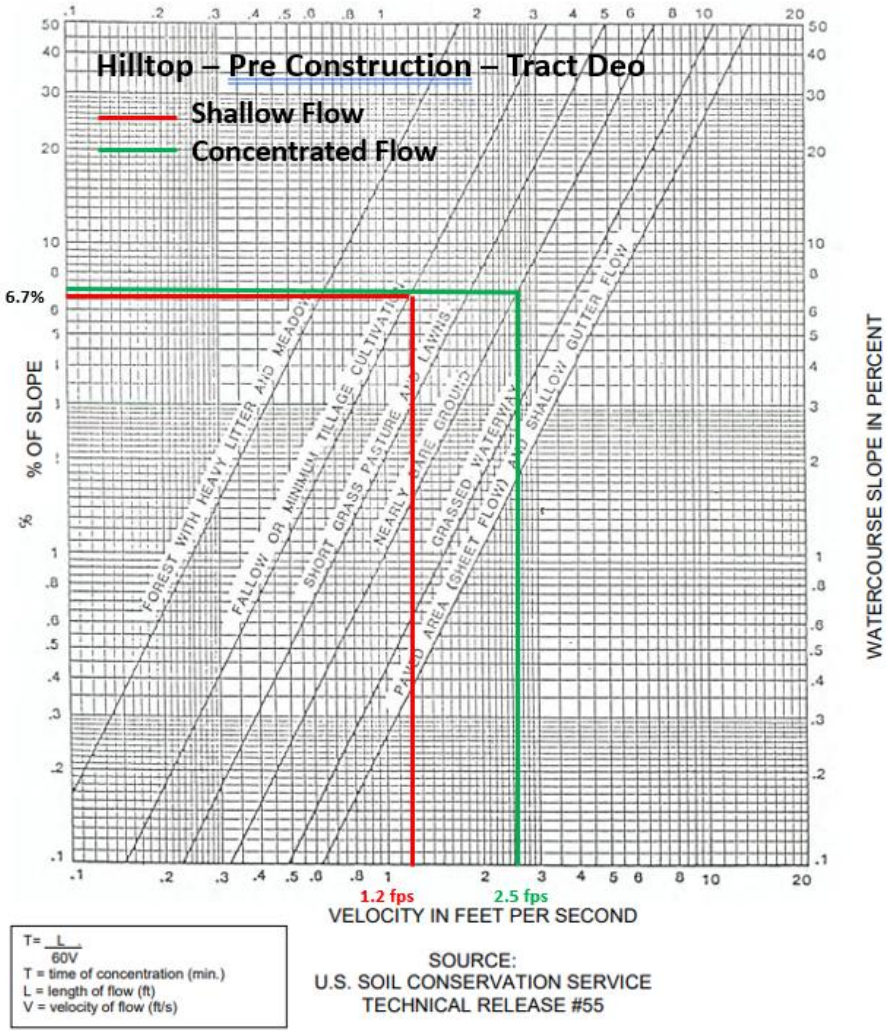
tc = ((300)/(60)(0.9)) + ((300)/(60)(2.0)) = 8 min

Flowrates for various Storm Events (Control Point C):

Storm Event	C	tc (min)	I (in/hour)	A (acres)	Q (cfs)
2	0.41	8	5.1	2.75	5.75
5	0.44	8	6	2.75	7.26
10	0.47	8	6.7	2.75	8.66
25	**0.52**	**8**	**7.7**	2.75	**11.01**
50	0.55	8	8.5	2.75	12.86
100	0.59	8	9.1	2.75	14.76

Control Point D

The time of concentration is determined as follows:



tc = ((300)/(60)(1.2)) + ((340)/(60)(2.5)) = 6.4 min

Flowrates for various Storm Events (Control Point D):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	4.16	9.55
5	0.44	6.5	6.6	4.16	12.08
10	0.47	6.5	7.3	4.16	14.27
25	**0.52**	**6.5**	**8.2**	4.16	**17.74**
50	0.55	6.5	9.2	4.16	21.05
100	0.59	6.5	9.8	4.16	24.05

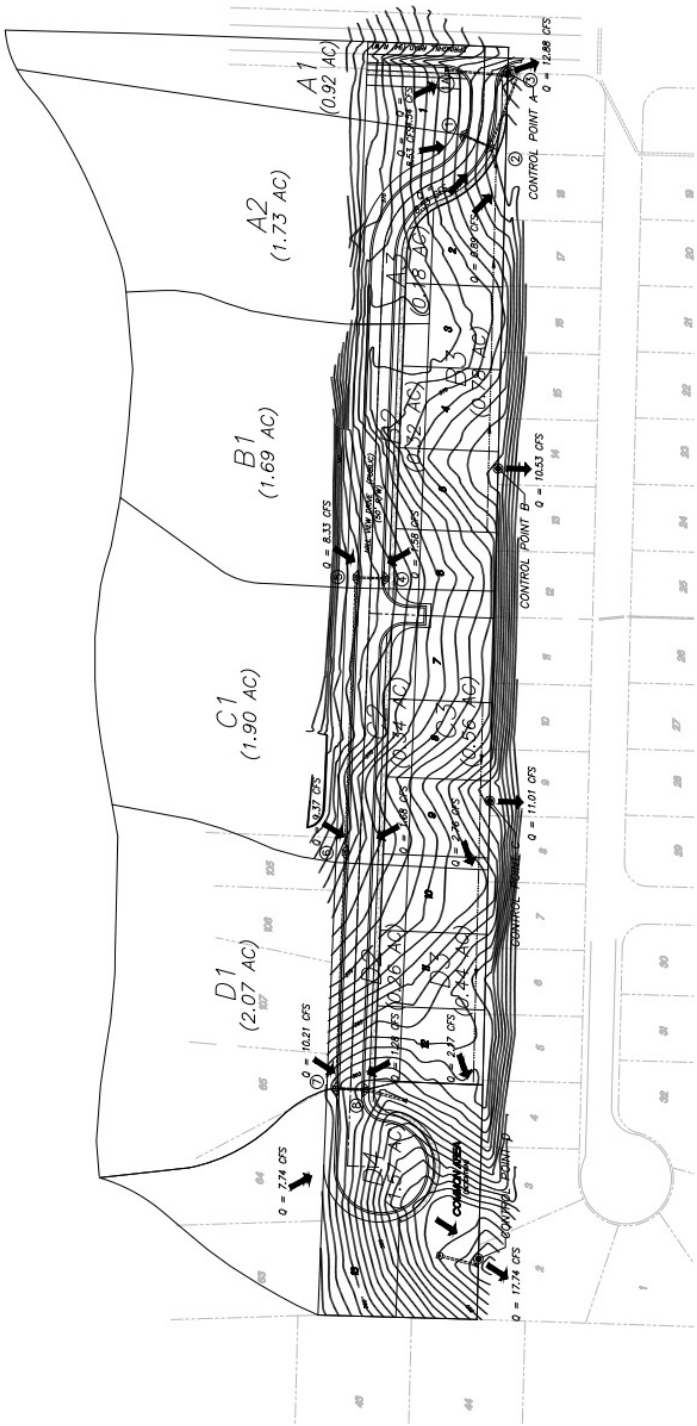
Determination of Flowrates for Culverts & Spreadflow

Attention is called to the following chart which provides C, Intensity, Area, and Flowrate (Q) of each Tract. Again, the Rational Method is being used for all basins. Attention is called to the Maps on the next two pages for a detailed drawings showing the various watershed tracts. The 25 year storm event will be used for culvert design. A conservative tc of 5 minutes is used for the culvert design.

Tract	C(Post)	I25 (in/hr)	A (ac)	Q25 (cfs)
A1	0.58	8.5	0.92	4.54
A2	0.58	8.5	1.73	8.53
A3	0.58	8.5	0.18	0.89
B1	0.58	8.5	1.69	8.33
B2	0.58	8.5	0.32	1.58
B3	0.58	8.5	0.78	3.85
C1	0.58	8.5	1.90	9.37
C2	0.58	8.5	0.34	1.68
C3	0.58	8.5	0.56	2.76
D1	0.58	8.5	2.07	10.21
D2	0.58	8.5	0.26	1.28
D3	0.58	8.5	0.44	2.17
D4	0.58	8.5	1.57	7.74

Drainage Map (Post Construction)

Revised 10/21/2024



See attached Map for additional information

Culvert Sizing

All culverts are sized to meet a 25 year storm, and the Rational Method is used. We will use a Manning's Coefficient of 0.012 shall be for all culverts (concrete and HDPE). The d/D ratio and velocity was computed using HawsEDC On-Line Calculator (hawsedc.com).

FES 1a
Q = Qa1 = 4.54 cfs
Use 18" @ 3.5%
Q capacity = 21.94 cfs
V actual = 9.68 fps (d/D = 0.32)

Inlet 1
Q = Qa2 = 8.53 cfs
Use 18" @ 1.1%
Q capacity = 12.30 cfs
V actual = 7.36 fps (d/D = 0.63)

Inlet 2
Q = Inlet 1 + Qa3 = 8.53 + 0.89 = 9.42 cfs
Use 24" @ 0.3%
Q capacity = 13.84 cfs
V actual = 4.63 fps (d/D = 0.62)

Junction Box 3 (verify capacity)
Q = Inlet 2 + Qb3 + Exist 18" in Hurricane Gardens
(Culvert in Hurricane Gardens is an 18" ADS at 0.46%, Capacity = 7.95 cfs at d/D=0.85)
Q = 9.42 + 3.85 + 7.95 = 21.22 cfs
Existing 24" Discharging from Junc Box is 24" ADS @ 5.20%
Q capacity = 57.58 cfs ***Capacity appears to exist***
V actual = 16.61 fps (d/D = 0.43)

Inlet 4
Q = Qb2 = 1.58 cfs
Use 18" @ 0.5%
Q capacity = 8.29 cfs
V actual = 3.53 fps (d/D = 0.30)

Inlet 5
Q = Inlet 4 + Qb1 = 1.58 + 8.33 = 9.91 cfs
Use 18" @ 1.0%
Q capacity = 11.73 cfs
V actual = 7.25 fps (d/D = 0.72)

Inlet 6
Q = Inlet 5 + Qc1 = 9.91 + 9.37 = 19.28 cfs
Use 18" @ 4.60%
Q capacity = 25.15 cfs
V actual = 15.30 fps (d/D = 0.67)

Inlet 7
Q = Inlet 6 + Qd1 = 19.28 + 10.21 = 29.49 cfs
Use 24" @ 2.0%
Q capacity = 35.71 cfs
V actual = 12.38 fps (d/D = 0.71)

Inlet 8
Q = Inlet 7 + Qc2 + Qd2 = 29.49 + 1.68 + 1.28 = 32.45 cfs
Use 24" @ 2.25%
Q capacity = 37.87 cfs
V actual = 13.28 fps (d/D = 0.73)

Street Spreadflow Analysis & Inlet Capture

In this Section of the Report, we will examine how the stormwater in the street gutters may impact in proposed inlets. We will use our 27' street width (back of curb to back of curb), while giving allowances for the vertical portion of the curb on each side. The crown on the street shall be 3.0%. The available street width, to handle the stormwater, has a width of 26'. Our goal is to provide a minimum "non submerged" street width ("clear space") of 8 feet. We will use the following equation (as provided in "Urban Drainage and Flood Control District – Urban

Storm Drainage Manual, Volume 1, dated January, 2016) to determine the required length of throat to capture 100% of the stormwater:

Lt = 0.38 (Q^0.51)(Sl^0.058)(1/nSx)^0.46, where:
Lt = required length of throat to capture 100%
Q = flowrate (cfs)
Sl = slope of gutter
N = manning's coef. = 0.012
Sx = cross slope of street = 0.03

Since n and Sx are constant, the equation can be reduced to:

Lt = 0.38 (Q^0.51)(Sl^0.058)(38.38)
Lt = 14.58 (Q^0.51) (Sl^0.058)

Attention is called to the Appendix for the spreadsheets used to evaluate these areas.

Check Inlet 1 & 2 – Hillcrest Drive (Spreadflow Analysis)

Inlet 1
Q = Qa2 = 8.53 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.33'
Width of water (from gutter) = 11.0'
Clear space (half street) = 13.0 – 11.0' = 2.0'
Inlet 2
Q = Qa3 = 0.89 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.14'
Width of water (from gutter) = 4.5'
Clear space (half street) = 13.0 – 4.5' = 8.5'
Total Clear Space = 2.0 + 8.5 = 10.5'

Stormwater Capture – Inlet 1
Lt = 14.58 (8.53^0.51)(0.015^0.058) = 34.10 feet
Using a 20' throat:
Q captured = 5.01 cfs (58.7%)
Q bypass = 3.52 cfs (41.3%)

Stormwater Capture – Inlet 2
Lt = 14.58 (0.89^0.51)(0.015^0.058) = 10.77 feet
Using a 12' throat:
Q captured = 0.89 cfs (100%)
Q bypass = 0.00 cfs (0%)

Check Inlet 4 & 5 – Hillcrest Drive (Spreadflow Analysis)

Inlet 4

Q = Qb2 = 1.58 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.21'
Width of water (from gutter) = 7.0'
Clear space (half street) = 13.0 – 7.0 = 6.0'

Inlet 5

Q = Qb1 = 8.33 fps
Gutter Slope = 0.5%
Height of water (from gutter) = 0.39'
Width of water (from gutter) = 13.0'
Clear space (half street) = 13.0 – 13.0' = 0.0'
Total Clear Space = 6.0 + 0.0 = 6.0'

TRY 10 YEAR STORM

Inlet 4

Q = Qb2 = 1.26 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.20'
Width of water (from gutter) = 6.5'
Clear space (half street) = 13.0 – 6.5' = 6.5'

Inlet 5

Q = Qb1 = 6.66 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.36'
Width of water (from gutter) = 12.0'
Clear space (half street) = 13.0 – 12.0' = 1.0'
Total Clear Space = 6.5 + 1.0 = 7.5'

Stormwater Capture – Inlet 4

Lt = 14.58 (1.26^0.51)(0.005^0.058) = 12.06 feet
Using a 13' throat:
Q captured = 1.26 cfs (100%)
Q bypass = 0.00 cfs (0%)

Stormwater Capture – Inlet 5

Lt = 14.58 (6.66^0.51)(0.005^0.058) = 28.20 feet
Using a 24' throat:
Q captured = 5.67 cfs (85.1%)
Q bypass = 0.99 cfs (14.9%)

Check Inlet 6 & Across Street – Hillcrest Drive (Spreadflow Analysis)

Inlet 6

Q = Qc1 = 9.37 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.30'
Width of water (from gutter) = 10.0'
Clear space (half street) = 13.0 – 10.0' = 3.0'

Across from Inlet 6

Q = Qc2 = 1.68 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.17'
Width of water (from gutter) = 5.5'
Clear space (half street) = 13.0 – 5.5 = 7.5'
Total Clear Space = 3.0 + 7.5 = 10.5'

Stormwater Capture – Inlet 6

Q = 9.37 + 0.99 (bypass from Inlet 5) = 10.36 cfs
Lt = 14.58 (10.36^0.51)(0.0267^0.058) = 38.93 feet
Using a 30' throat:
Q captured = 7.99 cfs (77.1%)
Q bypass = 2.37 cfs (22.9%)

Check Inlet 7 & 8 – Hillcrest (Spreadflow Analysis)

Inlet 7

Q = Qd1 = 10.21 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.29'
Width of water (from gutter) = 9.5'
Clear space (half street) = 13.0 – 9.5' = 2.5'

Inlet 8

Q = Qc2 + Qd2 = 2.42 + 2.17 = 2.96 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.18'
Width of water (from gutter) = 6.0'
Clear space (half street) = 13.0 – 6.0' = 7.0'
Total Clear Space = 2.5 + 7.0 = 9.5'

Stormwater Capture – Inlet 7

Q = 10.21 + 2.37 (bypass from Inlet 6) = 12.58 cfs
Lt = 14.58 (12.58^0.51)(0.0488^0.058) = 44.5 feet
Using a 30' throat:
Q captured = 8.48 cfs (67.4%)
Q bypass = 4.10 cfs (0%)

Stormwater Capture – Inlet 8
Lt = 14.58 (2.96^0.51)(0.0488^0.058) = 21.28 feet
Using a 22’ throat:
Q captured = 21.28 cfs (100%)
Q bypass = 0.00 cfs (0%)

Curb Cut on Street at North side of Detention Pond
Q = Qd4 + 4.10 (bypass from Inlet 7) = 7.74 + 4.10 = 11.84 cfs
Use a 6” x 8’ Curb Cut with a slope of 3%:
Q = (1.49/n)(A)(R^2/3)(S^1/2) = (1.49/0.012)(4)(4.33)(0.17) = 22.44 cfs

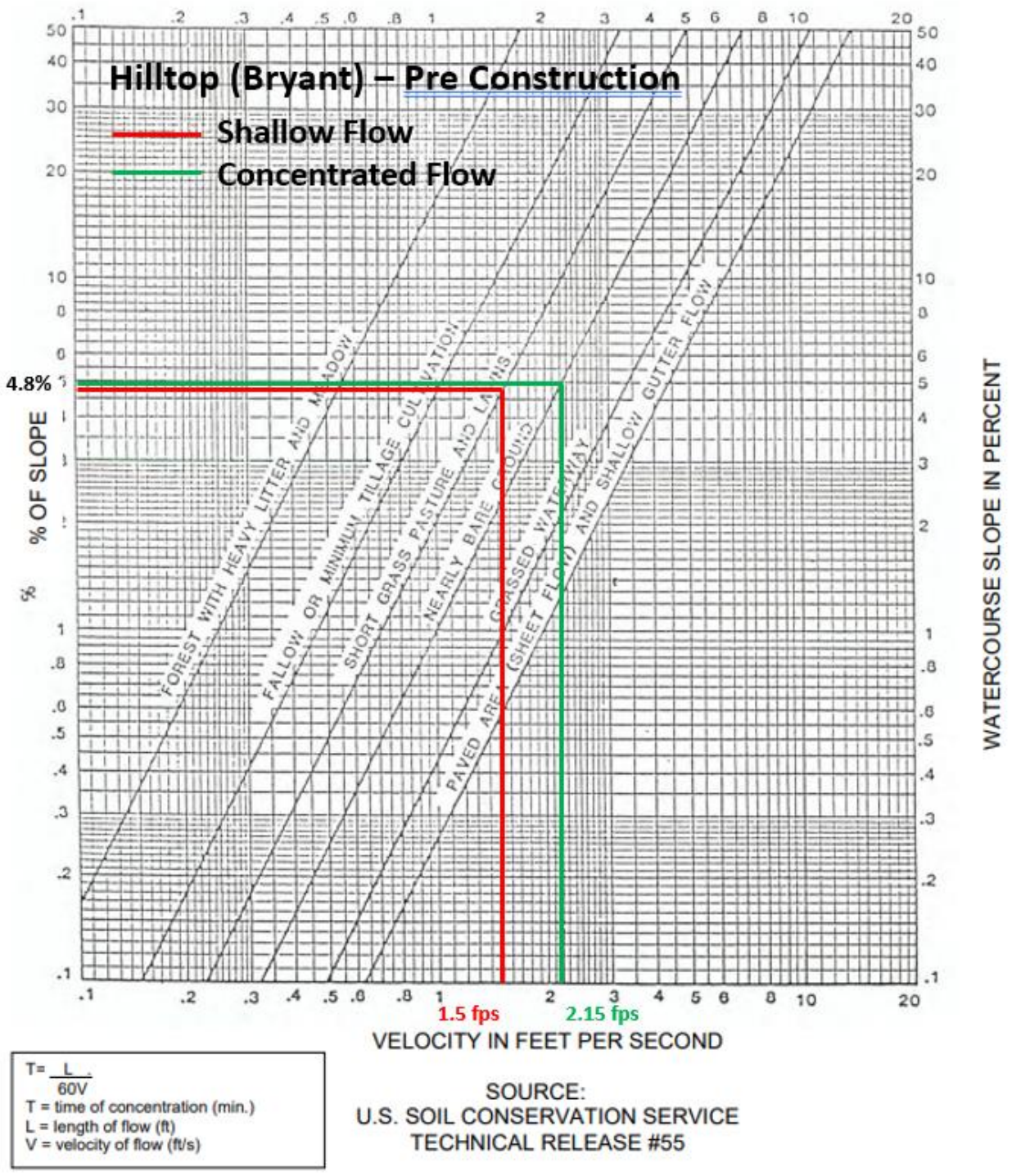
Detention Facility Computations

In this section, we will size the detention facility located in the Common Area (West side of the project). At the completion of this section, a summary of pre and post flows will be provided. Whereas the time of concentration will be used to determine the intensity (I), the runoff coefficient (C) for each storm analysis shall be based on that determined on pages 5 and 6 of this report.

Time of Concentration (tc)

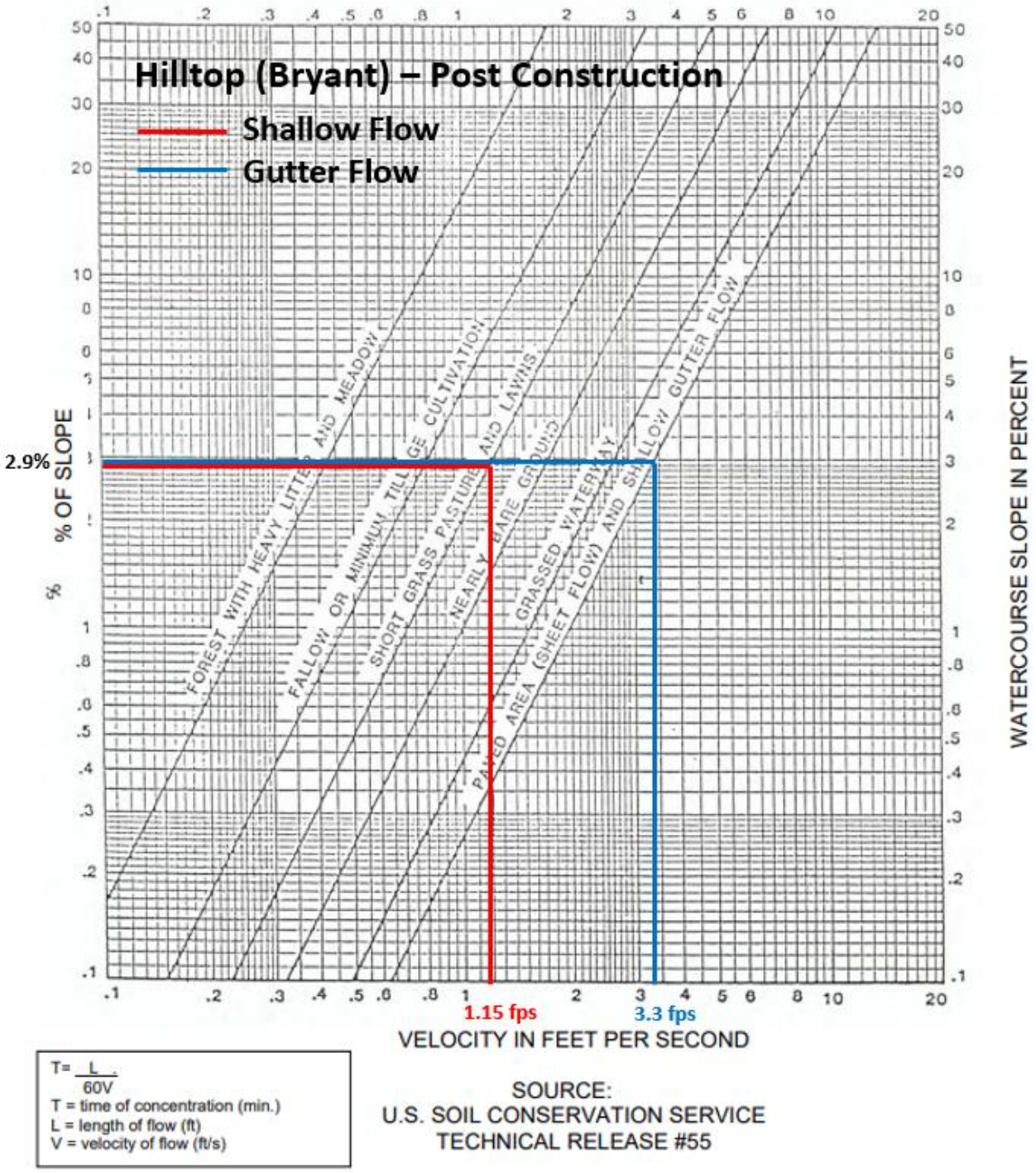
In determining the time of concentration, we must first determine the velocity of the runoff based on the type of ground cover and type of flow. The total tc is a sum of the tc for overland flow, the tc for shallow concentrated flow, and the tc for channelized flow. For this analysis, we will use the US Soil Conservation Service Technical Release #55, "Watercourse Slope vs Velocity" graph. A Pre Construction and Post Construction graph for each watershed is provided on the following pages.

Pre Construction Time of Concentration (tc)



Pre-Construction tc = Σ(L/(60)(V)) = 6 min

Post Construction Time of Concentration (tc)



Post-Construction tc = Σ(L/(60)(V)) = 9 min

Stage – Storage Table

The following Stage Storage Table is provided, based on the grading plan contained in the Civil Plans. The accumulative storage is provided in the right most column.

TYPE 3

Stage - Storage for Irregular Detention Basin

Top Elev	Bottom Elev	Increment
353.5	345.5	1

Stage	Area	Δ Volume	Volume
msl	sf	cf	cf
345.50	1	0	0
346.50	1853.50	927.25	927.25
347.50	2951.40	2402.45	3329.70
348.50	4240.13	3595.77	6925.47
349.50	5637.46	4938.80	11864.26
350.50	7118.75	6378.11	18242.37
351.50	8673.71	7896.23	26138.60
352.50	10265.99	9469.85	35608.45
353.50	11858.27	11062.13	46670.58

Stage – Discharge Table

The following Stage Discharge Table is provided, based on the grading plan contained in the Civil Plans. The discharge structure planned for this facility is shown later in this report.

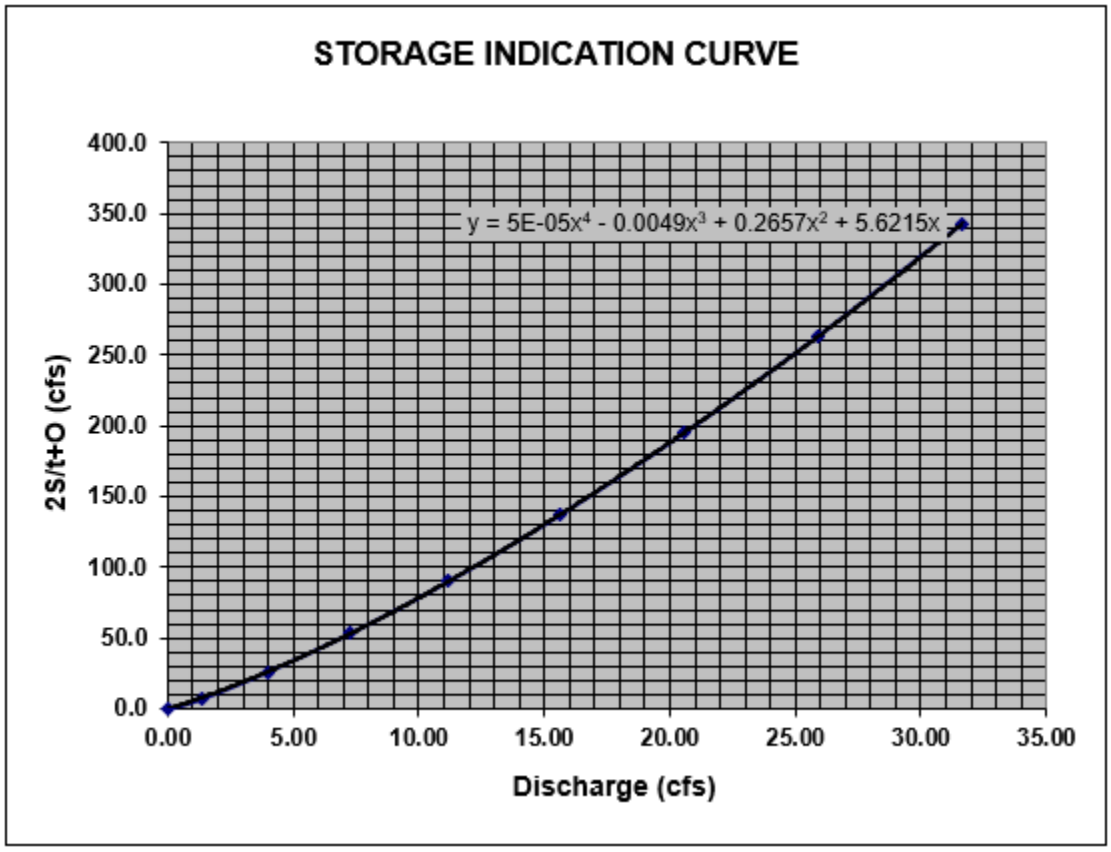
TYPE 2

Stage - Discharge for Rectangular Weir

FL Discharge	Beginning Elevation	Elevation Increment	Top of Basin
345.50	345.50	1.00	353.50

Stage	Head (H)	Weir Length (L)	Area (A)	Orifice Coefficient (C)	Velocity	Discharge (Q)
msl	ft	ft	sf		ft/s	cfs
345.50	0.00	0.42	0.00	3.33	0.00	0.00
346.50	1.00	0.42	0.42	3.33	3.33	1.40
347.50	2.00	0.42	0.84	3.33	4.71	3.96
348.50	3.00	0.42	1.26	3.33	5.77	7.27
349.50	4.00	0.42	1.68	3.33	6.66	11.19
350.50	5.00	0.42	2.10	3.33	7.45	15.64
351.50	6.00	0.42	2.52	3.33	8.16	20.56
352.50	7.00	0.42	2.94	3.33	8.81	25.90
353.50	8.00	0.42	3.36	3.33	9.42	31.65

Storage Indication Curve



Alternate Routing Time

The following spreadsheets represent the Hydrograph Routing for the various storm events. In each case, the Routing Storm Duration time was adjusted to provide the maximum storage required. Also, runoff coefficients C have been adjusted for each storm event:

Storm Event	Pre C	Post C
2	0.41	0.47
5	0.44	0.50
10	0.47	0.53
25	0.52	0.58
50	0.55	0.61
100	0.59	0.66

2 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 2 YEAR DESIGN STORM

Routing Storm Duration

20 **minutes**

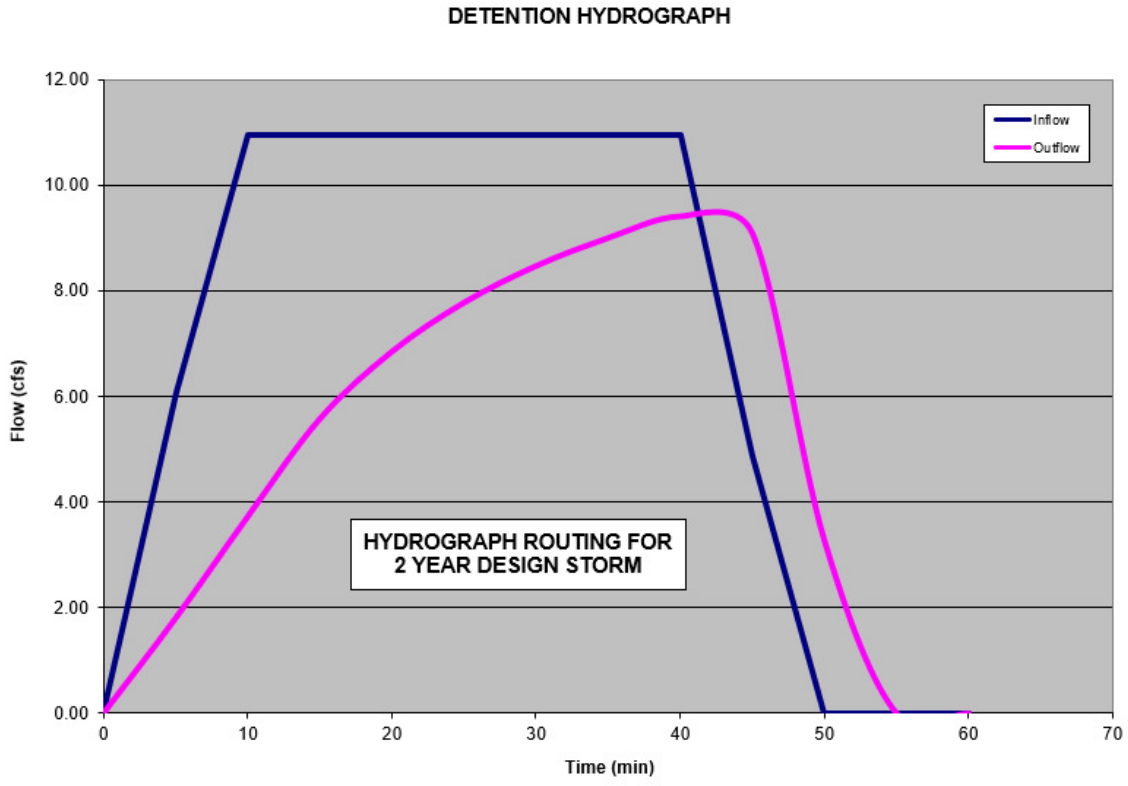
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	15.97	0	15.973	0	0	15.972	0.001
5	8.87	24.85	10.876	35.723	2.548	2013.7	35.724	-0.001
10	15.97	31.95	25.334	57.280	5.194	4579.3	57.280	0.000
15	15.97	31.95	41.818	73.764	7.731	7432.4	73.764	-0.001
20	15.97	23.07	54.737	77.809	9.513	9637.5	77.810	-0.001
25	7.10	7.10	57.939	65.038	9.935	10181.1	8.503	56.535
30	0.00	0.00	62.199	62.199	1.520	9527.8	0.000	62.199
35	0.00	0.00	50.999	50.999	0.000	9329.8	0.000	50.999
40	0.00	0.00	51.199	51.199	0.000	7649.8	0.000	51.199
45	0.00	0.00	51.399	51.399	0.000	7679.8	0.000	51.399
50	0.00	0.00	51.599	51.599	0.000	7709.8	0.000	51.599
55	0.00	0.00	51.799	51.799	0.000	7739.8	0.000	51.799
60	0.00	0.00	51.999	51.999	0.000	7769.8	0.000	51.999

Actual Maximum Storage needed is 10181.1 cubic feet

Maximum Storage required is achieved at an elev. = 349.32

Maximum Allowable (undeveloped) Discharge is 11.99 cfs

Maximum Discharge for the above storm is 9.93 cfs



5 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

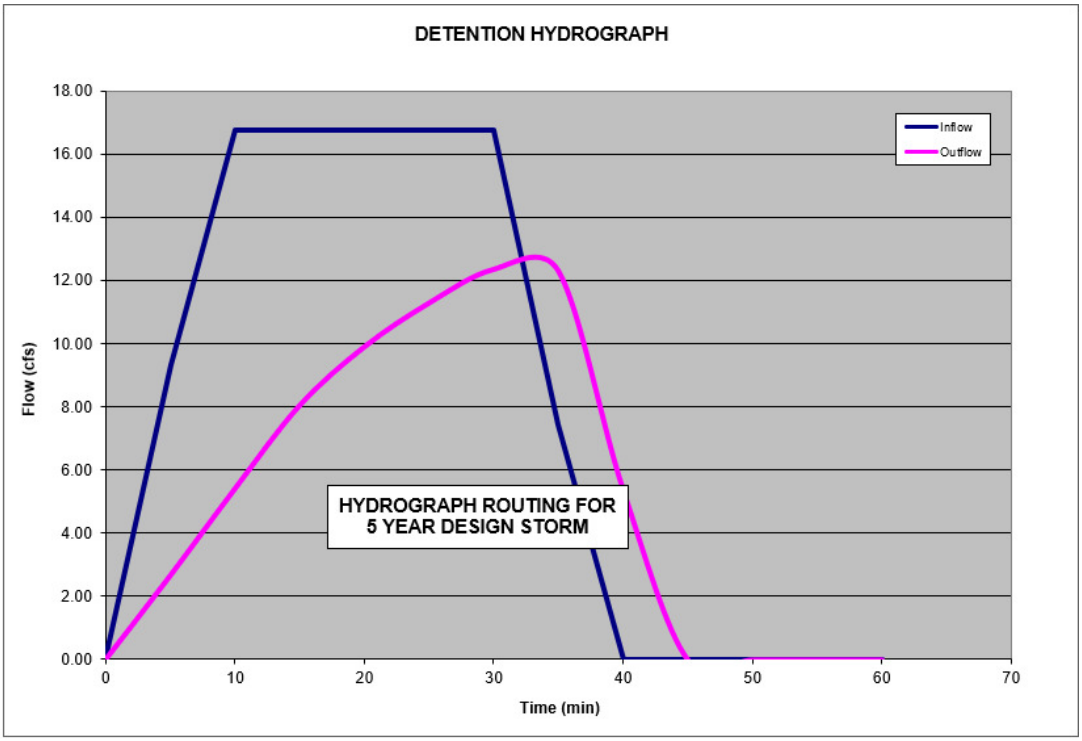
HYDROGRAPH ROUTING FOR 5 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	16.75	0	16.750	0	0	16.749	0.001
5	9.31	26.06	11.428	37.484	2.661	2113.4	37.485	-0.001
10	16.75	33.50	26.658	60.157	5.413	4810.6	60.158	-0.001
15	16.75	33.50	44.056	77.555	8.051	7816.0	77.555	0.001
20	16.75	33.50	57.739	91.238	9.908	10147.0	91.236	0.002
25	16.75	33.50	68.648	102.147	11.295	11991.4	102.146	0.001
30	16.75	24.19	77.420	101.614	12.364	13467.5	101.615	-0.001
35	7.44	7.44	76.989	84.434	12.312	13395.2	36.484	47.950
40	0.00	0.00	73.856	73.856	5.389	11856.7	0.000	73.856
45	0.00	0.00	74.056	74.056	0.000	11078.4	0.000	74.056
50	0.00	0.00	74.256	74.256	0.000	11108.4	0.000	74.256
55	0.00	0.00	74.456	74.456	0.000	11138.4	0.000	74.456
60	0.00	0.00	74.656	74.656	0.000	11168.4	0.000	74.656

Actual Maximum Storage needed is 13467.5 cubic feet
Maximum Storage required is achieved at an elev. = 349.89
Maximum Allowable (undeveloped) Discharge is 14.9 cfs
Maximum Discharge for the above storm is 12.36 cfs



10 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 10 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

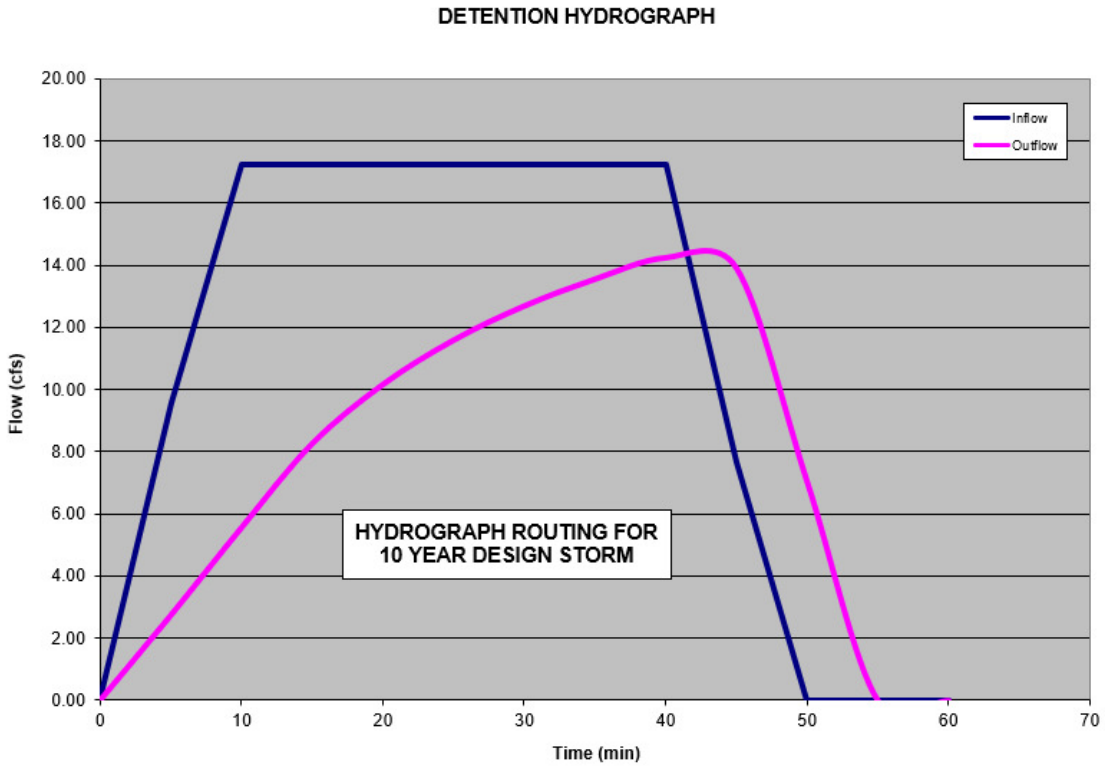
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	17.24	0	17.240	0	0	17.239	0.001
5	9.58	26.82	11.778	38.596	2.731	2176.3	38.597	-0.001
10	17.24	34.48	27.496	61.977	5.550	4956.9	61.976	0.001
15	17.24	34.48	45.475	79.956	8.251	8058.9	79.956	0.000
20	17.24	34.48	59.644	94.124	10.156	10469.9	94.123	0.001
25	17.24	34.48	70.962	105.442	11.581	12381.4	105.442	0.000
30	17.24	34.48	80.081	114.561	12.681	13914.2	114.560	0.001
35	17.24	34.48	87.472	121.953	13.544	15152.5	121.953	0.000
40	17.24	24.90	93.489	118.391	14.232	16158.1	118.390	0.001
45	7.66	7.66	90.587	98.249	13.902	15673.3	50.238	48.011
50	0.00	0.00	84.384	84.384	7.032	13682.5	0.000	84.384
55	0.00	0.00	84.584	84.584	0.000	12657.6	0.000	84.584
60	0.00	0.00	84.784	84.784	0.000	12687.6	0.000	84.784

Actual Maximum Storage needed is 16158.1 cubic feet

Maximum Storage required is achieved at an elev. = 350.25

Maximum Allowable (undeveloped) Discharge is 17.36 cfs

Maximum Discharge for the above storm is 14.23 cfs



25 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

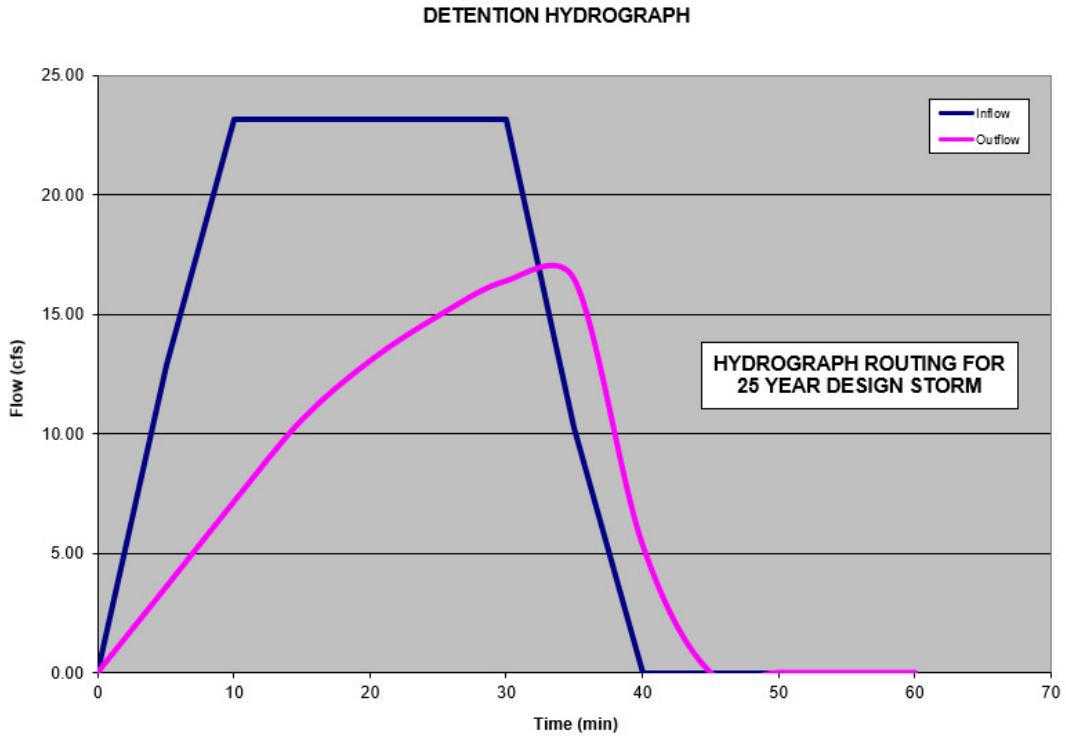
HYDROGRAPH ROUTING FOR 25 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	23.16	0	23.158	0	0	23.159	-0.001
5	12.87	36.02	16.041	52.065	3.559	2939.9	52.066	-0.001
10	23.16	46.32	37.780	84.097	7.142	6738.4	84.098	-0.001
15	23.16	46.32	62.939	109.256	10.579	11027.7	109.256	0.000
20	23.16	46.32	83.168	129.485	13.044	14431.8	129.484	0.001
25	23.16	46.32	99.641	145.958	14.922	17184.4	145.957	0.001
30	23.16	33.45	113.166	146.617	16.396	19434.3	146.616	0.001
35	10.29	10.29	113.708	124.001	16.454	19524.4	36.239	87.762
40	0.00	0.00	113.484	113.484	5.359	17796.3	0.000	113.484
45	0.00	0.00	113.684	113.684	0.000	17022.6	0.000	113.684
50	0.00	0.00	113.884	113.884	0.000	17052.6	0.000	113.884
55	0.00	0.00	114.084	114.084	0.000	17082.6	0.000	114.084
60	0.00	0.00	114.284	114.284	0.000	17112.6	0.000	114.284

Actual Maximum Storage needed is 19524.4 cubic feet
Maximum Storage required is achieved at an elev. = 350.65
Maximum Allowable (undeveloped) Discharge is 19.53 cfs
Maximum Discharge for the above storm is 16.45 cfs



50 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 50 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

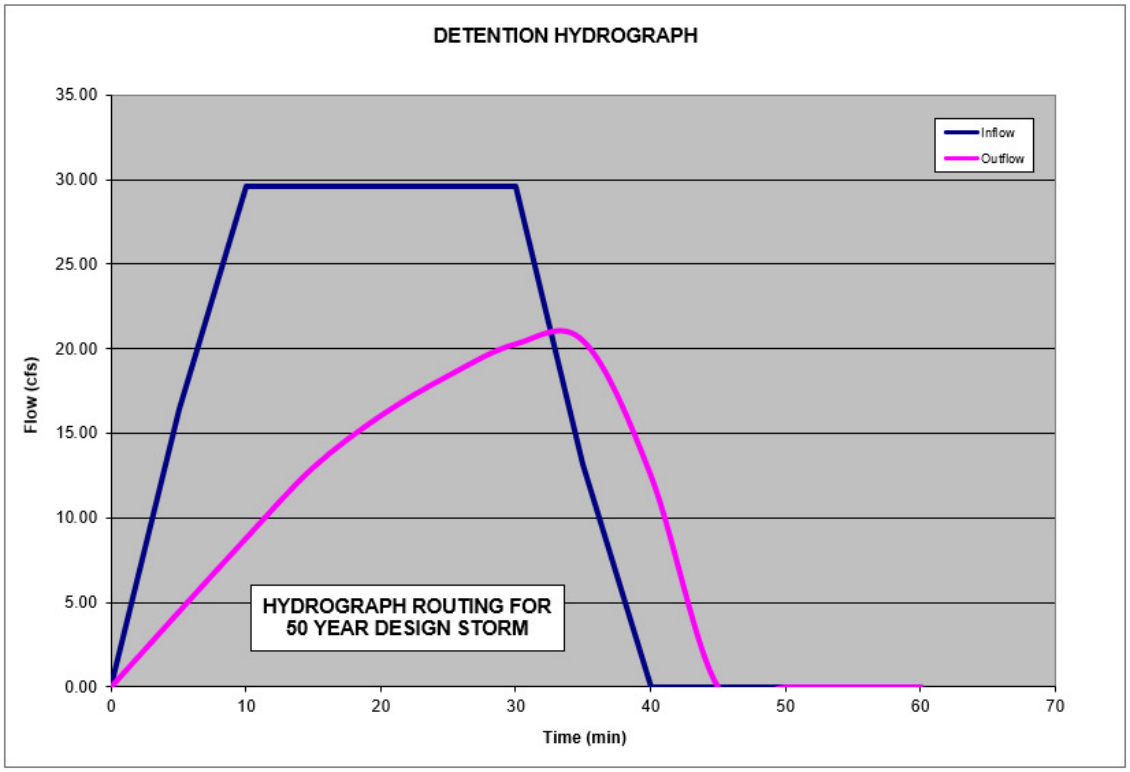
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	29.62	0	29.616	0	0	29.615	0.001
5	16.45	46.07	20.781	66.850	4.417	3779.8	66.850	0.000
10	29.62	59.23	49.291	108.522	8.779	8710.6	108.523	-0.001
15	29.62	59.23	82.573	141.804	12.974	14332.1	141.804	0.000
20	29.62	59.23	109.747	168.978	16.029	18866.3	168.978	0.000
25	29.62	59.23	132.202	191.433	18.388	22588.5	191.434	0.000
30	29.62	42.78	150.904	193.682	20.265	25675.3	193.683	-0.001
35	13.16	13.16	152.783	165.945	20.449	25984.8	102.860	63.085
40	0.00	0.00	141.080	141.080	12.532	23011.9	0.000	141.080
45	0.00	0.00	141.280	141.280	0.000	21162.0	0.000	141.280
50	0.00	0.00	141.480	141.480	0.000	21192.0	0.000	141.480
55	0.00	0.00	141.680	141.680	0.000	21222.0	0.000	141.680
60	0.00	0.00	141.880	141.880	0.000	21252.0	0.000	141.880

Actual Maximum Storage needed is 25984.8 cubic feet

Maximum Storage required is achieved at an elev. = 351.37

Maximum Allowable (undeveloped) Discharge is 25.68 cfs

Maximum Discharge for the above storm is 20.45 cfs



100 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 100 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

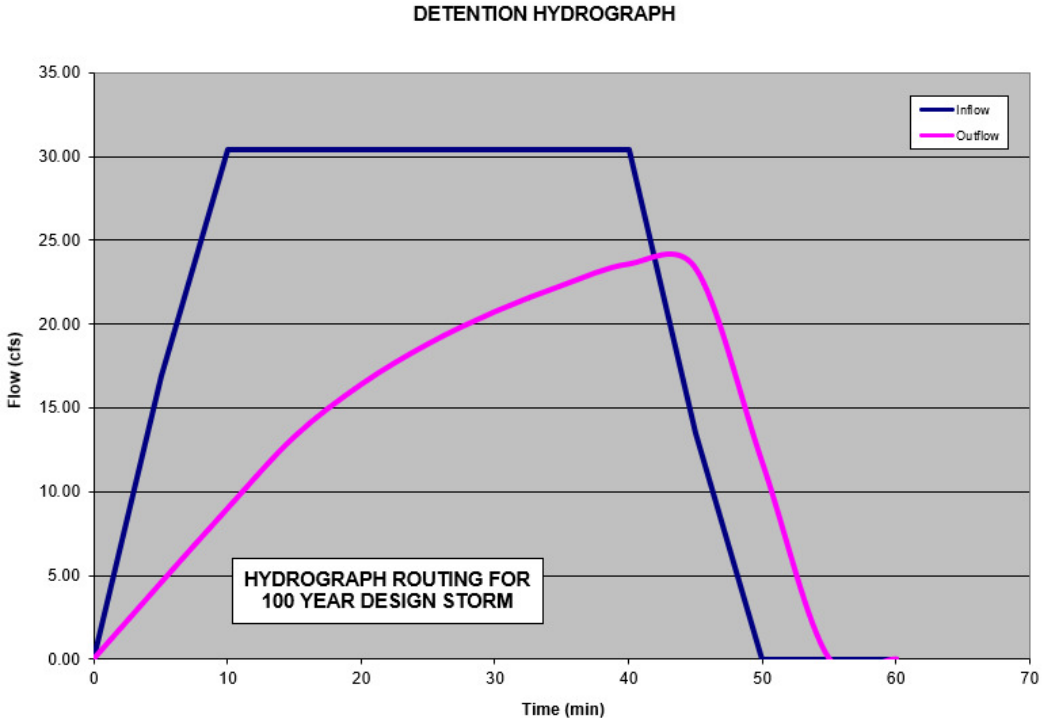
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	30.44	0	30.441	0	0	30.440	0.001
5	16.91	47.35	21.393	68.745	4.524	3887.5	68.746	-0.001
10	30.44	60.88	50.780	111.662	8.983	8964.4	111.661	0.001
15	30.44	60.88	85.119	146.000	13.272	14758.5	146.001	-0.001
20	30.44	60.88	113.200	174.082	16.400	19440.0	174.083	-0.001
25	30.44	60.88	136.442	197.324	18.820	23289.3	197.323	0.001
30	30.44	60.88	155.829	216.711	20.747	26486.5	216.710	0.001
35	30.44	60.88	172.091	232.972	22.310	29160.1	232.973	-0.001
40	30.44	43.97	185.788	229.759	23.592	31407.1	229.758	0.001
45	13.53	13.53	183.077	196.607	23.341	30962.7	94.375	102.232
50	0.00	0.00	173.395	173.395	11.706	27735.1	0.000	173.395
55	0.00	0.00	173.595	173.595	0.000	26009.2	0.000	173.595
60	0.00	0.00	173.795	173.795	0.000	26039.2	0.000	173.795

Actual Maximum Storage needed is 31407.1 cubic feet

Maximum Storage required is achieved at an elev. = 352.03

Maximum Allowable (undeveloped) Discharge is 29.36 cfs

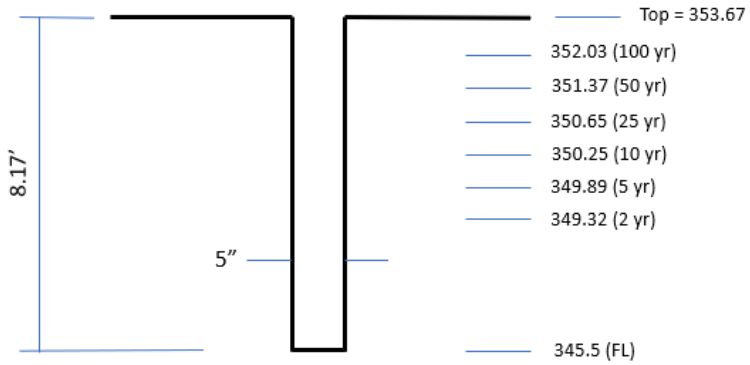
Maximum Discharge for the above storm is 23.59 cfs



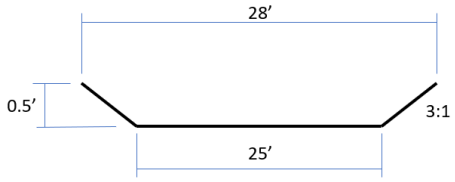
Summary – Detention

Storm Event	Volume Needed (cf)	WSE	Max Discharge Allowed (cfs)	Max Discharge Model (cfs)
2	10181.1	349.32	11.99	9.93
5	13467.5	349.89	14.90	12.36
10	16158.1	350.25	17.36	14.23
25	19524.4	350.65	19.53	16.45
50	25984.8	351.37	25.68	20.45
100	31407.1	352.03	29.36	23.59

Discharge Structure Detail



Overflow Structure Detail

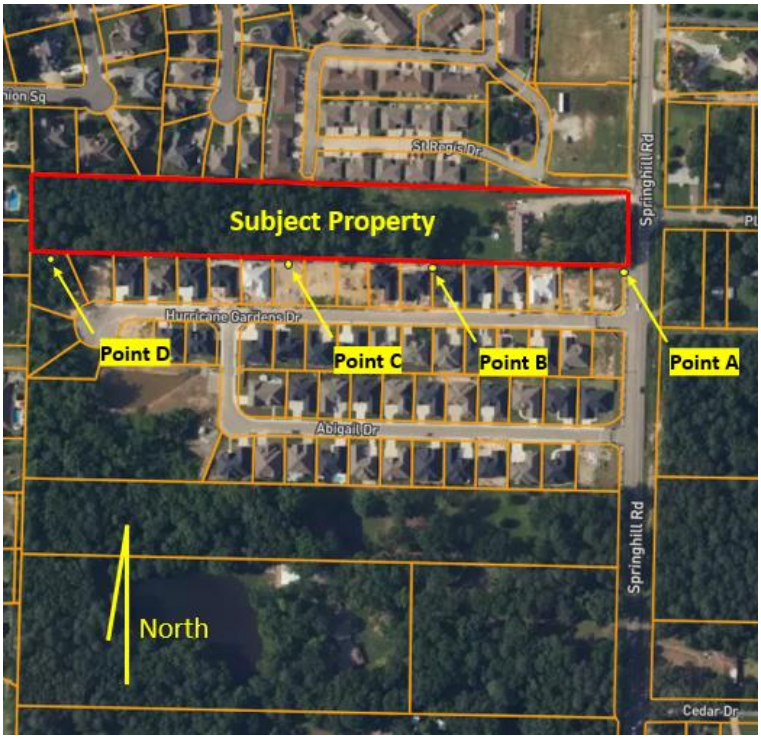


Q = (1.49/n)(A)(R^2/3)(S^0.5)

Q = (1.49/0.025)(13.25)(0.60)(0.1) = 47.38 cfs

Required Capacity = 23.59 cfs (2) = 47.18 cfs

Study Point Summary (25 yr Storm)



Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	12.88	16.81	16.81	3.93
B	10.53	0	0	-10.53
C	11.01	0	0	-11.01
D	17.74	38.08	16.45	-1.29
TOTAL	52.16	54.89	33.26	-18.9

* *Existing culvert originating at the Junction Box near the NE corner of Hurricane Gardens has adequate capacity to accept this slight increase in flow.*

Downstream Considerations

The discharge from the proposed Detention Facility will enter into an existing ditch that drains to the West, into Hurricane Lake, Phase 3. The ditch exists between Lots 47 and 48 of said development (based on Saline County GIS map). A 54" CMP (Helical) culvert exists under Worth Ave, at a grade of 0.7% (as shot in the field). Using an n of 0.012, the capacity of this culvert is computed at 183.65 cfs at d/D of 0.85 (velocity = 12.75 fps). It should be noted that the estimated post construction discharge is 1.29 cfs less than the estimated existing runoff from the same area. Therefore, this development should not have a negative impact on the downstream properties.



Source: Saline County GIS

Engineering Certification

I, Tim Lemons, Arkansas Registered Professional Engineer No. 7373, hereby certify that the drainage reports, and calculations contained in this report, have been prepared in accordance with sound engineering practice and principles, and based on best known available data. Improvements as outlined in this report and depicted on the preliminary plat and design drawings should not increase the risk of endangerment to life or have negative impacts on adjacent or downstream property or watersheds.



Timothy B. Lemons, PE
Arkansas Professional Engineer, #7373

Appendix

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 0.5%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.00500	0.0707	0.00
1	0.030	0.03	0.02	0.01	0.06	0.00500	0.0707	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.00500	0.0707	0.02
2	0.030	0.06	0.06	0.03	0.10	0.00500	0.0707	0.05
2.5	0.030	0.08	0.09	0.04	0.11	0.00500	0.0707	0.09
3	0.030	0.09	0.14	0.04	0.13	0.00500	0.0707	0.15
3.5	0.030	0.11	0.18	0.05	0.14	0.00500	0.0707	0.22
4	0.030	0.12	0.24	0.06	0.15	0.00500	0.0707	0.32
4.5	0.030	0.14	0.30	0.07	0.16	0.00500	0.0707	0.44
5	0.030	0.15	0.38	0.07	0.18	0.00500	0.0707	0.58
5.5	0.030	0.17	0.45	0.08	0.19	0.00500	0.0707	0.75
6	0.030	0.18	0.54	0.09	0.20	0.00500	0.0707	0.94
6.5	0.030	0.20	0.63	0.10	0.21	0.00500	0.0707	1.17
7	0.030	0.21	0.74	0.10	0.22	0.00500	0.0707	1.43
7.5	0.030	0.23	0.84	0.11	0.23	0.00500	0.0707	1.71
8.5	0.030	0.26	1.08	0.13	0.25	0.00500	0.0707	2.39
9	0.030	0.27	1.22	0.13	0.26	0.00500	0.0707	2.79
9.5	0.030	0.29	1.35	0.14	0.27	0.00500	0.0707	3.22
10	0.030	0.30	1.50	0.15	0.28	0.00500	0.0707	3.69
10.5	0.030	0.32	1.65	0.16	0.29	0.00500	0.0707	4.21
11	0.030	0.33	1.82	0.16	0.30	0.00500	0.0707	4.76
11.5	0.030	0.35	1.98	0.17	0.31	0.00500	0.0707	5.36
12	0.030	0.36	2.16	0.18	0.32	0.00500	0.0707	6.01
12.5	0.030	0.38	2.34	0.19	0.33	0.00500	0.0707	6.70
13	0.030	0.39	2.54	0.19	0.33	0.00500	0.0707	7.44

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 1.50%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.01500	0.1225	0.00
1	0.030	0.03	0.02	0.01	0.06	0.01500	0.1225	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.01500	0.1225	0.04
2	0.030	0.06	0.06	0.03	0.10	0.01500	0.1225	0.09
2.5	0.030	0.08	0.09	0.04	0.11	0.01500	0.1225	0.16
3	0.030	0.09	0.14	0.04	0.13	0.01500	0.1225	0.26
3.5	0.030	0.11	0.18	0.05	0.14	0.01500	0.1225	0.39
4	0.030	0.12	0.24	0.06	0.15	0.01500	0.1225	0.55
4.5	0.030	0.14	0.30	0.07	0.16	0.01500	0.1225	0.76
5	0.030	0.15	0.38	0.07	0.18	0.01500	0.1225	1.01
5.5	0.030	0.17	0.45	0.08	0.19	0.01500	0.1225	1.30
6	0.030	0.18	0.54	0.09	0.20	0.01500	0.1225	1.64
6.5	0.030	0.20	0.63	0.10	0.21	0.01500	0.1225	2.03
7	0.030	0.21	0.74	0.10	0.22	0.01500	0.1225	2.47
7.5	0.030	0.23	0.84	0.11	0.23	0.01500	0.1225	2.97
8.5	0.030	0.26	1.08	0.13	0.25	0.01500	0.1225	4.15
9	0.030	0.27	1.22	0.13	0.26	0.01500	0.1225	4.83
9.5	0.030	0.29	1.35	0.14	0.27	0.01500	0.1225	5.58
10	0.030	0.30	1.50	0.15	0.28	0.01500	0.1225	6.40
10.5	0.030	0.32	1.65	0.16	0.29	0.01500	0.1225	7.29
11	0.030	0.33	1.82	0.16	0.30	0.01500	0.1225	8.25
11.5	0.030	0.35	1.98	0.17	0.31	0.01500	0.1225	9.29
12	0.030	0.36	2.16	0.18	0.32	0.01500	0.1225	10.41
12.5	0.030	0.38	2.34	0.19	0.33	0.01500	0.1225	11.61
13	0.030	0.39	2.54	0.19	0.33	0.01500	0.1225	12.89

GUTTER CAPACITY OF STREETS - 27' BC to BC

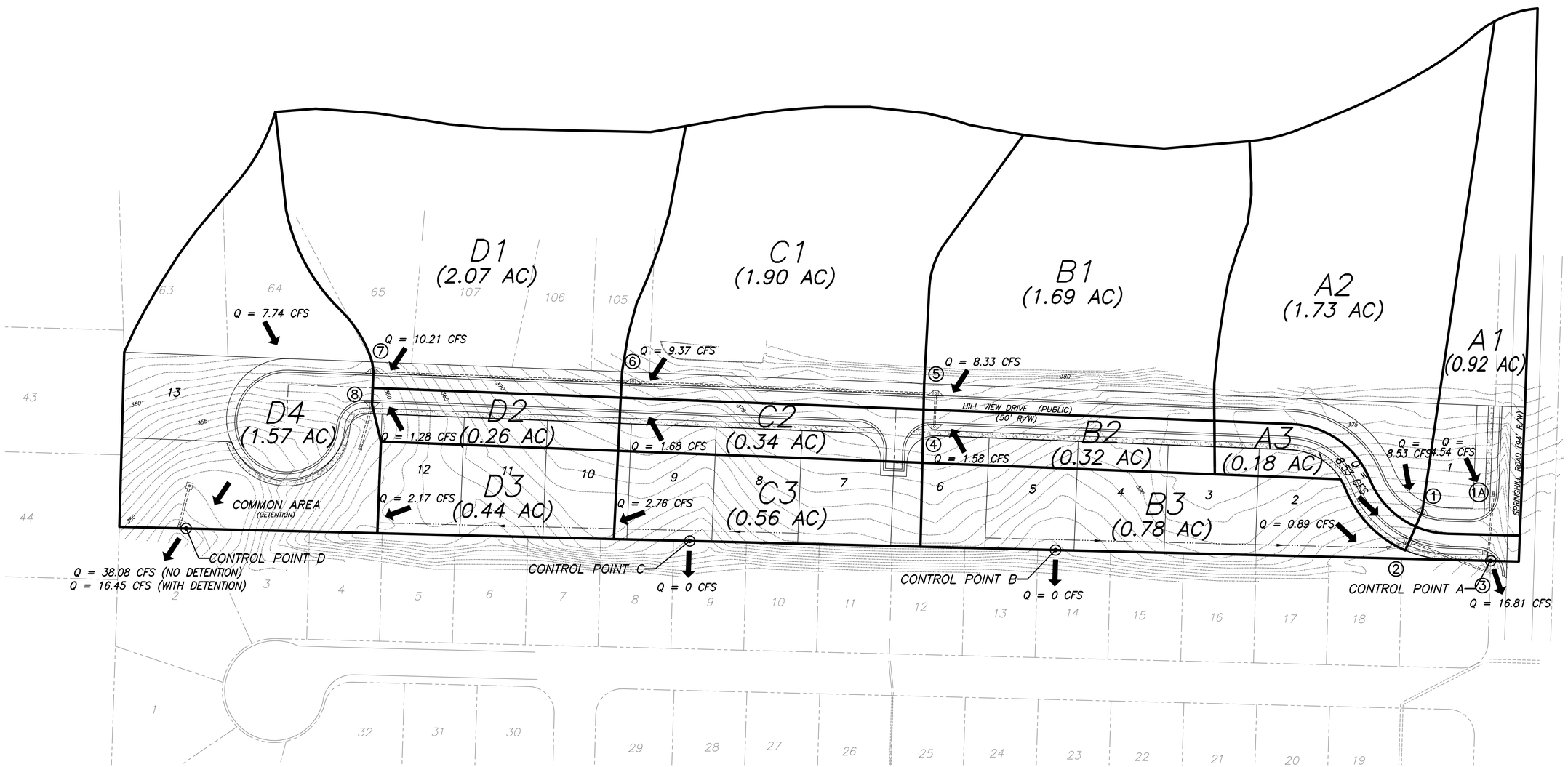
Slope = 2.67%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.02670	0.1634	0.00
1	0.030	0.03	0.02	0.01	0.06	0.02670	0.1634	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.02670	0.1634	0.05
2	0.030	0.06	0.06	0.03	0.10	0.02670	0.1634	0.12
2.5	0.030	0.08	0.09	0.04	0.11	0.02670	0.1634	0.21
3	0.030	0.09	0.14	0.04	0.13	0.02670	0.1634	0.34
3.5	0.030	0.11	0.18	0.05	0.14	0.02670	0.1634	0.52
4	0.030	0.12	0.24	0.06	0.15	0.02670	0.1634	0.74
4.5	0.030	0.14	0.30	0.07	0.16	0.02670	0.1634	1.01
5	0.030	0.15	0.38	0.07	0.18	0.02670	0.1634	1.34
5.5	0.030	0.17	0.45	0.08	0.19	0.02670	0.1634	1.73
6	0.030	0.18	0.54	0.09	0.20	0.02670	0.1634	2.18
6.5	0.030	0.20	0.63	0.10	0.21	0.02670	0.1634	2.70
7	0.030	0.21	0.74	0.10	0.22	0.02670	0.1634	3.29
7.5	0.030	0.23	0.84	0.11	0.23	0.02670	0.1634	3.96
8.5	0.030	0.26	1.08	0.13	0.25	0.02670	0.1634	5.53
9	0.030	0.27	1.22	0.13	0.26	0.02670	0.1634	6.44
9.5	0.030	0.29	1.35	0.14	0.27	0.02670	0.1634	7.44
10	0.030	0.30	1.50	0.15	0.28	0.02670	0.1634	8.53
10.5	0.030	0.32	1.65	0.16	0.29	0.02670	0.1634	9.72
11	0.030	0.33	1.82	0.16	0.30	0.02670	0.1634	11.01
11.5	0.030	0.35	1.98	0.17	0.31	0.02670	0.1634	12.40
12	0.030	0.36	2.16	0.18	0.32	0.02670	0.1634	13.89
12.5	0.030	0.38	2.34	0.19	0.33	0.02670	0.1634	15.49
13	0.030	0.39	2.54	0.19	0.33	0.02670	0.1634	17.20

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 4.88%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.04880	0.2209	0.00
1	0.030	0.03	0.02	0.01	0.06	0.04880	0.2209	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.04880	0.2209	0.07
2	0.030	0.06	0.06	0.03	0.10	0.04880	0.2209	0.16
2.5	0.030	0.08	0.09	0.04	0.11	0.04880	0.2209	0.28
3	0.030	0.09	0.14	0.04	0.13	0.04880	0.2209	0.46
3.5	0.030	0.11	0.18	0.05	0.14	0.04880	0.2209	0.70
4	0.030	0.12	0.24	0.06	0.15	0.04880	0.2209	1.00
4.5	0.030	0.14	0.30	0.07	0.16	0.04880	0.2209	1.37
5	0.030	0.15	0.38	0.07	0.18	0.04880	0.2209	1.81
5.5	0.030	0.17	0.45	0.08	0.19	0.04880	0.2209	2.34
6	0.030	0.18	0.54	0.09	0.20	0.04880	0.2209	2.95
6.5	0.030	0.20	0.63	0.10	0.21	0.04880	0.2209	3.65
7	0.030	0.21	0.74	0.10	0.22	0.04880	0.2209	4.45
7.5	0.030	0.23	0.84	0.11	0.23	0.04880	0.2209	5.35
8.5	0.030	0.26	1.08	0.13	0.25	0.04880	0.2209	7.48
9	0.030	0.27	1.22	0.13	0.26	0.04880	0.2209	8.71
9.5	0.030	0.29	1.35	0.14	0.27	0.04880	0.2209	10.06
10	0.030	0.30	1.50	0.15	0.28	0.04880	0.2209	11.54
10.5	0.030	0.32	1.65	0.16	0.29	0.04880	0.2209	13.14
11	0.030	0.33	1.82	0.16	0.30	0.04880	0.2209	14.88
11.5	0.030	0.35	1.98	0.17	0.31	0.04880	0.2209	16.76
12	0.030	0.36	2.16	0.18	0.32	0.04880	0.2209	18.77
12.5	0.030	0.38	2.34	0.19	0.33	0.04880	0.2209	20.94
13	0.030	0.39	2.54	0.19	0.33	0.04880	0.2209	23.25



⑥ – DRAINAGE STRUCTURE #

ALL FLOWRATES – 25 YR STORM EVENT

0' 50' 100' 150'
SCALE: 1" = 50'

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 843-5081 Fax (501) 941-0959
ENGINEERING + SURVEYING
WATER ◦ SEWER ◦ TRANSPORTATION ◦ SUBDIVISIONS

DRAINAGE MAP – POST CONSTRUCTION
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By

Project No.: 24-018
Date: OCTOBER 24, 2024
File: Drainage Post Con
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 1 of 1

Drainage Report

For

Hillcrest Addition

Springhill Road
Bryant, Arkansas

Revised: October 24, 2024

Prepared By:

Lemons Engineering Consultants, Inc.
204 West Cherry Street
Cabot, Arkansas 72023
(501) 605-7565
arstrep43@gmail.com

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Project Information

Project Title:	Hillcrest Addition
Project Description:	13 lot single family development located on the West side of Springhill Road, North of and adjacent to Hurricane Gardens, Bryant, Arkansas (address: 3927 Springhill Road)
Owner/Developer:	Springhill – Hwy 5 Development, LLC 816 East Oak Street Conway, Arkansas 72032
Engineer of Record:	Lemons Engineering Consultants, Inc. Tim Lemons, PE 204 Cherry Street Cabot, Arkansas 72023 (501) 605-7565

General Information

This proposed development shall include 13 single family lots. This property is essentially the Northern Most tract of land within the city limits of Bryant as it presently exist. The property to the North of the subject site is developed with duplex style residential structures existing outside the City limits of Bryant. The property to the South is an established subdivision (Hurricane Gardens). The property drains North to South. There have been several reports of drainage issues by the residents of Hurricane Gardens. At present, the drainage from the subject property, and that to the north of the subject property, flows onto Hurricane Gardens. No detention exists on the property located north of the subject property.

The objectives of this report are as follows:

1) Determine the estimated increase in runoff due to the development of Hillcrest Addition.
2) Provide design computations for a detention facility to bring the runoff from said tract to pre-construction rate.
3) Based on comments expressed by the residents, divert as much flow as possible away from the rear of the Northern most lots within Hurricane Gardens. As previously stated, the majority of the property to the North of Hurricane Gardens flows into the rear of the Northern most lots, creating an issue for the property owners.
4) Size the infrastructure in the development using the City's Drainage Code.
5) Compare the estimated Pre and Post flowrates at specific control points to show that the overall runoff from Hillcrest is at or less than the pre-construction flowrate.

The control points (A-D) to be used in this analysis are shown on the following vicinity map, and throughout this report.

Project Vicinity Map



Source: ARCOUNTYDATA.com

Hydrological Computations

For this analysis, we will use the Rational Method in determining culvert sizes, culvert capacity computations, and other related issues on site. The total watershed size for this development is estimated at 12.40 acres. Attention is called to the Watershed Map included in this report. As per the Rational Method, the following equation is used:

Q = C x I x A, where:
- Q = Flowrate (cfs)
- C = Runoff Coefficient
- I = Intensity (from tables)
- A = area (acres)

The selection of the appropriate intensity is based on the estimated time of concentration (tc).

Determination of Runoff Coefficients "C"

In determining the Pre Construction C, we must consider the property to the North that is developed, and discharging onto the subject property. The C factor for Pre and Post Conditions are based on Table 400-1 "Runoff Coefficients for Surface Types" as provided in the Bryant Drainage Manual. A factored (weighted) value of C is determined in the following tables:

Pre Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	0.19	0.29	4.59	0.41
5	0.8	3.04	0.32	4.73	0.8	0.19	0.32	4.59	0.44
10	0.83	3.04	0.35	4.73	0.83	0.19	0.35	4.59	0.47
25	0.88	3.04	0.39	4.73	0.88	0.19	0.39	4.59	0.52
50	0.92	3.04	0.42	4.73	0.92	0.19	0.42	4.59	0.55
100	0.97	3.04	0.46	4.73	0.97	0.19	0.46	4.59	0.59

C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

Post Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	1.81	0.29	3.07	0.47
5	0.8	3.04	0.32	4.73	0.8	1.81	0.32	3.07	0.50
10	0.83	3.04	0.35	4.73	0.83	1.81	0.35	3.07	0.53
25	0.88	3.04	0.39	4.73	0.88	1.81	0.39	3.07	0.58
50	0.92	3.04	0.42	4.73	0.92	1.81	0.42	3.07	0.61
100	0.97	3.04	0.46	4.73	0.97	1.81	0.46	3.07	0.66

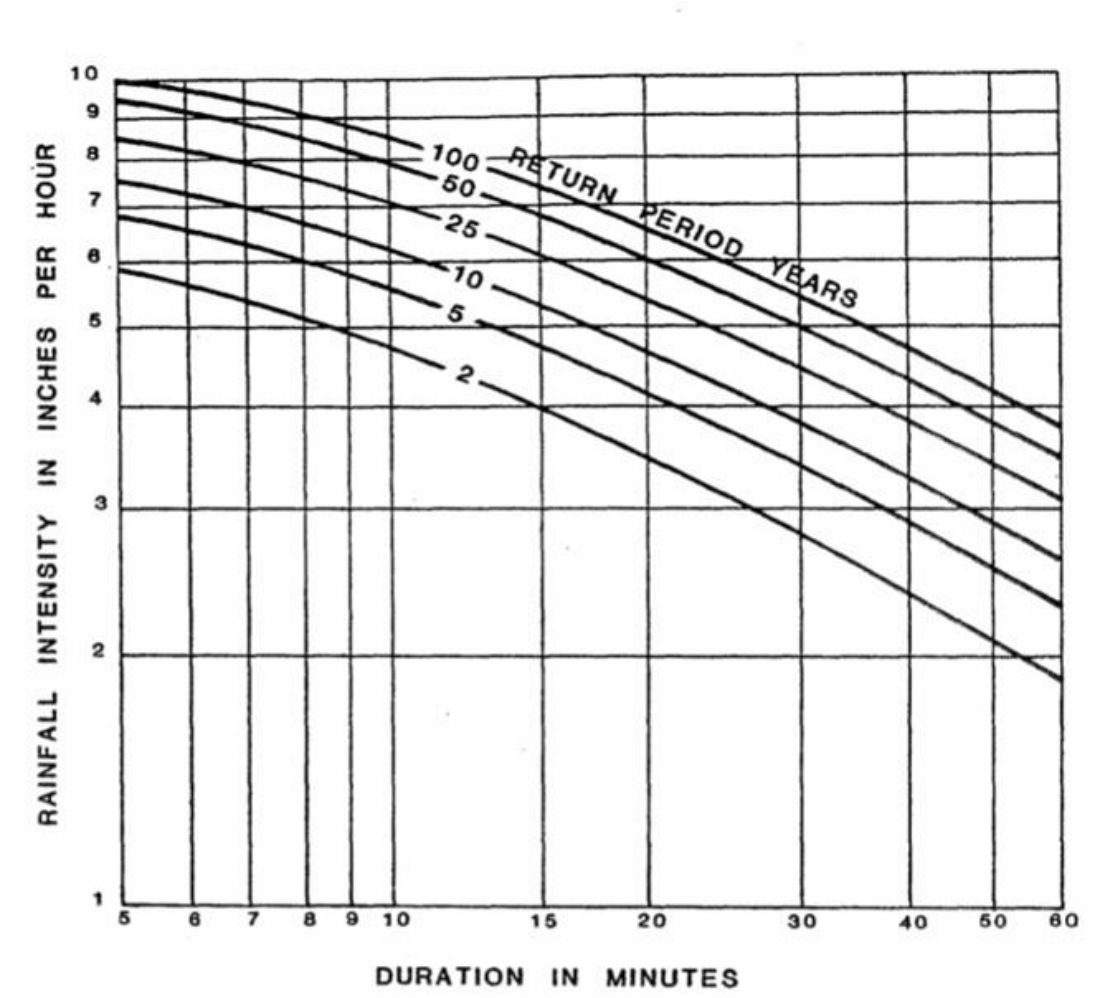
C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

The above variable values will be used in designing the Detention Facility. For culvert design, we will use the Post C values for the 25 year storm.

Determination of Intensity Values “I”

For this analysis, we will use the Intensity – Duration - Frequency Chart from the Little Rock Drainage Manual. Whereas the calculated value of I shall be used for Detention, we will use a tc (time of concentration) of 5 min for the culverts to also provide a conservative value.



INTENSITY - DURATION - FREQUENCY

LITTLE ROCK

SOURCE : HYDRO 35 & T.P. No. 40

Drainage Map (Pre-Construction)



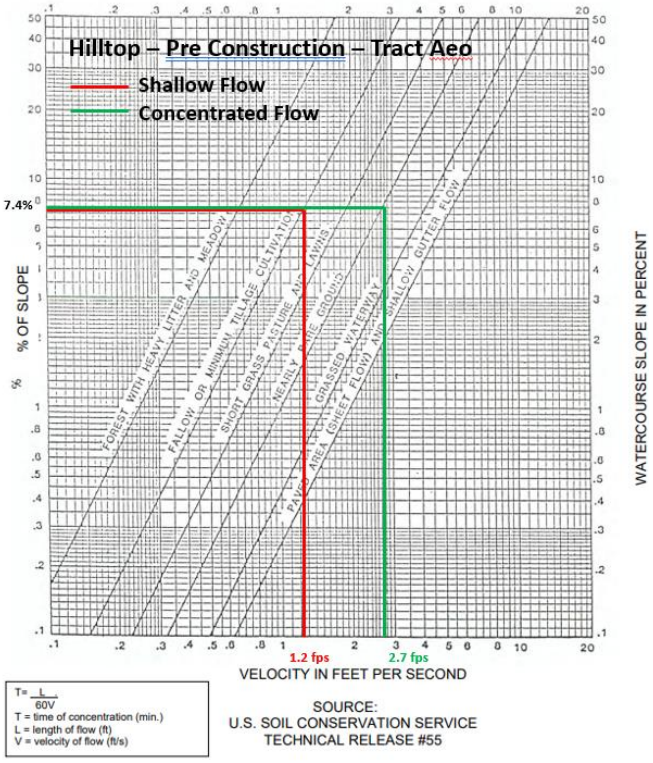
See attached map for additional information

Pre Construction Flowrates – Control Points

The estimated Pre Construction Flowrate for each Control Point is estimated as follows. These values will be used to compare to the Post Construction Flowrate later in this report:

Control Point A

The time of concentration is determined as follows:



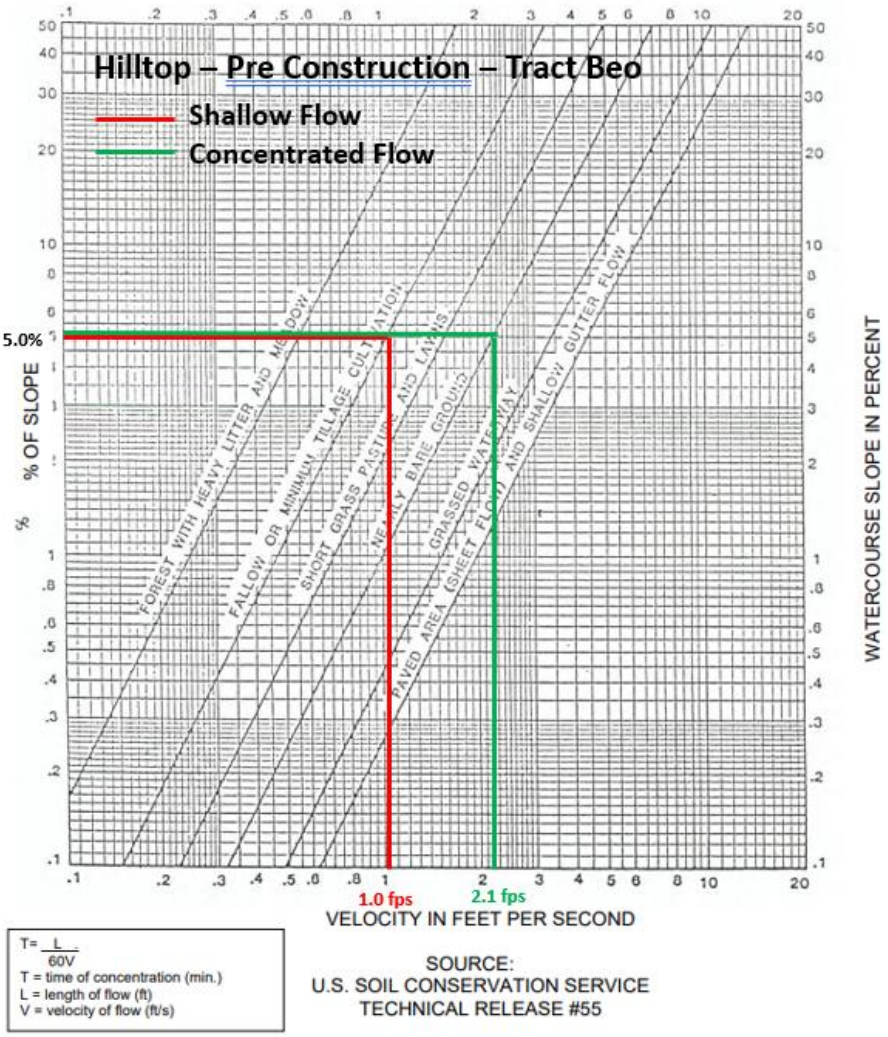
$$tc = ((300)/(60)(1.2)) + ((300)/(60)(2.7)) = 6 \text{ min}$$

Flowrates for various Storm Events (Control Point A):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6	5.6	3.02	6.93
5	0.44	6	6.6	3.02	8.77
10	0.47	6	7.3	3.02	10.36
25	**0.52**	**6**	**8.2**	**3.02**	**12.88**
50	0.55	6	9.2	3.02	15.28
100	0.59	6	9.8	3.02	17.46

Control Point B

The time of concentration is determined as follows:



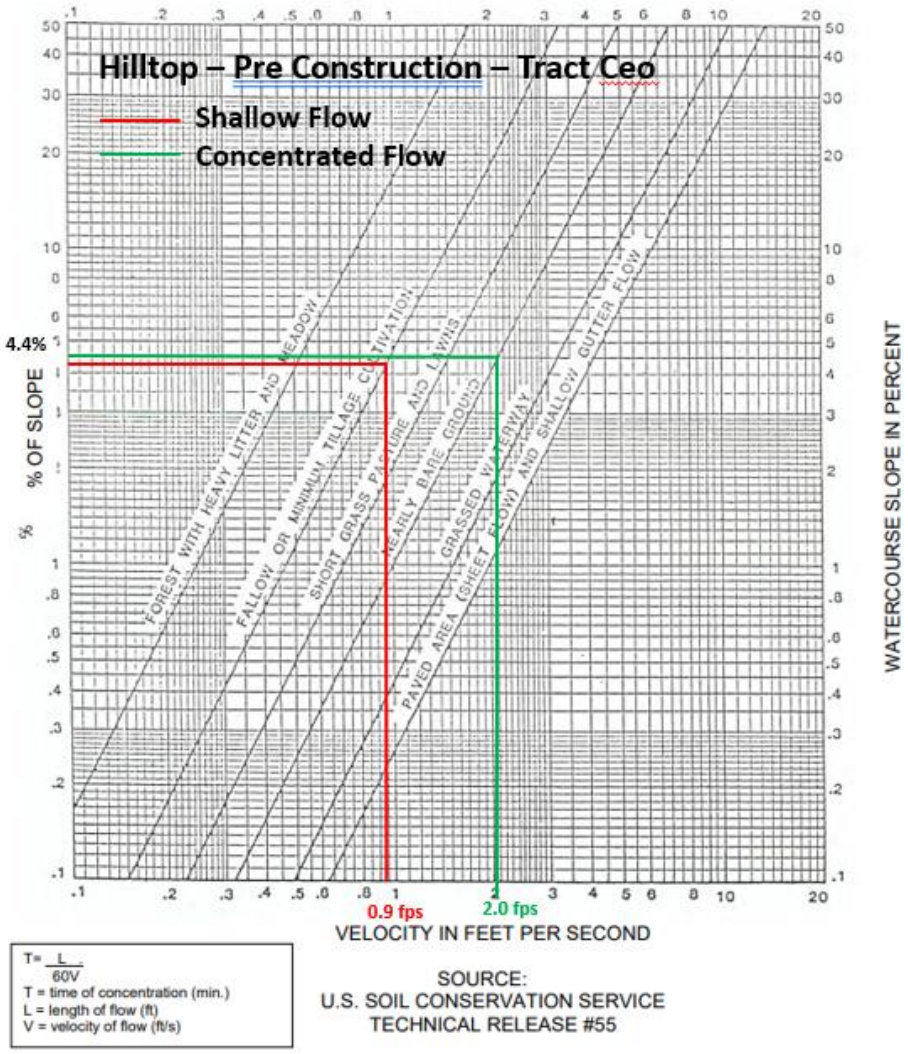
tc = ((300)/(60)(1.0)) + ((200)/(60)(2.1)) = 6.5 min

Flowrates for various Storm Events (Control Point B):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	2.47	5.67
5	0.44	6.5	6.6	2.47	7.17
10	0.47	6.5	7.3	2.47	8.47
25	**0.52**	**6.5**	**8.2**	**2.47**	**10.53**
50	0.55	6.5	9.2	2.47	12.50
100	0.59	6.5	9.8	2.47	14.28

Control Point C

The time of concentration is determined as follows:



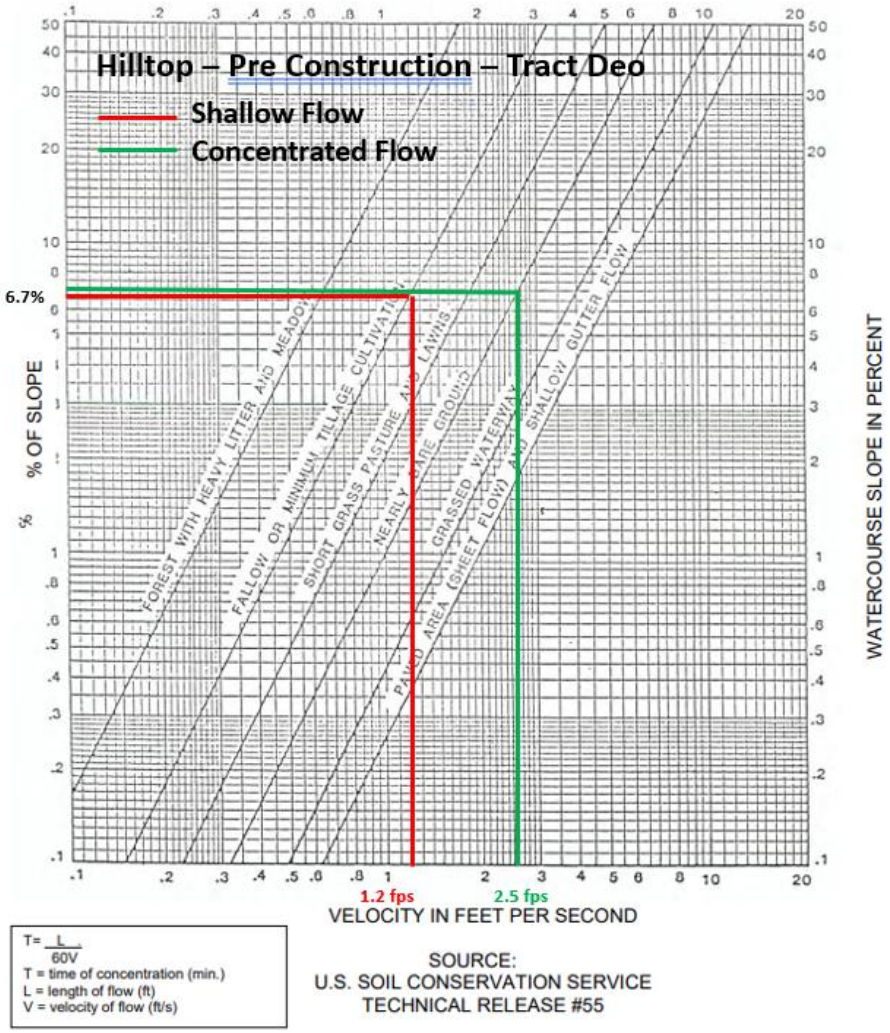
$$tc = ((300)/(60)(0.9)) + ((300)/(60)(2.0)) = 8 \text{ min}$$

Flowrates for various Storm Events (Control Point C):

Storm Event	C	tc (min)	I (in/hour)	A (acres)	Q (cfs)
2	0.41	8	5.1	2.75	5.75
5	0.44	8	6	2.75	7.26
10	0.47	8	6.7	2.75	8.66
25	**0.52**	**8**	**7.7**	2.75	**11.01**
50	0.55	8	8.5	2.75	12.86
100	0.59	8	9.1	2.75	14.76

Control Point D

The time of concentration is determined as follows:



tc = ((300)/(60)(1.2)) + ((340)/(60)(2.5)) = 6.4 min

Flowrates for various Storm Events (Control Point D):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	4.16	9.55
5	0.44	6.5	6.6	4.16	12.08
10	0.47	6.5	7.3	4.16	14.27
25	**0.52**	**6.5**	**8.2**	4.16	**17.74**
50	0.55	6.5	9.2	4.16	21.05
100	0.59	6.5	9.8	4.16	24.05

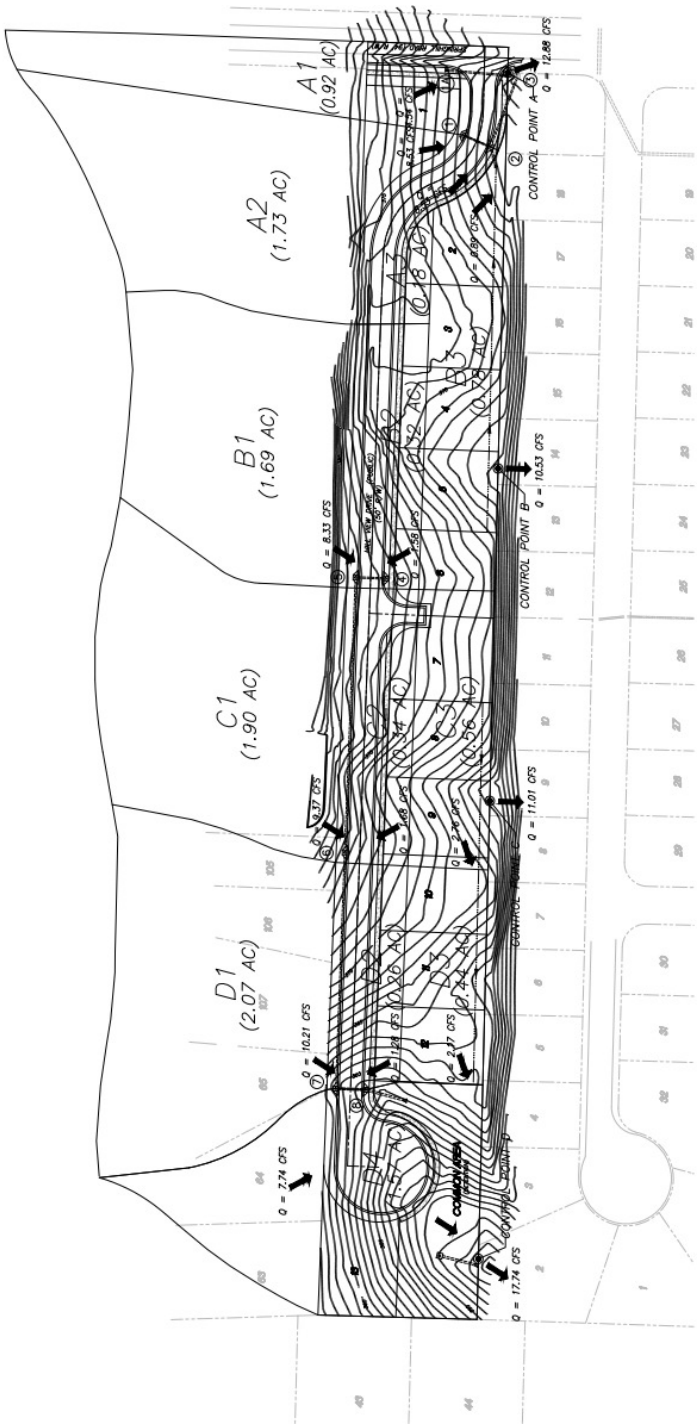
Determination of Flowrates for Culverts & Spreadflow

Attention is called to the following chart which provides C, Intensity, Area, and Flowrate (Q) of each Tract. Again, the Rational Method is being used for all basins. Attention is called to the Maps on the next two pages for a detailed drawings showing the various watershed tracts. The 25 year storm event will be used for culvert design. A conservative tc of 5 minutes is used for the culvert design.

Tract	C(Post)	I25 (in/hr)	A (ac)	Q25 (cfs)
A1	0.58	8.5	0.92	4.54
A2	0.58	8.5	1.73	8.53
A3	0.58	8.5	0.18	0.89
B1	0.58	8.5	1.69	8.33
B2	0.58	8.5	0.32	1.58
B3	0.58	8.5	0.78	3.85
C1	0.58	8.5	1.90	9.37
C2	0.58	8.5	0.34	1.68
C3	0.58	8.5	0.56	2.76
D1	0.58	8.5	2.07	10.21
D2	0.58	8.5	0.26	1.28
D3	0.58	8.5	0.44	2.17
D4	0.58	8.5	1.57	7.74

Drainage Map (Post Construction)

Revised 10/21/2024



See attached Map for additional information

Culvert Sizing

All culverts are sized to meet a 25 year storm, and the Rational Method is used. We will use a Manning's Coefficient of 0.012 shall be for all culverts (concrete and HDPE). The d/D ratio and velocity was computed using HawsEDC On-Line Calculator (hawsedc.com).

FES 1a
Q = Qa1 = 4.54 cfs
Use 18" @ 3.5%
Q capacity = 21.94 cfs
V actual = 9.68 fps (d/D = 0.32)

Inlet 1
Q = Qa2 = 8.53 cfs
Use 18" @ 1.1%
Q capacity = 12.30 cfs
V actual = 7.36 fps (d/D = 0.63)

Inlet 2
Q = Inlet 1 + Qa3 = 8.53 + 0.89 = 9.42 cfs
Use 24" @ 0.3%
Q capacity = 13.84 cfs
V actual = 4.63 fps (d/D = 0.62)

Junction Box 3 (verify capacity)
Q = Inlet 2 + Qb3 + Exist 18" in Hurricane Gardens
(Culvert in Hurricane Gardens is an 18" ADS at 0.46%, Capacity = 7.95 cfs at d/D=0.85)
Q = 9.42 + 3.85 + 7.95 = 21.22 cfs
Existing 24" Discharging from Junc Box is 24" ADS @ 5.20%
Q capacity = 57.58 cfs ***Capacity appears to exist***
V actual = 16.61 fps (d/D = 0.43)

Inlet 4
Q = Qb2 = 1.58 cfs
Use 18" @ 0.5%
Q capacity = 8.29 cfs
V actual = 3.53 fps (d/D = 0.30)

Inlet 5
Q = Inlet 4 + Qb1 = 1.58 + 8.33 = 9.91 cfs
Use 18" @ 1.0%
Q capacity = 11.73 cfs
V actual = 7.25 fps (d/D = 0.72)

Inlet 6
Q = Inlet 5 + Qc1 = 9.91 + 9.37 = 19.28 cfs
Use 18" @ 4.60%
Q capacity = 25.15 cfs
V actual = 15.30 fps (d/D = 0.67)

Inlet 7
Q = Inlet 6 + Qd1 = 19.28 + 10.21 = 29.49 cfs
Use 24" @ 2.0%
Q capacity = 35.71 cfs
V actual = 12.38 fps (d/D = 0.71)

Inlet 8
Q = Inlet 7 + Qc2 + Qd2 = 29.49 + 1.68 + 1.28 = 32.45 cfs
Use 24" @ 2.25%
Q capacity = 37.87 cfs
V actual = 13.28 fps (d/D = 0.73)

Street Spreadflow Analysis & Inlet Capture

In this Section of the Report, we will examine how the stormwater in the street gutters may impact in proposed inlets. We will use our 27' street width (back of curb to back of curb), while giving allowances for the vertical portion of the curb on each side. The crown on the street shall be 3.0%. The available street width, to handle the stormwater, has a width of 26'. Our goal is to provide a minimum "non submerged" street width ("clear space") of 8 feet. We will use the following equation (as provided in "Urban Drainage and Flood Control District – Urban

Storm Drainage Manual, Volume 1, dated January, 2016) to determine the required length of throat to capture 100% of the stormwater:

Lt = 0.38 (Q^0.51)(Sl^0.058)(1/nSx)^0.46, where:
Lt = required length of throat to capture 100%
Q = flowrate (cfs)
Sl = slope of gutter
N = manning's coef. = 0.012
Sx = cross slope of street = 0.03

Since n and Sx are constant, the equation can be reduced to:

Lt = 0.38 (Q^0.51)(Sl^0.058)(38.38)
Lt = 14.58 (Q^0.51) (Sl^0.058)

Attention is called to the Appendix for the spreadsheets used to evaluate these areas.

Check Inlet 1 & 2 – Hillcrest Drive (Spreadflow Analysis)

Inlet 1
Q = Qa2 = 8.53 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.33'
Width of water (from gutter) = 11.0'
Clear space (half street) = 13.0 – 11.0' = 2.0'
Inlet 2
Q = Qa3 = 0.89 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.14'
Width of water (from gutter) = 4.5'
Clear space (half street) = 13.0 – 4.5' = 8.5'
Total Clear Space = 2.0 + 8.5 = 10.5'

Stormwater Capture – Inlet 1
Lt = 14.58 (8.53^0.51)(0.015^0.058) = 34.10 feet
Using a 20' throat:
Q captured = 5.01 cfs (58.7%)
Q bypass = 3.52 cfs (41.3%)

Stormwater Capture – Inlet 2
Lt = 14.58 (0.89^0.51)(0.015^0.058) = 10.77 feet
Using a 12' throat:
Q captured = 0.89 cfs (100%)
Q bypass = 0.00 cfs (0%)

Check Inlet 4 & 5 – Hillcrest Drive (Spreadflow Analysis)

Inlet 4

Q = Qb2 = 1.58 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.21'
Width of water (from gutter) = 7.0'
Clear space (half street) = 13.0 – 7.0 = 6.0'

Inlet 5

Q = Qb1 = 8.33 fps
Gutter Slope = 0.5%
Height of water (from gutter) = 0.39'
Width of water (from gutter) = 13.0'
Clear space (half street) = 13.0 – 13.0' = 0.0'
Total Clear Space = 6.0 + 0.0 = 6.0'

TRY 10 YEAR STORM

Inlet 4

Q = Qb2 = 1.26 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.20'
Width of water (from gutter) = 6.5'
Clear space (half street) = 13.0 – 6.5' = 6.5'

Inlet 5

Q = Qb1 = 6.66 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.36'
Width of water (from gutter) = 12.0'
Clear space (half street) = 13.0 – 12.0' = 1.0'
Total Clear Space = 6.5 + 1.0 = 7.5'

Stormwater Capture – Inlet 4

Lt = 14.58 (1.26^0.51)(0.005^0.058) = 12.06 feet
Using a 13' throat:
Q captured = 1.26 cfs (100%)
Q bypass = 0.00 cfs (0%)

Stormwater Capture – Inlet 5

Lt = 14.58 (6.66^0.51)(0.005^0.058) = 28.20 feet
Using a 24' throat:
Q captured = 5.67 cfs (85.1%)
Q bypass = 0.99 cfs (14.9%)

Check Inlet 6 & Across Street – Hillcrest Drive (Spreadflow Analysis)

Inlet 6

Q = Qc1 = 9.37 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.30'
Width of water (from gutter) = 10.0'
Clear space (half street) = 13.0 – 10.0' = 3.0'

Across from Inlet 6

Q = Qc2 = 1.68 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.17'
Width of water (from gutter) = 5.5'
Clear space (half street) = 13.0 – 5.5 = 7.5'
Total Clear Space = 3.0 + 7.5 = 10.5'

Stormwater Capture – Inlet 6

Q = 9.37 + 0.99 (bypass from Inlet 5) = 10.36 cfs
Lt = 14.58 (10.36^0.51)(0.0267^0.058) = 38.93 feet
Using a 30' throat:
Q captured = 7.99 cfs (77.1%)
Q bypass = 2.37 cfs (22.9%)

Check Inlet 7 & 8 – Hillcrest (Spreadflow Analysis)

Inlet 7

Q = Qd1 = 10.21 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.29'
Width of water (from gutter) = 9.5'
Clear space (half street) = 13.0 – 9.5' = 2.5'

Inlet 8

Q = Qc2 + Qd2 = 2.42 + 2.17 = 2.96 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.18'
Width of water (from gutter) = 6.0'
Clear space (half street) = 13.0 – 6.0' = 7.0'
Total Clear Space = 2.5 + 7.0 = 9.5'

Stormwater Capture – Inlet 7

Q = 10.21 + 2.37 (bypass from Inlet 6) = 12.58 cfs
Lt = 14.58 (12.58^0.51)(0.0488^0.058) = 44.5 feet
Using a 30' throat:
Q captured = 8.48 cfs (67.4%)
Q bypass = 4.10 cfs (32.6%)

Stormwater Capture – Inlet 8
Lt = 14.58 (2.96^0.51)(0.0488^0.058) = 21.28 feet
Using a 22’ throat:
Q captured = 21.28 cfs (100%)
Q bypass = 0.00 cfs (0%)

Curb Cut on Street at North side of Detention Pond
Q = Qd4 + 4.10 (bypass from Inlet 7) = 7.74 + 4.10 = 11.84 cfs
Use a 6” x 8’ Curb Cut with a slope of 3%:
Q = (1.49/n)(A)(R^2/3)(S^1/2) = (1.49/0.012)(4)(4.33)(0.17) = 22.44 cfs

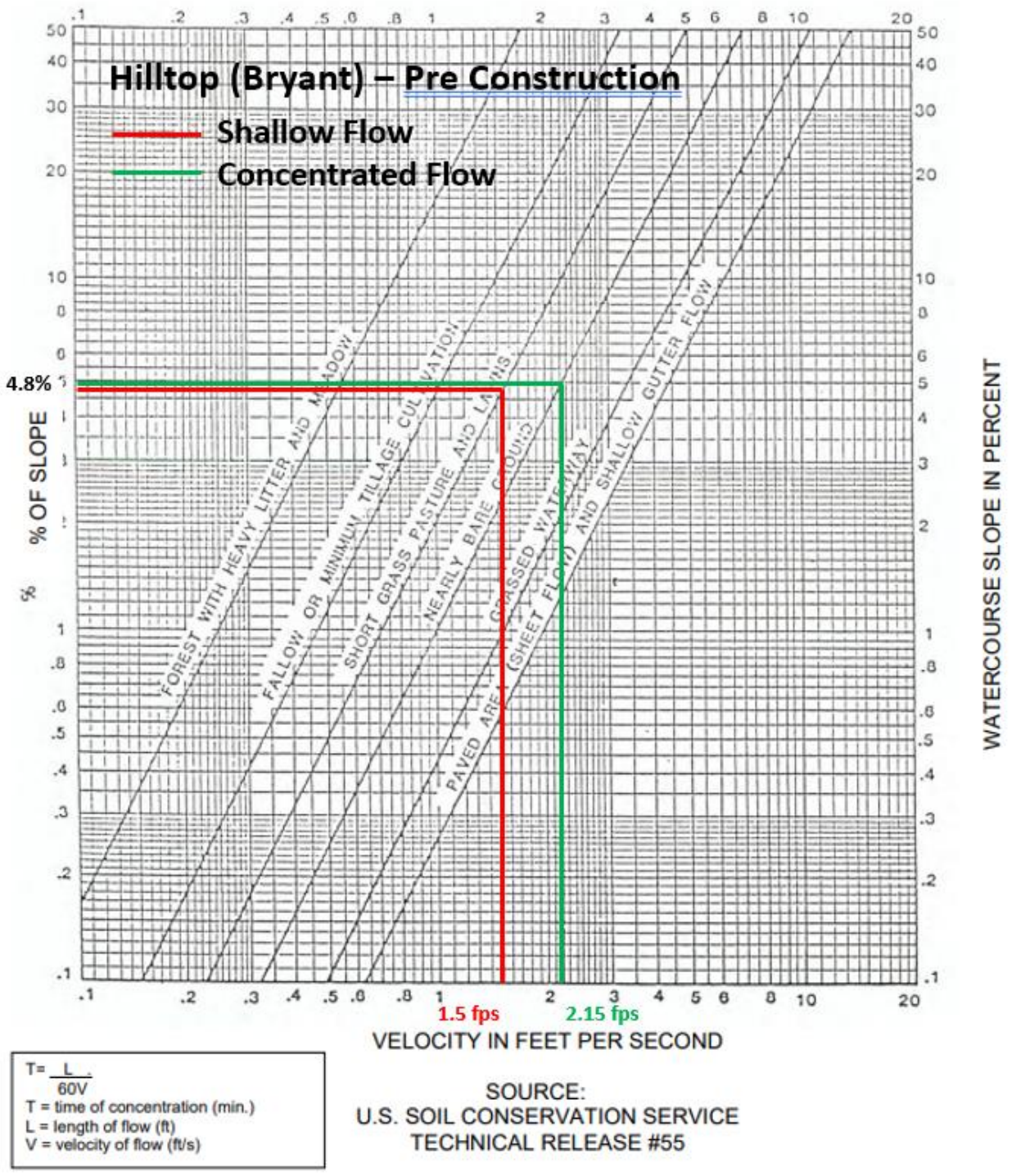
Detention Facility Computations

In this section, we will size the detention facility located in the Common Area (West side of the project). At the completion of this section, a summary of pre and post flows will be provided. Whereas the time of concentration will be used to determine the intensity (I), the runoff coefficient (C) for each storm analysis shall be based on that determined on pages 5 and 6 of this report.

Time of Concentration (tc)

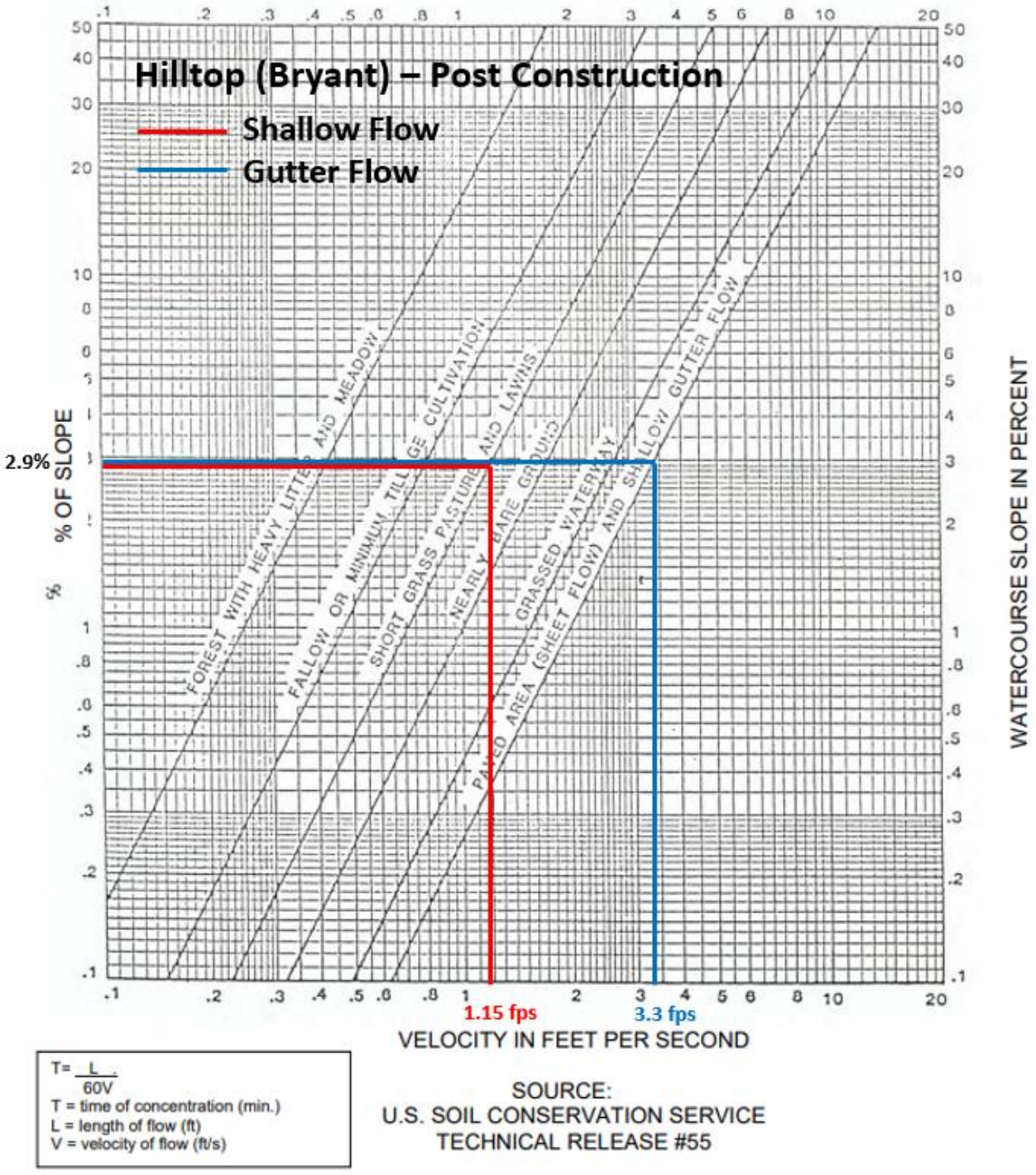
In determining the time of concentration, we must first determine the velocity of the runoff based on the type of ground cover and type of flow. The total tc is a sum of the tc for overland flow, the tc for shallow concentrated flow, and the tc for channelized flow. For this analysis, we will use the US Soil Conservation Service Technical Release #55, "Watercourse Slope vs Velocity" graph. A Pre Construction and Post Construction graph for each watershed is provided on the following pages.

Pre Construction Time of Concentration (tc)



Pre-Construction tc = Σ(L/(60)(V)) = 6 min

Post Construction Time of Concentration (tc)



Post-Construction tc = Σ(L/(60)(V)) = 9 min

Stage – Storage Table

The following Stage Storage Table is provided, based on the grading plan contained in the Civil Plans. The accumulative storage is provided in the right most column.

TYPE 3

Stage - Storage for Irregular Detention Basin

Top Elev	Bottom Elev	Increment
353.5	345.5	1

Stage	Area	Δ Volume	Volume
msl	sf	cf	cf
345.50	1	0	0
346.50	1853.50	927.25	927.25
347.50	2951.40	2402.45	3329.70
348.50	4240.13	3595.77	6925.47
349.50	5637.46	4938.80	11864.26
350.50	7118.75	6378.11	18242.37
351.50	8673.71	7896.23	26138.60
352.50	10265.99	9469.85	35608.45
353.50	11858.27	11062.13	46670.58

Stage – Discharge Table

The following Stage Discharge Table is provided, based on the grading plan contained in the Civil Plans. The discharge structure planned for this facility is shown later in this report.

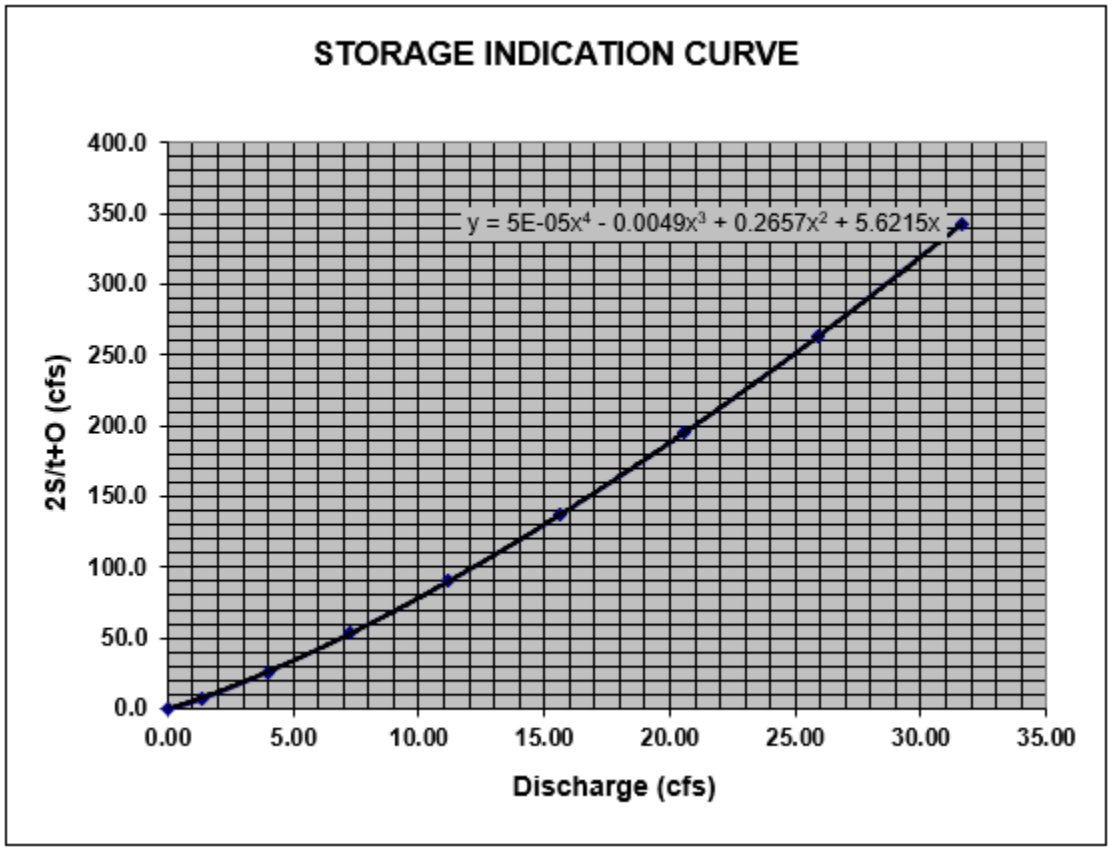
TYPE 2

Stage - Discharge for Rectangular Weir

FL Discharge	Beginning Elevation	Elevation Increment	Top of Basin
345.50	345.50	1.00	353.50

Stage	Head (H)	Weir Length (L)	Area (A)	Orifice Coefficient (C)	Velocity	Discharge (Q)
msl	ft	ft	sf		ft/s	cfs
345.50	0.00	0.42	0.00	3.33	0.00	0.00
346.50	1.00	0.42	0.42	3.33	3.33	1.40
347.50	2.00	0.42	0.84	3.33	4.71	3.96
348.50	3.00	0.42	1.26	3.33	5.77	7.27
349.50	4.00	0.42	1.68	3.33	6.66	11.19
350.50	5.00	0.42	2.10	3.33	7.45	15.64
351.50	6.00	0.42	2.52	3.33	8.16	20.56
352.50	7.00	0.42	2.94	3.33	8.81	25.90
353.50	8.00	0.42	3.36	3.33	9.42	31.65

Storage Indication Curve



Alternate Routing Time

The following spreadsheets represent the Hydrograph Routing for the various storm events. In each case, the Routing Storm Duration time was adjusted to provide the maximum storage required. Also, runoff coefficients C have been adjusted for each storm event:

Storm Event	Pre C	Post C
2	0.41	0.47
5	0.44	0.50
10	0.47	0.53
25	0.52	0.58
50	0.55	0.61
100	0.59	0.66

2 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 2 YEAR DESIGN STORM

Routing Storm Duration

20 **minutes**

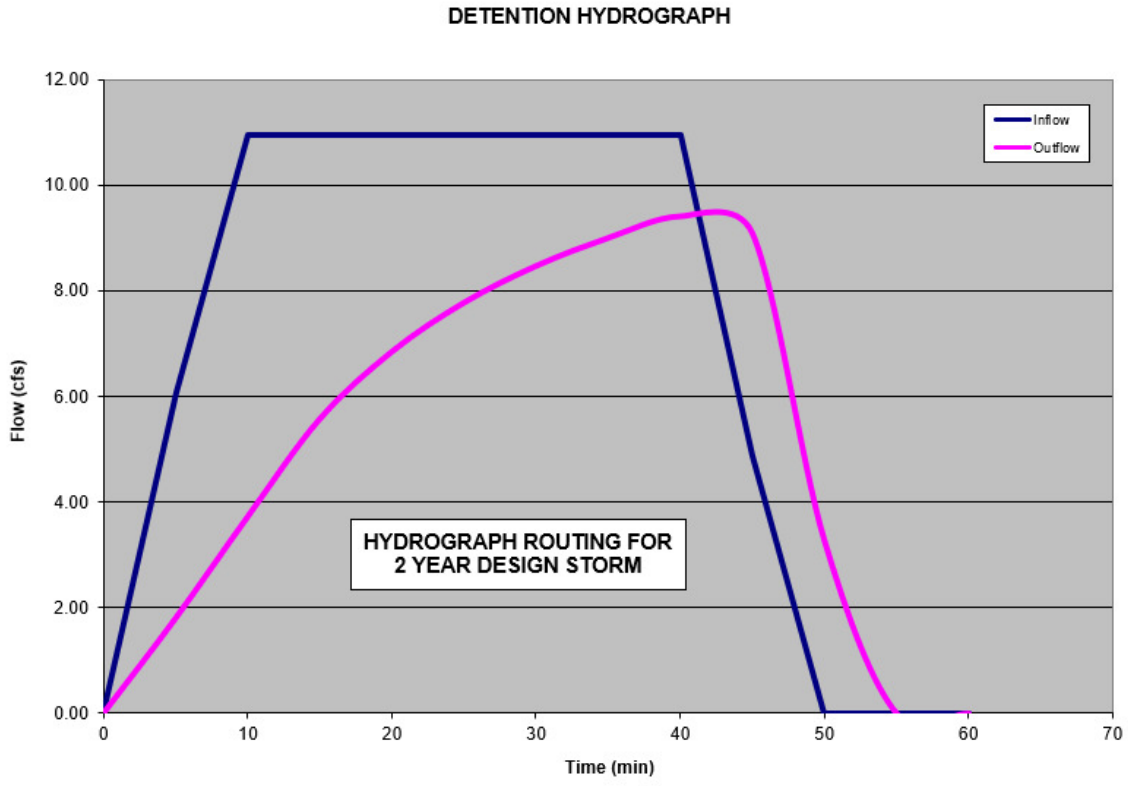
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	15.97	0	15.973	0	0	15.972	0.001
5	8.87	24.85	10.876	35.723	2.548	2013.7	35.724	-0.001
10	15.97	31.95	25.334	57.280	5.194	4579.3	57.280	0.000
15	15.97	31.95	41.818	73.764	7.731	7432.4	73.764	-0.001
20	15.97	23.07	54.737	77.809	9.513	9637.5	77.810	-0.001
25	7.10	7.10	57.939	65.038	9.935	10181.1	8.503	56.535
30	0.00	0.00	62.199	62.199	1.520	9527.8	0.000	62.199
35	0.00	0.00	50.999	50.999	0.000	9329.8	0.000	50.999
40	0.00	0.00	51.199	51.199	0.000	7649.8	0.000	51.199
45	0.00	0.00	51.399	51.399	0.000	7679.8	0.000	51.399
50	0.00	0.00	51.599	51.599	0.000	7709.8	0.000	51.599
55	0.00	0.00	51.799	51.799	0.000	7739.8	0.000	51.799
60	0.00	0.00	51.999	51.999	0.000	7769.8	0.000	51.999

Actual Maximum Storage needed is 10181.1 cubic feet

Maximum Storage required is achieved at an elev. = 349.32

Maximum Allowable (undeveloped) Discharge is 11.99 cfs

Maximum Discharge for the above storm is 9.93 cfs



5 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

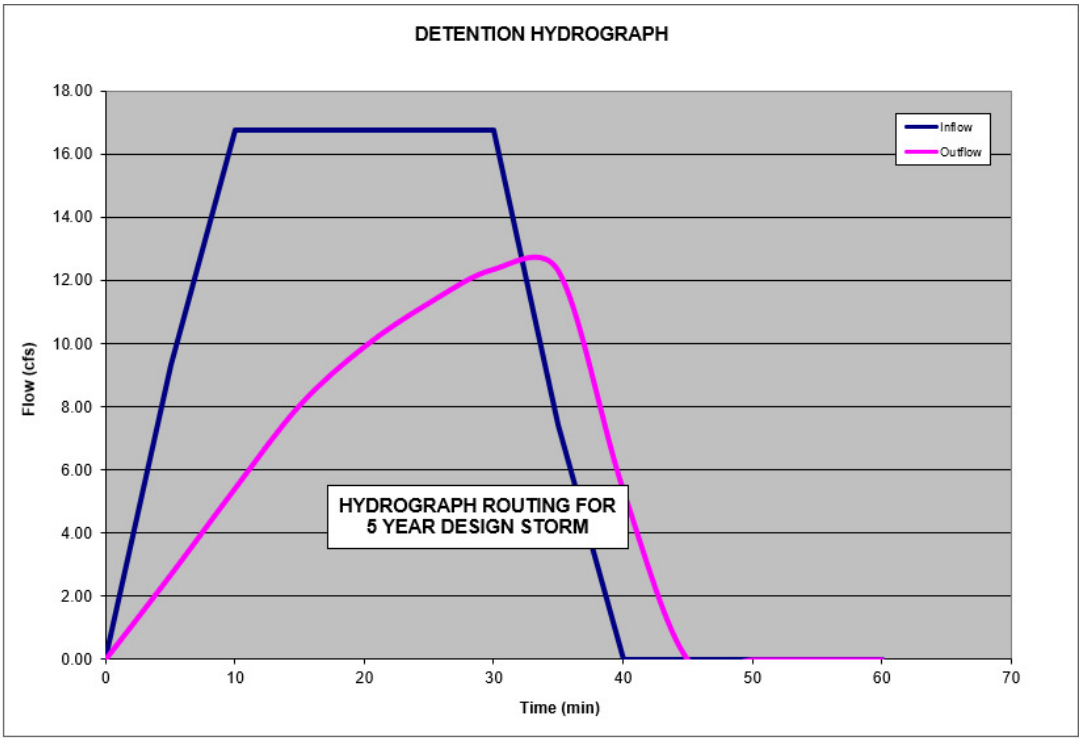
HYDROGRAPH ROUTING FOR 5 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	16.75	0	16.750	0	0	16.749	0.001
5	9.31	26.06	11.428	37.484	2.661	2113.4	37.485	-0.001
10	16.75	33.50	26.658	60.157	5.413	4810.6	60.158	-0.001
15	16.75	33.50	44.056	77.555	8.051	7816.0	77.555	0.001
20	16.75	33.50	57.739	91.238	9.908	10147.0	91.236	0.002
25	16.75	33.50	68.648	102.147	11.295	11991.4	102.146	0.001
30	16.75	24.19	77.420	101.614	12.364	13467.5	101.615	-0.001
35	7.44	7.44	76.989	84.434	12.312	13395.2	36.484	47.950
40	0.00	0.00	73.856	73.856	5.389	11856.7	0.000	73.856
45	0.00	0.00	74.056	74.056	0.000	11078.4	0.000	74.056
50	0.00	0.00	74.256	74.256	0.000	11108.4	0.000	74.256
55	0.00	0.00	74.456	74.456	0.000	11138.4	0.000	74.456
60	0.00	0.00	74.656	74.656	0.000	11168.4	0.000	74.656

Actual Maximum Storage needed is 13467.5 cubic feet
Maximum Storage required is achieved at an elev. = 349.89
Maximum Allowable (undeveloped) Discharge is 14.9 cfs
Maximum Discharge for the above storm is 12.36 cfs



10 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 10 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

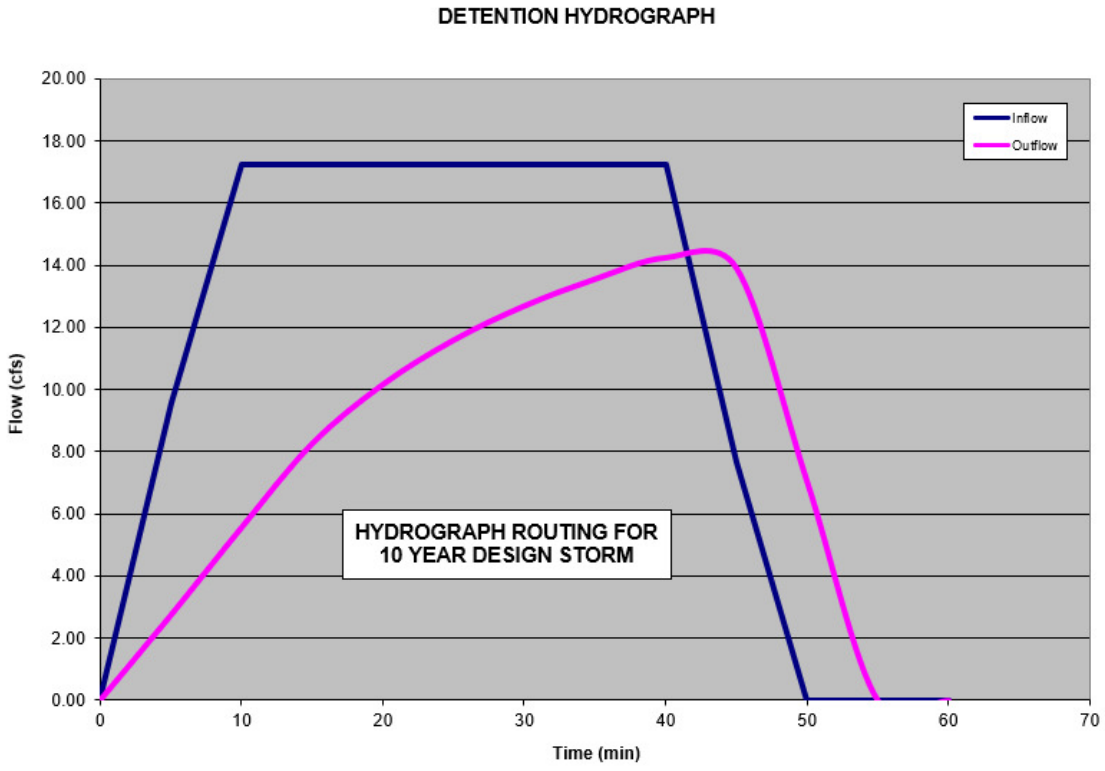
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	17.24	0	17.240	0	0	17.239	0.001
5	9.58	26.82	11.778	38.596	2.731	2176.3	38.597	-0.001
10	17.24	34.48	27.496	61.977	5.550	4956.9	61.976	0.001
15	17.24	34.48	45.475	79.956	8.251	8058.9	79.956	0.000
20	17.24	34.48	59.644	94.124	10.156	10469.9	94.123	0.001
25	17.24	34.48	70.962	105.442	11.581	12381.4	105.442	0.000
30	17.24	34.48	80.081	114.561	12.681	13914.2	114.560	0.001
35	17.24	34.48	87.472	121.953	13.544	15152.5	121.953	0.000
40	17.24	24.90	93.489	118.391	14.232	16158.1	118.390	0.001
45	7.66	7.66	90.587	98.249	13.902	15673.3	50.238	48.011
50	0.00	0.00	84.384	84.384	7.032	13682.5	0.000	84.384
55	0.00	0.00	84.584	84.584	0.000	12657.6	0.000	84.584
60	0.00	0.00	84.784	84.784	0.000	12687.6	0.000	84.784

Actual Maximum Storage needed is 16158.1 cubic feet

Maximum Storage required is achieved at an elev. = 350.25

Maximum Allowable (undeveloped) Discharge is 17.36 cfs

Maximum Discharge for the above storm is 14.23 cfs



25 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

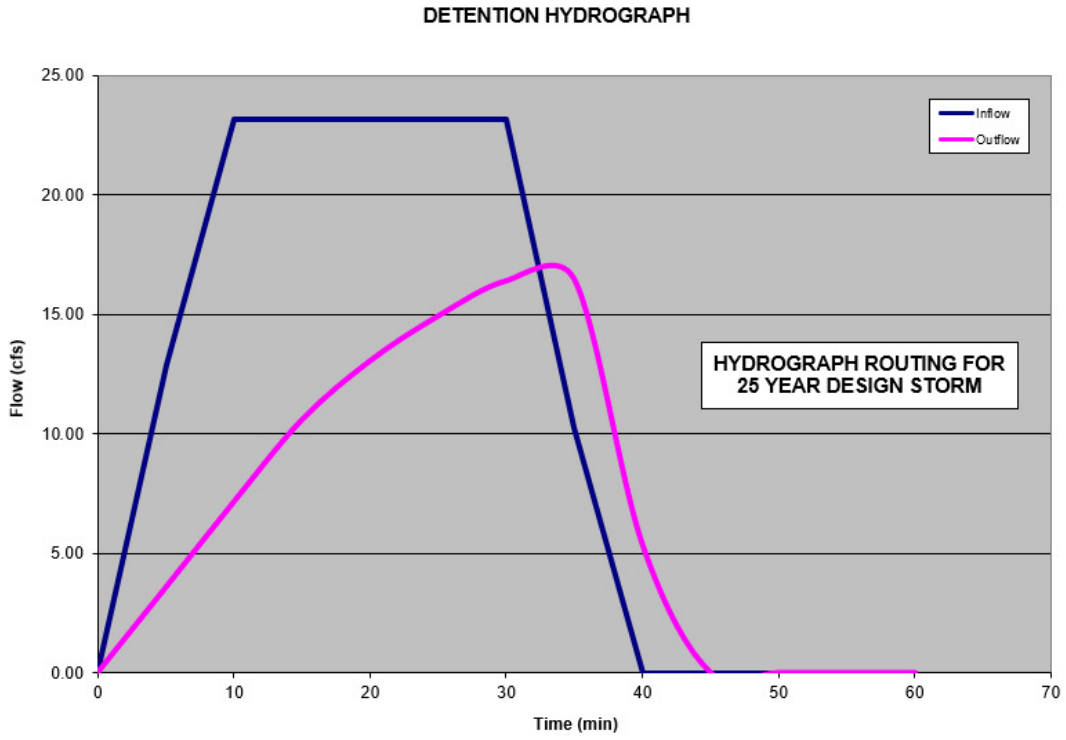
HYDROGRAPH ROUTING FOR 25 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	23.16	0	23.158	0	0	23.159	-0.001
5	12.87	36.02	16.041	52.065	3.559	2939.9	52.066	-0.001
10	23.16	46.32	37.780	84.097	7.142	6738.4	84.098	-0.001
15	23.16	46.32	62.939	109.256	10.579	11027.7	109.256	0.000
20	23.16	46.32	83.168	129.485	13.044	14431.8	129.484	0.001
25	23.16	46.32	99.641	145.958	14.922	17184.4	145.957	0.001
30	23.16	33.45	113.166	146.617	16.396	19434.3	146.616	0.001
35	10.29	10.29	113.708	124.001	16.454	19524.4	36.239	87.762
40	0.00	0.00	113.484	113.484	5.359	17796.3	0.000	113.484
45	0.00	0.00	113.684	113.684	0.000	17022.6	0.000	113.684
50	0.00	0.00	113.884	113.884	0.000	17052.6	0.000	113.884
55	0.00	0.00	114.084	114.084	0.000	17082.6	0.000	114.084
60	0.00	0.00	114.284	114.284	0.000	17112.6	0.000	114.284

Actual Maximum Storage needed is 19524.4 cubic feet
Maximum Storage required is achieved at an elev. = 350.65
Maximum Allowable (undeveloped) Discharge is 19.53 cfs
Maximum Discharge for the above storm is 16.45 cfs



50 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 50 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

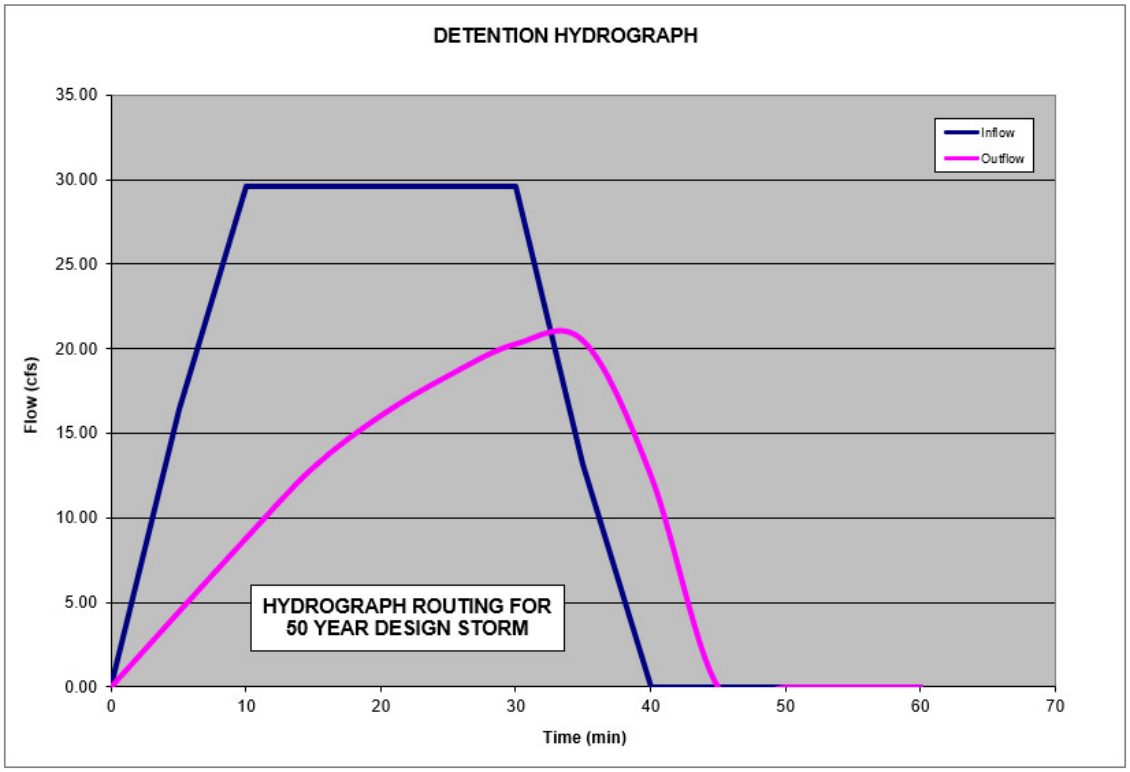
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	29.62	0	29.616	0	0	29.615	0.001
5	16.45	46.07	20.781	66.850	4.417	3779.8	66.850	0.000
10	29.62	59.23	49.291	108.522	8.779	8710.6	108.523	-0.001
15	29.62	59.23	82.573	141.804	12.974	14332.1	141.804	0.000
20	29.62	59.23	109.747	168.978	16.029	18866.3	168.978	0.000
25	29.62	59.23	132.202	191.433	18.388	22588.5	191.434	0.000
30	29.62	42.78	150.904	193.682	20.265	25675.3	193.683	-0.001
35	13.16	13.16	152.783	165.945	20.449	25984.8	102.860	63.085
40	0.00	0.00	141.080	141.080	12.532	23011.9	0.000	141.080
45	0.00	0.00	141.280	141.280	0.000	21162.0	0.000	141.280
50	0.00	0.00	141.480	141.480	0.000	21192.0	0.000	141.480
55	0.00	0.00	141.680	141.680	0.000	21222.0	0.000	141.680
60	0.00	0.00	141.880	141.880	0.000	21252.0	0.000	141.880

Actual Maximum Storage needed is 25984.8 cubic feet

Maximum Storage required is achieved at an elev. = 351.37

Maximum Allowable (undeveloped) Discharge is 25.68 cfs

Maximum Discharge for the above storm is 20.45 cfs



100 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 100 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

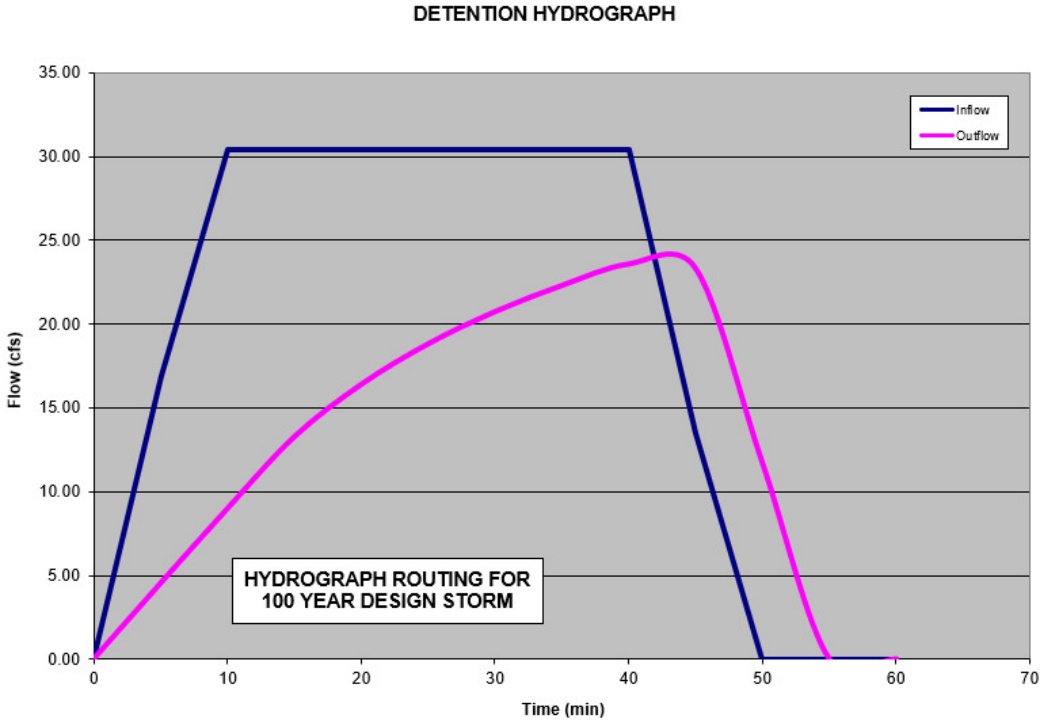
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	30.44	0	30.441	0	0	30.440	0.001
5	16.91	47.35	21.393	68.745	4.524	3887.5	68.746	-0.001
10	30.44	60.88	50.780	111.662	8.983	8964.4	111.661	0.001
15	30.44	60.88	85.119	146.000	13.272	14758.5	146.001	-0.001
20	30.44	60.88	113.200	174.082	16.400	19440.0	174.083	-0.001
25	30.44	60.88	136.442	197.324	18.820	23289.3	197.323	0.001
30	30.44	60.88	155.829	216.711	20.747	26486.5	216.710	0.001
35	30.44	60.88	172.091	232.972	22.310	29160.1	232.973	-0.001
40	30.44	43.97	185.788	229.759	23.592	31407.1	229.758	0.001
45	13.53	13.53	183.077	196.607	23.341	30962.7	94.375	102.232
50	0.00	0.00	173.395	173.395	11.706	27735.1	0.000	173.395
55	0.00	0.00	173.595	173.595	0.000	26009.2	0.000	173.595
60	0.00	0.00	173.795	173.795	0.000	26039.2	0.000	173.795

Actual Maximum Storage needed is 31407.1 cubic feet

Maximum Storage required is achieved at an elev. = 352.03

Maximum Allowable (undeveloped) Discharge is 29.36 cfs

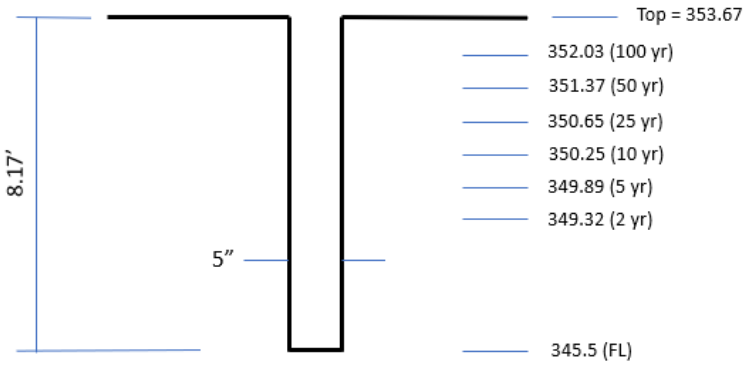
Maximum Discharge for the above storm is 23.59 cfs



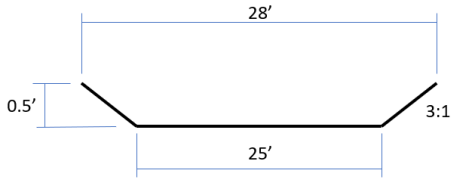
Summary – Detention

Storm Event	Volume Needed (cf)	WSE	Max Discharge Allowed (cfs)	Max Discharge Model (cfs)
2	10181.1	349.32	11.99	9.93
5	13467.5	349.89	14.90	12.36
10	16158.1	350.25	17.36	14.23
25	19524.4	350.65	19.53	16.45
50	25984.8	351.37	25.68	20.45
100	31407.1	352.03	29.36	23.59

Discharge Structure Detail



Overflow Structure Detail

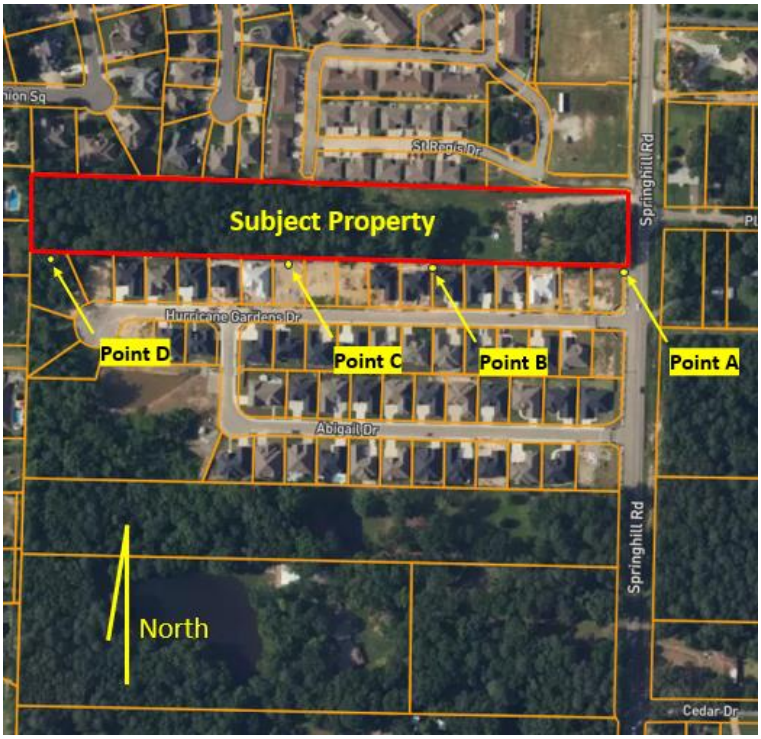


Q = (1.49/n)(A)(R^2/3)(S^0.5)

Q = (1.49/0.025)(13.25)(0.60)(0.1) = 47.38 cfs

Required Capacity = 23.59 cfs (2) = 47.18 cfs

Study Point Summary (25 yr Storm)



Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	12.88	16.81	16.81	3.93
B	10.53	0	0	-10.53
C	11.01	0	0	-11.01
D	17.74	38.08	16.45	-1.29
TOTAL	52.16	54.89	33.26	-18.9

** Existing culvert originating at the Junction Box near the NE corner of Hurricane Gardens has adequate capacity to accept this slight increase in flow.*

Downstream Considerations

The discharge from the proposed Detention Facility will enter into an existing ditch that drains to the West, into Hurricane Lake, Phase 3. The ditch exists between Lots 47 and 48 of said development (based on Saline County GIS map). A 54" CMP (Helical) culvert exists under Worth Ave, at a grade of 0.7% (as shot in the field). Using an n of 0.012, the capacity of this culvert is computed at 183.65 cfs at d/D of 0.85 (velocity = 12.75 fps). It should be noted that the estimated post construction discharge is 1.29 cfs less than the estimated existing runoff from the same area. Therefore, this development should not have a negative impact on the downstream properties.



Source: Saline County GIS

Engineering Certification

I, Tim Lemons, Arkansas Registered Professional Engineer No. 7373, hereby certify that the drainage reports, and calculations contained in this report, have been prepared in accordance with sound engineering practice and principles, and based on best known available data. Improvements as outlined in this report and depicted on the preliminary plat and design drawings should not increase the risk of endangerment to life or have negative impacts on adjacent or downstream property or watersheds.



Timothy B. Lemons, PE
Arkansas Professional Engineer, #7373

Appendix

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 0.5%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.00500	0.0707	0.00
1	0.030	0.03	0.02	0.01	0.06	0.00500	0.0707	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.00500	0.0707	0.02
2	0.030	0.06	0.06	0.03	0.10	0.00500	0.0707	0.05
2.5	0.030	0.08	0.09	0.04	0.11	0.00500	0.0707	0.09
3	0.030	0.09	0.14	0.04	0.13	0.00500	0.0707	0.15
3.5	0.030	0.11	0.18	0.05	0.14	0.00500	0.0707	0.22
4	0.030	0.12	0.24	0.06	0.15	0.00500	0.0707	0.32
4.5	0.030	0.14	0.30	0.07	0.16	0.00500	0.0707	0.44
5	0.030	0.15	0.38	0.07	0.18	0.00500	0.0707	0.58
5.5	0.030	0.17	0.45	0.08	0.19	0.00500	0.0707	0.75
6	0.030	0.18	0.54	0.09	0.20	0.00500	0.0707	0.94
6.5	0.030	0.20	0.63	0.10	0.21	0.00500	0.0707	1.17
7	0.030	0.21	0.74	0.10	0.22	0.00500	0.0707	1.43
7.5	0.030	0.23	0.84	0.11	0.23	0.00500	0.0707	1.71
8.5	0.030	0.26	1.08	0.13	0.25	0.00500	0.0707	2.39
9	0.030	0.27	1.22	0.13	0.26	0.00500	0.0707	2.79
9.5	0.030	0.29	1.35	0.14	0.27	0.00500	0.0707	3.22
10	0.030	0.30	1.50	0.15	0.28	0.00500	0.0707	3.69
10.5	0.030	0.32	1.65	0.16	0.29	0.00500	0.0707	4.21
11	0.030	0.33	1.82	0.16	0.30	0.00500	0.0707	4.76
11.5	0.030	0.35	1.98	0.17	0.31	0.00500	0.0707	5.36
12	0.030	0.36	2.16	0.18	0.32	0.00500	0.0707	6.01
12.5	0.030	0.38	2.34	0.19	0.33	0.00500	0.0707	6.70
13	0.030	0.39	2.54	0.19	0.33	0.00500	0.0707	7.44

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 1.50%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.01500	0.1225	0.00
1	0.030	0.03	0.02	0.01	0.06	0.01500	0.1225	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.01500	0.1225	0.04
2	0.030	0.06	0.06	0.03	0.10	0.01500	0.1225	0.09
2.5	0.030	0.08	0.09	0.04	0.11	0.01500	0.1225	0.16
3	0.030	0.09	0.14	0.04	0.13	0.01500	0.1225	0.26
3.5	0.030	0.11	0.18	0.05	0.14	0.01500	0.1225	0.39
4	0.030	0.12	0.24	0.06	0.15	0.01500	0.1225	0.55
4.5	0.030	0.14	0.30	0.07	0.16	0.01500	0.1225	0.76
5	0.030	0.15	0.38	0.07	0.18	0.01500	0.1225	1.01
5.5	0.030	0.17	0.45	0.08	0.19	0.01500	0.1225	1.30
6	0.030	0.18	0.54	0.09	0.20	0.01500	0.1225	1.64
6.5	0.030	0.20	0.63	0.10	0.21	0.01500	0.1225	2.03
7	0.030	0.21	0.74	0.10	0.22	0.01500	0.1225	2.47
7.5	0.030	0.23	0.84	0.11	0.23	0.01500	0.1225	2.97
8.5	0.030	0.26	1.08	0.13	0.25	0.01500	0.1225	4.15
9	0.030	0.27	1.22	0.13	0.26	0.01500	0.1225	4.83
9.5	0.030	0.29	1.35	0.14	0.27	0.01500	0.1225	5.58
10	0.030	0.30	1.50	0.15	0.28	0.01500	0.1225	6.40
10.5	0.030	0.32	1.65	0.16	0.29	0.01500	0.1225	7.29
11	0.030	0.33	1.82	0.16	0.30	0.01500	0.1225	8.25
11.5	0.030	0.35	1.98	0.17	0.31	0.01500	0.1225	9.29
12	0.030	0.36	2.16	0.18	0.32	0.01500	0.1225	10.41
12.5	0.030	0.38	2.34	0.19	0.33	0.01500	0.1225	11.61
13	0.030	0.39	2.54	0.19	0.33	0.01500	0.1225	12.89

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 2.67%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.02670	0.1634	0.00
1	0.030	0.03	0.02	0.01	0.06	0.02670	0.1634	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.02670	0.1634	0.05
2	0.030	0.06	0.06	0.03	0.10	0.02670	0.1634	0.12
2.5	0.030	0.08	0.09	0.04	0.11	0.02670	0.1634	0.21
3	0.030	0.09	0.14	0.04	0.13	0.02670	0.1634	0.34
3.5	0.030	0.11	0.18	0.05	0.14	0.02670	0.1634	0.52
4	0.030	0.12	0.24	0.06	0.15	0.02670	0.1634	0.74
4.5	0.030	0.14	0.30	0.07	0.16	0.02670	0.1634	1.01
5	0.030	0.15	0.38	0.07	0.18	0.02670	0.1634	1.34
5.5	0.030	0.17	0.45	0.08	0.19	0.02670	0.1634	1.73
6	0.030	0.18	0.54	0.09	0.20	0.02670	0.1634	2.18
6.5	0.030	0.20	0.63	0.10	0.21	0.02670	0.1634	2.70
7	0.030	0.21	0.74	0.10	0.22	0.02670	0.1634	3.29
7.5	0.030	0.23	0.84	0.11	0.23	0.02670	0.1634	3.96
8.5	0.030	0.26	1.08	0.13	0.25	0.02670	0.1634	5.53
9	0.030	0.27	1.22	0.13	0.26	0.02670	0.1634	6.44
9.5	0.030	0.29	1.35	0.14	0.27	0.02670	0.1634	7.44
10	0.030	0.30	1.50	0.15	0.28	0.02670	0.1634	8.53
10.5	0.030	0.32	1.65	0.16	0.29	0.02670	0.1634	9.72
11	0.030	0.33	1.82	0.16	0.30	0.02670	0.1634	11.01
11.5	0.030	0.35	1.98	0.17	0.31	0.02670	0.1634	12.40
12	0.030	0.36	2.16	0.18	0.32	0.02670	0.1634	13.89
12.5	0.030	0.38	2.34	0.19	0.33	0.02670	0.1634	15.49
13	0.030	0.39	2.54	0.19	0.33	0.02670	0.1634	17.20

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 4.88%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.04880	0.2209	0.00
1	0.030	0.03	0.02	0.01	0.06	0.04880	0.2209	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.04880	0.2209	0.07
2	0.030	0.06	0.06	0.03	0.10	0.04880	0.2209	0.16
2.5	0.030	0.08	0.09	0.04	0.11	0.04880	0.2209	0.28
3	0.030	0.09	0.14	0.04	0.13	0.04880	0.2209	0.46
3.5	0.030	0.11	0.18	0.05	0.14	0.04880	0.2209	0.70
4	0.030	0.12	0.24	0.06	0.15	0.04880	0.2209	1.00
4.5	0.030	0.14	0.30	0.07	0.16	0.04880	0.2209	1.37
5	0.030	0.15	0.38	0.07	0.18	0.04880	0.2209	1.81
5.5	0.030	0.17	0.45	0.08	0.19	0.04880	0.2209	2.34
6	0.030	0.18	0.54	0.09	0.20	0.04880	0.2209	2.95
6.5	0.030	0.20	0.63	0.10	0.21	0.04880	0.2209	3.65
7	0.030	0.21	0.74	0.10	0.22	0.04880	0.2209	4.45
7.5	0.030	0.23	0.84	0.11	0.23	0.04880	0.2209	5.35
8.5	0.030	0.26	1.08	0.13	0.25	0.04880	0.2209	7.48
9	0.030	0.27	1.22	0.13	0.26	0.04880	0.2209	8.71
9.5	0.030	0.29	1.35	0.14	0.27	0.04880	0.2209	10.06
10	0.030	0.30	1.50	0.15	0.28	0.04880	0.2209	11.54
10.5	0.030	0.32	1.65	0.16	0.29	0.04880	0.2209	13.14
11	0.030	0.33	1.82	0.16	0.30	0.04880	0.2209	14.88
11.5	0.030	0.35	1.98	0.17	0.31	0.04880	0.2209	16.76
12	0.030	0.36	2.16	0.18	0.32	0.04880	0.2209	18.77
12.5	0.030	0.38	2.34	0.19	0.33	0.04880	0.2209	20.94
13	0.030	0.39	2.54	0.19	0.33	0.04880	0.2209	23.25

DETAILED PLANS:

HILLCREST ADDITION

PART OF SECTION 12, T-4-N, R-10-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

JULY 9, 2024
REVISED: OCTOBER 24, 2024

PREPARED FOR:

SPRINGHILL HWY 5 DEVELOPMENT, LLC
816 E. OAK STREET
CONWAY, ARKANSAS 72032

Arkansas 811
Know what's below.
Call before you dig.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

Prepared By:

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023

ENGINEERING • SURVEYING • PLANNING

INDEX OF SHEETS

Preliminary Plat	1
Street Plan/Profile	2
Culvert Plan/Profile	3
Grading Plan	4
Detention Pond Plan	5
Water Layout	6
Construction Details – Water	7
Sewer Plan/Profile	8
Construction Details – Sewer	9
Erosion Control Plan	10

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

CERTIFICATE OF ENGINEERING ACCURACY:

I, TIMOTHY B. LEMONS, HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A PLAT MADE BY ME, OR UNDER MY SUPERVISION, AND THAT ENGINEERING REQUIREMENTS OF THE BRYANT SUBDIVISION RULES AND REGULATIONS HAVE BEEN COMPLIED WITH.

DATE — *TIMOTHY B. LEMONS, REGISTERED PROFESSIONAL ENGINEER NO. 7373, ARKANSAS*

REGISTERED
STATE OF ARKANSAS
NO 1552
SIGNATURE
BILLY A. LAWRENCE
PROFESSIONAL LAND SURVEYOR

CERTIFICATE OF SURVEYING ACCURACY:

I, BILLY A. LAWRENCE, HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A BOUNDARY SURVEY MADE BY ME AND ALL MONUMENTS SHOWN HEREON ACTUALLY EXIST AND THEIR LOCATION, SIZE, TYPE AND MATERIAL ARE CORRECTLY SHOWN.

DATE — *BILLY A. LAWRENCE, ARKANSAS PROFESSIONAL SURVEYOR, NO. 1552*

CERTIFICATE OF PRELIMINARY PLAT APPROVAL:

ALL REQUIREMENTS OF THE BRYANT SUBDIVISION RULES AND REGULATIONS RELATIVE TO THE PREPARATION AND SUBMITTAL OF A PRELIMINARY PLAT HAVING BEEN FULFILLED, APPROVAL OF THIS DOCUMENT IS HEREBY GRANTED, SUBJECT TO FURTHER PROVISIONS OF SAID RULES AND REGULATIONS, THIS CERTIFICATE SHALL EXPIRE _____ DATE

DATE OF EXECUTION — *SIGNED: CHAIRMAN, BRYANT PLANNING COMMISSION*

CERTIFICATE OF OWNERS:

WE, THE UNDERSIGNED, OWNERS OF THE REAL ESTATE SHOWN AND DESCRIBED HEREIN, DO HEREBY CERTIFY THAT WE HAVE LAID OFF, PLATTED, AND SUBDIVIDED, AND DO HEREBY LAY OFF, PLAT AND SUBDIVIDE SAID REAL ESTATE IN ACCORDANCE WITH THIS PLAT.

DATE — *SPRINGHILL HWY 5 DEVELOPMENT, LLC*
816 E. OAK STREET
CONWAY, ARKANSAS 72032

LEGAL DESCRIPTION:

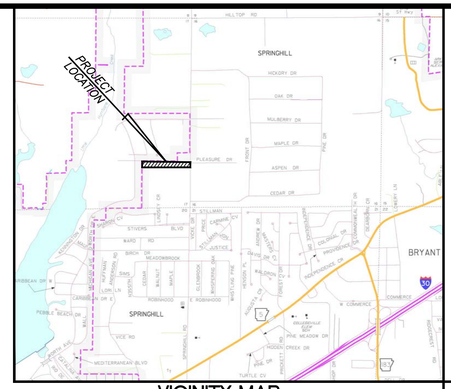
PART OF THE SE ¼, OF THE SE ¼, SECTION 17, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE SE ¼, OF THE SE ¼, SECTION 17, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS; THENCE N 02°17'33" E, 1167.19 FEET TO THE POINT OF BEGINNING; THENCE N 88°34'40" W, 1344.97 FEET; THENCE N 01°36'19" E, 167.98 FEET; THENCE S 87°44'58" E, 1346.85 FEET; THENCE S 02°18'02" W, 148.52 FEET; TO THE POINT OF BEGINNING, CONTAINING 4.89 ACRES, MORE OR LESS.

SOURCE OF TITLE: 2021-030121

FLOOD CERTIFICATION:

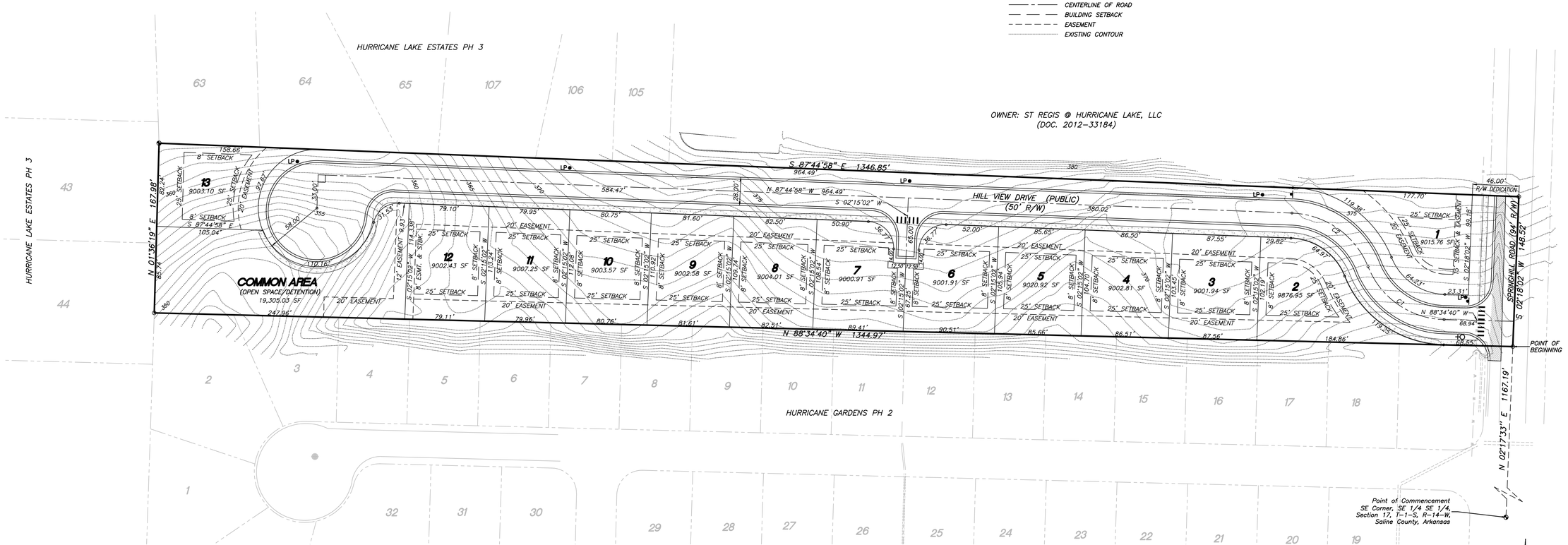
BASED UPON REVIEW OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FIRM COMMUNITY PANEL NO. 05125C0225E, EFFECTIVE DATE: JUNE 5, 2020 THE PROPERTY DEPICTED ON THIS PLAT IS LOCATED WITHIN ZONE X, AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.



VICINITY MAP
SCALE: 1" = 2000'

LEGEND:

- FOUND CONC. MONUMENT
- FOUND IRON PIN (FIP)
- LP● LIGHT POLE
- STOP/STREET NAME SIGN
- STREET SIGN
- PROPERTY BOUNDARY
- LOT LINE
- CENTERLINE OF ROAD
- BUILDING SETBACK
- EASEMENT
- EXISTING CONTOUR



CURVE	RADIUS	ARC LENGTH	TANGENT	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	83.37'	97.14'	54.93'	66°45'36"	N 55°11'52" W	91.74'
C2	84.70'	97.46'	54.93'	65°55'55"	N 54°47'01" W	92.17'

GENERAL NOTES:

1.) IRON PINS TO BE SET AT ALL LOT CORNERS.
2.) EASEMENTS TO BE USED FOR UTILITIES AND DRAINAGE.
3.) ALL EASEMENTS ARE AS NOTED.
4.) ALL BUILDING LINES ARE AS NOTED.
5.) CURRENT ZONING – R2.
6.) WATER – SALEM WATER.
7.) SEWER – CITY OF BRYANT.
8.) NO FENCES, POOLS, TEMPORARY OR PERMANENT OBSTRUCTIONS MAY BE PLACED IN ANY DRAINAGE, SEWER OR ACCESS EASEMENTS.

0' 50' 100' 150'
SCALE: 1" = 50'

Arkansas 811
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LEMONS ENGINEERING CONSULTANTS, INC.
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PRELIMINARY PLAT
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

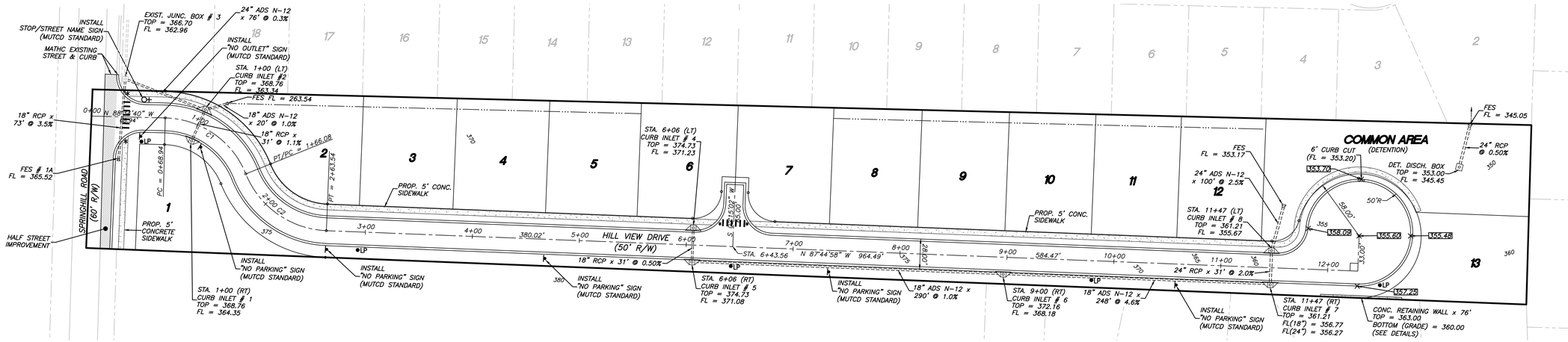
Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	7-25-24	B. Judd
2	Revised as per city's comments.	9-25-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No.: 24-018
Date: JULY 9, 2024
File: 01_Hillcrest Plat
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 1 of 10

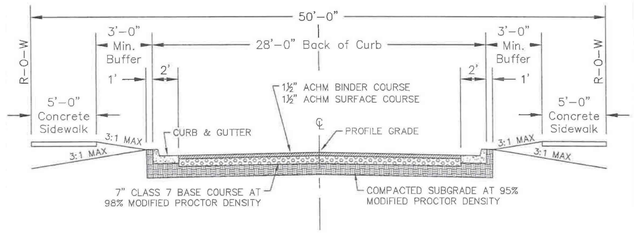
Arkansas 811
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CURVE	RADIUS	ARC LENGTH	TANGENT	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	83.37'	97.14'	54.93'	66°45'36"	N 55°11'52" W	91.74'
C2	84.70'	97.46'	54.93'	65°55'55"	N 54°47'01" W	92.17'

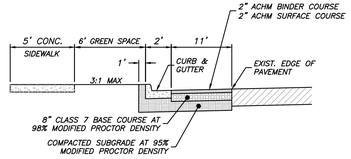


∗ – ADA COMPLIANT RAMP
INSTALL MUTCD SIGNAGE @ CROSSWALK.

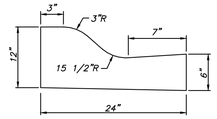
LEGEND:
- STOP / STREET NAME COMBINATION SIGN
- STREET SIGN
- LP● LIGHT POLE
- ∗ ADA RAMP
- INLET
- PROPERTY BOUNDARY
- LOT LINE
- CENTERLINE OF ROAD
- EXISTING CONTOUR
- DRAINAGE PIPE
- PROPOSED SIDEWALK



TYPICAL CROSS SECTION - LOCAL STREET
NTS

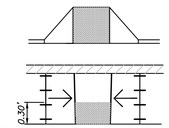


CROSS SECTION - SPRINGHILL RD (MINOR ARTERIAL)
NTS

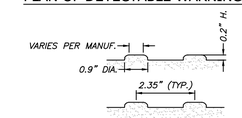


TYPICAL - CONC. CURB/GUTTER
NTS

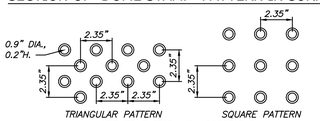
PAVEMENT STRUCTURE TO BE DETERMINED BY GEOTECHNICAL CONSULTANT



PLAN OF DETECTABLE WARNING SURFACE



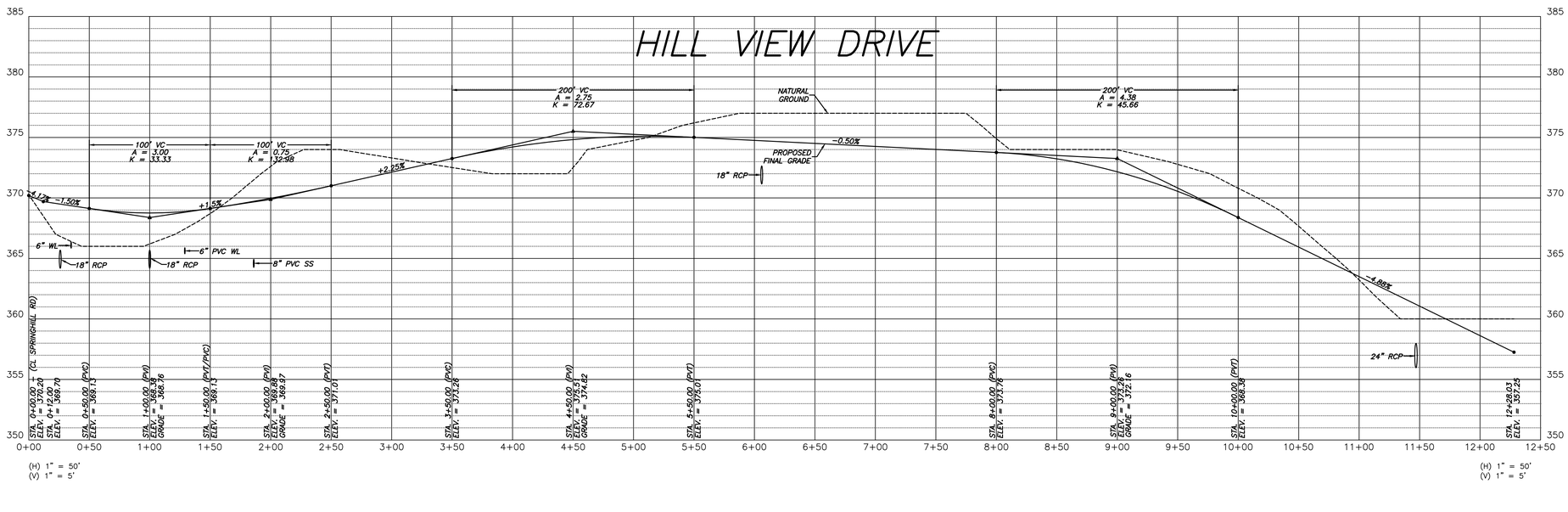
SECTION OF "DOME STAMP" PATTERN IN SURFACE



PLAN OF "DOME STAMP" PATTERN IN SURFACE

CURB RAMPS MUST HAVE A DETECTABLE WARNING FEATURE EXTENDING THE FULL WIDTH AND DEPTH OF THE RAMP (MID-WALK "IN-LINE" RAMPS ONLY NEED DETECTABLE WARNINGS AT WALK/PARKING TRANSITION). THE DETECTABLE SURFACE MUST CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 INCHES, A HEIGHT OF NOMINAL 0.2 INCHES AND A CENTER-TO CENTER SPACING OF NOMINAL 2.35 INCHES. THE TEXTURE OF THE DETECTABLE WARNING FEATURE MUST CONTRAST WITH THE SURROUNDING SURFACES (EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT). SEE ABOVE.

GENERAL NOTES
1. IN AREAS TO RECEIVE BITUMINOUS PAVING, CONCRETE DRIVEWAYS OR CURB AND GUTTER, SUBGRADE SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF MAXIMUM MODIFIED DENSITY OBTAINED AT OPTIMUM MOISTURE CONTENT.
2. FOR AREAS OF SUBGRADE PREPARATION TO RECEIVE CONCRETE SIDEWALKS, SUBGRADE SHALL BE COMPACTED TO DENSITY OF 90% MAXIMUM MODIFIED DENSITY.
3. CRUSHED STONE – MATERIAL IN EACH COURSE SHALL BE COMPACTED TO A DENSITY OF 98% MAXIMUM MODIFIED DENSITY.
4. CONCRETE SIDEWALK SHALL BE A MINIMUM OF 4' WIDE IN RESIDENTIAL SUBDIVISIONS



(H) 1" = 50'
(V) 1" = 5'

(H) 1" = 50'
(V) 1" = 5'

GENERAL NOTES:
1.) ALL STOP SIGNS SHALL BE 30" X 30"
2.) ALL TRAFFIC CONTROL MARKERS MUST MEET MUTCD SPECS.
3.) CONTRACTOR SHALL INCLUDE IN BID THE COST FOR COMPACTION TESTS ON SUBGRADE & SUBBASE. TEST TO BE CONDUCTED ON 500' INTERVALS.
4.) CONTRACTOR TO PROOF ROLL BOTH SUBGRADE AND SUBBASE (CITY TO INSPECT).
5.) LIGHT POLES SHALL BE PLACED AT ALL INTERSECTIONS. ADDITIONAL LOCATIONS TO BE DETERMINED BY THE CITY.
6.) ALL BACK OF CURB RADII AT INTERSECTIONS SHALL BE 25' UNLESS OTHERWISE NOTED.
7.) CONTRACTOR TO INCLUDE IN BID THE COST OF MATERIAL AND INSTALLATION OF STREET SIGNS & TRAFFIC CONTROL SIGNS.
8.) WHERE STOP SIGNS & STREET NAME SIGNS ARE SHOWN ON THE PLAN, A COMBINATION SIGN IS ACCEPTABLE.
10.) SEE PLAN/PROFILE SHEETS FOR ADDITIONAL INFORMATION.
11.) ALL PAVEMENT TO BE TYPE 'A'.
12.) ALL INLETS TO HAVE DOUBLE EXTENDED THROATS UNLESS STATED OTHERWISE.

0' 50' 100' 150'
SCALE: 1" = 50'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

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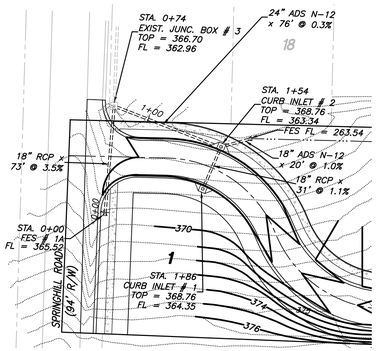
STREET PLAN/PROFILE
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

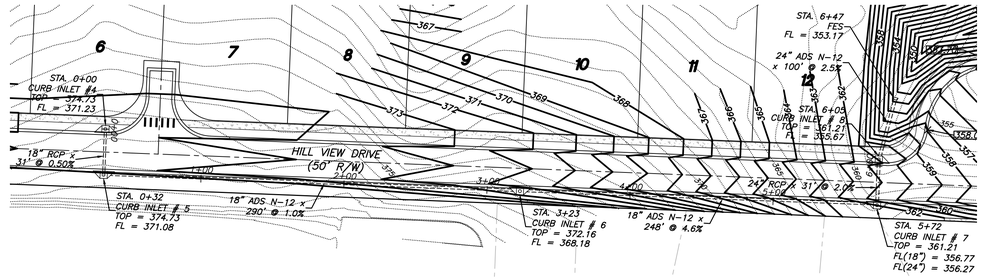
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

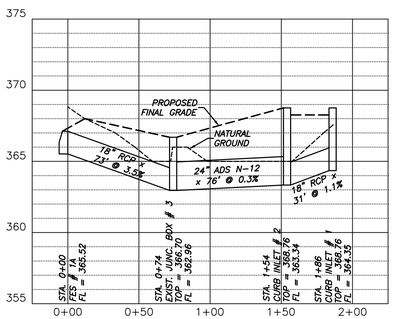
No.	Revisions	Date	By
1	Revised street width comments.	9-25-24	B. Judd
2	Revised per city comments.	10-1-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No. 24-018
Date: JULY 9, 2024
File: 02_Hillcrest Street
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 2 of 10

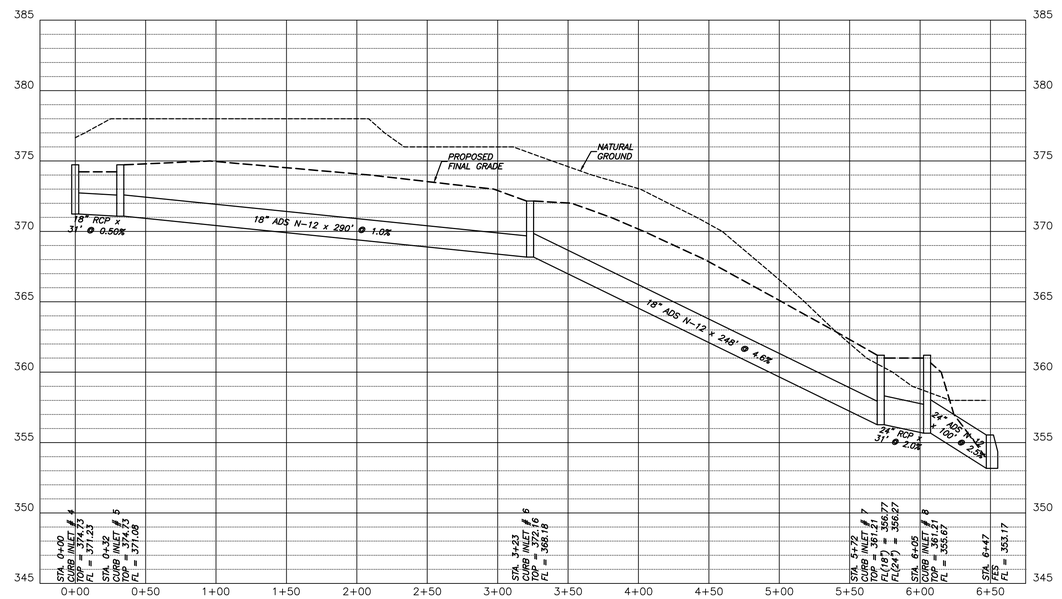
Arkansas 811
Know what's below. Call before you dig.







(H) 1" = 50'
(V) 1" = 5'



(H) 1" = 50'
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0' 50' 100' 150'
SCALE: 1" = 50'

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CULVERT PLAN/PROFILE
HILLCREST ADDITION

PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

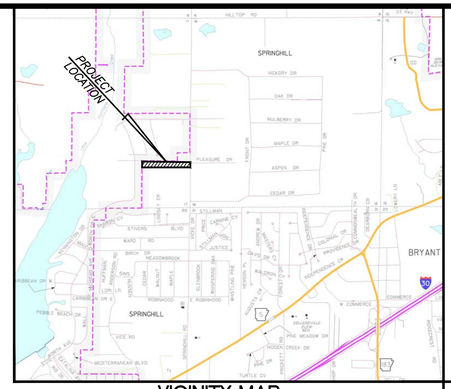
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	10-21-24	B. Judd
2	Revised as per city's comments.	10-24-24	B. Judd

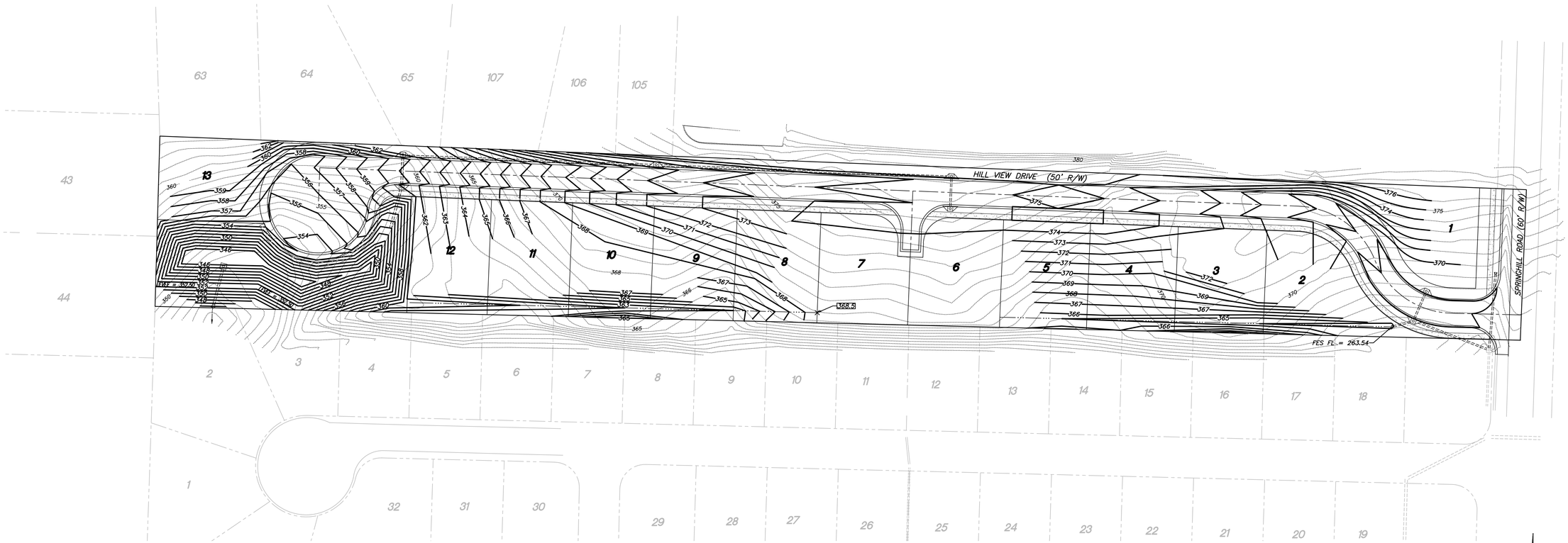
Project No.: 24-018
Date: SEPTEMBER 20, 2024
File: 03_Hillcrest Culvert
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 3 of 10

GENERAL NOTES:

1.) *ALL CONSTRUCTION AND MATERIALS TO BE VERIFIED BY A GEOTECHNICAL CONSULTANT PRIOR TO CONSTRUCTION.*
2.) *CONTRACTOR SHALL NOTIFY ENGINEER IF SIGNIFICANT CHANGES ARE MADE TO GRADING PLAN.*
3.) *ALL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR, INSTALLED IN 6" – 8" LIFTS, OR AS DIRECTED BY GEOTECHNICAL CONSULTANT.*
4.) *CONTRACTOR SHALL PROVIDE TEMPORARY EROSION CONTROL MEASURES UNTIL CONSTRUCTION IS COMPLETE.*
5.) *ALL UTILITIES TO BE LOCATED PRIOR TO CONSTRUCTION (ONE CALL, CITY, ETC.).*
6.) *CONTRACTOR SHALL NOT DISTURB ANY MORE GROUND THAN IS NECESSARY FOR THE INSTALLATION OF IMPROVEMENTS & GRADING WORK.*
7.) *CONTRACTOR SHALL GRADE YARDS TO ENSURE THAT GROUND SLOPES AWAY FROM ALL BUILDINGS IN ALL DIRECTIONS.*



VICINITY MAP
SCALE: 1" = 2000'



LEGEND:

350 – *EXISTING CONTOUR*
350 – *PROPOSED CONTOUR*

0' 50' 100' 150'
SCALE: 1" = 50'

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GRADING PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

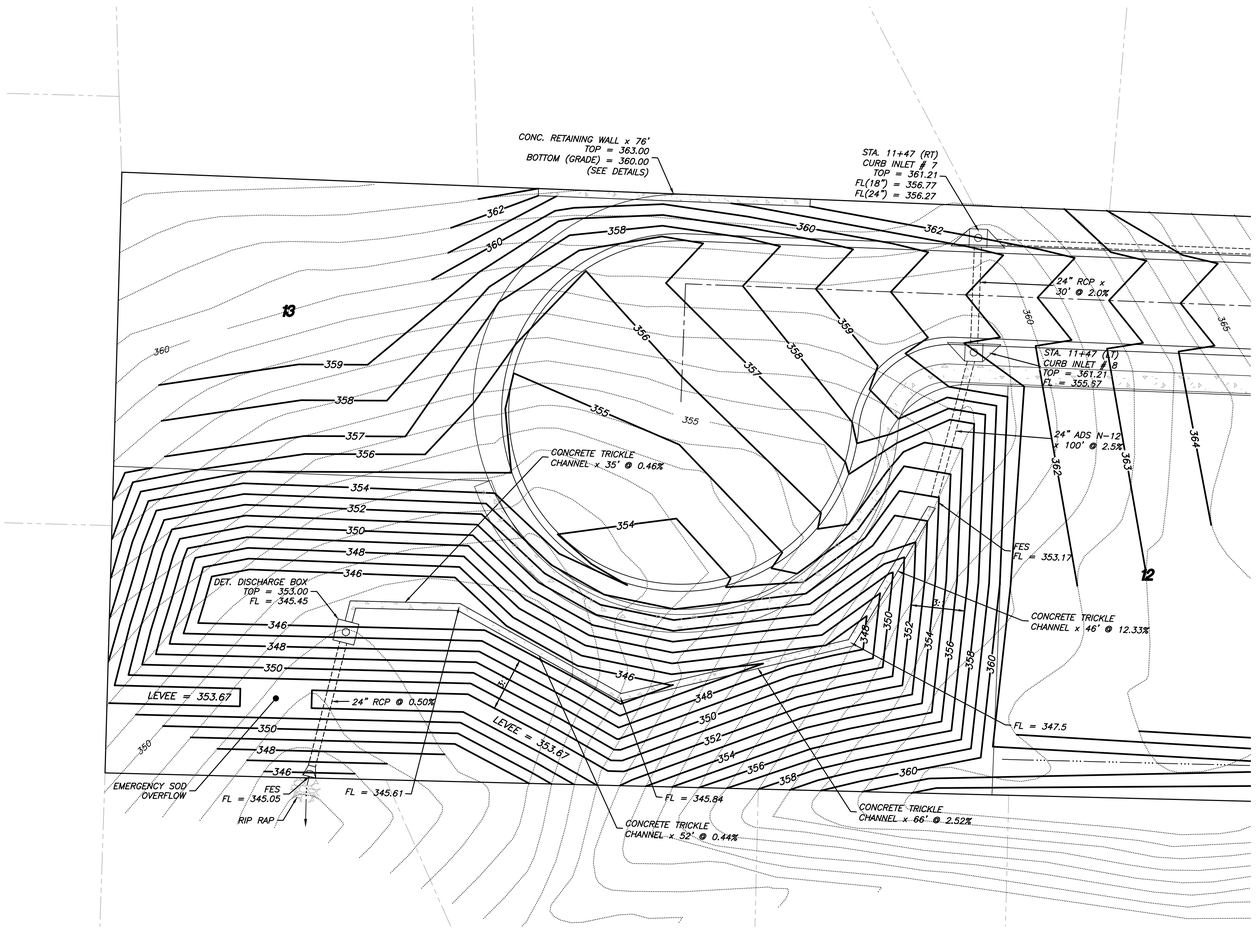
No.	Revisions	Date	By
1	Revised as per city's comments.	9-20-24	B. Judd
2	Revised as per city's comments.	10-1-24	B. Judd
3	Revised as per city's comments.	10-24-24	B. Judd

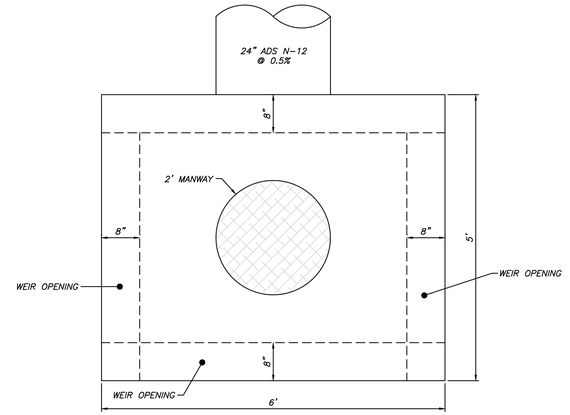
Project No.: 24-018
Date: JULY 9, 2024
File: 04_Hillcrest Grading
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 4 of 10

LEGEND:

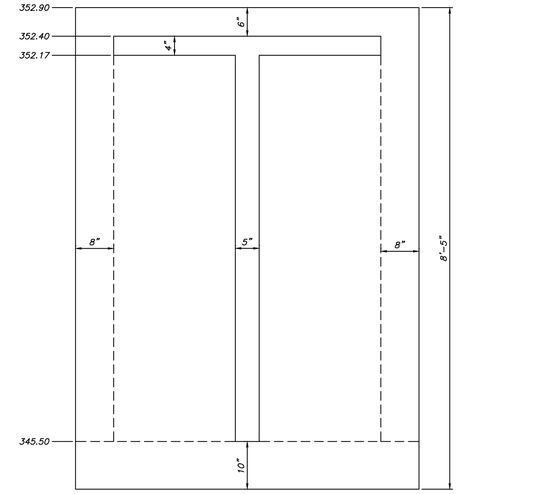
350 – EXISTING CONTOUR

350 – PROPOSED CONTOUR





TOP VIEW

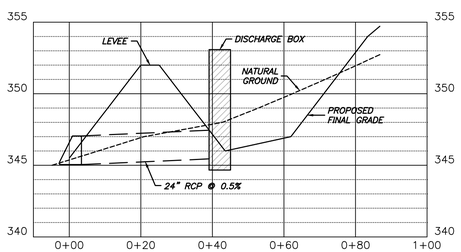


FRONT VIEW

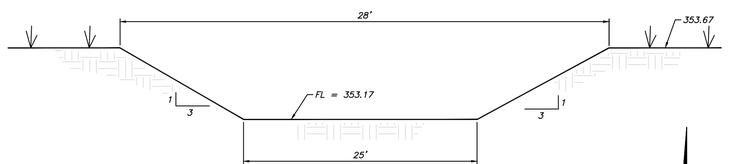
DISCHARGE STRUCTURE
NTS

GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO BE VERIFIED BY A GEOTECHNICAL CONSULTANT PRIOR TO CONSTRUCTION.
2.) CONTRACTOR SHALL NOTIFY ENGINEER IF SIGNIFICANT CHANGES ARE MADE TO GRADING PLAN.
3.) ALL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR, INSTALLED IN 6" – 8" LIFTS, OR AS DIRECTED BY GEOTECHNICAL CONSULTANT.
4.) CONTRACTOR SHALL PROVIDE TEMPORARY EROSION CONTROL MEASURES UNTIL CONSTRUCTION IS COMPLETE.
5.) ALL UTILITIES TO BE LOCATED PRIOR TO CONSTRUCTION (ONE CALL, CITY, ETC.).
6.) CONTRACTOR SHALL NOT DISTURB ANY MORE GROUND THAN IS NECESSARY FOR THE INSTALLATION OF IMPROVEMENTS & GRADING WORK.
7.) ALL LEVEES ASSOCIATED WITH DETENTION FACILITY SHALL NOT HAVE A SLOPE GREATER THAN 3:1.
8.) ALL AREAS OF DETENTION FACILITY SHALL INCLUDE SOLID SOD STABILIZATION.



(H) 1" = 20'
(V) 1" = 5'



DETAIL - EMERGENCY OVERFLOW
NTS



0' 20' 40' 60'

SCALE: 1" = 20'

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204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 843-5081 • FAX (501) 941-0959
ENGINEERING + SURVEYING
WATER • SEWER • TRANSPORTATION • SUBDIVISIONS

DETENTION POND PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

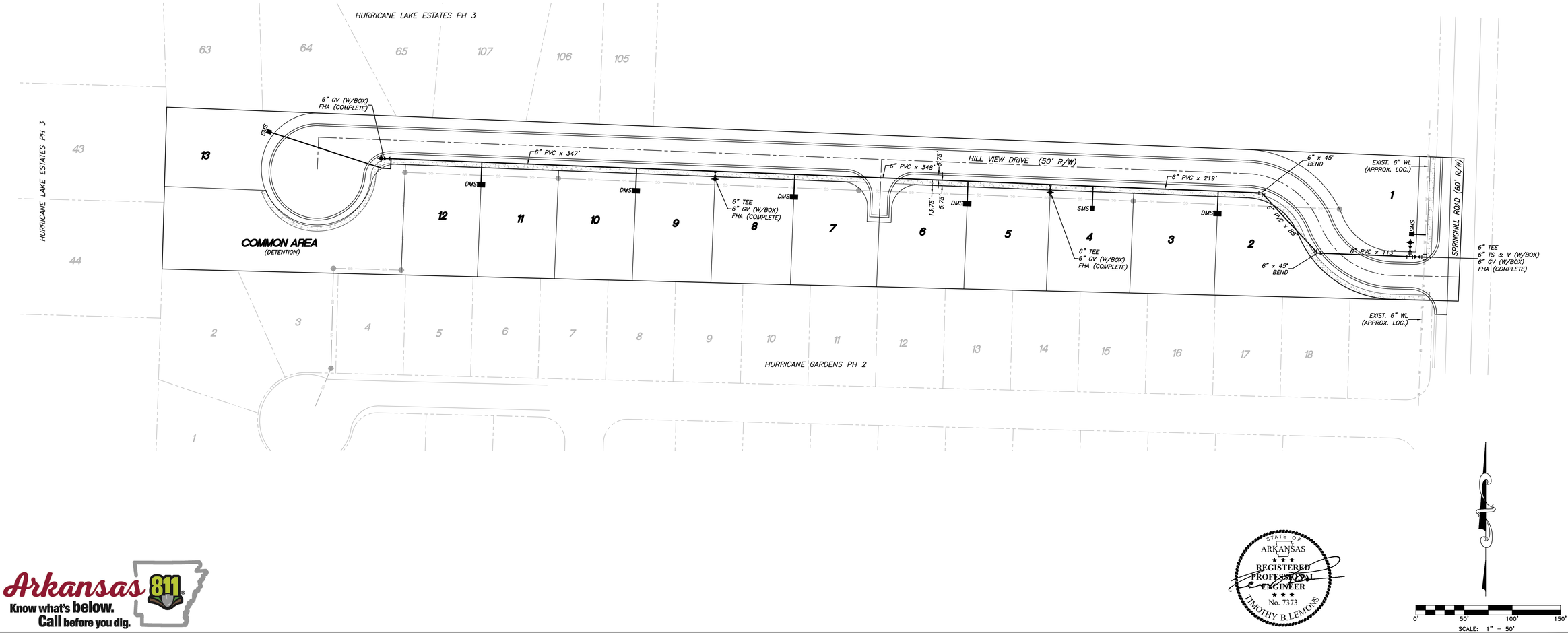
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Added cross section, revised per city's comments.	7-25-24	B. Judd
2	Revised as per city's comments.	8-29-24	B. Judd
3	Revised as per city's comments.	10-24-24	B. Judd

Project No.: 24-018
File: 05_Hillcrest Pond
Date: JULY 9, 2024
Scale: 1" = 20'
Drawn By: B. Judd
Sheet: 5 of 10

GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO MEET OR EXCEED SALEM WATER SPECIFICATIONS.
2.) INSTALL 12ga BLUE POLYETHELENE COATED SOLID COPPER WIRE IN A CONTINUOUS CIRCUIT UNDER ALL WATER MAINS AND SERVICE LINES. DIRECT BURY, WATERPROOF WIRE SPLICE CONNECTORS SHALL BE USED. TRACER WIRE SHALL BE TURNED UP AT ALL VALVES, HYDRANTS, METERS, AND BLOW-OFF'S.
3.) ALL FITTINGS SHALL BE DUCTILE IRON M.J. (WHERE AVAILABLE).
4.) ATTENTION IS CALLED TO DETAILS FOR ADDITIONAL INFORMATION.
5.) CONSTRUCTION SHALL COMPLY WITH SECTION XIV.A -ADH RULES PERTAINING TO PUBLIC WATER SYSTEMS THAT STATES: "THE OPERATING ROUTINE SHALL INCLUDE NECESSARY PROTECTIVE MEASURES TO DETECT AND REMOVE OR DESTROY ANY CONTAMINANT OF CONCERN OR REGULATION THAT MIGHT ENTER THE DISTRIBUTION SYSTEM. EVERY PRECAUTION MUST BE TAKEN AGAINST THE POSSIBILITY OF SEWAGE CONTAMINATION OF THE WATER IN THE DISTRIBUTION SYSTEM. WATER MAINS AND SANITARY SEWERS SHALL BE CONSTRUCTED AS FAR APART AS PRACTICABLE, AND SHALL BE SEPARATED BY UNDISTURBED AND COMPACTED EARTH. A MINIMUM HORIZONTAL DISTANCE OF TEN FEET SHOULD BE MAINTAINED BETWEEN WATER LINES AND SEWER LINES OR OTHER SOURCES OF CONTAMINATION. WATER LINES AND SEWERS SHALL NOT BE LAID IN THE SAME TRENCH EXCEPT ON THE WRITTEN APPROVAL OF THE ARKANSAS DEPARTMENT OF HEALTH. WATER MAINS NECESSARILY IN CLOSE PROXIMITY TO SEWERS MUST BE PLACED SO THAT THE BOTTOM OF THE WATER LINE WILL BE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE AT ITS HIGHEST POINT. IF THIS DISTANCE MUST UNAVOIDABLY BE REDUCED, THE WATER LINE OR THE SEWER LINE MUST BE ENCASED IN WATERTIGHT PIPE WITH SEALED WATERTIGHT ENDS EXTENDING AT LEAST TEN FEET EITHER SIDE OF THE CROSSING. ANY JOINT IN THE ENCASEMENT PIPE IS TO BE MECHANICALLY RESTRAINED. THE ENCASEMENT PIPE MAY BE VENTED TO THE SURFACE IF CARRYING WATER OR SEWER UNDER PRESSURE. WHERE A WATER LINE MUST UNAVOIDABLY PASS BENEATH THE SEWER LINE, AT LEAST 18 INCHES OF SEPARATION MUST BE MAINTAINED BETWEEN THE OUTSIDE OF THE TWO PIPES IN ADDITION TO THE PRECEDING ENCASEMENT REQUIREMENT. EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH. A MINIMUM HORIZONTAL DISTANCE OF THREE FEET SHALL BE MAINTAINED BETWEEN WATER LINES AND OTHER UNDERGROUND UTILITIES OF A NONSANITARY NATURE (GAS, ELECTRIC, ETC.). EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH.
6.) CONTRACTOR SHALL ADHERE TO CURRENT OSHA REGULATIONS FOR EXCAVATION & TRENCH SAFETY.
7.) CONTRACTOR TO ADHERE TO AWWA SPECS FOR BLOCKING.
8.) CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED PRIOR TO CONSTRUCTION.
9.) CONTRACTOR SHALL CONTACT WATER & WASTEWATER UTILITIES FOR ALL APPLICABLE INSPECTION & TESTING.
10.) CONTRACTOR SHALL CONTACT WATER & WASTEWATER UTILITIES AT LEAST 24 HOURS PRIOR TO DISRUPTION OF ANY SERVICE.
11.) ALL MATERIALS AND COMPONENTS INSTALLED IN DRINKING WATER SYSTEMS ARE REQUIRED TO COMPLY WITH THE FEDERAL DEFINITION OF "LEAD FREE" CONTAINED IN PUBLIC LAW 111-380.



0' 50' 100' 150'
SCALE: 1" = 50'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

Arkansas 811
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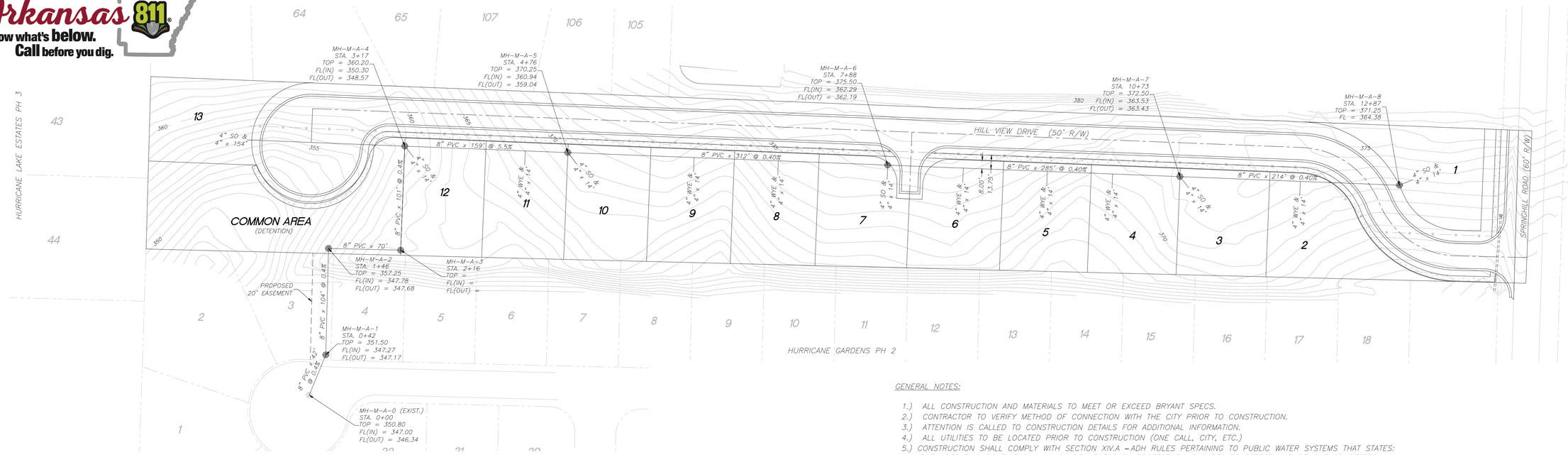
WATER LAYOUT
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1.	Revised as per city's comments.	8-20-24	B. Judd
2.	Revised as per city's comments.	9-20-24	B. Judd
3.	Revised as per city's comments.	10-24-24	B. Judd

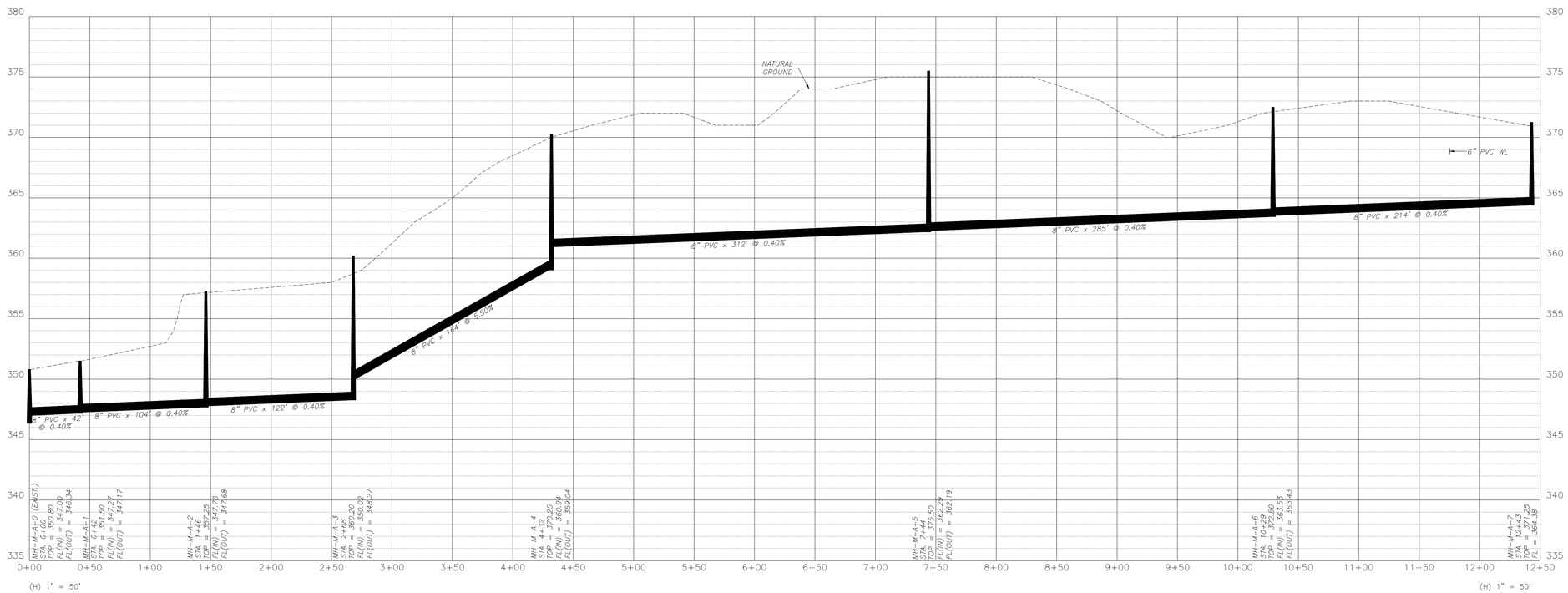
Project No. 24-018
Date: JULY 9, 2024
File: 06_Hillcrest Water
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 6 of 10

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GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO MEET OR EXCEED BRYANT SPECS.
2.) CONTRACTOR TO VERIFY METHOD OF CONNECTION WITH THE CITY PRIOR TO CONSTRUCTION.
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6.) CONTRACTOR TO ADHERE TO CURRENT OSHA EXCAVATION & TRENCH SAFETY REGULATIONS.
7.) BACKFILL FOR ALL DISTURBED (EXCAVATED) AREAS TO BE COMPACTED TO 95% SP.



(H) 1" = 50'
(V) 1" = 5'

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(V) 1" = 5'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

0' 50' 100' 150'
SCALE: 1" = 50'

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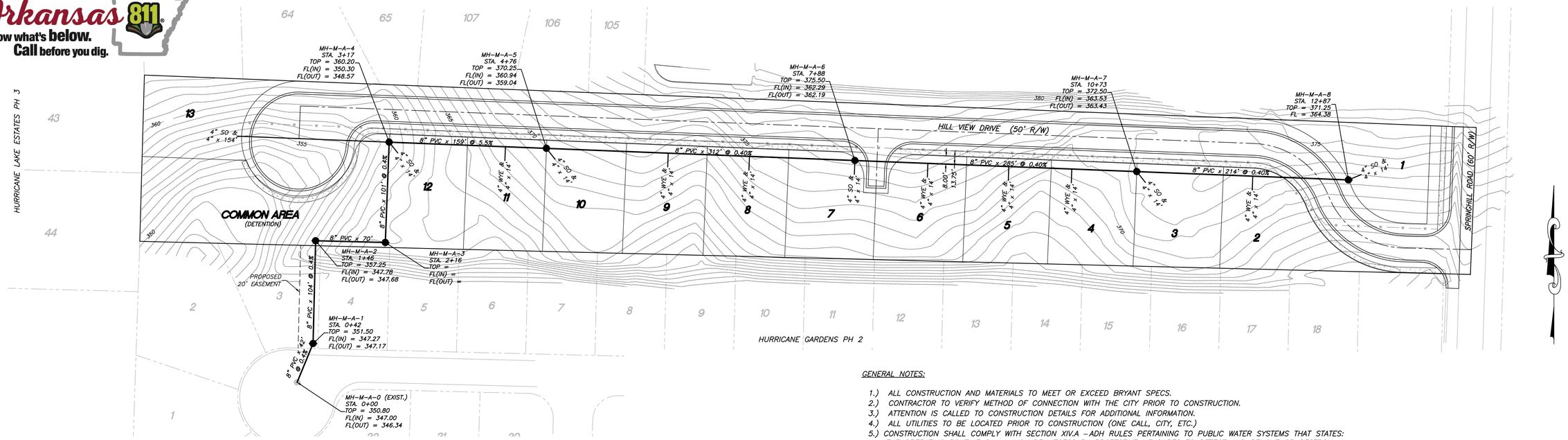
SEWER PLAN/PROFILE
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No:	Revisions	Date	By
1	Revised sewer design.	7-25-24	B. Judd
2	Revised as per city's comments.	9-20-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd

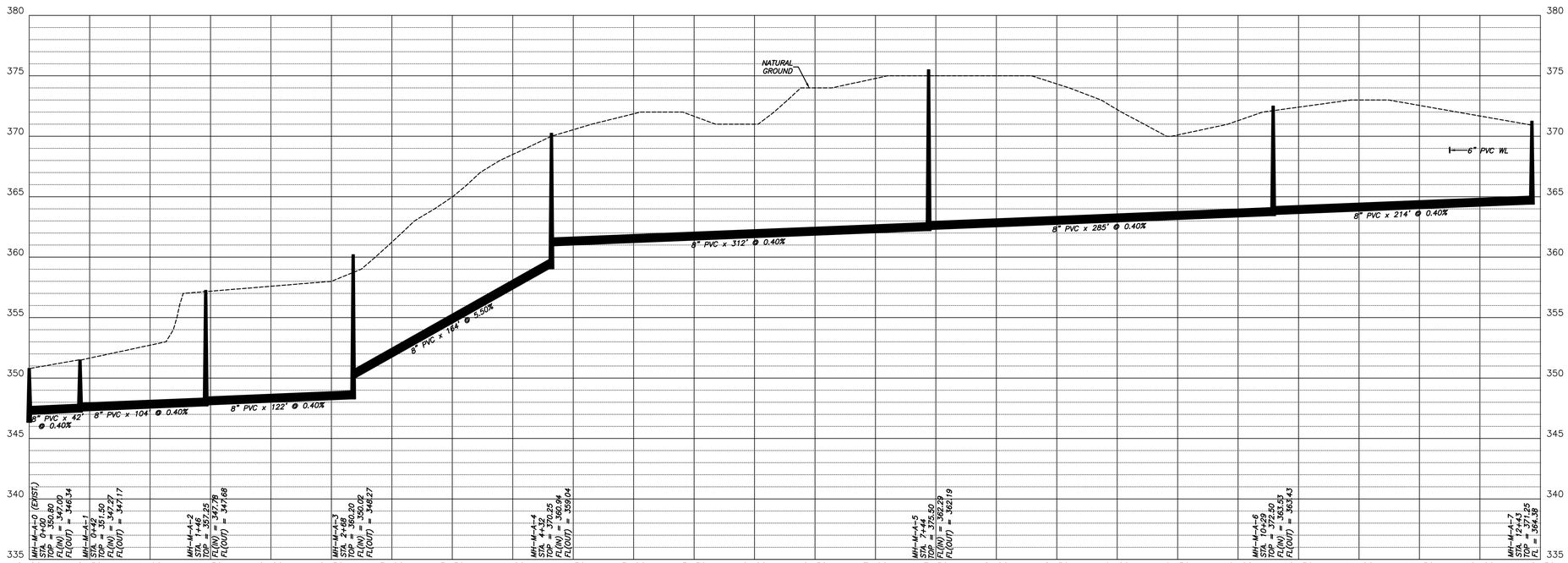
Project No: 24-018
Date: JULY 9, 2024
File: 08_Hillcrest Sewer
Scale: 1" = 50'
Sheet: 8 of 10
Drawn By: B. Judd

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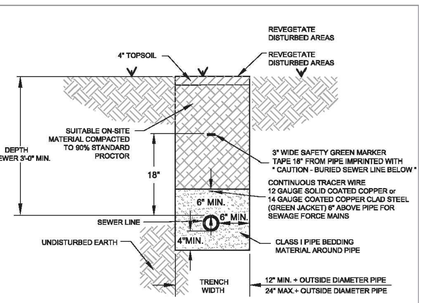
SEWER PLAN/PROFILE
HILLCREST ADDITION

PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised sewer profile.	7-25-24	B. Judd
2	Revised as per ADH's comments.	9-20-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No.: 24-018
Date: JULY 9, 2024
Scale: 1" = 50'
Drawn By: B. Judd
File: 08_Hillcrest Sewer
Sheet: 8 of 10



SEWER TRENCH

(NON-PAVED AREA)

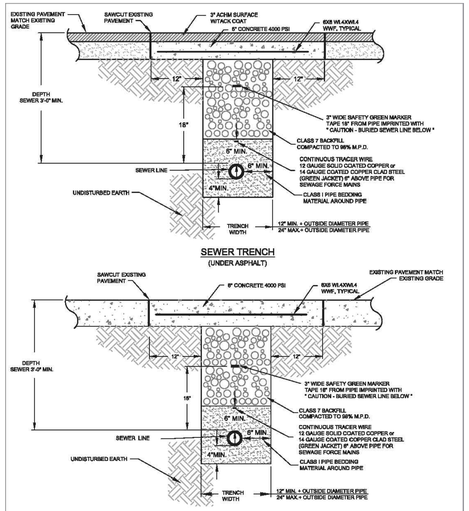
NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER TRENCH (NON-PAVED AREA) — DRAWN BY: — CHECKED BY: — FILE: S1-Sewer Trench (Non-Paved Area).dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S1



SEWER TRENCH

(UNDER ASPHALT)

SEWER TRENCH

(UNDER CONCRETE)

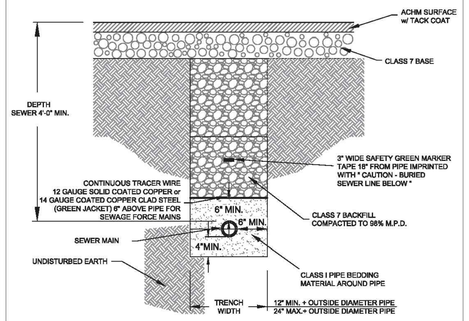
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3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER TRENCH (UNDER PAVEMENT) — DRAWN BY: — CHECKED BY: — FILE: S2-Sewer Trench (Under Pavement).dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S2



SEWER MAIN INSTALLATION

PRIOR TO ROADWAY CONSTRUCTION

NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
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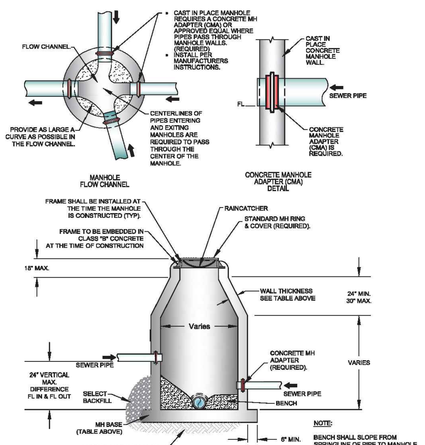
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER MAIN INSTALLATION PRIOR TO ROADWAY CONSTRUCTION — DRAWN BY: — CHECKED BY: — FILE: S3-Sewer Main Installation Prior to Roadway Const.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S3

Inside Diameter of Manhole	Minimum Wall Thickness	Base Thickness	Minimum Ring & Cover Size
4' DIA	6"	8"	24" (< or Equal to 24" Pipes)
5' DIA	8"	8"	30" (> 24" Pipes)
6' DIA	8"	12"	

MANHOLE INFORMATION TABLE



NOTE:

BENCH SHALL SLOPE FROM SPRINGLINE OF PIPE TO MANHOLE WALL. OUTLET CHANNEL SHALL BE FULL DEPTH "L" FROM CENTER OF MANHOLE TO WALL.

CAST-IN-PLACE MANHOLE

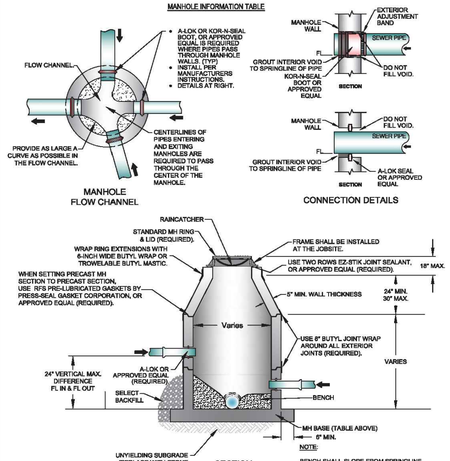
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: CAST-IN-PLACE MANHOLE — DRAWN BY: — CHECKED BY: — FILE: S4-Cast In Place Manhole.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S4

Inside Diameter of Manhole	Minimum Wall Thickness	Base Thickness	Minimum Ring & Cover Size
4' DIA	5"	6"	24" (< or Equal to 24" Pipes)
5' DIA	7"	8"	30" (> 24" Pipes)
6' DIA	7"	8"	

MANHOLE INFORMATION TABLE



NOTE:

BENCH SHALL SLOPE FROM SPRINGLINE OF PIPE TO MANHOLE WALL. OUTLET CHANNEL SHALL BE FULL DEPTH "L" FROM CENTER OF MANHOLE TO WALL.

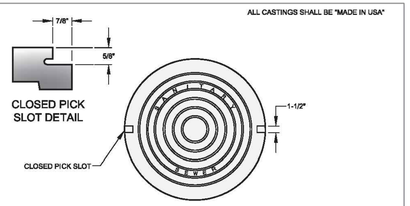
PRECAST MANHOLE

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: PRECAST MANHOLE — DRAWN BY: — CHECKED BY: — FILE: S5-Precast Manhole.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S5

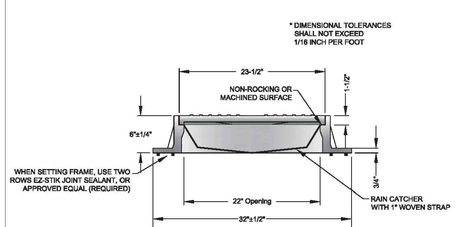
ALL CASTINGS SHALL BE "MADE IN USA"



COVER DETAIL

1. MINIMUM WEIGHT OF RING: 100 POUNDS
2. MINIMUM WEIGHT OF COVER: 110 POUNDS
3. COVERS ARE FURNISHED WITH TWO CLOSED PICK SLOTS.
4. CASTINGS SHALL BE "MADE IN USA"

* DIMENSIONAL TOLERANCES SHALL NOT EXCEED 1/16 INCH PER FOOT

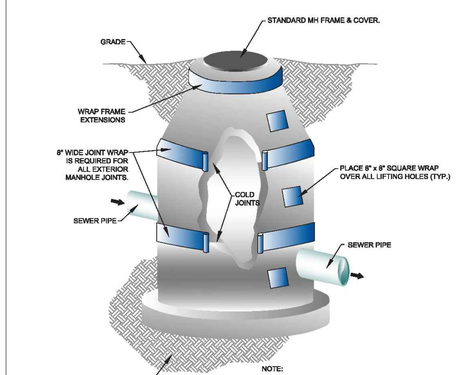


FRAME AND COVER DETAIL

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: MANHOLE FRAME AND COVER — DRAWN BY: — CHECKED BY: — FILE: S6-Manhole Frame and Cover.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S6



NOTE:

JOINT WRAP TO BE USED:

- ON OUTSIDE OF COLD JOINTS
- ON EXTERIOR OF ALL PRECAST MANHOLE JOINTS
- ON LIFT HOLES / SOCKETS

MANHOLE JOINT WRAP

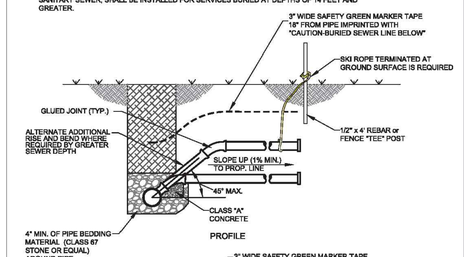
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

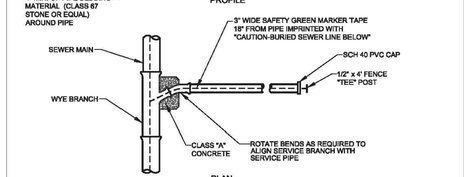
TITLE: SEWER DETAILS — DESCRIPTION: MANHOLE JOINT WRAP — DRAWN BY: — CHECKED BY: — FILE: S9-Manhole Joint Wrap.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S9

NOTES:

1. MODIFIED RISER LATERAL SHALL BE USED WHEN DEPTH OF COVER EXCEEDS 7'-0"
2. PLACE CLASS "A" CONCRETE UNDER EACH WYE BRANCH TO PREVENT CRACKING OR TWISTING UNDER EARTH LOADS.
3. SERVICE LATERAL STUBS SHALL TERMINATE AT LEAST 2 FEET INSIDE THE PROPERTY LINE BUT IN NO CASE SHALL THE SERVICE LATERAL STUB TERMINATE AT A DISTANCE LESS THAN 8 FEET FROM THE SANITARY SEWER MAIN.
4. BURY A 1/2" x 4' STEEL TEE FENCE POST AT END OF SERVICE LATERAL STUB AND BACKFILL TO FINISHED GRADE OF PROPERTY.
5. 4" DUCTILE IRON PIPE, LINED FOR SANITARY SEWER AND 4" DUCTILE IRON M.J. FITTINGS, LINED FOR SANITARY SEWER, SHALL BE INSTALLED FOR SERVICES BURIED AT DEPTHS OF 14 FEET AND GREATER.



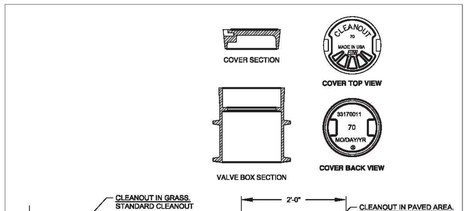


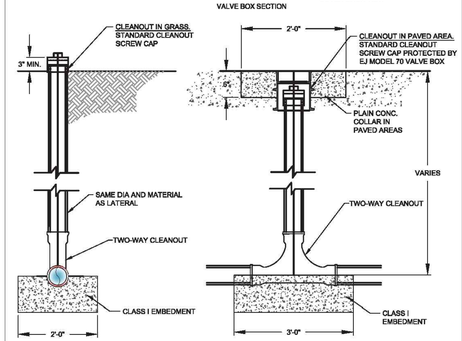
SEWER SERVICE LATERAL

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER SERVICE LATERAL — DRAWN BY: — CHECKED BY: — FILE: S15-Sewer Service Lateral.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S15





TYPICAL CLEANOUT

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER SERVICE CLEANOUT — DRAWN BY: — CHECKED BY: — FILE: S16-Sewer Service Cleanout.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S16

LEMONS ENGINEERING CONSULTANTS, INC.
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CABOT, ARKANSAS 72023
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CONSTRUCTION DETAILS – SEWER
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For: Springhill HWY 5 Development, LLC 816 E. Oak Street Conway, Arkansas 72032

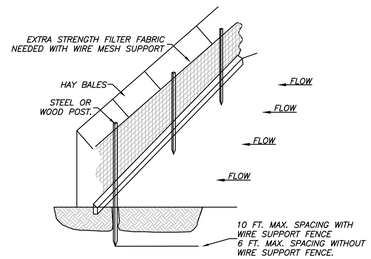
No.	Revisions	Date	By

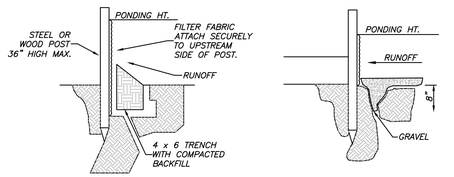
Date: JULY 9, 2024
Scale: N.T.S.
Drawn By: B. Judd
Project No.: 24-018
File: 09_Hillcrest CD Sewer
Sheet: 9 of 10

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

GENERAL NOTES:

1.) A SILT FENCE AND STRAW BALE DIKE SHALL BE PLACED AT POTENTIAL LOCATIONS OF HEAVY EROSION.
2.) TEMPORARY STRAW BALE DIKES ARE TO BE CONSTRUCTED NOT TO POND WATER ON ADJACENT PROPERTY.
3.) ALL TEMPORARY EROSION CONTROLS SHALL BE MAINTAINED UNTIL ALL CONSTRUCTION IS COMPLETE & PERMANENT GROUND COVER HAS BEEN ESTABLISHED.
4.) ONE OF THE FOLLOWING GROUND COVER METHODS SHALL BE USED AT AREAS OF CLEARING OTHER THAN FUTURE PAVEMENT SURFACES:
STRAW OR HAY–LOOSE 2.0 TONS/ACRE
STRAW OR HAY–TIED, ANCHORED, OR TACKED 1.5 TONS/ACRE
5.) SOIL EXPOSED FOR MORE THAN 14 DAYS WITH NO CONSTRUCTION ACTIVITY SHALL BE SEEDED OR REVEGITATED.
6.) CONSTRUCTION EXITS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING ON FLOW OF MUD INTO PUBLIC RIGHT–OF–WAY.
7.) ADDITIONAL EROSION CONTROL MEASURES WILL BE EMPLOYED WHERE NECESSARY BY SITE CONDITIONS.
8.) CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EROSION CONTROL MEASURES & PROVIDE RAIN FALL MONITORING & BI–WEEKLY INSPECTION REPORTS IN ACCORDANCE WITH THE NPDES PERMIT REQUIREMENTS.
9.) CONTRACTOR SHALL USE "BEST MANAGEMENT PRACTICES" (BMP'S) WHEN IMPLEMENTING & MAINTAINING SEDIMENT & RUN–OFF CONTROLS.
10.) THE USE OF "BIO–DEGRADABLE SOCK" IS ALLOWED AS OPPOSED TO SILT FENCE.





STANDARD DETAIL
TRENCH WITH NATIVE GRAVEL

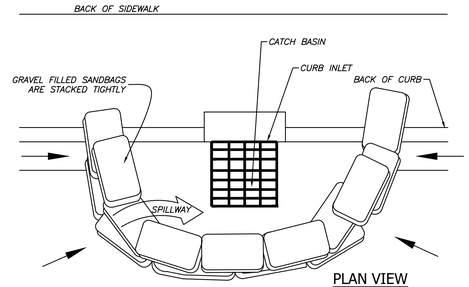
ALTERNATE DETAIL
TRENCH WITH GRAVEL

NOTE:
1.) INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.

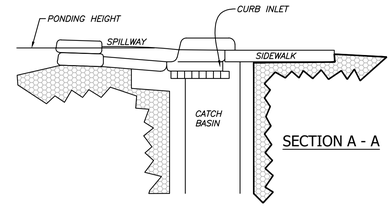
2.) REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND CAN BE PERMANENTLY STABILIZED.

3.) SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE
NTS



PLAN VIEW



SECTION A - A

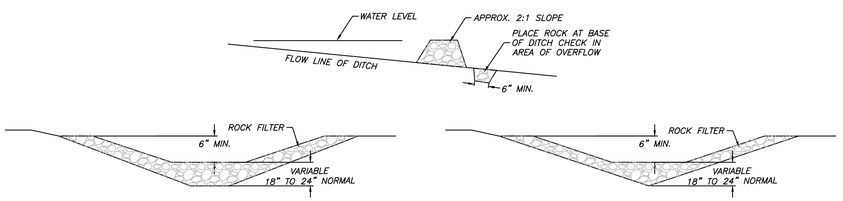
NOTES:
1.) PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.

2.) SANDBAGS OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC ARE FILLED WITH GRAVEL, LAYERED, AND PACKED TIGHTLY.

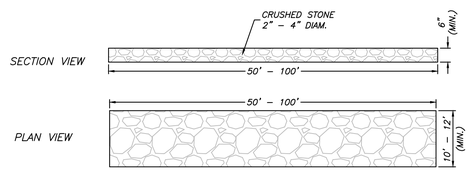
3.) LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.

4.) INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

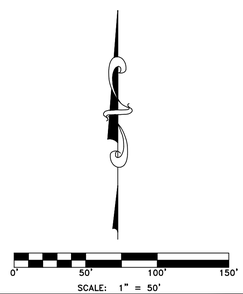
CURB INLET
SEDIMENT BARRIER
NTS



ROCK CHECK DAM
NTS



STABILIZED CONSTRUCTION ENTRANCE
NTS



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EROSION CONTROL PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T–1–S, R–14–W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	10-23-24	B. Judd
2	Revised as per city's comments.	10-24-24	B. Judd
3	Revised as per city's comments.		

Project No.: 24–018
File: 10_Hillcrest Erosion
Date: JULY 9, 2024
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 10 of 10

Lemons Engineering Consultants, Inc.
204 West Cherry Street
Cabot, Arkansas 72023
(501) 605-7565
arstrep43@gmail.com

October 21, 2024

Mr. Colton Leonard, City Planner
City of Bryant, Arkansas
Community Development
210 SW 3rd Street
Bryant, Arkansas 72022

Re: Preliminary Plat
3927 Springhill Road, Bryant, AR
Parcel # 840-11855-000

Dear Mr. Leonard:

Enclosed you will find the revised Civil Plans, and Drainage Report as pertaining to the referenced project. A brief summary of the revisions are as follows. Please review the attached revised plans, and include this project on the agenda of the next available City of Bryant Planning Commission Meeting.

Public Works

1. Discuss where the sewer will tie in. ***Connection is planned within the Hurricane Gardens development. See plans.***
2. Will roads be Public or Private? ***Public.***
3. Discuss Half Street Improvements. ***Half Street Improvements have been added to the revised plans as per the City's Master Plan.***
4. Core Sample Test will be required per Bryant Minimum Street Specifications. ***The test results shall be provided to the city upon receipt.***
5. ADA Compliant Ramps will be required at Crosswalk. ***References to this requirement have been added to the revised plans.***
6. Additional "No Parking" signs will be required beyond the two that are listed. ***See revised plans showing the placement of such signs.***

Stormwater

1. Discuss downstream drainage issues into Hurricane Gardens Subdivision? ***Since the original submittal, we have added a swale along the South property line of the subject tract, which is near***

the North subdivision line of Hurricane Gardens. This is shown on the revised plan and is taken into account with the revised Drainage Report. With the construction of the street within Hillcrest Addition, along with the swale along the South, the amount of discharge into the rear of the lots of Hurricane Gardens will be tremendously reduced, and in most cases, completely removed.

2. Discuss Storm Plans in detail (Piping, detention, retention, street inlets).

- ***a. As the City is aware, the property to the North of Hurricane Gardens drains directly into the rear of the lots along the North side of that development. The source of this stormwater is not only that which falls on the vacant land of the proposed Hillcrest Addition, but also a large area located to the North of the proposed Hillcrest Addition. In short, the Hurricane Gardens area is receiving approximately 10 acres of runoff into the rear of said lots. There are two items planned that should help the residents of Hurricane Gardens. First, the construction of the proposed street in the Hillcrest Addition development will help divert the stormwater away from the Hurricane Gardens lots by diverting it to the proposed detention pond near the Southwest corner of Hillcrest. Second, the addition of the swale along the South line of Hillcrest should catch the stormwater that will be falling on the rear of the lots in Hillcrest, to the same detention pond.***
- ***b. The piping and inlets are design to accommodate a 25 year storm as opposed to the required 10 year storm. Again, attention is called to the Revised Drainage Report.***

3. Detention basin outflow pipe is shown to be ADS. It is required to be RCP. ***This has been revised as requested.***

Engineering

1. Verify drainage area. Topography and eye witness accounts indicate the site receives runoff from north and east off-site and Springhill road. ***This has been verified.***

2. 0890-DRN-03.PDF

a. This off-site drainage plan shows the drainage basins that exist are apparently based upon the contours from Bryant's GIS, even though there is no reference to the source of the base map and contours***. Information added to the Drainage Report.***

b. There does not appear to be any basins delineated which extend to the south property line of the proposed subdivision. Provide a map showing the pre-development basins for the site, with checkpoints at all locations where flows leave the site. ***Information and maps added to the Drainage Report.***

3. 0890-PLN-02.PDF

a. On sheet 1, some of the lot dimensions are obscured on the drawing. ***This has been revised.***

b. On sheet 2:

i. the curb and gutter detail does not match the detail show in the City of Bryant's standard curb and gutter section, Detail 7; ***This has been revised.***

ii. The typical street section does not match Detail 1 of the City of Bryant's typical section for Local 1 / Residential Streets; ***This has been revised.***

iii. The pavement structure detail shown does not match the typical street section, see 3.b.ii. above. ***This has been revised.***

c. On sheet 3:

i. The grading plan shows that grades will continue to slope south from the south curb and gutter on the street, unlike shown in the drainage calculations (see section 4 below). ***Grading Plan has been revised.***

ii. Significant stormwater is being allowed to drain off of the site to the south, it is recommended that the engineer look at diverting flow to the detention pond. ***A swale has been added along the South property line to assist in diverting flow away from homes within Hurricane Gardens. See revised plans.***

iii. Will a separate drainage plan be developed for the plans? Profiles for the storm drainage? ***Drainage profiles have been added to the plans.***

iv. How will the discharge to Springhill Road be detained so that there is no increase in runoff from that part of the project? ***Due to the relatively small area flowing into the culvert system near the Southeast corner of the proposed development, no detention is being provided. However, the existing culvert does appear to have the capacity to accept the small increase in flow. This is further explained in the Drainage Report under the "Culvert Sizing Section (Junc Box 3)".***

d. On sheet 4:

i. Include a trickle channel in the pond; ***Added.***

ii. Include an emergency overflow for the pond, designed for the 100-year flow. This overflow must be 1-ft below the top of the levee. ***Added as applicable (see comment vii below).***

iii. Verify that the slopes inside and outside of the pond are no steeper than 3 horizontal : 1 vertical. ***All slopes have been verified.***

iv. The outfall structure detail of the pond shown on the drawing is not labeled or titled. Show slopes, elevations, etc. ***Information added as requested.***

v. Provide solid sodding inside of the pond. ***A note pertaining to this item has been added to the plans.***

vi. How far will the closest building be to the pond? ***Approximately 50 feet.***

vii. The top of the levee on the detention pond must be 2-ft above the outfall box, include 1-ft of freeboard, and be 1-ft higher than the 100-year elevation inside of the pond. ***Based on our present model, we can only provide 18" of the requested 2'. We ask that the City grant a waiver on the 6" difference.***

viii. What downstream scour protection will there be below the outfall pipe? ***Rip rap is planned for the discharge culvert from the pond.***

ix. What checks have been performed in the drain to the southwest? Verify that the flows will not exceed the current flows in this area. ***See Drainage Report under "Downstream Considerations".***

x. Provide Scour protection from the inflow pipe on the east end of the pond. ***A concrete trickle channel has been added to the end of the inflow FES.***

e. On sheet 5:

i. The main water line must be at least 8" up to the last fire hydrant, see city specifications. ***This has been revised.***

ii. The last fire hydrant shown on the west side of the cul-de-sac should be moved to the east side of the cul-de-sac. ***Revised as requested.***

4. Drainage Calculations:

a. For the runoff coefficient calculations on pages 5 and 6, please explain which basins A1, A2, A3, and A4 reflect. What about Basins B1 thru D3 and Ao thru Do2? **We have completely revised the attached Drainage Report for clarity. Please review.**

b. Each return storm has it's own C-factor. Show the C-factor used for each of the return storms, on each basin***. This was shown in the previous revised report.***

c. Detention pond design volume must be increased by 25% as a safety factor. ***At the 25 year storm elevation (in the pond) the volume is 21,300.7 cf. At the 100 year storm elevation, the volume is 31,596.5 cf. That is above the 25% safety factor.***

d. The emergency overflow spillway must be designed for the 100-year storm + 50% for blockage. ***Emergency spillway has the required capacity of 44.22 cfs. See Drainage Report "Overflow Structure Detail", sheet 33.***

e. The map on page 9 does not show the pre-development basins, including the current discharge locations from the site. ***Study Points have been added to all maps.***

f. Determine pre-development basins from the same discharge points for both pre-development and post-development conditions. ***The comparison between Pre and Post flowrates are shown near the end of the Drainage Report under "Study Point Summary".***

g. The basins shown on the map on page 10 does not reflect what the grading plan shows, see sheet 3 in the plans. It shows drainage of half of the lots going to the street, when the grading plan shows that flows will go to the south. ***This has been corrected. See revised Drainage Report and attached Maps.***

h. Show check points for each basin so calculations can be followed. ***Check points have been added to the maps within the Drainage Report.***

i. Show the hydraulic grade calculations for all of the storm drainage on the project (see section 600 in the stormwater manual). ***This has been added to the Drainage Report.***

j. Adjust drainage calculations for all flows for a 28-ft street instead of a 27-ft street. ***Revised.***

k. Show calculations for emergency spillway (include 50% blockage). ***See previous comment and response.***

l. Are the time of concentration calculations on pages 16 and 17 showing that there is the same velocity for all basins? Which basins do these graphs apply to for the pond? ***This is a comprehensive analysis using the entire watershed. However, individual tc values have been computed for each pre construction watershed (see revised Drainage Report).***

m. On page 15 it refers to the C-factor for the detention facility was shown on pages 5 and 6 but the C-factor is different for each storm event, and that is not reflected on pages 5 and 6***. This was revised in an earlier submittal (See sheets 6 and 7 of the Drainage Report).***

n. For the detention pond calculations, what basin(s) did you use for the pre- and post-development peak flows? ***The areas behind the proposed houses in this new development were not included in the Detention computations. However, we have added a sod swale along the South of this development that will assist in sending most, if not all of the area to the Detention facility. See revised plans.***

o. Sheet 4 in the plans shows a detail for a box with a slotted weir topped with a 5" high rectangular weir. Please verify that calculations reflect the correct weir type***. Yes the calculations are based on this type of weir.***

p. Refer to section 1000.4.3 of the stormwater manual for multi-stage outlet design considerations. ***After reviewing this section, it is our opinion that the design does meet this consideration.***

q. Refer to section 1000.5.6 of the stormwater manual for configuration of the outlet structure. ***After reviewing this section, it is our opinion that the design does meet said section.***

r. Note allowable computer software in section 600.6 of the stormwater manual***. Our program is based on the City of Rogers Drainage Manual which has been used by basically all municipalities in Northwest Arkansas, and is considered an acceptable method.***

Com Dev

1. Cul-de-sac turnarounds must have a 50ft radius. Currently the plans show 49' to BOC. ***This has been revised as requested.***

2. According to Subdivision Code, Cul-de-sac streets or courts designed to have one end permanently closed shall be no more than 550' long. This will have to be met or a modification from the subdivision code for a waiver on this requirement will have to be requested. ***Considering that all properties adjacent to this development have been developed, we formally ask for this waiver.***
3. Half-Street improvements to Springhill are required as part of this development. Springhill is designated as a minor arterial with a trail along the East Side. ***Plans have been modified to show this.***
4. Typical street cross section shown on page 3 of plans does not meet our street specifications. City Street specification for local road shown below. ***This has been corrected. Please see attached revised plans.***
5. Will this street be privately owned/maintained? ***Street shall be public.***
6. Discuss stormwater and outfall of detention pond area. ***See previous responses in this letter.***
7. Preliminary Plat application fees required to be paid $664. ***I will inform the owner.***

Please let me know if you need anything additional.

Sincerely,



Tim Lemons, PE

Lemons Engineering Consultants, Inc.
204 West Cherry Street
Cabot, Arkansas 72023
(501) 605-7565
arstrep43@gmail.com

October 24, 2024

Mr. Colton Leonard, City Planner &
Mr. Kelly Vanlandingham, PE, City Engineer
City of Bryant, Arkansas
Community Development
210 SW 3rd Street
Bryant, Arkansas 72022

Re: Preliminary Plat
3927 Springhill Road, Bryant, AR
Parcel # 840-11855-000

Dear Mr. Leonard and Mr. Vanlandingham:

Please accept this letter in response to your latest comments as provided in an email on October 22. 2024. I will address the items in the order expressed (my response is shown in ***bold italicized***):

Drainage Calculations

1. The contours on the post construction drainage map (page 15) are so bold that I cannot read the inlet numbers or the flows. ***Not sure what the issue is on this matter. The separate pdf (large scale) that was a separate attachment shows up fine on our computers. I am resending it (full size).***
2. At the bottom of page 20 Q bypass says 0% but it should be 32.6%. ***Whereas the amount of by pass is correct, I did not adjust the percentage. This typo has been corrected. The amount of by pass was included in the down stream inlet.***
3. Page 33, show calculations for slotted weir. Is clogging included in the calculations? ***Yes. The vertical opening in the weir structure (below the 100 year storm elevation) is 2.78 sf. The horizontal opening on three sides of the box add 4.00 sf of opening, for a total of 6.78 sf. This is well more than what is needed for clogging.***
4. Page 34, detention pond calculations must show that post-construction flows from the pond are less than the pre-construction flows for 2, 5, 10, 25, 50, and 100 year storms (Section 1000.5.6, paragraph 2). ***This is actually presented in the Summary-Detention Chart shown on Sheet 33.***

Drainage maps

1. The post-construction map shows the discharge from Control Point A as being 12.88 cfs. Page 34 in the calculations shows it as being 16.81 cfs. ***This has been corrected. See attached revised map.***
2. The post-construction map shows discharge from Control Point B and C and there is no discharge shown in the calculations. ***This has been corrected. See attached revised map.***
3. The post-construction map shows discharge from Control Point D as being 17.74 cfs but the calculations on page 34 show 38.08 cfs with no detention and 16.45 cfs with detention. ***This has been corrected. See attached revised map.***

Construction Plans

1. Sheet 3 of 10 shows the existing18" culvert stopping just behind the curb of the half-street improvements. Since the existing ditch will be graded over, it appears that this pipe should be extended to the north and pick up flow from the north. ***We will need to consult the owners as to when the half street improvements will be constructed. If the City and the Owner agree to an in leu of cost clause, the pipe will need to end in the vicinity of where it is shown on the existing plans. We are willing to discuss this with staff.***
2. Sheet 3 of 10, show the existing ditch & culvert to the south of JB#3 along Springhill Road. Show details on how the outlet looks and how the flow will be handled to the south. ***We will be matching the existing half street road improvements from our planned intersection, to the South. This has been added to this sheet.***
3. Sheet 5 of 10, show inlet numbers. ***Added as requested.***
4. Sheet 5 of 10, Is the top 4" slot all the way around the box beneath the top? ***Yes. I have added additional information on this detail to better represent this item.***

Please let me know if you need anything additional.

Sincerely,



Tim Lemons, PE

Drainage Report

For

Hillcrest Addition

Springhill Road
Bryant, Arkansas

Revised: October 24, 2024

Prepared By:

Lemons Engineering Consultants, Inc.
204 West Cherry Street
Cabot, Arkansas 72023
(501) 605-7565
arstrep43@gmail.com

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Project Information

Project Title:	Hillcrest Addition
Project Description:	13 lot single family development located on the West side of Springhill Road, North of and adjacent to Hurricane Gardens, Bryant, Arkansas (address: 3927 Springhill Road)
Owner/Developer:	Springhill – Hwy 5 Development, LLC 816 East Oak Street Conway, Arkansas 72032
Engineer of Record:	Lemons Engineering Consultants, Inc. Tim Lemons, PE 204 Cherry Street Cabot, Arkansas 72023 (501) 605-7565

General Information

This proposed development shall include 13 single family lots. This property is essentially the Northern Most tract of land within the city limits of Bryant as it presently exist. The property to the North of the subject site is developed with duplex style residential structures existing outside the City limits of Bryant. The property to the South is an established subdivision (Hurricane Gardens). The property drains North to South. There have been several reports of drainage issues by the residents of Hurricane Gardens. At present, the drainage from the subject property, and that to the north of the subject property, flows onto Hurricane Gardens. No detention exists on the property located north of the subject property.

The objectives of this report are as follows:

1) Determine the estimated increase in runoff due to the development of Hillcrest Addition.
2) Provide design computations for a detention facility to bring the runoff from said tract to pre-construction rate.
3) Based on comments expressed by the residents, divert as much flow as possible away from the rear of the Northern most lots within Hurricane Gardens. As previously stated, the majority of the property to the North of Hurricane Gardens flows into the rear of the Northern most lots, creating an issue for the property owners.
4) Size the infrastructure in the development using the City's Drainage Code.
5) Compare the estimated Pre and Post flowrates at specific control points to show that the overall runoff from Hillcrest is at or less than the pre-construction flowrate.

The control points (A-D) to be used in this analysis are shown on the following vicinity map, and throughout this report.

Project Vicinity Map



Source: ARCOUNTYDATA.com

Hydrological Computations

For this analysis, we will use the Rational Method in determining culvert sizes, culvert capacity computations, and other related issues on site. The total watershed size for this development is estimated at 12.40 acres. Attention is called to the Watershed Map included in this report. As per the Rational Method, the following equation is used:

Q = C x I x A, where:
- Q = Flowrate (cfs)
- C = Runoff Coefficient
- I = Intensity (from tables)
- A = area (acres)

The selection of the appropriate intensity is based on the estimated time of concentration (tc).

Determination of Runoff Coefficients "C"

In determining the Pre Construction C, we must consider the property to the North that is developed, and discharging onto the subject property. The C factor for Pre and Post Conditions are based on Table 400-1 "Runoff Coefficients for Surface Types" as provided in the Bryant Drainage Manual. A factored (weighted) value of C is determined in the following tables:

Pre Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	0.19	0.29	4.59	0.41
5	0.8	3.04	0.32	4.73	0.8	0.19	0.32	4.59	0.44
10	0.83	3.04	0.35	4.73	0.83	0.19	0.35	4.59	0.47
25	0.88	3.04	0.39	4.73	0.88	0.19	0.39	4.59	0.52
50	0.92	3.04	0.42	4.73	0.92	0.19	0.42	4.59	0.55
100	0.97	3.04	0.46	4.73	0.97	0.19	0.46	4.59	0.59

C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

Post Construction Conditions

Storm Event	Off Site C1	Off Site A1 (acres)	Off Site C2	Off Site A2 (acres)	On Site C3	On Site A3 (acres)	On Site C4	On Site A4 (acres)	Weighted C Factor
2	0.75	3.04	0.29	4.73	0.75	1.81	0.29	3.07	0.47
5	0.8	3.04	0.32	4.73	0.8	1.81	0.32	3.07	0.50
10	0.83	3.04	0.35	4.73	0.83	1.81	0.35	3.07	0.53
25	0.88	3.04	0.39	4.73	0.88	1.81	0.39	3.07	0.58
50	0.92	3.04	0.42	4.73	0.92	1.81	0.42	3.07	0.61
100	0.97	3.04	0.46	4.73	0.97	1.81	0.46	3.07	0.66

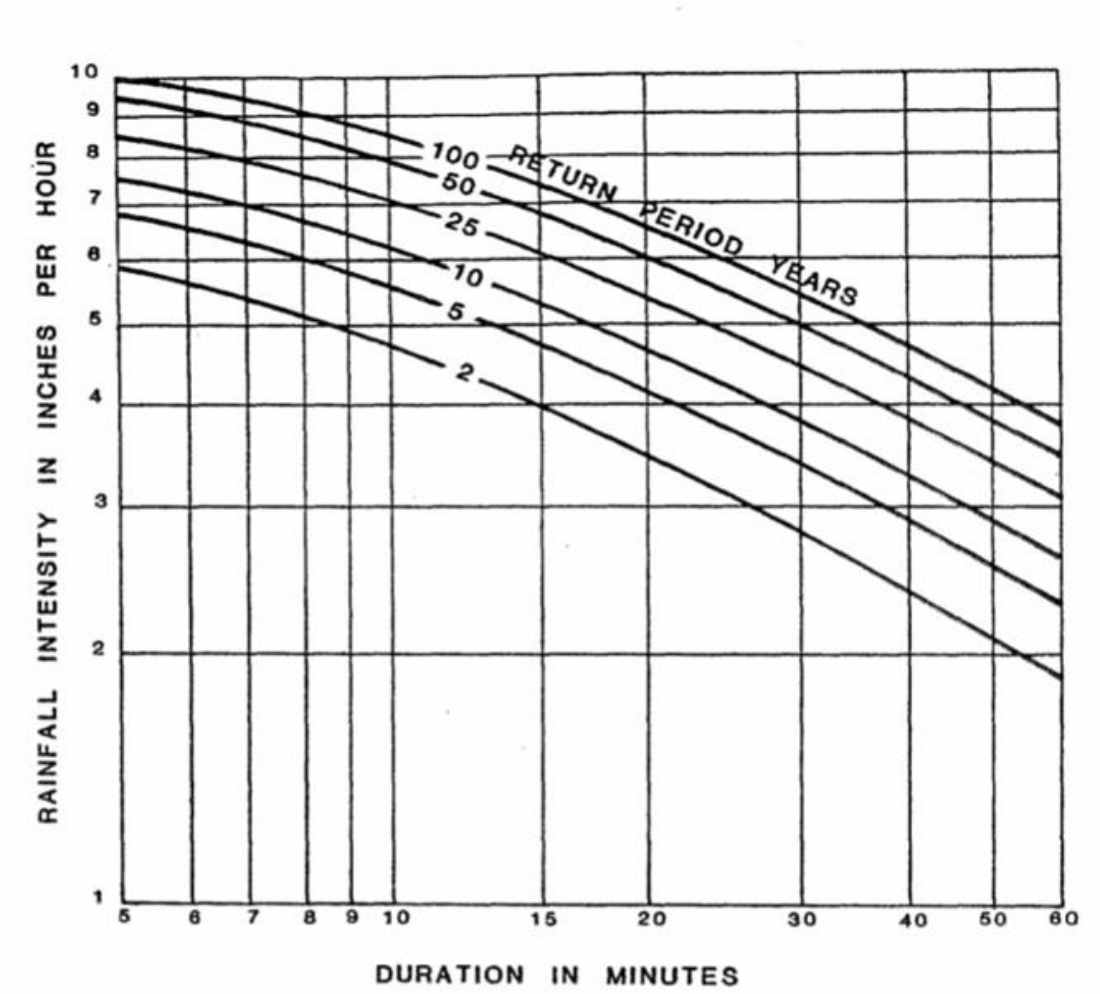
C1 (off site for homes, streets, etc.)
C2 (off site for grass, landscaping, etc.)
C3 (on site for homes, streets, etc.)
C4 (on site for grass. Landscaping, etc.)

A1 (off site area for C1)
A2 (off site area for C2)
A3 (on site area for C3)
A4 (on site area for C4)

The above variable values will be used in designing the Detention Facility. For culvert design, we will use the Post C values for the 25 year storm.

Determination of Intensity Values “I”

For this analysis, we will use the Intensity – Duration - Frequency Chart from the Little Rock Drainage Manual. Whereas the calculated value of I shall be used for Detention, we will use a tc (time of concentration) of 5 min for the culverts to also provide a conservative value.



INTENSITY - DURATION - FREQUENCY

LITTLE ROCK

SOURCE : HYDRO 35 & T.P. No. 40

Drainage Map (Pre-Construction)



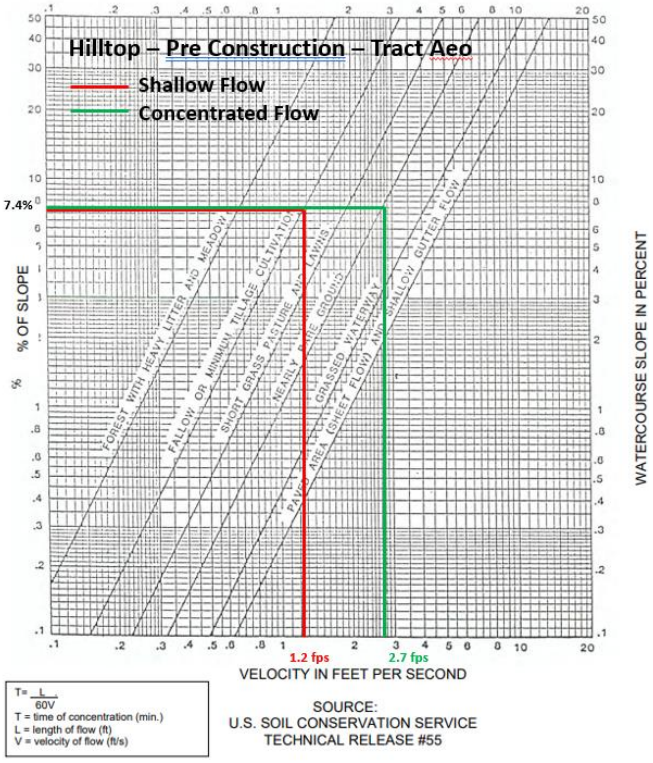
See attached map for additional information

Pre Construction Flowrates – Control Points

The estimated Pre Construction Flowrate for each Control Point is estimated as follows. These values will be used to compare to the Post Construction Flowrate later in this report:

Control Point A

The time of concentration is determined as follows:



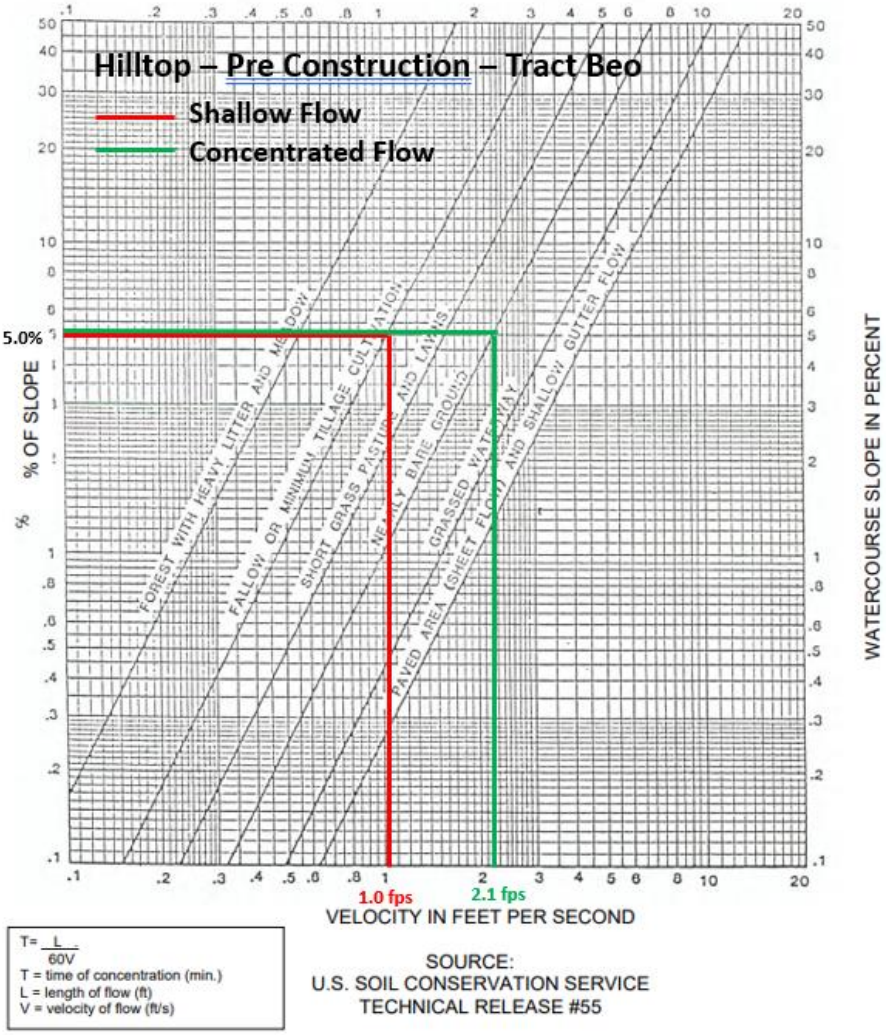
$$tc = ((300)/(60)(1.2)) + ((300)/(60)(2.7)) = 6 \text{ min}$$

Flowrates for various Storm Events (Control Point A):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6	5.6	3.02	6.93
5	0.44	6	6.6	3.02	8.77
10	0.47	6	7.3	3.02	10.36
25	**0.52**	**6**	**8.2**	**3.02**	**12.88**
50	0.55	6	9.2	3.02	15.28
100	0.59	6	9.8	3.02	17.46

Control Point B

The time of concentration is determined as follows:



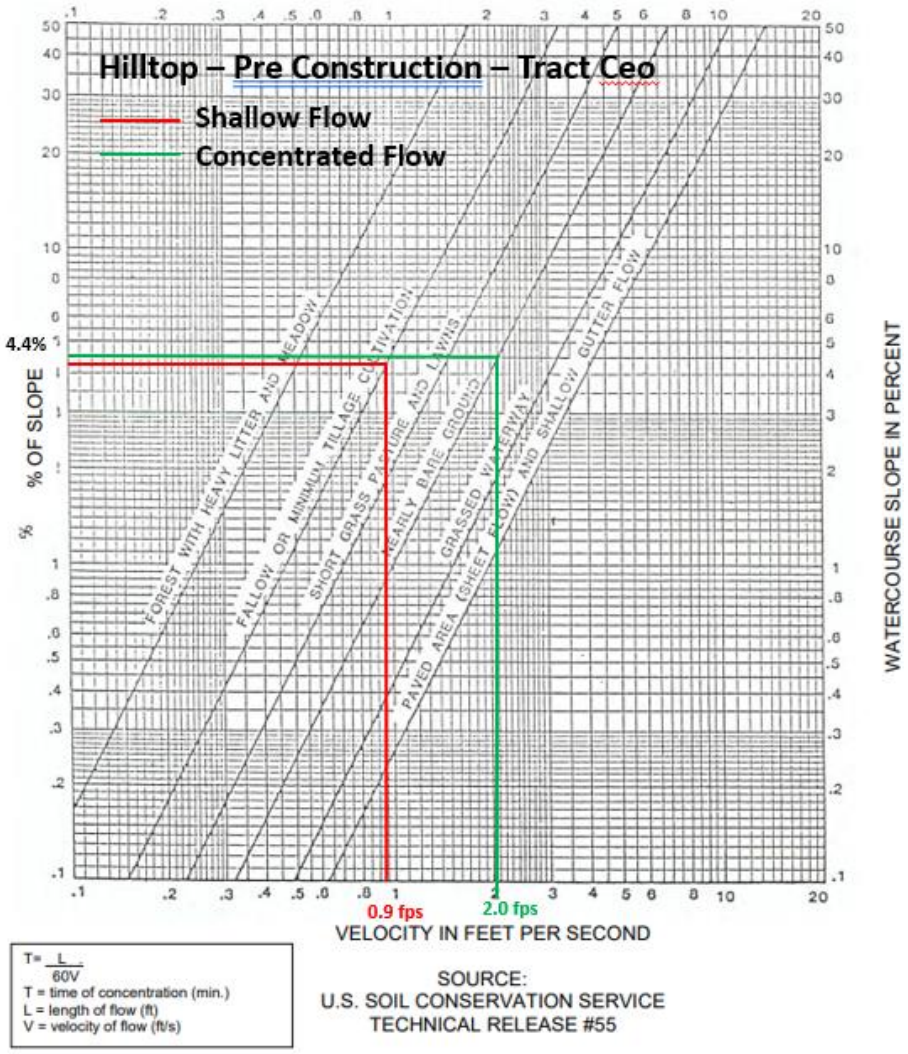
tc = ((300)/(60)(1.0)) + ((200)/(60)(2.1)) = 6.5 min

Flowrates for various Storm Events (Control Point B):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	2.47	5.67
5	0.44	6.5	6.6	2.47	7.17
10	0.47	6.5	7.3	2.47	8.47
25	**0.52**	**6.5**	**8.2**	**2.47**	**10.53**
50	0.55	6.5	9.2	2.47	12.50
100	0.59	6.5	9.8	2.47	14.28

Control Point C

The time of concentration is determined as follows:



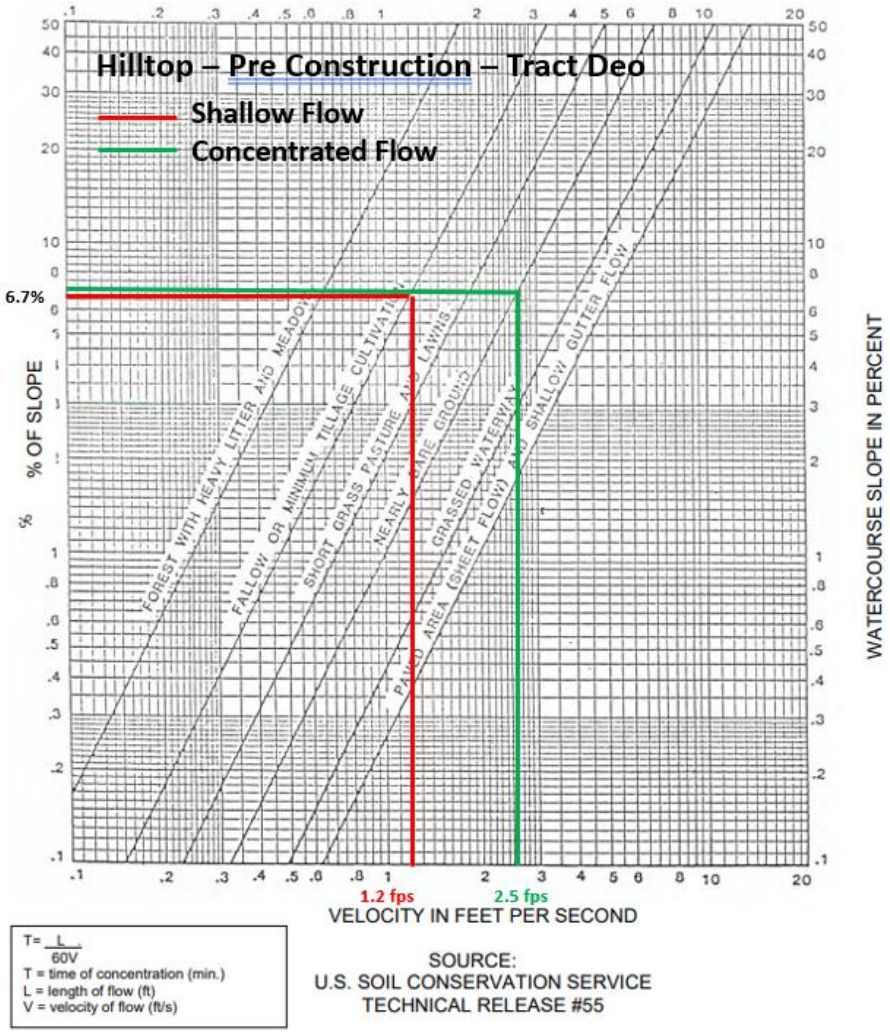
tc = ((300)/(60)(0.9)) + ((300)/(60)(2.0)) = 8 min

Flowrates for various Storm Events (Control Point C):

Storm Event	C	tc (min)	I (in/hour)	A (acres)	Q (cfs)
2	0.41	8	5.1	2.75	5.75
5	0.44	8	6	2.75	7.26
10	0.47	8	6.7	2.75	8.66
25	**0.52**	**8**	**7.7**	2.75	**11.01**
50	0.55	8	8.5	2.75	12.86
100	0.59	8	9.1	2.75	14.76

Control Point D

The time of concentration is determined as follows:



$$tc = ((300)/(60)(1.2)) + ((340)/(60)(2.5)) = 6.4 \text{ min}$$

Flowrates for various Storm Events (Control Point D):

Storm Event	C	tc	I	A	Q
		(min)	(in/hour)	(acres)	(cfs)
2	0.41	6.5	5.6	4.16	9.55
5	0.44	6.5	6.6	4.16	12.08
10	0.47	6.5	7.3	4.16	14.27
25	**0.52**	**6.5**	**8.2**	4.16	**17.74**
50	0.55	6.5	9.2	4.16	21.05
100	0.59	6.5	9.8	4.16	24.05

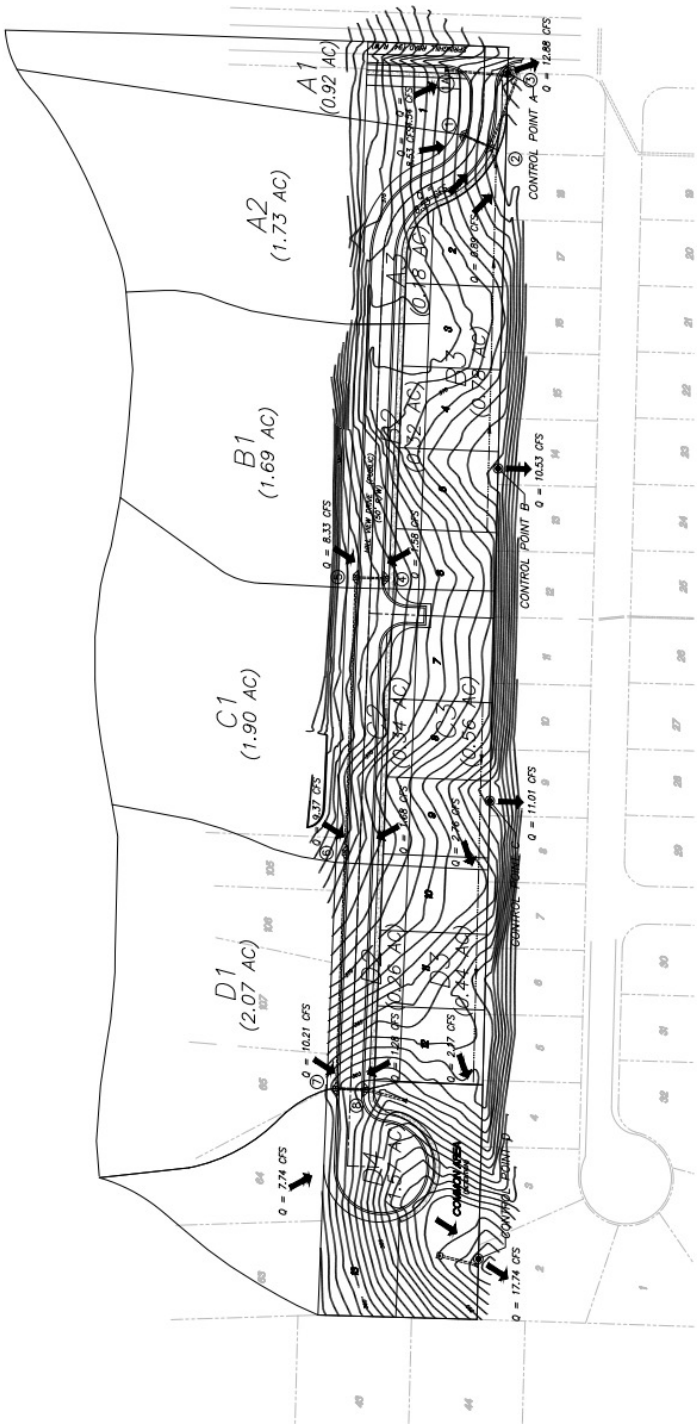
Determination of Flowrates for Culverts & Spreadflow

Attention is called to the following chart which provides C, Intensity, Area, and Flowrate (Q) of each Tract. Again, the Rational Method is being used for all basins. Attention is called to the Maps on the next two pages for a detailed drawings showing the various watershed tracts. The 25 year storm event will be used for culvert design. A conservative tc of 5 minutes is used for the culvert design.

Tract	C(Post)	I25 (in/hr)	A (ac)	Q25 (cfs)
A1	0.58	8.5	0.92	4.54
A2	0.58	8.5	1.73	8.53
A3	0.58	8.5	0.18	0.89
B1	0.58	8.5	1.69	8.33
B2	0.58	8.5	0.32	1.58
B3	0.58	8.5	0.78	3.85
C1	0.58	8.5	1.90	9.37
C2	0.58	8.5	0.34	1.68
C3	0.58	8.5	0.56	2.76
D1	0.58	8.5	2.07	10.21
D2	0.58	8.5	0.26	1.28
D3	0.58	8.5	0.44	2.17
D4	0.58	8.5	1.57	7.74

Drainage Map (Post Construction)

Revised 10/21/2024



See attached Map for additional information

Culvert Sizing

All culverts are sized to meet a 25 year storm, and the Rational Method is used. We will use a Manning's Coefficient of 0.012 shall be for all culverts (concrete and HDPE). The d/D ratio and velocity was computed using HawsEDC On-Line Calculator (hawsedc.com).

FES 1a
Q = Qa1 = 4.54 cfs
Use 18" @ 3.5%
Q capacity = 21.94 cfs
V actual = 9.68 fps (d/D = 0.32)

Inlet 1
Q = Qa2 = 8.53 cfs
Use 18" @ 1.1%
Q capacity = 12.30 cfs
V actual = 7.36 fps (d/D = 0.63)

Inlet 2
Q = Inlet 1 + Qa3 = 8.53 + 0.89 = 9.42 cfs
Use 24" @ 0.3%
Q capacity = 13.84 cfs
V actual = 4.63 fps (d/D = 0.62)

Junction Box 3 (verify capacity)
Q = Inlet 2 + Qb3 + Exist 18" in Hurricane Gardens
(Culvert in Hurricane Gardens is an 18" ADS at 0.46%, Capacity = 7.95 cfs at d/D=0.85)
Q = 9.42 + 3.85 + 7.95 = 21.22 cfs
Existing 24" Discharging from Junc Box is 24" ADS @ 5.20%
Q capacity = 57.58 cfs ***Capacity appears to exist***
V actual = 16.61 fps (d/D = 0.43)

Inlet 4
Q = Qb2 = 1.58 cfs
Use 18" @ 0.5%
Q capacity = 8.29 cfs
V actual = 3.53 fps (d/D = 0.30)

Inlet 5
Q = Inlet 4 + Qb1 = 1.58 + 8.33 = 9.91 cfs
Use 18" @ 1.0%
Q capacity = 11.73 cfs
V actual = 7.25 fps (d/D = 0.72)

Inlet 6
Q = Inlet 5 + Qc1 = 9.91 + 9.37 = 19.28 cfs
Use 18" @ 4.60%
Q capacity = 25.15 cfs
V actual = 15.30 fps (d/D = 0.67)

Inlet 7
Q = Inlet 6 + Qd1 = 19.28 + 10.21 = 29.49 cfs
Use 24" @ 2.0%
Q capacity = 35.71 cfs
V actual = 12.38 fps (d/D = 0.71)

Inlet 8
Q = Inlet 7 + Qc2 + Qd2 = 29.49 + 1.68 + 1.28 = 32.45 cfs
Use 24" @ 2.25%
Q capacity = 37.87 cfs
V actual = 13.28 fps (d/D = 0.73)

Street Spreadflow Analysis & Inlet Capture

In this Section of the Report, we will examine how the stormwater in the street gutters may impact in proposed inlets. We will use our 27' street width (back of curb to back of curb), while giving allowances for the vertical portion of the curb on each side. The crown on the street shall be 3.0%. The available street width, to handle the stormwater, has a width of 26'. Our goal is to provide a minimum "non submerged" street width ("clear space") of 8 feet. We will use the following equation (as provided in "Urban Drainage and Flood Control District – Urban

Storm Drainage Manual, Volume 1, dated January, 2016) to determine the required length of throat to capture 100% of the stormwater:

Lt = 0.38 (Q^0.51)(Sl^0.058)(1/nSx)^0.46, where:
Lt = required length of throat to capture 100%
Q = flowrate (cfs)
Sl = slope of gutter
N = manning's coef. = 0.012
Sx = cross slope of street = 0.03

Since n and Sx are constant, the equation can be reduced to:

Lt = 0.38 (Q^0.51)(Sl^0.058)(38.38)
Lt = 14.58 (Q^0.51) (Sl^0.058)

Attention is called to the Appendix for the spreadsheets used to evaluate these areas.

Check Inlet 1 & 2 – Hillcrest Drive (Spreadflow Analysis)

Inlet 1
Q = Qa2 = 8.53 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.33'
Width of water (from gutter) = 11.0'
Clear space (half street) = 13.0 – 11.0' = 2.0'
Inlet 2
Q = Qa3 = 0.89 cfs
Gutter Slope = 1.50%
Height of water (from gutter) = 0.14'
Width of water (from gutter) = 4.5'
Clear space (half street) = 13.0 – 4.5' = 8.5'
Total Clear Space = 2.0 + 8.5 = 10.5'

Stormwater Capture – Inlet 1
Lt = 14.58 (8.53^0.51)(0.015^0.058) = 34.10 feet
Using a 20' throat:
Q captured = 5.01 cfs (58.7%)
Q bypass = 3.52 cfs (41.3%)

Stormwater Capture – Inlet 2
Lt = 14.58 (0.89^0.51)(0.015^0.058) = 10.77 feet
Using a 12' throat:
Q captured = 0.89 cfs (100%)
Q bypass = 0.00 cfs (0%)

Check Inlet 4 & 5 – Hillcrest Drive (Spreadflow Analysis)

Inlet 4

Q = Qb2 = 1.58 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.21'
Width of water (from gutter) = 7.0'
Clear space (half street) = 13.0 – 7.0 = 6.0'

Inlet 5

Q = Qb1 = 8.33 fps
Gutter Slope = 0.5%
Height of water (from gutter) = 0.39'
Width of water (from gutter) = 13.0'
Clear space (half street) = 13.0 – 13.0' = 0.0'
Total Clear Space = 6.0 + 0.0 = 6.0'

TRY 10 YEAR STORM

Inlet 4

Q = Qb2 = 1.26 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.20'
Width of water (from gutter) = 6.5'
Clear space (half street) = 13.0 – 6.5' = 6.5'

Inlet 5

Q = Qb1 = 6.66 cfs
Gutter Slope = 0.5%
Height of water (from gutter) = 0.36'
Width of water (from gutter) = 12.0'
Clear space (half street) = 13.0 – 12.0' = 1.0'
Total Clear Space = 6.5 + 1.0 = 7.5'

Stormwater Capture – Inlet 4

Lt = 14.58 (1.26^0.51)(0.005^0.058) = 12.06 feet
Using a 13' throat:
Q captured = 1.26 cfs (100%)
Q bypass = 0.00 cfs (0%)

Stormwater Capture – Inlet 5

Lt = 14.58 (6.66^0.51)(0.005^0.058) = 28.20 feet
Using a 24' throat:
Q captured = 5.67 cfs (85.1%)
Q bypass = 0.99 cfs (14.9%)

Check Inlet 6 & Across Street – Hillcrest Drive (Spreadflow Analysis)

Inlet 6

Q = Qc1 = 9.37 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.30'
Width of water (from gutter) = 10.0'
Clear space (half street) = 13.0 – 10.0' = 3.0'

Across from Inlet 6

Q = Qc2 = 1.68 cfs
Gutter Slope = 2.67%
Height of water (from gutter) = 0.17'
Width of water (from gutter) = 5.5'
Clear space (half street) = 13.0 – 5.5 = 7.5'
Total Clear Space = 3.0 + 7.5 = 10.5'

Stormwater Capture – Inlet 6

Q = 9.37 + 0.99 (bypass from Inlet 5) = 10.36 cfs
Lt = 14.58 (10.36^0.51)(0.0267^0.058) = 38.93 feet
Using a 30' throat:
Q captured = 7.99 cfs (77.1%)
Q bypass = 2.37 cfs (22.9%)

Check Inlet 7 & 8 – Hillcrest (Spreadflow Analysis)

Inlet 7

Q = Qd1 = 10.21 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.29'
Width of water (from gutter) = 9.5'
Clear space (half street) = 13.0 – 9.5' = 2.5'

Inlet 8

Q = Qc2 + Qd2 = 2.42 + 2.17 = 2.96 cfs
Gutter Slope = 4.88%
Height of water (from gutter) = 0.18'
Width of water (from gutter) = 6.0'
Clear space (half street) = 13.0 – 6.0' = 7.0'
Total Clear Space = 2.5 + 7.0 = 9.5'

Stormwater Capture – Inlet 7

Q = 10.21 + 2.37 (bypass from Inlet 6) = 12.58 cfs
Lt = 14.58 (12.58^0.51)(0.0488^0.058) = 44.5 feet
Using a 30' throat:
Q captured = 8.48 cfs (67.4%)
Q bypass = 4.10 cfs (32.6%)

Stormwater Capture – Inlet 8
Lt = 14.58 (2.96^0.51)(0.0488^0.058) = 21.28 feet
Using a 22’ throat:
Q captured = 21.28 cfs (100%)
Q bypass = 0.00 cfs (0%)

Curb Cut on Street at North side of Detention Pond
Q = Qd4 + 4.10 (bypass from Inlet 7) = 7.74 + 4.10 = 11.84 cfs
Use a 6” x 8’ Curb Cut with a slope of 3%:
Q = (1.49/n)(A)(R^2/3)(S^1/2) = (1.49/0.012)(4)(4.33)(0.17) = 22.44 cfs

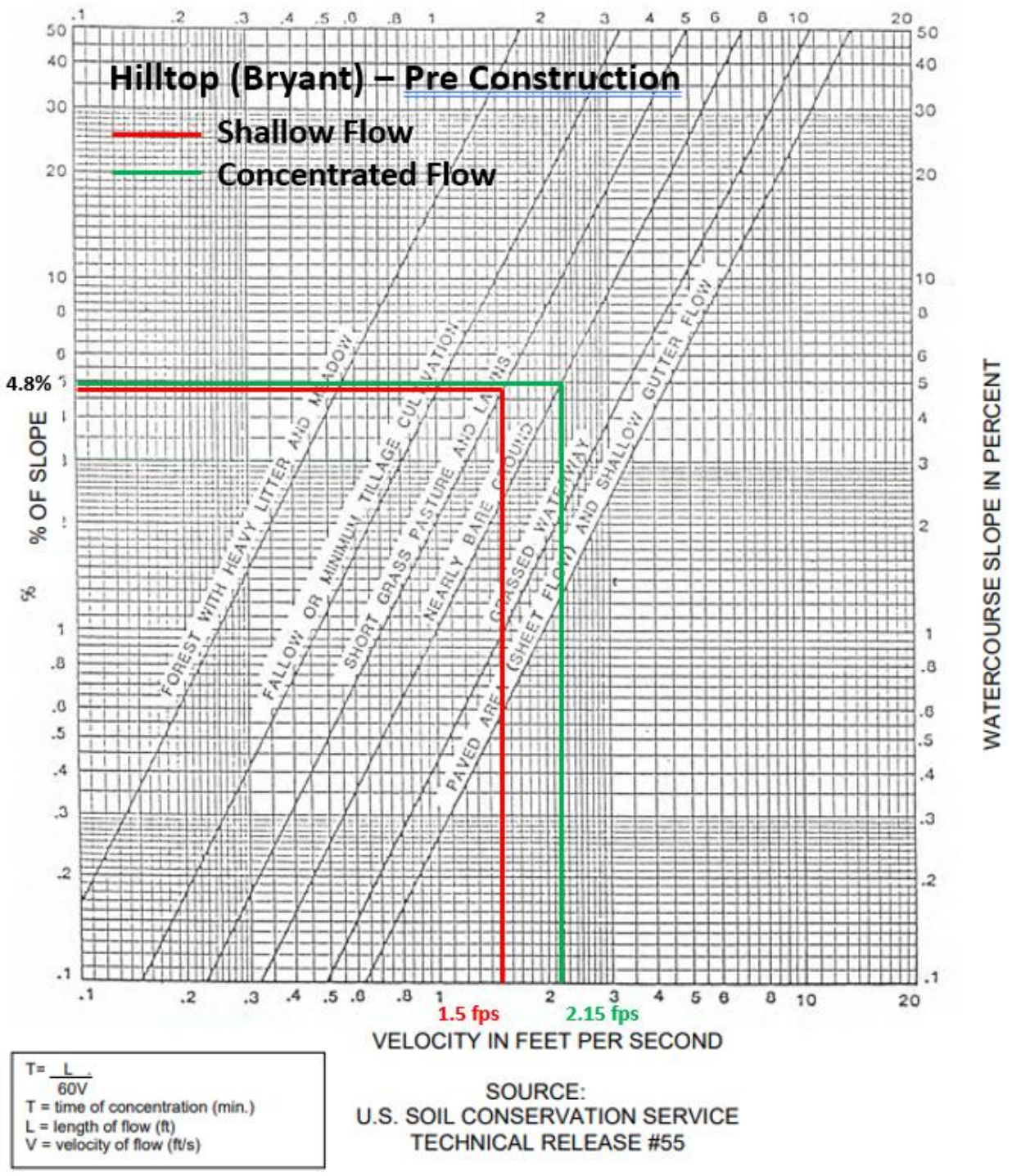
Detention Facility Computations

In this section, we will size the detention facility located in the Common Area (West side of the project). At the completion of this section, a summary of pre and post flows will be provided. Whereas the time of concentration will be used to determine the intensity (I), the runoff coefficient (C) for each storm analysis shall be based on that determined on pages 5 and 6 of this report.

Time of Concentration (tc)

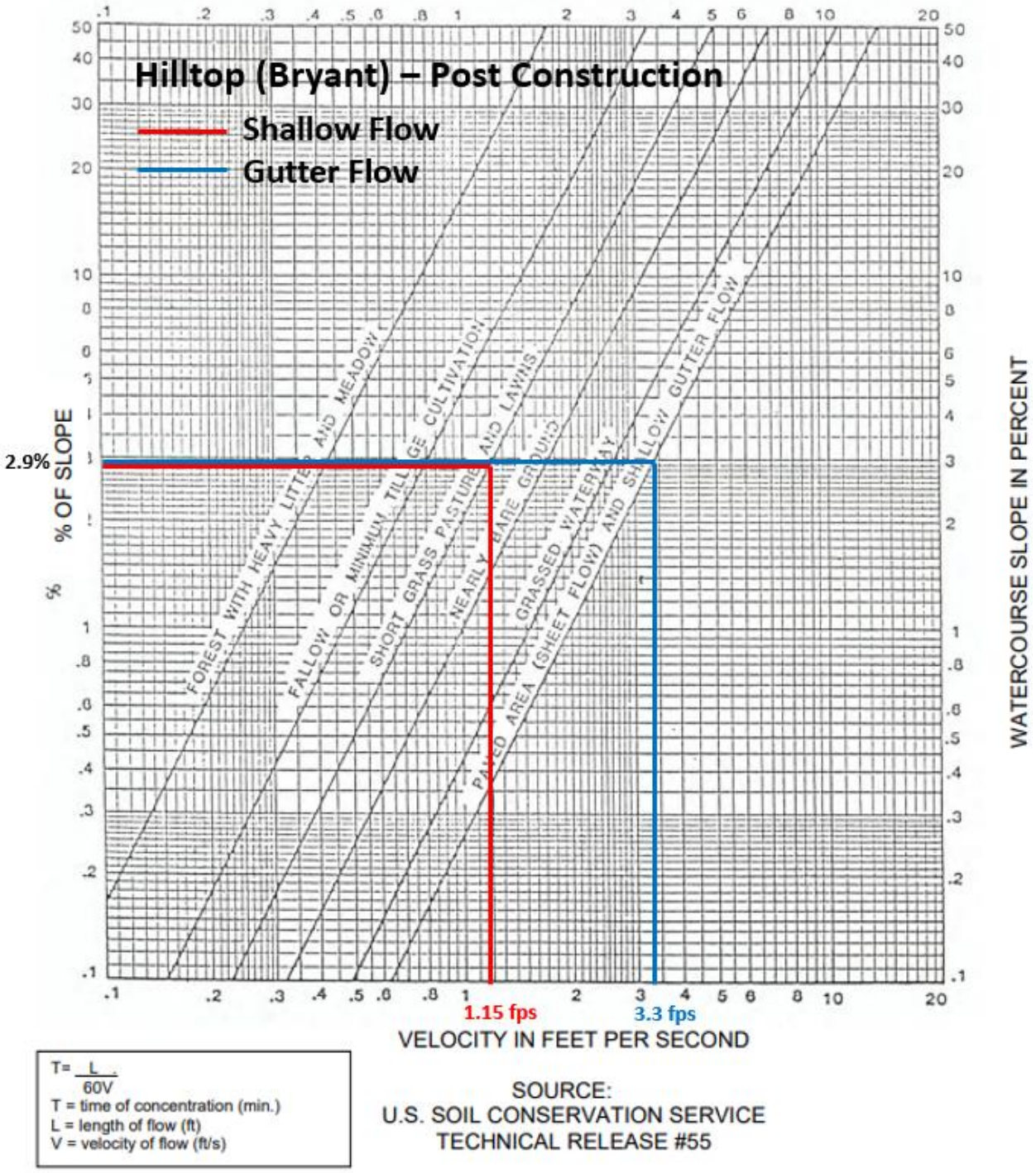
In determining the time of concentration, we must first determine the velocity of the runoff based on the type of ground cover and type of flow. The total tc is a sum of the tc for overland flow, the tc for shallow concentrated flow, and the tc for channelized flow. For this analysis, we will use the US Soil Conservation Service Technical Release #55, "Watercourse Slope vs Velocity" graph. A Pre Construction and Post Construction graph for each watershed is provided on the following pages.

Pre Construction Time of Concentration (tc)



Pre-Construction tc = Σ(L/(60)(V)) = 6 min

Post Construction Time of Concentration (tc)



$T = \frac{L}{60V}$

T = time of concentration (min.)
L = length of flow (ft)
V = velocity of flow (ft/s)

SOURCE:
U.S. SOIL CONSERVATION SERVICE
TECHNICAL RELEASE #55

Post-Construction tc = Σ(L/(60)(V)) = 9 min

Stage – Storage Table

The following Stage Storage Table is provided, based on the grading plan contained in the Civil Plans. The accumulative storage is provided in the right most column.

TYPE 3

Stage - Storage for Irregular Detention Basin

Top Elev	Bottom Elev	Increment
353.5	345.5	1

Stage	Area	Δ Volume	Volume
msl	sf	cf	cf
345.50	1	0	0
346.50	1853.50	927.25	927.25
347.50	2951.40	2402.45	3329.70
348.50	4240.13	3595.77	6925.47
349.50	5637.46	4938.80	11864.26
350.50	7118.75	6378.11	18242.37
351.50	8673.71	7896.23	26138.60
352.50	10265.99	9469.85	35608.45
353.50	11858.27	11062.13	46670.58

Stage – Discharge Table

The following Stage Discharge Table is provided, based on the grading plan contained in the Civil Plans. The discharge structure planned for this facility is shown later in this report.

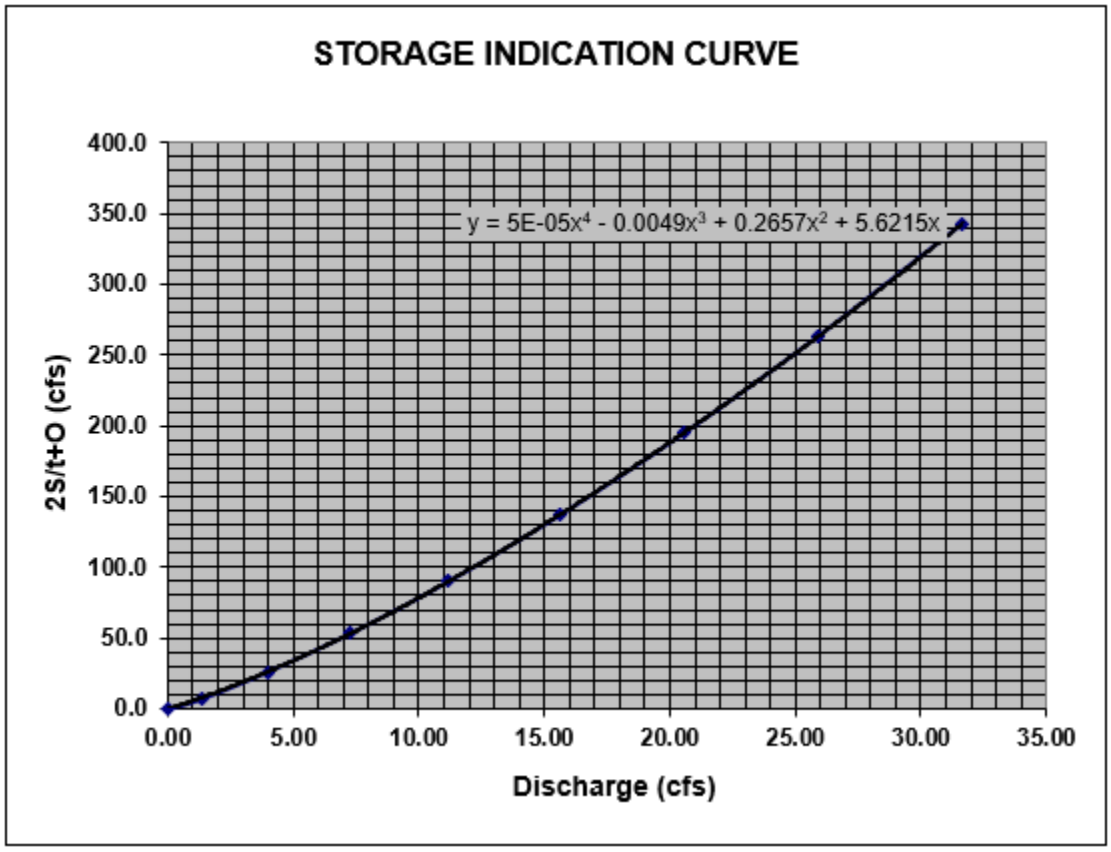
TYPE 2

Stage - Discharge for Rectangular Weir

FL Discharge	Beginning Elevation	Elevation Increment	Top of Basin
345.50	345.50	1.00	353.50

Stage	Head (H)	Weir Length (L)	Area (A)	Orifice Coefficient (C)	Velocity	Discharge (Q)
msl	ft	ft	sf		ft/s	cfs
345.50	0.00	0.42	0.00	3.33	0.00	0.00
346.50	1.00	0.42	0.42	3.33	3.33	1.40
347.50	2.00	0.42	0.84	3.33	4.71	3.96
348.50	3.00	0.42	1.26	3.33	5.77	7.27
349.50	4.00	0.42	1.68	3.33	6.66	11.19
350.50	5.00	0.42	2.10	3.33	7.45	15.64
351.50	6.00	0.42	2.52	3.33	8.16	20.56
352.50	7.00	0.42	2.94	3.33	8.81	25.90
353.50	8.00	0.42	3.36	3.33	9.42	31.65

Storage Indication Curve



Alternate Routing Time

The following spreadsheets represent the Hydrograph Routing for the various storm events. In each case, the Routing Storm Duration time was adjusted to provide the maximum storage required. Also, runoff coefficients C have been adjusted for each storm event:

Storm Event	Pre C	Post C
2	0.41	0.47
5	0.44	0.50
10	0.47	0.53
25	0.52	0.58
50	0.55	0.61
100	0.59	0.66

2 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 2 YEAR DESIGN STORM

Routing Storm Duration

20 **minutes**

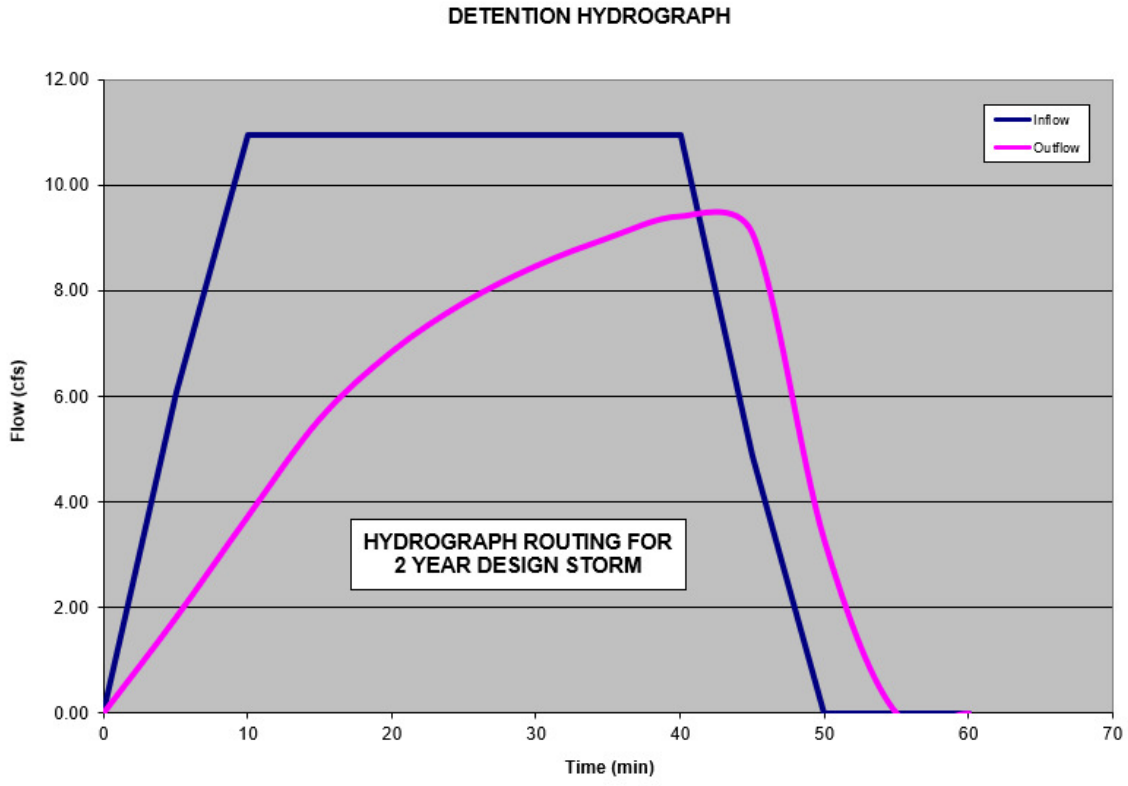
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	15.97	0	15.973	0	0	15.972	0.001
5	8.87	24.85	10.876	35.723	2.548	2013.7	35.724	-0.001
10	15.97	31.95	25.334	57.280	5.194	4579.3	57.280	0.000
15	15.97	31.95	41.818	73.764	7.731	7432.4	73.764	-0.001
20	15.97	23.07	54.737	77.809	9.513	9637.5	77.810	-0.001
25	7.10	7.10	57.939	65.038	9.935	10181.1	8.503	56.535
30	0.00	0.00	62.199	62.199	1.520	9527.8	0.000	62.199
35	0.00	0.00	50.999	50.999	0.000	9329.8	0.000	50.999
40	0.00	0.00	51.199	51.199	0.000	7649.8	0.000	51.199
45	0.00	0.00	51.399	51.399	0.000	7679.8	0.000	51.399
50	0.00	0.00	51.599	51.599	0.000	7709.8	0.000	51.599
55	0.00	0.00	51.799	51.799	0.000	7739.8	0.000	51.799
60	0.00	0.00	51.999	51.999	0.000	7769.8	0.000	51.999

Actual Maximum Storage needed is 10181.1 cubic feet

Maximum Storage required is achieved at an elev. = 349.32

Maximum Allowable (undeveloped) Discharge is 11.99 cfs

Maximum Discharge for the above storm is 9.93 cfs



5 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

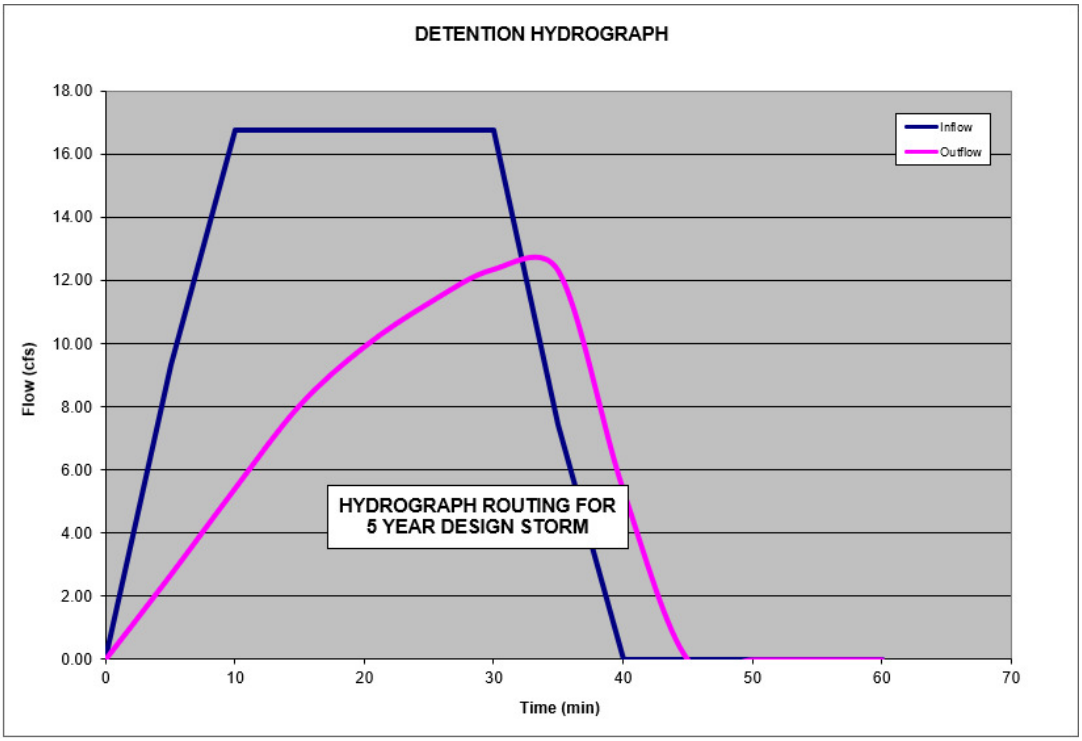
HYDROGRAPH ROUTING FOR 5 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	16.75	0	16.750	0	0	16.749	0.001
5	9.31	26.06	11.428	37.484	2.661	2113.4	37.485	-0.001
10	16.75	33.50	26.658	60.157	5.413	4810.6	60.158	-0.001
15	16.75	33.50	44.056	77.555	8.051	7816.0	77.555	0.001
20	16.75	33.50	57.739	91.238	9.908	10147.0	91.236	0.002
25	16.75	33.50	68.648	102.147	11.295	11991.4	102.146	0.001
30	16.75	24.19	77.420	101.614	12.364	13467.5	101.615	-0.001
35	7.44	7.44	76.989	84.434	12.312	13395.2	36.484	47.950
40	0.00	0.00	73.856	73.856	5.389	11856.7	0.000	73.856
45	0.00	0.00	74.056	74.056	0.000	11078.4	0.000	74.056
50	0.00	0.00	74.256	74.256	0.000	11108.4	0.000	74.256
55	0.00	0.00	74.456	74.456	0.000	11138.4	0.000	74.456
60	0.00	0.00	74.656	74.656	0.000	11168.4	0.000	74.656

Actual Maximum Storage needed is 13467.5 cubic feet
Maximum Storage required is achieved at an elev. = 349.89
Maximum Allowable (undeveloped) Discharge is 14.9 cfs
Maximum Discharge for the above storm is 12.36 cfs



10 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 10 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

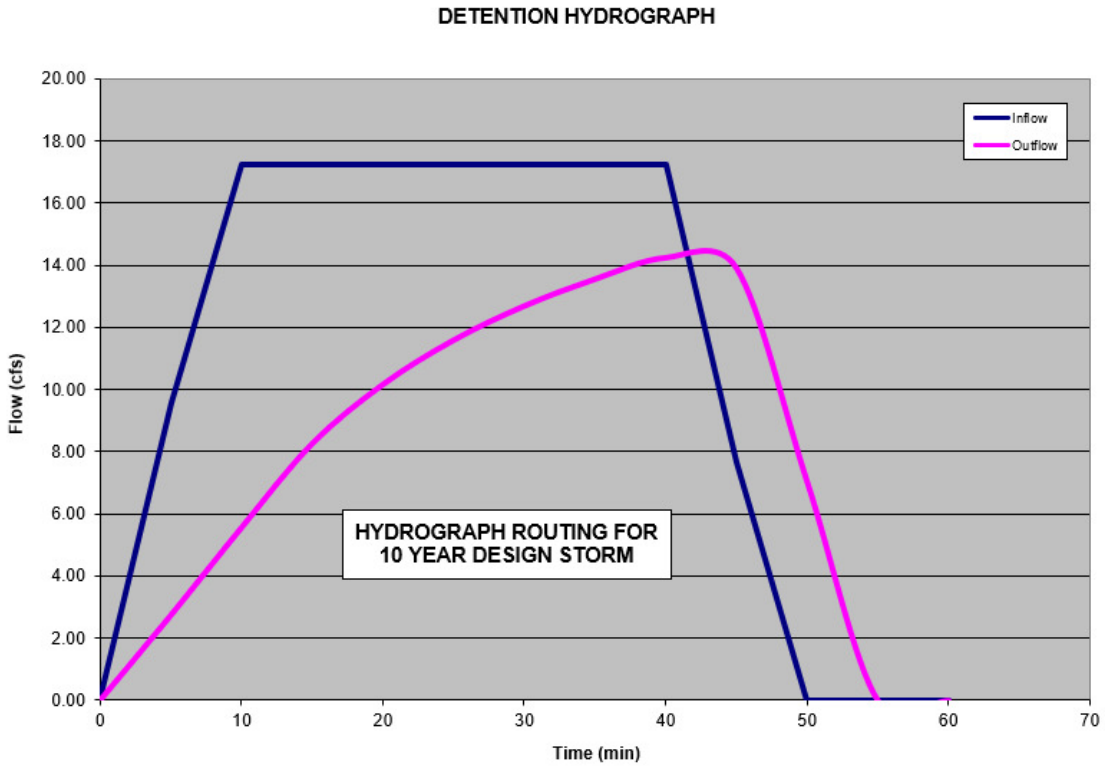
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	17.24	0	17.240	0	0	17.239	0.001
5	9.58	26.82	11.778	38.596	2.731	2176.3	38.597	-0.001
10	17.24	34.48	27.496	61.977	5.550	4956.9	61.976	0.001
15	17.24	34.48	45.475	79.956	8.251	8058.9	79.956	0.000
20	17.24	34.48	59.644	94.124	10.156	10469.9	94.123	0.001
25	17.24	34.48	70.962	105.442	11.581	12381.4	105.442	0.000
30	17.24	34.48	80.081	114.561	12.681	13914.2	114.560	0.001
35	17.24	34.48	87.472	121.953	13.544	15152.5	121.953	0.000
40	17.24	24.90	93.489	118.391	14.232	16158.1	118.390	0.001
45	7.66	7.66	90.587	98.249	13.902	15673.3	50.238	48.011
50	0.00	0.00	84.384	84.384	7.032	13682.5	0.000	84.384
55	0.00	0.00	84.584	84.584	0.000	12657.6	0.000	84.584
60	0.00	0.00	84.784	84.784	0.000	12687.6	0.000	84.784

Actual Maximum Storage needed is 16158.1 cubic feet

Maximum Storage required is achieved at an elev. = 350.25

Maximum Allowable (undeveloped) Discharge is 17.36 cfs

Maximum Discharge for the above storm is 14.23 cfs



25 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

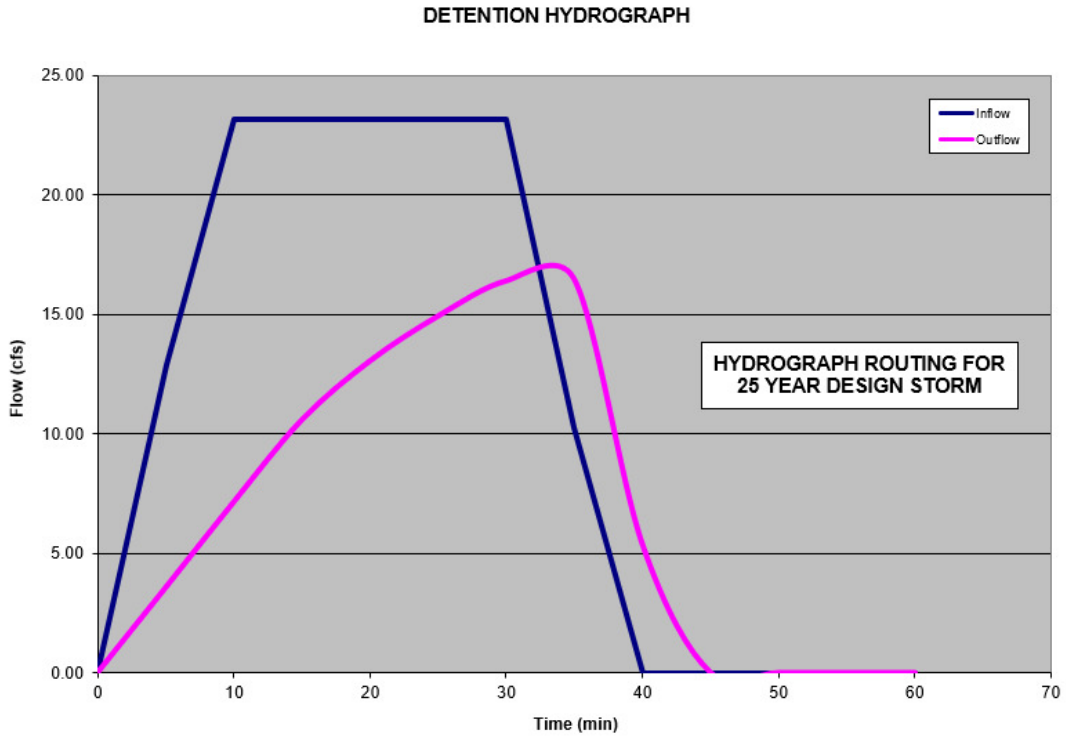
HYDROGRAPH ROUTING FOR 25 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	23.16	0	23.158	0	0	23.159	-0.001
5	12.87	36.02	16.041	52.065	3.559	2939.9	52.066	-0.001
10	23.16	46.32	37.780	84.097	7.142	6738.4	84.098	-0.001
15	23.16	46.32	62.939	109.256	10.579	11027.7	109.256	0.000
20	23.16	46.32	83.168	129.485	13.044	14431.8	129.484	0.001
25	23.16	46.32	99.641	145.958	14.922	17184.4	145.957	0.001
30	23.16	33.45	113.166	146.617	16.396	19434.3	146.616	0.001
35	10.29	10.29	113.708	124.001	16.454	19524.4	36.239	87.762
40	0.00	0.00	113.484	113.484	5.359	17796.3	0.000	113.484
45	0.00	0.00	113.684	113.684	0.000	17022.6	0.000	113.684
50	0.00	0.00	113.884	113.884	0.000	17052.6	0.000	113.884
55	0.00	0.00	114.084	114.084	0.000	17082.6	0.000	114.084
60	0.00	0.00	114.284	114.284	0.000	17112.6	0.000	114.284

Actual Maximum Storage needed is 19524.4 cubic feet
Maximum Storage required is achieved at an elev. = 350.65
Maximum Allowable (undeveloped) Discharge is 19.53 cfs
Maximum Discharge for the above storm is 16.45 cfs



50 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 50 YEAR DESIGN STORM

Routing Storm Duration

30 **minutes**

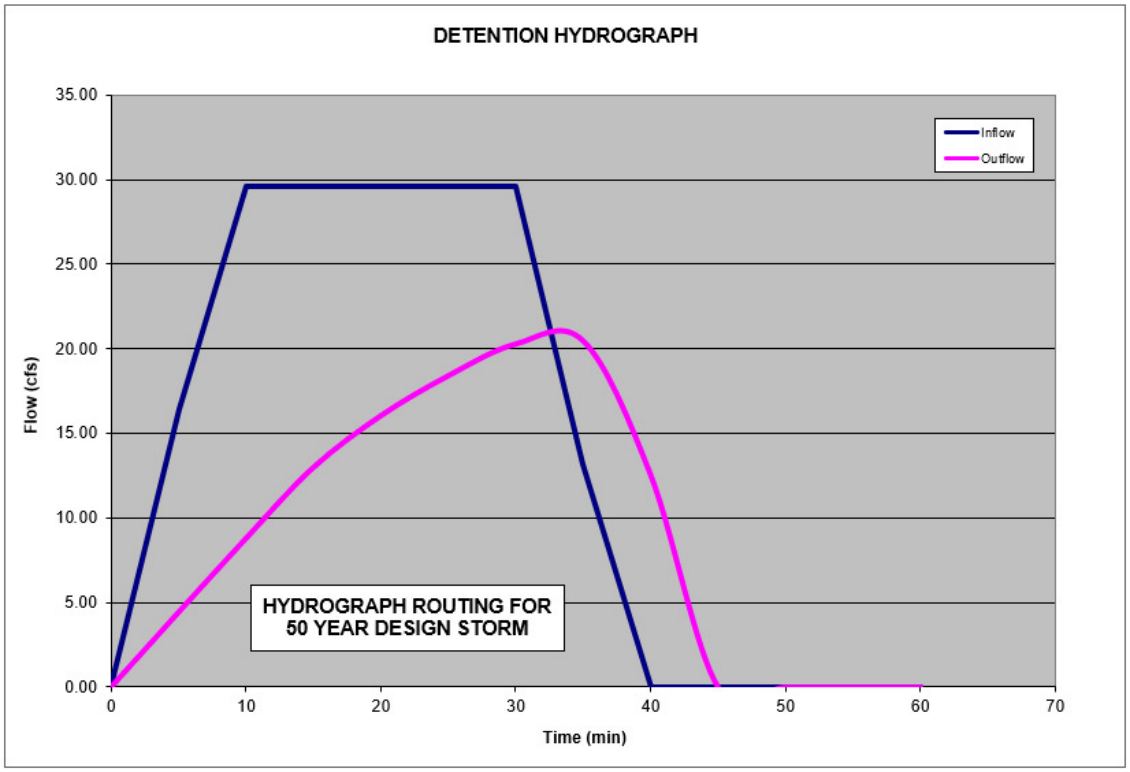
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	29.62	0	29.616	0	0	29.615	0.001
5	16.45	46.07	20.781	66.850	4.417	3779.8	66.850	0.000
10	29.62	59.23	49.291	108.522	8.779	8710.6	108.523	-0.001
15	29.62	59.23	82.573	141.804	12.974	14332.1	141.804	0.000
20	29.62	59.23	109.747	168.978	16.029	18866.3	168.978	0.000
25	29.62	59.23	132.202	191.433	18.388	22588.5	191.434	0.000
30	29.62	42.78	150.904	193.682	20.265	25675.3	193.683	-0.001
35	13.16	13.16	152.783	165.945	20.449	25984.8	102.860	63.085
40	0.00	0.00	141.080	141.080	12.532	23011.9	0.000	141.080
45	0.00	0.00	141.280	141.280	0.000	21162.0	0.000	141.280
50	0.00	0.00	141.480	141.480	0.000	21192.0	0.000	141.480
55	0.00	0.00	141.680	141.680	0.000	21222.0	0.000	141.680
60	0.00	0.00	141.880	141.880	0.000	21252.0	0.000	141.880

Actual Maximum Storage needed is 25984.8 cubic feet

Maximum Storage required is achieved at an elev. = 351.37

Maximum Allowable (undeveloped) Discharge is 25.68 cfs

Maximum Discharge for the above storm is 20.45 cfs



100 YEAR STORM EVENT

Coefficients for Storage Indication Curve from Chart			
Ax^4	Bx^3	Cx^2	Dx
0.0001	-0.0049	0.2657	5.6215

HYDROGRAPH ROUTING FOR 100 YEAR DESIGN STORM

Routing Storm Duration

40 **minutes**

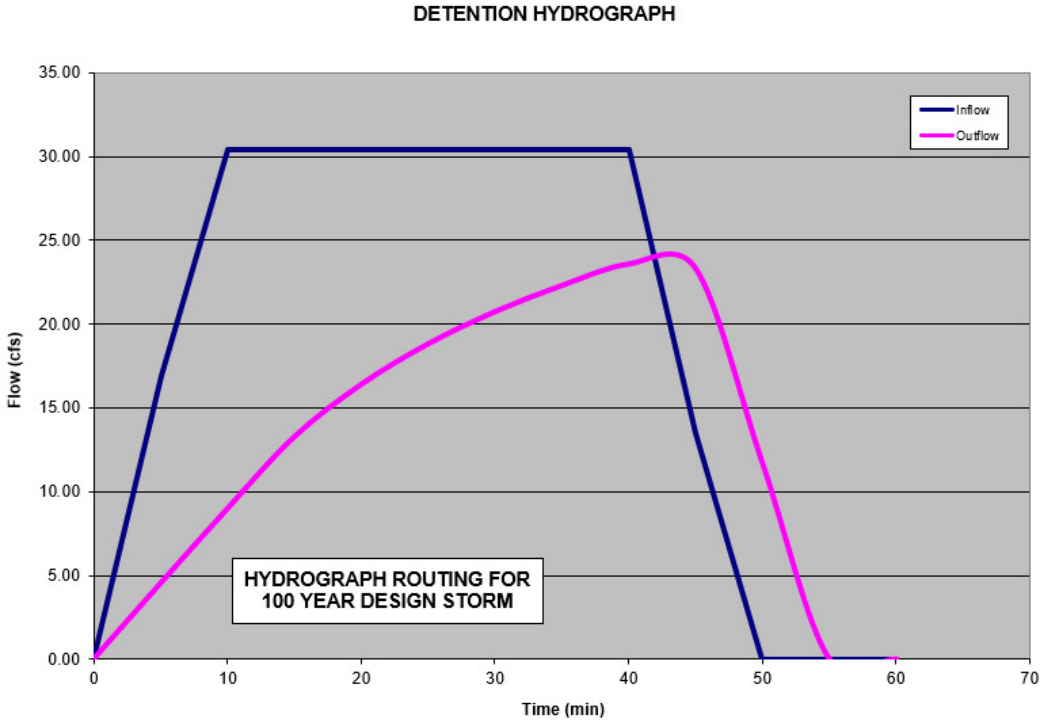
	1	2	3	4	5	6	7	8
Time	I_1	I_1+I_2	$2S_1/t-Q_1$	$2S_2/t+Q_2$	Q_2	S_2	2S/t-Q	Col 4 - 7
min	cfs	cfs	cfs	cfs	cfs	cf	from eqn.	
0	0.00	30.44	0	30.441	0	0	30.440	0.001
5	16.91	47.35	21.393	68.745	4.524	3887.5	68.746	-0.001
10	30.44	60.88	50.780	111.662	8.983	8964.4	111.661	0.001
15	30.44	60.88	85.119	146.000	13.272	14758.5	146.001	-0.001
20	30.44	60.88	113.200	174.082	16.400	19440.0	174.083	-0.001
25	30.44	60.88	136.442	197.324	18.820	23289.3	197.323	0.001
30	30.44	60.88	155.829	216.711	20.747	26486.5	216.710	0.001
35	30.44	60.88	172.091	232.972	22.310	29160.1	232.973	-0.001
40	30.44	43.97	185.788	229.759	23.592	31407.1	229.758	0.001
45	13.53	13.53	183.077	196.607	23.341	30962.7	94.375	102.232
50	0.00	0.00	173.395	173.395	11.706	27735.1	0.000	173.395
55	0.00	0.00	173.595	173.595	0.000	26009.2	0.000	173.595
60	0.00	0.00	173.795	173.795	0.000	26039.2	0.000	173.795

Actual Maximum Storage needed is 31407.1 cubic feet

Maximum Storage required is achieved at an elev. = 352.03

Maximum Allowable (undeveloped) Discharge is 29.36 cfs

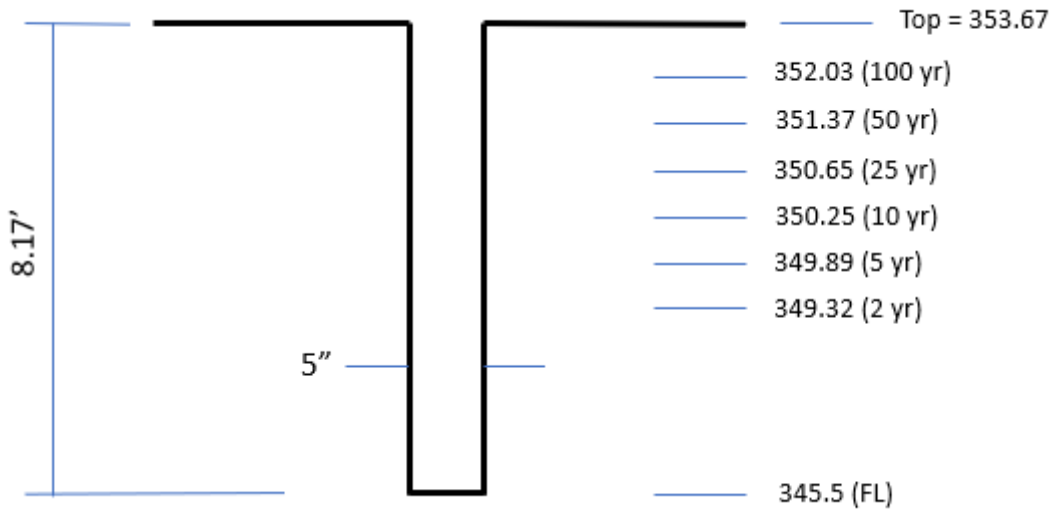
Maximum Discharge for the above storm is 23.59 cfs



Summary – Detention

Storm Event	Volume Needed (cf)	WSE	Max Discharge Allowed (cfs)	Max Discharge Model (cfs)
2	10181.1	349.32	11.99	9.93
5	13467.5	349.89	14.90	12.36
10	16158.1	350.25	17.36	14.23
25	19524.4	350.65	19.53	16.45
50	25984.8	351.37	25.68	20.45
100	31407.1	352.03	29.36	23.59

Discharge Structure Detail



Overall Weir Capacity

According to the City's Drainage Manual, the weir should be designed to overcome a 50% blockage. The weir on the proposed discharge structure will exist on the front, back, and both sides. The estimated excess capacity for the proposed weir is provided as follows (weir above the 100 year storm elevation):

Q = C x L x H^3/2, where:
Q = capacity (cfs)
C = 3.33
L = weir length (ft)
H = weir height (ft)

Front/Back Weir: Q = 3.33 (5.67)(0.33 ^ 1.5) = 3.58 cfs

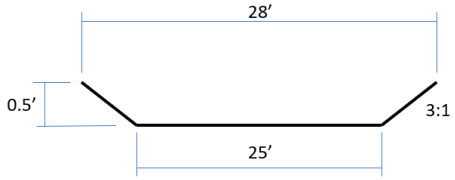
Side Weir: Q 3.33 (3.67)(0.33 ^ 1.5) = 2.32 cfs

Considering that we have 2 side weirs, the total excess capacity of the weirs, as proposed, is as follows:

Q = (2)(3.58) + (2)(2.32) = 11.80 cfs

The allowable flowrate at a 100 year storm event is estimated at 23.59 cfs, therefore the 50% blockage computes to 11.795 cfs. This weir structure meets this requirement.

Overflow Structure Detail

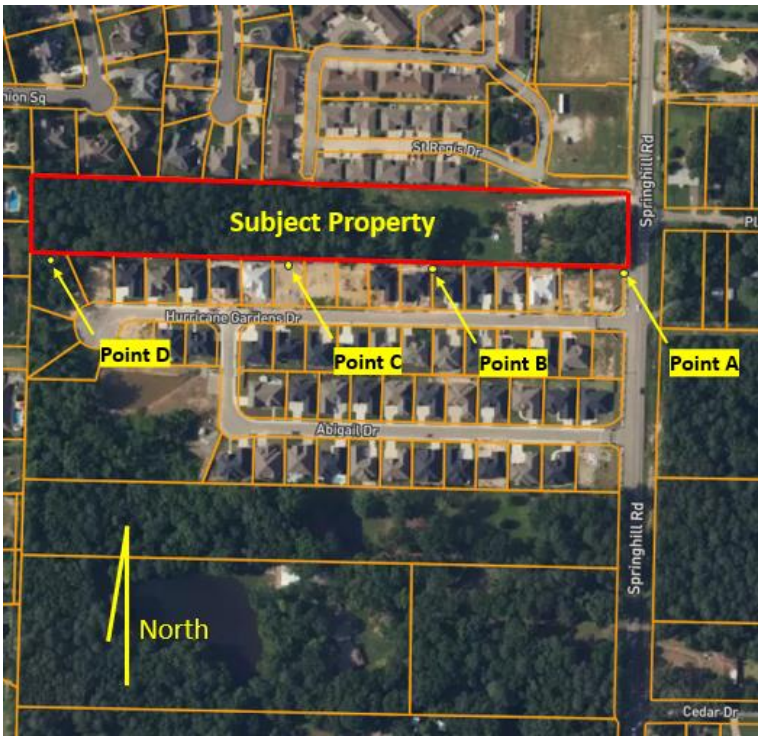


Q = (1.49/n)(A)(R^2/3)(S^0.5)

Q = (1.49/0.025)(13.25)(0.60)(0.1) = 47.38 cfs

Required Capacity = 23.59 cfs (2) = 47.18 cfs

Study Point Summary



2 Year Storm Event

Study Point	Pre Construction Q (cfs)	Post Construction Q (no detention) (cfs)	Post Construction Q (with detention) (cfs)	Change - Pre to Post (with detention) (cfs)
A	6.93	9.04	9.04	2.11
B	5.67	0	0	-5.67
C	5.75	0	0	-5.75
D	9.55	25.89	9.93	0.38
TOTAL	**27.9**	**34.93**	**18.97**	**-8.93**

5 Year Storm Event

Study Point	Pre Construction Q (cfs)	Post Construction Q (no detention) (cfs)	Post Construction Q (with detention) (cfs)	Change - Pre to Post (with detention) (cfs)
A	8.77	11.45	11.45	2.68
B	7.17	0	0	-7.17
C	7.26	0	0	-7.26
D	12.08	25.89	9.93	-2.15
TOTAL	**35.28**	**37.34**	**21.38**	**-13.9**

10 Year Storm Event

Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	10.36	13.52	13.52	3.16
B	8.47	0	0	-8.47
C	8.66	0	0	-8.66
D	14.27	33.89	14.23	-0.04
TOTAL	**41.76**	**47.41**	**27.75**	**-14.01**

25 Year Storm Event

Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	12.88	16.81	16.81	3.93
B	10.53	0	0	-10.53
C	11.01	0	0	-11.01
D	17.74	38.08	16.45	-1.29
TOTAL	**52.16**	**54.89**	**33.26**	**-18.9**

50 Year Storm Event

Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	15.28	19.94	19.94	4.66
B	12.5	0	0	-12.5
C	12.86	0	0	-12.86
D	21.05	42.65	20.45	-0.6
TOTAL	**61.69**	**62.59**	**40.39**	**-21.3**

100 Year Storm Event

Study Point	Pre Construction	Post Construction	Post Construction	Change - Pre to Post
	Q	Q (no detention)	Q (with detention)	(with detention)
	(cfs)	(cfs)	(cfs)	(cfs)
A	17.46	22.79	22.79	5.33
B	14.28	0	0	-14.28
C	14.76	0	0	-14.76
D	24.05	45.7	23.59	-0.46
TOTAL	**70.55**	**68.49**	**46.38**	**-24.17**

** Existing culvert originating at the Junction Box near the NE corner of Hurricane Gardens has adequate capacity to accept this slight increase in flow.*

Downstream Considerations

The discharge from the proposed Detention Facility will enter into an existing ditch that drains to the West, into Hurricane Lake, Phase 3. The ditch exists between Lots 47 and 48 of said development (based on Saline County GIS map). A 54" CMP (Helical) culvert exists under Worth Ave, at a grade of 0.7% (as shot in the field). Using an n of 0.012, the capacity of this culvert is computed at 183.65 cfs at d/D of 0.85 (velocity = 12.75 fps). It should be noted that the estimated post construction discharge is 1.29 cfs less than the estimated existing runoff from the same area. Therefore, this development should not have a negative impact on the downstream properties.



Source: Saline County GIS

Engineering Certification

I, Tim Lemons, Arkansas Registered Professional Engineer No. 7373, hereby certify that the drainage reports, and calculations contained in this report, have been prepared in accordance with sound engineering practice and principles, and based on best known available data. Improvements as outlined in this report and depicted on the preliminary plat and design drawings should not increase the risk of endangerment to life or have negative impacts on adjacent or downstream property or watersheds.



Timothy B. Lemons, PE
Arkansas Professional Engineer, #7373

Appendix

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 0.5%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.00500	0.0707	0.00
1	0.030	0.03	0.02	0.01	0.06	0.00500	0.0707	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.00500	0.0707	0.02
2	0.030	0.06	0.06	0.03	0.10	0.00500	0.0707	0.05
2.5	0.030	0.08	0.09	0.04	0.11	0.00500	0.0707	0.09
3	0.030	0.09	0.14	0.04	0.13	0.00500	0.0707	0.15
3.5	0.030	0.11	0.18	0.05	0.14	0.00500	0.0707	0.22
4	0.030	0.12	0.24	0.06	0.15	0.00500	0.0707	0.32
4.5	0.030	0.14	0.30	0.07	0.16	0.00500	0.0707	0.44
5	0.030	0.15	0.38	0.07	0.18	0.00500	0.0707	0.58
5.5	0.030	0.17	0.45	0.08	0.19	0.00500	0.0707	0.75
6	0.030	0.18	0.54	0.09	0.20	0.00500	0.0707	0.94
6.5	0.030	0.20	0.63	0.10	0.21	0.00500	0.0707	1.17
7	0.030	0.21	0.74	0.10	0.22	0.00500	0.0707	1.43
7.5	0.030	0.23	0.84	0.11	0.23	0.00500	0.0707	1.71
8.5	0.030	0.26	1.08	0.13	0.25	0.00500	0.0707	2.39
9	0.030	0.27	1.22	0.13	0.26	0.00500	0.0707	2.79
9.5	0.030	0.29	1.35	0.14	0.27	0.00500	0.0707	3.22
10	0.030	0.30	1.50	0.15	0.28	0.00500	0.0707	3.69
10.5	0.030	0.32	1.65	0.16	0.29	0.00500	0.0707	4.21
11	0.030	0.33	1.82	0.16	0.30	0.00500	0.0707	4.76
11.5	0.030	0.35	1.98	0.17	0.31	0.00500	0.0707	5.36
12	0.030	0.36	2.16	0.18	0.32	0.00500	0.0707	6.01
12.5	0.030	0.38	2.34	0.19	0.33	0.00500	0.0707	6.70
13	0.030	0.39	2.54	0.19	0.33	0.00500	0.0707	7.44

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 1.50%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.01500	0.1225	0.00
1	0.030	0.03	0.02	0.01	0.06	0.01500	0.1225	0.01
1.5	0.030	0.05	0.03	0.02	0.08	0.01500	0.1225	0.04
2	0.030	0.06	0.06	0.03	0.10	0.01500	0.1225	0.09
2.5	0.030	0.08	0.09	0.04	0.11	0.01500	0.1225	0.16
3	0.030	0.09	0.14	0.04	0.13	0.01500	0.1225	0.26
3.5	0.030	0.11	0.18	0.05	0.14	0.01500	0.1225	0.39
4	0.030	0.12	0.24	0.06	0.15	0.01500	0.1225	0.55
4.5	0.030	0.14	0.30	0.07	0.16	0.01500	0.1225	0.76
5	0.030	0.15	0.38	0.07	0.18	0.01500	0.1225	1.01
5.5	0.030	0.17	0.45	0.08	0.19	0.01500	0.1225	1.30
6	0.030	0.18	0.54	0.09	0.20	0.01500	0.1225	1.64
6.5	0.030	0.20	0.63	0.10	0.21	0.01500	0.1225	2.03
7	0.030	0.21	0.74	0.10	0.22	0.01500	0.1225	2.47
7.5	0.030	0.23	0.84	0.11	0.23	0.01500	0.1225	2.97
8.5	0.030	0.26	1.08	0.13	0.25	0.01500	0.1225	4.15
9	0.030	0.27	1.22	0.13	0.26	0.01500	0.1225	4.83
9.5	0.030	0.29	1.35	0.14	0.27	0.01500	0.1225	5.58
10	0.030	0.30	1.50	0.15	0.28	0.01500	0.1225	6.40
10.5	0.030	0.32	1.65	0.16	0.29	0.01500	0.1225	7.29
11	0.030	0.33	1.82	0.16	0.30	0.01500	0.1225	8.25
11.5	0.030	0.35	1.98	0.17	0.31	0.01500	0.1225	9.29
12	0.030	0.36	2.16	0.18	0.32	0.01500	0.1225	10.41
12.5	0.030	0.38	2.34	0.19	0.33	0.01500	0.1225	11.61
13	0.030	0.39	2.54	0.19	0.33	0.01500	0.1225	12.89

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 2.67%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.02670	0.1634	0.00
1	0.030	0.03	0.02	0.01	0.06	0.02670	0.1634	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.02670	0.1634	0.05
2	0.030	0.06	0.06	0.03	0.10	0.02670	0.1634	0.12
2.5	0.030	0.08	0.09	0.04	0.11	0.02670	0.1634	0.21
3	0.030	0.09	0.14	0.04	0.13	0.02670	0.1634	0.34
3.5	0.030	0.11	0.18	0.05	0.14	0.02670	0.1634	0.52
4	0.030	0.12	0.24	0.06	0.15	0.02670	0.1634	0.74
4.5	0.030	0.14	0.30	0.07	0.16	0.02670	0.1634	1.01
5	0.030	0.15	0.38	0.07	0.18	0.02670	0.1634	1.34
5.5	0.030	0.17	0.45	0.08	0.19	0.02670	0.1634	1.73
6	0.030	0.18	0.54	0.09	0.20	0.02670	0.1634	2.18
6.5	0.030	0.20	0.63	0.10	0.21	0.02670	0.1634	2.70
7	0.030	0.21	0.74	0.10	0.22	0.02670	0.1634	3.29
7.5	0.030	0.23	0.84	0.11	0.23	0.02670	0.1634	3.96
8.5	0.030	0.26	1.08	0.13	0.25	0.02670	0.1634	5.53
9	0.030	0.27	1.22	0.13	0.26	0.02670	0.1634	6.44
9.5	0.030	0.29	1.35	0.14	0.27	0.02670	0.1634	7.44
10	0.030	0.30	1.50	0.15	0.28	0.02670	0.1634	8.53
10.5	0.030	0.32	1.65	0.16	0.29	0.02670	0.1634	9.72
11	0.030	0.33	1.82	0.16	0.30	0.02670	0.1634	11.01
11.5	0.030	0.35	1.98	0.17	0.31	0.02670	0.1634	12.40
12	0.030	0.36	2.16	0.18	0.32	0.02670	0.1634	13.89
12.5	0.030	0.38	2.34	0.19	0.33	0.02670	0.1634	15.49
13	0.030	0.39	2.54	0.19	0.33	0.02670	0.1634	17.20

GUTTER CAPACITY OF STREETS - 27' BC to BC

Slope = 4.88%, n = 0.012

Width (ft)	Slope	Height (ft)	Area (sf)	R	R^2/3	S	S^1/2	Q (cfs)
0.5	0.030	0.02	0.00	0.01	0.04	0.04880	0.2209	0.00
1	0.030	0.03	0.02	0.01	0.06	0.04880	0.2209	0.02
1.5	0.030	0.05	0.03	0.02	0.08	0.04880	0.2209	0.07
2	0.030	0.06	0.06	0.03	0.10	0.04880	0.2209	0.16
2.5	0.030	0.08	0.09	0.04	0.11	0.04880	0.2209	0.28
3	0.030	0.09	0.14	0.04	0.13	0.04880	0.2209	0.46
3.5	0.030	0.11	0.18	0.05	0.14	0.04880	0.2209	0.70
4	0.030	0.12	0.24	0.06	0.15	0.04880	0.2209	1.00
4.5	0.030	0.14	0.30	0.07	0.16	0.04880	0.2209	1.37
5	0.030	0.15	0.38	0.07	0.18	0.04880	0.2209	1.81
5.5	0.030	0.17	0.45	0.08	0.19	0.04880	0.2209	2.34
6	0.030	0.18	0.54	0.09	0.20	0.04880	0.2209	2.95
6.5	0.030	0.20	0.63	0.10	0.21	0.04880	0.2209	3.65
7	0.030	0.21	0.74	0.10	0.22	0.04880	0.2209	4.45
7.5	0.030	0.23	0.84	0.11	0.23	0.04880	0.2209	5.35
8.5	0.030	0.26	1.08	0.13	0.25	0.04880	0.2209	7.48
9	0.030	0.27	1.22	0.13	0.26	0.04880	0.2209	8.71
9.5	0.030	0.29	1.35	0.14	0.27	0.04880	0.2209	10.06
10	0.030	0.30	1.50	0.15	0.28	0.04880	0.2209	11.54
10.5	0.030	0.32	1.65	0.16	0.29	0.04880	0.2209	13.14
11	0.030	0.33	1.82	0.16	0.30	0.04880	0.2209	14.88
11.5	0.030	0.35	1.98	0.17	0.31	0.04880	0.2209	16.76
12	0.030	0.36	2.16	0.18	0.32	0.04880	0.2209	18.77
12.5	0.030	0.38	2.34	0.19	0.33	0.04880	0.2209	20.94
13	0.030	0.39	2.54	0.19	0.33	0.04880	0.2209	23.25

DETAILED PLANS:

HILLCREST ADDITION

PART OF SECTION 12, T-4-N, R-10-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

JULY 9, 2024
REVISED: OCTOBER 29, 2024

PREPARED FOR:

SPRINGHILL HWY 5 DEVELOPMENT, LLC
816 E. OAK STREET
CONWAY, ARKANSAS 72032

Arkansas 811
Know what's below. Call before you dig.

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

Prepared By:

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023

ENGINEERING • SURVEYING • PLANNING

INDEX OF SHEETS

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Culvert Plan/Profile	3
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Detention Pond Plan	5
Water Layout	6
Construction Details – Water	7
Sewer Plan/Profile	8
Construction Details – Sewer	9
Erosion Control Plan	10

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

CERTIFICATE OF ENGINEERING ACCURACY:

I, TIMOTHY B. LEMONS, HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A PLAT MADE BY ME, OR UNDER MY SUPERVISION, AND THAT ENGINEERING REQUIREMENTS OF THE BRYANT SUBDIVISION RULES AND REGULATIONS HAVE BEEN COMPLIED WITH.

DATE — *TIMOTHY B. LEMONS, REGISTERED PROFESSIONAL ENGINEER NO. 7373, ARKANSAS*

REGISTERED
STATE OF ARKANSAS
NO 1552
SIGNATURE
BILLY A. LAWRENCE
PROFESSIONAL LAND SURVEYOR

CERTIFICATE OF SURVEYING ACCURACY:

I, BILLY A. LAWRENCE, HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A BOUNDARY SURVEY MADE BY ME AND ALL MONUMENTS SHOWN HEREON ACTUALLY EXIST AND THEIR LOCATION, SIZE, TYPE AND MATERIAL ARE CORRECTLY SHOWN.

DATE — *BILLY A. LAWRENCE, ARKANSAS PROFESSIONAL SURVEYOR, NO. 1552*

CERTIFICATE OF PRELIMINARY PLAT APPROVAL:

ALL REQUIREMENTS OF THE BRYANT SUBDIVISION RULES AND REGULATIONS RELATIVE TO THE PREPARATION AND SUBMITTAL OF A PRELIMINARY PLAT HAVING BEEN FULFILLED, APPROVAL OF THIS DOCUMENT IS HEREBY GRANTED, SUBJECT TO FURTHER PROVISIONS OF SAID RULES AND REGULATIONS, THIS CERTIFICATE SHALL EXPIRE _____ DATE

DATE OF EXECUTION — *SIGNED: CHAIRMAN, BRYANT PLANNING COMMISSION*

CERTIFICATE OF OWNERS:

WE, THE UNDERSIGNED, OWNERS OF THE REAL ESTATE SHOWN AND DESCRIBED HEREIN, DO HEREBY CERTIFY THAT WE HAVE LAID OFF, PLATTED, AND SUBDIVIDED, AND DO HEREBY LAY OFF, PLAT AND SUBDIVIDE SAID REAL ESTATE IN ACCORDANCE WITH THIS PLAT.

DATE — *SPRINGHILL HWY 5 DEVELOPMENT, LLC*
816 E. OAK STREET
CONWAY, ARKANSAS 72032

LEGAL DESCRIPTION:

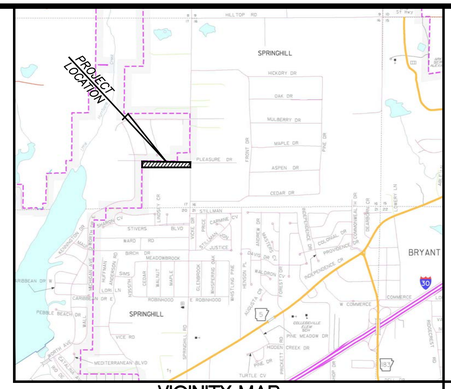
PART OF THE SE ¼, OF THE SE ¼, SECTION 17, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF THE SE ¼, OF THE SE ¼, SECTION 17, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS; THENCE N 02°17'33" E, 1167.19 FEET TO THE POINT OF BEGINNING; THENCE N 88°34'40" W, 1344.97 FEET; THENCE N 01°36'19" E, 167.98 FEET; THENCE S 87°44'58" E, 1346.85 FEET; THENCE S 02°18'02" W, 148.52 FEET; TO THE POINT OF BEGINNING, CONTAINING 4.89 ACRES, MORE OR LESS.

SOURCE OF TITLE: 2021-030121

FLOOD CERTIFICATION:

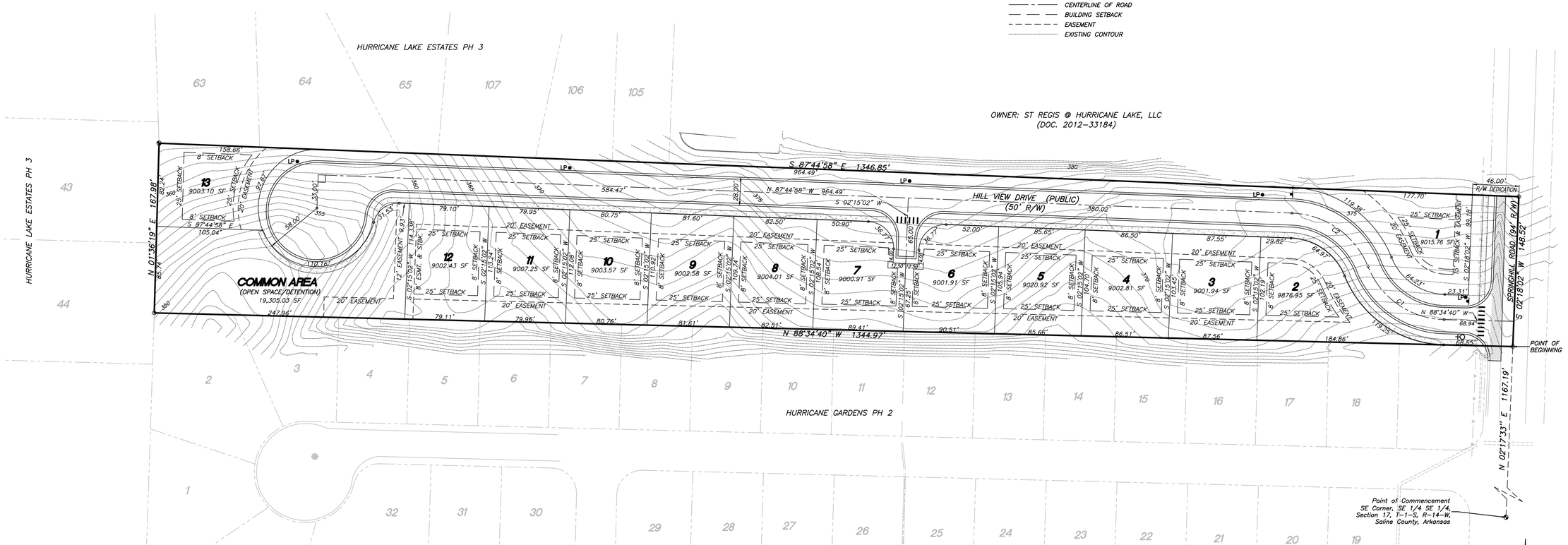
BASED UPON REVIEW OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FIRM COMMUNITY PANEL NO. 05125C0225E, EFFECTIVE DATE: JUNE 5, 2020 THE PROPERTY DEPICTED ON THIS PLAT IS LOCATED WITHIN ZONE X, AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN.



VICINITY MAP
SCALE: 1" = 2000'

LEGEND:

- FOUND CONC. MONUMENT
- FOUND IRON PIN (FIP)
- LP● LIGHT POLE
- STOP/STREET NAME SIGN
- STREET SIGN
- PROPERTY BOUNDARY
- LOT LINE
- CENTERLINE OF ROAD
- BUILDING SETBACK
- EASEMENT
- EXISTING CONTOUR



CURVE	RADIUS	ARC LENGTH	TANGENT	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	83.37'	97.14'	54.93'	66°45'36"	N 55°11'52" W	91.74'
C2	84.70'	97.46'	54.93'	65°55'55"	N 54°47'01" W	92.17'

GENERAL NOTES:

1.) IRON PINS TO BE SET AT ALL LOT CORNERS.
2.) EASEMENTS TO BE USED FOR UTILITIES AND DRAINAGE.
3.) ALL EASEMENTS ARE AS NOTED.
4.) ALL BUILDING LINES ARE AS NOTED.
5.) CURRENT ZONING – R2.
6.) WATER – SALEM WATER.
7.) SEWER – CITY OF BRYANT.
8.) NO FENCES, POOLS, TEMPORARY OR PERMANENT OBSTRUCTIONS MAY BE PLACED IN ANY DRAINAGE, SEWER OR ACCESS EASEMENTS.

0' 50' 100' 150'
SCALE: 1" = 50'

Arkansas 811
Know what's below.
Call before you dig.

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 845-5081 • FAX (501) 941-0959
ENGINEERING + SURVEYING
WATER • SEWER • TRANSPORTATION • SUBDIVISIONS

PRELIMINARY PLAT
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

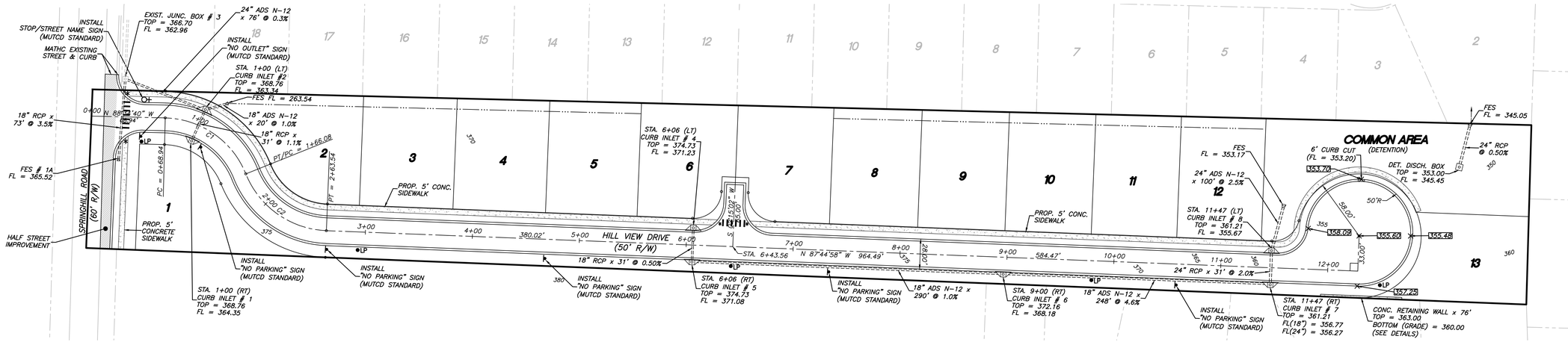
Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	7-25-24	B. Judd
2	Revised as per city's comments.	9-25-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No.: 24-018
Date: JULY 9, 2024
File: 01_Hillcrest Plat
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 1 of 10

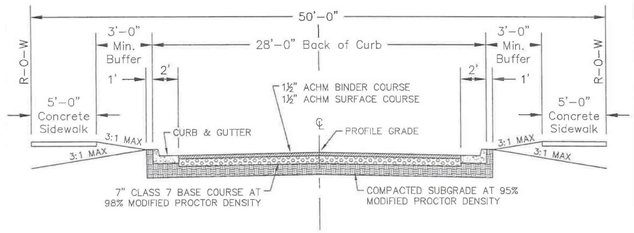
Arkansas 811
Know what's below. Call before you dig.

CURVE	RADIUS	ARC LENGTH	TANGENT	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	83.37'	97.14'	54.93'	66°45'36"	N 55°11'52" W	91.74'
C2	84.70'	97.46'	54.93'	65°55'55"	N 54°47'01" W	92.17'

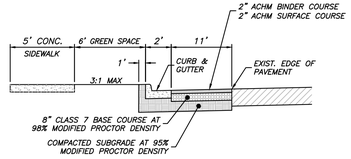


∗ – ADA COMPLIANT RAMP
INSTALL MUTCD SIGNAGE @ CROSSWALK.

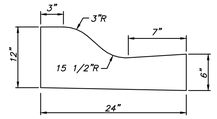
LEGEND:
- STOP / STREET NAME COMBINATION SIGN
- STREET SIGN
- LP● LIGHT POLE
- ∗ ADA RAMP
- INLET
- PROPERTY BOUNDARY
- LOT LINE
- CENTERLINE OF ROAD
- EXISTING CONTOUR
- DRAINAGE PIPE
- PROPOSED SIDEWALK



TYPICAL CROSS SECTION - LOCAL STREET
NTS

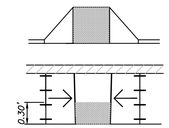


CROSS SECTION - SPRINGHILL RD (MINOR ARTERIAL)
NTS

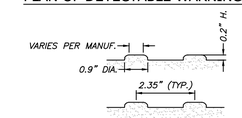


TYPICAL - CONC. CURB/GUTTER
NTS

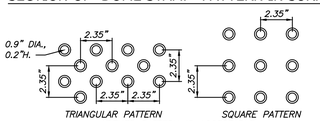
PAVEMENT STRUCTURE TO BE DETERMINED BY GEOTECHNICAL CONSULTANT



PLAN OF DETECTABLE WARNING SURFACE



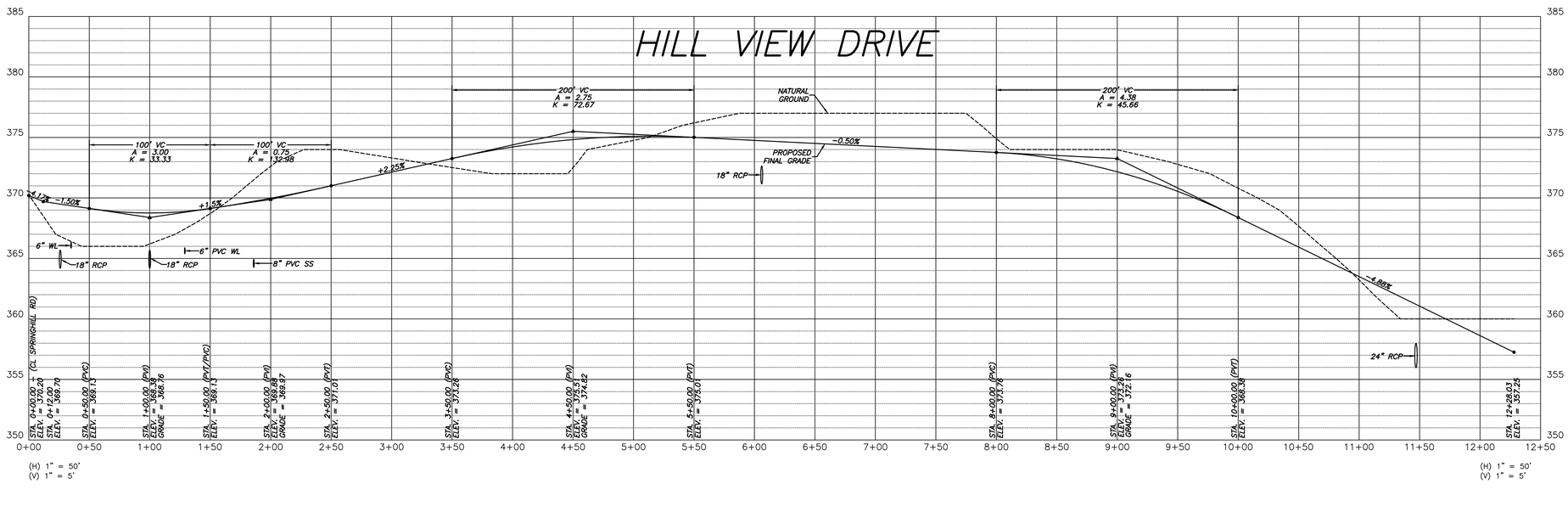
SECTION OF "DOME STAMP" PATTERN IN SURFACE



PLAN OF "DOME STAMP" PATTERN IN SURFACE

CURB RAMPS MUST HAVE A DETECTABLE WARNING FEATURE EXTENDING THE FULL WIDTH AND DEPTH OF THE RAMP (MID-WALK "IN-LINE" RAMPS ONLY NEED DETECTABLE WARNINGS AT WALK/PARKING TRANSITION). THE DETECTABLE SURFACE MUST CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 INCHES, A HEIGHT OF NOMINAL 0.2 INCHES AND A CENTER-TO CENTER SPACING OF NOMINAL 2.35 INCHES. THE TEXTURE OF THE DETECTABLE WARNING FEATURE MUST CONTRAST WITH THE SURROUNDING SURFACES (EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT). SEE ABOVE.

GENERAL NOTES
1. IN AREAS TO RECEIVE BITUMINOUS PAVING, CONCRETE DRIVEWAYS OR CURB AND GUTTER, SUBGRADE SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% OF MAXIMUM MODIFIED DENSITY OBTAINED AT OPTIMUM MOISTURE CONTENT.
2. FOR AREAS OF SUBGRADE PREPARATION TO RECEIVE CONCRETE SIDEWALKS, SUBGRADE SHALL BE COMPACTED TO DENSITY OF 90% MAXIMUM MODIFIED DENSITY.
3. CRUSHED STONE – MATERIAL IN EACH COURSE SHALL BE COMPACTED TO A DENSITY OF 98% MAXIMUM MODIFIED DENSITY.
4. CONCRETE SIDEWALK SHALL BE A MINIMUM OF 4' WIDE IN RESIDENTIAL SUBDIVISIONS



(H) 1" = 50'
(V) 1" = 5'

(H) 1" = 50'
(V) 1" = 5'

GENERAL NOTES:
1.) ALL STOP SIGNS SHALL BE 30" X 30"
2.) ALL TRAFFIC CONTROL MARKERS MUST MEET MUTCD SPECS.
3.) CONTRACTOR SHALL INCLUDE IN BID THE COST FOR COMPACTION TESTS ON SUBGRADE & SUBBASE. TEST TO BE CONDUCTED ON 500' INTERVALS.
4.) CONTRACTOR TO PROOF ROLL BOTH SUBGRADE AND SUBBASE (CITY TO INSPECT).
5.) LIGHT POLES SHALL BE PLACED AT ALL INTERSECTIONS. ADDITIONAL LOCATIONS TO BE DETERMINED BY THE CITY.
6.) ALL BACK OF CURB RADII AT INTERSECTIONS SHALL BE 25' UNLESS OTHERWISE NOTED.
7.) CONTRACTOR TO INCLUDE IN BID THE COST OF MATERIAL AND INSTALLATION OF STREET SIGNS & TRAFFIC CONTROL SIGNS.
8.) WHERE STOP SIGNS & STREET NAME SIGNS ARE SHOWN ON THE PLAN, A COMBINATION SIGN IS ACCEPTABLE.
10.) SEE PLAN/PROFILE SHEETS FOR ADDITIONAL INFORMATION.
11.) ALL PAVEMENT TO BE TYPE 'A'.
12.) ALL INLETS TO HAVE DOUBLE EXTENDED THROATS UNLESS STATED OTHERWISE.

0' 50' 100' 150'
SCALE: 1" = 50'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 845-5081 • FAX: (501) 941-0959
ENGINEERING + SURVEYING
WATER • SEWER • TRANSPORTATION • SUBDIVISIONS

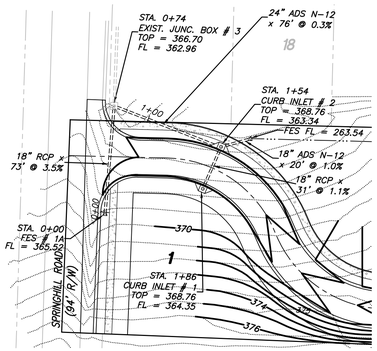
STREET PLAN/PROFILE
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

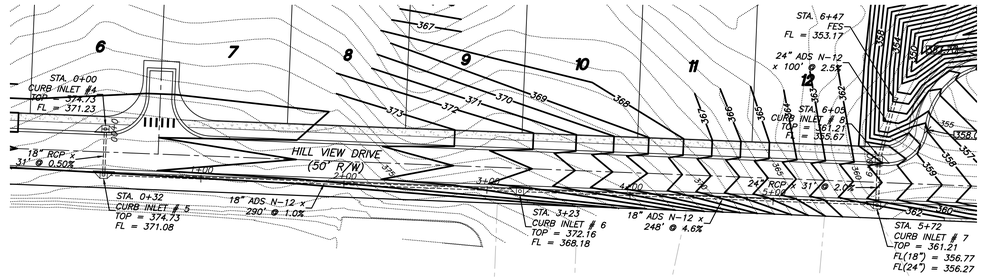
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

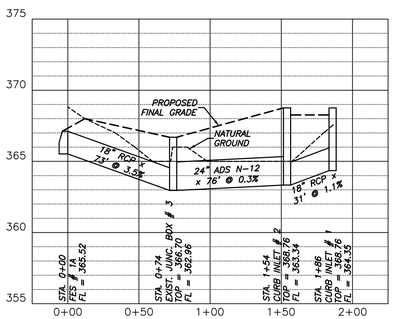
No.	Revisions	Date	By
1	Revised street width comments.	9-25-24	B. Judd
2	Revised per city comments.	10-1-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No. 24-018
Date: JULY 9, 2024
File: 02_Hillcrest Street
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 2 of 10

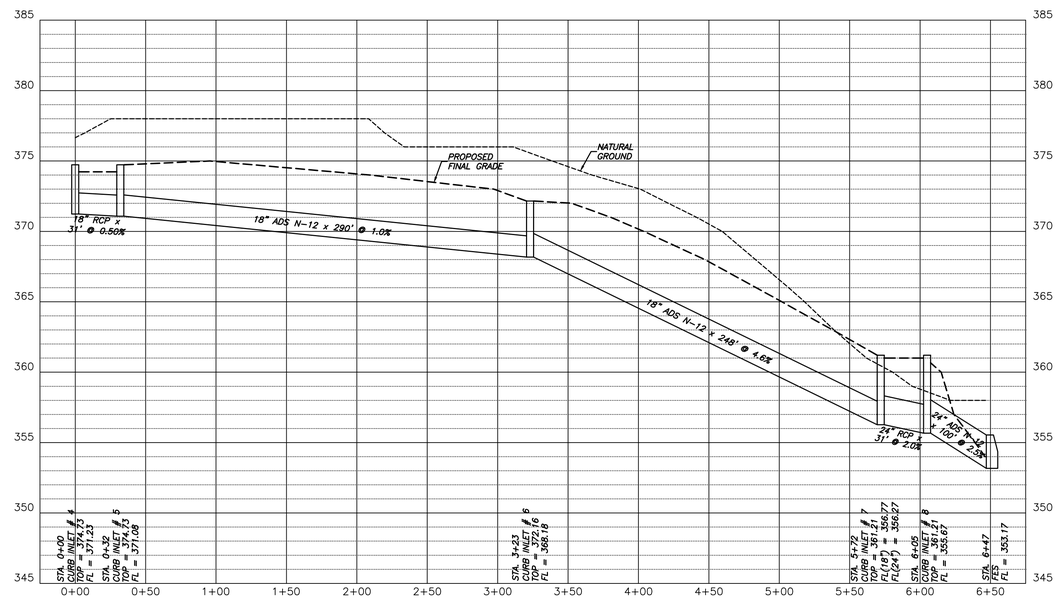
Arkansas 811
Know what's below. Call before you dig.







(H) 1" = 50'
(V) 1" = 5'



(H) 1" = 50'
(V) 1" = 5'

0' 50' 100' 150'
SCALE: 1" = 50'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

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CULVERT PLAN/PROFILE
HILLCREST ADDITION

PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

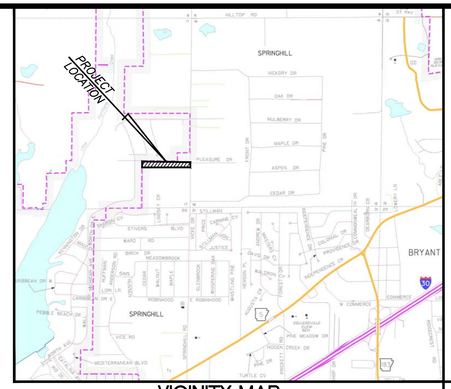
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	10-21-24	B. Judd
2	Revised as per city's comments.	10-24-24	B. Judd

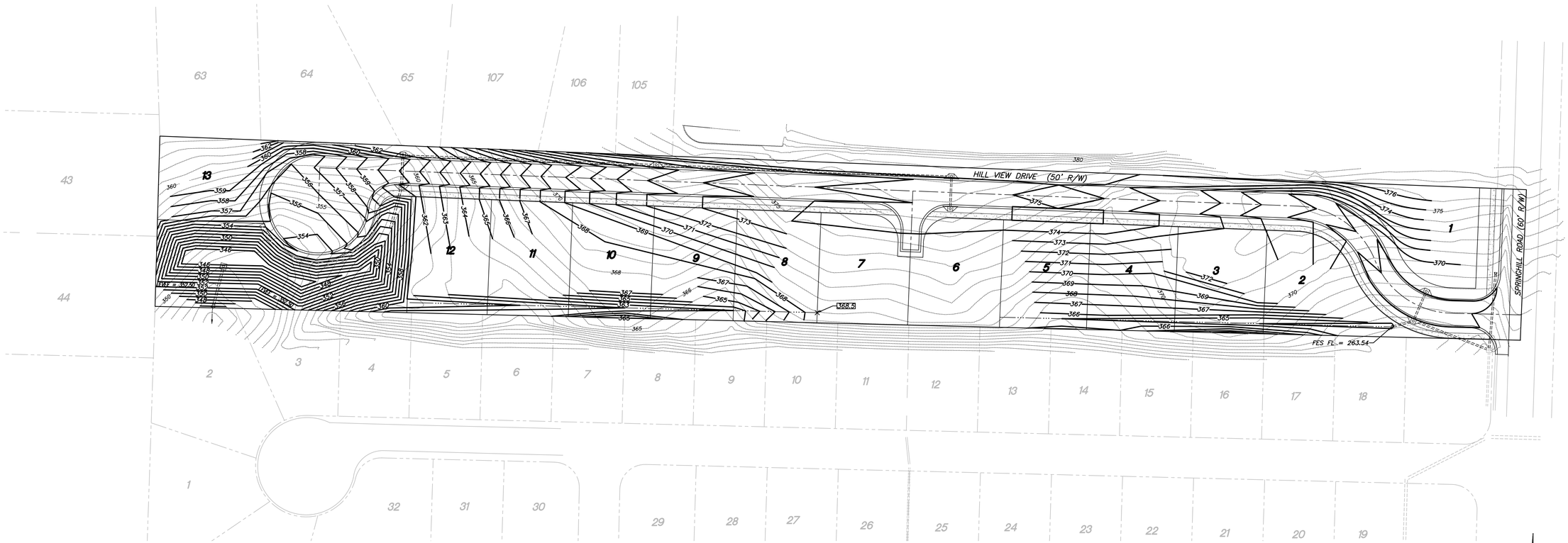
Project No.: 24-018
Date: SEPTEMBER 20, 2024
File: 03_Hillcrest Culvert
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 3 of 10

GENERAL NOTES:

1.) *ALL CONSTRUCTION AND MATERIALS TO BE VERIFIED BY A GEOTECHNICAL CONSULTANT PRIOR TO CONSTRUCTION.*
2.) *CONTRACTOR SHALL NOTIFY ENGINEER IF SIGNIFICANT CHANGES ARE MADE TO GRADING PLAN.*
3.) *ALL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR, INSTALLED IN 6" – 8" LIFTS, OR AS DIRECTED BY GEOTECHNICAL CONSULTANT.*
4.) *CONTRACTOR SHALL PROVIDE TEMPORARY EROSION CONTROL MEASURES UNTIL CONSTRUCTION IS COMPLETE.*
5.) *ALL UTILITIES TO BE LOCATED PRIOR TO CONSTRUCTION (ONE CALL, CITY, ETC.).*
6.) *CONTRACTOR SHALL NOT DISTURB ANY MORE GROUND THAN IS NECESSARY FOR THE INSTALLATION OF IMPROVEMENTS & GRADING WORK.*
7.) *CONTRACTOR SHALL GRADE YARDS TO ENSURE THAT GROUND SLOPES AWAY FROM ALL BUILDINGS IN ALL DIRECTIONS.*



VICINITY MAP
SCALE: 1" = 2000'



LEGEND:

350 – *EXISTING CONTOUR*
350 – *PROPOSED CONTOUR*

0' 50' 100' 150'
SCALE: 1" = 50'

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GRADING PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

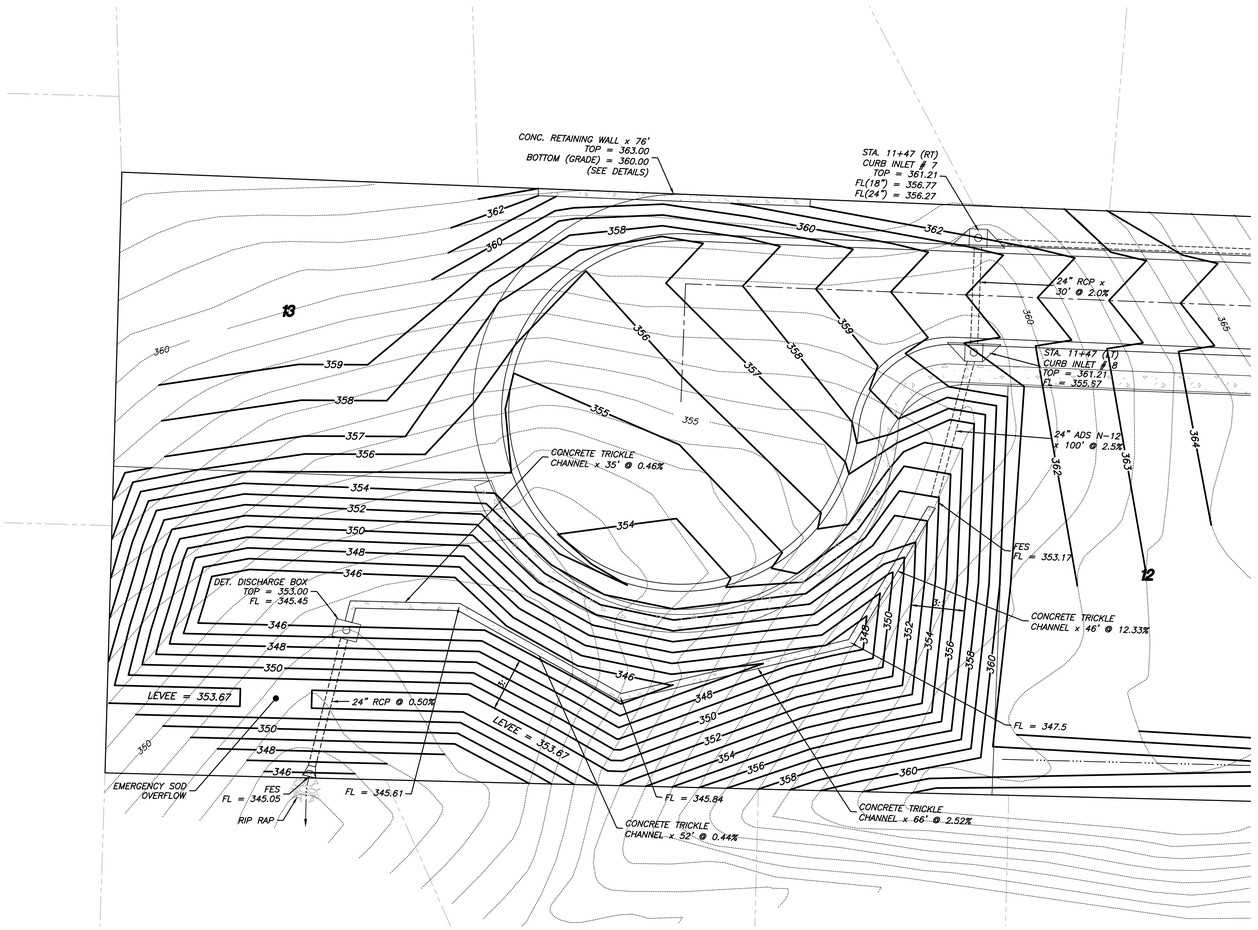
No.	Revisions	Date	By
1	Revised as per city's comments.	9-20-24	B. Judd
2	Revised as per city's comments.	10-1-24	B. Judd
3	Revised as per city's comments.	10-24-24	B. Judd

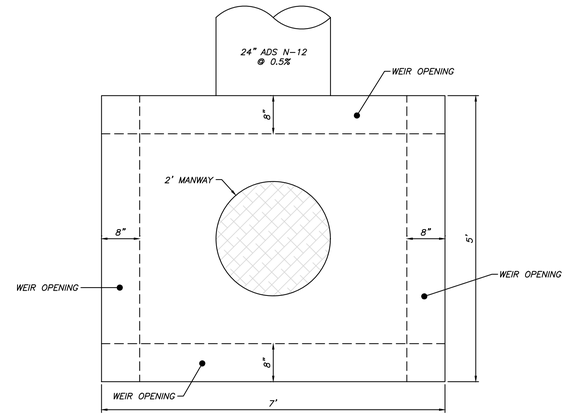
Project No.: 24-018
Date: JULY 9, 2024
File: 04_Hillcrest Grading
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 4 of 10

LEGEND:

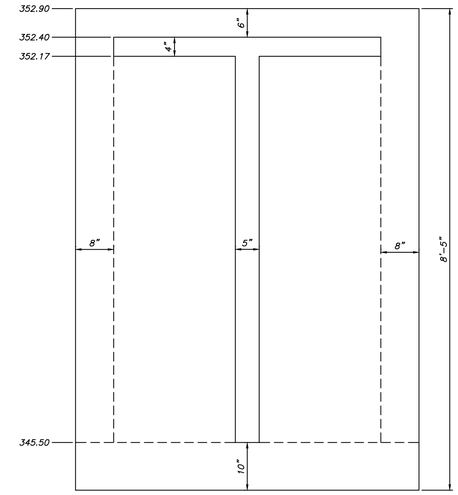
350 – EXISTING CONTOUR

350 – PROPOSED CONTOUR





TOP VIEW

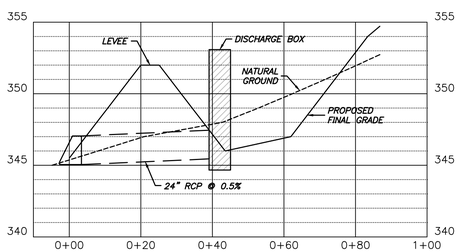


FRONT VIEW

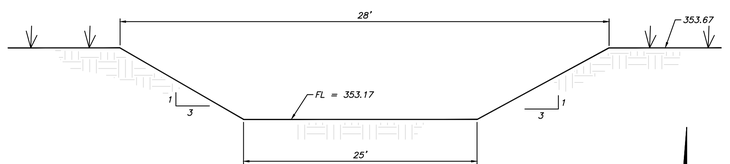
DISCHARGE STRUCTURE
NTS

GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO BE VERIFIED BY A GEOTECHNICAL CONSULTANT PRIOR TO CONSTRUCTION.
2.) CONTRACTOR SHALL NOTIFY ENGINEER IF SIGNIFICANT CHANGES ARE MADE TO GRADING PLAN.
3.) ALL MATERIAL TO BE COMPACTED TO 95% STANDARD PROCTOR, INSTALLED IN 6" – 8" LIFTS, OR AS DIRECTED BY GEOTECHNICAL CONSULTANT.
4.) CONTRACTOR SHALL PROVIDE TEMPORARY EROSION CONTROL MEASURES UNTIL CONSTRUCTION IS COMPLETE.
5.) ALL UTILITIES TO BE LOCATED PRIOR TO CONSTRUCTION (ONE CALL, CITY, ETC.).
6.) CONTRACTOR SHALL NOT DISTURB ANY MORE GROUND THAN IS NECESSARY FOR THE INSTALLATION OF IMPROVEMENTS & GRADING WORK.
7.) ALL LEVEES ASSOCIATED WITH DETENTION FACILITY SHALL NOT HAVE A SLOPE GREATER THAN 3:1.
8.) ALL AREAS OF DETENTION FACILITY SHALL INCLUDE SOLID SOD STABILIZATION.



(H) 1" = 20'
(V) 1" = 5'



DETAIL - EMERGENCY OVERFLOW
NTS



0' 20' 40' 60'

SCALE: 1" = 20'

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DETENTION POND PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

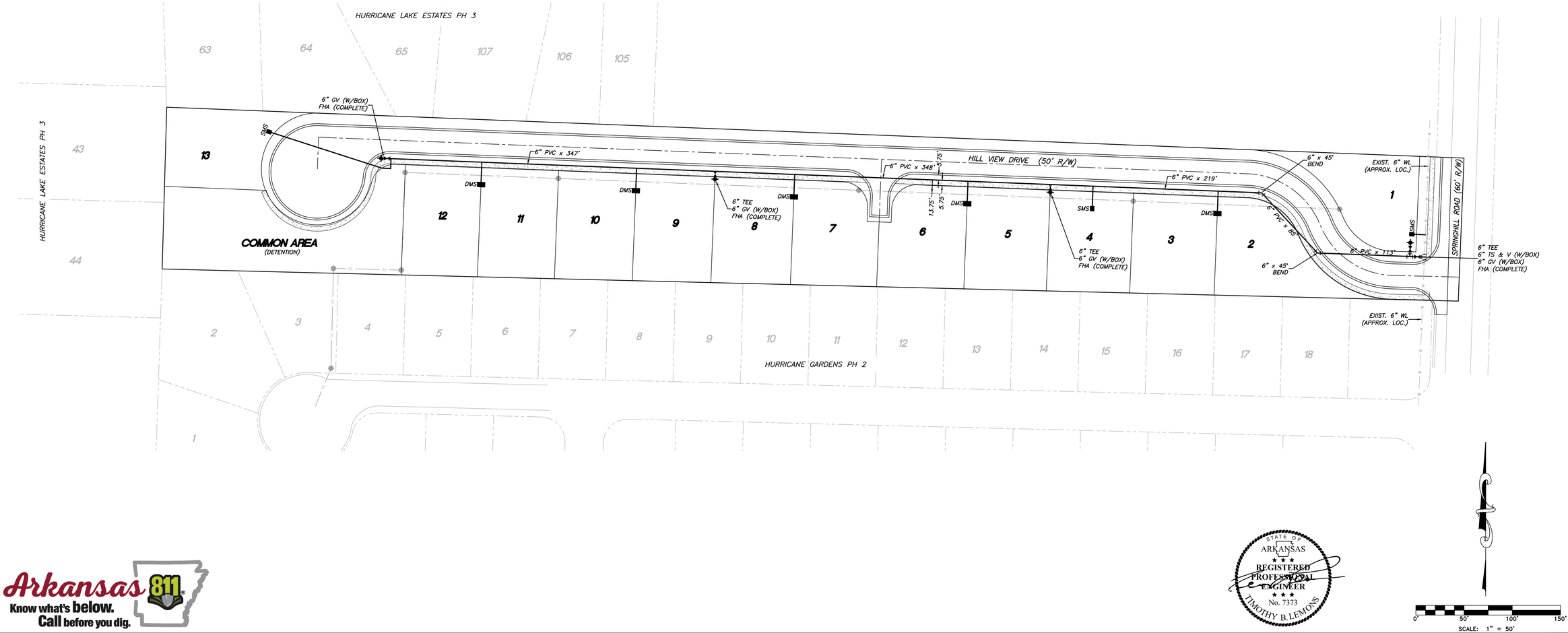
Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Added cross section, revised per City's comments.	7-25-24	B. Judd
2	Revised as per City's comments.	8-23-24	B. Judd
3	Revised as per City's comments.	10-4-24	B. Judd
4	Revised discharge structure.	10-29-24	B. Judd

Project No.: 24-018
Date: JULY 9, 2024
File: 05_Hillcrest Pond
Scale: 1" = 20'
Drawn By: B. Judd
Sheet: 5 of 10

GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO MEET OR EXCEED SALEM WATER SPECIFICATIONS.
2.) INSTALL 12ga BLUE POLYETHELENE COATED SOLID COPPER WIRE IN A CONTINUOUS CIRCUIT UNDER ALL WATER MAINS AND SERVICE LINES. DIRECT BURY, WATERPROOF WIRE SPLICE CONNECTORS SHALL BE USED. TRACER WIRE SHALL BE TURNED UP AT ALL VALVES, HYDRANTS, METERS, AND BLOW-OFF'S.
3.) ALL FITTINGS SHALL BE DUCTILE IRON M.J. (WHERE AVAILABLE).
4.) ATTENTION IS CALLED TO DETAILS FOR ADDITIONAL INFORMATION.
5.) CONSTRUCTION SHALL COMPLY WITH SECTION XIV.A -ADH RULES PERTAINING TO PUBLIC WATER SYSTEMS THAT STATES: "THE OPERATING ROUTINE SHALL INCLUDE NECESSARY PROTECTIVE MEASURES TO DETECT AND REMOVE OR DESTROY ANY CONTAMINANT OF CONCERN OR REGULATION THAT MIGHT ENTER THE DISTRIBUTION SYSTEM. EVERY PRECAUTION MUST BE TAKEN AGAINST THE POSSIBILITY OF SEWAGE CONTAMINATION OF THE WATER IN THE DISTRIBUTION SYSTEM. WATER MAINS AND SANITARY SEWERS SHALL BE CONSTRUCTED AS FAR APART AS PRACTICABLE, AND SHALL BE SEPARATED BY UNDISTURBED AND COMPACTED EARTH. A MINIMUM HORIZONTAL DISTANCE OF TEN FEET SHOULD BE MAINTAINED BETWEEN WATER LINES AND SEWER LINES OR OTHER SOURCES OF CONTAMINATION. WATER LINES AND SEWERS SHALL NOT BE LAID IN THE SAME TRENCH EXCEPT ON THE WRITTEN APPROVAL OF THE ARKANSAS DEPARTMENT OF HEALTH. WATER MAINS NECESSARILY IN CLOSE PROXIMITY TO SEWERS MUST BE PLACED SO THAT THE BOTTOM OF THE WATER LINE WILL BE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE AT ITS HIGHEST POINT. IF THIS DISTANCE MUST UNAVOIDABLY BE REDUCED, THE WATER LINE OR THE SEWER LINE MUST BE ENCASED IN WATERTIGHT PIPE WITH SEALED WATERTIGHT ENDS EXTENDING AT LEAST TEN FEET EITHER SIDE OF THE CROSSING. ANY JOINT IN THE ENCASEMENT PIPE IS TO BE MECHANICALLY RESTRAINED. THE ENCASEMENT PIPE MAY BE VENTED TO THE SURFACE IF CARRYING WATER OR SEWER UNDER PRESSURE. WHERE A WATER LINE MUST UNAVOIDABLY PASS BENEATH THE SEWER LINE, AT LEAST 18 INCHES OF SEPARATION MUST BE MAINTAINED BETWEEN THE OUTSIDE OF THE TWO PIPES IN ADDITION TO THE PRECEDING ENCASEMENT REQUIREMENT. EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH. A MINIMUM HORIZONTAL DISTANCE OF THREE FEET SHALL BE MAINTAINED BETWEEN WATER LINES AND OTHER UNDERGROUND UTILITIES OF A NONSANITARY NATURE (GAS, ELECTRIC, ETC.). EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH.
6.) CONTRACTOR SHALL ADHERE TO CURRENT OSHA REGULATIONS FOR EXCAVATION & TRENCH SAFETY.
7.) CONTRACTOR TO ADHERE TO AWWA SPECS FOR BLOCKING.
8.) CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED PRIOR TO CONSTRUCTION.
9.) CONTRACTOR SHALL CONTACT WATER & WASTEWATER UTILITIES FOR ALL APPLICABLE INSPECTION & TESTING.
10.) CONTRACTOR SHALL CONTACT WATER & WASTEWATER UTILITIES AT LEAST 24 HOURS PRIOR TO DISRUPTION OF ANY SERVICE.
11.) ALL MATERIALS AND COMPONENTS INSTALLED IN DRINKING WATER SYSTEMS ARE REQUIRED TO COMPLY WITH THE FEDERAL DEFINITION OF "LEAD FREE" CONTAINED IN PUBLIC LAW 111-380.



0' 50' 100' 150'
SCALE: 1" = 50'

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

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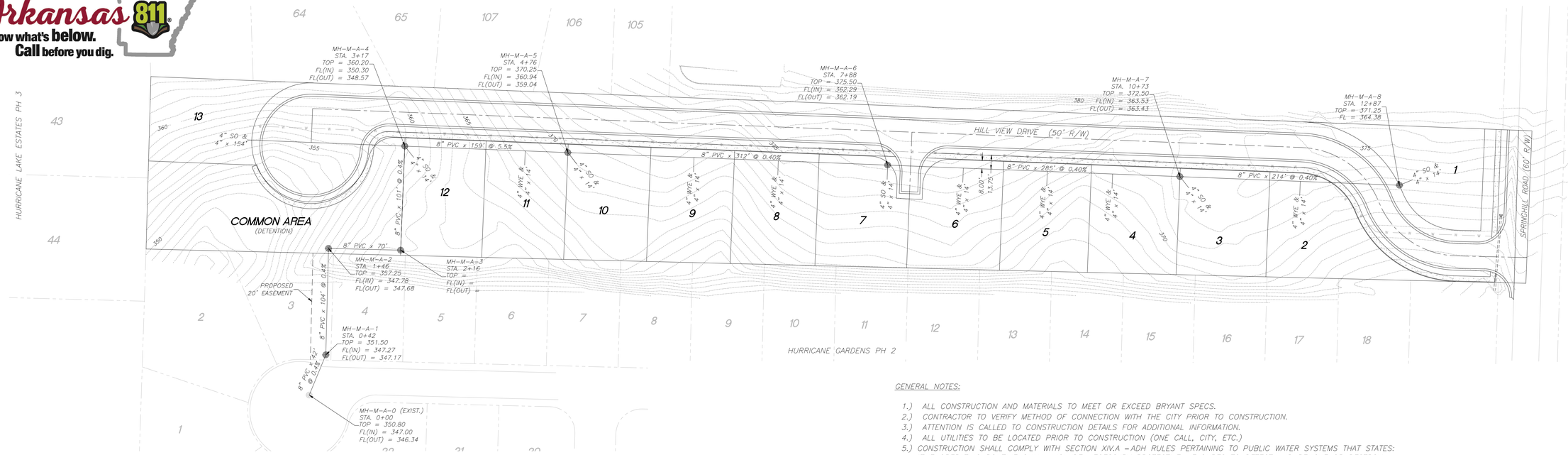
WATER LAYOUT
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5
Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1.	Revised as per city's comments.	8-20-24	B. Judd
2.	Revised as per city's comments.	9-20-24	B. Judd
3.	Revised as per city's comments.	10-24-24	B. Judd

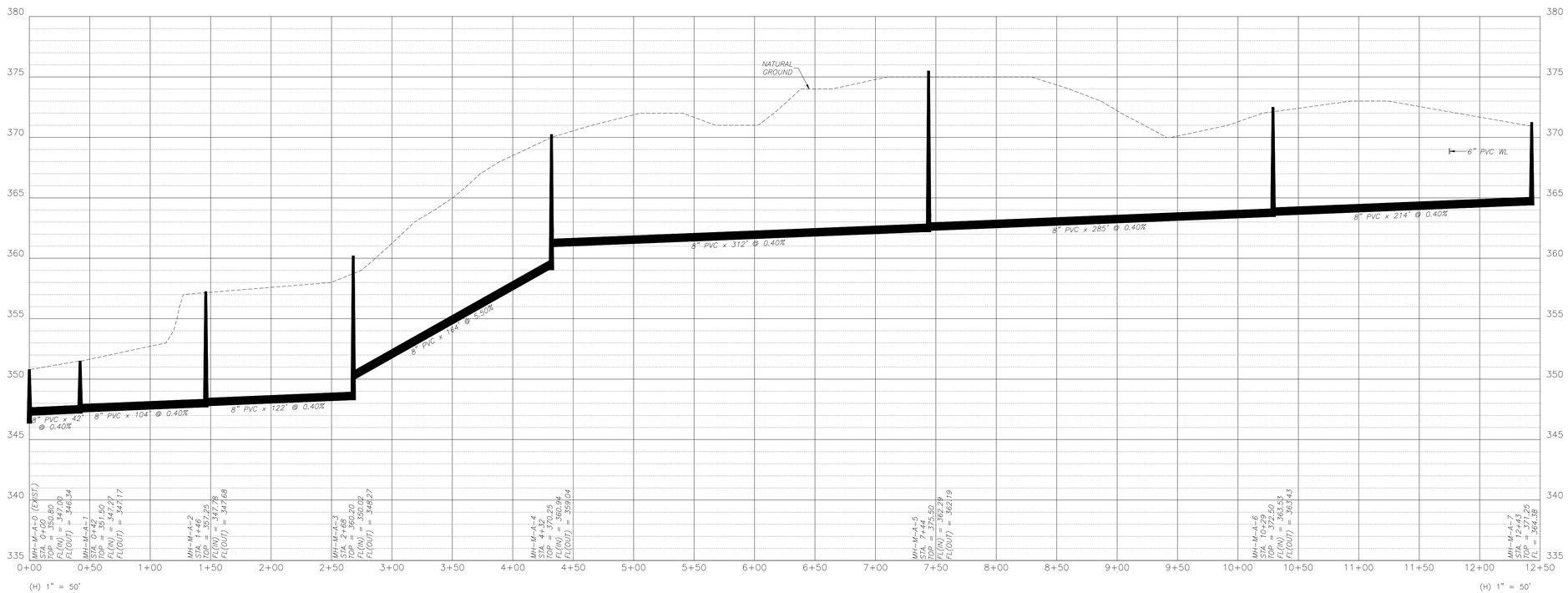
Project No. 24-018
Date: JULY 9, 2024
File: 06_Hillcrest Water
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 6 of 10

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GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO MEET OR EXCEED BRYANT SPECS.
2.) CONTRACTOR TO VERIFY METHOD OF CONNECTION WITH THE CITY PRIOR TO CONSTRUCTION.
3.) ATTENTION IS CALLED TO CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.
4.) ALL UTILITIES TO BE LOCATED PRIOR TO CONSTRUCTION (ONE CALL, CITY, ETC.)
5.) CONSTRUCTION SHALL COMPLY WITH SECTION XIV.A – ADH RULES PERTAINING TO PUBLIC WATER SYSTEMS THAT STATES: "THE OPERATING ROUTINE SHALL INCLUDE NECESSARY PROTECTIVE MEASURES TO DETECT AND REMOVE OR DESTROY ANY CONTAMINANT OF CONCERN OR REGULATION THAT MIGHT ENTER THE DISTRIBUTION SYSTEM. EVERY PRECAUTION MUST BE TAKEN AGAINST THE POSSIBILITY OF SEWAGE CONTAMINATION OF THE WATER IN THE DISTRIBUTION SYSTEM. WATER MAINS AND SANITARY SEWERS SHALL BE CONSTRUCTED AS FAR APART AS PRACTICABLE, AND SHALL BE SEPARATED BY UNDISTURBED AND COMPACTED EARTH. A MINIMUM HORIZONTAL DISTANCE OF TEN FEET SHOULD BE MAINTAINED BETWEEN WATER LINES AND SEWER LINES OR OTHER SOURCES OF CONTAMINATION. WATER LINES AND SEWERS SHALL NOT BE LAID IN THE SAME TRENCH EXCEPT ON THE WRITTEN APPROVAL OF THE ARKANSAS DEPARTMENT OF HEALTH. WATER MAINS NECESSARILY IN CLOSE PROXIMITY TO SEWERS MUST BE PLACED SO THAT THE BOTTOM OF THE WATER LINE WILL BE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE AT ITS HIGHEST POINT. IF THIS DISTANCE MUST UNAVOIDABLY BE REDUCED, THE WATER LINE OR THE SEWER LINE MUST BE ENCASED IN WATERTIGHT PIPE WITH SEALED WATERTIGHT ENDS EXTENDING AT LEAST TEN FEET EITHER SIDE OF THE CROSSING. ANY JOINT IN THE ENCASEMENT PIPE IS TO BE MECHANICALLY RESTRAINED. THE ENCASEMENT PIPE MAY BE VENTED TO THE SURFACE IF CARRYING WATER OR SEWER UNDER PRESSURE. WHERE A WATER LINE MUST UNAVOIDABLY PASS BENEATH THE SEWER LINE, AT LEAST 18 INCHES OF SEPARATION MUST BE MAINTAINED BETWEEN THE OUTSIDE OF THE TWO PIPES IN ADDITION TO THE PRECEDING ENCASEMENT REQUIREMENT. EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH. A MINIMUM HORIZONTAL DISTANCE OF THREE FEET SHALL BE MAINTAINED BETWEEN WATER LINES AND OTHER UNDERGROUND UTILITIES OF A NONSANITARY NATURE (GAS, ELECTRIC, ETC.). EXCEPTIONS TO THIS MUST BE APPROVED IN WRITING BY THE ARKANSAS DEPARTMENT OF HEALTH.
6.) CONTRACTOR TO ADHERE TO CURRENT OSHA EXCAVATION & TRENCH SAFETY REGULATIONS.
7.) BACKFILL FOR ALL DISTURBED (EXCAVATED) AREAS TO BE COMPACTED TO 95% SP.



(H) 1" = 50'
(V) 1" = 5'

(H) 1" = 50'
(V) 1" = 5'

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REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

0' 50' 100' 150'
SCALE: 1" = 50'

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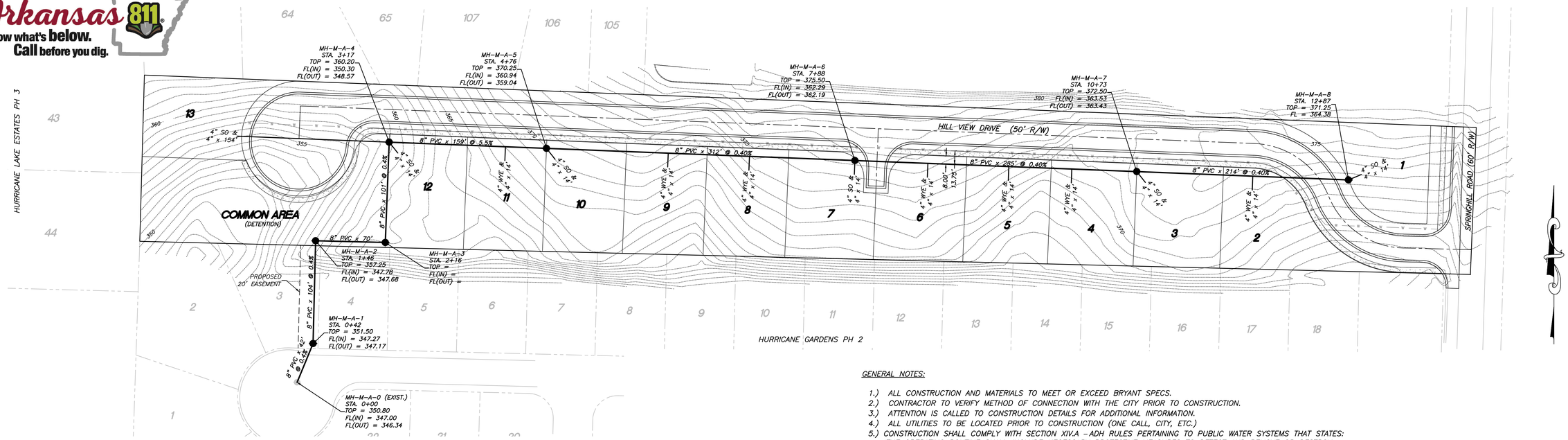
SEWER PLAN/PROFILE
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No:	Revisions	Date	By
1	Revised sewer design.	7-25-24	B. Judd
2	Revised as per city's comments.	9-20-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd

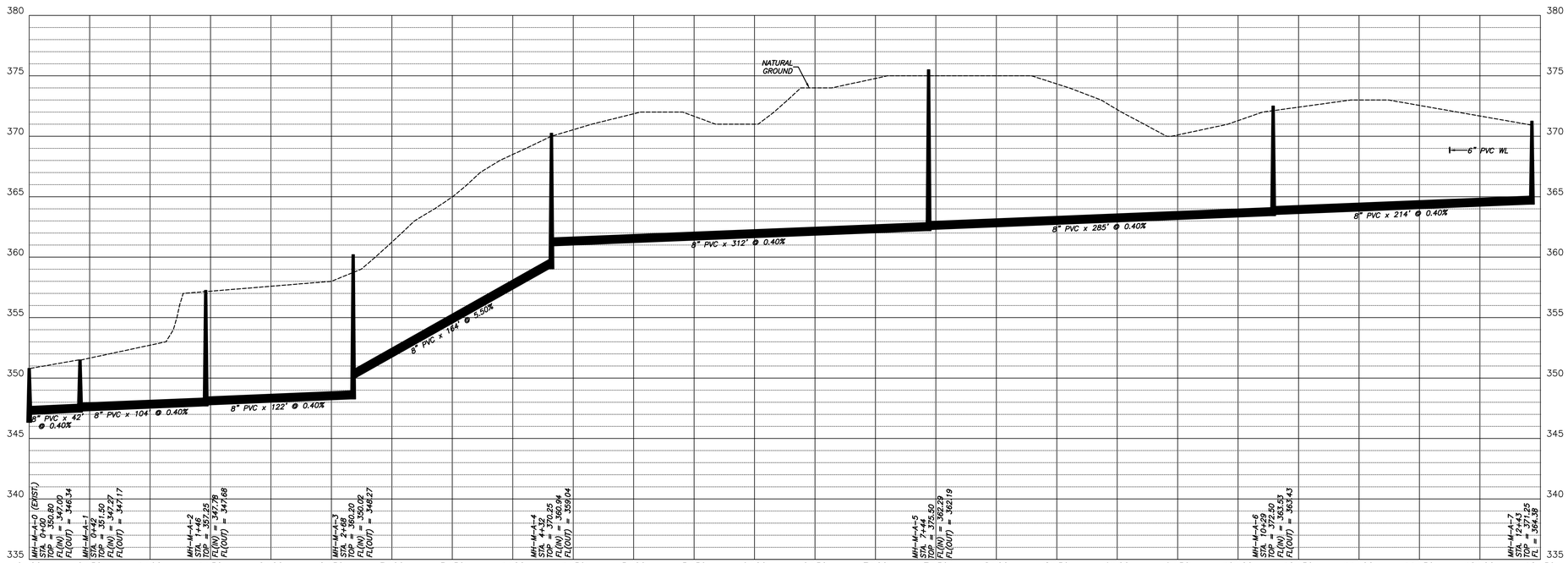
Project No: 24-018
Date: JULY 9, 2024
File: 08_Hillcrest Sewer
Scale: 1" = 50'
Sheet: 8 of 10
Drawn By: B. Judd

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GENERAL NOTES:

1.) ALL CONSTRUCTION AND MATERIALS TO MEET OR EXCEED BRYANT SPECS.
2.) CONTRACTOR TO VERIFY METHOD OF CONNECTION WITH THE CITY PRIOR TO CONSTRUCTION.
3.) ATTENTION IS CALLED TO CONSTRUCTION DETAILS FOR ADDITIONAL INFORMATION.
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SCALE: 1" = 50'

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204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 845-5081 • FAX: (501) 941-0959
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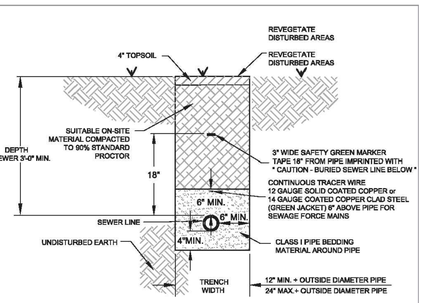
SEWER PLAN/PROFILE
HILLCREST ADDITION

PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised sewer profile.	7-25-24	B. Judd
2	Revised as per ADH's comments.	9-20-24	B. Judd
3	Revised as per city's comments.	10-21-24	B. Judd
4	Revised as per city's comments.	10-24-24	B. Judd

Project No.: 24-018
Date: JULY 9, 2024
Scale: 1" = 50'
Drawn By: B. Judd
File: 08_Hillcrest Sewer
Sheet: 8 of 10



SEWER TRENCH

(NON-PAVED AREA)

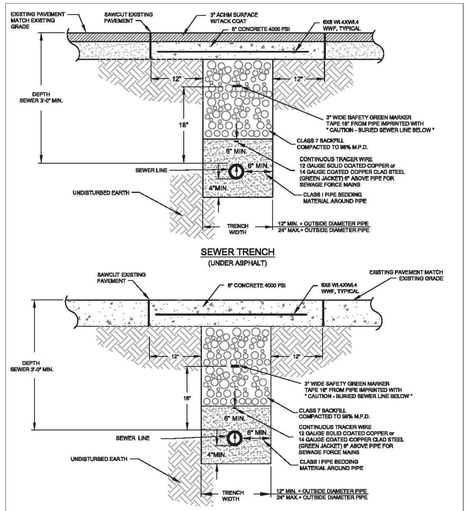
NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER TRENCH (NON-PAVED AREA) — DRAWN BY: — CHECKED BY: — FILE: S1-Sewer Trench (Non-Paved Area).dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S1



SEWER TRENCH

(UNDER ASPHALT)

SEWER TRENCH

(UNDER CONCRETE)

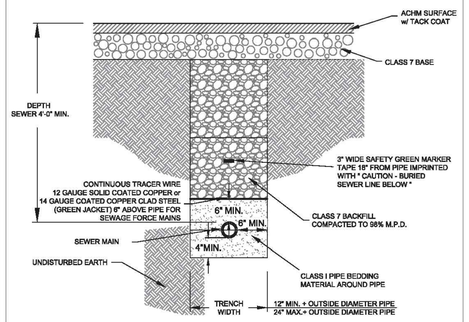
NOTE:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER TRENCH (UNDER PAVEMENT) — DRAWN BY: — CHECKED BY: — FILE: S2-Sewer Trench (Under Pavement).dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S2



SEWER MAIN INSTALLATION

PRIOR TO ROADWAY CONSTRUCTION

NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

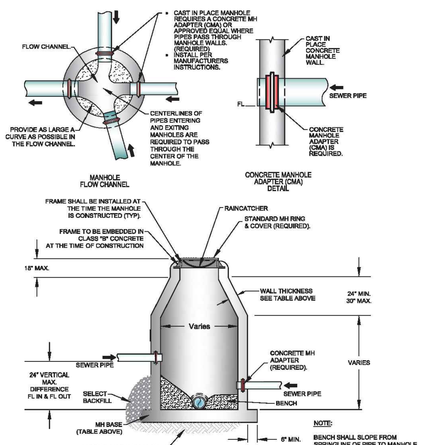
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER MAIN INSTALLATION PRIOR TO ROADWAY CONSTRUCTION — DRAWN BY: — CHECKED BY: — FILE: S3-Sewer Main Installation Prior to Roadway Const.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S3

Inside Diameter of Manhole	Minimum Wall Thickness	Base Thickness	Minimum Ring & Cover Size
4' DIA	6"	8"	24" (< or Equal to 24" Pipes)
5' DIA	8"	8"	30" (> 24" Pipes)
6' DIA	8"	12"	

MANHOLE INFORMATION TABLE



NOTE:

BENCH SHALL SLOPE FROM SPRINGLINE OF PIPE TO MANHOLE WALL. OUTLET CHANNEL SHALL BE FULL DEPTH "L" FROM CENTER OF MANHOLE TO WALL.

CAST-IN-PLACE MANHOLE

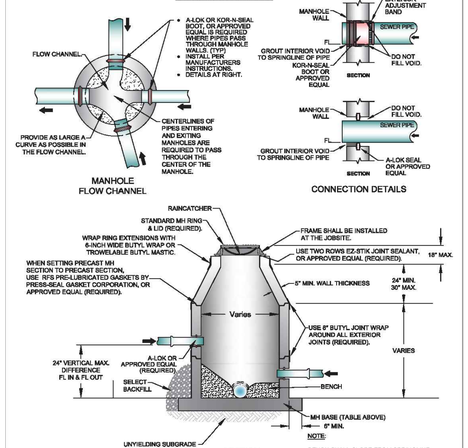
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: CAST-IN-PLACE MANHOLE — DRAWN BY: — CHECKED BY: — FILE: S4-Cast In Place Manhole.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S4

Inside Diameter of Manhole	Minimum Wall Thickness	Base Thickness	Minimum Ring & Cover Size
4' DIA	5"	6"	24" (< or Equal to 24" Pipes)
5' DIA	7"	8"	30" (> 24" Pipes)
6' DIA	7"	8"	

MANHOLE INFORMATION TABLE



NOTE:

BENCH SHALL SLOPE FROM SPRINGLINE OF PIPE TO MANHOLE WALL. OUTLET CHANNEL SHALL BE FULL DEPTH "L" FROM CENTER OF MANHOLE TO WALL.

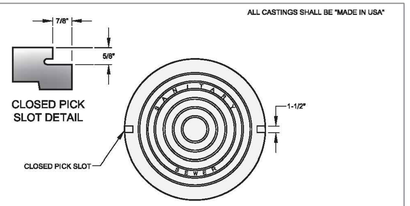
PRECAST MANHOLE

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: PRECAST MANHOLE — DRAWN BY: — CHECKED BY: — FILE: S5-Precast Manhole.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S5

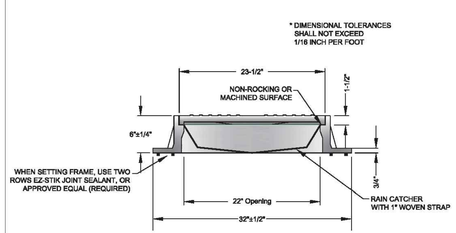
ALL CASTINGS SHALL BE "MADE IN USA"



COVER DETAIL

1. MINIMUM WEIGHT OF RING: 100 POUNDS
2. MINIMUM WEIGHT OF COVER: 110 POUNDS
3. COVERS ARE FURNISHED WITH TWO CLOSED PICK SLOTS.
4. CASTINGS SHALL BE "MADE IN USA"

* DIMENSIONAL TOLERANCES SHALL NOT EXCEED 1/16 INCH PER FOOT

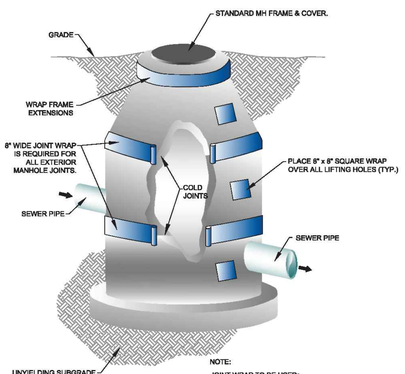


FRAME AND COVER DETAIL

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: MANHOLE FRAME AND COVER — DRAWN BY: — CHECKED BY: — FILE: S6-Manhole Frame and Cover.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S6



NOTE:

JOINT WRAP TO BE USED:

- ON OUTSIDE OF COLD JOINTS
- ON EXTERIOR OF ALL PRECAST MANHOLE JOINTS
- ON LIFT HOLES / SOCKETS

MANHOLE JOINT WRAP

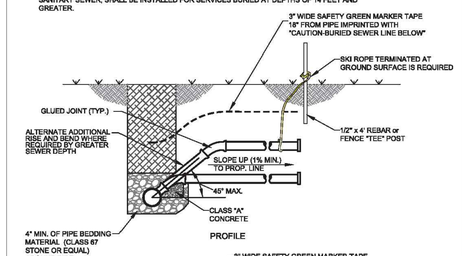
CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

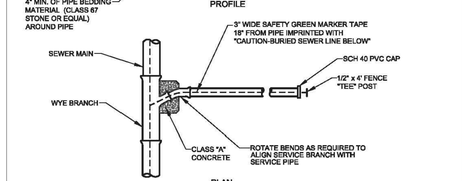
TITLE: SEWER DETAILS — DESCRIPTION: MANHOLE JOINT WRAP — DRAWN BY: — CHECKED BY: — FILE: S9-Manhole Joint Wrap.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S9

NOTES:

1. MODIFIED RISER LATERAL SHALL BE USED WHEN DEPTH OF COVER EXCEEDS 7'-0"
2. PLACE CLASS "A" CONCRETE UNDER EACH WYE BRANCH TO PREVENT CRACKING OR TWISTING UNDER EARTH LOADS.
3. SERVICE LATERAL STUBS SHALL TERMINATE AT LEAST 2 FEET INSIDE THE PROPERTY LINE BUT IN NO CASE SHALL THE SERVICE LATERAL STUB TERMINATE AT A DISTANCE LESS THAN 8 FEET FROM THE SANITARY SEWER MAIN.
4. BURY A 1/2" x 4' STEEL TEE FENCE POST AT END OF SERVICE LATERAL STUB AND BACKFILL TO FINISHED GRADE OF PROPERTY.
5. 4" DUCTILE IRON PIPE, LINED FOR SANITARY SEWER AND 4" DUCTILE IRON M.J. FITTINGS, LINED FOR SANITARY SEWER, SHALL BE INSTALLED FOR SERVICES BURIED AT DEPTHS OF 14 FEET AND GREATER.



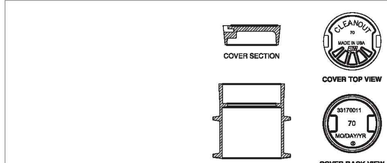


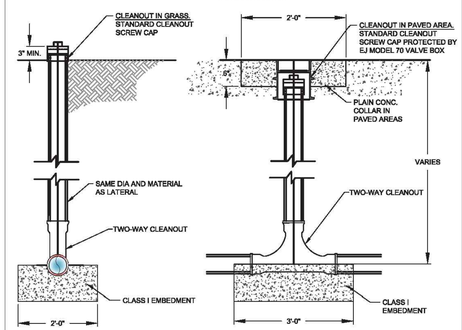
SEWER SERVICE LATERAL

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER SERVICE LATERAL — DRAWN BY: — CHECKED BY: — FILE: S15-Sewer Service Lateral.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S15





TYPICAL CLEANOUT

CITY OF BRYANT, AR — WATER UTILITIES — 210 S.W. 3rd. STREET — BRYANT, AR — PHONE: (501) 943-0466

TITLE: SEWER DETAILS — DESCRIPTION: SEWER SERVICE CLEANOUT — DRAWN BY: — CHECKED BY: — FILE: S16-Sewer Service Cleanout.dwg

DATE: APRIL 2019 — REVISED: ——— — SHEET: S16

LEMONS ENGINEERING CONSULTANTS, INC.
204 CHERRY STREET
CABOT, ARKANSAS 72023
(501) 843-5081 • Fax (501) 941-0959
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CONSTRUCTION DETAILS – SEWER
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T-1-S, R-14-W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For: Springhill HWY 5 Development, LLC 816 E. Oak Street Conway, Arkansas 72032

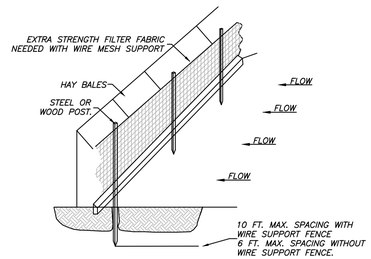
No.	Revisions	Date	By

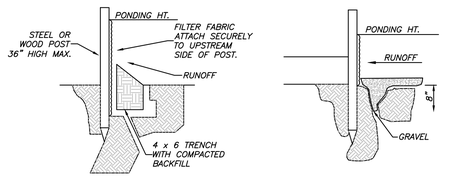
Project No.: 24-018
Date: JULY 9, 2024
File: 09_Hillcrest CD Sewer
Scale: N.T.S.
Sheet: 9 of 10
Drawn By: B. Judd

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 7373
TIMOTHY B. LEMONS

GENERAL NOTES:

1.) A SILT FENCE AND STRAW BALE DIKE SHALL BE PLACED AT POTENTIAL LOCATIONS OF HEAVY EROSION.
2.) TEMPORARY STRAW BALE DIKES ARE TO BE CONSTRUCTED NOT TO POND WATER ON ADJACENT PROPERTY.
3.) ALL TEMPORARY EROSION CONTROLS SHALL BE MAINTAINED UNTIL ALL CONSTRUCTION IS COMPLETE & PERMANENT GROUND COVER HAS BEEN ESTABLISHED.
4.) ONE OF THE FOLLOWING GROUND COVER METHODS SHALL BE USED AT AREAS OF CLEARING OTHER THAN FUTURE PAVEMENT SURFACES:
STRAW OR HAY–LOOSE 2.0 TONS/ACRE
STRAW OR HAY–TIED, ANCHORED, OR TACKED 1.5 TONS/ACRE
5.) SOIL EXPOSED FOR MORE THAN 14 DAYS WITH NO CONSTRUCTION ACTIVITY SHALL BE SEEDED OR REVEGITATED.
6.) CONSTRUCTION EXITS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING ON FLOW OF MUD INTO PUBLIC RIGHT–OF–WAY.
7.) ADDITIONAL EROSION CONTROL MEASURES WILL BE EMPLOYED WHERE NECESSARY BY SITE CONDITIONS.
8.) CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EROSION CONTROL MEASURES & PROVIDE RAIN FALL MONITORING & BI–WEEKLY INSPECTION REPORTS IN ACCORDANCE WITH THE NPDES PERMIT REQUIREMENTS.
9.) CONTRACTOR SHALL USE "BEST MANAGEMENT PRACTICES" (BMP'S) WHEN IMPLEMENTING & MAINTAINING SEDIMENT & RUN–OFF CONTROLS.
10.) THE USE OF "BIO–DEGRADABLE SOCK" IS ALLOWED AS OPPOSED TO SILT FENCE.





STANDARD DETAIL
TRENCH WITH NATIVE GRAVEL

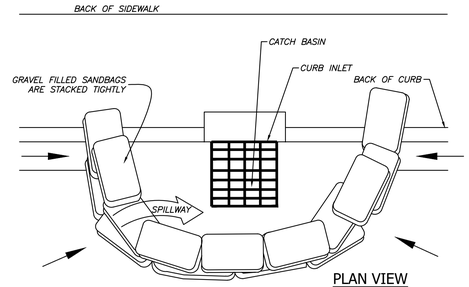
ALTERNATE DETAIL
TRENCH WITH GRAVEL

NOTE:
1.) INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.

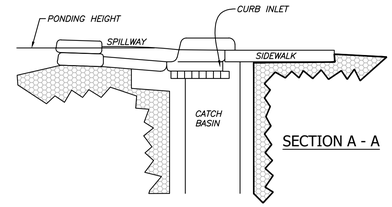
2.) REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF–SITE AND CAN BE PERMANENTLY STABILIZED.

3.) SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.

SILT FENCE
NTS



PLAN VIEW



SECTION A - A

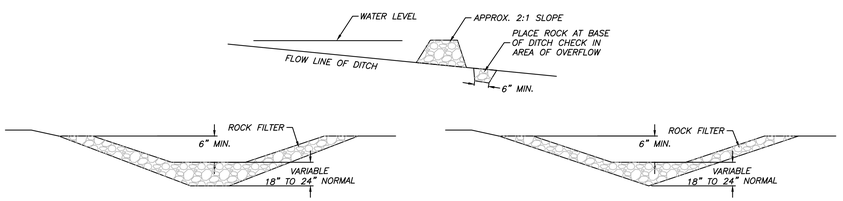
NOTES:
1.) PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.

2.) SANDBAGS OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC ARE FILLED WITH GRAVEL, LAYERED, AND PACKED TIGHTLY.

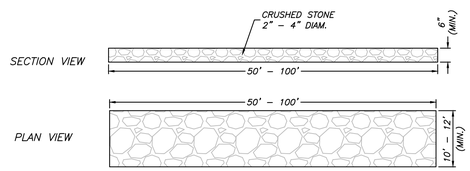
3.) LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.

4.) INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

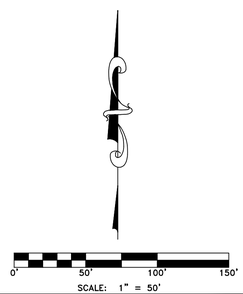
CURB INLET
SEDIMENT BARRIER
NTS



ROCK CHECK DAM
NTS



STABILIZED CONSTRUCTION ENTRANCE
NTS



Arkansas 811
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EROSION CONTROL PLAN
HILLCREST ADDITION
PART OF THE SE 1/4 OF SECTION 17, T–1–S, R–14–W
CITY OF BRYANT, SALINE COUNTY, ARKANSAS

Prepared For:
Springhill HWY 5 Development, LLC
816 E. Oak Street
Conway, Arkansas 72032

No.	Revisions	Date	By
1	Revised as per city's comments.	10-23-24	B. Judd
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Project No.: 24–018
File: 10_Hillcrest Erosion
Date: JULY 9, 2024
Scale: 1" = 50'
Drawn By: B. Judd
Sheet: 10 of 10


Window
World®
AMERICA'S EXTERIOR REMODELER℠
FRAGILE


A
SIERRA

City of Bryant, Arkansas
Community Development
210 SW 3rd Street Bryant, AR 72022
501-943-0943

SIGN PERMIT APPLICATION

Applicants are advised to read the Sign Ordinance prior to completing and signing this form. The Sign Ordinance is available at www.cityofbryant.com under the Planning and Community Development tab.

Note: Electrical Permits may be Required, Please contact the Community Development Office for more information.

Date: 9/18/2024

Sign Co. or Sign Owner

Name L.Graphics
Address 701 N. Reynolds Rd
City, State, Zip Bryant, AR 72022
Phone (501) 653-4444
Email Address Joe@LGraphix.com

Property Owner

Name Bart Furguson
Address 307 progress Dr Ste. 700-800
City, State, Zip Bryant, AR 72022
Phone (501) 840-2282
Email Address bferg620@GmaiL.com

GENERAL INFORMATION

Name of Business Willow + Grace Boutique
Address/Location of sign 307 Progress drive Ste 700-800
Zoning Classification

Please use following page to provide details on the signs requesting approval. Along with information provided on this application, **a Site Plan showing placement of sign(s) and any existing sign(s) on the property is required** to be submitted. **Renderings of the sign(s) showing the correct dimensions is also required** to be submitted with the application. A thirty-five dollar ($35) per sign payment will be collected at the time of permit issuance. According to the Sign Ordinance a fee for and sign variance or special sign permit request shall be one hundred dollars ($100). Additional documentation may be required by Sign Administrator.

READ CAREFULLY BEFORE SIGNING

I Joe Lam, do hereby certify that all information contained within this application is true and correct. I fully understand that the terms of the Sign Ordinance supersede the Sign Administrator's approval and that all signs must fully comply with all terms of the Sign Ordinance regardless of approval. I further certify that the proposed sign is authorized by the owner of the property and that I am authorized by the property owner to make this application. I understand

that no sign may be placed in public right of way. I understand that I must comply with all Building and Electrical Codes and that it is my responsibility to obtain all necessary permits.

Use table below to enter information regarding each sign for approval. Please use each letter to reference each sign rendering.

SIGN	**Type** (Façade, Pole, Monument, other)	**Dimensions** (Height, Length, Width)	**Sqft** (Measured in whole as rectangle)	**Height of Sign** (Measured from lot surface)		Column for Admin Certifying Approval
				Top of Sign	Bottom of Sign	
A	wall sign	72" X 74"	36	19	13	
B						
C						
E						
F						
G						


40 feet
WG
Willow + Grace
Boutique
307
Ste 800
307
Ste 700

City of Bryant, Arkansas
Community Development
210 SW 3rd Street Bryant, AR 72022
501-943-0943

SIGN PERMIT APPLICATION

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Note: Electrical Permits may be Required, Please contact the Community Development Office for more information.

Date: 10/1/2024

Sign Co. or Sign Owner

Name hGraphics
Address 701 N. Reynolds Rd
City, State, Zip Bryant, AR 72022
Phone (501) 653-4444
Email Address Joe@hGraphix.com

Property Owner

Name John A. Rees
Address 5313 Hwy 5
City, State, Zip Bryant, AR 72022
Phone (501) 519-7337
Email Address Jarees@reescommercial.com

GENERAL INFORMATION

Name of Business Bryant Mail and Print Center
Address/Location of sign 5313 Hwy 5 Ste 305 - Bryant, AR 72022
Zoning Classification _____

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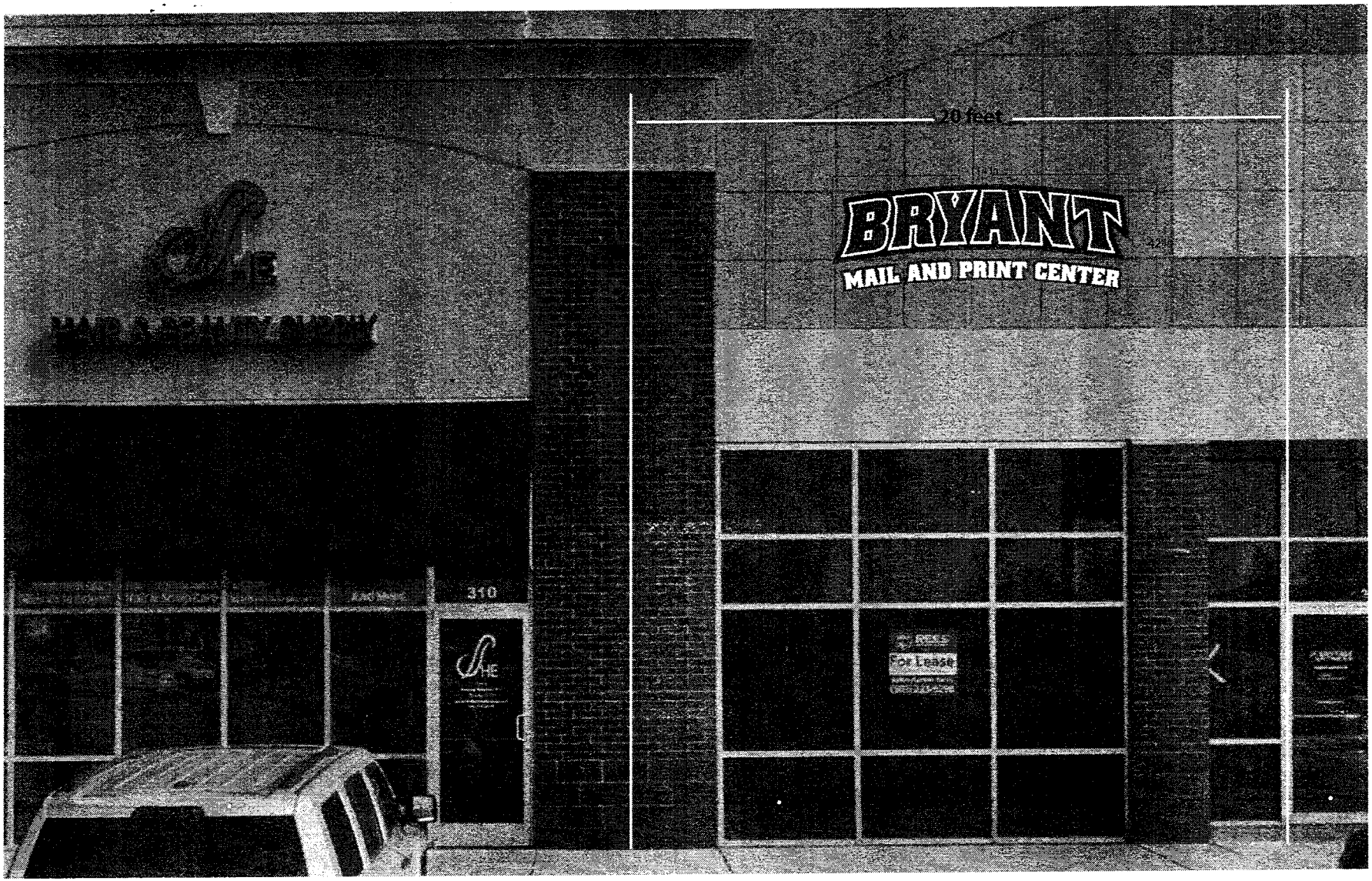
READ CAREFULLY BEFORE SIGNING

I Joe Lam, do hereby certify that all information contained within this application is true and correct. I fully understand that the terms of the Sign Ordinance supersede the Sign Administrator's approval and that all signs must fully comply with all terms of the Sign Ordinance regardless of approval. I further certify that the proposed sign is authorized by the owner of the property and that I am authorized by the property owner to make this application. I understand

that no sign may be placed in public right of way. I understand that I must comply with all Building and Electrical Codes and that it is my responsibility to obtain all necessary permits.

Use table below to enter information regarding each sign for approval. Please use each letter to reference each sign rendering.

SIGN	**Type** (Façade, Pole, Monument, other)	**Dimensions** (Height, Length, Width)	**Sqft** (Measured in whole as rectangle)	**Height of Sign** (Measured from lot surface)		Column for Admin Certifying Approval
				Top of Sign	Bottom of Sign	
A	Wall Signs	114" X 42"	33.6	20	16.5	
B						
C						
E						
F						
G						


114 in
BRYANT
MAIL AND PRINT CENTER
42 in
20 feet
BRYANT
MAIL AND PRINT CENTER
310
For Lease