



Bryant Planning Commission Meeting
Monday, December 11th, 2017
6:00 p.m.
Boswell Municipal Complex - City Hall Courtroom

Agenda

CALL TO ORDER

- Chairman to call the meeting to order.
- Secretary calls roll

APPROVAL OF MINUTES

Minutes

1. Planning Commission Minutes from November 13th, 2017
2. Special Planning Commission Meeting Minutes from November 27th, 2017

Documents:

[Bryant Planning Commission Meeting Minutes 11_13_17.pdf](#)
[Special Bryant Planning Commission Meeting Minutes 11_27_17.pdf](#)

ANNOUNCEMENTS

DRC REPORT

Baldwin And Shell Construction

Requesting Sign Permit Application Approval - **Approved**

Documents:

[B and Shell Sign.pdf](#)

Hurricane Storage Center

Requesting Commercial Development Approval - **Recommend Approval**

Greenway Equipment

Wally Cox - Requesting permission to add entrance and gate to rear of property on Corporate Center Drive - **Approved**

Documents:

[Greenway.pdf](#)
[Greenway Equipment.pdf](#)

Bryant Junior High School

Josh Minton - Requesting Site Plan Approval - **Recommend Approval**

Brushmaster

Requesting Site Plan Approval - **Approved with condition that the detention pond be restored.**

Documents:

[Lexington park DRAINAGE EASEMENTS PLAT 11-7-17.pdf](#)
[24inchPipeCalc.pdf](#)
[BrushmastersSiteReviewAnnotationLetterCityOfBryant.pdf](#)

Lot 10 Miller Place

Requesting a replat - **Approved**

Documents:

[Lot 10 Miller Place.pdf](#)

PUBLIC HEARING

Indian Springs Mobile Home Park

Requesting a Conditional Use Permit for Recreational Vehicles and Tiny Homes

Documents:

[Indian Springs Mobile Home Park CU App.pdf](#)
[17-0807-R2.pdf](#)

Roman Heights Subdivision

Requesting Rezoning from R-E to R-2

Documents:

[Roman Heights Rezone.pdf](#)
[Roman Heights Map.pdf](#)

703 SW Fourth Street

Requesting Rezone from R-2 to R-1.

Documents:

[703 SW Fourth Street Rezone Green Slips.pdf](#)
[703 SW Fourth Street - Rezone App.pdf](#)

OLD BUSINESS

Bryant Planning And Community Development Department

Zoning Code Changes - Request to be Tabled

NEW BUSINESS

Bryant Junior High School

Josh Minton - Requesting Site Plan Approval

Documents:

[BJRH - Site Plan.pdf](#)

[Bryant JRH Letter and Checklist.pdf](#)
[BJRH - Grading.pdf](#)
[BJRH - Utility.pdf](#)
[Garver Response Attachment - Civil.pdf](#)
[P1895-Traffic-Study-Report-12-8-17.pdf](#)

. **Hurricane Storage Center**

Requesting Commercial Development Approval

Documents:

[Hurricane Storage App.pdf](#)
[PC SUBMITTAL PLANS \(1\).PDF](#)
[DETENTION CALCS.pdf](#)
[MAINTENANCE PLAN.pdf](#)
[SPRINGHILL STORM CALCS.pdf](#)

. **Master Lighting Plan**

Presentation and Discussion. Coming back next meeting for Public Hearing and Request to Approve.

Documents:

[REV01 112717 REVISED.PDF](#)
[Add01 112017.pdf](#)
[E101.pdf](#)
[01170199 Project Manual 111417.pdf](#)

. **Midland Road Subdivision**

Requesting Plat Approval

Documents:

[Earle Preliminary Plat 12-04-17.pdf](#)
[Earle Drainage Report.pdf](#)
[doc07244720171207113352 \(1\).pdf](#)

. **The Heights At Waverly**

Requesting Preliminary Plat Approval

Documents:

[WAVERLY PHASE 1 12-07-17 \(1\).pdf](#)
[Letter Requesting Waiver.pdf](#)
[Letter Requesting Waiver \(2\).pdf](#)
[Heights Application Letter.pdf](#)

. **Nominating Committee Report**

Election of Chairman and Vice Chairman for 2018 Planning Commission.

. **Meetings For Next Calendar Year**

Adopt a calendar of regular meeting dates and times for Planning Commission meetings for 2018 (Previously has been 2nd Monday of every month at 6:00 p.m.).

Documents:

[Planning Commission Deadlines and Dates.pdf](#)

ADJOURNMENT



Bryant Planning Commission Meeting
Monday, December 11th, 2017
6:00 p.m.
Boswell Municipal Complex-City Hall Courtroom

UNAPPROVED MINTUES FOR 11/13/17 MEETING
4 Pages

CALL TO ORDER:

- Chairman Lance Penfield Calls Meeting To Order
- Commissioners Present: Brunt, Johnson, Burgess, Penfield, Poe, Statton, Mayfield.
- Commissioners Absent: Erwin

APPROVAL OF MINTUES:

Approval of the October 9th, 2017 Planning Commission Minutes.

Action taken: Motion made to approve by Commissioner Burgess and seconded by Commissioner Mayfield. Voice vote: 7 yeas and 0 nay. Erwin Absent. Passed

DRC REPORT

Zips Car Wash - Formerly Ultimate Car Wash - 1900 North Reynolds Road - Requesting Sign Permit Application Approval - Approved

The Heights At Waverly - Eric Richardson - Requesting Rezoning of Property - Recommend Approval

Salvation Army - 22000 I-30 - Requesting Sign Permit Approval - Approved

Pikewood Subdivision Lot 73R And 74R - Jeff Porter - Conditional Use Permit for Duplexes - Approved

Kensington Place Subdivision - Vernon Williams

1. Requesting Final Plat Approval for Phase 1 - Recommend Approval
2. Requesting Preliminary Plat Approval for Phase 2 - Recommend Approval

Hill Farm Barn - Chris Treat - Requesting Site Plan Revision to include fence - Approved

Bryant Junior High School - Josh Minton - Requesting Preliminary Facility Approval to Allow for Grading
- **Approved**

Big Red - 1524 South Reynolds Road - Jimmy Parker - Requesting Sign Permit Applications Approval -
Approved

Absolute Essenc - Tim Hendrix - Requesting Conditional Use Permit for Property Located at 9416
Highway 5 North - No Action Taken

Oriental Cuisine - Eric Warford - Requesting Site Plan Approval - Approved

Planning & Community Development Department

1. Master Transportation Plan Update - **Recommend Approval**
2. Bryant Parkway Access Management - **Recommend Approval**
3. Zoning Code Changes - **Recommend Approval**

OLD BUSINESS

Spin-Off - Andy Francis - Requesting Approval of Preliminary Concept Plan

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

NEW BUSINESS

Kensington Place Subdivision - Vernon Williams

1. Requesting Final Plat Approval of Phase 1
2. Requesting Preliminary Plat Approval of Phase 2

Removed from agenda by Applicant.

Hurricane Storage - Bud and Stuart Finley - Requesting Site Plan Approval

Removed from agenda by Applicant.

Chairman Penfield abstains from First Shot and Absolute Essence agenda items. With the absences of Vice-Chairman Erwin, Commissioner Statton makes a motion to elect Commissioner Johnson Chairman of these two items, Commissioner Brunt Seconds. Voice Vote: 6 yeas, 0 nay. Erwin Absent. Penfield Abstains. Passed.

First Shot - Joe White - Requesting Site Plan Approval

Acting Chairman Johnson Calls for a roll call vote. 6 yeas and 0 nay. Erwin Absent. Penfield Abstains. Passed.

PUBLIC HEARING

Commissioner Burgess makes a motion to suspend the rules to move Absolute Essence up to the next item on the agenda, Commissioner Poe seconds. Voice Vote: 6 yeas, 0 nay. Erwin Absent. Penfield Abstains. Passed.

Absolute Essence - Tim Hendrix - Requesting Conditional Use Permit for Property located at 9416 Highway 5 North.

Acting Chairman Johnson Calls for a roll call vote placing three conditions on the permit:

- 1. Applicant gets their site plan approved by Development and Review Committee*
- 2. Applicant will operate under current state regulations less such regulations were updated and became less stringent*
- 3. Applicant will operate between 10 am to 7 pm Monday thru Thursday and 10 am to 10 pm Friday and Saturday*

5 yeas and 1 nay. Erwin Absent. Penfield Abstains. Passed.

Pikewood Subdivision Lot 73R And 74R - Jeff Porter - Conditional Use Permit for Duplex's

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

The Heights At Waverly - Eric Richardson - Requesting Rezoning of property from R-E to R-2

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

Planning & Community Development Department

1. Master Transportation Plan Update

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

2. Bryant Parkway Access Management Plan

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

3. Zoning Code Changes

Commissioner Statton makes a motion to table, Commissioner Burgess seconds. Voice Vote. 7 yeas and 0 nay. Erwin Absent. Item is tabled.

REQUESTED TO BE ADD TO THE AGENDA

Commissioner Burgess makes a motion to suspend the rules and add Hurrigan Gardens to the agenda, Commissioner Johnson seconds. Voice Vote. 7 yeas and 0 nays. Erwin Absent. Item is added.

Hurricane Gardens - Requesting Final Plat Approval

Chairman Penfield Calls for a roll call vote. 7 yeas and 0 nay. Erwin Absent. Passed

ADJOURNMENT

Motion made to adjourn by Commissioner Brunt, seconded by Commissioner Poe.

Approval of the minutes for November, 13th Bryant Planning Commission meeting was approved on December 11th, 2017.

_____ Date: _____2017
Chairman Lance Penfield

_____ Date: _____2017
Secretary Truett Smith



Bryant Planning Commission Meeting
Monday, December 11th, 2017
6:00 p.m.
Boswell Municipal Complex-City Hall Courtroom

UNAPPROVED MINTUES FOR 11/27/17 MEETING
2 Pages

CALL TO ORDER:

- Chairman Lance Penfield Calls Meeting To Order
- Commissioners Present: Brunt, Johnson, Burgess, Penfield, Poe, Statton.
- Commissioners Absent: Erwin and Mayfield.

NEW BUSINESS

Andres Woods

Requesting Approval of Revised Final Plat

*Chairman Penfield Calls for a roll call vote. 5 yeas and 0 nay. Erwin and Mayfield Absent.
Chairman Penfield Abstains. Passed*

Kensington Place Phase 2

Gar Nat Engineering - Requesting Preliminary Plat Approval

*Chairman Penfield Calls for a roll call vote. 6 yeas and 0 nay. Erwin and Mayfield Absent.
Passed*

Kensington Place Phase 1

GarNat Engineering - Requesting Final Plat Approval of Phase 1

*Chairman Penfield Calls for a roll call vote with the conditions that before signing, the
applicant must get the remaining concerns of Public Works Director Mark Grimmert met. 6
yeas and 0 nay. Erwin and Mayfield Absent. Passed*

ADJOURNMENT

Motion made to adjourn by Commissioner Statton, seconded by Commissioner Burgess.

Approval of the minutes for November, 27th Bryant Planning Commission meeting was approved on December 11th, 2017.

_____ Date: _____2017
Chairman Lance Penfield

_____ Date: _____2017
Secretary Truett Smith

City of Bryant, Arkansas
Code Enforcement, Permits and Inspections
312 Roya Lane
Bryant, Ar 72022
501-847-6031

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.org.

Site plan showing placement of sign and any existing signs on the property. A rendering of sign showing correct dimensions of all signs are required with application. Additional documentation may be required by Sign Administrator.

Date: 11/10/17

Note: Electrical permits may be Required, Please contact the Permits Office at 847-6031 for more information.

SIGN CO. OR SIGN OWNER

Name Ace Sign Co

Address 11935 1-30

City, State, Zip Little Rock AR 72209

Phone (501) 562-0800

Alternate Phone _____

PROPERTY OWNER

Name Baldwin & Shell

Address 311 N. Reynolds Rd

City, State, Zip Bryant AR 72022

Phone #(501) 374-8677

Alternate Phone _____

GENERAL DETAILS

Name of Business Baldwin & Shell Co.

Address/Location of sign 311 N. Reynolds Rd

Sign dimensions (height, length, width) 5' x 8'

Zoning Classification _____

Aggregate Surface Area (total all signs) _____

Height of sign from lot surface: Bottom 3'

Top 5'

SIGN TYPE

Pole Monument

Wall

Other (type) _____

Total sq. ft. 40 sq ft

READ CAREFULLY BEFORE SIGNING

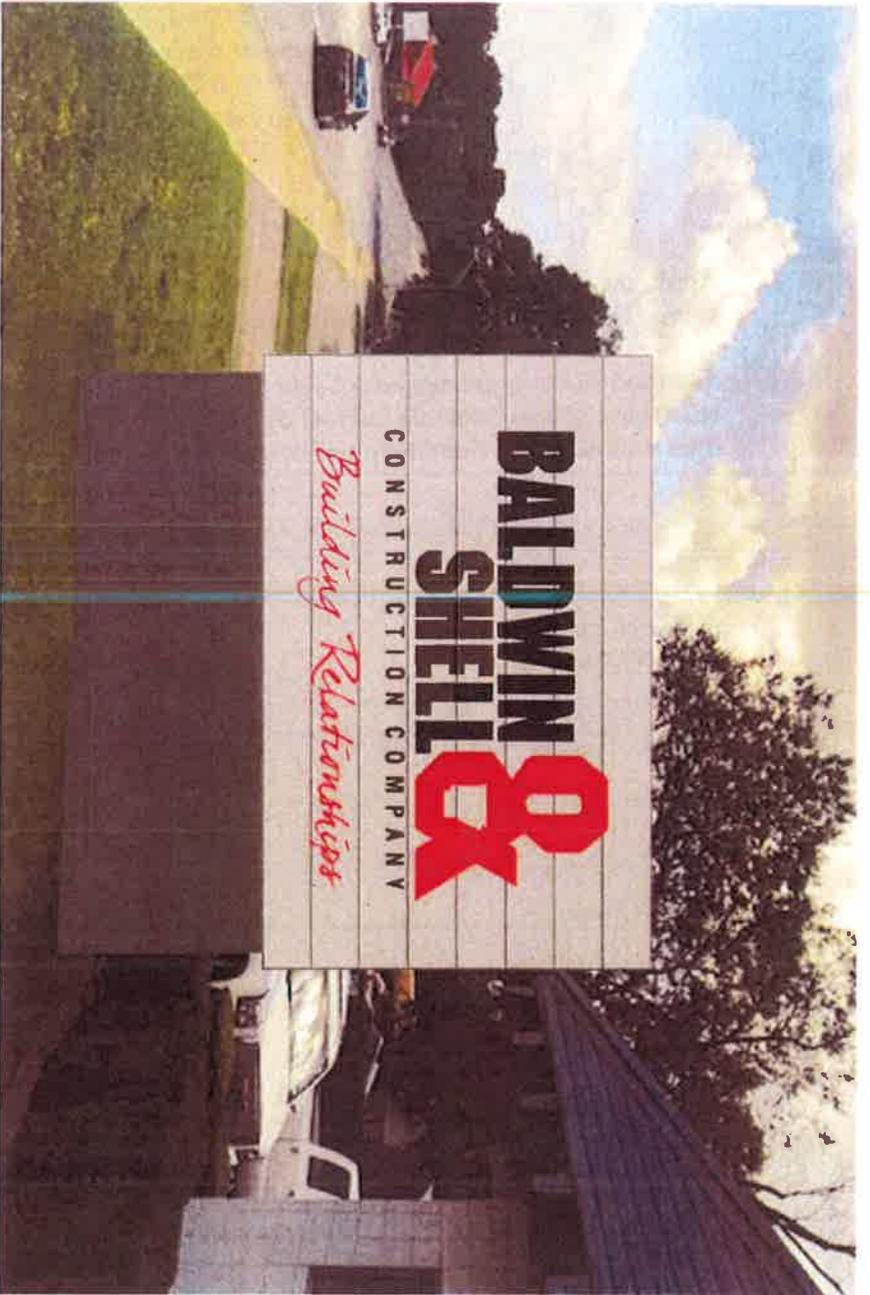
I, Candice Stalpers, do hereby certify that all information contained within this application is true and correct. I fully understand that the terms of the Sign Ordinance supersede the Sign Administrator's approval and that all signs must fully comply with all terms of the Sign Ordinance regardless of 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 any 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.

Applicant's Signature Stalpers

Date 11/10/17

Sign Administrator (or Designee) Approval _____

Date _____



Composite decking detail



1/4" pin mounted acrylic



11935 I-30, Little Rock, AR 72209
 P:800-224-1366 / F:501-492-8268
 www.acesigncompany.com

Prepared for:
 Baldwin & Shell

Project:
 Bryant office

Sheet Description:
 Freestanding sign

Salesperson:

Artist:

Customer approval

Date:

©2016 Ace Sign Company, LLC. All Rights Reserved. This design is the property of Ace Signs and are the result of original work of its employees. They are submitted to your company for the purpose of consideration to purchase from Ace Sign Company, a project according to this design. Exhibition to anyone other than employees of your company or use of this design or to create a design that is similar without written approval from Ace Sign Company is a violation of copyright. The colors and dimensions are approximate and may vary from the actual product.



Truett Smith <tsmith@cityofbryant.com>

FW: Greenway Equipment

1 message

Wally Cox <WCox@gogreenway.com>
To: "tsmith@cityofbryant.com" <tsmith@cityofbryant.com>

Thu, Nov 9, 2017 at 12:32 PM

Mr. Smith ,

Per our conversation attached are pictures of our store located at 215315 I-30 S Bryant ,AR. We would like to add an exit to the rear of our location onto Corporate Center Drive. Presently we have a wooden fence along the road and would replace part of it with a 16'- 20' gate. This would allow exiting of customers vehicle with trailers. No large truck(semis) would use this gate. We would construct this with concrete or asphalt.

Please let me know what action needs to be taken by Greenway to further this along.

**Wally Cox** | Location Manager**Greenway Equipment**

501.326.9001 c | 501.753.4100 w

25315 I30 South

Bryant,AR 72022

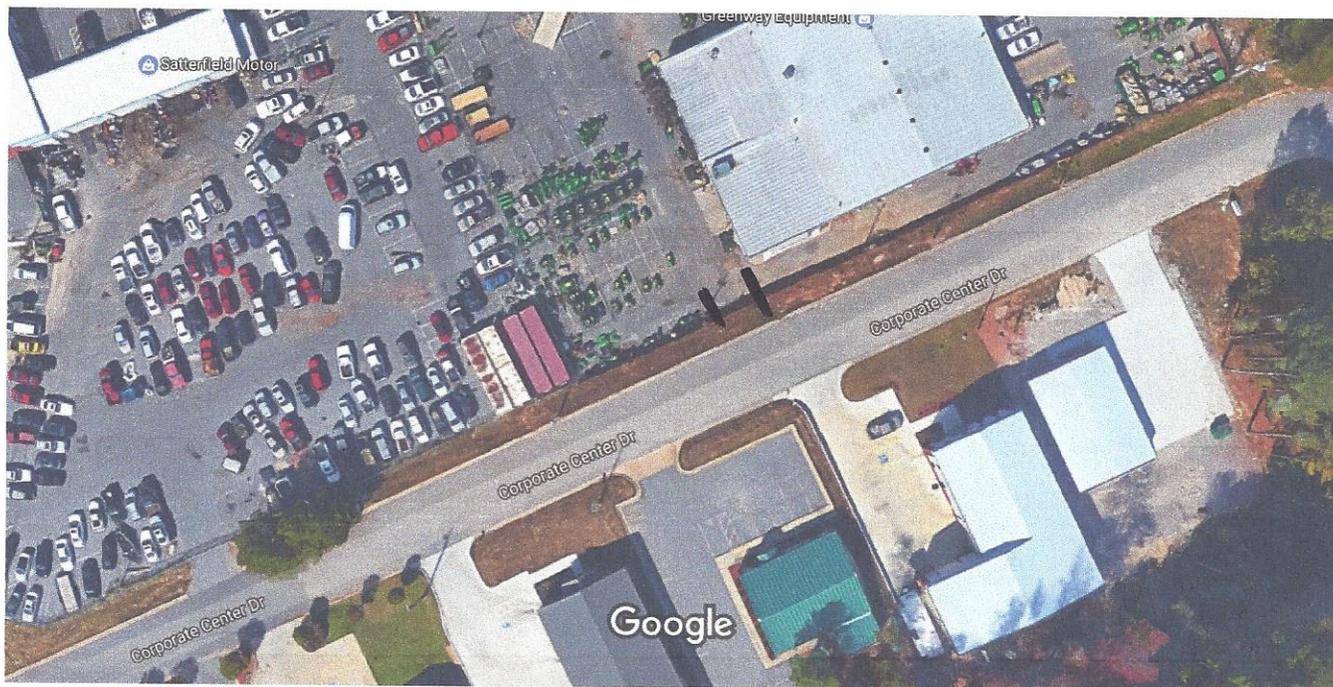
wcox@gogreenway.com

Please do not include sensitive or confidential information in your e-mail unless a secure e-mail system is used. The information transmitted is intended only for the person or entity to which it is addressed and may contain proprietary, business-confidential and/or privileged material. If you are not the intended recipient of this message you are hereby notified that any use, review, retransmission, dissemination, distribution, reproduction or any action taken in reliance upon this message is prohibited. If you received this in error, please contact the sender and delete the material from any computer.

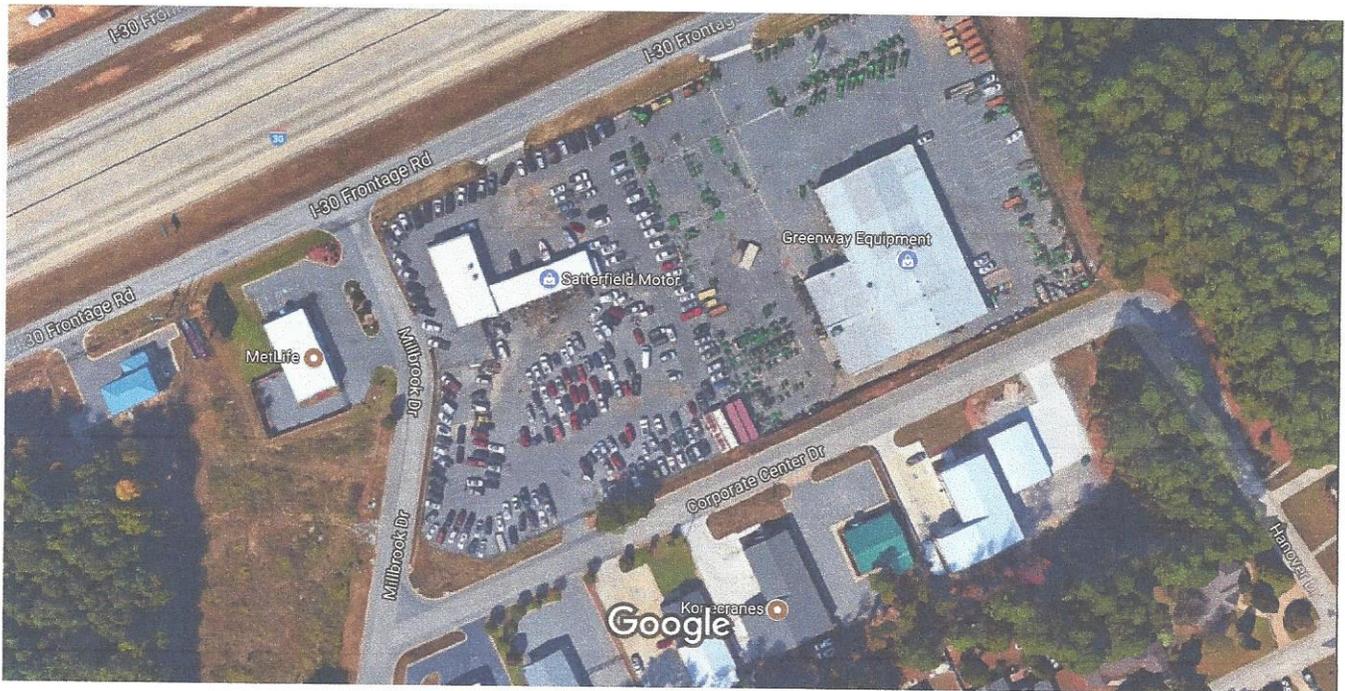
**Greenway Equipment.pdf**

1228K

Google Maps



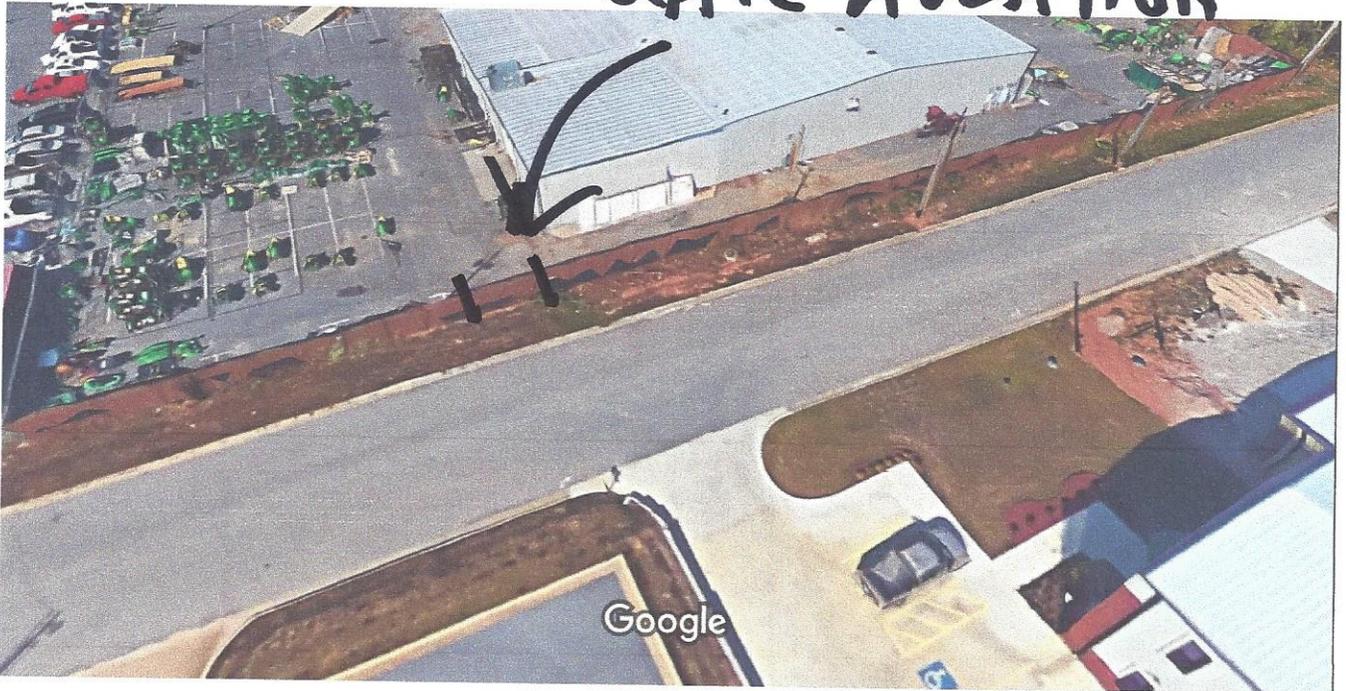
Imagery ©2017 Google, Map data ©2017 Google 50 ft



Imagery ©2017 Google, Map data ©2017 Google 100 ft

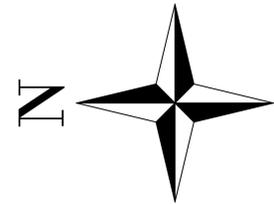
Google Maps

GATE LOCATION



Imagery ©2017 Google, Map data ©2017 Google 20 ft





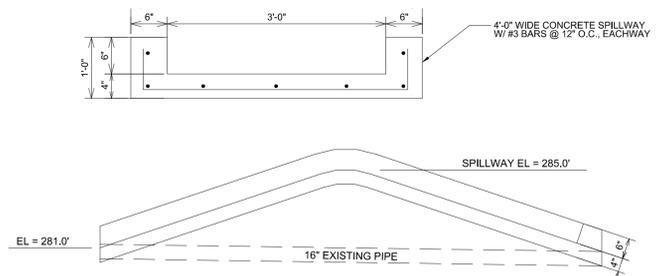
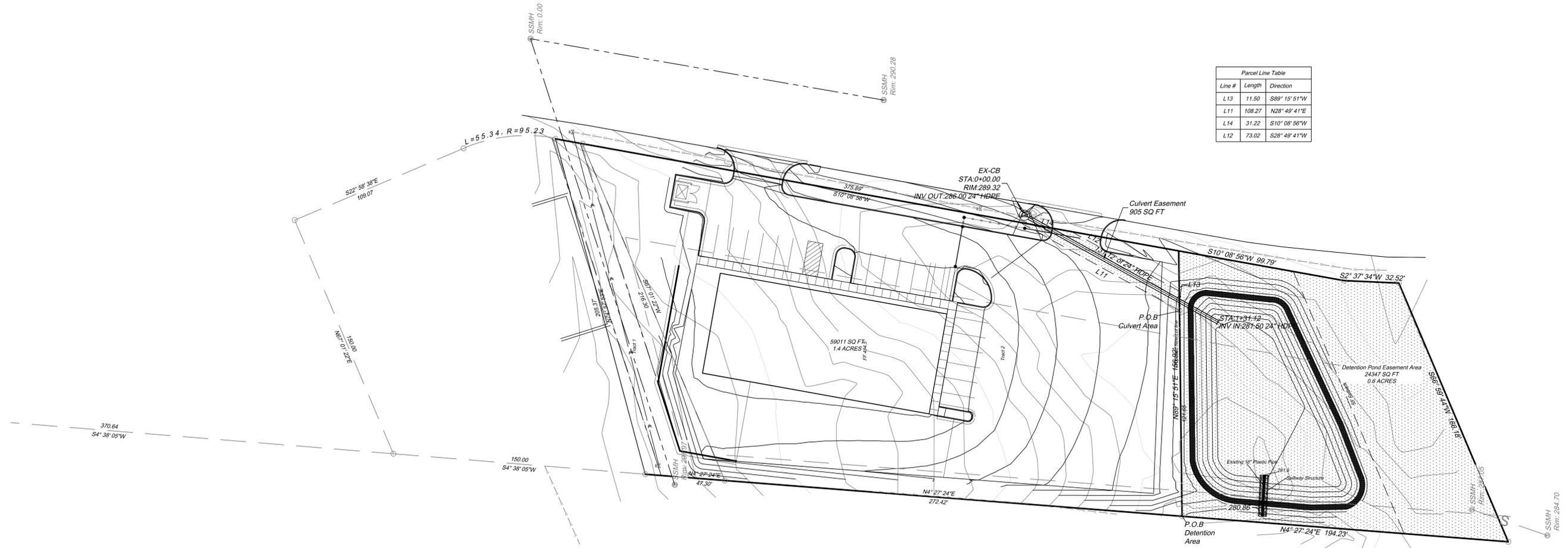
DETENTION POND EASEMENT AREA

THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, OF SECTION 13, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS, DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER, SECTION 13 AND RUN THENCE SOUTH 04°38'05" WEST, ALONG THE WEST LINE THEREOF FOR 370.64 FEET TO THE SOUTH RIGHT OF WAY LINE OF INTERSTATE #30; THENCE NORTH 67°01'22" EAST, A DISTANCE OF 150.00 FEET TO THE WEST RIGHT OF WAY LINE OF STREET; THENCE SOUTH 22°58'38" EAST, ALONG SAID WEST RIGHT OF WAY LINE FOR A 113.54 FEET TO THE POINT OF CURVATURE OF A TANGENT, OF WHICH THE RADIUS POINT BEARS SOUTH 67°01'22" WEST, A DISTANCE OF 100.00 FEET; THENCE SOUTHEASTERLY ALONG SAID CURVE A DISTANCE OF 50.90 FEET; THENCE SOUTH 74°57'43" WEST, A DISTANCE OF 205.37 FEET TO THE WEST LINE OF SAID SOUTHWEST QUARTER; SECTION 13; THENCE SOUTH 04°27'24" WEST, A DISTANCE OF 47.34 FEET; CONTINUE THENCE ALONG THE WEST LINE OF SAID SOUTHWEST QUARTER; SECTION 13; THENCE SOUTH 04°27'24" WEST, A DISTANCE OF 272.42 FEET TO THE POINT OF BEGINNING; THENCE NORTH 89°15'51" EAST A DISTANCE OF 156.92 FEET TO THE WEST RIGHT OF WAY OF SAID STREET; THENCE SOUTH 10°08'56" WEST ALONG SAID WEST RIGHT OF WAY A DISTANCE OF 99.79 FEET; THENCE SOUTH 2°37'34" WEST ALONG SAID WEST RIGHT OF WAY A DISTANCE OF 32.52 FEET; THENCE SOUTH 66°59'44" WEST A DISTANCE OF 166.18 TO A POINT ON THE WEST SOUTHWEST QUARTER, SECTION 13; THENCE NORTH 4°27'24" EAST TO THE POINT OF BEGINNING, CONTAINING 24347 SQUARE FEET/ 0.6 ACRES MORE OR LESS.

CULVERT EASEMENT

THAT PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, OF SECTION 13, T-1-S, R-14-W, SALINE COUNTY, ARKANSAS, DESCRIBED AS FOLLOWS: COMMENCING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER, SECTION 13 AND RUN THENCE SOUTH 04°38'05" WEST, ALONG THE WEST LINE THEREOF FOR 370.64 FEET TO THE SOUTH RIGHT OF WAY LINE OF INTERSTATE #30; THENCE NORTH 67°01'22" EAST, A DISTANCE OF 150.00 FEET TO THE WEST RIGHT OF WAY LINE OF STREET; THENCE SOUTH 22°58'38" EAST, ALONG SAID WEST RIGHT OF WAY LINE FOR A 113.54 FEET TO THE POINT OF CURVATURE OF A TANGENT, OF WHICH THE RADIUS POINT BEARS SOUTH 67°01'22" WEST, A DISTANCE OF 100.00 FEET; THENCE SOUTHEASTERLY ALONG SAID CURVE A DISTANCE OF 50.90 FEET; THENCE SOUTH 74°57'43" WEST, A DISTANCE OF 205.37 FEET TO THE WEST LINE OF SAID SOUTHWEST QUARTER; SECTION 13; THENCE SOUTH 04°27'24" WEST, A DISTANCE OF 47.34 FEET; CONTINUE THENCE ALONG THE WEST LINE OF SAID SOUTHWEST QUARTER; SECTION 13; THENCE SOUTH 04°27'24" WEST, A DISTANCE OF 272.42 FEET; THENCE NORTH 89°15'51" EAST A DISTANCE OF 121.65 FEET; THENCE NORTH 28°49'41" EAST A DISTANCE OF 108.27 FEET; THENCE SOUTH 10°08'56" WEST A DISTANCE OF 31.22; THENCE SOUTH 28°49'41" WEST A DISTANCE OF 73.02 FEET; THENCE SOUTH 89°15'51" WEST A DISTANCE OF 11.50 FEET TO THE POINT OF BEGINNING, CONTAINING 905 SQUARE FEET MORE OR LESS.

Line #	Length	Direction
L13	11.50	S89° 15' 51"W
L11	108.27	N28° 49' 41"E
L14	31.22	S10° 08' 56"W
L12	73.02	S28° 49' 41"W



CONCRETE SPILLWAY DETAIL NOT TO SCALE

Partially Full Pipe Flow Calculator and Equations

**Fluid Flow Table of Contents | Hydraulic and Pneumatic Knowledge
Fluid Power Equipment**

This engineering calculator determines the Flow within a partially full pipe using the Manning equation calculator can also be used for uniform flow in a pipe, but the Manning roughness coefficient needs to be considered to be variable, dependent upon the depth of flow.

Partially Full Pipe Flow Calculations - U.S. Units

II. Calculation of Discharge, Q, and average velocity, V
for pipes more than half full

Instructions: Enter values in blue boxes. Calculations in yellow

Inputs

Pipe Diameter, **D** = in
Depth of flow, **y** = in

(must have $y \geq D/2$)

Full Pipe Manning
roughness, **n_{full}** =
Channel bottom
slope, **S** = ft/ft

Calculations

n/n_{full} =
Partially Full Manning
roughness, **n** =

Calculations

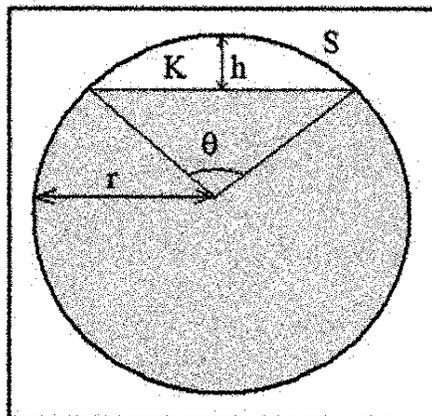
Pipe Diameter, **D** = ft
Pipe Radius, **r** = ft

Circ. Segment Height, **h** = ft

Central Angle, **q** = radian
Cross-Sect. Area, **A** = ft²

Wetted Perimeter, **P** = ft
Hydraulic Radius, **R** = ft
Discharge, **Q** = cfs
Ave. Velocity, **V** = ft/sec

pipe % full $[(A/A_{full}) * 100\%]$ =



**Partially Full Pipe Flow Parameters
(More Than Half Full)**

$r = D/2$

$h = 2r - y$

(hydraulic radius)

$R = A/P$

(Manning Equation)

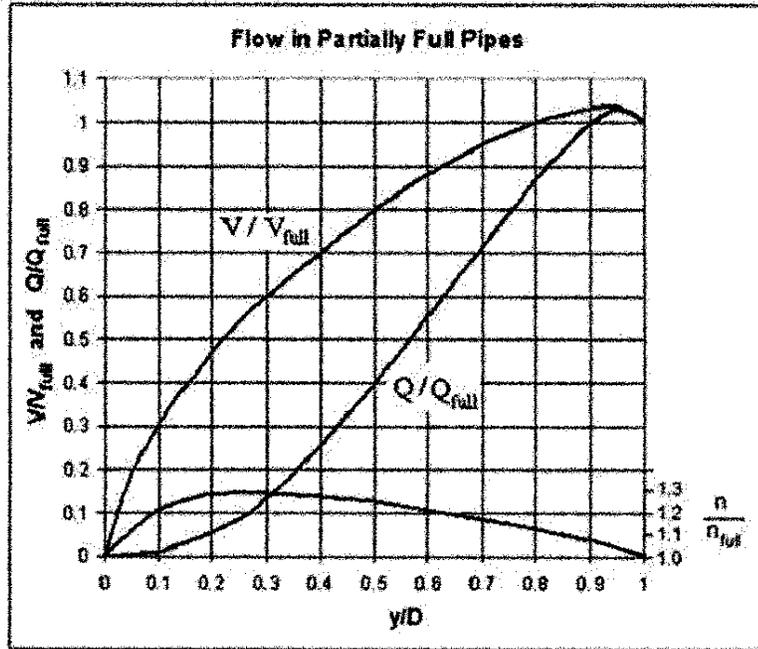
$Q = (1.49/n)(A)(R^{2/3})(S^{1/2})$

$V = Q/A$

P

$$\theta = 2 \arccos \left(\frac{r-h}{r} \right)$$

Equation used for n/n_{full} : $n/n_{full} = 1.25 - (y/D - 0.5)^2$ $A = \pi r^2 - \frac{r^2(\theta - \sin \theta)}{2}$



Flow In Partially Full Pipes

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PHILLIP LEWIS ENGINEERING, INC.
Structural + Civil Consultants
2701 Kavanaugh Blvd, Suite 200
Little Rock, Arkansas 72205

November 8, 2017

City of Bryant Planning and Development

Attn: **Mr. Truett Smith**
Assistant Planning Director
210 S.W. 3rd St.
Bryant, AR 72022

Re: Review Comment Annotation Letter for **New Brushmasters Office Building**, Bryant, Arkansas

Truett,

The following are the responses to the comments in the review letter prepared by Les Price of Crist Engineers dated 9 August 2017:

1. *Provide a sidewalk along Millbrook Drive for entire length of property or an in lieu of fee.* **Will comply but would like to further discuss options (Owner requested) at next DRC meeting on 16 November 2017.**
2. *Provide and easement (or replat) for the storm detention basin.* **Concur. See attached drawing.**
3. *The existing storm detention structure needs to be repaired to its original condition with levees, outlet structure, etc. Provide a drawing showing repairs that will be made to the storm detention basin.* **Concur. See attached drawing. The original (and non-functioning) detention area will be regraded to provide the same volume of the original detention basin for the Lexington Park Commercial Subdivision as could best be determined from topographic surveys. It should be noted that several large trees will have to be removed to provide the detention basin as these have grown in over time in the original detention basin area. The original levee (currently breached) of the original detention area will be repaired to properly function. The regraded detention basin will be seeded to provide stabilization of the soil after regrading. Please note that we (Phillip Lewis Engineering and Brushmasters Construction and Development) in no way are assuming liability for design of detention basin for this area or future functionality and maintenance of the basin.**
4. *Provide drainage calculations for the 24-inch storm drain.* **Concur. See attached calculations.**

Please do not hesitate to call me with any questions regarding the details of this letter

Respectfully submitted,

Phillip Lewis, P.E.
c.501.350.9840

CERTIFICATE OF OWNER:

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 the plat.

Date of Execution _____ Name: _____

CERTIFICATE OF FINAL SURVEYING ACCURACY:

I, Jonathan L. Hope, hereby certify that this plat correctly represents a survey completed by me, or under my supervision, that the boundary lines shown hereon correspond with the description in the deeds cited in the above Source of Titles; and that all monuments which were found or placed on the property are correctly described and located.

Date of Execution _____ Name: Jonathan L. Hope,
Registered Professional
Land Surveyor, No. 1762
Arkansas

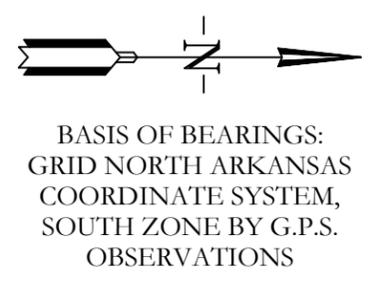
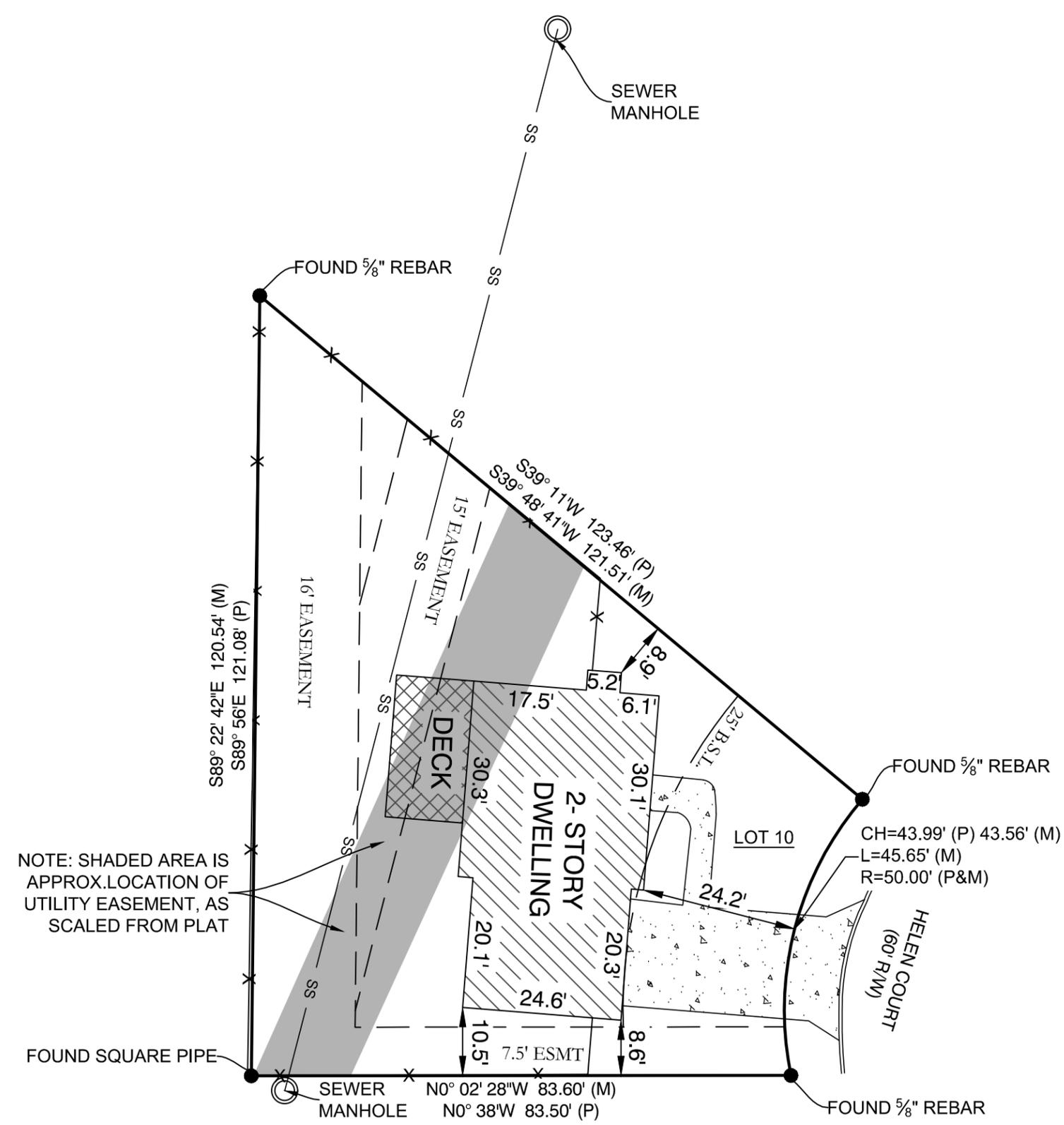
CERTIFICATE OF FINAL APPROVAL:

Pursuant to the City of Bryant Subdivision Rules and Regulations, this document was given approval by the Bryant Planning Commission at a meeting held _____, 20____. All of the conditions of approval having been completed, this document is hereby accepted, and this certificate executed under the authority of said rules and regulations.

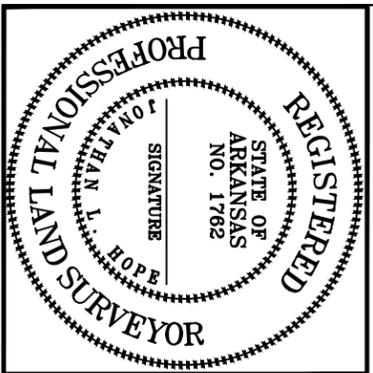
Date of Execution _____ Name: BRYANT PLANNING
COMMISSION

A REPLAT OF LOT 10, MILLER PLACE
AN ADDITION TO THE CITY OF BRYANT, SALINE COUNTY, ARKANSAS

SURVEYOR'S NOTE: THE PURPOSE OF THIS REPLAT IS TO CORRECT THE LOCATION OF THE 15' EASEMENT ACROSS THE WESTERN PART OF THE LOT TO FIT THE UTILITIES (SEWER) AS CONSTRUCTED.



NOTE: SHADED AREA IS APPROX. LOCATION OF UTILITY EASEMENT, AS SCALED FROM PLAT



HOPE CONSULTING ENGINEERS - SURVEYORS
117 S. Market Street,
Benton, Arkansas 72015
TEL (501) 315-2626
FAX (501) 315-0024
www.hopeconsulting.com

Rosalyn Houston
Realty Title & Fidelity National Title Company
Address 1319 Helen Court
Bryant, Arkansas 72022
Date 10/24/2017

By affixing my seal and signature, I, Jonathan L. Hope, PLS No. 1762, hereby certify that this drawing correctly depicts a survey compiled under my supervision.

NOTE: This survey was based on legal descriptions and title work furnished by others. No investigation or independent search has been made for easements of record, encumbrances, restrictive covenants, ownership title information, or any other facts which an accurate and current title search may disclose.

No portion of the property described hereon lies within the 100 year flood plane, according to the Flood Insurance Rate Map, panel # 05125C0360D, dated: June 19, 2012.

LEGEND

- - Found Aliquot Corner
- - Found Monument
- - Set 1/2" Rebar w. Cap
- △ - Computed point
- (M) - Measured
- (P) - Platted

Drawn By DKP
Checked By _____

HOPE

CONSULTING

ENGINEERS - SURVEYORS

Wednesday November 15, 2017

Truett Smith
City of Bryant
210 Southwest Third St., Bryant, AR 72022

RE: Conditional Use Permit with The City of Bryant

Truett,
Based on my discussions with the City we will prepare a drawing for presentation purposes of the areas we want to change use.

11 Lots are currently ready for Recreational Vehicles now
Lots 25-29, 47-49, 82, 93 and 94

12 Lots are being proposed for Tiny Homes
Lots 30, 37(split), 38, 73, 130, 132, 136, 137, 140, 143 and 379

48 Lots are being proposed for Recreational Vehicles
-Lots 4-6, 10-11, 14, 34-35, 44-45, 54,56-57, 61-62, 66, 77, 96, 98, 104-107A,109, 112,
117, 121, 126, 164, 168, 170, 173, 183-185, 187-188, 190-193, 197, 200-201, 211, 213, 215

6 Lots are currently being used for Recreational Vehicles
-Lots 80, 86, 87A, 114-115, 206

22 Lots are owned by Bryant Group Properties LLC that will be proposed for additional use as as
Recreational Vehicle Lot or Tiny Home Lot
-Lots 21, 41, 70, 79, 91, 100, 108, 113, 127, 131, 176-177, 181, 218, 222-223, 235-236,
285, 348-349,357

Sincerely,

Jonathan Hope

117 SOUTH MARKET ST. BENTON, ARKANSAS 72015
501-315-2626
WWW.HOPECONSULTING.COM

CONDITIONAL USE PERMIT APPLICATION

210 S.W. 3rd Street
Bryant, AR 72022
PHONE: 501-943-0857
FAX: 501-943-0992
EMAIL: tsmith@cityofbryant.com

DATE RECEIVED _____

FEE - \$125.00 (Check made payable to City of Bryant)

=====

APPLICANT Bryant Group Properties, LLC.

PHONE 501-847-3170 FAX _____ EMAIL _____

ADDRESS 154 Quapaw Dr.

CITY Bryant STATE AR ZIP 72022

PROPERTY OWNER(S) Bryant Group Properties, LLC

ADDRESS 154 Quapaw Dr. PHONE 847-3170 FAX _____

PROJECT/DEVELOPMENT NAME Indian Springs Mobile Home Park

PROJECT LOCATION I-30 / Indian Springs Dr.

PURPOSE OF CONDITIONAL USE PERMIT _____

LEGAL DESCRIPTION OF PROPERTY (attach a separate document if necessary):

See Attached

This application must be signed by all owners of the subject property or an explanation given why this is not the case.

We, the undersigned, have read and understand the above.

Signature of Applicant

Date

Signature of Owner (s)

Date

Signature of Owner (s)

Date

8 0 1 1 0 5 0
TX 4006433



2016-002814
I certify this instrument
was filed on:
02/10/2016 2:46:25 PM
Myka Bono Sample
Saline County Circuit Clerk

THIS INSTRUMENT PREPARED BY
AMY C BAGNALL
KUTAK ROCK LLP
124 W CAPITOL AVE, STE 2000
LITTLE ROCK, AR 72201

AFTER RECORDING RETURN TO,
STANDARD ABSTRACT & TITLE COMPANY
ATTN BRAD SIMS
3420 OLD CANTRELL ROAD
LITTLE ROCK, AR 72202

Pages: 7
K SCHANE

THE ABOVE SPACE IS FOR RECORDER'S USE.

SPECIAL WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS

That **JAMES A. OSBORNE** and **LINDA OSBORNE**, husband and wife (jointly, "Grantors"), for and in consideration of the sum of Ten and No/100 Dollars (\$10 00) and other good and valuable consideration to the undersigned paid by **BRYANT GROUP PROPERTIES, LLC**, an Arkansas limited liability company ("Grantee"), the receipt and sufficiency of which is hereby acknowledged, do hereby GRANT, BARGAIN, SELL and CONVEY unto Grantee that certain real property and improvements thereon located in Saline County, Arkansas, and more particularly described on Exhibit A attached hereto, together with all rights, privileges, appurtenances, minerals, utilities, adjacent streets, alleys, strips, gores, and rights-of-way, if any, (collectively, "Property") SUBJECT TO those matters set forth on Exhibit B attached hereto (collectively, "Permitted Exceptions") to the extent the Permitted Exceptions are still valid and effective as of the date of this deed. The mere reference to the Permitted Exceptions shall not be deemed to impose, reimpose or reinstate the Permitted Exceptions, if the same are not valid and effective as of the date of this deed.

THE PROPERTY is being sold in its "AS IS," "WHERE IS," "WITH ALL FAULTS" condition, subject however to the Seller Representations as defined in the Real Estate Purchase and Sale Agreement dated effective October 15, 2015 between Grantors' predecessor in title, Yorkshire Properties, LLC, as seller, and Grantee, as buyer, which survive the delivery of this deed in accordance with said Real Estate Purchase and Sale Agreement and do not merge into this deed.

TO HAVE AND TO HOLD the Property unto Grantee, its successors and assigns forever, with all the appurtenances thereto belonging, and Grantors hereby bind themselves and their successors and assigns, to warrant and forever defend, all and singular the Property, except for the Permitted Exceptions, unto Grantee, its successors and assigns, against any person whomsoever lawfully claiming or to claim the same or any part thereof by, through or under Grantors, but not otherwise.

GRANTORS, and each of them, does, for the consideration stated above, hereby release and relinquish unto GRANTEE any and all rights of dower, curtesy and homestead in and to said land which GRANTOR might have.

4849-8005-6365 8

EXECUTED this 4th day of February, 2016

James A Osborne
James A Osborne

Linda Osborne
Linda Osborne

STATE OF ARKANSAS)
)ss
COUNTY OF PULASKI)

ACKNOWLEDGMENT

On this the 4th day of February, 2016, before me, Brad Sims, the undersigned notary, personally appeared **James A. Osborne** and **Linda Osborne**, known to me (or satisfactorily proven) to be the persons whose names are subscribed to the within instrument and acknowledged that they executed and delivered said foregoing instrument for the consideration, uses and purposes therein mentioned and set forth

IN WITNESS WHEREOF, I hereunto set my hand and official seal

Brad Sims
NOTARY PUBLIC

My Commis



GRANTEE'S STATEMENT

I certify under penalty of false swearing that documentary stamps or a documentary symbol in the legally correct amount has been placed on this instrument

GRANTEE/GRANTEE'S AGENT

By _____
Name _____
Title _____
Address _____

EXHIBIT A
PROPERTY DESCRIPTION

PART OF THE NORTHEAST QUARTER AND PART OF THE NORTH ONE HALF OF THE SOUTHEAST QUARTER OF SECTION 22 AND PART OF THE NORTH ONE HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 23 ALL IN TOWNSHIP 1 SOUTH, RANGE 14 WEST, SALINE COUNTY, ARKANSAS, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS BEGINNING AT THE SOUTHEAST CORNER OF THE SAID NORTH ONE HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, SECTION 23, TOWNSHIP 1 SOUTH, RANGE 14 WEST, THENCE NORTH 88 DEGREES 01 MINUTES 14 SECONDS WEST 1337 07 FEET TO A FOUND ONE INCH PIPE USED FOR THE SOUTHEAST CORNER OF THE NORTH ONE HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER, SECTION 22, THENCE NORTH 88 DEGREES 01 MINUTES 57 SECONDS WEST 2041 79 FEET TO A FOUND ONE HALF INCH REBAR ON THE EAST LINE OF CARYWOOD SUBDIVISION, THENCE ALONG THE SAID EAST LINE NORTH 02 DEGREES 41 MINUTES 17 SECONDS EAST 642 40 FEET TO A FOUND ONE HALF INCH REBAR ON THE SOUTH RIGHT OF WAY LINE OF LORA DRIVE, THENCE SOUTH 88 DEGREES 22 MINUTES 59 SECONDS EAST 131 01 FEET ALONG THE SAID SOUTH RIGHT OF WAY LINE TO A POINT ON THE WEST RIGHT OF WAY LINE OF MILLS PARK ROAD, THENCE ALONG THE SAID WEST RIGHT OF WAY LINE OF MILLS PARK ROAD THE FOLLOWING EIGHT (8) COURSES AND DISTANCES, THENCE NORTH 01 DEGREES 17 MINUTES 16 SECONDS EAST 93 72 FEET TO A POINT, THENCE 153 95 FEET ALONG THE ARC OF A 325 00 FOOT RADIUS CURVE TO THE RIGHT HAVING A CHORD BEARING AND DISTANCE OF NORTH 16 DEGREES 24 MINUTES 41 SECONDS EAST 152 51 FEET TO A POINT, THENCE NORTH 29 DEGREES 47 MINUTES 19 SECONDS EAST 178 51 FEET TO A FOUND MAG NAIL, THENCE 43 73 FEET ALONG THE ARC OF A 25 00 FOOT RADIUS CURVE TO THE LEFT HAVING A CHORD BEARING AND DISTANCE OF NORTH 20 DEGREES 18 MINUTES 25 SECONDS WEST 38 37 FEET TO A FOUND ONE HALF INCH REBAR, THENCE 46 01 FEET ALONG THE ARC OF A 525 00 FOOT RADIUS CURVE TO THE RIGHT HAVING A CHORD BEARING AND DISTANCE NORTH 66 DEGREES 38 MINUTES 54 SECONDS WEST 46 00 FEET TO A FOUND ONE HALF INCH REBAR, THENCE NORTH 65 DEGREES 22 MINUTES 44 SECONDS WEST 233 16 FEET TO A FOUND ONE HALF INCH REBAR, THENCE 171 39 FEET ALONG THE ARC OF A 275 00 FOOT RADIUS CURVE TO THE RIGHT HAVING A CHORD BEARING AND DISTANCE OF NORTH 47 DEGREES 56 MINUTES 48 SECONDS WEST 168 63 FEET TO A FOUND ONE HALF INCH REBAR, THENCE NORTH 31 DEGREES 11 MINUTES 22 SECONDS WEST 373 67 FEET TO A POINT ON THE SOUTH RIGHT OF WAY LINE OF INTERSTATE 30, THENCE ALONG THE SAID SOUTH RIGHT OF WAY LINE THE FOLLOWING TWO (2) COURSES AND DISTANCES, THENCE 328 26 FEET ALONG ARC OF A 5580 00 FOOT RADIUS CURVE TO THE RIGHT HAVING A CHORD BEARING AND DISTANCE OF NORTH 63 DEGREES 26 MINUTES 24 SECONDS EAST 328 22 FEET TO A POINT, THENCE NORTH 65 DEGREES 08 MINUTES 17 SECONDS EAST 234 10 FEET TO A FOUND ONE HALF INCH REBAR, THENCE DEPARTING SAID SOUTH RIGHT OF WAY LINE SOUTH 24 DEGREES 51 MINUTES 43 SECONDS EAST 91 00 FEET TO A FOUND ONE HALF INCH REBAR, THENCE NORTH 88 DEGREES 02

MINUTES 17 SECONDS EAST 87 64 FEET TO A POINT, THENCE NORTH 65 DEGREES 08 MINUTES 17 SECONDS EAST 314 35 FEET TO A POINT, THENCE SOUTH 24 DEGREES 51 MINUTES 43 SECONDS EAST 25 00 FEET TO A POINT, THENCE NORTH 65 DEGREES 08 MINUTES 17 SECONDS EAST 313 09 FEET TO A POINT, THENCE SOUTH 43 DEGREES 38 MINUTES 07 SECONDS EAST 89 35 FEET TO A POINT, THENCE SOUTH 80 DEGREES 03 MINUTES 29 SECONDS EAST 129 95 FEET TO A POINT, THENCE NORTH 85 DEGREES 38 MINUTES 02 SECONDS EAST 231 30 FEET TO A POINT ON THE WEST RIGHT OF WAY LINE OF ARROWHEAD DRIVE, THENCE ALONG THE SAID WEST RIGHT OF WAY 145 64 FEET ALONG THE ARC OF A 251 18 FOOT RADIUS CURVE TO THE LEFT HAVING A CHORD BEARING AND DISTANCE OF NORTH 12 DEGREES 01 MINUTES 38 SECONDS WEST 143 61 FEET TO A POINT, THENCE DEPARTING SAID WEST RIGHT OF WAY LINE NORTH 61 DEGREES 21 MINUTES 43 SECONDS EAST 50 00 FEET TO A POINT, THENCE SOUTH 84 DEGREES 06 MINUTES 25 SECONDS EAST 123 03 FEET TO A POINT, THENCE SOUTH 81 DEGREES 40 MINUTES 55 SECONDS EAST 393 68 FEET TO A POINT, THENCE NORTH 73 DEGREES 30 MINUTES 56 SECONDS EAST 245 85 FEET TO A POINT ON THE EAST LINE OF THE SAID SECTION 22, THENCE SOUTH 01 DEGREES 36 MINUTES 52 SECONDS WEST 2179 57 FEET ALONG THE SAID EAST LINE TO A POINT, THENCE SOUTH 88 DEGREES 01 MINUTES 14 SECONDS EAST 1337 07 FEET TO A POINT, THENCE SOUTH 02 DEGREES 33 MINUTES 20 SECONDS WEST 10 10 FEET TO THE POINT OF BEGINNING, CONTAINING 4,122,224 SQUARE FEET OR 94 63 ACRES MORE OR LESS

EXHIBIT B
PERMITTED EXCEPTIONS

- 1 General taxes for the year 2015 which are not yet due and payable and subsequent years, and future installments of the following Special Improvement District(s)

Bryant Water & Sewer Improvement District No 1,
Bryant Fire Protection District No 1 (aka Salem Fire Protection District No 59), and
Saline Watershed Distribution District
- 2 Conveyance of all interest of, in and to all minerals and mineral and mining rights, in, on, to and under subject property by Aluminum Company of America in favor of American Bauxite Company in Warranty Deed, of record in Deed Book X, Page 476, records of Saline County, Arkansas
- 3 Subject to controlled access to Interstate 30 as set forth in Warranty Deed from John L Jones and Louise H Jones, his wife and D B Hill, Jr and Shirley Vestal Hill, his wife in favor of the Arkansas State Highway Commission, of record in Deed Book 88, Page 61, records of Saline County, Arkansas
- 4 10 foot wide Easement and Right of Way in favor of Arkansas Power & Light Company, of record in Deed Book 24, Page 235, records of Saline County, Arkansas
- 5 Bill of Sale and Easement of undisclosed length and width in favor of Arkansas Louisiana Gas Company, of record in Misc Book 49, Page 683, records of Saline County, Arkansas
- 6 Easement being one rod wide and extending approximately 257 feet across the front of property in favor of Southwestern Bell Telephone Company, of record in Misc Book 56, Page 762, records of Saline County, Arkansas, and as shown on survey prepared by Marion Scott Foster, Registered Land Surveyor, dated January 21, 2016 and revised January 27, 2016
- 7 Easement of varying length and width in favor of Southwestern Bell Telephone Company, of record in Misc Book 60, Page 144, records of Saline County, Arkansas, and as shown on survey prepared by Marion Scott Foster, Registered Land Surveyor, dated January 21, 2016 and revised January 27, 2016
- 8 Easement of varying length and width in favor of Southwestern Bell Telephone Company, of record in Misc Book 60, Page 149, records of Saline County, Arkansas, and as shown on survey prepared by Marion Scott Foster, Registered Land Surveyor, dated January 21, 2016 and revised January 27, 2016
- 9 Terms, provisions, covenants, restrictions and easements provided in the Dedication to the Public, of record as Instrument Number 1995, Page 19218 and in Declaration of

Restrictive Covenants by Indian Springs Joint Venture No 1, of record as Instrument Number 05 78556, records of Saline County, Arkansas

- 10 Plat of record as Instrument Number 1995, Page 19224, records of Saline County, Arkansas
- 11 Memorandum of Agreement made and entered into April 15, 1999 by and between Indian Springs Joint Venture #1 and Comcast Cablevision of Bryant, Inc , of record as Instrument Number 99 20711, records of Saline County, Arkansas
- 12 Grant of Easement in favor of Comcast Cablevision of Bryant, Inc , of record as Instrument Number 99 20718, records of Saline County, Arkansas
- 13 10 foot wide Electrical Easement in favor of Entergy of record as Instrument Number 07 71929, records of Saline County, Arkansas, and as shown on survey prepared by Marion Scott Foster, Registered Land Surveyor, dated January 21, 2016 and revised January 27, 2016
- 14 Grant of Easement in favor of Comcast of Bryant, Inc , of record as Instrument Number 13 11-4350, records of Saline County, Arkansas
- 15 Rights of tenant in possession under the unrecorded leases assumed in writing by Grantee contemporaneously with the conveyance of the subject property to Grantee
- 16 Any matters disclosed on survey prepared by Marion Scott Foster, Registered Land Surveyor, dated January 21, 2016 and revised January 27, 2016



STATE OF ARKANSAS
DEPARTMENT OF FINANCE AND ADMINISTRATION
MISCELLANEOUS TAX SECTION
P O BOX 896, LITTLE ROCK, AR 72203-0896

Affidavit of Compliance



File Number E-15-58438

Grantee: BRYANT GROUP PROPERTIES, LLC
Mailing Address: 60 RIVER RIDGE RD
LITTLE ROCK AR 722270000

Grantor: JAMES A OSBORNE AND LINDA OSBORNE
Mailing Address: 2200 RODNEY PARHAM RD
LITTLE ROCK AR 722120000

Property Purchase Price: \$0 00
Tax Amount: \$0 00

County: SALINE
Date Issued: 02/10/2016
Affidavit ID: 1698324480

The grantee/grantor claims the following exemption to the Real Estate Transfer Tax

Revenue shown on previous deed between sellers Charles B Whiteside, III and Catherine Whiteside, and buyer Bryant Group Properties, LLC

I certify under penalty of false swearing that documentary stamps or a documentary symbol in the legally correct amount has been placed on this instrument

~~Grantee or Agent Name~~ (printed) Eric Crawford, agent

~~Grantee or Agent Name~~ (signature) [Signature] Date 2-10-16

Address 60 River Ridge Rd.

City/State/Zip Little Rock, AR 72227

INTERSTATE 30
FRONTAGE ROAD



- ALL RVs SHALL BE MAINTAINED IN A SAFE HABITABLE CONDITION.
- EACH RV PAD SHALL BE PROVIDED AN ANCHORING SYSTEM TO SECURE RVs.
- RVs REQUIRED TO BE FULLY LICENSED AND READY FOR HIGHWAY USE
- CITY OF BRYANT ALLOWED TO VISUALLY INSPECT RVs WITH OCCUPANCY'S LONGER THAN 60 DAYS.
- RVs REQUIRED TO BE FULLY LICENSED AND READY FOR HIGHWAY USE.
- IMPROVEMENTS WILL ONLY INCLUDE PROVIDING A PERMANENT WAY TO CONNECT EXISTING WATER, SEWER AND ELECTRIC.
- SEWER: PROVIDE A SEWER CONNECTION STUB REQUIRING A CAM-LOCK CONNECTION AT TRAILER AND STUB.
- WATER: PROVIDE A HOSE BIB.



LEGEND	
	LOTS PROPOSED RECREATIONAL VEHICLES
	EXISTING LOTS RECREATIONAL VEHICLES
	FUTURE LOTS TINY HOMES
	LOTS READY FOR RECREATIONAL VEHICLES

INDIAN SPRINGS MOBILE HOME PARK
IN THE CITY OF BRYANT, SALINE COUNTY, ARKANSAS

<p>HOPE CONSULTING ENGINEERS - SURVEYORS</p>			<p>117 S. Market Street, Benton, Arkansas 72015 PH. (501)315-2626 FAX (501) 315-0024 www.hopeconsulting.com</p>
<p>FOR USE AND BENEFIT OF:</p>			
<p align="center">INDIAN SPRINGS MOBILE HOME PARK IN THE CITY OF BRYANT, SALINE COUNTY, ARKANSAS</p>			
DATE: 11/13/2017	C.A.D. BY: BJOHNSON	DRAWING NUMBER: 17-0807	
REVISED:	CHECKED BY:	SCALE: 1"=100'	

**APPLICATION
FOR CHANGE IN
ZONING DISTRICT BOUNDARIES**

Applicant Name: Bull Development, LLC

Spouse Name: _____

Property Address: Lombard Rd. Bryant, AR Parcel # 840-11632-425

Legal Description: see Attached.

Existing Zoning Classification: R-E

Requested Change: R-2

Plat of Property is Attached

Vicinity Map of property is attached

The undersigned designates the following process agent or attorney to represent the applicant at all hearings:

Jonathan Hope

This _____ day of _____, _____

Applicant

Spouse of Applicant

Address

Phone

LEGAL DESCRIPTION: PART OF THE NW 1/4 OF THE SW 1/4 AND PART OF THE SW 1/4 OF THE NW 1/4; ALL IN SECTION 10, TOWNSHIP 01 SOUTH, RANGE 14 WEST, SALINE COUNTY, ARKANSAS; MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT A FOUND 1/2" REBAR, ACCEPTED AS THE SW CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S88°21'12"E, A DISTANCE OF 25.00 FEET TO A FOUND 5/8" REBAR; THENCE N02°03'56"E, A DISTANCE OF 970.17 FEET TO A FOUND 5/8" REBAR (PLS #1375), BEING THE POINT OF BEGINNING OF HEREIN DESCRIBED TRACT; THENCE N02°00'45"E, A DISTANCE OF 643.89 FEET TO A POINT ON THE SOUTH LINE OF THE GLENN HILL ESTATES SUBDIVISION, AS FILED IN SALINE COUNTY DEED BOOK 284, PAGE 155 ; THENCE ALONG THE SOUTH LINE OF SAID SUBDIVISION, N78°45'10"E, A DISTANCE OF 1,324.41 FEET TO A FOUND 5/8" REBAR ON THE EAST LINE OF THE SW 1/4 OF THE NW 1/4 OF SECTION 10; THENCE S02°16'42"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 580.14 FEET TO A FOUND 5/8" REBAR, ACCEPTED AS THE NE CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S01°58'23"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 360.26 FEET TO A POINT; THENCE LEAVING SAID EAST LINE, N88°18'41"W, A DISTANCE OF 1,286.67 FEET TO THE POINT OF BEGINNING. SAID TRACT CONTAINING A CUMULATIVE OF 1,019,435 SQUARE FEET, OR 23.403 ACRES, MORE OR LESS. SAID TRACT SUBJECT TO A 100 FOOT ELECTRIC TRANSMISSION EASEMENT ACROSS THE NORTH 100 FEET THEREOF, AND ANY OTHER EASEMENTS OR ENCUMBRANCES OF RECORD.

HOPE
CONSULTING
ENGINEERS - SURVEYORS

November 30, 2017

Bull Development, LLC
P.O. Box 908
Bryant, AR 72089

Re: Re-Zoning Petition

The Property located at Lombard Road, Bryant, Arkansas is being considered for re-zoning from R-E to R-2. The property is more particularly described as follows:

PART OF THE NW 1/4 OF THE SW 1/4 AND PART OF THE SW 1/4 OF THE NW 1/4; ALL IN SECTION 10, TOWNSHIP 01 SOUTH, RANGE 14 WEST, SALINE COUNTY, ARKANSAS; MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT A FOUND 1/2" REBAR, ACCEPTED AS THE SW CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S88°21'12"E, A DISTANCE OF 25.00 FEET TO A FOUND 5/8" REBAR; THENCE N02°03'56"E, A DISTANCE OF 970.17 FEET TO A FOUND 5/8" REBAR (PLS #1375), BEING THE POINT OF BEGINNING OF HEREIN DESCRIBED TRACT; THENCE N02°00'45"E, A DISTANCE OF 643.89 FEET TO A POINT ON THE SOUTH LINE OF THE GLENN HILL ESTATES SUBDIVISION, AS FILED IN SALINE COUNTY DEED BOOK 284, PAGE 155 ; THENCE ALONG THE SOUTH LINE OF SAID SUBDIVISION, N78°45'10"E, A DISTANCE OF 1,324.41 FEET TO A FOUND 5/8" REBAR ON THE EAST LINE OF THE SW 1/4 OF THE NW 1/4 OF SECTION 10; THENCE S02°16'42"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 580.14 FEET TO A FOUND 5/8" REBAR, ACCEPTED AS THE NE CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S01°58'23"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 360.26 FEET TO A POINT; THENCE LEAVING SAID EAST LINE, N88°18'41"W, A DISTANCE OF 1,286.67 FEET TO THE POINT OF BEGINNING. SAID TRACT CONTAINING A CUMULATIVE OF 1,019,435 SQUARE FEET, OR 23.403 ACRES, MORE OR LESS. SAID TRACT SUBJECT TO A 100 FOOT ELECTRIC TRANSMISSION EASEMENT ACROSS THE NORTH 100 FEET THEREOF, AND ANY OTHER EASEMENTS OR ENCUMBRANCES OF RECORD.

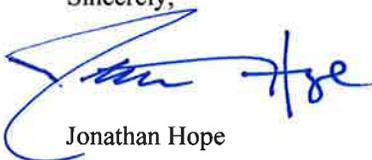
A petition has been filed with the City of Bryant Planning Commission to re-zone the property. As a part of this process a public hearing will be held December 11, 2017 at 6:00 pm in the Boswell Community Center, 210 Southwest 3rd Street, Bryant, Arkansas 72022.

Public comments will be accepted at that time regarding this re-zoning. Since you own property within 300 feet of the tract in consideration, you have sent this letter via certified mail as required by City Ordinance.

Should you have any questions regarding this matter you may contact the City of Bryant at 501-943-0309 and ask for Truett Smith or by calling me at 501-315-2626.

Thank you for your consideration in this matter.

Sincerely,



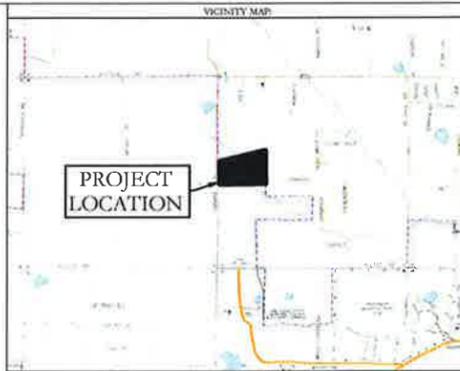
Jonathan Hope

NOTICE OF PUBLIC HEARING

A PUBLIC HEARING WILL BE HELD MONDAY, DECEMBER 11, 2017 AT 6:00 P.M. AT THE BRYANT CITY OFFICE COMPLEX, 210 SOUTHWEST 3RD STREET, CITY OF BRYANT, SALINE COUNTY, ARKANSAS FOR THE PURPOSE OF PUBLIC COMMENT ON A RE-ZONING APPROVAL REQUEST AT THE SITE OF: PART OF THE NW 1/4 OF THE SW 1/4 AND PART OF THE SW 1/4 OF THE NW 1/4; ALL IN SECTION 10, TOWNSHIP 01 SOUTH, RANGE 14 WEST; SALINE COUNTY, ARKANSAS; MORE PARTICULARLY DESCRIBED AS FOLLOWS: COMMENCING AT A FOUND 1/2" REBAR, ACCEPTED AS THE SW CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S88°21'12"E, A DISTANCE OF 25.00 FEET TO A FOUND 5/8" REBAR; THENCE N02°03'56"E, A DISTANCE OF 970.17 FEET TO A FOUND 5/8" REBAR (PLS #1375), BEING THE POINT OF BEGINNING OF HEREIN DESCRIBED TRACT; THENCE N02°00'45"E, A DISTANCE OF 643.89 FEET TO A POINT ON THE SOUTH LINE OF THE GLENN HILL ESTATES SUBDIVISION, AS FILED IN SALINE COUNTY DEED BOOK 284, PAGE 155 ; THENCE ALONG THE SOUTH LINE OF SAID SUBDIVISION, N78°45'10"E, A DISTANCE OF 1,324.41 FEET TO A FOUND 5/8" REBAR ON THE EAST LINE OF THE SW 1/4 OF THE NW 1/4 OF SECTION 10; THENCE S02°16'42"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 580.14 FEET TO A FOUND 5/8" REBAR, ACCEPTED AS THE NE CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S01°58'23"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 360.26 FEET TO A POINT; THENCE LEAVING SAID EAST LINE, N88°18'41"W, A DISTANCE OF 1,286.67 FEET TO THE POINT OF BEGINNING. SAID TRACT CONTAINING A CUMULATIVE OF 1,019,435 SQUARE FEET, OR 23.403 ACRES, MORE OR LESS. SAID TRACT SUBJECT TO A 100 FOOT ELECTRIC TRANSMISSION EASEMENT ACROSS THE NORTH 100 FEET THEREOF, AND ANY OTHER EASEMENTS OR ENCUMBRANCES OF RECORD. FOR QUESTIONS PLEASE CALL HOPE CONSULTING AT 501-860-0467.

Curve #	Length	Radius	Delta	Chord	Chord Direction	Ch. Length
C1	19.44	25.00	44°33'13"	N56°28'34"E		18.95
C2	23.83	30.00	38°45'44"	N64°32'17"E		24.77
C3	44.56	50.00	31°03'50"	N88°24'36"E		43.10
C4	44.16	50.00	30°53'53"	S40°40'32"W		42.93
C5	54.13	50.00	62°01'33"	S15°33'12"W		51.52
C6	18.44	25.00	44°33'13"	S84°17'22"W		18.95
C7	22.42	25.00	51°23'08"	S25°49'49"W		21.68
C8	35.83	50.00	40°08'18"	S20°18'14"W		34.32
C9	43.36	50.00	49°41'24"	S19°36'38"W		42.02
C10	89.53	50.00	100°33'33"	N88°14'52"W		78.04
C11	22.42	25.00	51°23'08"	N62°38'43"W		21.68
C12	28.05	18.00	89°16'36"	S47°01'46"W		25.29
C13	39.59	25.00	90°43'39"	S42°58'21"E		35.58
C14	39.12	25.00	89°59'04"	S44°30'17"W		35.25
C15	45.06	25.00	103°15'35"	S49°37'02"E		39.20

Curve #	Delta	Chord B & D	Arc Length	Arc Radius
SC1	103°15'35"	N49°37'02"W 78.40	80.11	50.00
SC2	89°38'04"	N48°50'17"E 70.49	78.23	50.00



CITY OF BRYANT CERTIFICATIONS:

OWNER:	DEVELOPER:
Name: BULL DEVELOPMENT LLC	Name: BULL DEVELOPMENT LLC
Address: P.O. BOX 908	Address: P.O. BOX 908
BRYANT, AR 72089	BRYANT, AR 72089

CERTIFICATE OF OWNER:
We, the undersigned, owners of the real estate shown and described herein do hereby certify that we have caused to be laid off, plotted and subdivided, and to hereby lay off, plot and subdivide said real estate in accordance with the plat.

CERTIFICATE OF PRELIMINARY SURVEYING ACCURACY:
I, Jonathan L. Hope, hereby certify that this plat correctly represents a boundary survey made by me or under my supervision; that all monuments shown hereon actually exist and their location, size, type and material are correctly shown; and that all interior lot lines will be accurately described in terms of length and direction of the property side as required in accord with the City of Bryant Subdivision Rules and Regulations.

CERTIFICATE OF PRELIMINARY ENGINEERING ACCURACY:
I, William W. McFadden, hereby certify that this plat correctly represents a plan made by me, and that the engineering requirements of the City of Bryant Subdivision Rules and Regulations have been complied with.

CERTIFICATE OF PRELIMINARY PLAT APPROVAL:
Pursuant to the City of Bryant Subdivision Rules and Regulations, and all of the conditions of approval having been completed, this document is hereby accepted. This certificate is hereby executed under the authority of said rules and regulations.

FLOODPLAIN CERTIFICATION:
By affixing my real and signature, I, Jonathan L. Hope, PLS No. 1762, hereby certify that this drawing correctly depicts a survey compiled under my supervision.
NOTE: This survey was based on legal descriptions and title work furnished by others and does not represent a title search.

PROPERTY SPECIFICATIONS:

OWNER: BULL DEVELOPMENT LLC P.O. BOX 908 BRYANT, AR 72089	MIN. LOT SIZE: 10,000 S.F. NUMBER OF LOTS: 57
DEVELOPER: BULL DEVELOPMENT LLC P.O. BOX 908 BRYANT, AR 72089	SOURCE OF WATER: CITY OF BRYANT
ENGINEERS: HOPE CONSULTING, INC. 117 S MARKET STREET BENTON, AR 72015	SOURCE OF SEWER: CITY OF BRYANT SOURCE OF ELECTRIC: FIRST ELECTRIC COOP SOURCE OF GAS: CENTERPOINT ENERGY
NAME OF SUBDIVISION: ROMAN HEIGHTS SUBDIVISION	BUILDING SETBACKS: FRONT: 25' OR AS SHOWN REAR: 25' OR AS SHOWN SIDE: 5' OR AS SHOWN
ZONING CLASSIFICATION: R-2	ASSESSMENTS: UTILITY & DRAINAGE (D & E) FRONT: 10' OR AS SHOWN REAR: 10' OR AS SHOWN SIDE: 5' OR AS SHOWN
SOURCE OF TITLE: SALINE COUNTY DOCUMENT BOOK 2012 PAGE 095811	STREET RIGHT OF WAYS: 50' OR AS SHOWN STREET WIDTH: 28' TO 30' TO BOC LOT CORNERS: SET 1/2" REBAR WITH CAP

HOPE CONSULTING ENGINEERS - SURVEYORS
117 South Market Street, Benton, Arkansas 72015
PH: (501) 315-2626
FAX: (501) 315-0024
www.hopeconsulting.com

FOR USE AND BENEFIT OF:
BULL DEVELOPMENT LLC

PRELIMINARY PLAT
ROMAN HEIGHTS SUBDIVISION
A SUBDIVISION IN THE CITY OF BRYANT, SALINE COUNTY, ARKANSAS

DATE: 11/20/2017	C.A.D. BY: JJP	DRAWING NUMBER:
REVISION:	CHECKED BY:	17-0077
	SCALE: 1" = 60'	

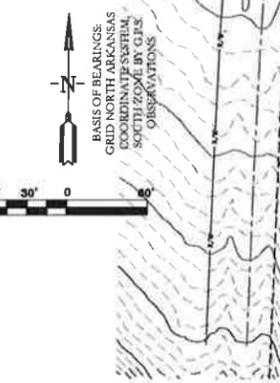
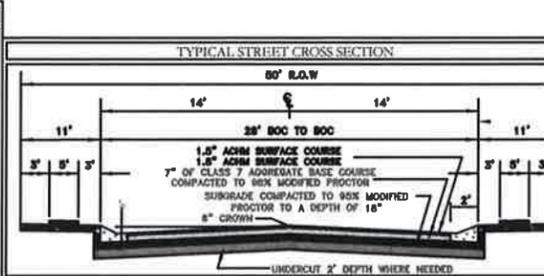


PRELIMINARY PLAT
ROMAN HEIGHTS SUBDIVISION
A SUBDIVISION IN THE CITY OF BRYANT, SALINE COUNTY, ARKANSAS

PROPERTY DESCRIPTION:
PART OF THE NW 1/4 OF THE SW 1/4 AND PART OF THE SW 1/4 OF THE NW 1/4, ALL IN SECTION 10, TOWNSHIP 01 SOUTH, RANGE 14 WEST, SALINE COUNTY, ARKANSAS, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
COMMENCING AT A FOUND \times REBAR, ACCEPTED AS THE SW CORNER OF THE NW 1/4 OF THE SW 1/4 OF SECTION 10; THENCE S88°21'12"E, A DISTANCE OF 25.00 FEET TO A FOUND \times REBAR, THENCE N02°03'56"E, A DISTANCE OF 970.17 FEET TO A FOUND \times REBAR (PLS #1375), BEING THE POINT OF BEGINNING OF HEREIN DESCRIBED TRACT; THENCE N02°00'45"E, A DISTANCE OF 643.89 FEET TO A POINT ON THE SOUTH LINE OF THE GLENN HILL ESTATES SUBDIVISION, AS FILED IN SALINE COUNTY DEED BOOK 284, PAGE 155; THENCE ALONG THE SOUTH LINE OF SAID SUBDIVISION, N78°45'10"E, A DISTANCE OF 1,324.41 FEET TO A FOUND \times REBAR ON THE EAST LINE OF THE SW 1/4 OF THE NW 1/4 OF SECTION 10; THENCE S02°16'42"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 880.14 FEET TO A FOUND \times REBAR, ACCEPTED AS THE NE CORNER OF THE NW 1/4 OF SECTION 10; THENCE S01°58'23"W, ALONG THE EAST LINE THEREOF, A DISTANCE OF 360.26 FEET TO A POINT; THENCE LEAVING SAID EAST LINE, N88°18'41"W, A DISTANCE OF 1,286.67 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINING A CUMULATIVE OF 1,019,435 SQUARE FEET, OR 23.403 ACRES, MORE OR LESS.

SAID TRACT SUBJECT TO A 100 FOOT ELECTRIC TRANSMISSION EASEMENT ACROSS THE NORTH 100 FEET THEREOF, AND ANY OTHER EASEMENTS OR ENCUMBRANCES OF RECORD.



CERTIFICATE OF AUTHORIZATION
HOPE CONSULTING, INC.
No. 1762
ARKANSAS

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
No. 10044
WILLIAM W. MCFADDEN

STATE OF ARKANSAS
REGISTERED PROFESSIONAL LAND SURVEYOR
No. 1762
JONATHAN L. HOPE

- LEGEND:**
- - Found Allotment Corner
 - △ - Computed point
 - - Found monument
 - - Set #4 RB/Plas Cap(S/P)
 - (M) - Measured
 - (R) - Record
 - (P) - Platted
 - ⊙ - Street Light
 - ⊙ - Fire Hydrant
 - ⊙ - Stop Sign

ENCLOSURE PROJECTS 2014 SUBDIVISIONS 2017 11-2017 ROMAN HEIGHTS 17-0077 P.P. & 2-DWG

7017 0190 0000 4815 7699

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<input type="checkbox"/> Return Receipt (electronic)	\$2.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$1.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$8.59

Sent To: **George Vales**
Street and Apt. No., or PO Box No.: **601 SW 3rd St**
City, State, ZIP+4®: **Bryant, AR 72022-3372**

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<input type="checkbox"/> Return Receipt (electronic)	\$2.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$1.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$8.59

Sent To: **Paula Queen**
Street and Apt. No., or PO Box No.: **707 SW 3rd St**
City, State, ZIP+4®: **Bryant, AR 72022**

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<input type="checkbox"/> Return Receipt (electronic)	\$2.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$1.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$8.59

Sent To: **Dennis + Jo Bowles**
Street and Apt. No., or PO Box No.: **710 SW 4th St**
City, State, ZIP+4®: **Bryant, AR 72022**

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<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$2.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$1.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$8.59

Sent To: **Rhonda Porter**
Street and Apt. No., or PO Box No.: **706 SW 4th St**
City, State, ZIP+4®: **Bryant, AR 72022**

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<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$2.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$1.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$8.59

Sent To: **Rental By Ray LLC**
Street and Apt. No., or PO Box No.: **3917 Commonwealth**
City, State, ZIP+4®: **Bryant, AR 72022**

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Extra Services & Fees (check box, add fee as appropriate)	\$12.75
<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.45
Total Postage and Fees	\$16.55

Sent To: Gary + Kadal Thompson
711 SW 3rd St.
Bryant AR 72022-3374

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<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.44
Total Postage and Fees	\$16.59

Sent To: Jack + Norma Lawton
701 SW 3rd St.
Bryant AR 72022

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Extra Services & Fees (check box, add fee as appropriate)	\$12.75
<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.47
Total Postage and Fees	\$16.59

Sent To: Gary + Donna Teeter
603 Chain Dr.
Bryant AR 72022-3700

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Extra Services & Fees (check box, add fee as appropriate)	\$12.75
<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.45
Total Postage and Fees	\$16.55

Sent To: Cateen + Adrian Cook
1 Chain Dr.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (hardcopy)	\$2.75
<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Wayne + Amy Birge
607 SW 3rd St.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Loyd + Carolyn Jiggs
607 SW 3rd St.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Roger Urrey
705 SW 4th St.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.47
Total Postage and Fees	\$16.59

Sent To: Charles + Cynthia Lawkes
2 Chain Dr
Bryant AR 72022

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<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Breath of Life Church
702 SW 4th St.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Tammie Nance
709 SW 4th St
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: Raymond + Evans Cagle
605 SW 4th St.
Bryant AR 72022

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<input type="checkbox"/> Return Receipt (electronic)	\$0.00
<input type="checkbox"/> Certified Mail Restricted Delivery	\$0.00
<input type="checkbox"/> Adult Signature Required	\$0.00
<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00
Postage	\$0.49
Total Postage and Fees	\$16.59

Sent To: James + Brenda Qualls
1022 Mills Park Rd.
Bryant AR 72022

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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **William Higgins**
Street and Apt. No., or PO Box No. **406 Sanders Lane**
City, State, ZIP+4® **Bryant, AR 72022**

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BENTON AR 72015
NOV 20 2017
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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Stephen & Carol Vogler**
Street and Apt. No., or PO Box No. **65 Crain Dr.**
City, State, ZIP+4® **Bryant AR 72022**

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BENTON AR 72015
NOV 20 2017
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7017 0190 0000 4815 7927

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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **James & Tina Hanley**
Street and Apt. No., or PO Box No. **609 SW 4th St**
City, State, ZIP+4® **Bryant AR 72022**

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BENTON AR 72015
NOV 20 2017
Postmark Here
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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **John & Tina Johnston**
Street and Apt. No., or PO Box No. **65 Crain Dr**
City, State, ZIP+4® **Bryant, AR 72022**

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NOV 20 2017
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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Kim Jobe**
Street and Apt. No., or PO Box No. **2404 Rainier Dr.**
City, State, ZIP+4® **Bryant, AR 72022**

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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Sheryl Edwards**
Street and Apt. No., or PO Box No. **408 Sanders Lane**
City, State, ZIP+4® **Bryant, AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

BENTON AR 72015
NOV 20 2017
Postmark Here
USPS

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Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **David Hannah**
Street and Apt. No., or PO Box No. **62 Crain Drive**
City, State, ZIP+4® **Bryant, AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Raymond & Frances Griebel**
Street and Apt. No., or PO Box No. **60 Crain Dr**
City, State, ZIP+4® **Bryant AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Charles & Carrie Hanes**
Street and Apt. No., or PO Box No. **609 SW 4th St.**
City, State, ZIP+4® **Bryant, AR 72022-3334**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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NOV 20 2017
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Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Jerry & Laura Hearn**
Street and Apt. No., or PO Box No. **65 Crain Dr**
City, State, ZIP+4® **Bryant AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

BENTON AR 72015
NOV 20 2017
Postmark Here
USPS

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Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **Charles & Patsy Pinkston**
Street and Apt. No., or PO Box No. **3 Crain Dr.**
City, State, ZIP+4® **Bryant AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

BENTON AR 72015
NOV 20 2017
Postmark Here
USPS

7017 0190 0000 4815 7750

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Certified Mail Fee \$13.35

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage \$0.49

Total Postage and Fees \$13.84

Sent To **David & Frankie Garrett**
Street and Apt. No., or PO Box No. **609 SW 4th St.**
City, State, ZIP+4® **Bryant AR 72022**

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

BENTON AR 72015
NOV 20 2017
Postmark Here
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CITY OF BRYANT
210 SW 3RD STREET
BRYANT, AR 72022
501-943-0309

PC MEETING DATE: SECOND MONDAY OF EACH MONTH
TIME: 6:00 P.M.
PLACE: COURTROOM - BRYANT OFFICE COMPLEX
AGENDA DEADLINE: 5:00 P.M. THREE WEEKS PRIOR TO THE REGULARLY SCHEDULED MEETING DATE

**APPLICATION
FOR CHANGE IN
ZONING DISTRICT BOUNDARIES**

Applicant Name: Southern General Contractors

Spouse Name: _____

Property Address: 703 SW Fourth St., Bryant, AR

Legal Description: Lot 1, Block 3 of Brenner Addition,
A subdivision of the NW 1/4, of the SW 1/4 of Section
34, T-1-S, R-14-W, Saline County, Arkansas.

Existing Zoning Classification: R-2

Requested Change: R-1

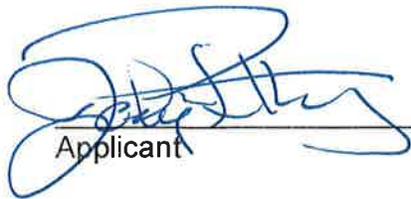
Plat of Property is Attached _____

Vicinity Map of property is attached ✓

The undersigned designates the following process agent or attorney to represent the applicant at all hearings:

HOPE CONSULTING: JONATHAN HOPE

This _____ day of _____


Applicant

Spouse of Applicant

PO BOX 1009
Address
Bryant AR 72089
501-~~912~~912-8525
Phone



Not A Legal Survey

840-02002-000
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840-09003-000
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Bryant Meadows (Rt)

Sanderson Ave

Craig St

Craig St

S W 4th St

Sanders Ln

S Cherry St

S Maple St

S Fir St

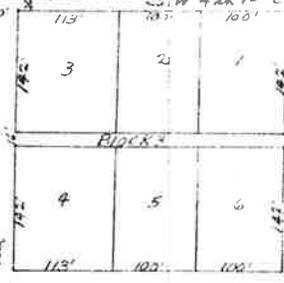
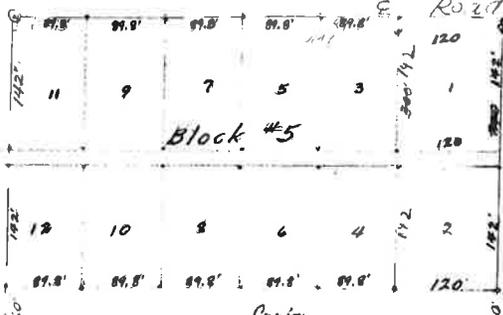
Map Scale: 1" = 30' 0"

0 15 30 Feet

Deed Record

85 PAGE 274

Prop Line S.W. 4th St

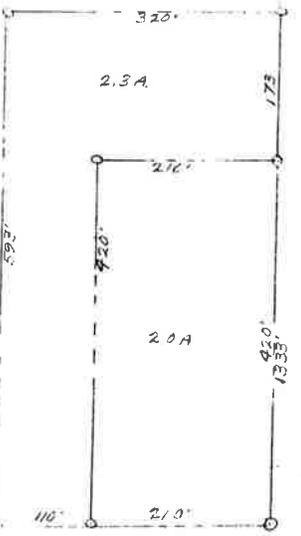
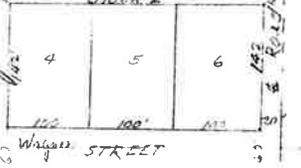
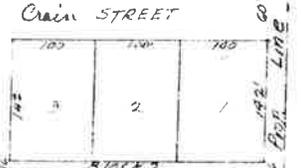
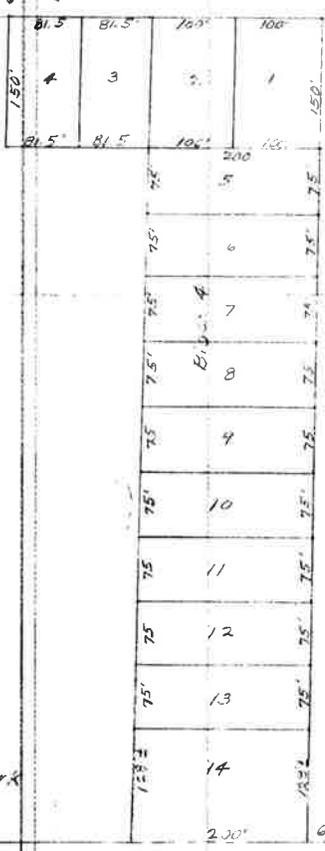


FILED
SALINE CIRCUIT &
CLERKERY BUREAU
1931 JUN 22 AM 10:45
BY *Edward J. ...*

N.W. 1/4 OF S.W. 1/4 SEC. 34
T-1-S-R-14-N

12.83a ±

SCALE 1" = 100'
J.C. Harper
Revised
Bauxite Ark
11-19-51
7-10-50
4-15-57



67-135

S113404

67-135

HOPE

CONSULTING

ENGINEERS - SURVEYORS

117 S. Market St. Benton, AR 72015 * 501-315-2626 * Fax 501-315-0024

November 17, 2017

Southern General Contractors
P.O. Box 1007
Bryant, AR 72089-1007

Re: Re-Zoning Petition

The Property located at 703 SW Fourth Street, Bryant, Arkansas is being considered for re-zoning from R2 to R1. The property is more particularly described as follows:

Lot 1, Block 3 of Brenner Addition, A Subdivision of the Northwest Quarter of the Southwest Quarter of Section 34, Township 1 South, Range 14 West, Saline County, Arkansas.

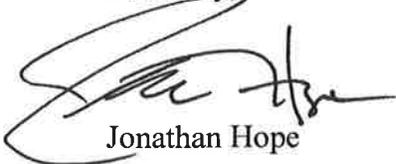
A petition has been filed with the City of Bryant Planning Commission to re-zone the property. As a part of this process a public hearing will be held December 11, 2017 at 6:00 pm in the Boswell Community Center, 210 Southwest 3rd Street, Bryant, Arkansas 72022.

Public comments will be accepted at that time regarding this re-zoning. Since you own property within 300 feet of the tract in consideration, you have sent this letter via certified mail as required by City Ordinance.

Should you have any questions regarding this matter you may contact the City of Bryant at 501-943-0309 and ask for Truett Smith or by calling me at 501-315-2626.

Thank you for your consideration in this matter.

Sincerely,



Jonathan Hope



300 North Port Drive
Cabot, AR 72023
(501) 941-5559

October 11, 2017

Mr. Truett Smith
City of Bryant - Planning
210 S.W. 3rd St.
Bryant, AR 72022

Re: Large Scale Development, New Junior High School, Bryant Public Schools, Bryant, AR

Mr. Smith:

Attached please find the Large Scale Development building checklist and all associated documents. A full set of building plans are not included, the building is currently under design. We are requesting early approval of the site plan so dirtwork can begin, building plans will be submitted in November. The SWPPP will be submitted once the project is bid and all responsible parties are involved. The drainage calculations have been submitted to Les Price @ Crist Engineers.

This project consists of a 171,000 SF new junior high school located at the southeast corner of Hill Farm Road and South Reynolds Road. The elementary school will be accessed by a future boulevard from the south, which is currently under design, and will also be accessed by Hill Farm Road to the north. Water will be served by an existing 8" line on the north side of Hill Farm Road, sewer will be served by the existing main to the west.

Please place this item on the agenda for the next Planning Commission Meeting. Contact me if you need any additional information to accompany this submittal.

Sincerely,

A handwritten signature in blue ink, appearing to read 'JM', is written over a large, stylized blue 'M' that serves as a background for the signature.

Josh Minton, PE
Project Engineer

Cc: John McMorran, AIA – Lewis Architects

Bryant Planning Commission

LARGE SCALE DEVELOPMENT COMMERCIAL BUILDING CHECKLIST

CITY OF BRYANT
210 SW 3RD STREET
BRYANT, AR 72022
501-943-0309

PC MEETING DATE: SECOND MONDAY OF EACH MONTH
TIME: 6:00 P.M.
PLACE: COURTROOM - BRYANT OFFICE COMPLEX
AGENDA DEADLINE: 5:00 P.M. THREE WEEKS PRIOR TO THE REGULARLY SCHEDULED MEETING DATE

REQUIREMENTS FOR SUBMISSION

LETTER TO PLANNING COMMISSION STATING YOUR REQUEST
COMPLETED CHECKLIST (SUBDIVISION OR BUILDING)
ADA/ABA FORM COMPLETED
TWO FULL SETS OF BUILDING PLANS
20 FOLDED COPIES OF SITE PLAN (MINIMUM SIZE 17" X 34") THAT INCLUDES THE FOLLOWING:
VICINITY MAP - LEGAL DESCRIPTION - LANDSCAPING PLAN
20 FOLDED COPIES OF FLOOR PLAN
20 COPIES OF FRONT AND REAR BUILDING ELEVATIONS
AN IBM COMPATIBLE DISKETTE IN PDF FORMAT
COPY OF ADEQ STORMWATER POLLUTION PREVENTION PLAN FOR PROPERTY PARCEL CONTAINING ONE ACRE OR LARGER.
COPY OF STORMWATER DETENTION APPROVAL BY ENGINEER
\$250.00 FOR STORMWATER DETENTION AND DRAINAGE PLAN REVIEW

ALL REQUIREMENTS LISTED ABOVE MUST BE COMPLETED AND ATTACHED BEFORE SUBMITTING APPLICATION TO BE PLACED ON THE PLANNING COMMISSION AGENDA.

NOTE: WHEN MAKING CHANGES TO AN APPROVED SITE PLAN, A REVISED SITE PLAN MUST BE SUBMITTED TO THE BRYANT PLANNING COMMISSION FOR APPROVAL. THIS MUST BE DONE PRIOR TO IMPLEMENTATION. FAILURE TO COMPLY WILL RESULT IN PENALTIES/FINES BEING IMPOSED IN ACCORDANCE WITH CITY ORDINANCES.

I HAVE COMPLIED WITH THE REQUIREMENTS LISTED ABOVE AND HAVE CHECKED ALL OF THE BOXES ON THE CHECKLIST WHICH APPLY TO THIS PROJECT SUBMITTAL.

SIGNATURE

DATE

10-11-17

City of Bryant Commercial Building Checklist

Name of Development Bryant Junior High
Site Location SE corner Reynolds & Hill Farm Current zoning C2
Owner Bryant School District Phone (501) 847-5600

I. BASIC INFORMATION NEEDED ON THE SITE PLAN

- ✓▲ 1. Name of Development
- ✓▲ 2. Current zoning
- ✓▲ 3. Name and Address of owner of Record
- ✓▲ 4. Name and address of the architect, landscape architect, engineer, surveyor, or other person involved in the preparation of the plan
- ✓▲ 5. Date of preparation of the plan
- ✓▲ 6. Vicinity map locating streets, highways, section lines, railroad, schools, & parks within ½ mile
- ✓▲ 7. Legal description of the property with exact boundary lines
- ✓▲ 8. North arrow & Scale
- ✓▲ 9. Identification of any land areas within the 100 year floodplain and within the 100 year floodway
- ✓▲ 10. Lot area in square feet
- ✓▲ 11. Show scale (not less than 1" = 100') (paper size minimum 17" X 34")
- ✓▲ 12. Existing streams, drainage channels, and other bodies of water
- ✓▲ 13. Drainage easements for stormwater run-off and detention shown & labeled
- ✓▲ 14. Location and name of existing streets
- ✓▲ 15. Show source of water supply
- ✓▲ 16. Show location of waste water connection to municipal system & sanitary sewer layout
- ✓▲ 17. Fire Hydrant placement
- ✓▲ 18. Proposed location of buildings and other structures, parking areas, drives, loading areas, service areas, alleys, walks, screening, and public streets
- ✓▲ 19. Sufficient dimensions to indicate relationship between buildings, property lines, parking areas and other elements of the plan
- ✓▲ 20. Extent and character of proposed landscaping. Common and/or Botanical plant names and sizes of new vegetation must be clearly indicated.
- ✓▲ 21. Location, massing and pattern of existing vegetation to be retained
- N/A ▲ 22. Existing structures on the site
- ✓▲ 23. Pedestrian and vehicular access points, sidewalks, crosswalks, etc.
- ✓▲ 24. Typical building elevations depicting the style, size and exterior construction materials of the buildings proposed. Where several building types are proposed on the plan, such as apartments and commercial buildings, a separate sketch shall be prepared for each type. The elevations shall be drawn at a minimum scale of 1/16" to a foot and must show adjoining context.
- N/A ▲ 25. Any variance approvals

II. ADDITIONAL INFORMATION NEEDED, BUT NOT ON THE SITE PLAN

COMMERCIAL BUILDING WORKSHEET

	Yes	No
Site is compatible with Master Street Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Proposed improvement is within building line setbacks Front _____ ft. Side _____ ft. CNR Side _____ ft. Back _____ ft.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Parking requirements can be satisfied ? Floor Space _____ sq.ft. divided by 300 = _____ (no. of parking spaces required)	<input type="checkbox"/>	<input type="checkbox"/>
Improvement is outside 100 year flood plain (if answer is no - Provide 404 Permit for site)	<input type="checkbox"/>	<input type="checkbox"/>
Lowest building floor level and all mechanical equipment are above FEMA 100 year flood elevation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will there be a dumpster located on the site?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will there be a construction site office?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Have you made "One Call"?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Structure and site complies with ADA (Americans with Disability Act) and ABA (Architectural Barriers Act) Accessibility Guidelines	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Design complies with Arkansas Plumbing Code and National Electric Code requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Foundation and structure meet earthquake requirements for Zone 1.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Structure meets Arkansas Energy Code for specified use.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Complies with Arkansas Fire Prevention Code	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Complies with International Code Council regulations	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will a Site Clearance Permit be required? (City Ordinance 2002-03)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Are you granted any variances by the Board of Adjustment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If you have been granted a variance please explain in detail:		

III. LANDSCAPING COMPLIANCE WITH REQUIREMENTS

	YES	NO
No planting within 5 feet of a fire hydrant	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spacing will be 40' between trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tree must be a minimum 3" in diameter at the base and 12' + tall	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Existing trees meeting the minimum size can be counted to meet above criteria	<input checked="" type="checkbox"/>	<input type="checkbox"/>
No trees can be planted within 30 feet of a property corner or driveway	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Shrubs along street right-of-way lines cannot exceed 30 inches in height	<input checked="" type="checkbox"/>	<input type="checkbox"/>

IV. SITE COVERAGE COMPLIANCE WITH REQUIREMENTS

(FOR YOUR CONVENIENCE WE HAVE LISTED THE THREE COMMERCIAL ZONING SITE COVERAGE REQUIREMENTS - CHOOSE THE ZONING FOR THIS PROJECT AND COMPLETE ONLY THAT SECTION)

	<u>YES</u>	<u>NO</u>
1. C-1 Zoning - Neighborhood Commercial		
Lot area: minimum of 2,500 square feet; maximum 16,000 square feet	_____	_____
Front Yard: none required	_____	_____
Side Yard: minimum of 5 feet each side	_____	_____
Rear Yard: minimum of 55 feet	_____	_____
Maximum lot coverage of 70% of the total area of the site for all principal, accessory buildings, parking lots, sidewalks, private streets, or drives.	_____	_____
Parking: one space per each 200 sq. ft. of commercial use	_____	_____
Loading areas: physically separated from all streets with 10 ft grassy area	_____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	_____	_____
2. C-2 Zoning - Lots fronting along roadways designated as Interstate 30 and frontage roads, State Highway 5 and 183		
Front Yard: not less than 50 feet from front property line	_____	_____
Side Yard: not required, except where they abut a street or a residential lot line then a minimum of 25 feet is required	_____	_____
Rear Yard: minimum of 15 feet, except where they abut residential area then a minimum of 55 feet is required	_____	_____
A maximum lot coverage of 35% of the total area of the site for all principal and accessory buildings	_____	_____
Parking: one space per each 300 sq. ft. of occupied space	_____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	_____	_____
3. C-2 Zoning - Lots fronting along roadways designated as interior local.		
Front Yard: none required	_____	_____
Side Yard: not required, except where they abut a street or a residential lot line then a minimum of 25 percent of lot dimension	_____	_____
Rear Yard: minimum of 15 feet, except where they abut residential area then a minimum of 55 feet is required	_____	_____
A maximum lot coverage of 85% of the total area of the site for all principal, accessory buildings and parking	_____	_____
Parking: one space per each 300 sq. ft. of occupied space	_____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	_____	_____

V. SITE PLAN ATTACHMENTS

(APPLICATION WILL NOT BE ACCEPTED UNTIL ALL ATTACHMENT REQUIREMENTS ARE MET)

- ✓▲ 26. Letter to Planning Commission stating your request
- ✓▲ 27. Completed Checklist
- ▲ 28. Completed ADA/ABA Form
- ▲ 29. Two full sets of Building Plans → *Currently under Design*
- ✓▲ 30. 20 copies of Site Plan (folded to no larger than 8 1/2 X 14 size) that includes vicinity map and landscaping plan (minimum size 17" X 34" paper)
- ✓▲ 31. 20 copies of Landscaping Plan (folded to no larger than 8 1/2 X 14 size)
- ✓▲ 32. 20 copies of building floor plan (folded to no larger than 8 1/2 X 14 size)
- ▲ 33. Copy of Stormwater Detention approval → *Submitted to LES*
- ▲ 34. Copy of ADEQ Stormwater Pollution Prevention Plan for property containing one acre or larger. → *will be submitted by contractor*
- ✓▲ 35. IBM compatible diskette or CD with data in PDF format.
- ✓▲ 36. Receipt for \$250.00 for Stormwater Detention and Drainage Plan review

I CERTIFY that the design of Bryant Junior High in the City of Bryant, Arkansas complies with the above regulations, laws and codes.

Bryant Public Schools
Owner

Minton Engineering / Lewis Architects
Engineer/Architect

300 Northport Dr. Cabot
Mailing Address AR, 72023

(501) 941-5559
Phone #

City

10-11-17
Date

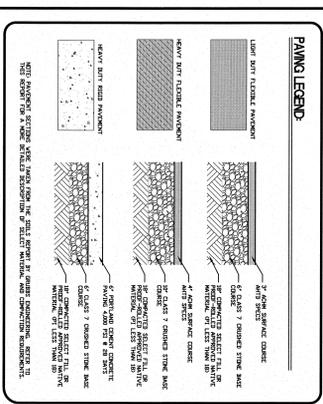
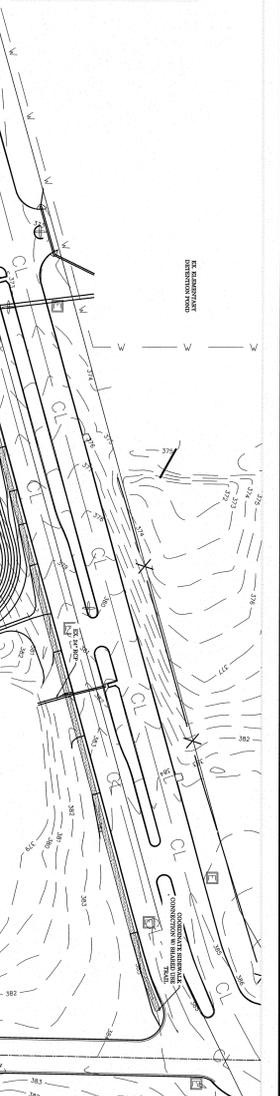
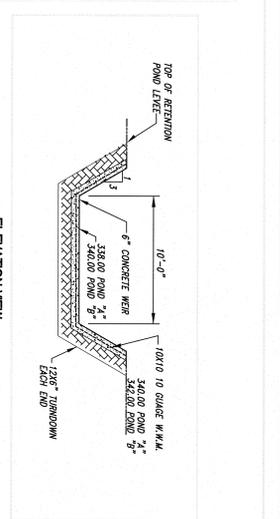
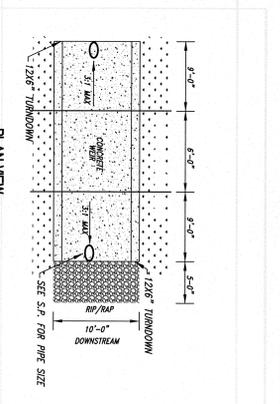
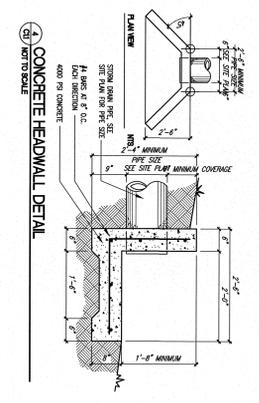
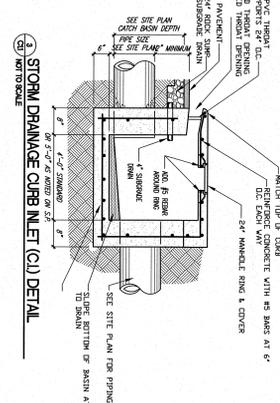
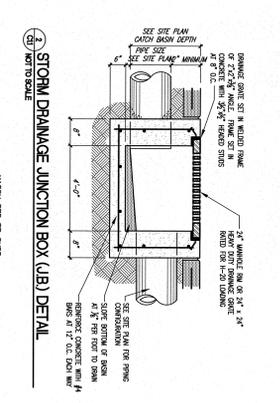
CITY USE

Action Taken:

Special Conditions:

Permit Issued:	Date _____	Sq.Ft. _____	Amount \$ _____
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Construction Completed Certified For Occupancy:	Date: _____
	Inspector: _____



GENERAL SITE GRADING NOTES

1. ALL EXISTING AND PROPOSED CONSTRUCTION SHALL BE SHOWN ON THIS PLAN.
2. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF BRYANT SPECIFICATIONS FOR CONSTRUCTION.
3. ALL NEW CONSTRUCTION SHALL BE SHOWN WITH A 10% MINIMUM SLOPE TO THE NEAREST DRAINAGE POINT.
4. ALL EXISTING CONSTRUCTION SHALL BE SHOWN WITH A 10% MINIMUM SLOPE TO THE NEAREST DRAINAGE POINT.
5. THE ENGINEER SHALL HAVE THE RESPONSIBILITY OF VERIFYING THE ACCURACY OF ALL SURVEY DATA AND THE SUFFICIENCY OF ALL CONSTRUCTION DETAILS.
6. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF BRYANT.
7. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ARKANSAS DEPARTMENT OF TRANSPORTATION.
8. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ARKANSAS DEPARTMENT OF REVENUE.
9. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY.
10. THE ENGINEER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE ARKANSAS DEPARTMENT OF HEALTH.

SITE LEGEND

100	EX. CENTERLINE
101	PROPOSED CENTERLINE
102	EX. SIDEWALK
103	PROPOSED SIDEWALK
104	EX. DRIVE
105	PROPOSED DRIVE
106	EX. WALKWAY
107	PROPOSED WALKWAY
108	EX. DRIVE
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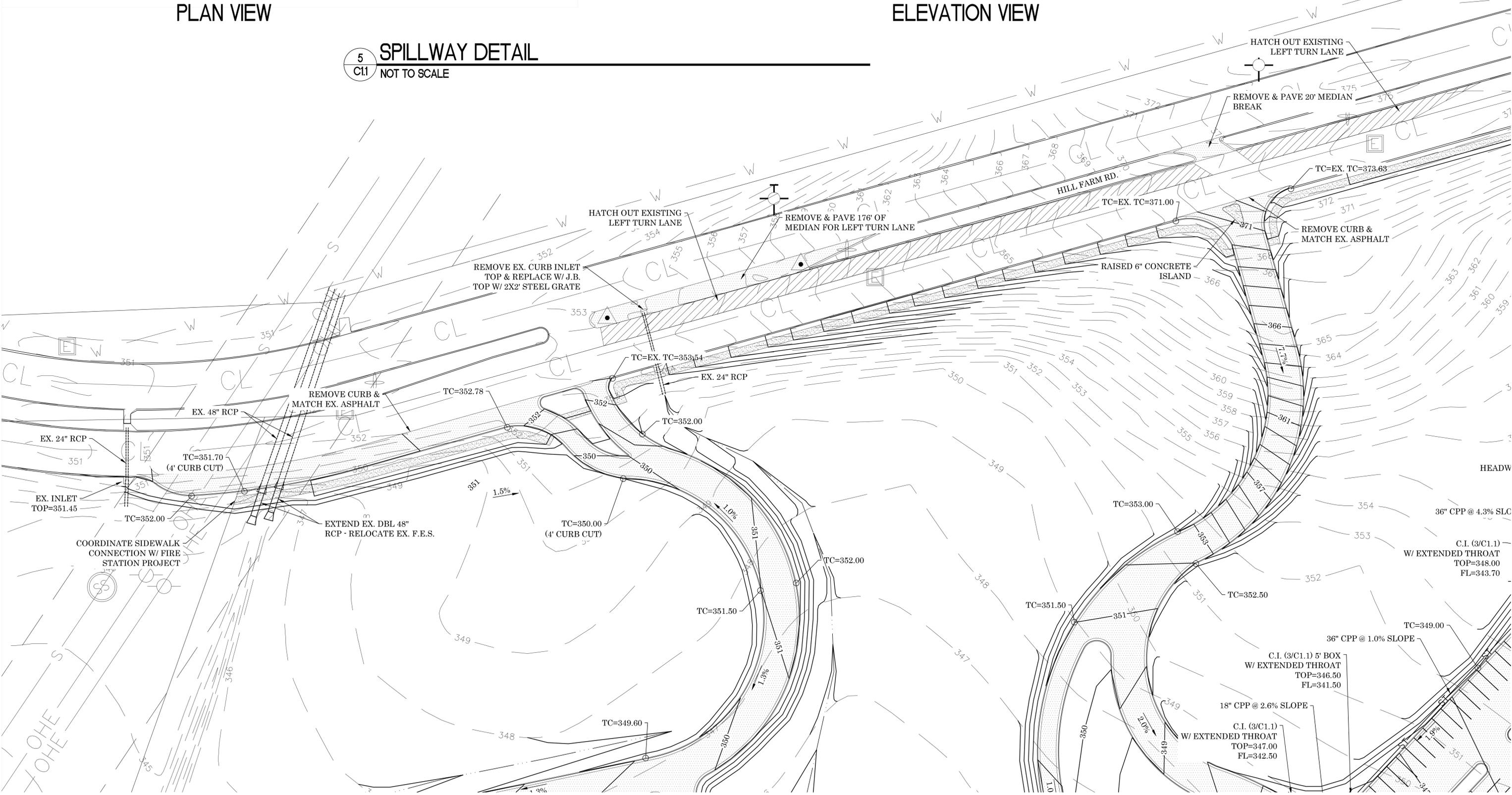


12X6" TURNDOWN

PLAN VIEW

ELEVATION VIEW

5 **SPILLWAY DETAIL**
 C11 NOT TO SCALE



HATCH OUT EXISTING LEFT TURN LANE

REMOVE & PAVE 176' OF MEDIAN FOR LEFT TURN LANE

HATCH OUT EXISTING LEFT TURN LANE

REMOVE & PAVE 20' MEDIAN BREAK

REMOVE EX. CURB INLET TOP & REPLACE W/ J.B. TOP W/ 2X2' STEEL GRATE

REMOVE CURB & MATCH EX. ASPHALT

REMOVE CURB & MATCH EX. ASPHALT

RAISED 6" CONCRETE ISLAND

EX. 48" RCP

TC=EX. TC=353.54

EX. 24" RCP

TC=352.78

TC=352.00

TC=351.70 (4' CURB CUT)

EX. INLET TOP=351.45

TC=352.00

EXTEND EX. DBL 48" RCP - RELOCATE EX. F.E.S.

TC=350.00 (4' CURB CUT)

TC=351.50

TC=352.00

TC=353.00

TC=351.50

TC=352.50

COORDINATE SIDEWALK CONNECTION W/ FIRE STATION PROJECT

36" CPP @ 4.3% SLOPE

C.I. (3/C1.1) W/ EXTENDED THROAT TOP=348.00 FL=343.70

36" CPP @ 1.0% SLOPE

C.I. (3/C1.1) 5' BOX W/ EXTENDED THROAT TOP=346.50 FL=341.50

18" CPP @ 2.6% SLOPE

C.I. (3/C1.1) W/ EXTENDED THROAT TOP=347.00 FL=342.50

TC=349.00

TOOHE

Traffic Study

Bryant Public School District New Junior High School Hill Farm Road

prepared for:



Hill Farm Road
and Reynolds Road

Bryant, Arkansas



PETERS & ASSOCIATES
ENGINEERS, INC.

• CIVIL & TRAFFIC ENGINEERING •

5507 Ranch Drive - Suite 205 (501) 868-3999
Little Rock, Arkansas 72223 Fax (501) 868-9710

Project No.: P-1895

December 8, 2017

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APPENDIX

- Site Plan
- Trip Generation Data
- Vehicle Turning Movement Count Data
- Capacity and Level of Service Calculations
- Traffic Signal Warrants Analysis Results



INTRODUCTION

Peters & Associates Engineers, Inc. conducted a traffic engineering study relating to a proposed new junior high school for Bryant Public Schools. The site is located along on the south side of Hill Farm Road, just east of Reynolds Road (Highway 183) and immediately south of the existing Hill Farm Elementary School. The Saline County Regional Airport is just northeast of the site. The school is proposed to accommodate a maximum enrollment of approximately 2,000 students in grades 8 and 9.

As a part of this study, traffic analysis has been conducted for the intersections of Reynolds Road and Hill Farm Road and Reynolds Road and Hill Road as well as the access drives along Hill Farm Road proposed to serve the junior high school and the existing access drives along Hill Farm Road and along Hill Road that currently serve Hill Farm Elementary School. Additionally, the Bryant Public Schools bus facility will be relocated from the existing high school campus to a site just east of the existing Hill Farm Elementary School and will take access via Hill Road and via Hill Farm Road. Locations of existing and proposed school access drives, parent pickup and drop-off areas and bus pick-up / drop-off areas proposed to serve the new junior high school site and new bus facility and existing elementary school and have been taken into account as traffic volume projections for the study intersections were calculated.

The City has plans to extend Bryant Parkway, that currently exists near I-30 to Highway 5, to extend south along the east edge of the airport and connect to Reynolds Road south of the proposed junior high school site.

Existing AM peak hours (7:00 – 9:00 AM) and school PM peak hours (2:30 – 4:00 PM) vehicle turning movement counts were made by this consultant for the intersection of Reynolds Road and Hill Farm Road, Reynolds Road and Hill Road, Hill Road and Hill Farm Elementary School access drive and Hill Farm Road and Hill Farm Elementary School access drive as a part of this study.



Traffic Study

Projected traffic volumes for the proposed junior high school and bus facility were calculated with input from Bryant Public Schools representatives. These projected site volumes were added to the existing AM and school PM peak hours traffic volumes, which resulted in total projected traffic volumes with maximum enrollment of 2,000 students for the proposed new junior high school and new bus facility. Additionally, traffic volumes expected to be projected by a new gas station and c-store recently constructed on the northwest corner of Reynolds Road and Hill Farm Road have also been included in the projected traffic volumes for this study.

Projected vehicle queuing capacity for pick-up and drop-off vehicles at the proposed junior high school site have also been determined as a part of this study.

In the following sections of this report there are presented traffic data, study methods, findings and recommendations of this traffic engineering investigation. The traffic engineering study is technical in nature. Certain data and calculations relative to traffic operational analysis are referenced in the report.



Traffic Study

THE SITE

The site is located along on the south side of Hill Farm Road, just east of Reynolds Road and immediately south of the existing Hill Farm Elementary School. The Saline County Regional Airport is just northeast of the site.

The proposed development site vicinity and site plan are shown on Figures 1 and 2, which follows.



Figure 1 – Vicinity Map



Traffic Study

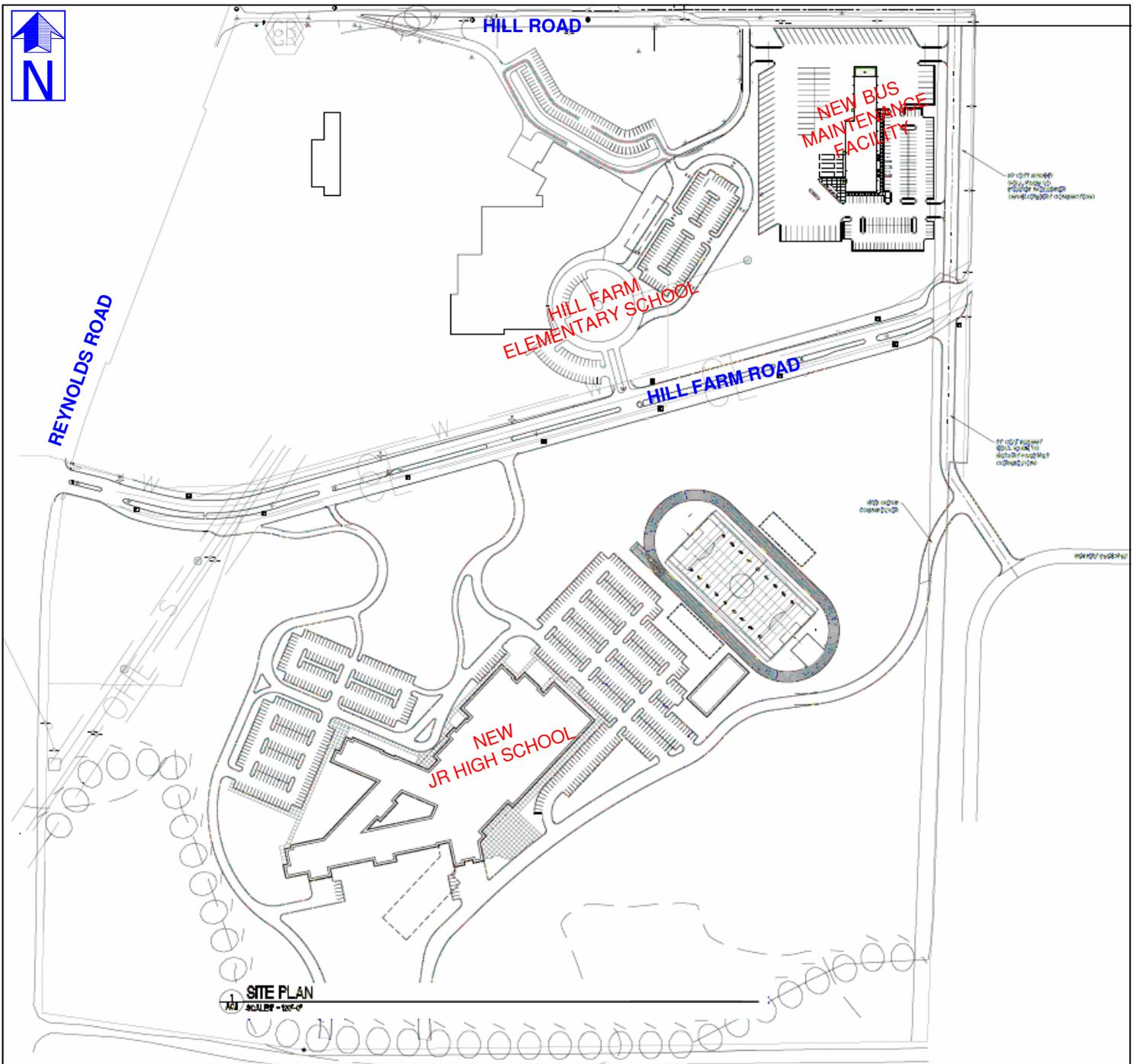


Figure 2 – Preliminary Site Plan

Traffic Study

The school is proposed to accommodate a maximum enrollment of approximately 2,000 students in grades 8 and 9. Access to the proposed junior high school site is via two parent / staff access drives (one entry only and one entry and exit) and one inbound bus access drive along Hill Farm Road and one parent / staff access drive (entry and exit) and one outbound bus access drive along the planned Bryant Parkway extension. The bus facility will have access via Hill Road and via Hill Farm Road.

Additionally, as shown on Figure 2, more internal access queuing is proposed at the existing elementary school to allow vehicles to stack on the site instead of on Hill Farm Road.

The following photos show the general layout of the study intersections of Hill Farm Road and Reynolds Road and Reynolds Road and Hill Road. Photos were taken at locations as indicated on the captions.



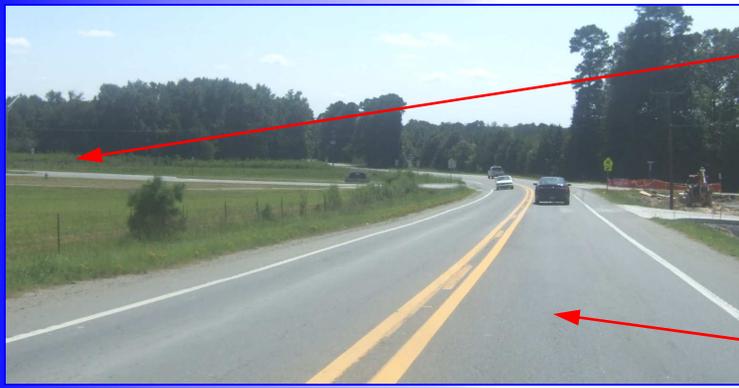
Reynolds Road and Hill Farm Road



Reynolds Road

Looking west on Hill Farm Road toward Reynolds Road.

Hill Farm Road



Site

Looking south on Reynolds Road toward Hill Farm Road.

Reynolds Road

Traffic Study

Reynolds Road and Hill Road



Looking west on Hill Road toward Reynolds Road.

Hill Road



Looking north on Reynolds Road toward Hill Road.

Reynolds Road

EXISTING TRAFFIC CONDITIONS

Hourly, 24-hour traffic counts were made at the following locations as a part of this study:

STREET	24-HOUR WKDY VOLUME	TABLE & CHART
Reynolds Road Approaches to Hill Farm Road (Two-Way)	13,956	Table 1/Chart 1
Hill Farm Road, East of Reynolds Road (Two-Way)	1,129	Table 2/Chart 2
Hill Road, East of Reynolds Road (Two-Way)	313	Table 3/Chart 3
Hill Farm Road Approaches to Reynolds Road (Two-Way)	699	Table 4/Chart 4

Hourly 24-hour traffic count data for these locations are summarized on Tables and Charts 1 thru 4 which follow.

Other traffic count data collected as a part of this study also include AM and school PM peak hour vehicle turning movement counts for the following intersections:

- ◆ Reynolds Road and Hill Farm Road.
- ◆ Reynolds Road and Hill Road.
- ◆ Hill Farm Road and Elementary School Access Drive.
- ◆ Hill Road and Elementary School Inbound Access Drive.

The existing AM and PM peak hours traffic volumes are shown on Figure 3A, "Existing Traffic Volumes - AM Peak Hour," and Figure 3B, "Existing Traffic Volumes - School PM Peak Hour," and are presented in more detail in the Appendix of this report.

Traffic Study

TIME	Reynolds Road Approaches to Hill Farm Road		
	Northbound	Southbound	NB + SB
01:00 PM	301	396	697
02:00 PM	335	534	869
03:00 PM	639	968	1607
04:00 PM	566	675	1241
05:00 PM	357	741	1098
06:00 PM	267	457	724
07:00 PM	197	367	564
08:00 PM	108	298	406
09:00 PM	66	149	215
10:00 PM	40	80	120
11:00 PM	23	53	76
12:00 AM	6	27	33
01:00 AM	7	21	28
02:00 AM	12	9	21
03:00 AM	19	7	26
04:00 AM	41	21	62
05:00 AM	214	66	280
06:00 AM	584	279	863
07:00 AM	960	597	1557
08:00 AM	439	249	688
09:00 AM	342	303	645
10:00 AM	374	322	696
11:00 AM	353	374	727
12:00 PM	317	395	712
24-Hour Total:	6568	7388	13956

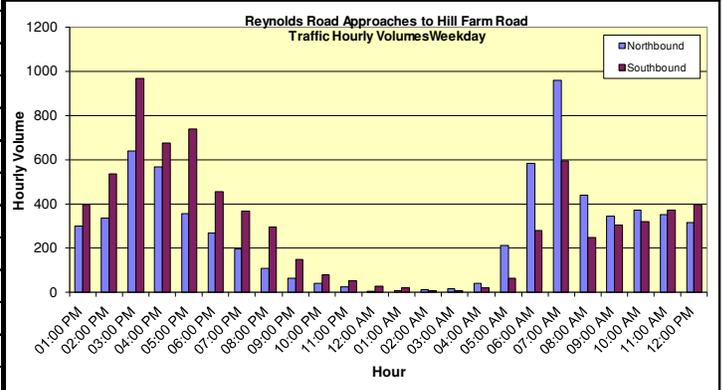


Table 1 – Chart 1 24-Hour Traffic Counts
Reynolds Road Approaches to Hill Farm Road

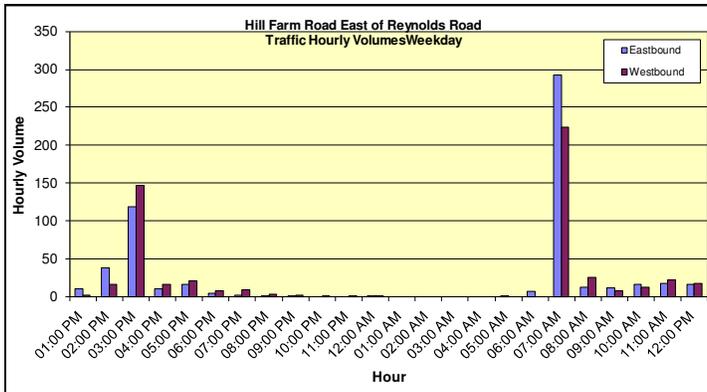
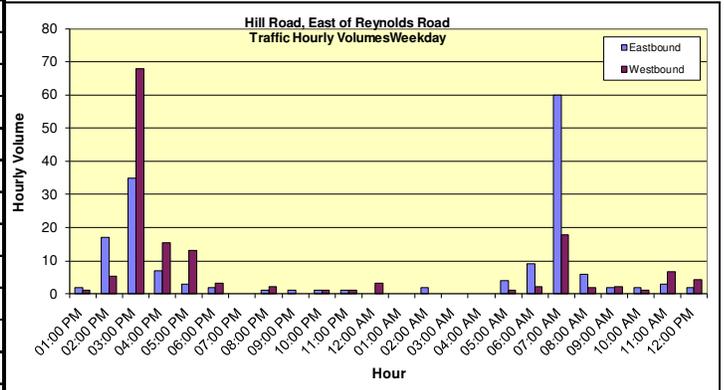


Table 2 – Chart 2 24-Hour Traffic Counts
Hill Farm Road, East of Reynolds Road

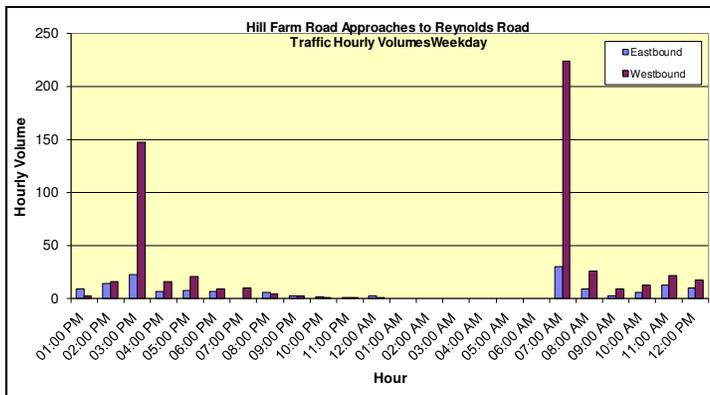
TIME	Hill Farm Road East of Reynolds Road		
	Eastbound	Westbound	EB + WB
01:00 PM	11	3	15
02:00 PM	39	16	56
03:00 PM	119	147	266
04:00 PM	11	16	27
05:00 PM	17	21	38
06:00 PM	5	9	14
07:00 PM	3	10	13
08:00 PM	1	4	5
09:00 PM	2	3	5
10:00 PM	0	1	1
11:00 PM	0	1	1
12:00 AM	1	1	2
01:00 AM	0	0	0
02:00 AM	0	0	0
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	1	0	1
06:00 AM	7	0	7
07:00 AM	292	224	516
08:00 AM	13	26	39
09:00 AM	12	9	21
10:00 AM	16	13	29
11:00 AM	18	22	40
12:00 PM	16	18	34
24-Hour Total:	584	544	1129

Traffic Study

TIME	Hill Road, East of Reynolds Road		
	Eastbound	Westbound	EB + WB
01:00 PM	2	1	4
02:00 PM	17	6	23
03:00 PM	35	68	103
04:00 PM	7	15	22
05:00 PM	3	13	16
06:00 PM	2	3	5
07:00 PM	0	0	0
08:00 PM	1	2	3
09:00 PM	1	0	1
10:00 PM	1	1	2
11:00 PM	1	1	2
12:00 AM	0	3	3
01:00 AM	0	0	0
02:00 AM	2	0	2
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	4	1	5
06:00 AM	9	2	11
07:00 AM	60	18	78
08:00 AM	6	2	8
09:00 AM	2	2	4
10:00 AM	2	1	3
11:00 AM	3	7	10
12:00 PM	2	4	6
24-Hour Total:	160	152	313



**Table 3 – Chart 3 24-Hour Traffic Counts
Farm Road, East of Reynolds Road**



**Table 4 – Chart 4 24-Hour Traffic Counts
Hill Farm Road Approaches to Reynolds Road**

TIME	Hill Farm Road Approaches to Reynolds Road		
	Eastbound	Westbound	EB + WB
01:00 PM	9	3	13
02:00 PM	14	16	31
03:00 PM	23	147	170
04:00 PM	7	16	23
05:00 PM	8	21	29
06:00 PM	7	9	16
07:00 PM	0	10	10
08:00 PM	6	4	10
09:00 PM	3	3	6
10:00 PM	2	1	3
11:00 PM	1	1	2
12:00 AM	3	1	4
01:00 AM	0	0	0
02:00 AM	0	0	0
03:00 AM	0	0	0
04:00 AM	0	0	0
05:00 AM	0	0	0
06:00 AM	0	0	0
07:00 AM	30	224	254
08:00 AM	9	26	35
09:00 AM	3	9	12
10:00 AM	6	13	19
11:00 AM	13	22	35
12:00 PM	10	18	28
24-Hour Total:	154	544	699

TRIP GENERATION and SITE TRAFFIC PROJECTIONS

The Trip Generation, an Informational Report, published by the Institute of Transportation Engineers (ITE) and The Trip Generation Manual by Trafficware, LLC (9th Edition), 2012, were reviewed in calculating the magnitude of traffic volumes expected to be generated by the proposed junior high school land-uses of this site. These are typically reliable sources for this information and are commonly used in the traffic engineering profession.

The proposed school development at this site will be public school to accommodate a maximum enrollment of 2,000 junior high school students. Additionally, from information provided by Bryant Public Schools, it is assumed that approximately forty school busses will serve students to pick-up / drop-off at the site. For comparison, trip generation for the proposed school was examined using data from the North Carolina Department of Transportation. The data base and calculations associated with NCDOT values are based on averaging traffic volume data obtained at public schools across North Carolina. This source has been proven to be an accurate representation of trip-generation for schools. Using data from that source results in projected traffic volume of 1,549 AM peak hour trips and 606 school PM peak hour trips. These are more conservative values and higher than what is calculated for this school (projected volume of 1,080 AM peak hour trips and 320 school PM peak hour trips) using The Trip Generation, an Informational Report, published by the Institute of Transportation Engineers (ITE) and The Trip Generation Manual by Trafficware, LLC (9th Edition), 2012. The higher and more conservative volumes calculated using the NCDOT data are the volumes used in this study.

Results of the NCDOT calculations are summarized on Table 5, "Summary of Trip Generation."

Traffic Study

PROPOSED LAND USE	APPROXIMATE SIZE	ITE CODE	24-HOUR TWO-WAY WEEKDAY VOLUME	AM PEAK HOUR VOLUME		SCHOOL PM PEAK HOUR VOLUME	
				ENTER	EXIT	ENTER	EXIT
Junior High School	2,000 Students	*522	3,240	857	692	283	323
TOTAL ENTERING + EXITING				1,549		606	

**Volumes derived from NCDOT calculations. These were compared to ITE calculations and were found to be higher.*

Table 5 – Summary of Trip-Generation

The new bus facility is expected to accommodate approximately 80-90 busses and will have access via Hill Road and via Hill Farm Road and a connection to the future Bryant Parkway extension through the new junior high site. Volumes associated with these busses are included in the projected volumes as a part of this study.

School traffic, as will be the traffic associated with this site, ordinarily does contribute to the adjacent street traffic conditions during the on-street AM peak traffic hour and the school PM peak traffic hour. Accordingly, the AM and school PM peak traffic periods of the adjacent street in the immediate vicinity of the site are the traffic operating conditions which have warranted primary traffic analysis as a part of this study.

TRAFFIC VOLUME ASSIGNMENTS

Once projected traffic was estimated for the site, directional distributions were made to reflect the percent of anticipated left-turns, right-turns and thru vehicle movements at the study intersections with the completion of the Bryant Parkway extension assumed. Vehicle trip distribution was developed based on current traffic counts, Bryant Public Schools zoning map and expected travel patterns to and from the site. Directional distribution percentages used in this study are shown on Figure 4, "Directional Distribution - Site Traffic."



Traffic Study



Figure 4
Directional Distribution
Parent / Staff Site Traffic

Traffic Study

The directional distribution percentages for site traffic have been equated to percentage turns for each movement at the study intersections. The site-generated traffic volumes result from applying the directional distribution percentages to the corresponding projected site-generated traffic volumes summarized on Table 5, "Summary of Trip-Generation."

Projected traffic volumes for the proposed junior high school and bus facility were calculated with input from Bryant Public Schools representatives. These projected site volumes were added to the existing AM and school PM peak hours traffic volumes, which resulted in total projected traffic volumes with maximum enrollment of 2,000 students for the proposed new junior high school and new bus facility. Additionally, traffic volumes expected to be projected by a new gas station and c-store recently constructed located on the northwest corner of Reynolds Road and Hill Farm Road have also been included in the projected traffic volumes included in this study. The peak hour projected traffic volumes results are depicted on Figure 5A, "Projected Traffic Volumes - AM Peak Hour," and Figure 5B, "Projected Traffic Volumes - School PM Peak Hour."

Traffic volumes shown on Figures 3A, 3B, 5A and 5B are the values used in capacity and level of service calculations conducted as a part of this study. The effect of existing background traffic (i.e. the adjacent street non-site traffic which exists), other known development, future Bryant Parkway extension and projected traffic associated with the maximum enrollment of the junior high school site development and new bus maintenance facility has thus been accounted for in this analysis.



Traffic Study

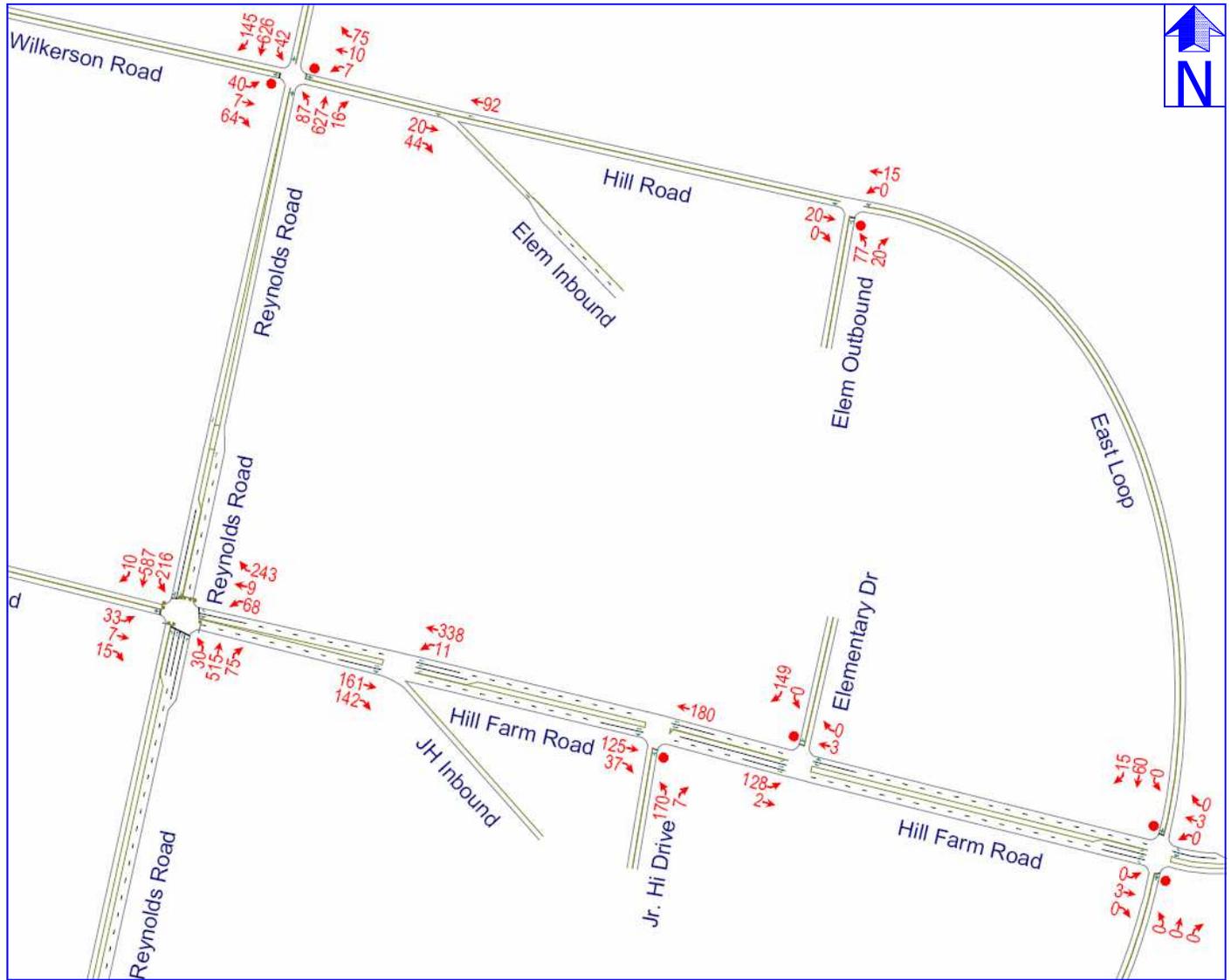


Figure 5B
Projected Traffic Volumes - School PM Peak Hour

CAPACITY and LEVEL OF SERVICE

Generally, the "capacity" of a street is a measure of its ability to accommodate a certain magnitude of moving vehicles. It is a rate as opposed to a quantity, measured in terms of vehicles per hour. More specifically, street capacity refers to the maximum number of vehicles that a street element (e.g. an intersection) can be expected to accommodate in a given time period under the prevailing roadway and traffic conditions.

Traffic operational analysis for the study intersection were evaluated based on the methodologies outlined in the Highway Capacity Manual, 2010 Edition, published by the Transportation Research Board. The operating conditions at an intersection are graded by the "level of service" experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from "A" to "F". LOS "A" represents the most desirable condition with free-flow movement of traffic with minimal delays. LOS "F" generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Delay is measured in seconds per vehicle. The table below shows the upper limit of delay associated with each level of service for signalized and un-signalized intersections.

Intersection Level of Service Delay Thresholds

Level of Service

(LOS)	Signalized	Un-Signalized
A	< 10 Seconds	< 10 Seconds
B	< 20 Seconds	< 15 Seconds
C	< 35 Seconds	< 25 Seconds
D	< 55 Seconds	< 35 Seconds
E	< 80 Seconds	< 50 Seconds
F	≥ 80 Seconds	≥ 50 Seconds

Traffic Study

The LOS rating deemed acceptable varies by community, facility type and traffic control device. A LOS "D" or better is the desirable goal for movements at un-signalized intersections that must yield to other movements; however, a LOS "E" or "F" is often accepted for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection or the location is deemed undesirable for signalization for other reasons. Study intersections were evaluated using the Synchro analysis software package based on Highway Capacity Manual methods. This computer program has been proven to be reliable when used to analyze capacity and levels of traffic service under various operating conditions. Detailed results for all capacity calculations are included in the Appendix. The adjacent street weekday AM and school PM peak traffic periods were used for these calculations. Factors included in the analysis are as follows:

- Existing traffic volumes and patterns.
- The expected directional distribution of projected traffic volumes.
- Existing and proposed intersection geometry (including elements such as turn lanes, curb radii, etc.).
- Existing traffic volumes with background traffic growth and projected site-generated volumes for projected traffic conditions.
- Existing and proposed traffic control.



CAPACITY ANALYSIS

Level of Service Analysis Results

Existing Traffic Conditions

Capacity and level of service analysis was performed for existing traffic volumes, lane geometry and traffic control for the AM and school PM peak hours for the following study intersections:

- ◆ Reynolds Road and Hill Farm Road.
- ◆ Reynolds Road and Hill Road / Wilkerson Road.
- ◆ Hill Farm Road and Elementary School Access Drive.
- ◆ Hill Road and Elementary School Inbound Access Drive.

As indicated in Table 6, "Level of Service Summary – Existing Traffic Conditions," all vehicle movements currently operate at what calculates as an acceptable LOS "D" or better for existing traffic conditions at the study intersections for the AM and school PM peak hours except for the eastbound and westbound approaches on Hill Farm Road and on Hill Road / Wilkerson Road to Reynolds Road during the AM and School PM peak hour (LOS "F").

Traffic volumes used for this analysis are shown on Figure 3A, "Existing Traffic Volumes - AM Peak Hour," and Figure 3B, "Existing Traffic Volumes - School PM Peak Hour."

EXISTING TRAFFIC CONDITIONS		Traffic Control	Eastbound Left-Turn	Eastbound Thru	Eastbound Right-Turn	Westbound Left-Turn	Westbound Thru	Westbound Right-Turn	Northbound Left-Turn	Northbound Thru	Northbound Right-Turn	Southbound Left-Turn	Southbound Thru	Southbound Right-Turn	Overall Intersection	Avg. Control Delay Seconds / Vehicle
INTERSECTION	PEAK HR		PEAK HOUR - LEVEL OF SERVICE													
Reynolds Road and Hill Road / Wilkerson Road	AM	"STOP" SIGN	F			C			A			A			n/a	57.9
	School PM		F			F			B			A			n/a	21.0
Reynolds Road and Hill Farm Road	AM	"STOP" SIGN	F			F	D	A			B			n/a	100.5	
	School PM		F			F	C	A			A			n/a	18.3	
Hill Road and Elementary School Inbound Drive	AM	"STOP" SIGN		A		A									n/a	0.0
	School PM			A		A									n/a	0.0
Hill Road and Elementary School Outbound Drive	AM	"STOP" SIGN		A	A			A		A					n/a	0.0
	School PM			A	A			A		A					n/a	0.0
Hill Farm Road and Elementary School Drive	AM	"STOP" SIGN	A	A			A					A		A	n/a	8.7
	School PM		A	A			A					B		B	n/a	5.5

Table 6 - Level of Service Summary - Existing Traffic Conditions

Projected Traffic Conditions

Capacity and LOS analysis was performed for projected full build-out traffic conditions to include the proposed maximum approximate 2,000 student junior high school, new bus maintenance facility, plus traffic expected to be associated with the new c-store gas station (recently constructed) and the future Bryant Parkway extension for the AM and school PM peak hours for the following intersections:

- ◆ Reynolds Road and Hill Farm Road.
- ◆ Reynolds Road and Hill Road / Wilkerson Road.
- ◆ Hill Road and Elementary School Inbound Drive.
- ◆ Hill Road and Elementary School Outbound Drive.
- ◆ Hill Farm Road and Elementary School Access Drive.
- ◆ Hill Farm Road and Junior High School Inbound Drive.
- ◆ Hill Farm Road and Junior High School Access Drive.
- ◆ Hill Farm Road and East Loop (serving bus maintenance facility).

Traffic volumes used for these projected traffic conditions are shown on Figure 5A, "Projected Traffic Volumes - AM Peak Hour," and Figure 5B, "Projected Traffic Volumes - School PM Peak Hour." The operating conditions projected to exist at the study intersections are summarized in Table 7, "Level of Service Summary - Projected Traffic Conditions."



PROJECTED TRAFFIC CONDITIONS		PEAK HOUR - LEVEL OF SERVICE														Overall Intersection	Avg. Control Delay Seconds / Vehicle																
		INTERSECTION		PEAK HR		Eastbound		Left-Turn		Right-Turn		Westbound		Thru				Westbound		Right-Turn		Thru		Northbound		Left-Turn		Southbound		Thru		Southbound	
		Traffic Control		Eastbound	Left-Turn	Eastbound	Thru	Eastbound	Right-Turn	Westbound	Left-Turn	Westbound	Thru	Westbound	Right-Turn	Northbound	Left-Turn	Northbound	Thru	Northbound	Right-Turn	Southbound	Left-Turn	Southbound	Thru	Southbound	Right-Turn	Overall					
Reynolds Road and Hill Road / Wilkerson Road	AM	"STOP" SIGN	F	F	F	F	F	F	F	F	F	F	F	F	F	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n/a	1308.5
	School PM	"STOP" SIGN	F	F	F	F	F	F	F	F	F	F	F	F	F	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n/a	72.4
Reynolds Road and Hill Farm Road	AM	"STOP" SIGN	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	n/a	24.9
	School PM	"STOP" SIGN	D	D	D	D	D	D	D	D	D	D	D	D	D	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n/a	1.7
	AM	W/ SIGNAL & MITIGATION	C	C	C	C	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	D	51.3
	School PM	MITIGATION	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
Hill Road and Elementary School Inbound Drive	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	0.0
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	0.0
Hill Road and Elementary School Outbound Drive	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	4.5
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	6.7
Hill Farm Road and Elementary School Drive	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	8.9
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	8.2
Hill Farm Road and Jr High Entry	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	0.0
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	0.0
Hill Farm Road and Jr High Drive	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	n/a	14.0
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	n/a	4.0
Hill Farm Road and East Loop	AM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	8.7
	School PM	"STOP" SIGN	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	n/a	8.6

Table 7 - Level of Service Summary - Projected Traffic Conditions

Traffic Study

As indicated in Table 7, with traffic signal control and additional lanes, as shown on Figure 6 on this page, at the intersection of Reynolds Road and Hill Farm Road and with "Stop" sign control at the other study intersections, all vehicle movements are expected to operate at what calculates as an acceptable LOS "D" or better at the study intersections for the AM and school PM peak hours except for the following:

- The eastbound and westbound vehicle movements on Hill Drive / Wilkerson Road approaches to Reynolds Road during the AM peak hour and school PM peak hours. This condition already occurs with existing condition and the delay is caused by the much higher volumes on Reynolds Road.
- The westbound thru/left-turn, northbound thru and southbound left-turn vehicle movements on Hill Farm Road at Reynolds Road during the AM peak hour (LOS "E"). However, the overall intersection is expected to operate at an acceptable level with a significant reduction in delay and vehicle queuing with the installation of a traffic signal and additional lanes.
- The northbound exiting vehicle movements on the Junior High Drive approaches to Hill Farm Road during the AM peak hour (LOS "E"). The delay is expected for a short time only during the AM peak hour and will not impede thru traffic volumes on Hill Farm Road.

Figure 6
Proposed Schematic Lane Geometry
Reynolds Road and Hill Farm Road



TRAFFIC SIGNAL WARRANTS ANALYSIS

In evaluating the need for a traffic signal, certain established warrants are examined by investigating traffic conditions and physical characteristics of the location. The decision to install a traffic signal at a particular location is evaluated quantitatively relative to these warrants. Satisfaction of conditions for only one of the warrants, as specified, is required for signalization. These warrants, as specified in the Manual on Uniform Traffic Control Devices (MUTCD), are described in detail in the appendix of this report. They are summarized as follows:

- ◆ **Warrant One: Eight-Hour Vehicular Volume**
- ◆ **Warrant Two: Four-Hour Vehicular Volume**
- ◆ **Warrant Three: Peak Hour**
- ◆ **Warrant Four: Pedestrian Volume**
- ◆ **Warrant Five: School Crossing**
- ◆ **Warrant Six: Coordinated Signal System**
- ◆ **Warrant Seven: Crash Experience**
- ◆ **Warrant Eight: Roadway Network**

SIGNAL WARRANTS RESULTS

Traffic signal warrants analysis was made for projected traffic volumes for the intersection of Reynolds Road and Hill Farm Road.

As stated in MUTCD Section 4C.01, Studies Factors for Justifying Traffic Control Signals, the study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants. As a part of the traffic signal warrants analysis for this intersection included in this study, 50 percent of the eastbound and westbound right-turns on Hill Farm Road approached to Reynolds Road have been factored out for analysis of projected traffic conditions.



It was found that traffic signal warrants are projected to be met for the intersection of Reynolds Road and Hill Farm Road with the projected traffic volumes. Traffic signal warrants analysis for this intersection indicates projected volumes are expected to be sufficient to satisfy Warrant 3 (peak hour warrant) and only one hour short of satisfying Warrant 3 (peak hour warrant). The traffic signal warrants analysis results for this intersection for projected conditions are summarized in Table 8, "Traffic Signal Warrants Results - Reynolds Road and Hill Farm Road – Projected Traffic Conditions."

FINAL RESULTS:		Traffic Signal Warrants Analysis							
Projected Conditions		Hour warrant was met:							
W/ 50% RTs Fact. Out									
Major St.: Reynolds Road		VOLUME		COMB.		4 Hr.		Peak	
Minor St.: Hill Farm Road		600	900	480	720				
		150	75	120	60				
HOUR	SUM MAJOR	MAX. MINOR	1A	1B	1AB	2	3		
7:00	2059	190	1	1	1 1 1	1	1	1	
8:00	785	30	0	0	0 0 0	0	0	0	
9:00	712	19	0	0	0 0 0	0	0	0	
10:00	779	25	0	0	0 0 0	0	0	0	
11:00	825	31	0	0	0 0 0	0	0	0	
12:00	824	37	0	0	0 0 0	0	0	0	
13:00	835	44	0	0	0 0 0	0	0	0	
14:00	1048	70	0	0	0 0 1	0	0	0	
15:00	2007	191	1	1	1 1 1	1	1	1	
16:00	1391	80	0	1	0 0 1	1	1	0	
17:00	1225	57	0	0	0 0 0	0	0	0	
18:00	847	46	0	0	0 0 0	0	0	0	
19:00	676	36	0	0	0 0 0	0	0	0	
20:00	488	27	0	0	0 0 0	0	0	0	
21:00	267	15	0	0	0 0 0	0	0	0	
			2	3	2	3	2		

Table 8
Traffic Signal Warrants Results
Reynolds Road and Hill Farm Road
Projected Traffic Conditions

This intersection SATISFIES the warrants for signalization as outlined in the "M.U.T.C.D."

AVAILABLE VEHICLE QUEUING

Proposed school vehicular access routes and on-site available vehicle queuing distance for the new junior high school are shown on Figure A, "Access and Available On-Site Queuing for Parent Routes." Calculations have been made to verify the adequacy of the proposed vehicle queuing to be available on-site as to not queue vehicles on the adjacent Hill Farm Road during the AM and School PM peak hours. The adequacy of the planned pick-up and drop-off areas has been verified by using an analysis tool produced and used in North Carolina. The analysis tool is entitled:

*Municipal and School Transportation Assistance
Traffic Management Unit
Transportation Mobility and Safety
Division of Highways
North Carolina Department of Transportation.*

The calculation is for the school type referred to as "Typical Public with Busses." The Typical Public with Busses data is based on 2,000 students and 40 buses serving this site. The results from the analysis tool is shown on the following page. The calculated vehicle queue length based on this tool is 3,334 linear feet.

Figure A, "Access and Available On-Site Queuing for Parent Routes," lists available on-site vehicle queuing distance that is proposed as a part of the site development. As depicted, there is expected to be approximately 3,830 linear feet of available on-site vehicle queuing without stacking onto Hill Farm Road. This is more than the calculated vehicle queue length needed based on the NCDOT tool of 3,334 linear feet. It is expected that the planned school vehicle queuing will likely not queue beyond the proposed available storage within the site.

Traffic Study

Type School	Student Population	Number of Buses	Staff Members	PM Total Vehicles	PM Peak Vehicles	Calculated Queue Length	Total AM Trips	Total PM Trips
Jr High	2000	40	125	283	147	3334	1549	606

Calculated Vehicle Queuing and Vehicle Trips
 Source: North Carolina Department of Transportation

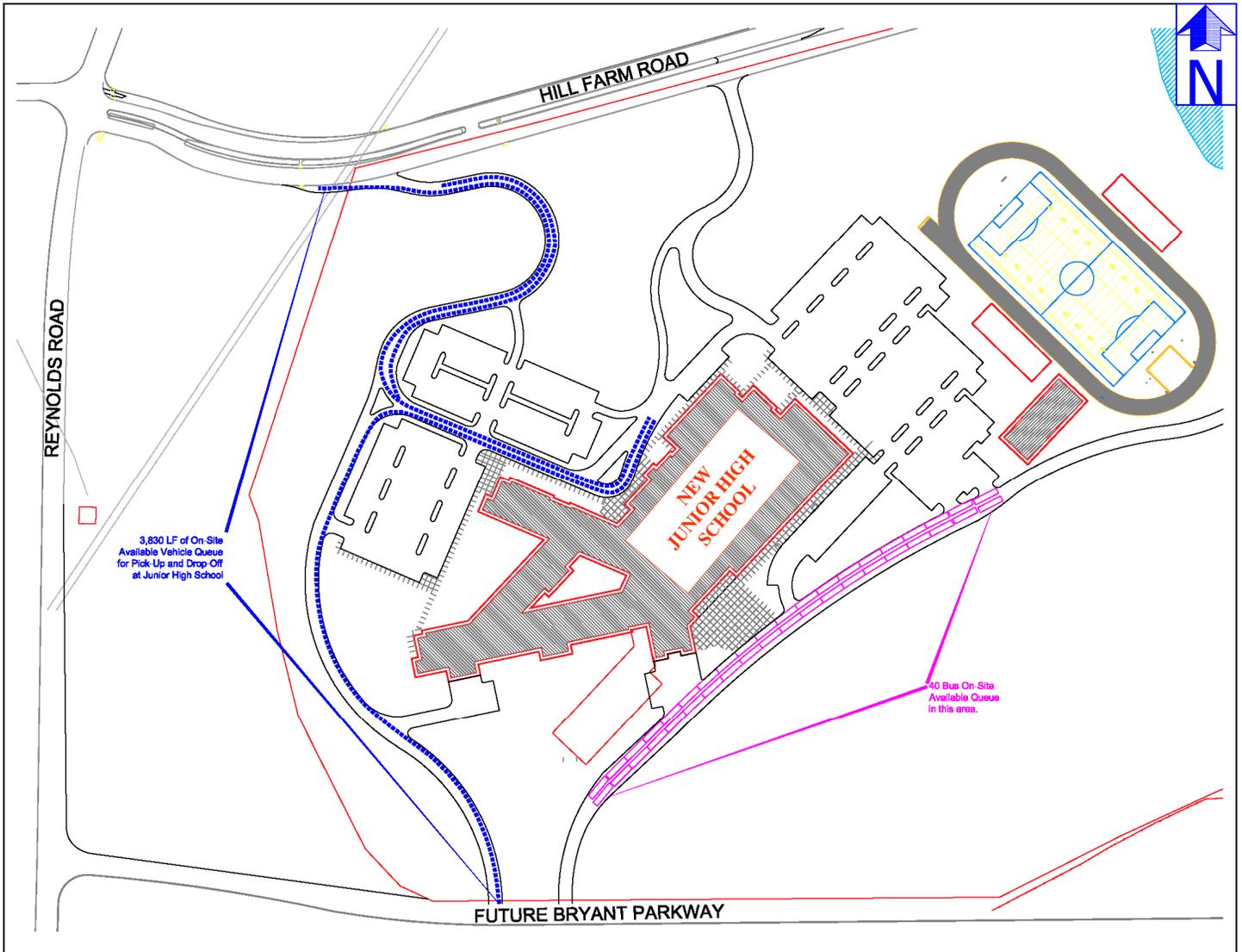


Figure A
 Access and Available On-Site Vehicle Queuing
 for Parent Routes

Traffic Study

Additionally, as shown on Figure B below, more internal access queuing is proposed at the existing elementary school to allow vehicles to stack on the site instead of on Hill Farm Road.

Figure B, "Additional On-Site Vehicle Queuing for Parent Routes - Hill Farm Elementary School," lists additional on-site vehicle queuing distance that is planned to be constructed. As depicted, there will be approximately 1,890 additional linear feet of on-site vehicle queuing. This is more than the approximate 1,080 linear feet of vehicle queuing that is currently stacking on Hill Farm Road. It is expected that the school vehicle queuing will likely not queue beyond the proposed available storage within the elementary school site with this additional stacking distance.

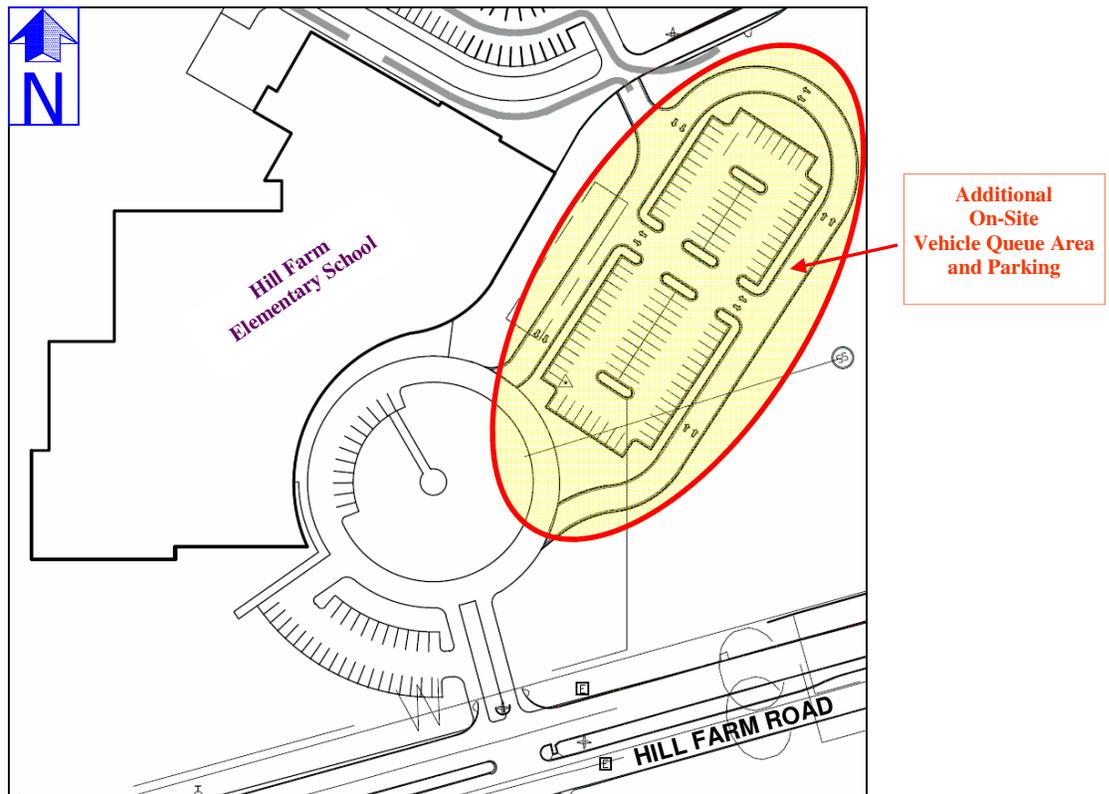


Figure B
Additional On-Site Vehicle Queuing
for Parent Routes - Hill Farm Elementary School

FINDINGS and RECOMMENDATIONS

Findings of this study are summarized as follows:

- Approximately 1,549 vehicle trips (combined in and out) are projected to be generated by the approximate 2,000 student junior high school development as proposed during the AM peak hour and approximately 606 vehicle trips are estimated during the traffic conditions of the school PM peak hour.
- Capacity and level of service analysis was performed for existing traffic volumes, lane geometry and traffic control for the AM and school PM peak hours for the study intersections. Currently, all vehicle movements currently operate at what calculates as an acceptable LOS "D" or better for existing traffic conditions at the study intersections for the AM and school PM peak hours except for the eastbound and westbound approaches on Hill Farm Road and on Hill Road / Wilkerson Road to Reynolds Road during the AM and School PM peak hour (LOS "F").
- Capacity and LOS analysis was performed for projected full build-out traffic conditions to include the proposed maximum approximate 2,000 student junior high school, new bus maintenance facility, plus traffic expected to be associated with the new c-store gas station (recently constructed) and the future Bryant Parkway extension for the AM and school PM peak hours for the study intersections. With traffic signal control and additional lanes, as shown on Figure 6 on this page, at the intersection of Reynolds Road and Hill Farm Road and with "Stop" sign control at the other study intersections, all vehicle movements are expected to operate at what calculates as an acceptable LOS "D" or better at the study intersections for the AM and school PM peak hours except for the following:
 - The eastbound and westbound vehicle movements on Hill Drive / Wilkerson Road approaches to Reynolds Road during the AM peak hour and school PM



- peak hours. This condition already occurs with existing condition and the delay is caused by the much higher volumes on Reynolds Road.
- o The westbound thru/left-turn, northbound thru and southbound left-turn vehicle movements on Hill Farm Road at Reynolds Road during the AM peak hour (LOS "E"). However, the overall intersection is expected to operate at an acceptable level with a significant reduction in delay and vehicle queuing with the installation of a traffic signal and additional lanes.
 - o The northbound exiting vehicle movements on the Junior High Drive approaches to Hill Farm Road during the AM peak hour (LOS "E"). The delay is expected for a short time only during the AM peak hour and will not impede thru traffic volumes on Hill Farm Road.
- It was found that traffic signal warrants are projected to be met for the intersection of Reynolds Road and Hill Farm Road with the projected traffic volumes to include the planned junior high school and the c-store and gas station recently constructed at this intersection. Traffic signal warrants analysis for this intersection indicates projected volumes are expected to be sufficient to satisfy Warrant 3 (peak hour warrant) and only one hour short of satisfying Warrant 3 (peak hour warrant).
 - There is expected to be approximately 3,830 linear feet of available on-site vehicle queuing without stacking onto Hill Farm Road. This is more than the calculated vehicle queue length needed of 3,334 linear feet. It is expected that the planned school vehicle queuing will likely not queue beyond the proposed available storage within the site.

Recommendations of this study are summarized as follows:

- It is recommended that Reynolds Road northbound approach to Hill Farm Road be widened to accommodate the addition of a right-turn lane, a left-turn lane and an additional thru lane. It is also recommended that Reynolds Road southbound approach to Hill Farm Road be widened to accommodate the addition of a left-turn lane.
- It is recommended that a fully-actuated traffic signal be installed at the intersection of Reynolds Road and Hill Farm Road. This traffic signal could also include the addition of provisions for pedestrians at this intersection.
- It is recommended that a median cut to include a westbound left-turn lane be constructed on Hill Farm Road at the new junior high school entry drive.
- Intersection improvements and traffic signal design for Reynolds Road and Hill Farm Road must conform to design standards of ARDOT and the City of Bryant and will require approval by ARDOT and the City.
- New driveway intersections along Hill Farm Road, Hill Road and Bryant Parkway must conform to design standards of the City of Bryant and will require approval by the City.



APPENDIX



PETERS & ASSOCIATES
ENGINEERS, INC.

Site Plan



PETERS & ASSOCIATES
ENGINEERS, INC.

Trip-Generation Data



PETERS & ASSOCIATES
ENGINEERS, INC.

Bryant Public Schools
Planned New Junior High School
Bryant, Arkansas

P1895

PROPOSED LAND USE	APPROXIMATE SIZE	ITE CODE	24-HOUR TWO-WAY WEEKDAY VOLUME	AM PEAK HOUR VOLUME		SCHOOL PM PEAK HOUR VOLUME	
				ENTER	EXIT	ENTER	EXIT
<i>Junior High School</i>	<i>2,000 Students</i>	<i>*522</i>	<i>3,240</i>	<i>857</i>	<i>692</i>	<i>283</i>	<i>323</i>
TOTAL ENTERING + EXITING				1,549		606	

*Volumes derived from NCDOT calculations. These were compared to ITE calculations and were found to be higher.

Trip Generation Summary - Bryant Jr High School

Project: Bryant Jr High School
 Alternative: Bryant Jr High School

Open Date: 11/1/2017
 Analysis Date: 11/1/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
522	SCHOOLMID 1 2000 Students	1620	1620	3240	594	486	1080	157	163	320
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Trip Generation Summary - New C Store

Project: New C Store
 Alternative: New C Store

Open Date: 10/18/2017
 Analysis Date: 10/18/2017

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
945	GASMARKET 1	1140	1139	2279	71	71	142	95	94	189
	14 Vehicle Fueling Positions									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	44	44	88	53	53	106
Volume Added to Adjacent Streets		0	0	0	-44	-44	-88	-53	-53	-106

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent



PETERS & ASSOCIATES
ENGINEERS, INC.

Vehicle Turning Movement Count Data

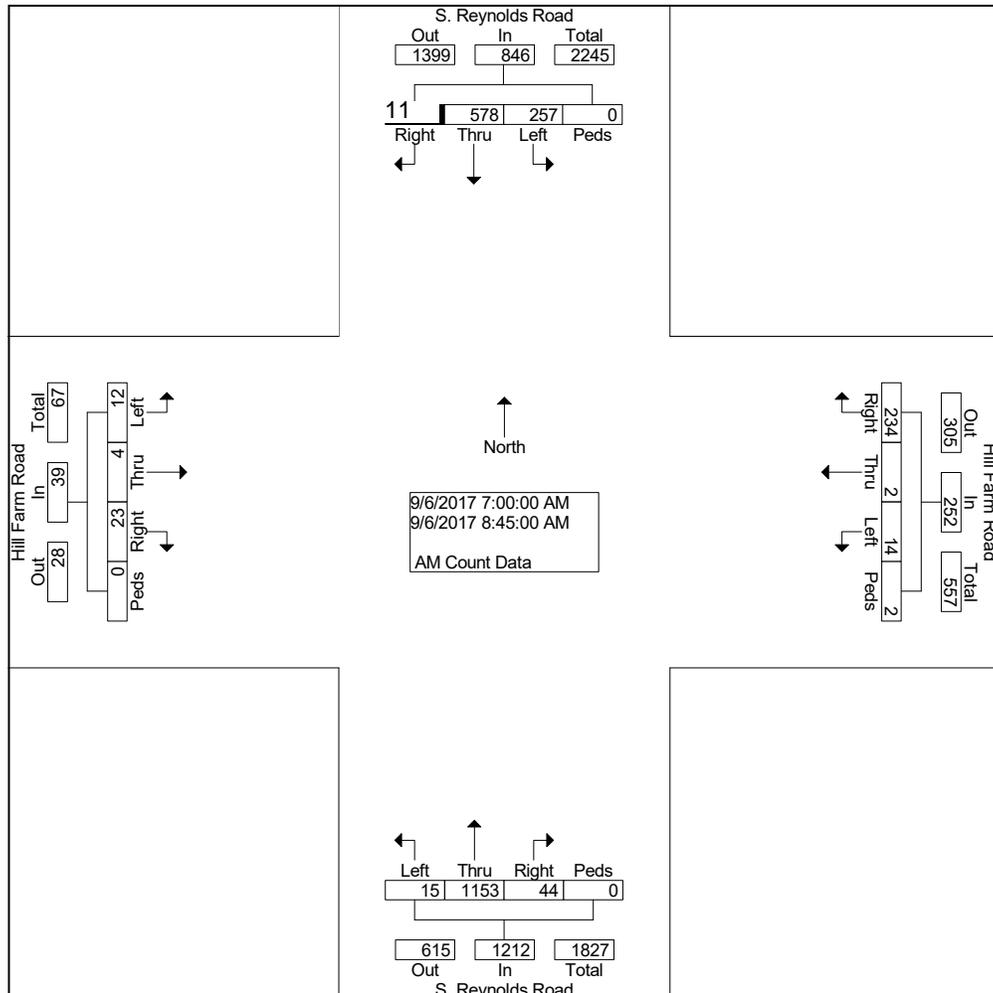
Peters & Associates Engineers, Inc.
Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
S. Reynolds Road & Hill Farm Road
Bryant, Arkansas
P-1895

File Name : AM-HF
Site Code : 00000000
Start Date : 09/06/2017
Page No : 1

Groups Printed- AM Count Data

Start Time	S. Reynolds Road From North					Hill Farm Road From East					S. Reynolds Road From South					Hill Farm Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	1	77	20	0	98	0	0	0	0	0	1	170	0	0	171	3	0	0	0	3	272
07:15 AM	2	96	69	0	167	48	0	3	0	51	10	194	8	0	212	8	1	3	0	12	442
07:30 AM	3	89	76	0	168	78	0	7	2	87	15	176	2	0	193	11	0	0	0	11	459
07:45 AM	3	78	83	0	164	86	2	0	0	88	15	204	4	0	223	1	2	1	0	4	479
Total	9	340	248	0	597	212	2	10	2	226	41	744	14	0	799	23	3	4	0	30	1652
08:00 AM	1	66	3	0	70	14	0	2	0	16	0	129	0	0	129	0	1	2	0	3	218
08:15 AM	1	63	1	0	65	2	0	0	0	2	1	111	0	0	112	0	0	3	0	3	182
08:30 AM	0	61	2	0	63	4	0	1	0	5	1	90	0	0	91	0	0	1	0	1	160
08:45 AM	0	48	3	0	51	2	0	1	0	3	1	79	1	0	81	0	0	2	0	2	137
Total	2	238	9	0	249	22	0	4	0	26	3	409	1	0	413	0	1	8	0	9	697
Grand Total	11	578	257	0	846	234	2	14	2	252	44	1153	15	0	1212	23	4	12	0	39	2349
Apprch %	1.3	68.3	30.4	0.0		92.9	0.8	5.6	0.8		3.6	95.1	1.2	0.0		59.0	10.3	30.8	0.0		
Total %	0.5	24.6	10.9	0.0	36.0	10.0	0.1	0.6	0.1	10.7	1.9	49.1	0.6	0.0	51.6	1.0	0.2	0.5	0.0	1.7	

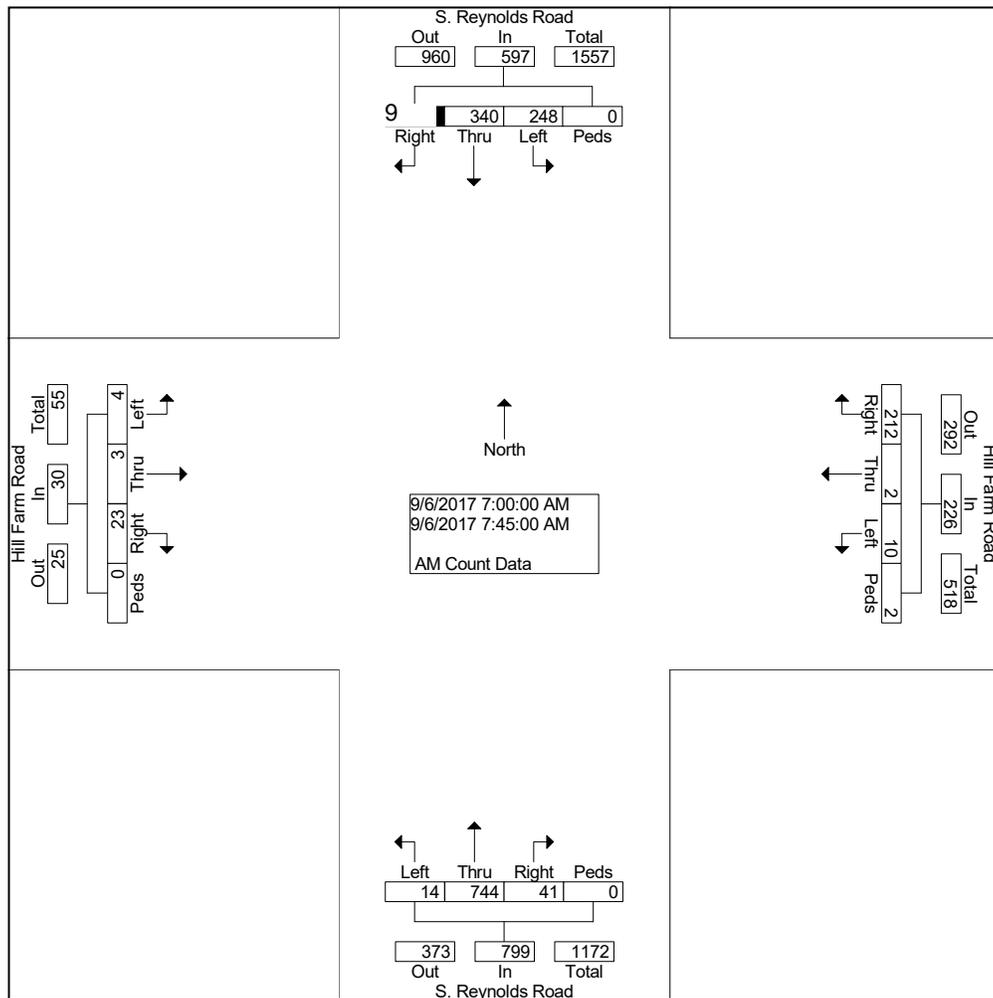


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
 S. Reynolds Road & Hill Farm Road
 Bryant, Arkansas
 P-1895

File Name : AM-HF
 Site Code : 00000000
 Start Date : 09/06/2017
 Page No : 2

Start Time	S. Reynolds Road From North					Hill Farm Road From East					S. Reynolds Road From South					Hill Farm Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	9	340	248	0	597	212	2	10	2	226	41	744	14	0	799	23	3	4	0	30	1652
Percent	1.5	57.0	41.5	0.0		93.8	0.9	4.4	0.9		5.1	93.1	1.8	0.0		76.7	10.0	13.3	0.0		
07:45 Volume	3	78	83	0	164	86	2	0	0	88	15	204	4	0	223	1	2	1	0	4	479
Peak Factor	0.862																				
High Int. Volume	07:30 AM					07:45 AM					07:45 AM					07:15 AM					
Peak Factor	3	89	76	0	168	86	2	0	0	88	15	204	4	0	223	8	1	3	0	12	5
	0.88					0.64					0.89					0.62					
	8					2					6					5					



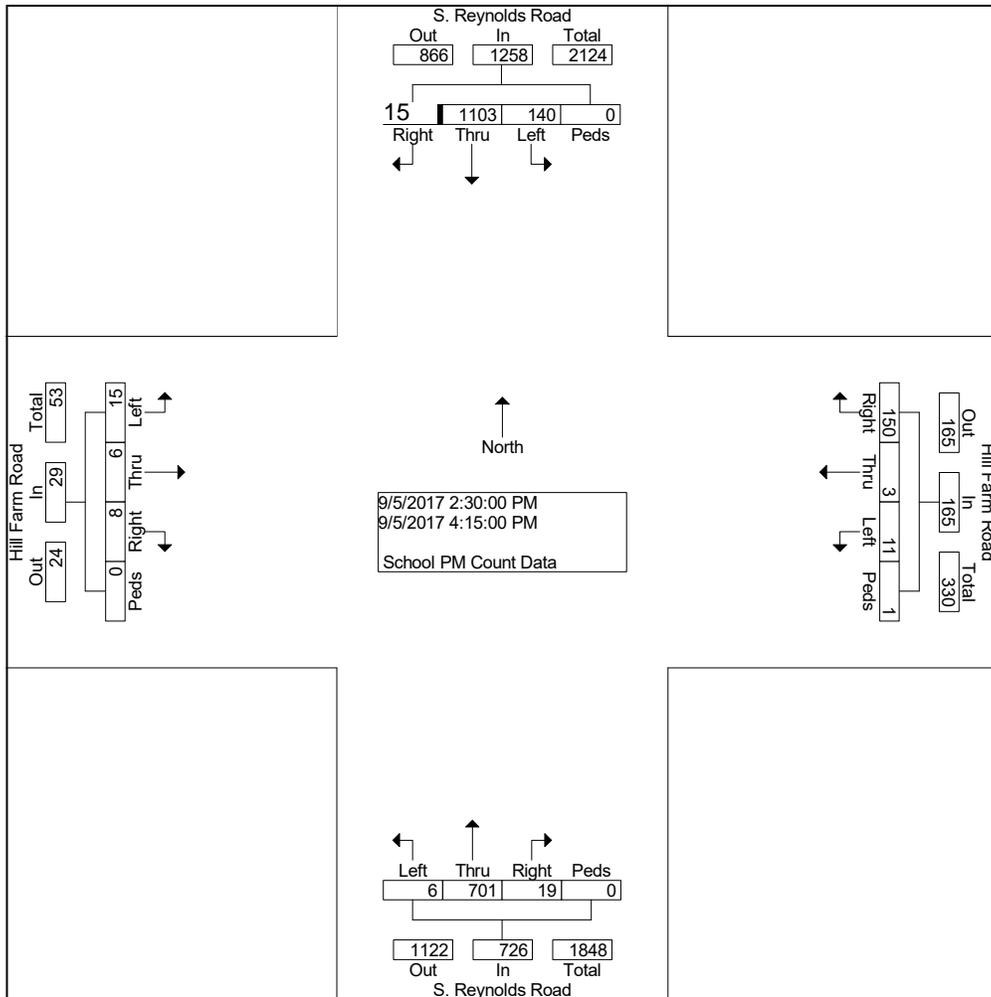
Peters & Associates Engineers, Inc.
Peak Hours Turning Movement Count Data

School PM Turning Movement Count Data
S. Reynolds Road & Hill Farm Road
Bryant, Arkansas
P-1895

File Name : PM-HF
Site Code : 00000000
Start Date : 09/05/2017
Page No : 1

Groups Printed- School PM Count Data

Start Time	S. Reynolds Road From North					Hill Farm Road From East					S. Reynolds Road From South					Hill Farm Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:30 PM	1	95	8	0	104	2	0	1	1	4	1	54	1	0	56	0	0	1	0	1	165
02:45 PM	1	125	24	0	150	4	0	0	0	4	7	58	0	0	65	0	2	1	0	3	222
Total	2	220	32	0	254	6	0	1	1	8	8	112	1	0	121	0	2	2	0	4	387
03:00 PM	0	146	27	0	173	7	0	0	0	7	2	94	0	0	96	3	2	3	0	8	284
03:15 PM	5	129	41	0	175	1	0	1	0	2	1	117	1	0	119	0	1	1	0	2	298
03:30 PM	4	130	31	0	165	113	3	7	0	123	7	114	4	0	125	1	0	5	0	6	419
03:45 PM	0	156	6	0	162	13	0	2	0	15	0	96	0	0	96	4	1	2	0	7	280
Total	9	561	105	0	675	134	3	10	0	147	10	421	5	0	436	8	4	11	0	23	1281
04:00 PM	2	146	1	0	149	3	0	0	0	3	0	85	0	0	85	0	0	2	0	2	239
04:15 PM	2	176	2	0	180	7	0	0	0	7	1	83	0	0	84	0	0	0	0	0	271
Grand Total	15	1103	140	0	1258	150	3	11	1	165	19	701	6	0	726	8	6	15	0	29	2178
Apprch %	1.2	87.7	11.1	0.0		90.9	1.8	6.7	0.6		2.6	96.6	0.8	0.0		27.6	20.7	51.7	0.0		
Total %	0.7	50.6	6.4	0.0	57.8	6.9	0.1	0.5	0.0	7.6	0.9	32.2	0.3	0.0	33.3	0.4	0.3	0.7	0.0	1.3	

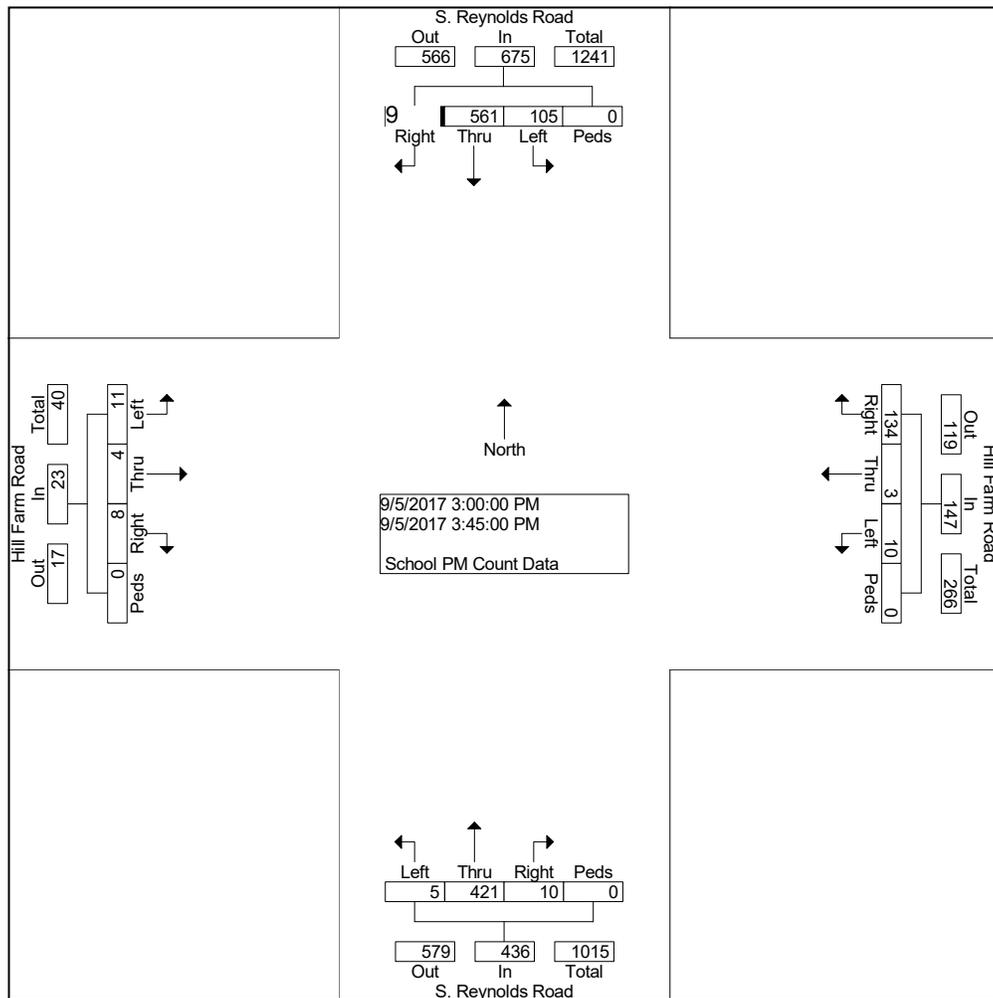


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

School PM Turning Movement Count Data
 S. Reynolds Road & Hill Farm Road
 Bryant, Arkansas
 P-1895

File Name : PM-HF
 Site Code : 00000000
 Start Date : 09/05/2017
 Page No : 2

Start Time	S. Reynolds Road From North					Hill Farm Road From East					S. Reynolds Road From South					Hill Farm Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:00 PM																				
Volume	9	561	105	0	675	134	3	10	0	147	10	421	5	0	436	8	4	11	0	23	1281
Percent	1.3	83.1	15.6	0.0		91.2	2.0	6.8	0.0		2.3	96.6	1.1	0.0		34.8	17.4	47.8	0.0		
03:30 Volume	4	130	31	0	165	113	3	7	0	123	7	114	4	0	125	1	0	5	0	6	419
Peak Factor	0.764																				
High Int. Volume	03:15 PM					03:30 PM					03:30 PM					03:00 PM					
Peak Factor	5	129	41	0	175	113	3	7	0	123	7	114	4	0	125	3	2	3	0	8	0.96
Factor	4					0.29					0.87					0.71					
						9					2					9					



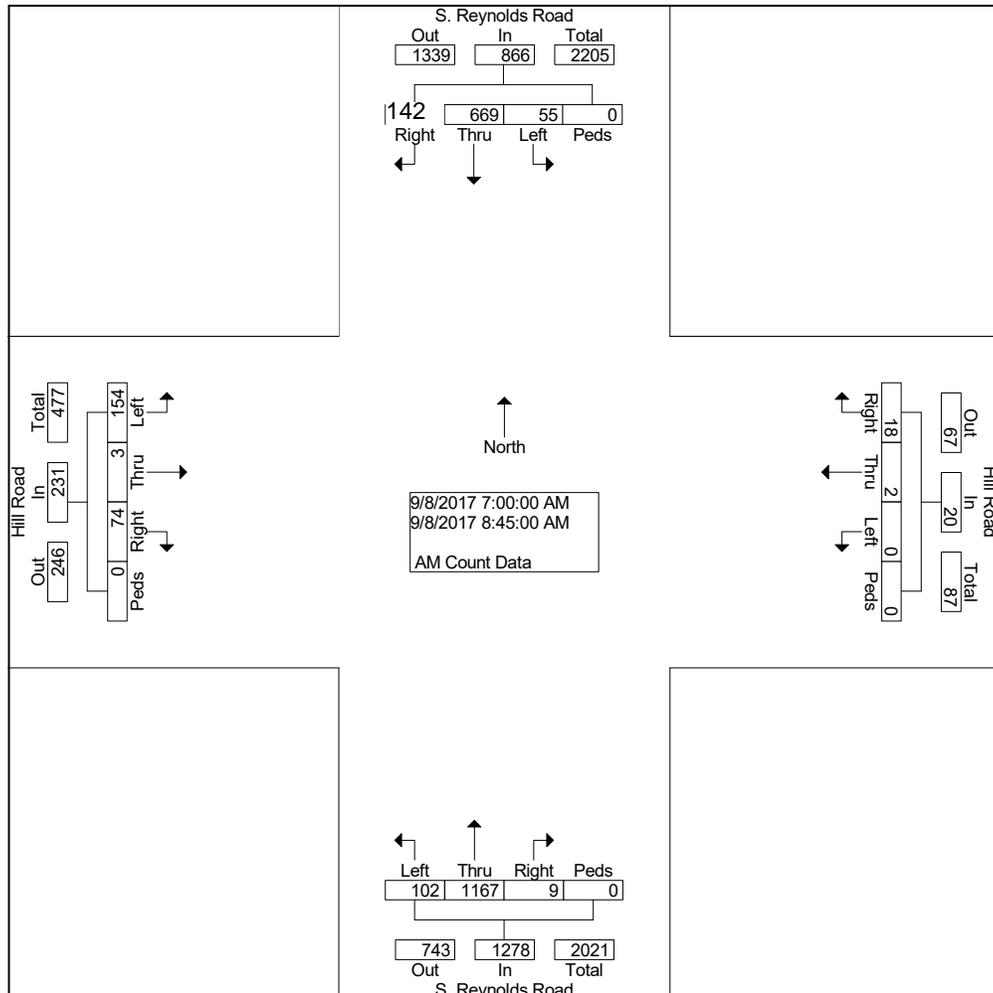
Peters & Associates Engineers, Inc.
Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
S. Reynolds Road & Hill Road
Bryant, Arkansas
P-1895

File Name : AM-Hill
Site Code : 00000000
Start Date : 09/08/2017
Page No : 1

Groups Printed- AM Count Data

Start Time	S. Reynolds Road From North					Hill Road From East					S. Reynolds Road From South					Hill Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	13	74	9	0	96	0	0	0	0	0	1	149	11	0	161	4	1	30	0	35	292
07:15 AM	14	117	16	0	147	6	0	0	0	6	3	204	10	0	217	12	1	20	0	33	403
07:30 AM	20	145	18	0	183	7	0	0	0	7	4	210	19	0	233	10	0	17	0	27	450
07:45 AM	30	128	7	0	165	4	1	0	0	5	1	225	28	0	254	20	1	8	0	29	453
Total	77	464	50	0	591	17	1	0	0	18	9	788	68	0	865	46	3	75	0	124	1598
08:00 AM	28	66	1	0	95	0	1	0	0	1	0	108	6	0	114	9	0	17	0	26	236
08:15 AM	13	53	2	0	68	0	0	0	0	0	0	96	4	0	100	7	0	15	0	22	190
08:30 AM	8	49	1	0	58	1	0	0	0	1	0	94	13	0	107	6	0	33	0	39	205
08:45 AM	16	37	1	0	54	0	0	0	0	0	0	81	11	0	92	6	0	14	0	20	166
Total	65	205	5	0	275	1	1	0	0	2	0	379	34	0	413	28	0	79	0	107	797
Grand Total	142	669	55	0	866	18	2	0	0	20	9	1167	102	0	1278	74	3	154	0	231	2395
Apprch %	16.4	77.3	6.4	0.0		90.0	10.0	0.0	0.0		0.7	91.3	8.0	0.0		32.0	1.3	66.7	0.0		
Total %	5.9	27.9	2.3	0.0	36.2	0.8	0.1	0.0	0.0	0.8	0.4	48.7	4.3	0.0	53.4	3.1	0.1	6.4	0.0	9.6	

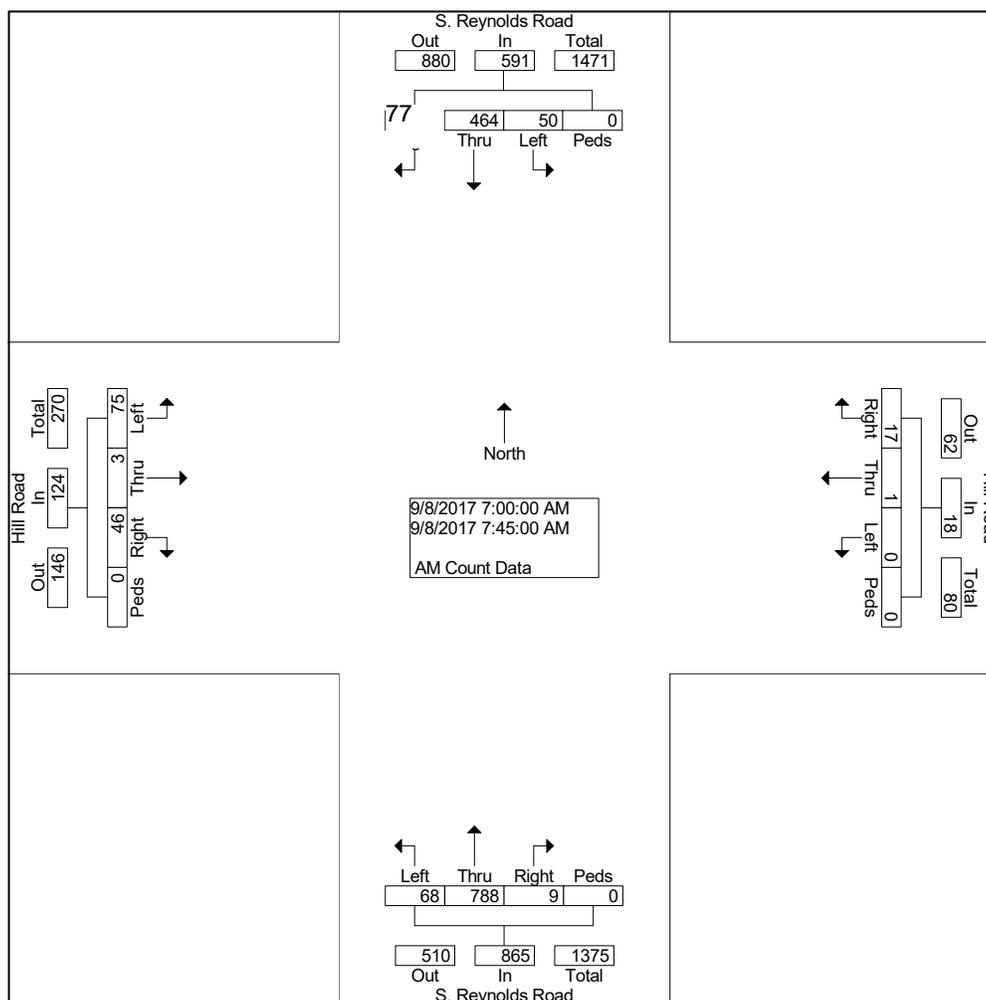


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
 S. Reynolds Road & Hill Road
 Bryant, Arkansas
 P-1895

File Name : AM-Hill
 Site Code : 00000000
 Start Date : 09/08/2017
 Page No : 2

Start Time	S. Reynolds Road From North					Hill Road From East					S. Reynolds Road From South					Hill Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	77	464	50	0	591	17	1	0	0	18	9	788	68	0	865	46	3	75	0	124	1598
Percent	13.0	78.5	8.5	0.0		94.4	5.6	0.0	0.0		1.0	91.1	7.9	0.0		37.1	2.4	60.5	0.0		
07:45 Volume	30	128	7	0	165	4	1	0	0	5	1	225	28	0	254	20	1	8	0	29	453
Peak Factor	0.882																				
High Int. Volume	07:30 AM					07:30 AM					07:45 AM					07:00 AM					
Peak Factor	20	145	18	0	183	7	0	0	0	7	1	225	28	0	254	4	1	30	0	35	0.886
					0.807					0.643					0.851					0.886	



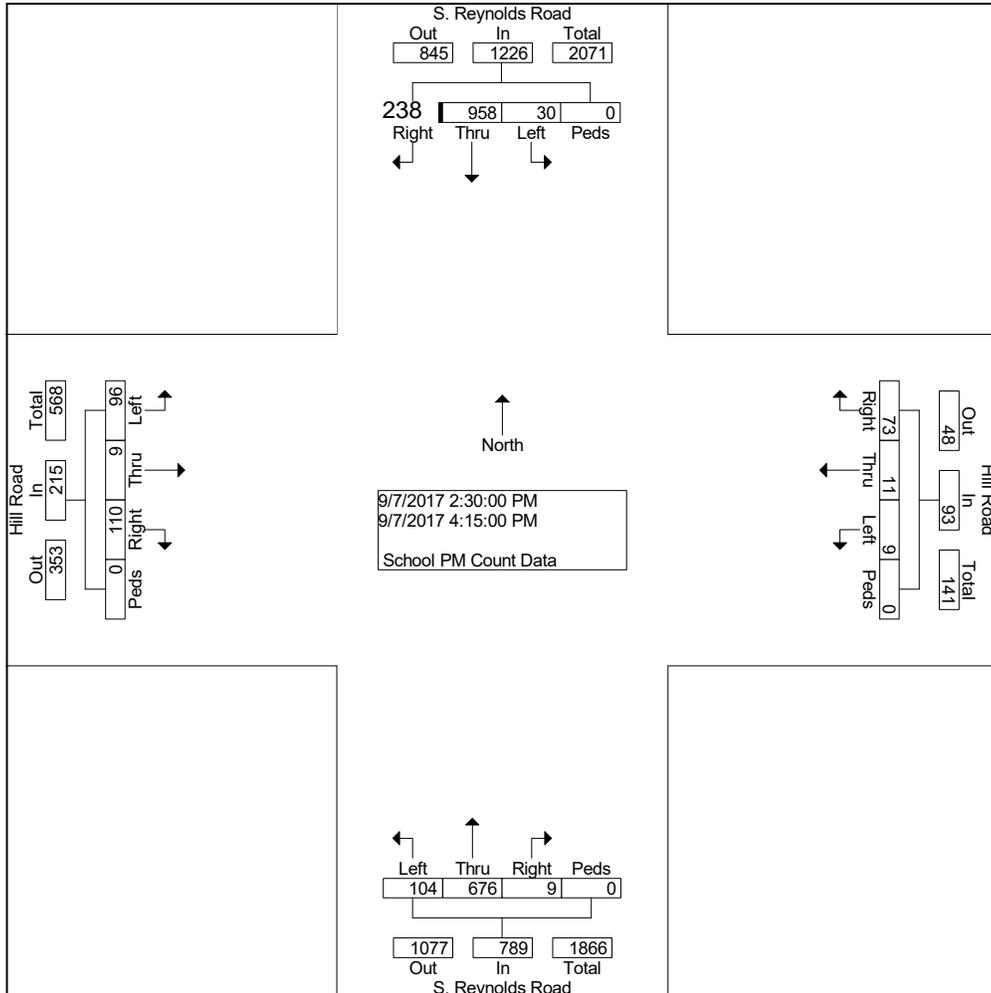
Peters & Associates Engineers, Inc.
Peak Hours Turning Movement Count Data

School PM Turning Movement Count Data
S. Reynolds Road & Hill Road
Bryant, Arkansas
P-1895

File Name : PM-Hill
Site Code : 00000000
Start Date : 09/07/2017
Page No : 1

Groups Printed- School PM Count Data

Start Time	S. Reynolds Road From North					Hill Road From East					S. Reynolds Road From South					Hill Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:30 PM	19	93	5	0	117	3	0	2	0	5	1	51	5	0	57	9	0	10	0	19	198
02:45 PM	23	117	4	0	144	0	0	0	0	0	0	60	5	0	65	11	1	14	0	26	235
Total	42	210	9	0	261	3	0	2	0	5	1	111	10	0	122	20	1	24	0	45	433
03:00 PM	19	122	9	0	150	1	0	0	0	1	2	55	5	0	62	18	2	18	0	38	251
03:15 PM	15	122	7	0	144	12	5	3	0	20	4	85	15	0	104	18	5	13	0	36	304
03:30 PM	40	137	2	0	179	28	1	2	0	31	2	145	22	0	169	15	1	9	0	25	404
03:45 PM	49	120	1	0	170	14	1	1	0	16	0	127	24	0	151	13	0	10	0	23	360
Total	123	501	19	0	643	55	7	6	0	68	8	412	66	0	486	64	8	50	0	122	1319
04:00 PM	41	109	2	0	152	6	3	1	0	10	0	75	18	0	93	11	0	8	0	19	274
04:15 PM	32	138	0	0	170	9	1	0	0	10	0	78	10	0	88	15	0	14	0	29	297
Grand Total	238	958	30	0	1226	73	11	9	0	93	9	676	104	0	789	110	9	96	0	215	2323
Apprch %	19.4	78.1	2.4	0.0		78.5	11.8	9.7	0.0		1.1	85.7	13.2	0.0		51.2	4.2	44.7	0.0		
Total %	10.2	41.2	1.3	0.0	52.8	3.1	0.5	0.4	0.0	4.0	0.4	29.1	4.5	0.0	34.0	4.7	0.4	4.1	0.0	9.3	

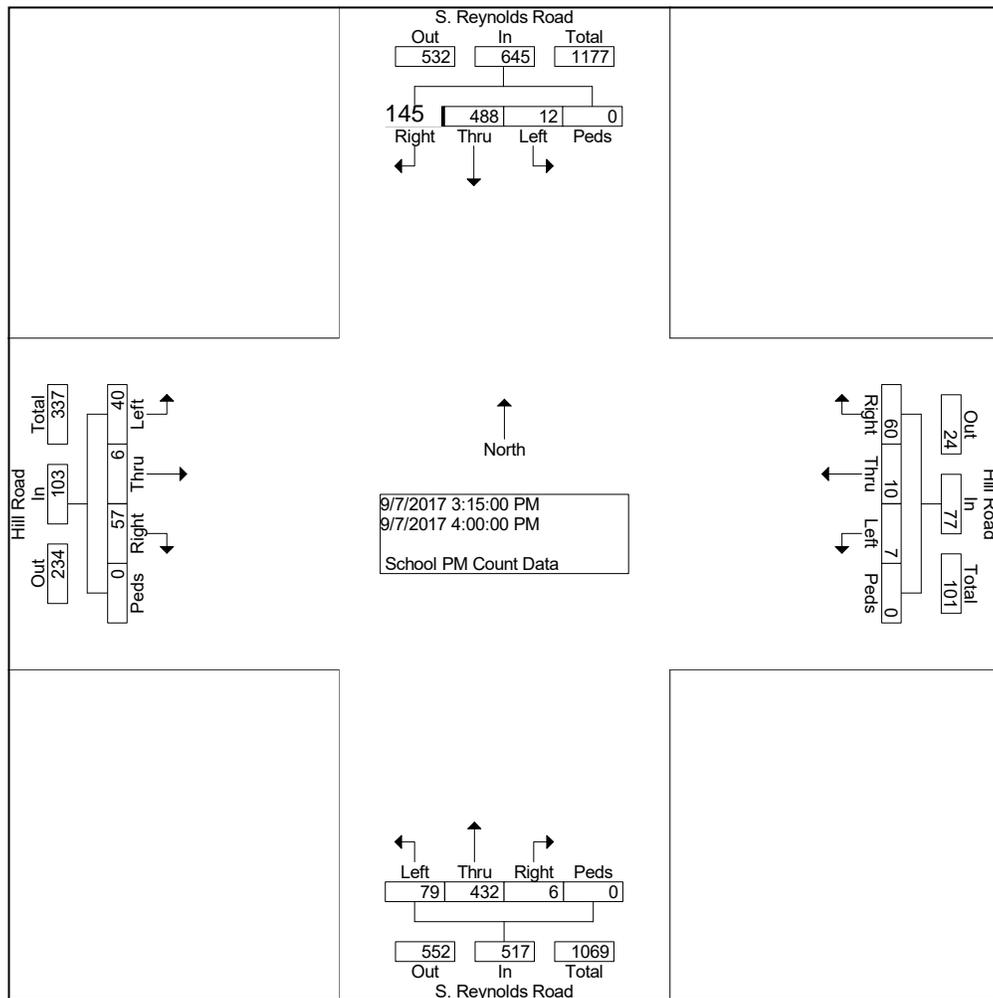


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

School PM Turning Movement Count Data
 S. Reynolds Road & Hill Road
 Bryant, Arkansas
 P-1895

File Name : PM-Hill
 Site Code : 00000000
 Start Date : 09/07/2017
 Page No : 2

Start Time	S. Reynolds Road From North					Hill Road From East					S. Reynolds Road From South					Hill Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:15 PM																				
Volume	145	488	12	0	645	60	10	7	0	77	6	432	79	0	517	57	6	40	0	103	1342
Percent	22.5	75.7	1.9	0.0		77.9	13.0	9.1	0.0		1.2	83.6	15.3	0.0		55.3	5.8	38.8	0.0		
03:30 Volume	40	137	2	0	179	28	1	2	0	31	2	145	22	0	169	15	1	9	0	25	404
Peak Factor	0.830																				
High Int. Volume	03:30 PM					03:30 PM					03:30 PM					03:15 PM					
Peak Factor	0.90					0.62					0.76					0.71					
Factor	1					1					5					5					



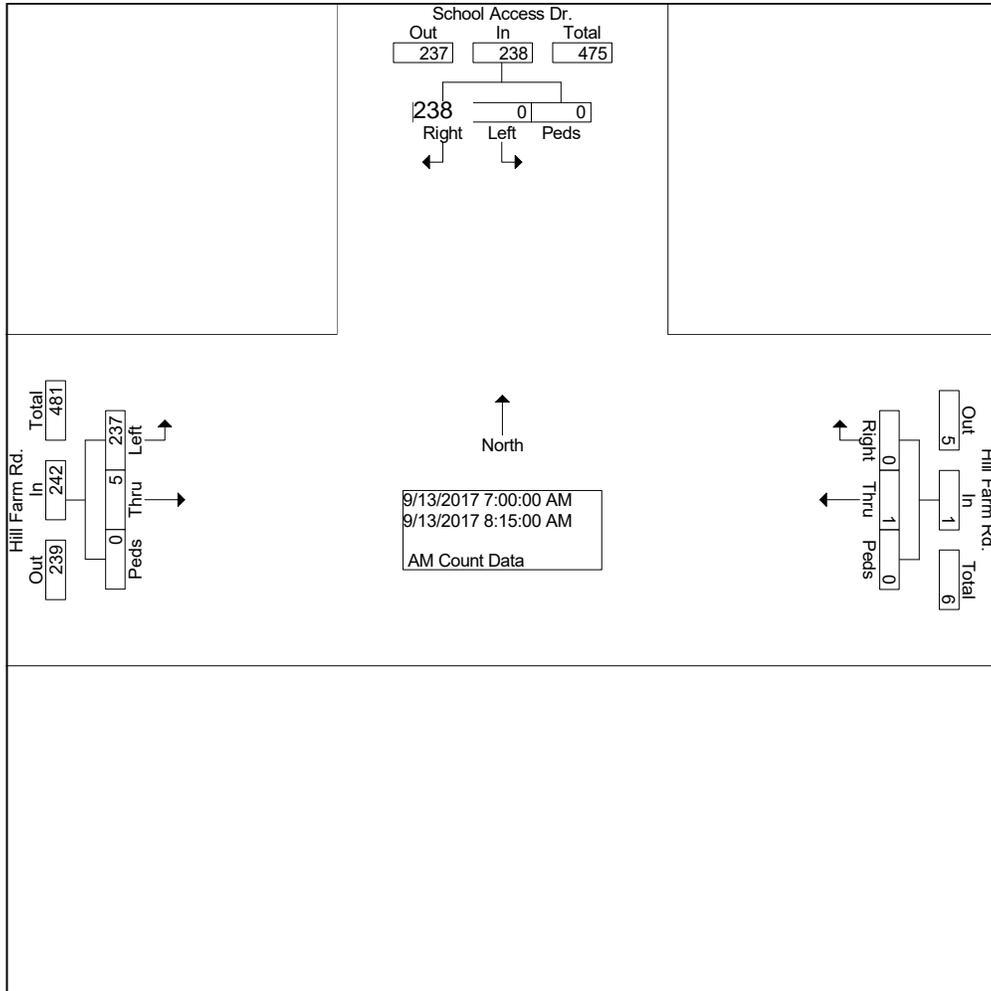
Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
 Hill Farm Road and School Access Drive
 Bryant, AR
 P1895

File Name : AM-AccDr
 Site Code : 00000000
 Start Date : 09/13/2017
 Page No : 1

Groups Printed- AM Count Data

Start Time	School Access Dr. From North				Hill Farm Rd. From East				Hill Farm Rd. From West				Int. Total
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	5	0	0	5	0	0	0	0	0	12	0	12	17
07:15 AM	70	0	0	70	0	0	0	0	1	59	0	60	130
07:30 AM	82	0	0	82	0	1	0	1	3	100	0	103	186
07:45 AM	66	0	0	66	0	0	0	0	0	55	0	55	121
Total	223	0	0	223	0	1	0	1	4	226	0	230	454
08:00 AM	11	0	0	11	0	0	0	0	0	8	0	8	19
08:15 AM	4	0	0	4	0	0	0	0	1	3	0	4	8
Grand Total	238	0	0	238	0	1	0	1	5	237	0	242	481
Apprch %	100.0	0.0	0.0		0.0	100.0	0.0		2.1	97.9	0.0		
Total %	49.5	0.0	0.0	49.5	0.0	0.2	0.0	0.2	1.0	49.3	0.0	50.3	

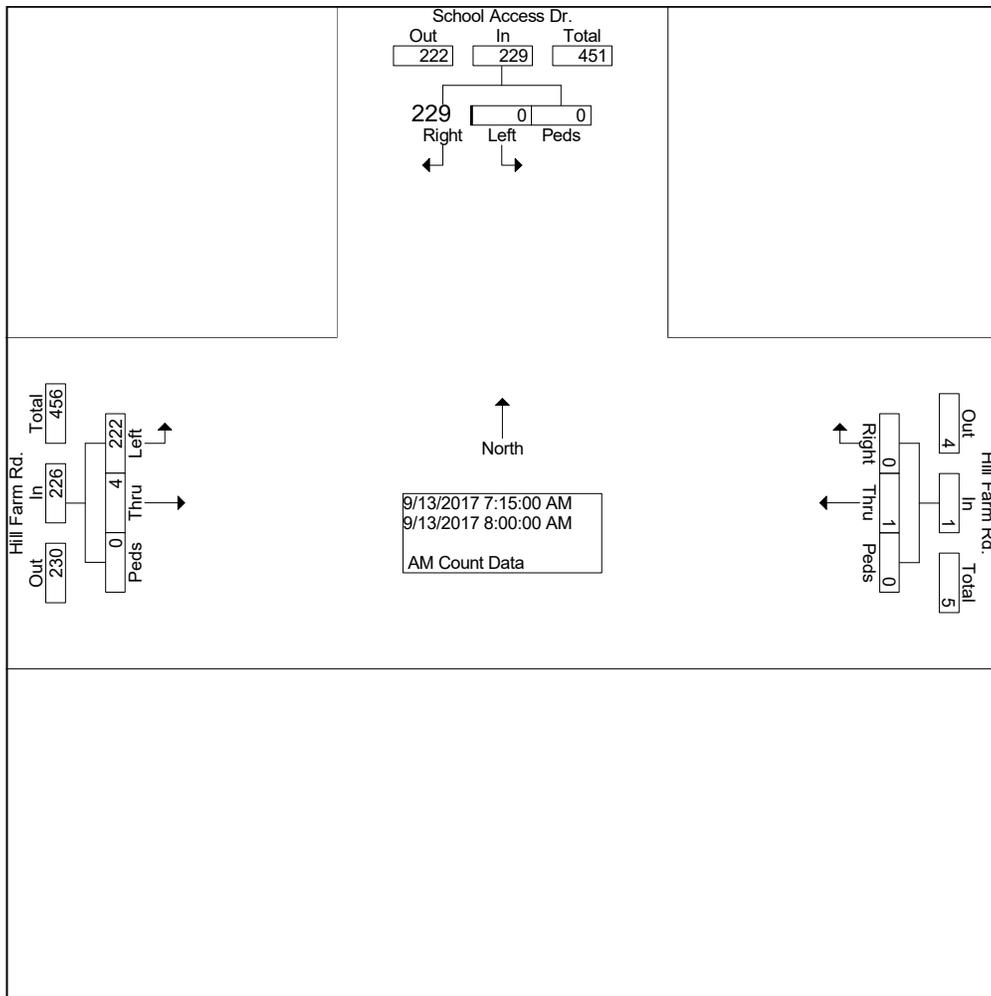


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

AM Hour Turning Movement Count Data
 Hill Farm Road and School Access Drive
 Bryant, AR
 P1895

File Name : AM-AccDr
 Site Code : 00000000
 Start Date : 09/13/2017
 Page No : 2

Start Time	School Access Dr. From North				Hill Farm Rd. From East				Hill Farm Rd. From West				Int. Total
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	
Peak Hour From 07:00 AM to 08:15 AM - Peak 1 of 1													
Intersection	07:15 AM												
Volume	229	0	0	229	0	1	0	1	4	222	0	226	456
Percent	100.0	0.0	0.0		0.0	100.0	0.0		1.8	98.2	0.0		
07:30 Volume	82	0	0	82	0	1	0	1	3	100	0	103	186
Peak Factor	0.613												
High Int.	07:30 AM												
Volume	82	0	0	82	0	1	0	1	3	100	0	103	
Peak Factor	0.698				0.250				0.549				



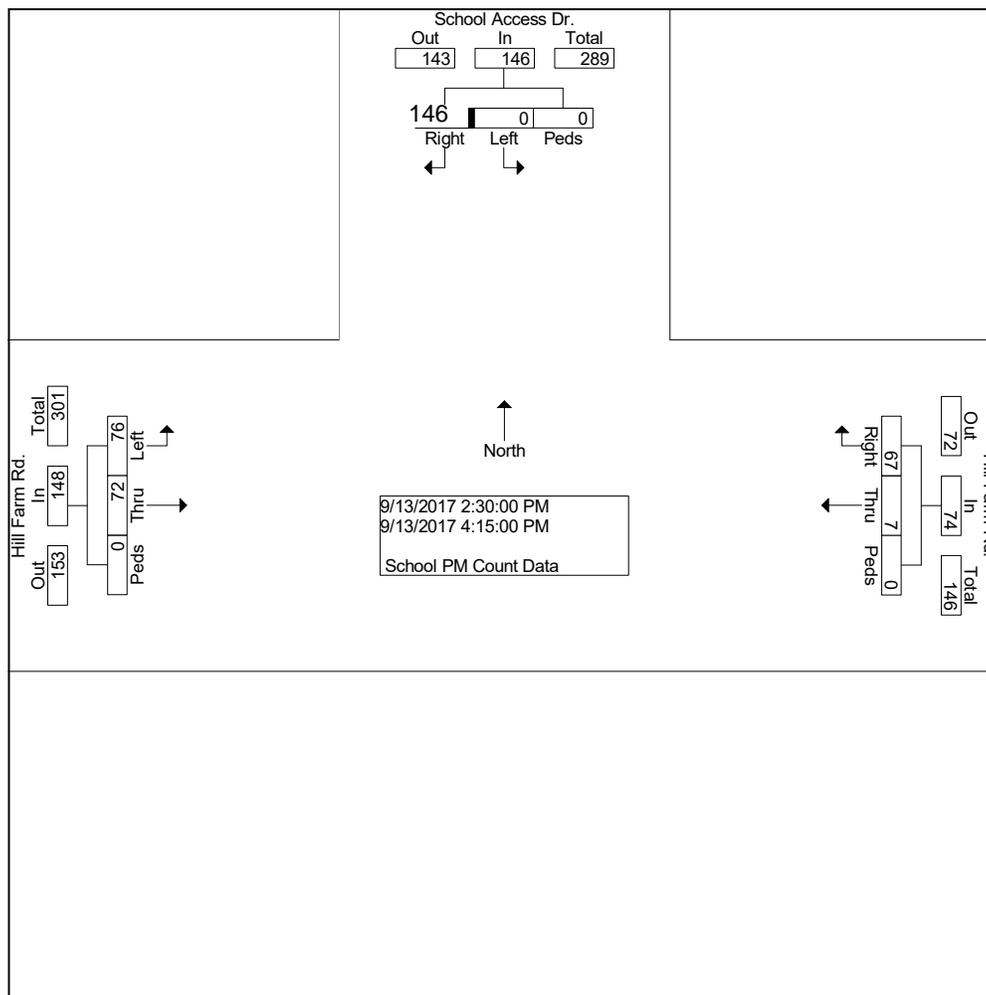
Peters & Associates Engineers, Inc.
Peak Hours Turning Movement Count Data

PM Hour Turning Movement Count Data
Hill Farm Road and School Access Drive
Bryant, Ar
P1895

File Name : PM-AccDr
Site Code : 00000000
Start Date : 09/13/2017
Page No : 1

Groups Printed- School PM Count Data

Start Time	School Access Dr. From North				Hill Farm Rd. From East				Hill Farm Rd. From West				Int. Total
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
02:30 PM	1	0	0	1	0	1	0	1	1	4	0	5	7
02:45 PM	1	0	0	1	0	1	0	1	3	16	0	19	21
Total	2	0	0	2	0	2	0	2	4	20	0	24	28
03:00 PM	0	0	0	0	0	0	0	0	7	15	0	22	22
03:15 PM	3	0	0	3	3	1	0	4	34	9	0	43	50
03:30 PM	114	0	0	114	64	2	0	66	24	17	0	41	221
03:45 PM	20	0	0	20	0	0	0	0	1	11	0	12	32
Total	137	0	0	137	67	3	0	70	66	52	0	118	325
04:00 PM	5	0	0	5	0	1	0	1	1	3	0	4	10
04:15 PM	2	0	0	2	0	1	0	1	1	1	0	2	5
Grand Total	146	0	0	146	67	7	0	74	72	76	0	148	368
Apprch %	100.0	0.0	0.0		90.5	9.5	0.0		48.6	51.4	0.0		
Total %	39.7	0.0	0.0	39.7	18.2	1.9	0.0	20.1	19.6	20.7	0.0	40.2	

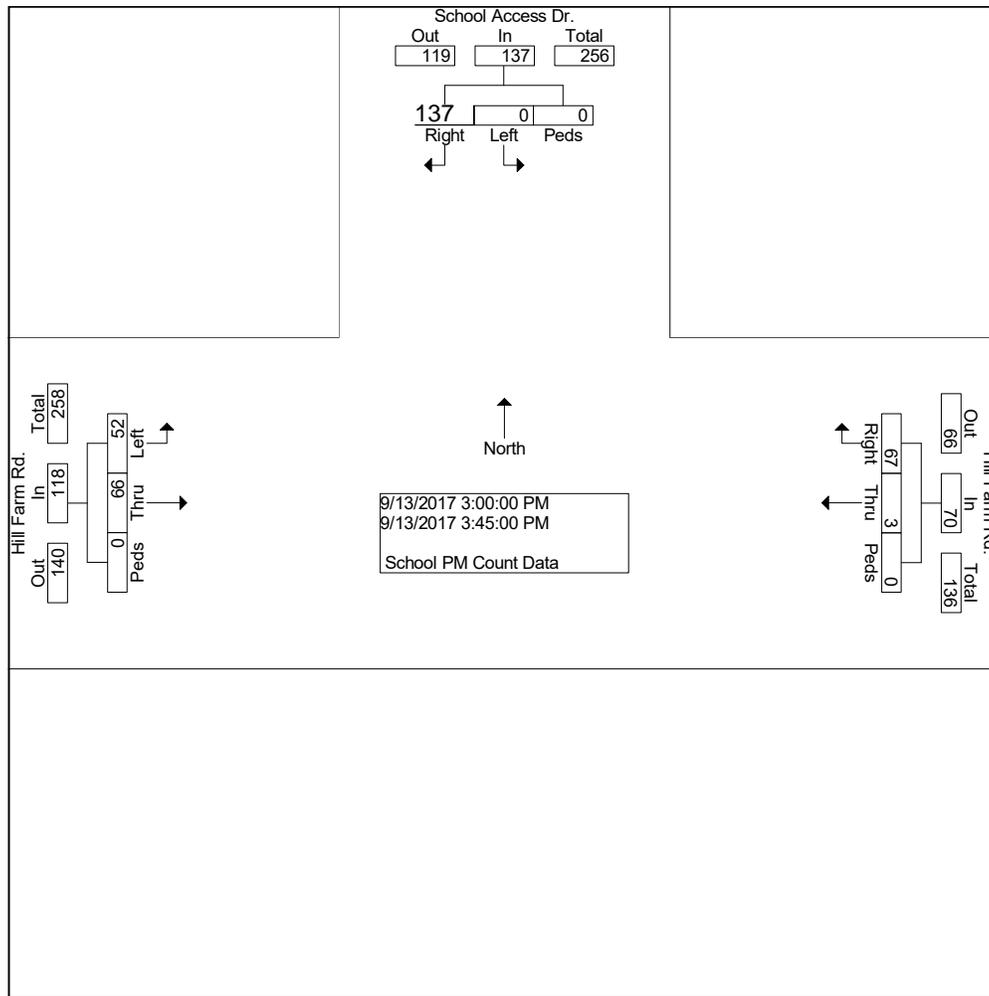


Peters & Associates Engineers, Inc.
 Peak Hours Turning Movement Count Data

PM Hour Turning Movement Count Data
 Hill Farm Road and School Access Drive
 Bryant, Ar
 P1895

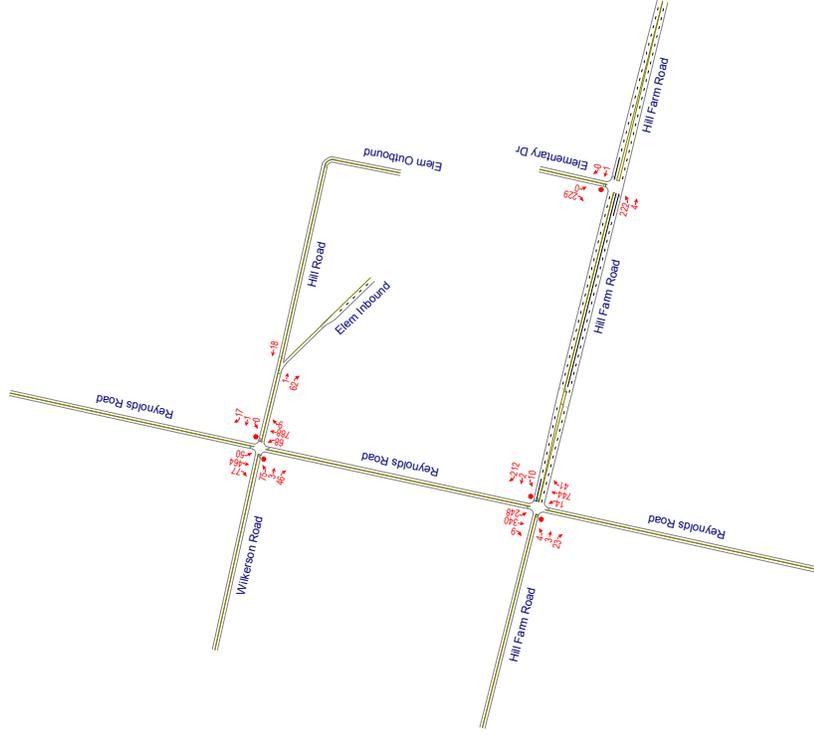
File Name : PM-AccDr
 Site Code : 00000000
 Start Date : 09/13/2017
 Page No : 2

Start Time	School Access Dr. From North				Hill Farm Rd. From East				Hill Farm Rd. From West				Int. Total
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	
Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1													
Intersection	03:00 PM												
Volume	137	0	0	137	67	3	0	70	66	52	0	118	325
Percent	100.0	0.0	0.0		95.7	4.3	0.0		55.9	44.1	0.0		
03:30 Volume	114	0	0	114	64	2	0	66	24	17	0	41	221
Peak Factor													
High Int.	03:30 PM												
Volume	114	0	0	114	64	2	0	66	34	9	0	43	0.368
Peak Factor													
	0.300				0.265				0.686				



Capacity and Level of Service Calculations





HCM 2010 TWSC
 3: Reynolds Road & Hill Farm Road

9/14/2017

Intersection												
Intersection Delay, s/veh	100.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	3	23	10	2	212	14	744	41	248	340	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	64	64	64	89	89	89	62	62	62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	3	26	16	3	331	16	836	46	400	548	15
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	2248	2269	556	2260	2253	859	563	0	0	882	0	0
Stage 1	1356	1356	-	890	890	-	-	-	-	-	-	-
Stage 2	892	913	-	1370	1363	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	30	40	531	29	41	356	1008	-	-	767	-	-
Stage 1	184	217	-	337	361	-	-	-	-	-	-	-
Stage 2	337	352	-	181	216	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	# 1	9	531	# 8	9	356	1008	-	-	767	-	-
Mov Capacity-2 Maneuver	# 1	9	-	# 8	9	-	-	-	-	-	-	-
Stage 1	178	52	-	327	350	-	-	-	-	-	-	-
Stage 2	23	341	-	38	52	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	\$ 2763.1		\$ 358.1			0.2			6.1			
HCM LOS	F		F									
Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	1008	-	-	7	49	356	767	-	-			
HCM Lane V/C Ratio	0.016	-	-	4.87	2.636	0.62	0.522	-	-			
HCM Control Delay (s)	8.628	0	-	\$ 2763.1	\$ 918.4	30.3	14.693	0	-			
HCM Lane LOS	A	A	-	F	F	D	B	A	-			
HCM 95th %tile Q(veh)	0.048	-	-	5.649	13.586	3.969	3.065	-	-			
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												

Intersection

Intersection Delay, s/veh 57.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	75	3	46	0	1	17	68	788	9	50	464	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	64	64	64	85	85	85	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	94	4	58	0	2	27	80	927	11	56	521	87

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1783	1775	565	1800	1812	932	608	0	0	938	0	0
Stage 1	677	677	-	1092	1092	-	-	-	-	-	-	-
Stage 2	1106	1098	-	708	720	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	# 64	83	524	62	78	323	970	-	-	730	-	-
Stage 1	443	452	-	260	291	-	-	-	-	-	-	-
Stage 2	255	289	-	426	432	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	# 46	61	524	42	57	323	970	-	-	730	-	-
Mov Capacity-2 Maneuver	# 46	61	-	42	57	-	-	-	-	-	-	-
Stage 1	366	399	-	215	241	-	-	-	-	-	-	-
Stage 2	192	239	-	331	381	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	\$ 684.5			20.7			0.7			0.9		
HCM LOS	F			C								

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	970	-	-	70	257	730	-	-
HCM Lane V/C Ratio	0.082	-	-	2.214	0.109	0.077	-	-
HCM Control Delay (s)	9.045	0	-	\$ 684.5	20.7	10.342	0	-
HCM Lane LOS	A	A	-	F	C	B	A	-
HCM 95th %tile Q(veh)	0.269	-	-	14.605	0.364	0.249	-	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	0	0	0	1	18	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1	20	0

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1
Stage 1	-	-	0
Stage 2	-	-	1
Follow-up Headway	-	2.218	3.518
Pot Capacity-1 Maneuver	-	-	1022
Stage 1	-	-	-
Stage 2	-	-	1022
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	-	1022
Mov Capacity-2 Maneuver	-	-	1022
Stage 1	-	-	-
Stage 2	-	-	1022

Approach	EB	WB	NB
HCM Control Delay, s	0	0	+
HCM LOS			-

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	+	-	-	-	-
HCM Lane V/C Ratio	+	-	-	-	-
HCM Control Delay (s)	+	-	-	0	-
HCM Lane LOS	+			A	
HCM 95th %tile Q(veh)	+	-	-	-	-

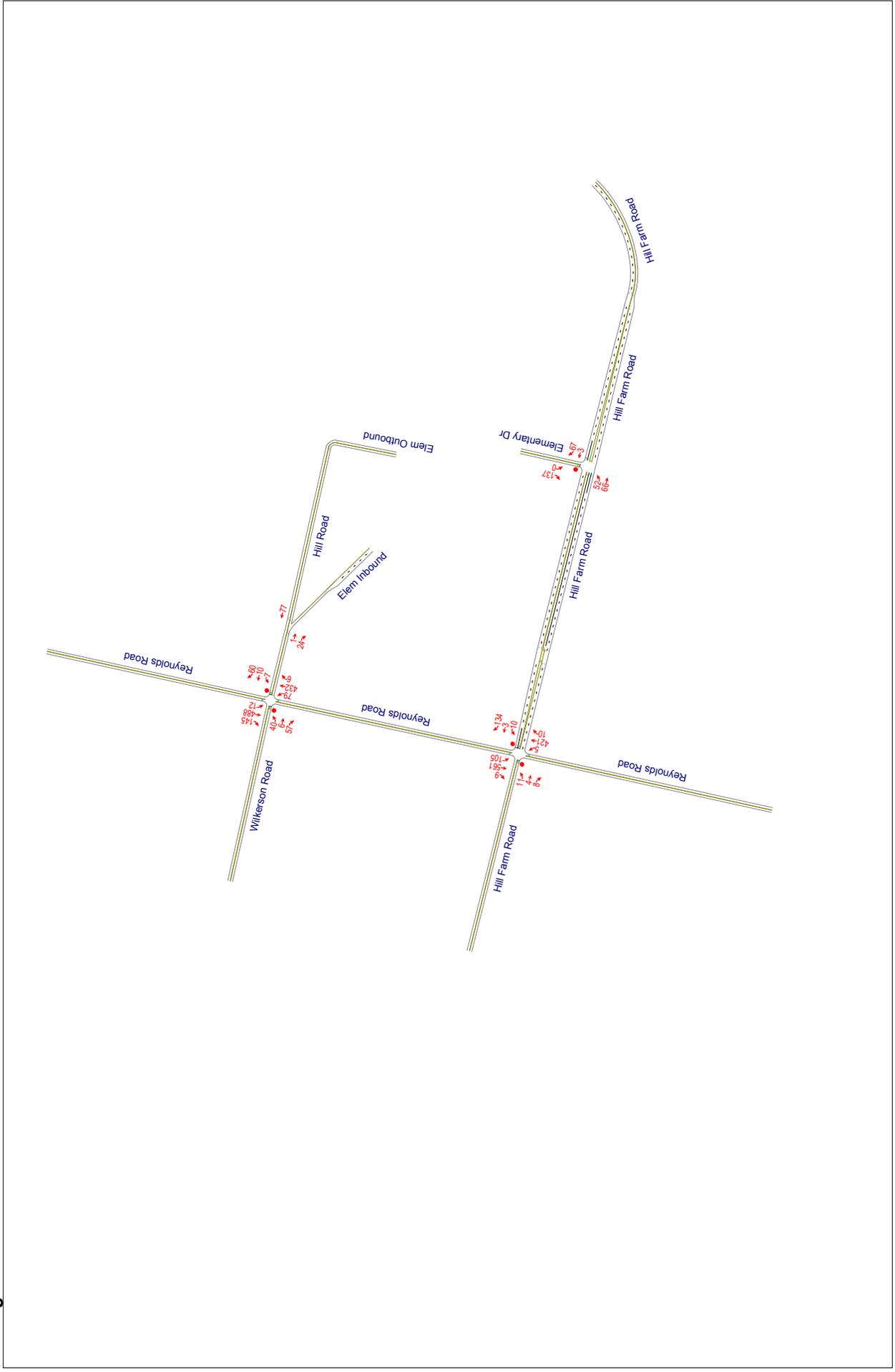
Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection												
Intersection Delay, s/veh	8.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	222	4	0	0	1	0	0	0	0	0	0	229
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	885	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	60	92	92	92	92	92	92	92	92	92	92	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	370	4	0	0	1	0	0	0	0	0	0	327
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1	0	0	4	0	0	745	745	2	743	745	1
Stage 1	-	-	-	-	-	-	744	744	-	1	1	-
Stage 2	-	-	-	-	-	-	1	1	-	742	744	-
Follow-up Headway	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Capacity-1 Maneuver	1620	-	-	1616	-	-	302	341	1081	304	341	1083
Stage 1	-	-	-	-	-	-	373	420	-	1021	895	-
Stage 2	-	-	-	-	-	-	1021	895	-	374	420	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	1620	-	-	1616	-	-	174	263	1081	250	263	1083
Mov Capacity-2 Maneuver	-	-	-	-	-	-	174	263	-	250	263	-
Stage 1	-	-	-	-	-	-	288	324	-	788	895	-
Stage 2	-	-	-	-	-	-	713	895	-	289	324	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.8			0			0			9.8		
HCM LOS	A			A			A			A		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	0	1620	-	-	1616	-	-	1083				
HCM Lane V/C Ratio	+	0.228	-	-	-	-	-	0.302				
HCM Control Delay (s)	0	7.879	-	-	0	-	-	9.8				
HCM Lane LOS	A	A	-	-	A	-	-	A				
HCM 95th %tile Q(veh)	+	0.883	-	-	0	-	-	1.281				

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined



Intersection

Intersection Delay, s/veh 18.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	4	8	10	3	134	5	421	10	105	561	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	29	29	29	87	87	87	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	4	8	34	10	462	6	484	11	148	790	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1598	1599	796	1600	1600	490	803	0	0	495	0	0
Stage 1	1092	1092	-	501	501	-	-	-	-	-	-	-
Stage 2	506	507	-	1099	1099	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	86	106	387	85	106	578	821	-	-	1069	-	-
Stage 1	260	291	-	552	543	-	-	-	-	-	-	-
Stage 2	549	539	-	258	288	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	12	79	387	64	79	578	821	-	-	1069	-	-
Mov Capacity-2 Maneuver	12	79	-	64	79	-	-	-	-	-	-	-
Stage 1	257	218	-	546	538	-	-	-	-	-	-	-
Stage 2	107	534	-	185	216	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 441.9		47.8		0.1		1.4	
HCM LOS	F		E					

Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	821	-	-	23	212	578	1069	-	-
HCM Lane V/C Ratio	0.007	-	-	1.042	0.938	0.533	0.138	-	-
HCM Control Delay (s)	9.416	0	-	\$ 441.9	93.8	18.1	8.908	0	-
HCM Lane LOS	A	A	-	F	F	C	A	A	-
HCM 95th %tile Q(veh)	0.021	-	-	3.058	7.853	3.133	0.48	-	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
6: Reynolds Road & Wilkerson Road/Hill Road

9/14/2017

Intersection

Intersection Delay, s/veh 21

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	40	6	57	7	10	60	79	432	6	12	488	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	62	62	62	76	76	76	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	7	63	11	16	97	104	568	8	17	687	204

Major/Minor	Minor2		Minor1			Major1		Major2				
Conflicting Flow All	1660	1607	789	1638	1705	572	892	0	0	576	0	0
Stage 1	823	823	-	780	780	-	-	-	-	-	-	-
Stage 2	837	784	-	858	925	-	-	-	-	-	-	-
Follow-up Headway	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Capacity-1 Maneuver	78	105	391	80	91	520	760	-	-	997	-	-
Stage 1	368	388	-	388	406	-	-	-	-	-	-	-
Stage 2	361	404	-	352	348	-	-	-	-	-	-	-
Time blocked-Platoon, %								-	-	-	-	-
Mov Capacity-1 Maneuver	# 43	81	391	52	70	520	760	-	-	997	-	-
Mov Capacity-2 Maneuver	# 43	81	-	52	70	-	-	-	-	-	-	-
Stage 1	294	374	-	310	324	-	-	-	-	-	-	-
Stage 2	223	322	-	280	336	-	-	-	-	-	-	-

Approach	EB		WB			NB		SB		
HCM Control Delay, s	269.3		50.6			1.6		0.2		
HCM LOS	F		F							

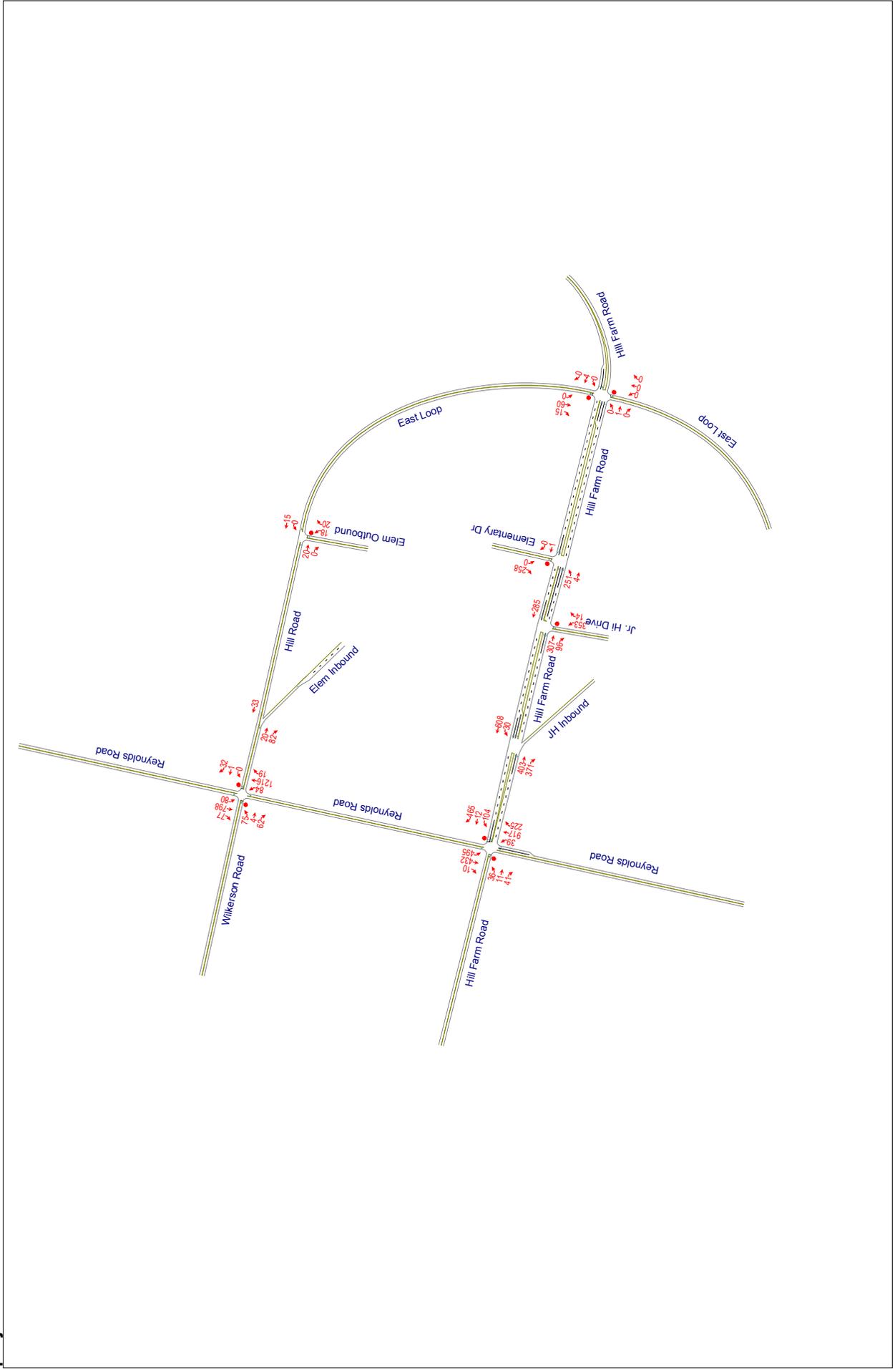
Minor Lane / Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	760	-	-	90	196	997	-	-
HCM Lane V/C Ratio	0.137	-	-	1.272	0.634	0.017	-	-
HCM Control Delay (s)	10.486	0	-	269.3	50.6	8.673	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.473	-	-	8.255	3.68	0.052	-	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection						
Intersection Delay, s/veh	8.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	0	1	0	0	77	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	84	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	1	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Follow-up Headway	-	-	2.218	-	3.518	3.318
Pot Capacity-1 Maneuver	-	-	1622	-	1022	1084
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-
Time blocked-Platoon, %	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	-	1622	-	1022	1084
Mov Capacity-2 Maneuver	-	-	-	-	1022	-
Stage 1	-	-	-	-	1022	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		8.8		
HCM LOS	A					
Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1022	-	-	1622	-	
HCM Lane V/C Ratio	0.082	-	-	-	-	
HCM Control Delay (s)	8.8	-	-	0	-	
HCM Lane LOS	A	A				
HCM 95th %tile Q(veh)	0.267	-	-	0	-	
Notes						
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined						

Intersection												
Intersection Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	52	66	0	0	3	67	0	0	0	0	0	137
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	885	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	92	92	50	50	92	92	92	92	92	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	132	0	0	6	134	0	0	0	0	0	274
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	140	0	0	132	0	0	343	480	66	347	413	70
Stage 1	-	-	-	-	-	-	340	340	-	73	73	-
Stage 2	-	-	-	-	-	-	3	140	-	274	340	-
Follow-up Headway	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Capacity-1 Maneuver	1441	-	-	1451	-	-	587	484	984	583	528	978
Stage 1	-	-	-	-	-	-	648	638	-	928	833	-
Stage 2	-	-	-	-	-	-	1019	780	-	709	638	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	1441	-	-	1451	-	-	399	449	984	551	490	978
Mov Capacity-2 Maneuver	-	-	-	-	-	-	399	449	-	551	490	-
Stage 1	-	-	-	-	-	-	601	592	-	861	833	-
Stage 2	-	-	-	-	-	-	734	780	-	658	592	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.4			0			0			10.1		
HCM LOS							A			B		
Minor Lane / Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	0	1441	-	-	1451	-	-	978				
HCM Lane V/C Ratio	+	0.072	-	-	-	-	-	0.28				
HCM Control Delay (s)	0	7.693	-	-	0	-	-	10.1				
HCM Lane LOS	A	A			A			B				
HCM 95th %tile Q(veh)	+	0.233	-	-	0	-	-	1.153				
Notes												
~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined												



HCM 2010 TWSC
 3: Reynolds Road & Hill Farm Road

10/20/2017

Intersection

Int Delay, s/veh 24.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	36	11	41	104	12	465	39	917	225	495	432	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	0	-	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	64	64	64	89	89	89	62	62	62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	12	47	162	19	727	44	1030	253	798	697	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3429	3420	705	3449	3428	1030	713	0	0	1030	0	0
Stage 1	2302	2302	-	1118	1118	-	-	-	-	-	-	-
Stage 2	1127	1118	-	2331	2310	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 4	~ 7	436	~ 4	~ 7	~ 283	887	-	-	~ 674	-	-
Stage 1	51	73	-	251	282	-	-	-	-	-	-	-
Stage 2	249	282	-	~ 49	72	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	~ 6	436	-	~ 6	~ 283	887	-	-	~ 674	-	-
Mov Cap-2 Maneuver	-	~ 6	-	-	~ 6	-	-	-	-	-	-	-
Stage 1	41	73	-	203	228	-	-	-	-	-	-	-
Stage 2	-	228	-	~ 36	72	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.3	63.1
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	887	-	-	-	-	283	~ 674	-	-
HCM Lane V/C Ratio	0.049	-	-	-	-	2.567	1.185	-	-
HCM Control Delay (s)	9.3	0	-	-	~ 743.3	119.5	0	-	-
HCM Lane LOS	A	A	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-	60	26.7	-	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
6: Reynolds Road & Wilkerson Road/Hill Road

10/20/2017

Intersection

Int Delay, s/veh 1308.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	75	4	62	0	1	32	84	1216	19	80	798	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	64	64	64	85	85	85	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	94	5	78	0	2	50	99	1431	22	90	897	87

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2785	2771	940	2800	2802	1442	983	0	0	1453	0	0
Stage 1	1120	1120	-	1639	1639	-	-	-	-	-	-	-
Stage 2	1665	1651	-	1161	1163	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 12	19	320	12	18	162	703	-	-	466	-	-
Stage 1	251	282	-	127	158	-	-	-	-	-	-	-
Stage 2	122	156	-	238	269	-	-	-	-	-	-	-
Platoon blocked, %							-	-	-	-	-	-
Mov Cap-1 Maneuver	~ 2	~ 3	320	-	3	162	703	-	-	466	-	-
Mov Cap-2 Maneuver	~ 2	~ 3	-	-	3	-	-	-	-	-	-	-
Stage 1	~ 65	159	-	33	41	-	-	-	-	-	-	-
Stage 2	~ 21	41	-	99	152	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	\$ 21164		0.7	1.2
HCM LOS	F	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	703	-	-	4	-	466	-
HCM Lane V/C Ratio	0.141	-	-44.063	-	0.193	-	-
HCM Control Delay (s)	11	0	\$ 21164	-	14.6	0	-
HCM Lane LOS	B	A	-	F	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	24.3	-	0.7	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	20	0	0	15	18	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	0	0	16	20	22

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	22
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1593
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1593
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1015	-	-	1593	-
HCM Lane V/C Ratio	0.041	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection

Int Delay, s/veh 8.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	251	4	1	0	0	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	885	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	92	92	92	92	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	418	4	1	0	0	369

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	840
Stage 1	-	-	1
Stage 2	-	-	839
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	1620	-	304
Stage 1	-	-	1022
Stage 2	-	-	384
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1620	-	226
Mov Cap-2 Maneuver	-	-	226
Stage 1	-	-	1022
Stage 2	-	-	285

Approach	EB	WB	SB
HCM Control Delay, s	7.9	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1620	-	-	-	1083
HCM Lane V/C Ratio	0.258	-	-	-	0.34
HCM Control Delay (s)	8	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	1	-	-	-	1.5

Intersection

Int Delay, s/veh 14

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	307	96	0	285	353	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	334	104	0	310	384	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	438
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1118
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1118
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	40.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	478	-	-	1118	-
HCM Lane V/C Ratio	0.835	-	-	-	-
HCM Control Delay (s)	40.2	-	-	0	-
HCM Lane LOS	E	-	-	A	-
HCM 95th %tile Q(veh)	8.2	-	-	0	-

Intersection													
Int Delay, s/veh	8.7												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1	0	0	4	0	0	0	0	0	60	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	0	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	4	0	0	0	0	0	65	16

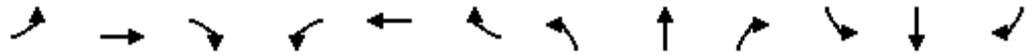
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4	0	0	1	0	0	46	5	1	5	5	4
Stage 1	-	-	-	-	-	-	1	1	-	4	4	-
Stage 2	-	-	-	-	-	-	45	4	-	1	1	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1618	-	-	1622	-	-	955	890	1084	1016	890	1080
Stage 1	-	-	-	-	-	-	1022	895	-	1018	892	-
Stage 2	-	-	-	-	-	-	969	892	-	1022	895	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1618	-	-	1622	-	-	888	890	1084	1016	890	1080
Mov Cap-2 Maneuver	-	-	-	-	-	-	888	890	-	1016	890	-
Stage 1	-	-	-	-	-	-	1022	895	-	1018	892	-
Stage 2	-	-	-	-	-	-	885	892	-	1022	895	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1618	-	-	1622	-	-	922
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.088
HCM Control Delay (s)	0	0	-	-	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.3

Lanes, Volumes, Timings
3: Reynolds Road & Hill Farm Road

10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕	↕	↕↕	↕	↕	↕	↕
Volume (vph)	36	11	41	104	12	465	39	917	225	465	432	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	100		150	200		0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1575	0	0	1642	1458	1630	3260	1458	1630	1711	0
Flt Permitted		0.739			0.652		0.394			0.106		
Satd. Flow (perm)	0	1188	0	0	1119	1458	676	3260	1458	182	1711	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				595			153			2
Link Speed (mph)		30			30			30				30
Link Distance (ft)		997			498			1275				1249
Travel Time (s)		22.7			11.3			29.0				28.4
Peak Hour Factor	0.88	0.88	0.88	0.64	0.64	0.64	0.89	0.89	0.89	0.62	0.62	0.62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	100	0	0	181	727	44	1030	253	750	713	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	
Total Split (s)	26.0	26.0		26.0	26.0	26.0	8.0	37.0	37.0	47.0	76.0	
Total Split (%)	23.6%	23.6%		23.6%	23.6%	23.6%	7.3%	33.6%	33.6%	42.7%	69.1%	
Maximum Green (s)	22.0	22.0		22.0	22.0	22.0	4.0	33.0	33.0	43.0	72.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		20.7			20.7	20.7	37.0	33.0	33.0	80.1	73.7	
Actuated g/C Ratio		0.19			0.19	0.19	0.34	0.30	0.30	0.74	0.68	
v/c Ratio		0.39			0.85	0.96	0.17	1.04	0.46	1.06	0.62	
Control Delay		29.9			76.2	33.4	14.9	77.7	15.4	79.5	13.4	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		29.9			76.2	33.4	14.9	77.7	15.4	79.5	13.4	
LOS		C			E	C	B	E	B	E	B	
Approach Delay		29.9			41.9			63.7			47.3	
Approach LOS		C			D			E			D	
Queue Length 50th (ft)		39			123	101	12	~419	53	~545	271	
Queue Length 95th (ft)		88			136	19	26	#539	126	354	204	

Lanes, Volumes, Timings
 3: Reynolds Road & Hill Farm Road

10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		917			418			1195				1169
Turn Bay Length (ft)							100		150	200		
Base Capacity (vph)		269			226	769	265	989	549	706	1159	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.37			0.80	0.95	0.17	1.04	0.46	1.06	0.62	

Intersection Summary

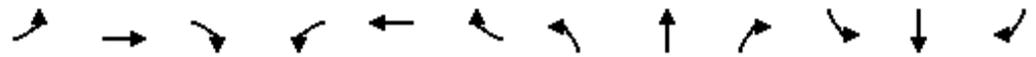
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	108.8
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.06
Intersection Signal Delay:	51.3
Intersection LOS:	D
Intersection Capacity Utilization	79.1%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 3: Reynolds Road & Hill Farm Road

Ø1	Ø2	Ø4
47 s	37 s	26 s
Ø5	Ø6	Ø8
8 s	76 s	26 s

Lanes, Volumes, Timings
 6: Reynolds Road & Wilkerson Road/Hill Road

10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	75	4	62	0	1	32	84	1216	19	80	798	77
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	0	1572	0	0	1493	0	0	1707	0	0	1690	0
Flt Permitted		0.974						0.997			0.996	
Satd. Flow (perm)	0	1572	0	0	1493	0	0	1707	0	0	1690	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		910			371			1249			1123	
Travel Time (s)		20.7			8.4			28.4			25.5	
Peak Hour Factor	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.89	0.89	0.89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	52	0	0	1552	0	0	1074	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	115.4%
ICU Level of Service	H
Analysis Period (min)	15

Intersection

Int Delay, s/veh 1308.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	75	4	62	0	1	32	84	1216	19	80	798	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	64	64	64	85	85	85	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	94	5	78	0	2	50	99	1431	22	90	897	87

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2785	2771	940	2800	2802	1442	983	0	0	1453	0	0
Stage 1	1120	1120	-	1639	1639	-	-	-	-	-	-	-
Stage 2	1665	1651	-	1161	1163	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 12	19	320	12	18	162	703	-	-	466	-	-
Stage 1	251	282	-	127	158	-	-	-	-	-	-	-
Stage 2	122	156	-	238	269	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	~ 2	~ 3	320	-	3	162	703	-	-	466	-	-
Mov Cap-2 Maneuver	~ 2	~ 3	-	-	3	-	-	-	-	-	-	-
Stage 1	~ 65	159	-	33	41	-	-	-	-	-	-	-
Stage 2	~ 21	41	-	99	152	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	\$ 21164		0.7	1.2
HCM LOS	F	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	703	-	-	4	-	466	-
HCM Lane V/C Ratio	0.141	-	-44.063	-	0.193	-	-
HCM Control Delay (s)	11	0	\$ 21164	-	14.6	0	-
HCM Lane LOS	B	A	-	F	-	B	A
HCM 95th %tile Q(veh)	0.5	-	-	24.3	-	0.7	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
 8: JH Inbound & Hill Farm Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑↑		↙	↑↑		
Volume (vph)	403	371	30	608	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		0	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3025	0	1630	3260	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	3025	0	1630	3260	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	498			627	524	
Travel Time (s)	11.3			14.3	11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	841	0	33	661	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.4%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
 9: Elem Inbound & Hill Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (vph)	20	82	0	33	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	1530	0	0	1716	0	0
Flt Permitted						
Satd. Flow (perm)	1530	0	0	1716	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	371			937	291	
Travel Time (s)	8.4			21.3	6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	111	0	0	36	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 11: Elem Outbound & Hill Road/East Loop

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	20	0	0	15	18	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	1716	0	0	1716	1557	0
Flt Permitted					0.977	
Satd. Flow (perm)	1716	0	0	1716	1557	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	937			1829	331	
Travel Time (s)	21.3			41.6	7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	0	16	42	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	20	0	0	15	18	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	0	0	16	20	22

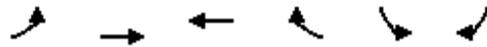
Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	22
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1593
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1593
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1015	-	-	1593	-
HCM Lane V/C Ratio	0.041	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lanes, Volumes, Timings
 14: Hill Farm Road & Elementary Dr

10/20/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	251	4	1	0	0	258
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	885			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Satd. Flow (prot)	1630	3260	3260	0	1484	0
Flt Permitted	0.950					
Satd. Flow (perm)	1630	3260	3260	0	1484	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		325	845		346	
Travel Time (s)		7.4	19.2		7.9	
Peak Hour Factor	0.60	0.92	0.92	0.92	0.92	0.70
Shared Lane Traffic (%)						
Lane Group Flow (vph)	418	4	1	0	369	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.8% ICU Level of Service A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 8.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	251	4	1	0	0	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	885	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	92	92	92	92	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	418	4	1	0	0	369

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	840
Stage 1	-	-	1
Stage 2	-	-	839
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	1620	-	304
Stage 1	-	-	1022
Stage 2	-	-	384
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1620	-	226
Mov Cap-2 Maneuver	-	-	226
Stage 1	-	-	1022
Stage 2	-	-	285

Approach	EB	WB	SB
HCM Control Delay, s	7.9	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1620	-	-	-	1083
HCM Lane V/C Ratio	0.258	-	-	-	0.34
HCM Control Delay (s)	8	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	1	-	-	-	1.5

Lanes, Volumes, Timings
 16: Jr. Hi Drive & Hill Farm Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Volume (vph)	307	96	0	285	353	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	3142	0	0	3260	1629	0
Flt Permitted					0.954	
Satd. Flow (perm)	3142	0	0	3260	1629	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	627			325	325	
Travel Time (s)	14.3			7.4	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	438	0	0	310	399	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.4%
ICU Level of Service	A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 14

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	307	96	0	285	353	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	334	104	0	310	384	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	438
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1118
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1118
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	40.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	478	-	-	1118	-
HCM Lane V/C Ratio	0.835	-	-	-	-
HCM Control Delay (s)	40.2	-	-	0	-
HCM Lane LOS	E	-	-	A	-
HCM 95th %tile Q(veh)	8.2	-	-	0	-

Lanes, Volumes, Timings
 17: East Loop & Hill Farm Road

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1	0	0	4	0	0	0	0	0	60	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	100		0	0		100	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1716	1716	1716	0	1716	1716	0	1716	0	0	1669	0
Flt Permitted												
Satd. Flow (perm)	1716	1716	1716	0	1716	1716	0	1716	0	0	1669	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		845			636			1107			1829	
Travel Time (s)		19.2			14.5			25.2			41.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	0	4	0	0	0	0	0	81	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	14.4%
Analysis Period (min)	15
	ICU Level of Service A

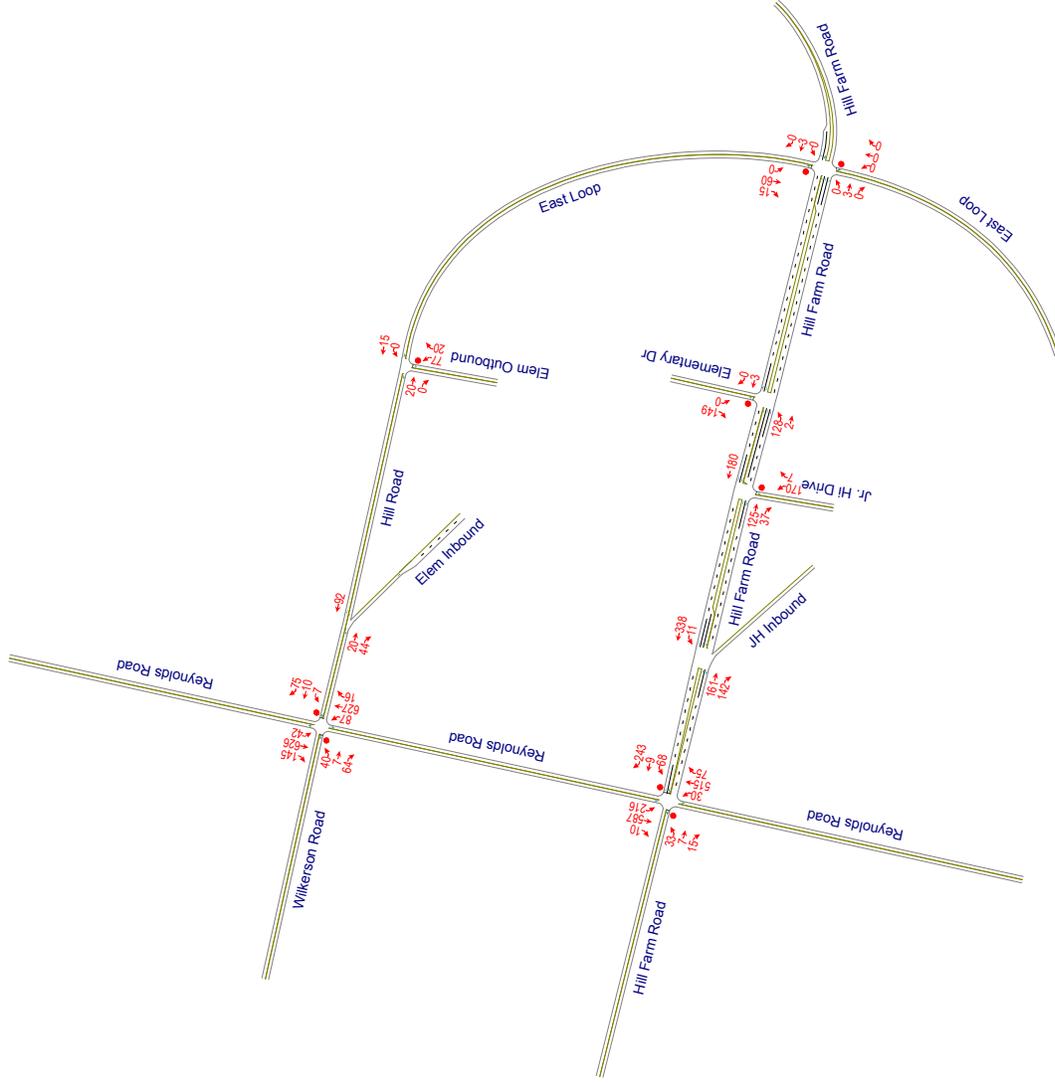
Intersection													
Int Delay, s/veh	8.7												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1	0	0	4	0	0	0	0	0	60	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	0	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	4	0	0	0	0	0	65	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	4	0	0	1	0	0	46	5	1	5	5	4
Stage 1	-	-	-	-	-	-	1	1	-	4	4	-
Stage 2	-	-	-	-	-	-	45	4	-	1	1	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1618	-	-	1622	-	-	955	890	1084	1016	890	1080
Stage 1	-	-	-	-	-	-	1022	895	-	1018	892	-
Stage 2	-	-	-	-	-	-	969	892	-	1022	895	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1618	-	-	1622	-	-	888	890	1084	1016	890	1080
Mov Cap-2 Maneuver	-	-	-	-	-	-	888	890	-	1016	890	-
Stage 1	-	-	-	-	-	-	1022	895	-	1018	892	-
Stage 2	-	-	-	-	-	-	885	892	-	1022	895	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1618	-	-	1622	-	-	922
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.088
HCM Control Delay (s)	0	0	-	-	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.3



HCM 2010 TWSC
 3: Reynolds Road & Hill Farm Road

10/20/2017

Intersection

Int Delay, s/veh 1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	33	7	15	68	9	243	30	515	75	216	587	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	64	64	64	89	89	89	62	62	62
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	8	17	106	14	380	34	579	84	348	947	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2347	2382	955	2352	2348	621	963	0	0	663	0	0
Stage 1	1652	1652	-	688	688	-	-	-	-	-	-	-
Stage 2	695	730	-	1664	1660	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 25	34	313	~ 25	36	487	715	-	-	926	-	-
Stage 1	124	156	-	436	447	-	-	-	-	-	-	-
Stage 2	433	428	-	122	154	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	-	~ 6	313	-	~ 6	487	715	-	-	926	-	-
Mov Cap-2 Maneuver	-	~ 6	-	-	~ 6	-	-	-	-	-	-	-
Stage 1	115	29	-	403	413	-	-	-	-	-	-	-
Stage 2	85	395	-	~ 16	29	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.5	3
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	715	-	-	-	-	487	926	-	-
HCM Lane V/C Ratio	0.047	-	-	-	-	0.78	0.376	-	-
HCM Control Delay (s)	10.3	0	-	-	-	33.9	11.2	0	-
HCM Lane LOS	B	A	-	-	-	D	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	7	1.8	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
 6: Reynolds Road & Wilkerson Road/Hill Road

10/20/2017

Intersection

Int Delay, s/veh 72.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	40	7	64	7	10	75	87	627	16	42	626	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	64	64	64	85	85	85	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	9	80	11	16	117	102	738	19	47	703	163

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1897	1840	785	1876	1913	747	866	0	0	756	0	0
Stage 1	879	879	-	952	952	-	-	-	-	-	-	-
Stage 2	1018	961	-	924	961	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	53	75	393	55	68	413	777	-	-	855	-	-
Stage 1	342	365	-	312	338	-	-	-	-	-	-	-
Stage 2	286	335	-	323	335	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	~ 22	52	393	29	47	413	777	-	-	855	-	-
Mov Cap-2 Maneuver	~ 22	52	-	29	47	-	-	-	-	-	-	-
Stage 1	264	325	-	241	261	-	-	-	-	-	-	-
Stage 2	149	259	-	223	298	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	\$ 922.9	133.1	1.2	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	777	-	-	52 145	855	-	-
HCM Lane V/C Ratio	0.132	-	-	2.668 0.991	0.055	-	-
HCM Control Delay (s)	10.3	0	-\$ 922.9	133.1 9.5	0	-	-
HCM Lane LOS	B	A	-	F F	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	14.4 7.3	0.2	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 6.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	20	0	0	15	77	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	0	0	16	84	22

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	22
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1593
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1593
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	990	-	-	1593	-
HCM Lane V/C Ratio	0.106	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection

Int Delay, s/veh 8.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	128	2	3	0	0	149
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	885	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	92	92	92	92	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	213	2	3	0	0	213

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	3	0	431
Stage 1	-	-	3
Stage 2	-	-	428
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	1618	-	553
Stage 1	-	-	1019
Stage 2	-	-	625
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1618	-	480
Mov Cap-2 Maneuver	-	-	480
Stage 1	-	-	1019
Stage 2	-	-	543

Approach	EB	WB	SB
HCM Control Delay, s	7.5	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1618	-	-	-	1081
HCM Lane V/C Ratio	0.132	-	-	-	0.197
HCM Control Delay (s)	7.6	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.5	-	-	-	0.7

Intersection

Int Delay, s/veh 4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	125	37	0	180	170	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	40	0	196	185	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	176
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1398
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1398
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	720	-	-	1398	-
HCM Lane V/C Ratio	0.267	-	-	-	-
HCM Control Delay (s)	11.8	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.1	-	-	0	-

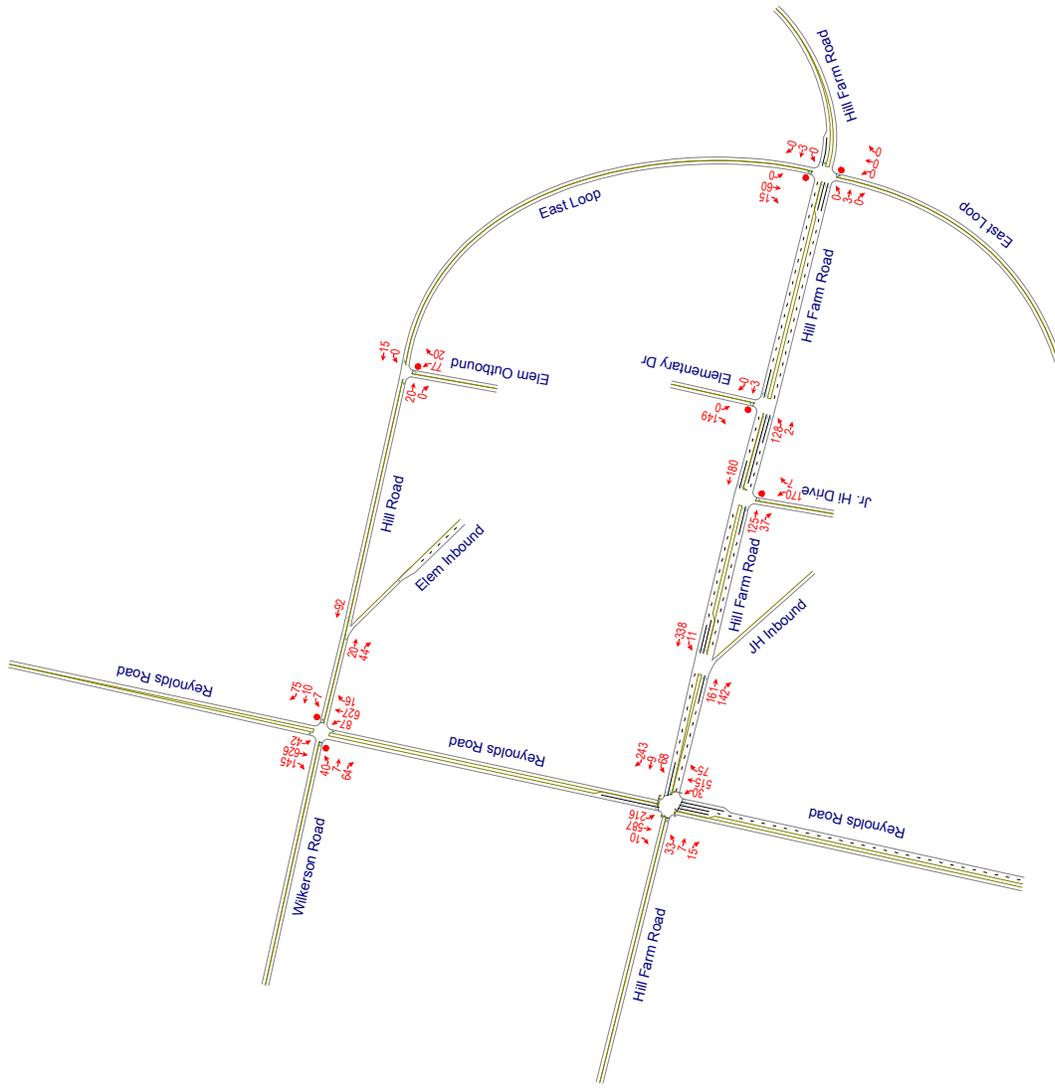
Intersection												
Int Delay, s/veh	8.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	3	0	0	3	0	0	0	0	0	60	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	0	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	0	3	0	0	0	0	0	65	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	3	0	0	47	6	3	6	6	3
Stage 1	-	-	-	-	-	-	3	3	-	3	3	-
Stage 2	-	-	-	-	-	-	44	3	-	3	3	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1619	-	-	1619	-	-	954	889	1081	1014	889	1081
Stage 1	-	-	-	-	-	-	1020	893	-	1020	893	-
Stage 2	-	-	-	-	-	-	970	893	-	1020	893	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1619	-	-	1619	-	-	887	889	1081	1014	889	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	887	889	-	1014	889	-
Stage 1	-	-	-	-	-	-	1020	893	-	1020	893	-
Stage 2	-	-	-	-	-	-	886	893	-	1020	893	-

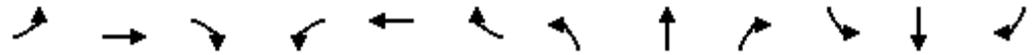
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1619	-	-	1619	-	-	922
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.088
HCM Control Delay (s)	0	0	-	-	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.3



Lanes, Volumes, Timings
3: Reynolds Road & Hill Farm Road

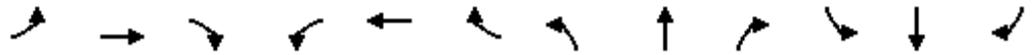
10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↗	↗	↗	↗	↗	↗	↗
Volume (vph)	33	7	15	68	9	243	30	515	75	216	587	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	100		150	200		0
Storage Lanes	0		0	0		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1606	0	0	1644	1458	1630	3260	1458	1630	1712	0
Flt Permitted		0.787			0.779		0.155			0.347		
Satd. Flow (perm)	0	1302	0	0	1337	1458	266	3260	1458	595	1712	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				380			123			2
Link Speed (mph)		30			30			30				30
Link Distance (ft)		997			498			1275			1249	
Travel Time (s)		22.7			11.3			29.0			28.4	
Peak Hour Factor	0.88	0.88	0.88	0.64	0.64	0.64	0.89	0.89	0.89	0.62	0.62	0.62
Adj. Flow (vph)	38	8	17	106	14	380	34	579	84	348	947	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	120	380	34	579	84	348	963	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	8.0	37.0	37.0	23.0	52.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%	25.0%	10.0%	46.3%	46.3%	28.8%	65.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0	16.0	4.0	33.0	33.0	19.0	48.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	Min	Min	None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		11.7			11.7	11.7	33.9	29.6	29.6	45.4	41.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.52	0.45	0.45	0.69	0.63	
v/c Ratio		0.26			0.50	0.66	0.15	0.39	0.12	0.59	0.89	
Control Delay		23.9			35.9	9.8	6.7	13.2	1.6	8.5	25.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		23.9			35.9	9.8	6.7	13.2	1.6	8.5	25.3	
LOS		C			D	A	A	B	A	A	C	
Approach Delay		23.9			16.1			11.5			20.9	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)		19			53	0	3	74	0	44	339	

Lanes, Volumes, Timings
 3: Reynolds Road & Hill Farm Road

10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		51			70	0	12	136	12	54	276	
Internal Link Dist (ft)		917			418			1195			1169	
Turn Bay Length (ft)							100		150	200		
Base Capacity (vph)		354			350	662	226	1901	901	733	1278	
Starvation Cap Reductn		0			0	0	0	0	0	0	0	
Spillback Cap Reductn		0			0	0	0	0	0	0	0	
Storage Cap Reductn		0			0	0	0	0	0	0	0	
Reduced v/c Ratio		0.18			0.34	0.57	0.15	0.30	0.09	0.47	0.75	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	65.8
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	17.5
Intersection LOS:	B
Intersection Capacity Utilization:	57.6%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Reynolds Road & Hill Farm Road

Ø1	Ø2	Ø4
23 s	37 s	20 s
Ø5	Ø6	Ø8
8 s	52 s	20 s

Lanes, Volumes, Timings
 6: Reynolds Road & Wilkerson Road/Hill Road

10/20/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	7	64	7	10	75	87	627	16	42	626	145
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	0	1553	0	0	1521	0	0	1700	0	0	1669	0
Flt Permitted		0.982			0.996			0.994			0.997	
Satd. Flow (perm)	0	1553	0	0	1521	0	0	1700	0	0	1669	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		910			371			1249			1123	
Travel Time (s)		20.7			8.4			28.4			25.5	
Peak Hour Factor	0.80	0.80	0.80	0.64	0.64	0.64	0.85	0.85	0.85	0.89	0.89	0.89
Adj. Flow (vph)	50	9	80	11	16	117	102	738	19	47	703	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	144	0	0	859	0	0	913	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	90.8%
ICU Level of Service	E
Analysis Period (min)	15

HCM 2010 TWSC
6: Reynolds Road & Wilkerson Road/Hill Road

10/20/2017

Intersection

Int Delay, s/veh 72.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	40	7	64	7	10	75	87	627	16	42	626	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	64	64	64	85	85	85	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	9	80	11	16	117	102	738	19	47	703	163

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1897	1840	785	1876	1913	747	866	0	0	756	0	0
Stage 1	879	879	-	952	952	-	-	-	-	-	-	-
Stage 2	1018	961	-	924	961	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	53	75	393	55	68	413	777	-	-	855	-	-
Stage 1	342	365	-	312	338	-	-	-	-	-	-	-
Stage 2	286	335	-	323	335	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	~ 22	52	393	29	47	413	777	-	-	855	-	-
Mov Cap-2 Maneuver	~ 22	52	-	29	47	-	-	-	-	-	-	-
Stage 1	264	325	-	241	261	-	-	-	-	-	-	-
Stage 2	149	259	-	223	298	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	\$ 922.9	133.1	1.2	0.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	777	-	-	52 145	855	-	-
HCM Lane V/C Ratio	0.132	-	-	2.668 0.991	0.055	-	-
HCM Control Delay (s)	10.3	0	-\$ 922.9	133.1 9.5	0	-	-
HCM Lane LOS	B	A	-	F F	A	A	-
HCM 95th %tile Q(veh)	0.5	-	-	14.4 7.3	0.2	-	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
 8: JH Inbound & Hill Farm Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑↑		↖	↑↑		
Volume (vph)	161	142	11	338	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		0	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3032	0	1630	3260	0	0
Flt Permitted			0.950			
Satd. Flow (perm)	3032	0	1630	3260	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	498			627	524	
Travel Time (s)	11.3			14.3	11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	175	154	12	367	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	329	0	12	367	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	13.5% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
 9: Elem Inbound & Hill Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (vph)	20	44	0	92	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	1556	0	0	1716	0	0
Flt Permitted						
Satd. Flow (perm)	1556	0	0	1716	0	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	371			937	291	
Travel Time (s)	8.4			21.3	6.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	48	0	100	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	0	0	100	0	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
 11: Elem Outbound & Hill Road/East Loop

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	20	0	0	15	77	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	1716	0	0	1716	1604	0
Flt Permitted					0.962	
Satd. Flow (perm)	1716	0	0	1716	1604	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	937			1829	331	
Travel Time (s)	21.3			41.6	7.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	0	0	16	84	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	0	16	106	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 6.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	20	0	0	15	77	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	0	0	16	84	22

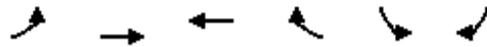
Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	22
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	1593
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1593
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	990	-	-	1593	-
HCM Lane V/C Ratio	0.106	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Lanes, Volumes, Timings
 14: Hill Farm Road & Elementary Dr

10/20/2017



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	128	2	3	0	0	149
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	885			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	25				25	
Satd. Flow (prot)	1630	3260	3260	0	1484	0
Flt Permitted	0.950					
Satd. Flow (perm)	1630	3260	3260	0	1484	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		325	845		346	
Travel Time (s)		7.4	19.2		7.9	
Peak Hour Factor	0.60	0.92	0.92	0.92	0.92	0.70
Adj. Flow (vph)	213	2	3	0	0	213
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	2	3	0	213	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	31.0% ICU Level of Service A
Analysis Period (min)	15

Intersection

Int Delay, s/veh 8.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	128	2	3	0	0	149
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	885	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	92	92	92	92	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	213	2	3	0	0	213

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	3	0	431
Stage 1	-	-	3
Stage 2	-	-	428
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	1618	-	553
Stage 1	-	-	1019
Stage 2	-	-	625
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1618	-	480
Mov Cap-2 Maneuver	-	-	480
Stage 1	-	-	1019
Stage 2	-	-	543

Approach	EB	WB	SB
HCM Control Delay, s	7.5	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1618	-	-	-	1081
HCM Lane V/C Ratio	0.132	-	-	-	0.197
HCM Control Delay (s)	7.6	-	-	-	9.1
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.5	-	-	-	0.7

Lanes, Volumes, Timings
 16: Jr. Hi Drive & Hill Farm Road

10/20/2017



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Volume (vph)	125	37	0	180	170	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	3149	0	0	3260	1627	0
Flt Permitted					0.954	
Satd. Flow (perm)	3149	0	0	3260	1627	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	627			325	325	
Travel Time (s)	14.3			7.4	7.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	40	0	196	185	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	176	0	0	196	193	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	22.8%
Analysis Period (min)	15
	ICU Level of Service A

Intersection

Int Delay, s/veh 4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	125	37	0	180	170	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	136	40	0	196	185	8

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	176
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	1398
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1398
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	720	-	-	1398	-
HCM Lane V/C Ratio	0.267	-	-	-	-
HCM Control Delay (s)	11.8	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.1	-	-	0	-

Lanes, Volumes, Timings
 17: East Loop & Hill Farm Road

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	3	0	0	3	0	0	0	0	0	60	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	100		0	0		100	0		0	0		0
Storage Lanes	1		1	0		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1716	1716	1716	0	1716	1716	0	1716	0	0	1669	0
Flt Permitted												
Satd. Flow (perm)	1716	1716	1716	0	1716	1716	0	1716	0	0	1669	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		845			636			1107			1829	
Travel Time (s)		19.2			14.5			25.2			41.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	3	0	0	3	0	0	0	0	0	65	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	3	0	0	3	0	0	0	0	0	81	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	14.4%						ICU Level of Service A					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	8.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	3	0	0	3	0	0	0	0	0	60	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	100	-	0	-	-	100	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	0	3	0	0	0	0	0	65	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	3	0	0	3	0	0	47	6	3	6	6	3
Stage 1	-	-	-	-	-	-	3	3	-	3	3	-
Stage 2	-	-	-	-	-	-	44	3	-	3	3	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1619	-	-	1619	-	-	954	889	1081	1014	889	1081
Stage 1	-	-	-	-	-	-	1020	893	-	1020	893	-
Stage 2	-	-	-	-	-	-	970	893	-	1020	893	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1619	-	-	1619	-	-	887	889	1081	1014	889	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	887	889	-	1014	889	-
Stage 1	-	-	-	-	-	-	1020	893	-	1020	893	-
Stage 2	-	-	-	-	-	-	886	893	-	1020	893	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	9.3
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1619	-	-	1619	-	-	922
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.088
HCM Control Delay (s)	0	0	-	-	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.3

Traffic Signal Warrants Analysis Results



Traffic Signal Warrants Analysis

Traffic Signal Warrants Analysis

CITY: Little Rock, AR
 CO.: Pulaski County
 HWY.,Mjr.: Reynolds Road
 ST.,Minor: Hill Farm Road

Required Vol. for Warrant: major minor
 Warrant 1A 150
 1B 75
 1AB (80% 1A & 1B) 480
 2 (4 Hr.) 720
 3 (see formula)

INTERSECTION CONFIGURATION

No. Lanes Major: 2 Minor: 1
 Accidents > 5/yr? (Y or N) ***
 Speed =>40, or Pop. < 10 K (Y or N) N
 Factor out "RTs" (Y or N)? Y
 Major: NB SB
 Minor: EB WB
 RMT Y Y
 Study performed b Adj. Factor: 1

CITY: Little Rock, AR
 CO.: Pulaski County
 HWY.,Mjr.: Reynolds Road
 ST.,Minor: Hill Farm Road

Required Vol. for Warrant: major minor
 Warrant 1A 150
 1B 75
 1AB (80% 1A & 1B) 480
 2 (4 Hr.) 720
 3 (see formula)

INTERSECTION CONFIGURATION

No. Lanes Major: 2 Minor: 1
 Accidents > 5/yr? (Y or N) ***
 Speed =>40, or Pop. < 10 K (Y or N) N
 Factor out "RTs" (Y or N)? Y
 Major: NB SB
 Minor: EB WB
 RMT Y Y
 Study performed b Adj. Factor: 1

CITY: Little Rock, AR
 CO.: Pulaski County
 HWY.,Mjr.: Reynolds Road
 ST.,Minor: Hill Farm Road

November 1, 2017 Study performed b RMT Y Y
 Major: NB SB
 Minor: EB WB
 RMT Y Y
 Study performed b Adj. Factor: 1

November 1, 2017 Study performed b RMT Y Y
 Major: NB SB
 Minor: EB WB
 RMT Y Y
 Study performed b Adj. Factor: 1

MAJOR ST. (direction) SB
 MINOR ST. (direction) WB

Direction: NB SB
 Factor: 100% 100%
 Existing + Projected man. results

FINAL RESULTS:

Projected Conditions
 W/ 50% RTs Fact. Out
 Major St.: Reynolds Road
 Minor St.: Hill Farm Road

Hour warrant was met:
 VOLUME COMB. 4 Hr. Peak
 600 900 480 720
 150 75 120 60

HOUR	MAJOR	SUM	MAX. MINOR	1A	1B	1AB	2	3
7:00	2059	190	30	1	1	1	1	1
8:00	785	30	19	0	0	0	0	0
9:00	712	25	31	0	0	0	0	0
10:00	779	31	37	0	0	0	0	0
11:00	825	44	44	0	0	0	0	0
12:00	824	44	44	0	0	0	0	0
13:00	835	44	44	0	0	0	0	0
14:00	1048	70	70	0	0	0	0	0
15:00	2007	191	80	1	1	1	1	1
16:00	1391	80	57	0	0	0	0	0
17:00	1225	57	46	0	0	0	0	0
18:00	847	36	27	0	0	0	0	0
19:00	676	27	15	0	0	0	0	0
20:00	488	15	2	0	0	0	0	0
21:00	267	2	2	0	0	0	0	0

Hour warrant was met:
 VOLUME COMB. 4 Hr. Peak
 600 900 480 720
 150 75 120 60

HOUR	MAJOR	SUM	MAX. MINOR	1A	1B	1AB	2	3
7:00	2059	190	30	1	1	1	1	1
8:00	785	30	19	0	0	0	0	0
9:00	712	25	31	0	0	0	0	0
10:00	779	31	37	0	0	0	0	0
11:00	825	44	44	0	0	0	0	0
12:00	824	44	44	0	0	0	0	0
13:00	835	44	44	0	0	0	0	0
14:00	1048	70	70	0	0	0	0	0
15:00	2007	191	80	1	1	1	1	1
16:00	1391	80	57	0	0	0	0	0
17:00	1225	57	46	0	0	0	0	0
18:00	847	36	27	0	0	0	0	0
19:00	676	27	15	0	0	0	0	0
20:00	488	15	2	0	0	0	0	0
21:00	267	2	2	0	0	0	0	0

Hour warrant was met:
 VOLUME COMB. 4 Hr. Peak
 600 900 480 720
 150 75 120 60

HOUR	MAJOR	SUM	MAX. MINOR	1A	1B	1AB	2	3
7:00	2059	190	30	1	1	1	1	1
8:00	785	30	19	0	0	0	0	0
9:00	712	25	31	0	0	0	0	0
10:00	779	31	37	0	0	0	0	0
11:00	825	44	44	0	0	0	0	0
12:00	824	44	44	0	0	0	0	0
13:00	835	44	44	0	0	0	0	0
14:00	1048	70	70	0	0	0	0	0
15:00	2007	191	80	1	1	1	1	1
16:00	1391	80	57	0	0	0	0	0
17:00	1225	57	46	0	0	0	0	0
18:00	847	36	27	0	0	0	0	0
19:00	676	27	15	0	0	0	0	0
20:00	488	15	2	0	0	0	0	0
21:00	267	2	2	0	0	0	0	0

Hour warrant was met:
 VOLUME COMB. 4 Hr. Peak
 600 900 480 720
 150 75 120 60

HOUR	MAJOR	SUM	MAX. MINOR	1A	1B	1AB	2	3
7:00	2059	190	30	1	1	1	1	1
8:00	785	30	19	0	0	0	0	0
9:00	712	25	31	0	0	0	0	0
10:00	779	31	37	0	0	0	0	0
11:00	825	44	44	0	0	0	0	0
12:00	824	44	44	0	0	0	0	0
13:00	835	44	44	0	0	0	0	0
14:00	1048	70	70	0	0	0	0	0
15:00	2007	191	80	1	1	1	1	1
16:00	1391	80	57	0	0	0	0	0
17:00	1225	57	46	0	0	0	0	0
18:00	847	36	27	0	0	0	0	0
19:00	676	27	15	0	0	0	0	0
20:00	488	15	2	0	0	0	0	0
21:00	267	2	2	0	0	0	0	0

This intersection SATISFIES the warrants for signalization as outlined in the "M.U.T.C.D."

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

- 01 An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.
- 02 The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:
- Warrant 1, Eight-Hour Vehicular Volume
 - Warrant 2, Four-Hour Vehicular Volume
 - Warrant 3, Peak Hour
 - Warrant 4, Pedestrian Volume
 - Warrant 5, School Crossing
 - Warrant 6, Coordinated Signal System
 - Warrant 7, Crash Experience
 - Warrant 8, Roadway Network
 - Warrant 9, Intersection Near a Grade Crossing
- 03 The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.
- Support:
- 04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.
- Guidance:*
- 05 A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.
- 06 A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.
- 07 A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.
- 08 The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.
- 09 Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.
- 10 Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.
- 11 At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.
- 12 For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.

Option:

- 13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the “minor-street” volume and the corresponding single direction of opposing traffic on the major street as the “major-street” volume.
- 14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.
- 15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

- 16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

- 17 Engineering study data may include the following:
- A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
 - B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
 - C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
 - D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
 - E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
 - F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
 - G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.
- 18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:
- A. Vehicle-hours of stopped time delay determined separately for each approach.
 - B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
 - C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
 - D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
 - E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

- 01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.
- 02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.
- 03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

- 04 The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:
- A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection;
 - B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

- 05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

- 06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Standard:

- 07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:
- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and
 - B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume

^b Used for combination of Conditions A and B after adequate trial of other remedial measures

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Option:

- 08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

- 01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

- 01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

- 02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**
- 03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**
- A. **If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:**
 1. **The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and**
 2. **The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and**
 3. **The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.**
 - B. **The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.**

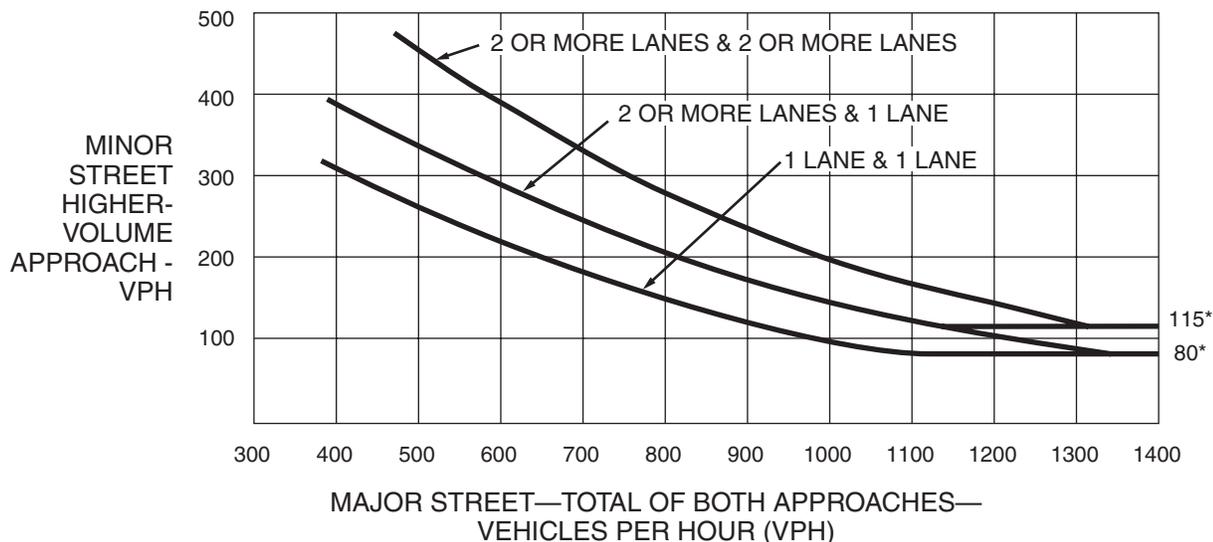
Option:

- 04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.
- 05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

- 06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

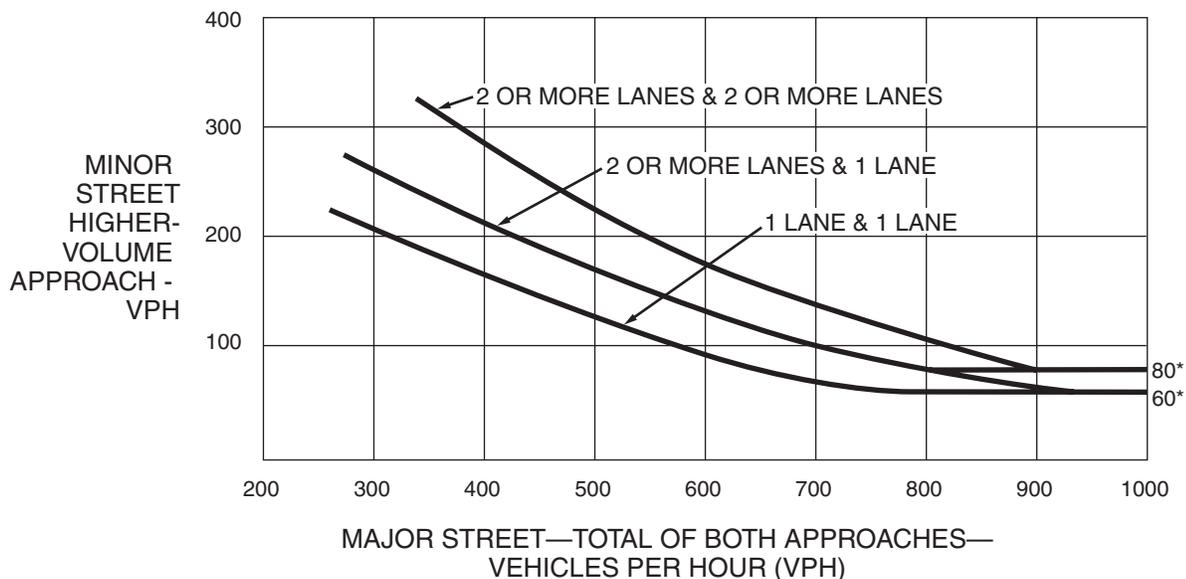
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

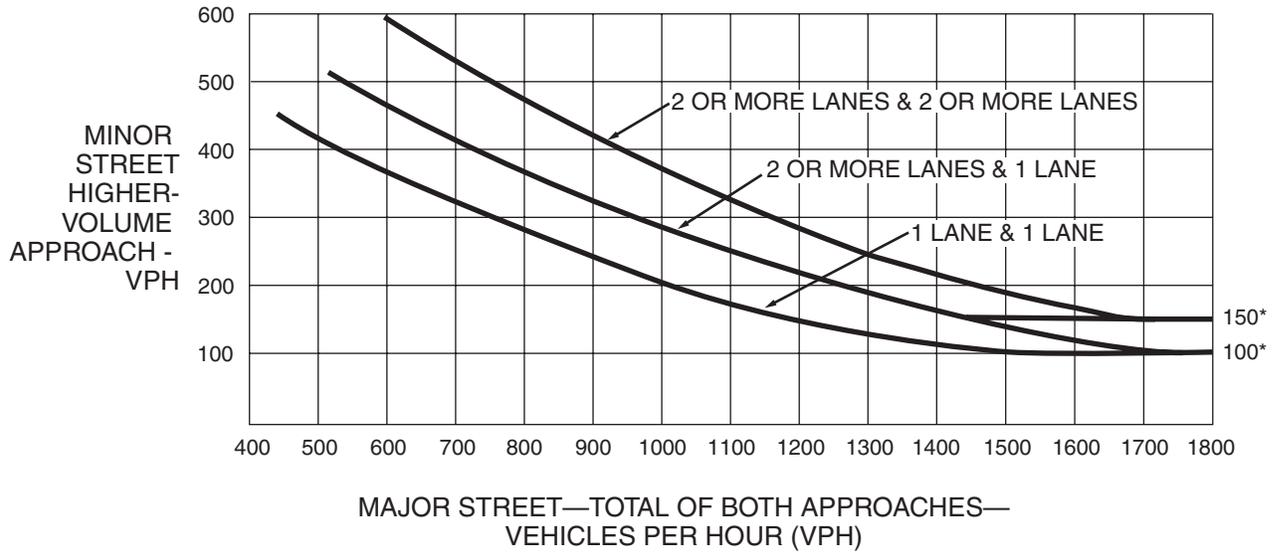
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

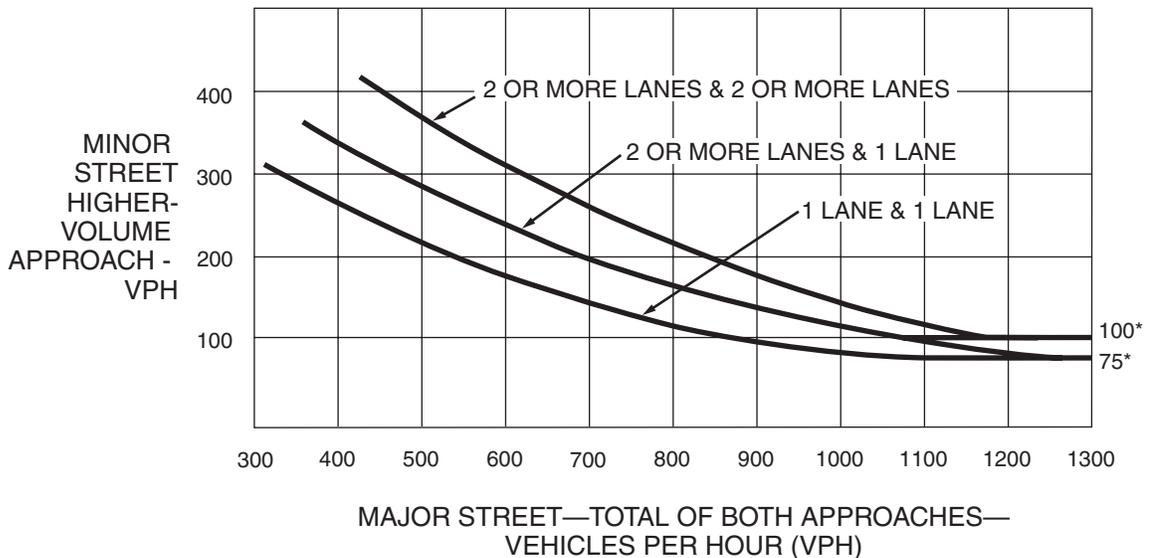
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Section 4C.05 Warrant 4, Pedestrian Volume

Support:

- 01 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

- 02 **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**
- A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or
 - B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

Standard:

- 04 **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**
- 05 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

Guidance:

- 06 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*
- A. *If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
 - B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
 - C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

Option:

- 07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.
- 08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

Section 4C.06 Warrant 5, School Crossing

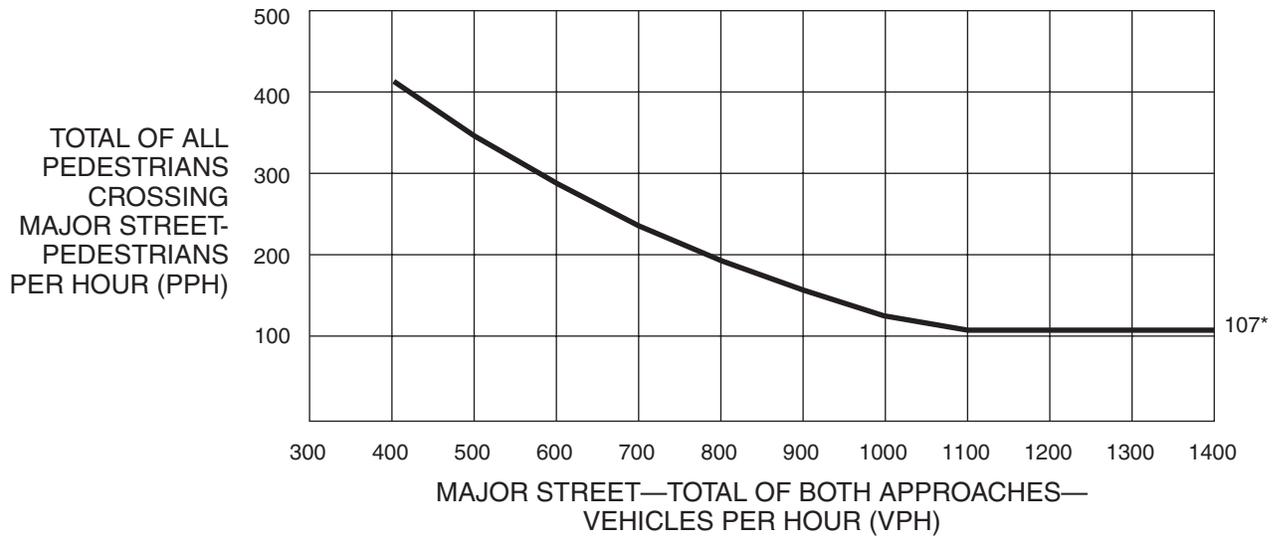
Support:

- 01 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “schoolchildren” includes elementary through high school students.

Standard:

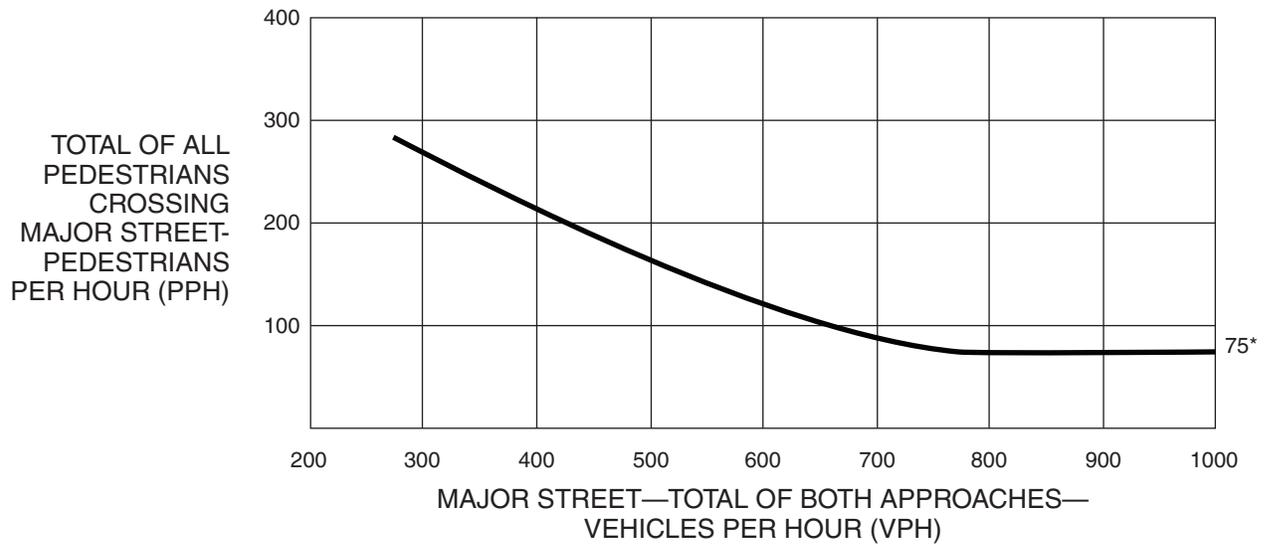
- 02 **The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



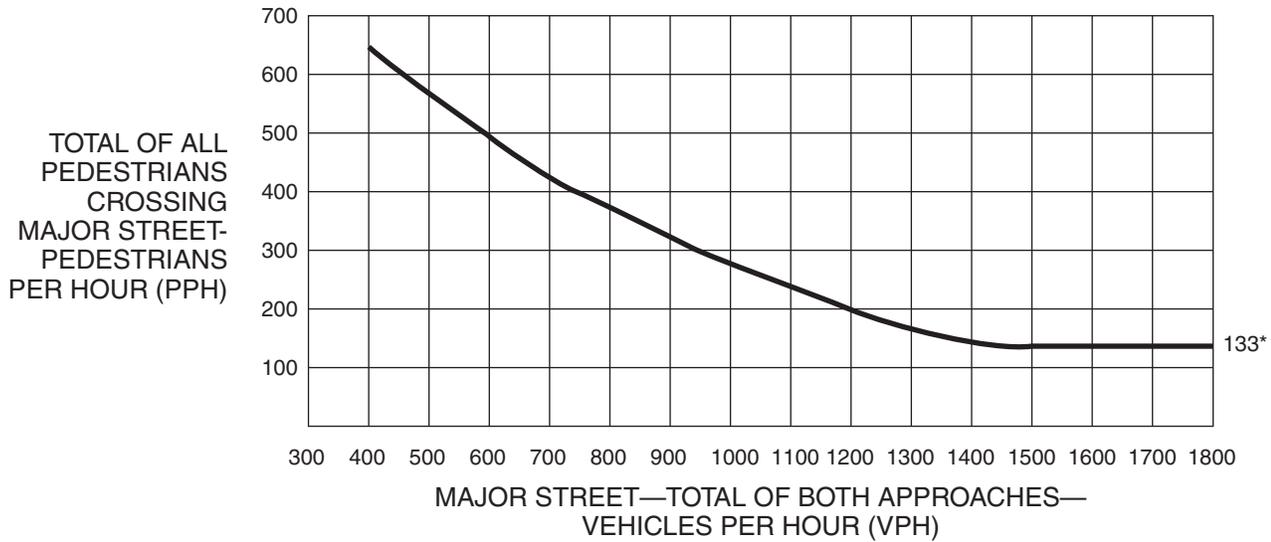
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



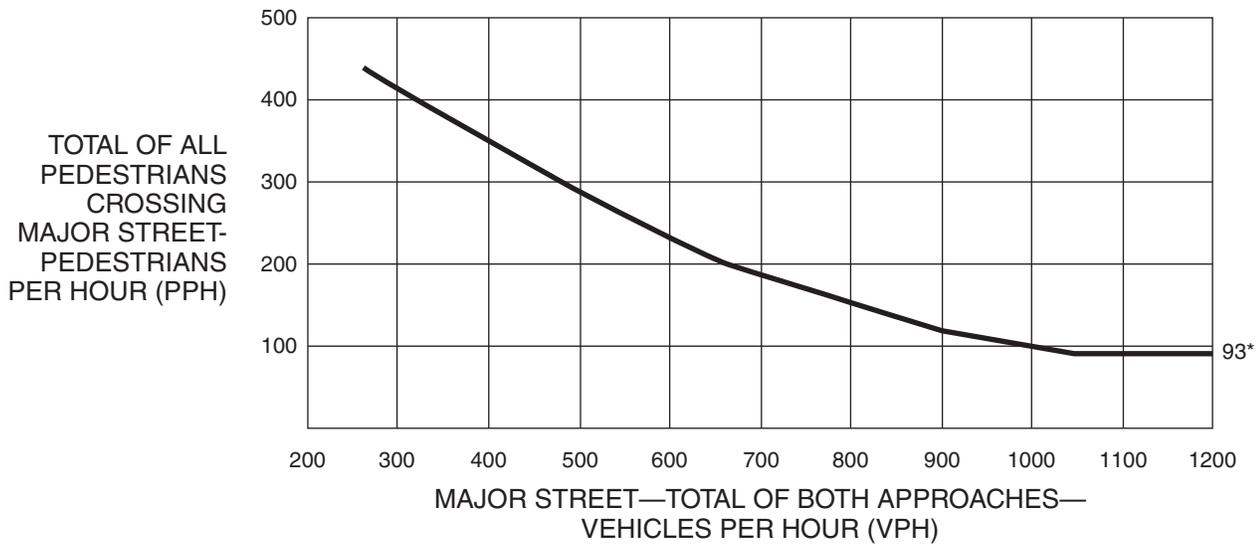
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

03 **Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.**

04 **The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

Guidance:

- 05 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*
- A. *If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
 - B. *If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
 - C. *Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

Section 4C.07 Warrant 6, Coordinated Signal System

Support:

01 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

Standard:

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:**
- A. **On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.**
 - B. **On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.**

Guidance:

03 *The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.*

Section 4C.08 Warrant 7, Crash Experience

Support:

01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:**
- A. **Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and**
 - B. **Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and**
 - C. **For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.**

Option:

- 03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.09 Warrant 8, Roadway Network

Support:

- 01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Standard:

- 02 **The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:**

- A. **The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or**
- B. **The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).**

- 03 **A major route as used in this signal warrant shall have at least one of the following characteristics:**

- A. **It is part of the street or highway system that serves as the principal roadway network for through traffic flow.**
- B. **It includes rural or suburban highways outside, entering, or traversing a city.**
- C. **It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.**

Section 4C.10 Warrant 9, Intersection Near a Grade Crossing

Support:

- 01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

Guidance:

- 02 *This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing. Among the alternatives that should be considered or tried are:*
- A. *Providing additional pavement that would enable vehicles to clear the track or that would provide space for an evasive maneuver, or*
 - B. *Reassigning the stop controls at the intersection to make the approach across the track a non-stopping approach.*

Standard:

- 03 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:**

- A. **A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and**
- B. **During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13.**

Guidance:

- 04 *The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:*
- A. *Figure 4C-9 should be used if there is only one lane approaching the intersection at the track crossing location and Figure 4C-10 should be used if there are two or more lanes approaching the intersection at the track crossing location.*



PETERS & ASSOCIATES
ENGINEERS, INC.

• *CIVIL & TRAFFIC ENGINEERING* •

5507 Ranch Drive - Suite 205 (501) 868-3999
Little Rock, Arkansas 72223 Fax (501) 868-9710



Commercial real estate brokerage, development and investment

November 22, 2017

Mr. Truett Smith
Planning Director
210 SW 3rd Street
Bryant, AR 72022

Dear Mr. Smith:

Please find attached, the Planning Commission Application package for our Hurricane Storage Center self-storage project located at 4302 Springhill Road, Bryant. We would like to be on the December 11, 2017 PC agenda.

Included in the package are the following items:

- Completed checklist
- Executed ADA form
- 10 sets of plans reflecting comments from the DRC and with required specifications
- Stormwater detention plans
- \$250 fee for Stormwater plan review (previously submitted)

Please let me know what else you may require for this submission to be on the requested agenda.

Sincerely,

A handwritten signature in black ink, appearing to read "Bud Finley", is written over the typed name.

Bud Finley

Physical Address: 408 Office Park Drive, Bryant, AR 72022
Mailing Address: P.O. Box 10, Bryant, AR 72089
Telephone: (501) 666-1300 • Fax: (501) 666-1904

Bryant Planning Commission

LARGE SCALE DEVELOPMENT COMMERCIAL BUILDING CHECKLIST

CITY OF BRYANT
210 SW 3RD STREET
BRYANT, AR 72022
501-943-0309

PC MEETING DATE: SECOND MONDAY OF EACH MONTH
TIME: 6:00 P.M.
PLACE: COURTROOM - BRYANT OFFICE COMPLEX
AGENDA DEADLINE: 5:00 P.M. THREE WEEKS PRIOR TO THE REGULARLY SCHEDULED MEETING DATE ✓

REQUIREMENTS FOR SUBMISSION

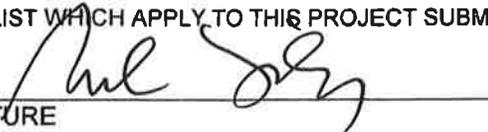
LETTER TO PLANNING COMMISSION STATING YOUR REQUEST
COMPLETED CHECKLIST (SUBDIVISION OR BUILDING)
ADA/ABA FORM COMPLETED
TWO FULL SETS OF BUILDING PLANS
20 FOLDED COPIES OF SITE PLAN (MINIMUM SIZE 17" X 34") THAT INCLUDES THE FOLLOWING:
VICINITY MAP - LEGAL DESCRIPTION - LANDSCAPING PLAN
20 FOLDED COPIES OF FLOOR PLAN
20 COPIES OF FRONT AND REAR BUILDING ELEVATIONS
AN IBM COMPATIBLE DISKETTE IN PDF FORMAT
COPY OF ADEQ STORMWATER POLLUTION PREVENTION PLAN FOR PROPERTY PARCEL CONTAINING ONE ACRE OR LARGER.
COPY OF STORMWATER DETENTION APPROVAL BY ENGINEER
\$250.00 FOR STORMWATER DETENTION AND DRAINAGE PLAN REVIEW

ALL REQUIREMENTS LISTED ABOVE MUST BE COMPLETED AND ATTACHED BEFORE SUBMITTING APPLICATION TO BE PLACED ON THE PLANNING COMMISSION AGENDA.

NOTE: WHEN MAKING CHANGES TO AN APPROVED SITE PLAN, A REVISED SITE PLAN MUST BE SUBMITTED TO THE BRYANT PLANNING COMMISSION FOR APPROVAL. THIS MUST BE DONE PRIOR TO IMPLEMENTATION. FAILURE TO COMPLY WILL RESULT IN PENALTIES/FINES BEING IMPOSED IN ACCORDANCE WITH CITY ORDINANCES.

I HAVE COMPLIED WITH THE REQUIREMENTS LISTED ABOVE AND HAVE CHECKED ALL OF THE BOXES ON THE CHECKLIST WHICH APPLY TO THIS PROJECT SUBMITTAL.

SIGNATURE



DATE

11-2-17

City of Bryant Commercial Building Checklist

Name of Development Hurricane Storage Center (Ph. 1)
Site Location 4302 Springhill Rd Current zoning C-2
Owner Arkansas Storage Centers V LLC Phone 501-666-1300

I. BASIC INFORMATION NEEDED ON THE SITE PLAN

- ▲ 1. Name of Development
- ▲ 2. Current zoning
- ▲ 3. Name and Address of owner of Record
- ▲ 4. Name and address of the architect, landscape architect, engineer, surveyor, or other person involved in the preparation of the plan
- ▲ 5. Date of preparation of the plan
- ▲ 6. Vicinity map locating streets, highways, section lines, railroad, schools, & parks within ½ mile
- ▲ 7. Legal description of the property with exact boundary lines
- ▲ 8. North arrow & Scale
- ▲ 9. Identification of any land areas within the 100 year floodplain and within the 100 year floodway
- ▲ 10. Lot area in square feet
- ▲ 11. Show scale (not less than 1" = 100') (paper size minimum 17" X 34")
- ▲ 12. Existing streams, drainage channels, and other bodies of water
- ▲ 13. Drainage easements for stormwater run-off and detention shown & labeled *MS*
- ▲ 14. Location and name of existing streets
- ▲ 15. Show source of water supply
- ▲ 16. Show location of waste water connection to municipal system & sanitary sewer layout
- ▲ 17. Fire Hydrant placement *MS*
- ▲ 18. Proposed location of buildings and other structures, parking areas, drives, loading areas, service areas, alleys, walks, screening, and public streets
- ▲ 19. Sufficient dimensions to indicate relationship between buildings, property lines, parking areas and other elements of the plan
- ▲ 20. Extent and character of proposed landscaping. Common and/or Botanical plant names and sizes of new vegetation must be clearly indicated.
- ▲ 21. Location, massing and pattern of existing vegetation to be retained
- ▲ 22. Existing structures on the site
- ▲ 23. Pedestrian and vehicular access points, sidewalks, crosswalks, etc. *MS*
- ▲ 24. Typical building elevations depicting the style, size and exterior construction materials of the buildings proposed. Where several building types are proposed on the plan, such as apartments and commercial buildings, a separate sketch shall be prepared for each type. The elevations shall be drawn at a minimum scale of 1/16" to a foot and must show adjoining context.
- ▲ 25. Any variance approvals

Adrian S. [Signature]

II. ADDITIONAL INFORMATION NEEDED, BUT NOT ON THE SITE PLAN

COMMERCIAL BUILDING WORKSHEET

	Yes	No
Site is compatible with Master Street Plan	X	
Proposed improvement is within building line setbacks Front <u>50</u> ft. Side <u>25</u> ft. CNR Side _____ ft. Back <u>55</u> ft.		
Parking requirements can be satisfied Floor Space _____ sq.ft. divided by 300 = _____ (no. of parking spaces required)		
Improvement is outside 100 year flood plain (if answer is no - Provide 404 Permit for site)	✓	
Lowest building floor level and all mechanical equipment are above FEMA 100 year flood elevation		
Will there be a dumpster located on the site? <u>Construction</u>	✓	✓
Will there be a construction site office?		✓
Have you made "One Call"?	✓	
Structure and site complies with ADA (Americans with Disability Act) and ABA (Architectural Barriers Act) Accessibility Guidelines	✓	
Design complies with Arkansas Plumbing Code and National Electric Code requirements	✓	
Foundation and structure meet earthquake requirements for Zone 1.	✓	
Structure meets Arkansas Energy Code for specified use.	✓	
Complies with Arkansas Fire Prevention Code	✓	
Complies with International Code Council regulations	✓	
Will a Site Clearance Permit be required? (City Ordinance 2002-03)	✓	
Are you granted any variances by the Board of Adjustment?		✓
If you have been granted a variance please explain in detail:		

III. LANDSCAPING COMPLIANCE WITH REQUIREMENTS

	YES	NO
No planting within 5 feet of a fire hydrant	✓	_____
Spacing will be 40' between trees	✓	_____
Tree must be a minimum 3" in diameter at the base and 12' + tall	✓	_____
Existing trees meeting the minimum size can be counted to meet above criteria	✓	_____
No trees can be planted within 30 feet of a property corner or driveway	✓	_____
Shrubs along street right-of-way lines cannot exceed 30 inches in height	✓	_____

V. SITE PLAN ATTACHMENTS

(APPLICATION WILL NOT BE ACCEPTED UNTIL ALL ATTACHMENT REQUIREMENTS ARE MET)

- ▲ 26. Letter to Planning Commission stating your request
- ▲ 27. Completed Checklist
- ▲ 28. Completed ADA/ABA Form
- ▲ 29. Two full sets of Building Plans
- ▲ 30. 20 copies of Site Plan (folded to no larger than 8 1/2 X 14 size) that includes vicinity map and landscaping plan (minimum size 17" X 34" paper)
- ▲ 31. 20 copies of Landscaping Plan (folded to no larger than 8 1/2 X 14 size)
- ▲ 32. 20 copies of building floor plan (folded to no larger than 8 1/2 X 14 size)
- ▲ 33. Copy of Stormwater Detention approval
- ▲ 34. Copy of ADEQ Stormwater Pollution Prevention Plan for property containing one acre or larger.
- ▲ 35. IBM compatible diskette or CD with data in PDF format.
- ▲ 36. Receipt for \$250.00 for Stormwater Detention and Drainage Plan review

YO


I CERTIFY that the design of Hurricane Storage Center in the City of Bryant, Arkansas complies with the above regulations, laws and codes.

Bud Finley / Stuart Finley
Owner

Thomas Engineering
Thomas Pownall
Engineer/Architect

P.O. Box 10
Mailing Address

501-753-4463
Phone #

Bryant, AR 72089
City

11-2-17
Date

CITY USE

Action Taken:

Special Conditions:

Permit Issued:	Date _____	Sq.Ft. _____	Amount \$ _____
----------------	------------	--------------	-----------------

Construction Completed Certified For Occupancy:	Date: _____
	Inspector: _____

IV. SITE COVERAGE COMPLIANCE WITH REQUIREMENTS

(FOR YOUR CONVENIENCE WE HAVE LISTED THE THREE COMMERCIAL ZONING SITE COVERAGE REQUIREMENTS - CHOOSE THE ZONING FOR THIS PROJECT AND COMPLETE ONLY THAT SECTION)

	<u>YES</u>	<u>NO</u>
1. C-1 Zoning - Neighborhood Commercial		
Lot area: minimum of 2,500 square feet; maximum 16,000 square feet	_____	_____
Front Yard: none required	_____	_____
Side Yard: minimum of 5 feet each side	_____	_____
Rear Yard: minimum of 55 feet	_____	_____
Maximum lot coverage of 70% of the total area of the site for all principal, accessory buildings, parking lots, sidewalks, private streets, or drives.	_____	_____
Parking: one space per each 200 sq. ft. of commercial use	_____	_____
Loading areas: physically separated from all streets with 10 ft grassy area	_____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	_____	_____
2. C-2 Zoning - Lots fronting along roadways designated as Interstate 30 and frontage roads, State Highway 5 and 183		
Front Yard: not less than 50 feet from front property line	✓ _____	_____
Side Yard: not required, except where they abut a street or a residential lot line then a minimum of 25 feet is required	✓ _____	_____
Rear Yard: minimum of 15 feet, except where they abut residential area then a minimum of 55 feet is required	✓ _____	_____
A maximum lot coverage of 35% of the total area of the site for all principal and accessory buildings	✓ _____	_____
Parking: one space per each 300 sq. ft. of occupied space	✓ _____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	✓ _____	_____
3. C-2 Zoning - Lots fronting along roadways designated as interior local.		
Front Yard: none required	_____	_____
Side Yard: not required, except where they abut a street or a residential lot line then a minimum of 25 percent of lot dimension	_____	_____
Rear Yard: minimum of 15 feet, except where they abut residential area then a minimum of 55 feet is required	_____	_____
A maximum lot coverage of 85% of the total area of the site for all principal, accessory buildings and parking	_____	_____
Parking: one space per each 300 sq. ft. of occupied space	_____	_____
When abuts a residential district, a minimum 6' high wood, rock, or masonry fence is required with a landscape screen	_____	_____

Permit No. _____

BUILDING PERMIT

ADA/ABA ACCESSIBILITY STANDARDS

The *Americans with Disability Act* and *Architectural Barriers Act* Accessibility Guidelines were prepared by the U.S. Access Board and mandated by the U. S. Department of Justice regulations implementing Title III as the official ADA/ABA accessibility guidelines. All new construction, remodeling, and modifications must conform to these building standards for places of public accommodation and commercial facilities. Residential is exempt.

The ADA/ABA accessibility guidelines contain general design standards for building and site elements, such as accessible entrances and routes, ramps, parking spaces, stairs, elevators, restrooms, signage, etc. Also included are specific standards for restaurants, medical care facilities, libraries and transportation facilities and vehicles, and places of lodging.

The guidelines also include "scoping" requirements that outline the necessary features or appropriate quantity for achieving ready access. For example, at least 50 percent of all public entrances to buildings must be accessible with an accessible path of travel. In public restrooms, at least one bathroom stall must be accessible unless there are more than six stalls, in which case the number increases.

I hereby certify that I have read and examined the above notice and will comply with all guidelines of the ADA Accessibility Guidelines. I further understand that a copy of the ADA/ABA Regulations are available for inspection during business hours of City Hall or I may obtain a copy by writing:

The Access Board
1331 F Street, NW, Suite 1000
Washington, DC 20004-1111
(202) 272-0080 (v) (202) 272-0082 (TTY) (202) 272-0081 (fax)
(800) 872-2253 (v) (800) 993-2822 (TTY)
email: info@access-board.gov

Signature of Contractor
or Authorized Agent _____

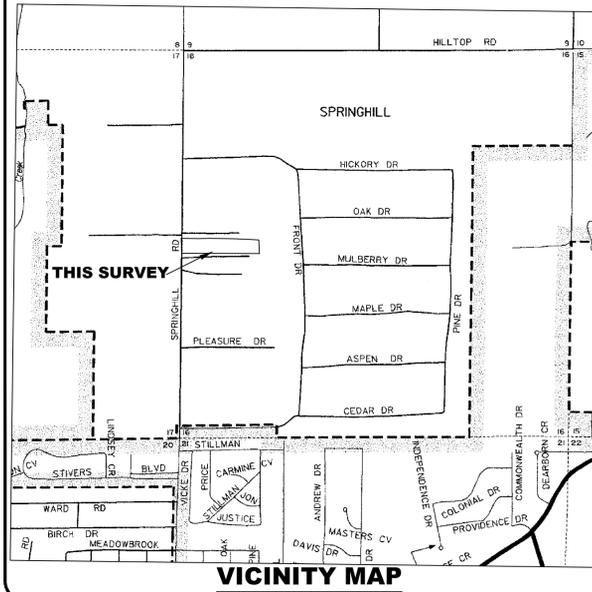
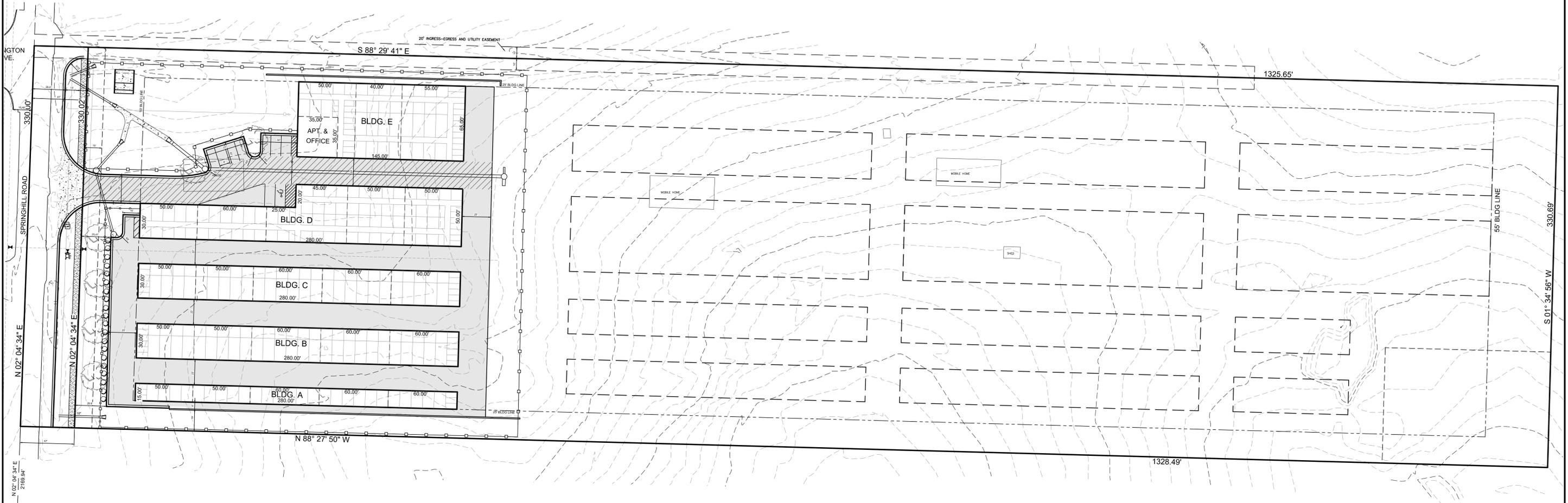
Date _____

Signature of Owner
(if owner-builder) _____

Paul J. Jolley *Furley + Co., Inc.* Date *11-2-17*

Application of Permit Approved: _____ Date _____

Commission - Chairman



- SITE PLAN REVIEW NOTES**
1. SITE CONTAINS 5 BUILDINGS IN PHASE 1. TOTAL SQUARE FOOTAGE OF ALL UNITS IS 41,725 SF.
 2. BASIS OF BEARINGS: PAGIS
 3. THE PROPERTY IS NOT SHOWN IN THE 100 YEAR FLOOD PLAIN ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 050308 0225 D DATED JUNE 19, 2012.
 4. THIS PROPERTY IS ZONED C-2 (HIGHWAY COMMERCIAL).
 5. ALL ABUTTING PROPERTY IS ZONED R-1.
 6. THIS TRACT CONTAINS 438,384 S.F. OR 10.06 ACRES, MORE OR LESS.
 7. SETBACKS SHOWN ARE FOR C-2 ZONING.
50' FRONT
25' SIDE (ABUTTING RESIDENTIAL)
55' REAR (ABUTTING RESIDENTIAL)

LEGAL DESCRIPTION
(AS PREPARED BY RASBURY SURVEYING, 1/23/17)

THAT PART OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 16, TOWNSHIP 1 SOUTH RANGE 14 WEST, SALINE COUNTY, ARKANSAS, DESCRIBED AS FOLLOWS:

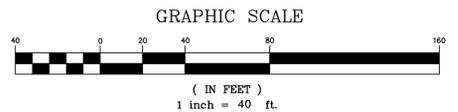
COMMENCING AT A #4 REBAR, BEING THE SOUTHWEST CORNER OF SECTION 16, TOWNSHIP 1 SOUTH, RANGE 15 WEST;

THENCE N 00° 46' 14" E ALONG THE WEST LINE THEREOF FOR 2499.94 FEET TO THE POINT OF BEGINNING;
THENCE S 89° 48' 01" E FOR 1325.65 FEET TP A #3 REBAR, SAID POINT BEING ON THE EAST LINE OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER;
THENCE S 00° 16' 36" W ALONG SAID EAST LINE FOR 330.69 FEET TO A 1" PIPE;
THENCE N 89° 46' 10" W FOR 1328.49 FEET TO A POINT ON THE WEST LINE OF SECTION 16;
THENCE N 00° 46' 14" E ALONG SAID WEST LINE FOR 330.00 FEET TO THE POINT OF BEGINNING; CONTAINING 10.06 ACRES, MORE OR LESS.

SUBJECT TO AND TOGETHER WITH AN EASEMENT FOR INGRESS, EGRESS AND UTILITY PURPOSES OVER AND ACROSS THE FOLLOWING DESCRIBED PROPERTY ALL THAT PART OF THE WEST HALF OF SECTION 16, TOWNSHIP 1 SOUTH, RANGE 14 WEST, SALINE COUNTY, ARKANSAS, DESCRIBED AS:

BEGINNING AT A POINT ON THE WEST LINE OF SAID SECTION 16 THAT IS 2500.6 FEET NORTH OF THE SOUTHWEST CORNER THEREOF;
FROM SAID POINT, RUN THENCE SOUTH 10 FEET;
THENCE EAST FOR 1056 FEET, MORE OR LESS, TO A POINT THAT IS 264 FEET WEST OF THE EAST LINE OF THE WEST HALF OF THE WEST HALF OF SECTION 16;
THENCE NORTH 20 FEET TO A POINT THAT IS 264 FEET WEST OF THE EAST LINE OF THE WEST HALF OF THE WEST HALF OF SECTION 16;
THENCE WEST 1056 FEET TO A POINT THAT IS DUE NORTH OF THE POINT OF BEGINNING; RUN THENCE SOUTH 10 FEET TO THE POINT OF BEGINNING.

SUBJECT TO THE RIGHT-OF-WAY OF SPRINGHILL ROAD.



PARKING

REGULAR	9 SPACES
ASSESSIBLE	1 SPACE
TOTAL	10 SPACES



ARKANSAS STATE LAW REQUIRES THAT THE EXCAVATOR IS TO LOCATE ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ARKANSAS UNDERGROUND FACILITIES DAMAGE PREVENTION ACT. THIS LAW REQUIRES THAT THE EXCAVATOR MAKE A TELEPHONE CALL TO THE ARKANSAS ONE CALL SYSTEM AT 1-800-482-8998 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION TO INSURE THAT ANY EXISTING UTILITIES CAN BE LOCATED.

OWNER AND DEVELOPER:
STUART FINLEY
FINLEY & COMPANY
P.O. BOX 10
BRYANT, AR. 72089

**PRELIMINARY
NOT FOR CONSTRUCTION**



TE THOMAS ENGINEERING COMPANY
3810 LOOKOUT ROAD, N. LITTLE ROCK, AR. 72116
TEL: 501-753-4463 FAX: 501-753-6814

**SITE PLAN REVIEW
HURRICANE STORAGE PH. 1
BRYANT, ARKANSAS**

APPROVED	DRAWN BY	DATE	SHEET NO.
JRP	JRP	11/21/17	C 1.0
SCALE			
1" = 40'			

HURRICANE STORAGE - BRYANT.dwg

PLOTTED: 11/21/2017

LEXINGTON AVE.

SPRINGHILL ROAD

CITY OF BENTON
CITY OF BRYANT

20' INGRESS-EGRESS AND UTILITY EASEMENT

S 88° 29' 41" E

N 88° 27' 50" W

LEGEND

- SHOWS HEAVY DUTY ASPHALT PAVEMENT
- SHOWS STANDARD DUTY ASPHALT PAVEMENT
- SHOWS PROPOSED SHRUB @ 3' CENTERS DWARF YAUPON (ILEX VOMITORIA "NANA")
- SHOWS PROPOSED TREE WILLOW OAK (QUERCUS PHELLOS) 6 TOTAL SHOWN FOR 3 ACRE DEVELOPMENT

SITE PLAN REVIEW NOTES

- SITE CONTAINS 5 BUILDINGS IN PHASE 1. TOTAL SQUARE FOOTAGE OF ALL UNITS IS 41,725.
- BASIS OF BEARINGS: PAGIS
- THE PROPERTY IS NOT SHOWN IN THE 100 YEAR FLOOD PLAIN ON THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 050308 0225 D DATED JUNE 19, 2012.
- THIS PROPERTY IS ZONED C-2 (HIGHWAY COMMERCIAL).
- ALL ABUTTING PROPERTY IS ZONED R-1.
- THIS TRACT CONTAINS 438,384 S.F. OR 10.06 ACRES, MORE OR LESS.
- SETBACKS SHOWN ARE FOR C-2 ZONING.
50' FRONT
25' SIDE (ABUTTING RESIDENTIAL)
55' REAR (ABUTTING RESIDENTIAL)

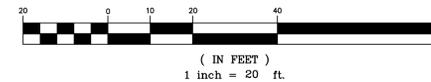
OWNER AND DEVELOPER:

STUART FINLEY
FINLEY & COMPANY
P.O. BOX 10
BRYANT, AR. 72089

PARKING

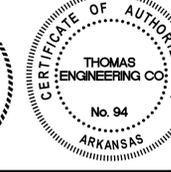
REGULAR	9 SPACES
ASSESSIBLE	1 SPACE
TOTAL	10 SPACES

GRAPHIC SCALE



ARKANSAS STATE LAW REQUIRES THAT THE EXCAVATOR IS TO LOCATE ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ARKANSAS UNDERGROUND FACILITIES DAMAGE PREVENTION ACT. THIS LAW REQUIRES THAT THE EXCAVATOR MAKE A TELEPHONE CALL TO THE ARKANSAS ONE CALL SYSTEM AT 1-800-482-8998 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION TO INSURE THAT ANY EXISTING UTILITIES CAN BE LOCATED.

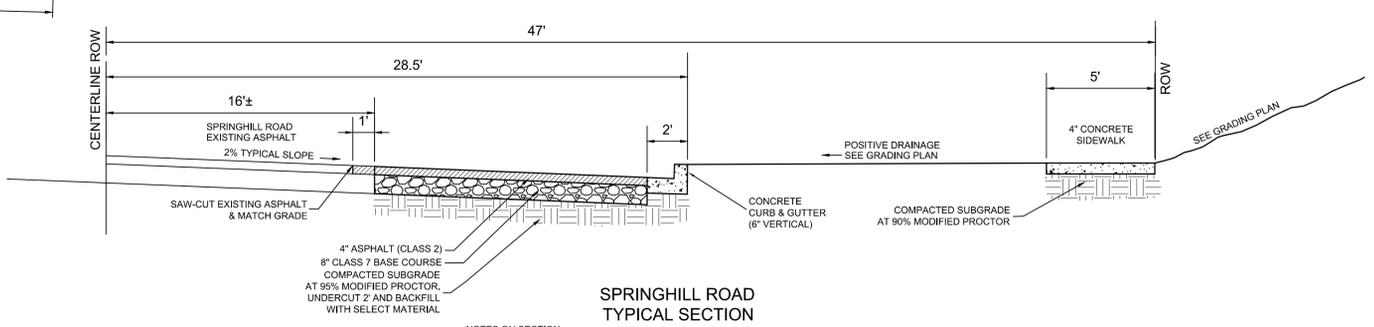
PRELIMINARY
NOT FOR CONSTRUCTION



TE THOMAS ENGINEERING COMPANY
3810 LOOKOUT ROAD, N. LITTLE ROCK, AR. 72116
TEL: 501-753-4463 FAX: 501-753-6814

SITE PLAN
HURRICANE STORAGE PH. 1
BRYANT, ARKANSAS

APPROVED	DRAWN BY	DATE	SHEET NO.
JRP	JRP	11/21/17	C 1.1
SCALE	1" = 20'		



- NOTES ON SECTION:
- SUBGRADE SHALL BE COMPACTED TO 90% MODIFIED PROCTOR UNDER SIDEWALKS.
 - CRUSHED STONE - MATERIAL IN EACH COURSE SHALL BE COMPACTED TO 98% MODIFIED PROCTOR.
 - ANY UNDERCUT SHALL BE SPECIFIED AND APPROVED BY CITY AND/OR INSPECTING ENGINEER.

SIGN, SIZE & LOCATION PER CODE.

47' STREET DEDICATION

5' CONCRETE SIDEWALK

STREET WIDENING

15' EASEMENT

METAL FENCE WITH BRICK COLUMNS

6" WOOD FENCE

6" CHAIN LINK FENCE (BLACK)

HURRICANE STORAGE - BRYANT.dwg

PLOTTED: 11/21/2017

LEXINGTON AVE.

SPRINGHILL ROAD

CONSTRUCT DROP INLET
TOP 477.3
FL 472.8

18 LF 18" RCP

18" FES
FL 468.7

CONSTRUCT 2' BOTTOM
GRASS SWALE

TOP 474.0
TOE 473.0

TOP 479.6
TOE 473.8

TOP 479.6
TOE 474.8

CONSTRUCT 190 LF
RETAINING WALL

CONSTRUCT 2' BOTTOM
GRASS SWALE

TOP 480.5
TOE 477.0

TOP 481.2
TOE 477.9

TOP 480.7
TOE 479.0

OVERFLOW WEIR
TOP: 473.0

41 LF 18" RCP

18" FES
FL 468.8

30" FES
FL 469.4

33 LF 30" RCP

18" FES
FL 469.4

27 LF 18" RCP

260 LF 30" RCP

8 LF 18" RCP
FL 478.7

CONSTRUCT JUNCTION BOX
TOP 482.0
18" FL 478.5
30" FL 477.5

8 LF 30" RCP
FL 478.7

CONSTRUCT DROP INLET
TOP 475.0
FL 471.0

CONSTRUCT DROP INLET
TOP 478.5
FL 474.0

52 LF 18" RCP

CONSTRUCT DROP INLET
TOP 477.3
FL 472.8

FFE = 479.0

FFE = 479.66

FFE = 480.33

FFE = 481.0

FFE = 481.67

FFE = 479.0

FFE = 479.66

FFE = 480.33

FFE = 481.0

FFE = 481.67

FFE = 479.0

FFE = 479.66

FFE = 480.33

FFE = 481.0

FFE = 481.67

35 LF 18" RCP

18" FES
FL 475.0

TOP 479.0
TOE 478.2

TOP 480.0
TOE 478.4

CONSTRUCT 305 LF
RETAINING WALL

TOP 485.0
TOE 479.8

CONSTRUCT 2' BOTTOM
GRASS SWALE

TOP 487.0
TOE 481.1

TOP 487.0
TOE 481.3

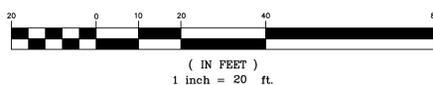
TOP 487.0
TOE 482.0

TOP 487.5
TOE 487.0

LEGEND

- 99.5 SHOWS SPOT ELEVATION AT GUTTER OF CURB
- NOTE: SPOT ELEVATIONS FINISHED GRADE UNLESS OTHERWISE SHOWN.

GRAPHIC SCALE



GRADING PLAN
GENERAL NOTES

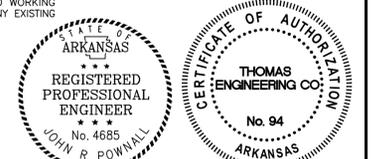
1. THE GENERAL CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGES TO THE ADJACENT PROPERTIES OCCURRING DURING THE CONSTRUCTION PHASES OF THIS PROJECT.
2. WARRANTY/DISCLAIMER. THE DESIGNS REPRESENTED IN THESE PLANS ARE IN ACCORDANCE WITH ESTABLISHED PRACTICES OF CIVIL ENGINEERING FOR THE DESIGN FUNCTIONS AND USES INTENDED AT THIS TIME. HOWEVER, NEITHER THOMAS ENGINEERING COMPANY, INC., NOR ITS PERSONNEL CAN OR DO WARRANTY THESE DESIGNS OR PLANS AS CONSTRUCTED EXCEPT IN THE SPECIFIC CASES WHERE THOMAS ENGINEERING COMPANY PERSONNEL INSPECT AND CONTROL THE PHYSICAL CONSTRUCTION ON A CONTEMPORARY BASIS AT THE SITE.
3. SAFETY NOTICE TO CONTRACTOR. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON OR NEAR THE CONSTRUCTION SITE.
4. ENGINEER'S NOTICE TO CONTRACTOR. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
5. SEE ARCHITECTURAL PLANS FOR DETAILS ON CONCRETE RAMPS AND SIDEWALKS ATTACHED TO BUILDINGS.
6. FINISHED GRADE CONTOURS ARE INDICATED ALONG TOP OF COMPLETED STRUCTURES, TOP OF PAVEMENT AND GUTTER LINE OF CURB, UNLESS OTHERWISE SHOWN. FOR ROUGH GRADING, CONTRACTOR SHALL ALLOW FOR DEPTHS OF TOPSOIL AND CONCRETE STRUCTURES. FOR FINISH GRADING, CONTRACTOR SHALL INSTALL TOPSOIL AND CONCRETE STRUCTURES TO FINISHED GRADE AS INDICATED ON THIS SHEET.
7. GRADE TO DRAIN AWAY FROM BUILDING AT MINIMUM 1% SLOPE.
8. THE GENERAL CONTRACTOR SHALL FURNISH "AS-BUILT" DRAWINGS AT END OF PROJECT.
9. ALL STORM DRAIN LINES AND UTILITY LINES UNDER THE PAVEMENT SHALL BE BACK FILLED WITH CRUSHED STONE.
10. PLACE A 6" MINIMUM DEPTH OF TOPSOIL OVER ALL LAWN AND LANDSCAPE AREAS.
11. REFER TO LANDSCAPE PLAN FOR PERMANENT TURF SOO AND SEEDING AREAS.
12. PROVIDE TEMPORARY SEEDING AND EROSION CONTROL PER STATE AND LOCAL CODES.
13. ALL STORM DRAINS SHALL BE INSTALLED ACCORDING TO THE LATEST SPECIFICATIONS OF THE BRYANT STREET DEPARTMENT.

DETENTION BASIN NOTES:

1. DETENTION BASIN IS SIZED FOR 5.8 ACRES OF DEVELOPMENT.
2. DETENTION BASIN SHALL BE MAINTAINED BY OWNER.
3. DETENTION BASIN SHALL BE SODED OR HYDRO-SEEDED TO ESTABLISH VEGETATION.



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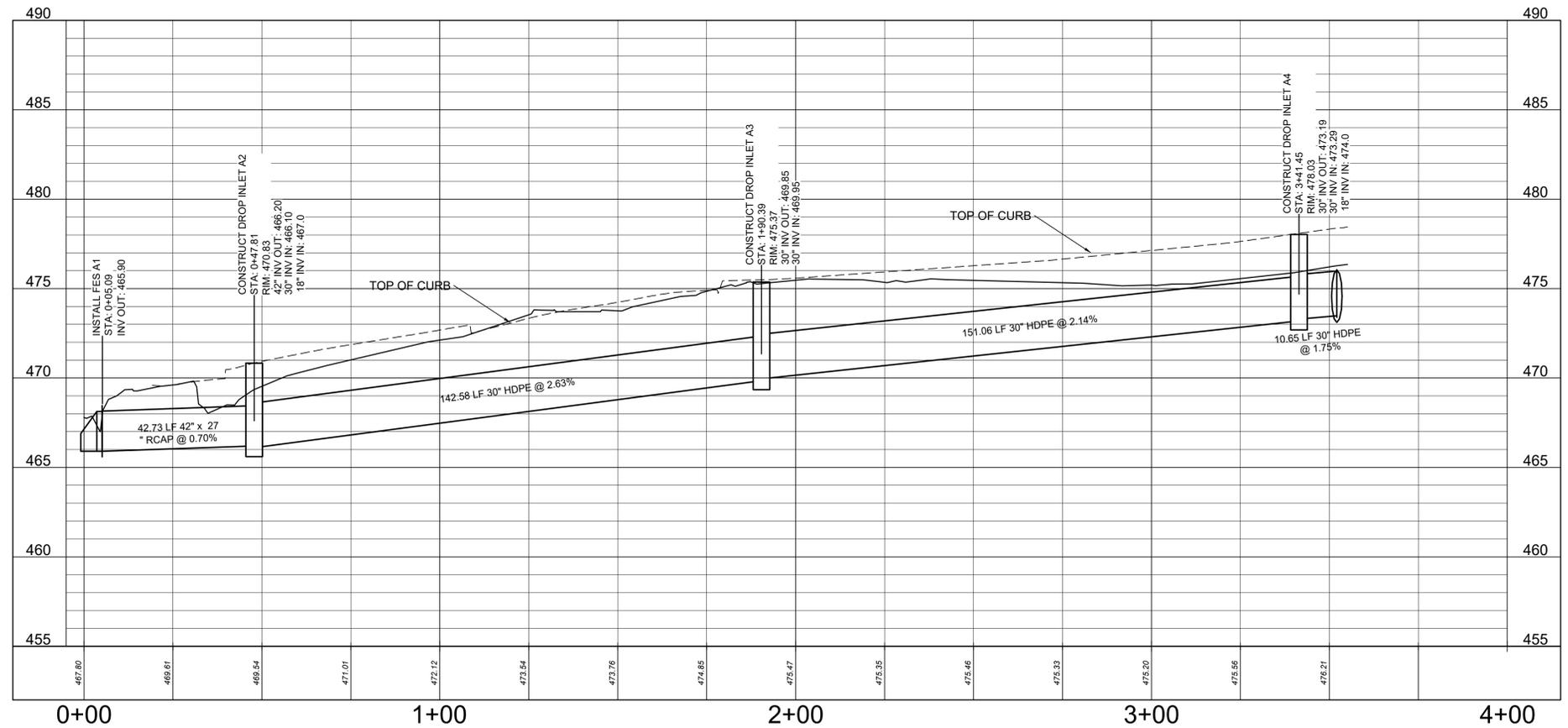
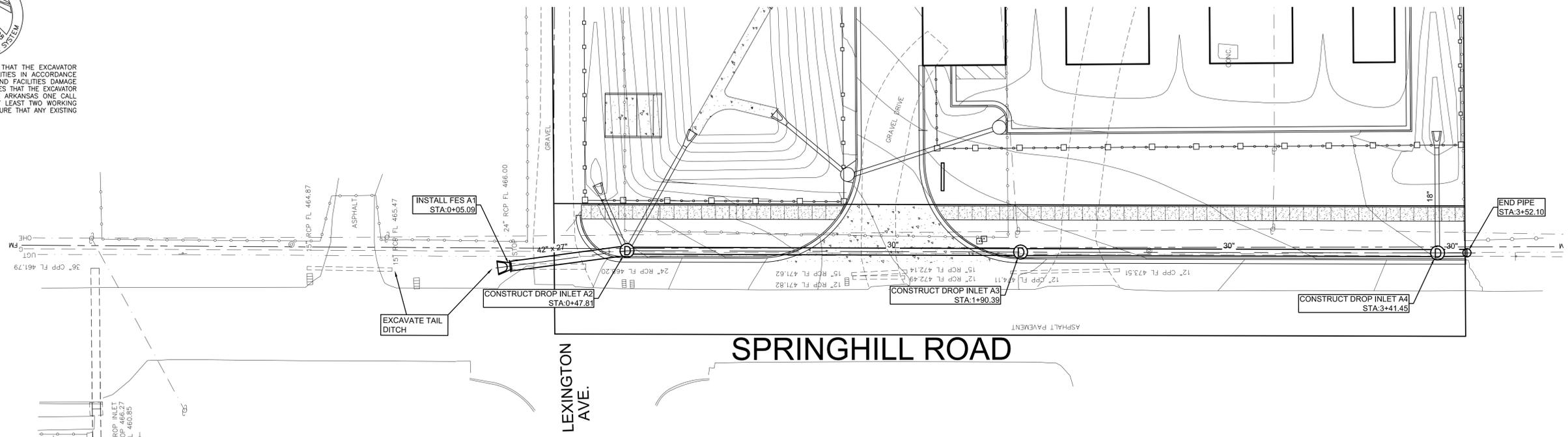
THOMAS ENGINEERING COMPANY
3810 LOOKOUT ROAD, N. LITTLE ROCK, AR. 72116
TEL: 501-753-4463 FAX: 501-753-6814

**GRADING PLAN
HURRICANE STORAGE PH. 1
BRYANT, ARKANSAS**

APPROVED	DRAWN BY	DATE	SHEET NO.
JRP	JRP	11/21/17	C 2.0
SCALE			
1" = 20'	2-6/4-6		



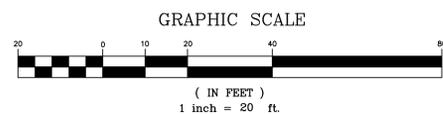
ARKANSAS STATE LAW REQUIRES THAT THE EXCAVATOR IS TO LOCATE ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ARKANSAS UNDERGROUND FACILITIES DAMAGE PREVENTION ACT. THIS LAW REQUIRES THAT THE EXCAVATOR MAKE A TELEPHONE CALL TO THE ARKANSAS ONE CALL SYSTEM AT 1-800-452-8888 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION TO INSURE THAT ANY EXISTING UTILITIES CAN BE LOCATED.



STORM DRAIN LINE A

HURRICANE STORAGE - BRYANT.dwg

PLOTTED: 11/18/2017



PRELIMINARY
NOT FOR CONSTRUCTION

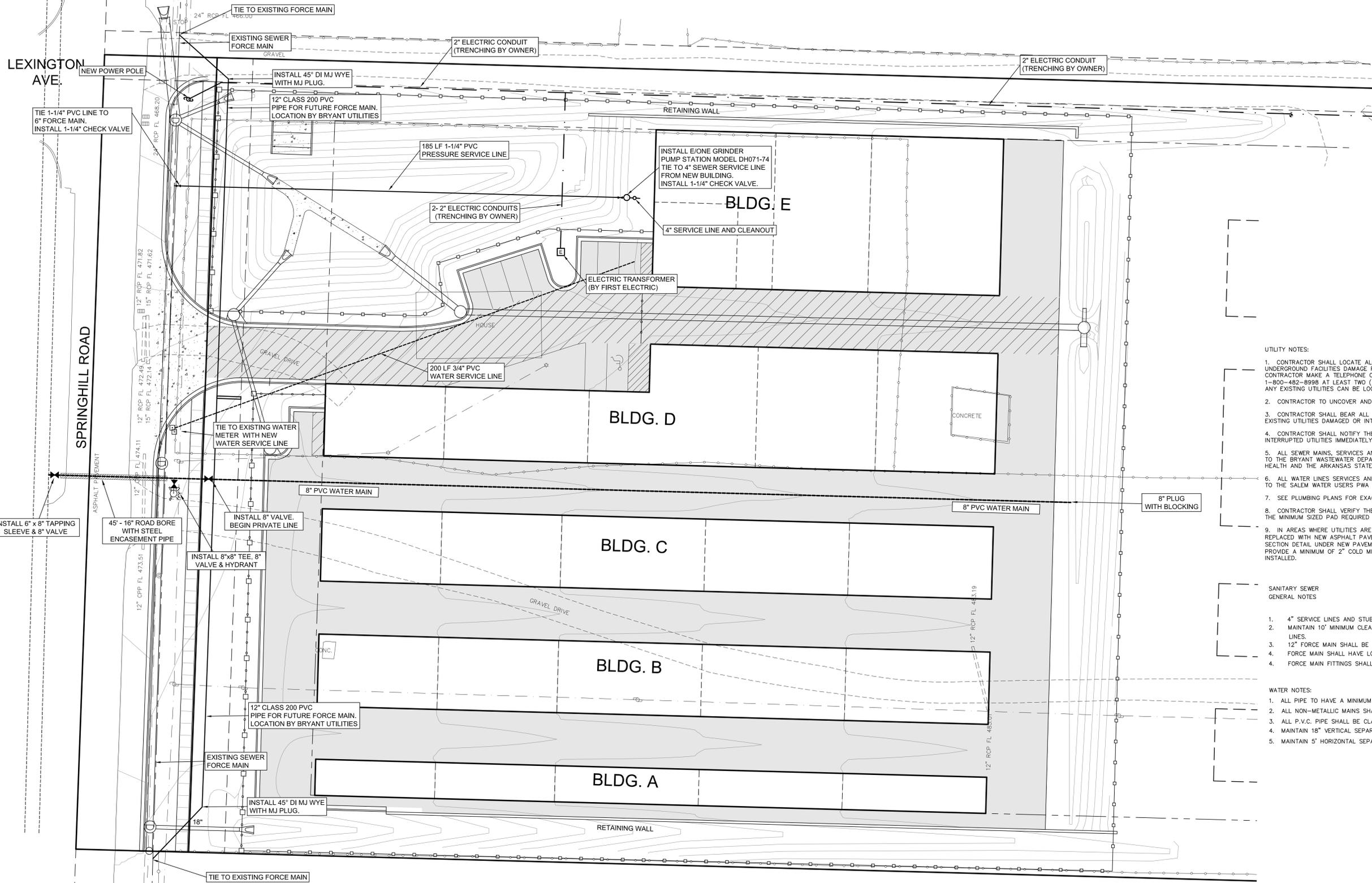


TE THOMAS ENGINEERING COMPANY
 3810 LOOKOUT ROAD, N. LITTLE ROCK, AR. 72116
 TEL: 501-753-4463 FAX: 501-753-6814

PLAN & PROFILE STORM DRAIN LINE A STA. 0+00 TO STA. 4+00 HURRICANE STORAGE PH. 1			
APPROVED JRP	DRAWN BY JRP	DATE 11/18/17	SHEET NO. C 3.0
SCALE 1" = 20'		2-6/4-6	

HURRICANE STORAGE - BRYANT.dwg

PLOTTED: 12/6/2017



UTILITY NOTES:

- CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ARKANSAS UNDERGROUND FACILITIES DAMAGE PREVENTION ACT. THIS LAW REQUIRES THAT THE CONTRACTOR MAKE A TELEPHONE CALL TO THE ARKANSAS ONE-CALL SYSTEM AT 1-800-482-8998 AT LEAST TWO (2) WORKING DAYS PRIOR TO EXCAVATING TO ENSURE THAT ANY EXISTING UTILITIES CAN BE LOCATED.
- CONTRACTOR TO UNCOVER AND MARK UTILITY LINES BEFORE CONSTRUCTION.
- CONTRACTOR SHALL BEAR ALL RESPONSIBILITY AND COST OF REPAIR OR REPLACEMENT OF EXISTING UTILITIES DAMAGED OR INTERRUPTED AS A RESULT OF THIS CONSTRUCTION.
- CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND THE OWNER OF ANY DAMAGED OR INTERRUPTED UTILITIES IMMEDIATELY.
- ALL SEWER MAINS, SERVICES AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE TO THE BRYANT WASTEWATER DEPARTMENT SPECIFICATIONS, THE ARKANSAS DEPARTMENT OF HEALTH AND THE ARKANSAS STATE PLUMBING CODE.
- ALL WATER LINES SERVICES AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE TO THE SALEM WATER USERS PWA REQUIREMENTS AND THE ARKANSAS STATE PLUMBING CODE.
- SEE PLUMBING PLANS FOR EXACT LOCATION OF UTILITY ENTRANCES TO THE BUILDING.
- CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF TRANSFORMER PAD AND PROVIDE THE MINIMUM SIZED PAD REQUIRED BY THE ELECTRIC UTILITY.
- IN AREAS WHERE UTILITIES ARE INSTALLED UNDER EXISTING ASPHALT THAT IS TO BE REPLACED WITH NEW ASPHALT PAVEMENT, REFER TO DETAIL "PIPE TRENCH & BACKFILL SECTION DETAIL UNDER NEW PAVEMENT." SAW CUT ASPHALT FOR UTILITY TRENCHES AND PROVIDE A MINIMUM OF 2" COLD MIX FOR TEMPORARY SURFACE UNTIL NEW PAVEMENT IS INSTALLED.

SANITARY SEWER GENERAL NOTES

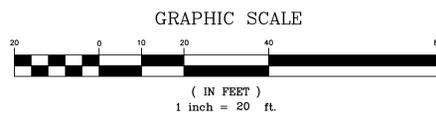
- 4" SERVICE LINES AND STUBS SHALL BE LAID ON MINIMUM 1% SLOPE.
- MAINTAIN 10" MINIMUM CLEARANCE BETWEEN WATER AND SEWER LINES.
- 12" FORCE MAIN SHALL BE CAPPED AT EACH END WITH RFID LOCATORS.
- FORCE MAIN SHALL HAVE LOCATE WIRE AND BE PRESSURE TESTED.
- FORCE MAIN FITTINGS SHALL BE MJ DUCTILE IRON WITH MEGA-LUGS.

WATER NOTES:

- ALL PIPE TO HAVE A MINIMUM OF 3' OF COVER.
- ALL NON-METALLIC MAINS SHALL BE WRAPPED WITH 16 GA. COPPER WIRE.
- ALL P.V.C. PIPE SHALL BE CLASS 250.
- MAINTAIN 18" VERTICAL SEPARATION BETWEEN WATER/SEWER CROSSINGS.
- MAINTAIN 5' HORIZONTAL SEPARATION BETWEEN PARALLEL UTILITIES.



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UTILITY PLAN
 HURRICANE STORAGE PH. 1
 BRYANT, ARKANSAS

APPROVED	DRAWN BY	DATE	SHEET NO.
JRP	JRP	11/21/17	C 4.0
SCALE			
1" = 20'	2-6/4-6		

HURRICANE STORAGE - BRYANT.dwg

PLOTTED: 11/21/2017

LEXINGTON AVE.

SPRINGHILL ROAD

DISCHARGE TO BRYANT MS4

24" RCP FL 466.00

INSTALL ROCK CHECK DAM

INSTALL ROCK CHECK DAM

INSTALL SILT FENCE

INSTALL SILT FENCE

INSTALL ROCK CHECK DAM

INSTALL SILT FENCE

INSTALL GRAVELED CONSTRUCTION ENTRANCE TO PREVENT OFF-SITE TRACKING OF SOIL

INSTALL SILT FENCE

INSTALL SILT FENCE

INSTALL ROCK CHECK DAM

INSTALL ROCK CHECK DAM

1 2 3

CONCRETE

LEGEND

-  SHOWS SILT FENCE
-  SHOWS DRAINAGE ARROW
-  SHOWS ROCK CHECK DAM
-  PORT-A-POTTY LOCATION
-  SOLID WASTE DUMPSTER LOCATION
-  CONCRETE WASHOUT-OUT AREA

SEQUENCE OF CONSTRUCTION

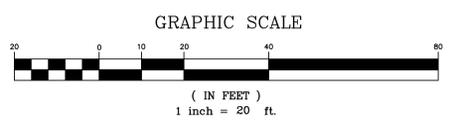
1. INSTALL CONSTRUCTION ENTRANCE & POST ADEQ PERMIT.
2. INSTALL WHATEVER DIVERSIONS/SWALES ARE NECESSARY TO ROUTE ALL SEDIMENT LADEN WATER TO SILT FENCING OR CHECK DAMS.
3. CLEAR THE SITE OF TREES AS DELINEATED ON THIS PLAN.
4. LIMIT SOIL DISTURBING ACTIVITIES DURING CLEARING.
5. BEGIN GRADING FOR SITE.
6. INSTALL UNDERGROUND UTILITIES.
7. POUR BUILDING PADS AND GRADE FOR PAVING.
8. CONSTRUCT BUILDINGS.
9. PAVE THE SITE.
10. INSTALL PERMANENT SEEDING OF DISTURBED AREAS.
11. INSPECT AND RESEED ALL DISTURBED AREAS AS NECESSARY. UPON FINAL SITE STABILIZATION, CLEAN SILT FROM BEHIND ALL SEDIMENT FENCES AND INLET PROTECTION, AND REMOVE ALL TEMPORARY EROSION CONTROL DEVICES.

EROSION CONTROL NOTES:

1. SEDIMENT CONTROL MEASURES MUST BE INSPECTED AND MAINTAINED REGULARLY IN ORDER TO INSURE THAT THE INTENDED PURPOSES ARE ACCOMPLISHED.
2. ALL DISTURBED AREAS NOT INTENDED FOR PAVING SHALL BE SEEDED OR SODDED AS PER SPECIFICATIONS.
3. STABILIZATION REQUIREMENTS: (NOT NECESSARILY VEGETATION) ALL PERIMETER CONTROLS ARE TO BE STABILIZED WITHIN 7 DAYS OF INSTALLATION. ALL OTHER DISTURBED AREAS ARE TO BE STABILIZED WITHIN 14 DAYS.
4. TEMPORARY SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL ALL CONTRIBUTING AREAS ARE GRADED AND STABILIZED.
5. EXCAVATED EARTH SHALL BE PILED ON THE HIGH SIDE OF EXCAVATIONS.
6. EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.
7. THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND-DISTURBING ACTIVITIES.
8. DISTURBED AREA: 3.23 AC
TOTAL SITE AREA THIS PHASE 3.23 AC



ARKANSAS STATE LAW REQUIRES THAT THE EXCAVATOR IS TO LOCATE ALL EXISTING UTILITIES IN ACCORDANCE WITH THE ARKANSAS UNDERGROUND FACILITIES DAMAGE PREVENTION ACT. THIS LAW REQUIRES THAT THE EXCAVATOR MAKE A TELEPHONE CALL TO THE ARKANSAS ONE CALL SYSTEM AT 1-800-482-8998 AT LEAST TWO WORKING DAYS PRIOR TO EXCAVATION TO INSURE THAT ANY EXISTING UTILITIES CAN BE LOCATED.



PRELIMINARY NOT FOR CONSTRUCTION

THOMAS ENGINEERING COMPANY

3810 LOOKOUT ROAD, N. LITTLE ROCK, AR. 72116
TEL: 501-753-4463 FAX: 501-753-6814

STATE OF ARKANSAS
REGISTERED PROFESSIONAL ENGINEER
JOHN R. POWNALL
No. 4685

CERTIFICATE OF AUTHORIZATION
THOMAS ENGINEERING CO.
No. 94
ARKANSAS

EROSION CONTROL PLAN
HURRICANE STORAGE PH. 1
BRYANT, ARKANSAS

APPROVED	DRAWN BY	DATE	SHEET NO.
	JRP	11/21/17	C 5.0
SCALE	2-6/4-6		
1" = 20'			

HURRICANE STORAGE
BRYANT
DETENTION CALCULATIONS

7/18/17

AREA = 5.81 AC.

25 YEAR STORM

EXISTING

$$C_E = 0.42 \text{ (DEV., FAIR COND, 2-7\%)} \text{ TAB. 400-2}$$

$$t_{\text{OVERLAND}} = 12 \text{ MIN (L=150, n=0.4, S=4\%)}$$

EXH. 400-3

$$t_{\text{CHANNEL}} = 2 \text{ MIN (L=775, n=0.2, S=3\%)}$$

EXH. 400-3

$$t_E = 12 + 2 = 14 \text{ MIN}$$

$$I_{25E} = 6.4$$

$$I_{100E} = 8.0$$

DEVELOPED

$$C_D = 0.88 \text{ (DEV. CONC/ROOF)}$$

$$t_{\text{OVER}} = 0.3 \text{ MIN (L=110, PAV, 1\%)}$$

$$t_{\text{PIPE}} = 2 \text{ MIN, (720 FT / 6 FPS / 60 SEC)}$$

$$t_D = 5 \text{ MIN. (MIN)}$$

$$I_{25D} = 8.5$$

$$I_{100D} = 10.0$$

DESIGN DISCHARGE

$$Q_{25E} = C I A$$

$$= (0.42)(6.4)(5.81)$$

$$= \underline{\underline{15.6 \text{ CFS}}}$$

DEVELOPED DISCHARGE

$$Q_{25D} = C I A$$

$$= (0.88)(8.5)(5.81)$$

$$= \underline{\underline{43.5 \text{ CFS}}}$$

STORAGE REQUIRED

$$S = \frac{1}{2} (Q_D - Q_E) T_D \times 60 \text{ (CITY OF LB)}$$

$$= \frac{1}{2} (43.5 - 15.6) (2.67 \times 5) (60)$$

$$= 11,200 \text{ C.F.}$$

VOLUME OF DETENTION BASIN

<u>ELEV</u>	<u>AREA (ft²)</u>	<u>VOLUME (ft³)</u>
469	3087	3591
470	4095	4638
471	5182	5769
472	6357	

13,998 ft³ vs 11,200 c.f.
OK

OUTLET STRUCTURE

$$Q_{25} = 15.6 \text{ CFS}$$

TRY 18" RCP

$$\frac{HW}{D} = 2.2 \text{ (3) (FIG. 4-17 LPA)}$$

$$HL \text{ PIPE} = 468.8$$

$$HW = 3.3 \text{ FT. (WATER DEPTH)} = 472.1 \text{ WATER ELEV.}$$

USE 18" RCP WITH SPILLWAY ELEV = 473.0

$$\begin{aligned} \text{SPILLWAY } Q_s &= Q_{100} - Q_{25} \\ &= 51.6 - 15.6 = 36.0 \text{ CFS} \end{aligned}$$

USE 16' BOTTOM WEIR 0.76' DEEP (8").

$$Q = 35.5 \text{ CF}$$

100 YEAR STORM

DESIGN DISCHARGE

$$\begin{aligned} Q_{100E} &= C I A \\ &= (0.42)(8)(5.81) \\ &= \underline{\underline{19.5 \text{ CFS}}} \end{aligned}$$

DEVELOPED DISCHARGE

$$\begin{aligned} Q_{100D} &= C I A \\ &= (0.88)(10)(5.81) \\ &= \underline{\underline{51.1 \text{ CFS}}} \end{aligned}$$

STORAGE REQUIRED

$$\begin{aligned} S &= \frac{1}{2} (Q_D - Q_E) T_b \times 60 \\ &= \frac{1}{2} (51.1 - 19.5) (2.67 \times 5) (60) \\ &= \underline{\underline{12,660 \text{ C.F.}}} \end{aligned}$$

Weir Report

<Name>

Rectangular Weir

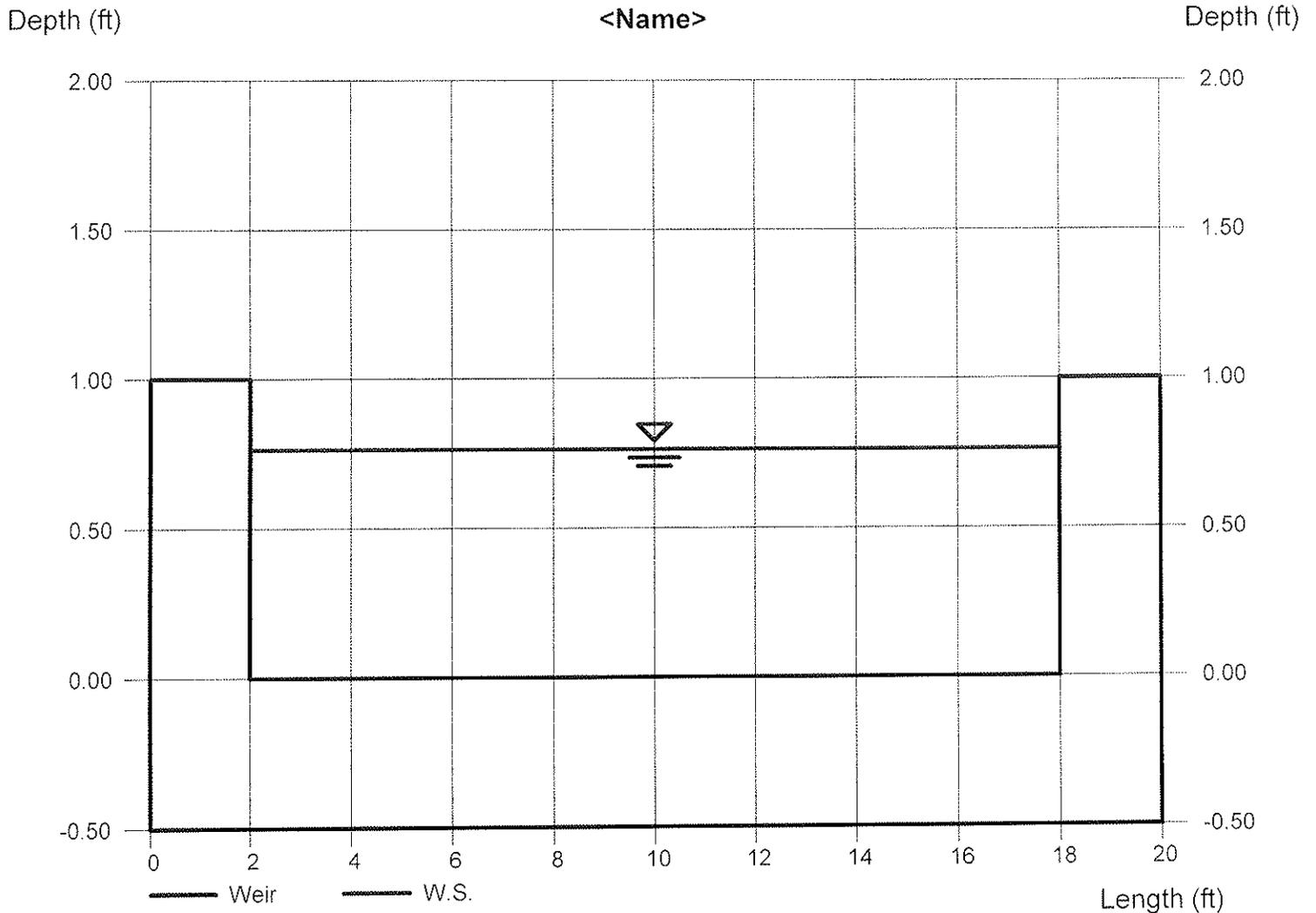
Crest = Sharp
Bottom Length (ft) = 16.00
Total Depth (ft) = 1.00

Highlighted

Depth (ft) = 0.76
Q (cfs) = 35.50
Area (sqft) = 12.20
Velocity (ft/s) = 2.91
Top Width (ft) = 16.00

Calculations

Weir Coeff. Cw = 3.33
Compute by: Known Q
Known Q (cfs) = 35.50



Hydrology Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

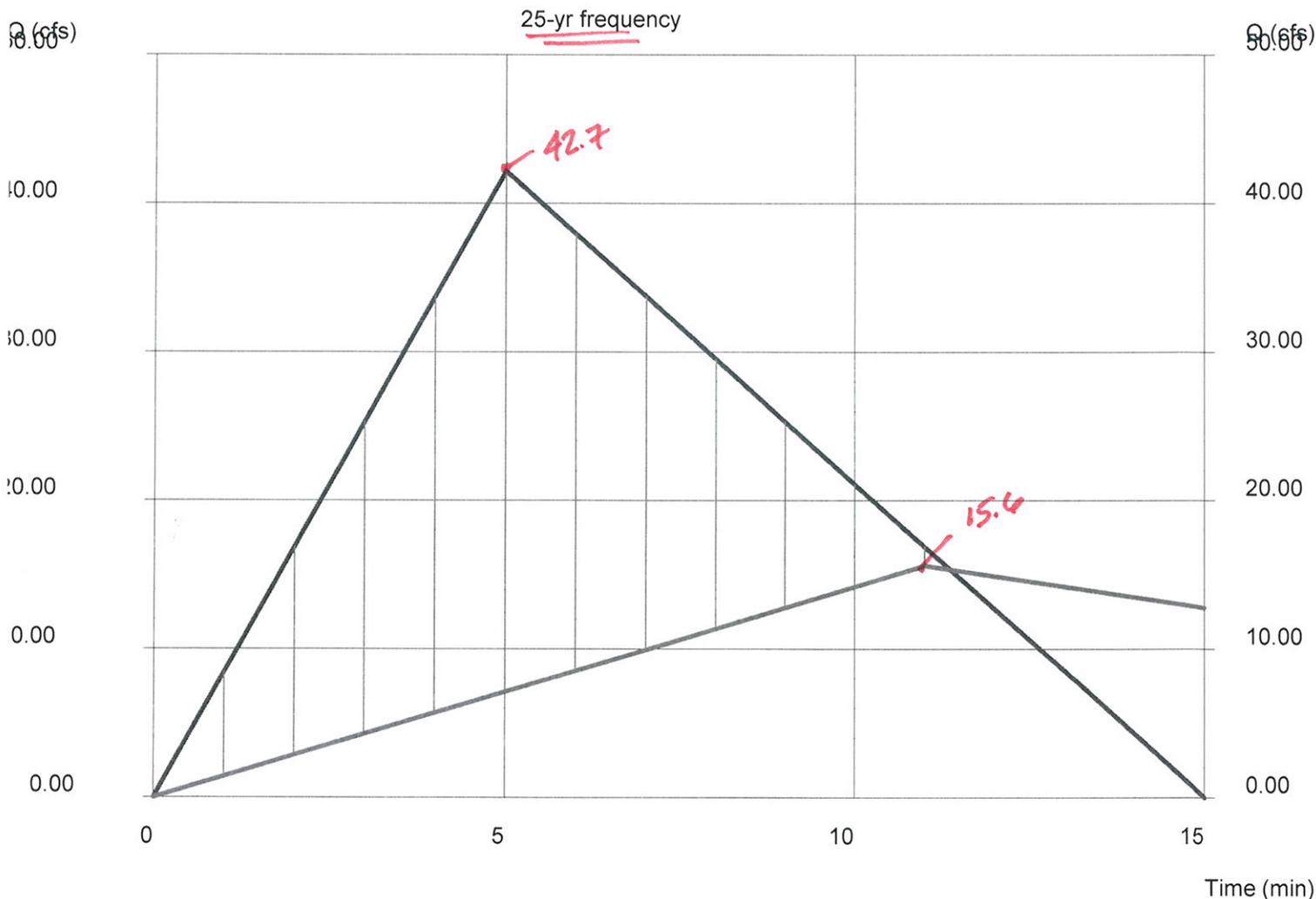
Wednesday, Oct 18 2017

<Name>

Hydrograph type	= Rational	Peak discharge (cfs)	= 42.17
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 5.810	Runoff coeff. (C)	= 0.88
Rainfall Inten (in/hr)	= 8.247	Tc by User (min)	= 5
IDF Curve	= SampleExpress.IDF	Rec limb factor	= <u>2.00</u>

Hydrograph Volume = 18,975 (cuft); 0.436 (acft)

Runoff Hydrograph



Runoff Hyd - Qp = 42.17 (cfs)

Outflow Hyd *



Req. Stor = 11,841 (cuft) *

* Estimated

Outflow Hydrograph	Detention
Volume	Required Storage
(cuft)	(cuft)
0.00	0.00
85.09	420.91
255.27	1,263
510.55	2,525
850.91	4,209
1,276	6,314
1,787	8,080
2,383	9,508
3,063	10,599
3,829	11,351
4,680	11,765
5,616	11,841
6,509	0.00
7,360	0.00
8,169	0.00
8,935	0.00

Runoff Hydrograph			Outflow Hydrograph
Time	Q	Volume	Q
(min)	(cfs)	(cuft)	(cfs)
0	0.000	0.00	0.000
1	8.433	253.00	1.418
2	16.87	1,012	2.836
3	25.30	2,277	4.255
4	33.73	4,048	5.673
5	42.17	6,325	7.091
6	37.95	8,729	8.509
7	33.73	10,879	9.927
8	29.52	12,777	11.35
9	25.30	14,421	12.76
10	21.08	15,813	14.18
11	16.87	16,951	15.60
12	12.65	17,837	14.89
13	8.433	18,469	14.18
14	4.217	18,849	13.47
15	0.000	18,975	12.76

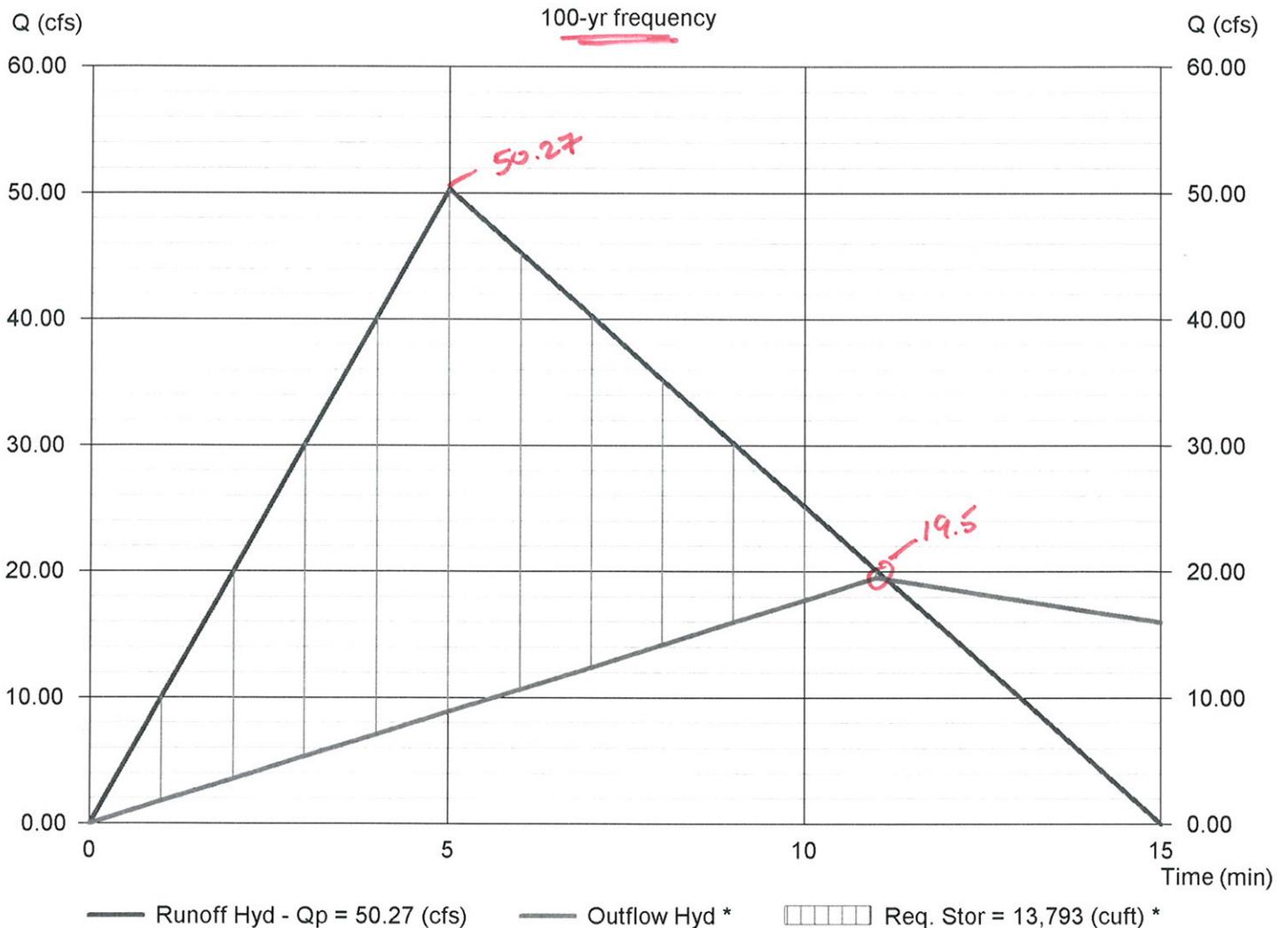
Hydrology Report

<Name>

Hydrograph type	= Rational	Peak discharge (cfs)	= 50.27
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 5.810	Runoff coeff. (C)	= 0.88
Rainfall Inten (in/hr)	= 9.833	Tc by User (min)	= 5
IDF Curve	= SampleExpress.IDF	Rec limb factor	= <u>2.00</u>

Hydrograph Volume = 22,623 (cuft); 0.519 (acft)

Runoff Hydrograph



* Estimated

Runoff Hydrograph			Outflow Hydrograph
Time	Q	Volume	Q
(min)	(cfs)	(cuft)	(cfs)
0	0.000	0.00	0.000
1	10.05	301.64	1.773
2	20.11	1,207	3.545
3	30.16	2,715	5.318
4	40.22	4,826	7.091
5	50.27	7,541	8.864
6	45.25	10,407	10.64
7	40.22	12,971	12.41
8	35.19	15,233	14.18
9	30.16	17,193	15.95
10	25.14	18,852	17.73
11	20.11	20,210	19.50
12	15.08	21,266	18.61
13	10.05	22,020	17.73
14	5.027	22,472	16.84
15	0.000	22,623	15.95

Outflow Hydrograph	Detention
Volume	Required Storage
(cuft)	(cuft)
0.00	0.00
106.36	496.92
319.09	1,491
638.18	2,981
1,064	4,969
1,595	7,454
2,234	9,530
2,978	11,199
3,829	12,459
4,786	13,312
5,850	13,757
7,020	13,793
8,137	0.00
9,200	0.00
10,211	0.00
11,168	0.00

Culvert Report

RETENTION CULVERT/PIPE

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Wednesday, Oct 18 2017

Circular Culvert

Invert Elev Dn (ft) = 68.20
 Pipe Length (ft) = 42.00
 Slope (%) = 1.43
 Invert Elev Up (ft) = 68.80
 Rise (in) = 18.0
 Shape = Circular
 Span (in) = 18.0
 No. Barrels = 1
 n-Value = 0.013
 Culvert Type = Circular Concrete
 Culvert Entrance = Groove end projecting (C)
 Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.2

Calculations

Qmin (cfs) = 1.00
 Qmax (cfs) = 19.50
 Tailwater Elev (ft) = (dc+D)/2

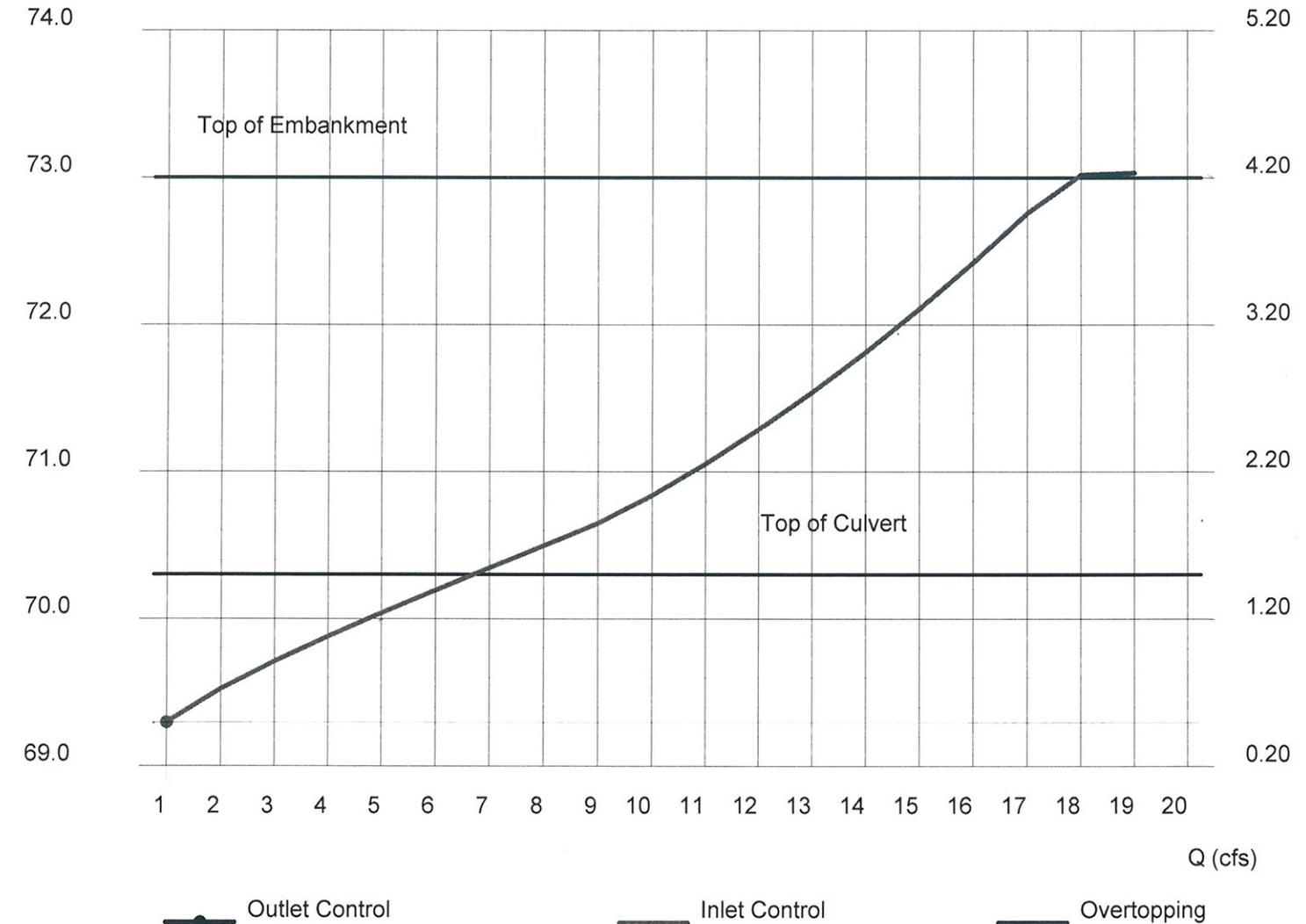
Highlighted

Qtotal (cfs) = 1.00
 Qpipe (cfs) = 1.00
 Qovertop (cfs) = 0.00
 Veloc Dn (ft/s) = 0.86
 Veloc Up (ft/s) = 2.92
 HGL Dn (ft) = 69.14
 HGL Up (ft) = 69.17
 Hw Elev (ft) = 69.30
 Hw/D (ft) = 0.33
 Flow Regime = Inlet Control
 Hw Depth (ft)

Embankment

Top Elevation (ft) = 73.00
 Top Width (ft) = 3.00
 Crest Width (ft) = 50.00

Performance Curve



Q			Veloc		Depth	
Total	Pipe	Over	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)
1.00	1.00	0.00	0.86	2.92	11.24	4.47
2.00	2.00	0.00	1.57	3.56	12.20	6.39
3.00	3.00	0.00	2.20	4.02	12.95	7.90
4.00	4.00	0.00	2.79	4.42	13.59	9.18
5.00	5.00	0.00	3.35	4.77	14.16	10.32
6.00	6.00	0.00	3.89	5.12	14.67	11.34
7.00	7.00	0.00	4.41	5.45	15.14	12.28
8.00	8.00	0.00	4.92	5.79	15.57	13.14
9.00	9.00	0.00	5.43	6.14	15.96	13.91
10.00	10.00	0.00	5.94	6.51	16.31	14.61
11.00	11.00	0.00	6.45	6.90	16.62	15.23
12.00	12.00	0.00	6.97	7.32	16.88	15.76
13.00	13.00	0.00	7.50	7.75	17.10	16.23
14.00	14.00	0.00	8.03	7.92	17.28	18.00
15.00	15.00	0.00	8.57	8.49	17.43	18.00
16.00	16.00	0.00	9.12	9.05	17.54	18.00
17.00	17.00	0.00	9.67	9.62	17.63	18.00
18.00	17.74	0.26	10.08	10.04	17.69	18.00
19.00	17.78	1.22	10.10	10.06	17.69	18.00

68.8 FL

Q

cls

HGL			
Dn	Up	Hw	Hw/D
(ft)	(ft)	(ft)	
69.14	69.17	69.30	0.33
69.22	69.33	69.52	0.48
69.28	69.46	69.71	0.61
69.33	69.56	69.88	0.72
69.38	69.66	70.04	0.83
69.42	69.75	70.19	0.93
69.46	69.82	70.35	1.03
69.50	69.89	70.50	1.13
69.53	69.96	70.65	1.23
69.56	70.02	70.84	1.36
69.58	70.07	71.05	1.50
69.61	70.11	71.29	1.66
69.63	70.15	71.54	1.83
69.64	70.37	71.81	2.01
69.65	70.48	72.11	2.21
69.66	70.60	72.42	2.42
69.67	70.73	72.76	2.64
69.67	70.83	73.02	2.81
69.67	70.83	73.03	2.82

1

2

3

4

5

1.2'

6

7

8

9

10

11

12

13

14

15

3.2'

16

17

18

19



CIVIL ENGINEERS LAND SURVEYORS

ROUTE TIXE 25 YEAR STORM

INFLOW HYDROGRAPH

- DIMENSIONLESS HYDROGRAPH

$$\frac{t}{t_p}$$

$$\frac{Q}{Q_p}$$

0.5

0.4

1.0

1.0

1.5

0.6

2.0

0.3

3.0

0.07

$$t_p = \frac{25}{25} \text{ 5 MIN}$$

$$Q_p = \frac{43.5}{25}$$

(DEVELOPED FLOW)

t

Q

2.5

17.4

5

43.5

7.5

26.10

10

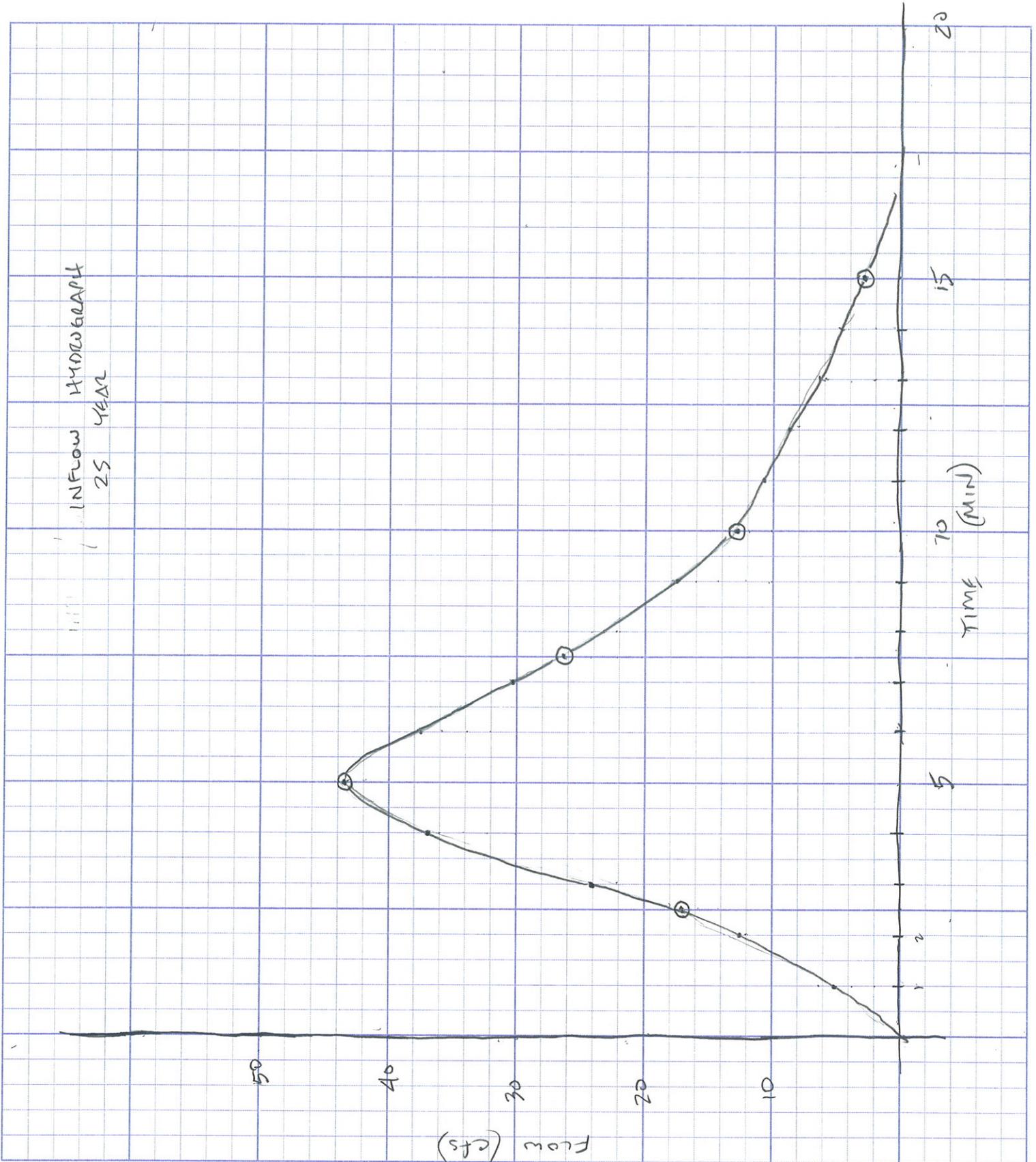
13.05

15

3.05

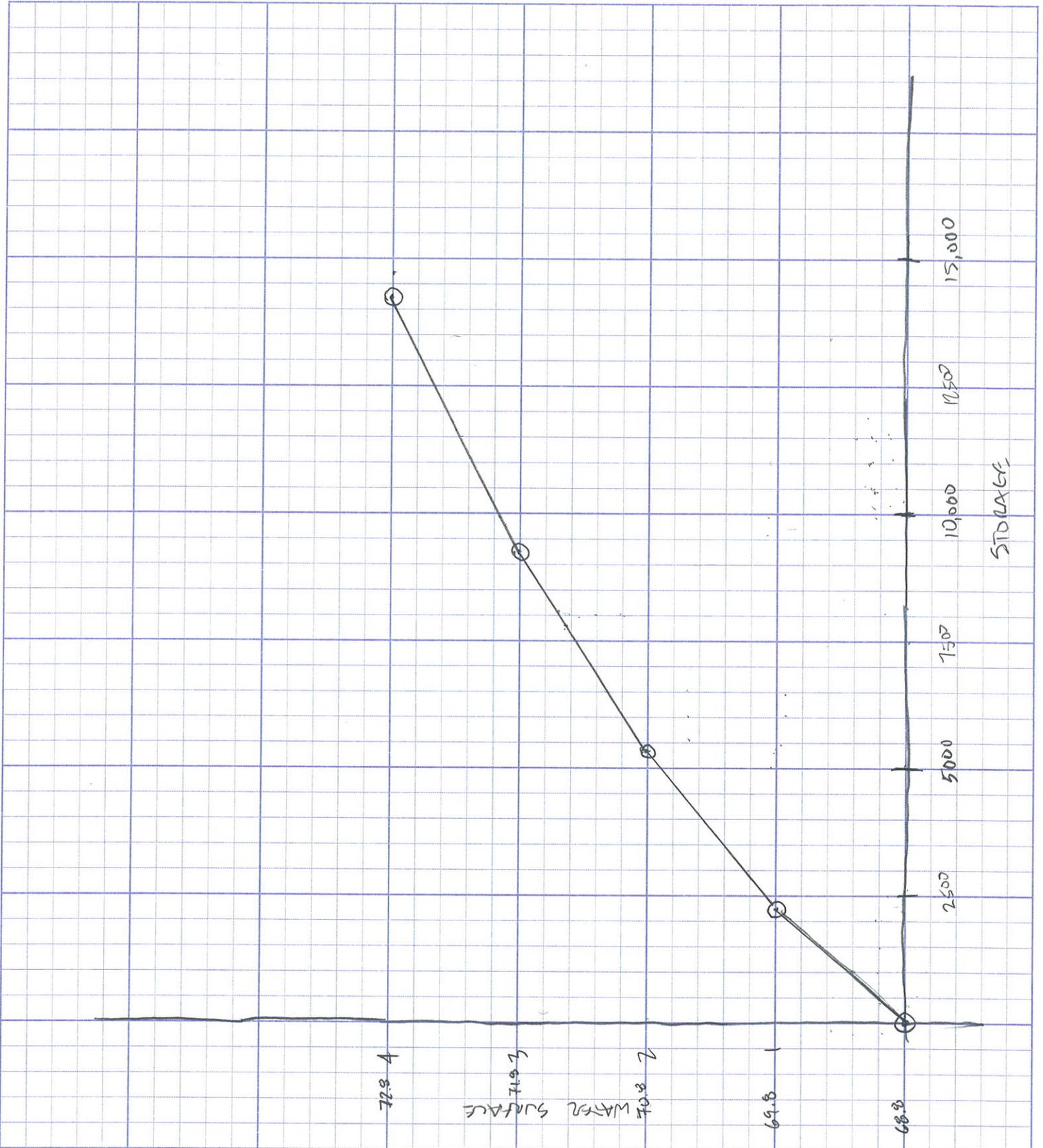


CIVIL ENGINEERS LAND SURVEYORS





CIVIL ENGINEERS LAND SURVEYORS





CIVIL ENGINEERS LAND SURVEYORS

25 YEAR ROUTE

TIME	Cfs INFLOW	Fi ³ STORAGE	Cfs OUTFLOW
0	0	0 $\Delta S = 0$	0
1	5	0 $\Delta S = 300$	0
2	12.5	300 $\Delta S = 750$	0
3	24	1050 $\Delta S = 1380$	1
4	37	2430 $\Delta S = 1980$	4
5	43.5	4410 $\Delta S = 2130$	8
6	37.5	6540 $\Delta S = 1560$	11.5
7	31.5	8100 $\Delta S = 1110$	13.0
8	23	9210 $\Delta S = 540$	14.0
9	17.5	9750 $\Delta S = 180$	14.5
10	13.0	9930 $\Delta S = -102$	14.7
11	10.8	9828 $\Delta S = -228$	14.6
12	9.0	9600	
13	6.3		
14	4.5		
15	3.0		

WATER ELEV 72.0 RELEASE RATE 147
 MAX STORAGE NEEDED

9930 Fi³

25 YEAR

GOOD



CIVIL ENGINEERS LAND SURVEYORS

ROUTE THE 100 YEAR STORM

INFLOW HYDROGRAPH - DIMENSIONLESS HYDROGRAPH

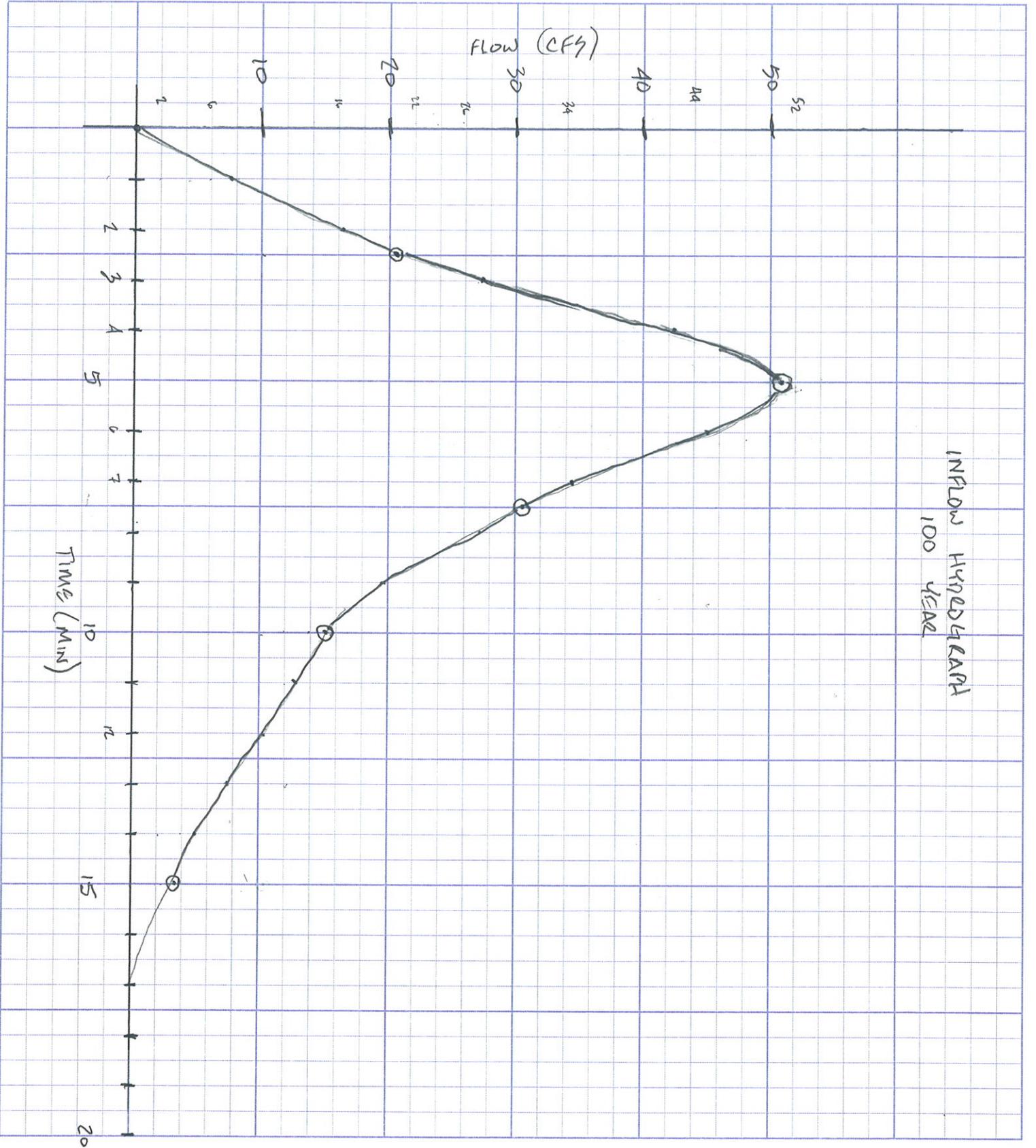
t/t_p	Q/Q_p
0.5	0.4
1.0	1.0
1.5	0.6
2.0	0.3
3.0	0.07

$t_{p_{100}} = 5 \text{ min}$

$Q_{p_{100}} = 51.1$

(DEVELOPED FLOW)

t	Q
2.5	20.44
5	51.1
7.5	30.66
10	15.33
15	3.60



CIVIL ENGINEERS LAND SURVEYORS



**THOMAS
ENGINEERING
COMPANY**

PREPARED BY _____

PROJECT DESCRIPTION _____

SHEETS _____

DATE _____



CIVIL ENGINEERS LAND SURVEYORS

100 YEAR ROUTE

TIME	INFLOW cfs	STORAGE	OUTFLOW	
0	0	0 $\Delta S = 0$	0	
1	7.8	0 $\Delta S = 468$	0	
2	16.3	468 $\Delta S = 978$	0	
3	27.5	1446 $\Delta S = 1560$	1.5	
4	42.5	3006 $\Delta S = 2250$	5	
5	51.1	5256 $\Delta S = 2466$	10	
6	45.0	7722 $\Delta S = 1950$	12.5	
7	34.5	9722 $\Delta S = 1200$	14.5	
8	27.3	10922 $\Delta S = 720$	15.3	
9	18.6	11642 $\Delta S = 180$	15.6	
10	15.33	11822 $\Delta S = -61$	16	← MAX STORAGE NEEDED 11822 FT ³
11	13.0	11761 $\Delta S = -174$	15.9	WATER ELEVATION @ 16 cfs = 72.42
12	10.4	11587 $\Delta S = -312$	15.6	
13	7.5			100 YEAR 6000
14	5.0			
15				



CIVIL ENGINEERS LAND SURVEYORS

CALCULATE PRE + POST DEVELOPMENT RUNOFFS	
$A = 5.81 \text{ AC.}$	$t_{CE} = 14 \text{ MIN}$ $t_{CD} = 5 \text{ MIN}$ $C_E = 0.42$ $C_D = 0.88$ $CA_E = 2.44$ $CA_D = 5.11$
PRE	POST
$Q_2 = 2.44(4.1) = 10.0$	$Q_2 = 5.11(5.8) = 29.6$
$Q_{10} = 2.44(5.5) = 13.4$	$Q_{10} = 5.11(7.6) = 38.8$
$Q_{25} = 2.44(6.4) = 15.6$	$Q_{25} = 5.11(8.5) = 43.4$
$Q_{50} = 2.44(7.0) = 17.1$	$Q_{50} = 5.11(9.3) = 47.5$
$Q_{100} = 2.44(8.6) = 19.5$	$Q_{100} = 5.11(10.0) = 51.1$

INSPECTION REPORT
 STORM WATER DETENTION FACILITY
 DATE: ___/___/___
 HURRICANE STORAGE
 SPRINGHILL ROAD

INLET #	OBSERVATION	ACTION TAKEN
1		
2		
3		
4		

CHECK LISTS:

- _____ INLET BOX LINT IN GOOD CONDITION (NOT BROKEN) AND FITS CORRECTLY
- _____ INLET THROAT FREE OF OBSTRUCTIONS
- _____ MONITOR FOR BREAKS, CRACKS OR DETERIORATION OF CONCRETE
- _____ MONITOR AND REMOVE ANY SEDIMENT IN INLET OR CONCRETE FLUME
- _____ REMOVE ANY TRASH WITHIN BASIN OR ANY OBSTRUCTIONS OF PIPES
- _____ VERIFY VEGETATION OF BASIN SLOPES TO PREVENT EROSION

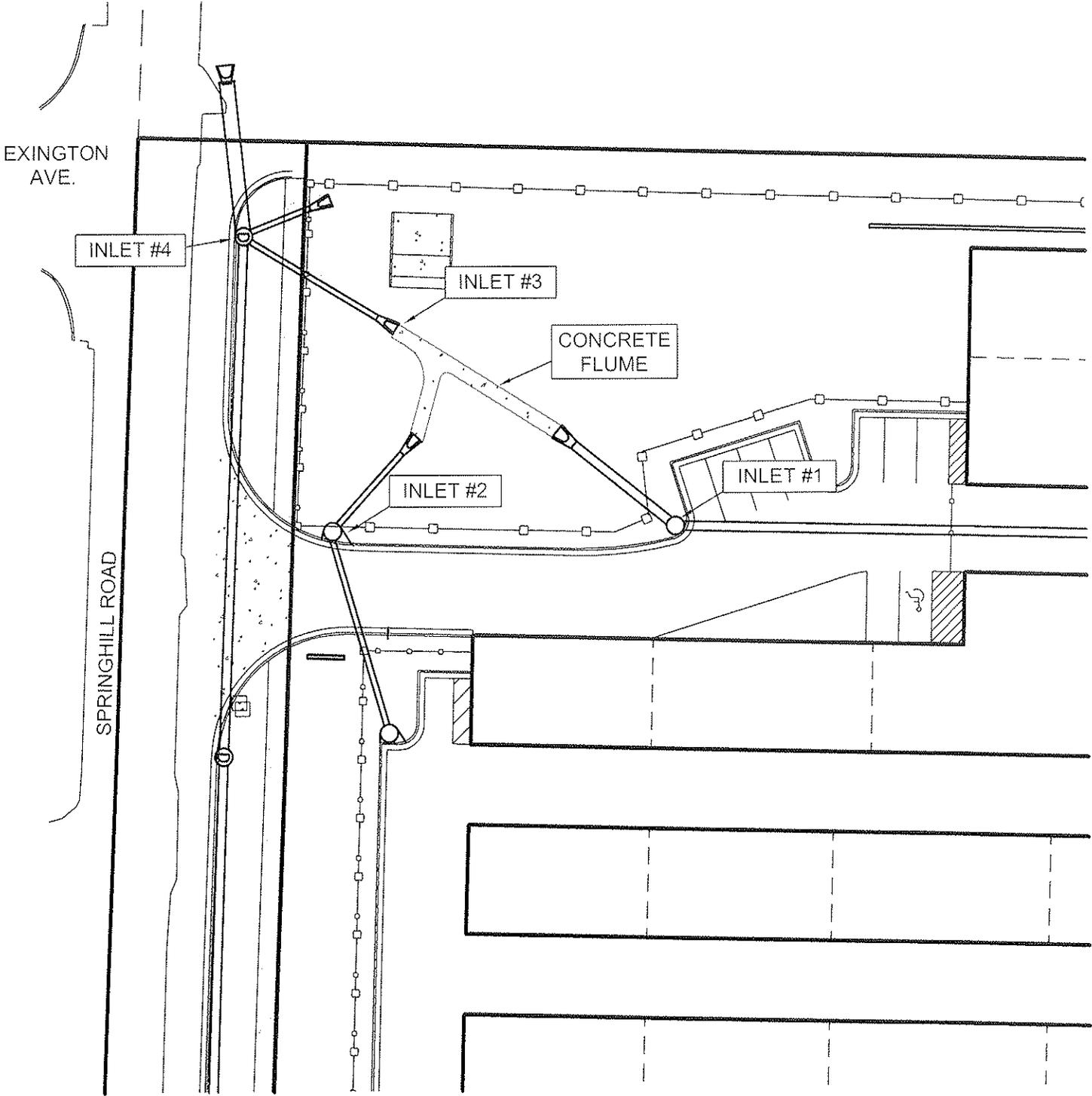
NOTE:

INSPECTIONS WILL OCCUR EVERY MONTH OR AFTER A ½" RAIN EVENT, WHICHEVER COMES FIRST.

 REPORTS WILL BE KEPT ON SITE IN STORE MANAGERS OFFICE.

COMMENTS:

INSPECTION REPORT
STORM WATER DETENTION FACILITY
DATE: ___/___/___
HURRICANE STORAGE
SPRINGHILL ROAD





CIVIL ENGINEERS LAND SURVEYORS

USE 25 YEAR STORM FOR MINOR UTILITY
USE RATIONAL METHOD
SURROUNDING AREA IS ZONED SINGLE FAMILY (R-2)

C = 0.60 USE C = 0.65 TO BE CONSERVATIVE

(A) A = 5.58 AC C = 0.65

OVERLAND FLOW : L = 100' SLOPE = 6% N = 0.40 PASTURE / AVG. GRASS

$$t = 0.83 \left(\frac{[NL]^{0.467}}{[S]^{0.5}} \right) = \frac{0.83 \left(\frac{[0.40 \cdot 100]^{0.467}}{(.06)^{0.5}} \right)}{1} = 8.96$$

SHALLOW CONCENTRATED : L = 200' SLOPE = 6% V = 4 fps $\Rightarrow t = 0.83$

STORM DRAIN : L = 300' V = 6 fps $\Rightarrow t = 0.83$

$t_c = 10.6 \text{ min}$

(B) A = 1.0 AC C = 0.65

OVERLAND FLOW: $t_c = 8.96$ (SEE (A))
SHALLOW CONC.: $t = 0.83$ (SEE (A))
CHANNEL $t = 0.83$

$t_c = 10.6 \text{ min}$

(C) A = 0.22 AC C = 0.90 $t_c = 5 \text{ min}$

(D) A = 5.81 C = 0.87 $t_c = 5 \text{ min}$ (SEE DEFLECTION CALCS)

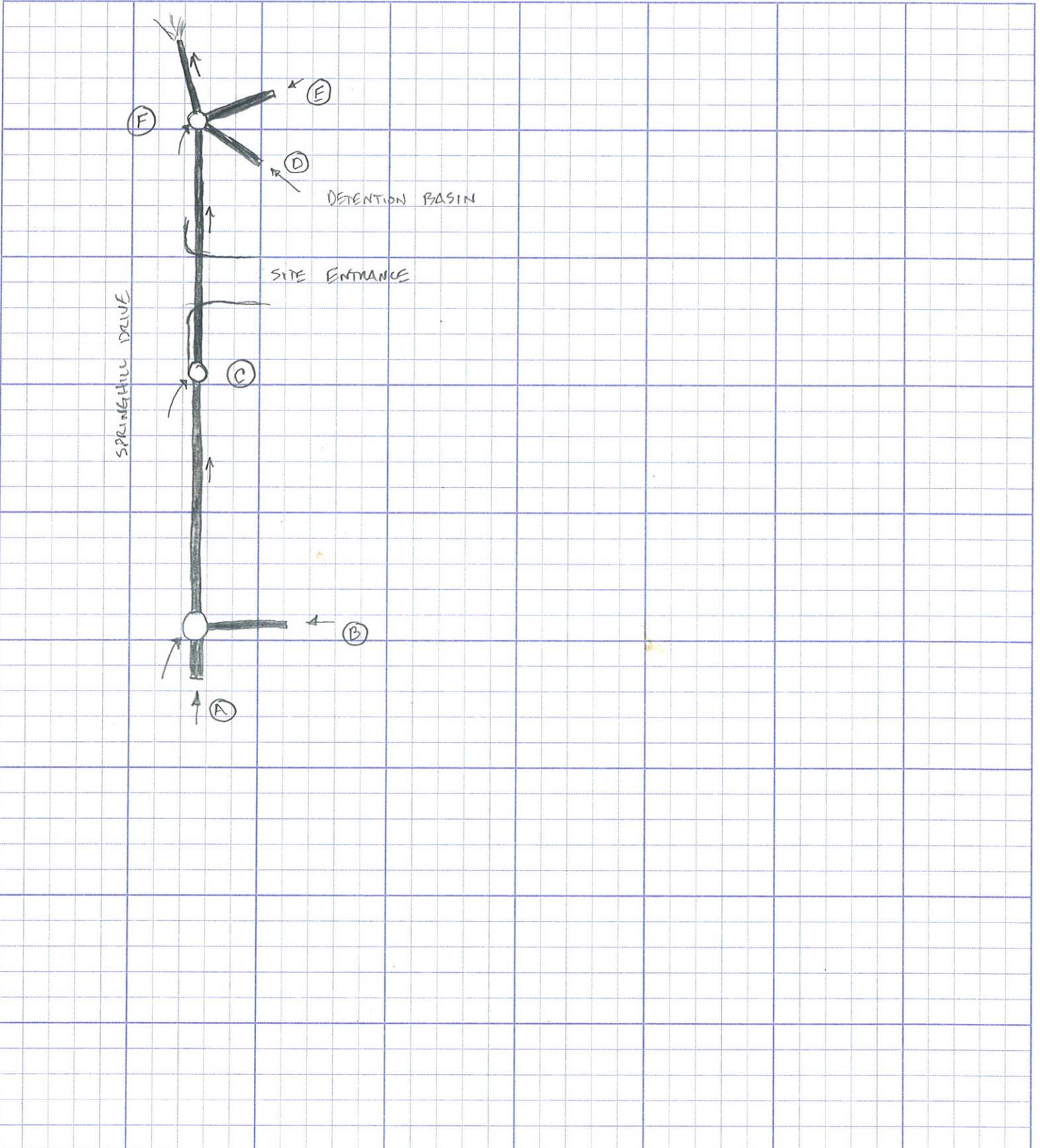
(E) A = 0.44 C = 0.80 (GRAVEL + DITCH)

1000' @ CHANNEL FLOW V = 6 fps $\Rightarrow t_c = 2.7$ USE 5 MIN

(F) A = 0.16 C = 0.80 $t_c = 5 \text{ min}$



CIVIL ENGINEERS LAND SURVEYORS



Project Description

File Name DRAINAGE CALCS SPRINGHILL ROAD.SPF

Analysis Options

Flow Units cfs
 Subbasin Hydrograph Method. Rational
 Time of Concentration..... SCS TR-55
 Return Period..... 25 years
 Link Routing Method Kinematic Wave
 Storage Node Exfiltration.. None
 Starting Date NOV-21-2017 00:00:00
 Ending Date NOV-21-2017 23:00:00
 Report Time Step 00:00:10

Element Count

Number of subbasins 6
 Number of nodes 8
 Number of links 7

Subbasin Summary

Subbasin ID	Total Area acres
Sub-A	5.58
Sub-B	1.00
Sub-C	0.22
Sub-D	5.81
Sub-E	0.44
Sub-F	0.16

Node Summary

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft ²	External Inflow
Inlet-04	JUNCTION	468.70	472.00	10.00	
Inlet-05	JUNCTION	468.80	473.50	10.00	
Jun-04	JUNCTION	475.00	478.00	0.00	
Jun-05	JUNCTION	473.40	478.10	0.00	
Out-01	OUTFALL	465.70	468.23	0.00	

Inlet Summary

Catchbasin ID	Inlet Inlet Manufacturer	Inlet Ponded Manufacturer	Initial	Manufacturer Grate Part	Inlet Location	Number of

Invert Elevation	Rim Elevation	Area	Water Elevation	Clogging Number Factor	Inlets
ft	ft	ft ²	ft	%	
Inlet-01 466.20	470.83	FHWA HEC-22 10.00	GENERIC 466.20	N/A 0.00	On Sag 1
Inlet-02 469.85	475.37	FHWA HEC-22 10.00	GENERIC 469.85	N/A 0.00	On Sag 1
Inlet-03 473.19	478.10	FHWA HEC-22 10.00	GENERIC 473.19	N/A 0.00	On Sag 1

Roadway and Gutter Summary

Inlet ID	Roadway Longitudinal Slope	Roadway Cross Slope	Roadway Manning's Roughness	Gutter Cross Slope	Gutter Width	Gutter Depression
	ft/ft	ft/ft		ft/ft	ft	in
Inlet-01	-	0.0200	0.0130	0.0620	1.50	2.00
Inlet-02	-	0.0200	0.0160	0.0620	2.00	2.00
Inlet-03	-	0.0200	0.0130	0.0620	1.50	2.00

Link Summary

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Link-01	Inlet-03	Inlet-02	CONDUIT	151.0	2.1457	0.0130
Link-02	Inlet-02	Inlet-01	CONDUIT	143.0	2.4825	0.0130
Link-03	Inlet-01	Out-01	CONDUIT	43.0	1.1628	0.0130
Link-05	Inlet-05	Inlet-01	CONDUIT	41.0	5.6098	0.0130
Link-06	Inlet-04	Inlet-01	CONDUIT	18.0	12.2222	0.0130
Link-09	Jun-04	Inlet-03	CONDUIT	35.0	2.8571	0.0130
Link-10	Jun-05	Inlet-03	CONDUIT	9.0	1.2222	0.0130

Cross Section Summary

Link Design ID	Shape	Depth/Diameter	Width	No. of Barrels	Cross Sectional Area	Full Flow Hydraulic Radius
		ft	ft		ft ²	ft
Link-01 60.08	CIRCULAR	2.50	2.50	1	4.91	0.63
Link-02 64.63	CIRCULAR	2.50	2.50	1	4.91	0.63
Link-03 69.78	ARCH	2.58	4.25	1	8.65	0.77
Link-05 53.58	CIRCULAR	2.00	2.00	1	3.14	0.50
Link-06	CIRCULAR	1.50	1.50	1	1.77	0.38

36.72							
Link-09	CIRCULAR	1.50	1.50	1	1.77	0.38	
17.76							
Link-10	CIRCULAR	2.50	2.50	1	4.91	0.63	
45.35							

```

*****
Runoff Quantity Continuity
*****
Volume      Depth
acre-ft     inches
-----
Total Precipitation ..... 1.074 0.975
Continuity Error (%) ..... 0.278

```

```

*****
Flow Routing Continuity
*****
Volume      Volume
acre-ft     Mgallons
-----
External Inflow ..... 0.000 0.000
External Outflow ..... 39.146 12.756
Initial Stored Volume .... 0.000 0.000
Final Stored Volume ..... 0.000 0.000
Continuity Error (%) ..... 0.000

```

```

*****
Runoff Coefficient Computations Report
*****

```

```

-----
Subbasin Sub-A
-----

```

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	5.58	-	0.65
Composite Area & Weighted Runoff Coeff.	5.58		0.65

```

-----
Subbasin Sub-B
-----

```

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	1.00	-	0.65
Composite Area & Weighted Runoff Coeff.	1.00		0.65

```

-----
Subbasin Sub-C
-----

```

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.22	-	0.90
Composite Area & Weighted Runoff Coeff.	0.22		0.90

```

-----
Subbasin Sub-D
-----

```

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	5.81	-	0.87
Composite Area & Weighted Runoff Coeff.	5.81		0.87

```

-----
Subbasin Sub-E
-----

```

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.44	-	0.80
Composite Area & Weighted Runoff Coeff.	0.44		0.80

Subbasin Sub-F

Soil/Surface Description	Area (acres)	Soil Group	Runoff Coeff.
-	0.16	-	0.88
Composite Area & Weighted Runoff Coeff.	0.16		0.88

SCS TR-55 Time of Concentration Computations Report

Sheet Flow Equation

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where:

- Tc = Time of Concentration (hrs)
- n = Manning's Roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation

- V = 16.1345 * (Sf^{0.5}) (unpaved surface)
- V = 20.3282 * (Sf^{0.5}) (paved surface)
- V = 15.0 * (Sf^{0.5}) (grassed waterway surface)
- V = 10.0 * (Sf^{0.5}) (nearly bare & untilled surface)
- V = 9.0 * (Sf^{0.5}) (cultivated straight rows surface)
- V = 7.0 * (Sf^{0.5}) (short grass pasture surface)
- V = 5.0 * (Sf^{0.5}) (woodland surface)
- V = 2.5 * (Sf^{0.5}) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

Where:

- Tc = Time of Concentration (hrs)
- Lf = Flow Length (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)

Channel Flow Equation

$$V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n$$

$$R = A_q / W_p$$

$$T_c = (L_f / V) / (3600 \text{ sec/hr})$$

Where:

- Tc = Time of Concentration (hrs)
- Lf = Flow Length (ft)
- R = Hydraulic Radius (ft)
- Aq = Flow Area (ft²)
- Wp = Wetted Perimeter (ft)

SEE HAND CALC'S
FOR Tc

V = Velocity (ft/sec)
 Sf = Slope (ft/ft)
 n = Manning's Roughness

 Subbasin Sub-A

User-Defined TOC override (minutes): 10.60

 Subbasin Sub-B

User-Defined TOC override (minutes): 10.60

 Subbasin Sub-C

User-Defined TOC override (minutes): 5.00

 Subbasin Sub-D

User-Defined TOC override (minutes): 5.00

 Subbasin Sub-E

User-Defined TOC override (minutes): 5.00

 Subbasin Sub-F

User-Defined TOC override (minutes): 5.00

SEE HAND CALC'S

 Subbasin Runoff Summary

Subbasin ID	Accumulated Precip in	Rainfall Intensity in/hr	Total Runoff in	Peak Runoff cfs	Weighted Runoff Coeff	Time of Concentration days	Time of Retention hh:mm:ss
Sub-A	1.25	7.05	0.81	25.56	0.650	0	00:10:36
Sub-B	1.25	7.05	0.81	4.58	0.650	0	00:10:36
Sub-C	0.70	8.40	0.63	1.66	0.900	0	00:05:00
Sub-D	0.70	8.40	0.61	42.46	0.870	0	00:05:00
Sub-E	0.70	8.40	0.56	2.96	0.800	0	00:05:00
Sub-F	0.70	8.40	0.62	1.18	0.880	0	00:05:00

 Node Depth Summary

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	Time of Max Occurrence hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
---------	---------------------------	---------------------------	-------------------------	-----------------------------	------------------------------	------------------------------	----------------------------	-------------------------

Inlet-04	0.07	0.29	468.99	0	00:05	0	0	0:00:00
Inlet-05	0.31	1.34	470.14	0	00:05	0	0	0:00:00
Jun-04	0.27	0.52	475.52	0	00:10	0	0	0:00:00
Jun-05	0.68	1.34	474.74	0	00:10	0	0	0:00:00
Out-01	0.62	1.74	467.44	0	00:11	0	0	0:00:00

Node Flow Summary

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days hh:mm
Inlet-04	JUNCTION	2.96	2.96	0 00:05	0.00	
Inlet-05	JUNCTION	42.46	42.46	0 00:05	0.00	
Jun-04	JUNCTION	4.58	4.58	0 00:10	0.00	
Jun-05	JUNCTION	25.56	25.56	0 00:10	0.00	
Out-01	OUTFALL	0.00	77.79	0 00:11	0.00	

Inlet Depth Summary

Inlet ID	Max Gutter Spread during Peak Flow ft	Max Gutter Water Elev during Peak Flow ft	Max Gutter Water Depth during Peak Flow ft	Time of Maximum Depth Occurrence days hh:mm
Inlet-01	7.50	471.21	0.38	0 00:11
Inlet-02	2.24	475.78	0.41	0 00:11
Inlet-03	0.00	478.10	0.00	0 00:10

Inlet Flow Summary

Inlet Total ID Time Flooded minutes	Peak Flow cfs	Peak Lateral Flow cfs	Peak Flow Intercepted by Inlet cfs	Peak Flow Bypassing Inlet cfs	Inlet Efficiency during Peak Flow %	Total Flooding acre-in
Inlet-01	1.18	1.18	-	-	-	0.000
Inlet-02	1.66	1.66	-	-	-	0.000
Inlet-03	0.00	0.00	-	-	-	0.000

 Outfall Loading Summary

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
Gut-01	78.71	26.16	77.79
System	78.71	26.16	77.79

 Link Flow Summary

Link ID	Ratio of Total Flow	Element Reported Type	Time of Peak Flow Occurrence	Maximum Velocity Attained	Length Factor	Peak Flow during Analysis	Design Flow Capacity	Ratio of Maximum / Design Flow
Ratio of Maximum Flow Depth	Surcharged minutes	Condition	days hh:mm	ft/sec		cfs	cfs	
Link-01	0.50	0 Calculated	0 00:11	12.25	1.00	30.13	60.08	0.50
Link-02	0.50	0 Calculated	0 00:11	13.11	1.00	31.77	64.63	0.49
Link-03	0.67	0 Calculated	0 00:11	11.64	1.00	77.79	89.78	0.87
Link-05	0.67	0 Calculated	0 00:05	18.92	1.00	42.45	53.58	0.79
Link-06	0.19	0 Calculated	0 00:05	12.48	1.00	2.96	36.72	0.08
Link-09	0.35	0 Calculated	0 00:10	8.43	1.00	4.58	17.76	0.26
Link-10	0.54	0 Calculated	0 00:10	9.51	1.00	25.56	49.35	0.56

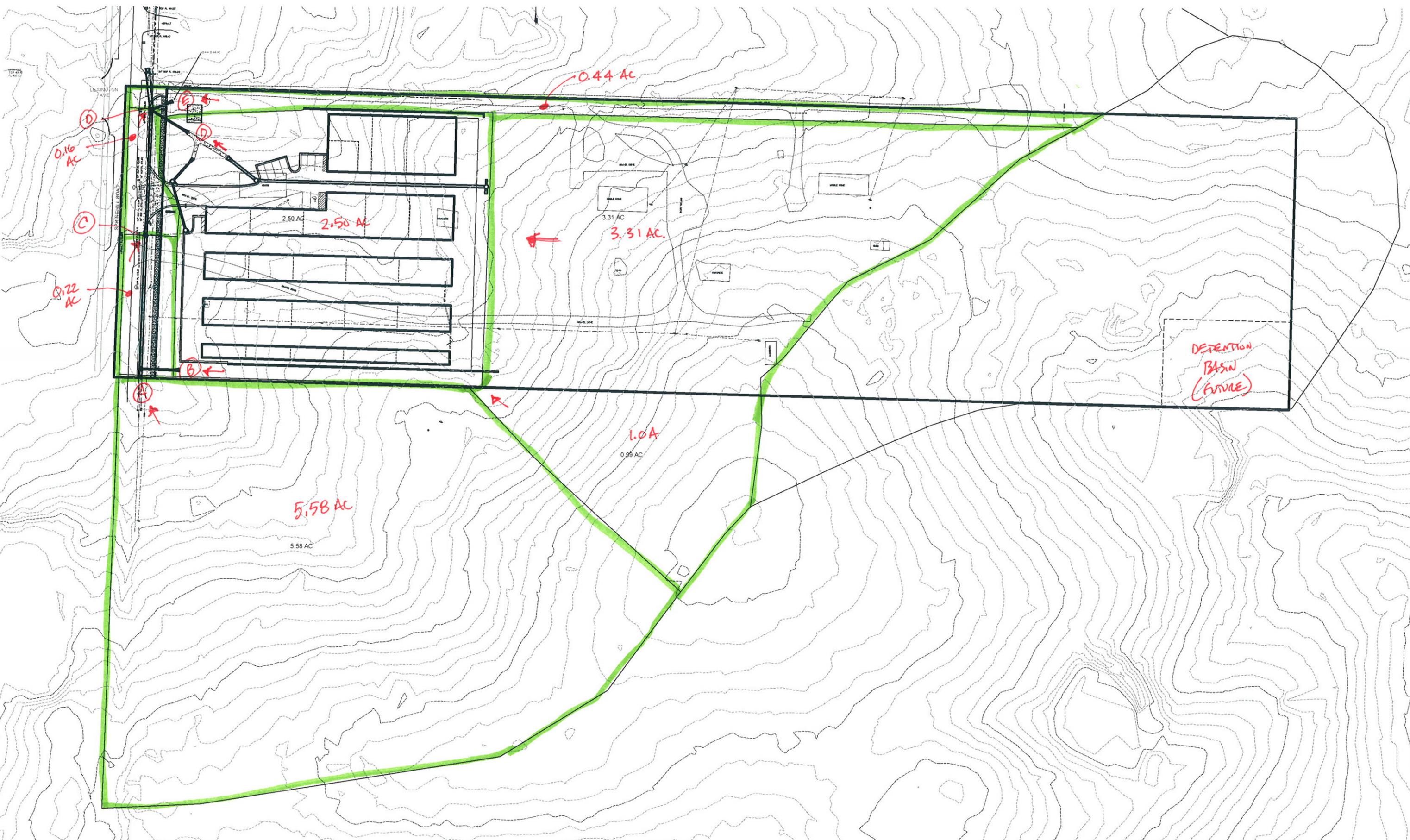
 Highest Flow Instability Indexes

 All links are stable.

WARNING 107 : Initial water surface elevation defined for Junction Inlet-04 is below junction invert elevation.
 Assumed initial water surface elevation equal to invert elevation.
 WARNING 108 : Surchage elevation defined for Junction Inlet-04 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
 WARNING 107 : Initial water surface elevation defined for Junction Inlet-05 is below junction invert elevation.
 Assumed initial water surface elevation equal to invert elevation.
 WARNING 108 : Surchage elevation defined for Junction Inlet-05 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
 WARNING 107 : Initial water surface elevation defined for Junction Jun-04 is below junction invert elevation.
 Assumed initial water surface elevation equal to invert elevation.

WARNING 108 : Surcharge elevation defined for Junction Jun-04 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
WARNING 107 : Initial water surface elevation defined for Junction Jun-05 is below junction invert elevation.
Assumed initial water surface elevation equal to invert elevation.
WARNING 108 : Surcharge elevation defined for Junction Jun-05 is below junction maximum elevation. Assumed surcharge elevation equal to maximum elevation.
WARNING 138 : Initial water surface elevation defined for Inlet Inlet-01 is below catchbasin invert elevation.
Assumed initial water surface elevation equal to catchbasin inlet invert elevation.
WARNING 138 : Initial water surface elevation defined for Inlet Inlet-02 is below catchbasin invert elevation.
Assumed initial water surface elevation equal to catchbasin inlet invert elevation.
WARNING 138 : Initial water surface elevation defined for Inlet Inlet-03 is below catchbasin invert elevation.
Assumed initial water surface elevation equal to catchbasin inlet invert elevation.

Analysis began on: Tue Nov 21 17:20:44 2017
Analysis ended on: Tue Nov 21 17:20:46 2017
Total elapsed time: 00:00:02



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ArDOT REVISION # 01 Comments

**Bryant Parkway Off Ramp Lighting
City of Bryant
Bryant, Arkansas**

Bernhard TME Job No. 01-17-0199

November 27, 2017

Drawings:

Electrical:

1. Refer to Revised Sheet – E1.01 – Bryant Parkway Off Ramp – Lighting – revision dated 11/27/17:
 - A. Add keynotes 7 and 8 for clarification.
 - B. Revise notes in pole base detail to ensure break away base.
 - C. Add notes to general notes for clarification.
 - D. Add measurement notes on plans for clarification of minimum dimension requirements.
 - E. Revise pole catalog number for clarification.

End of ArDOT Revision # 01 Comments

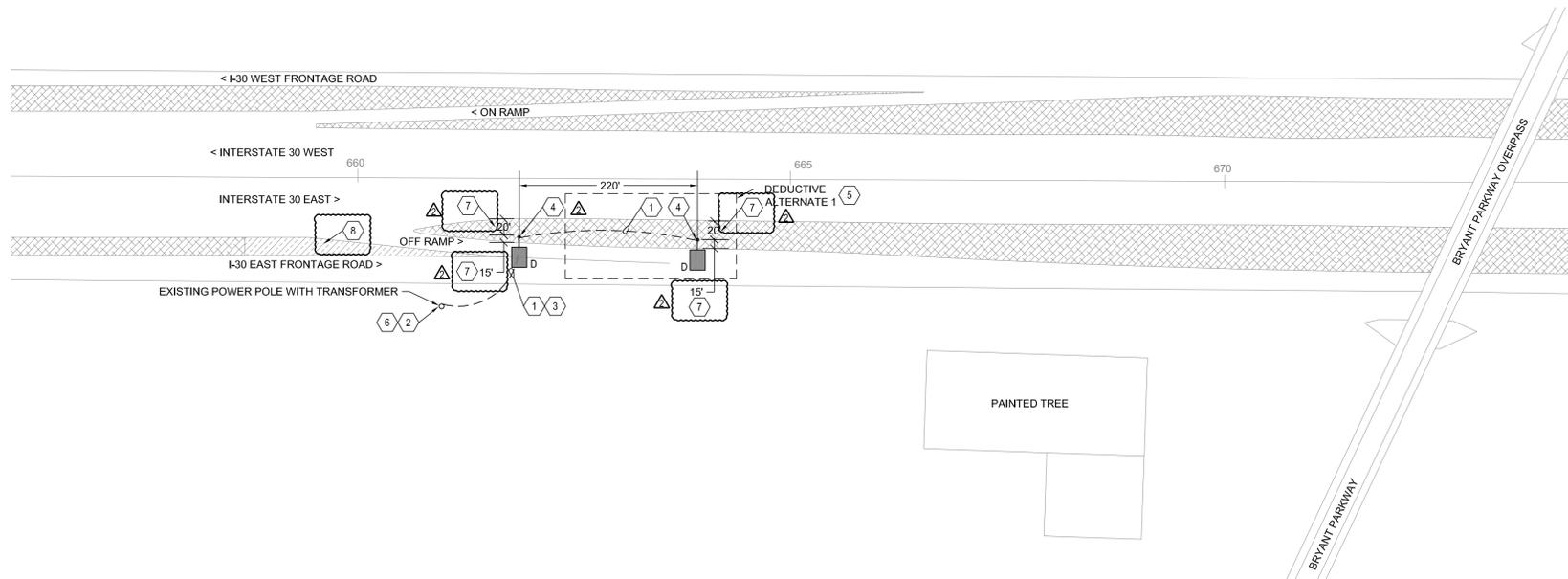


CORPORATE SEAL

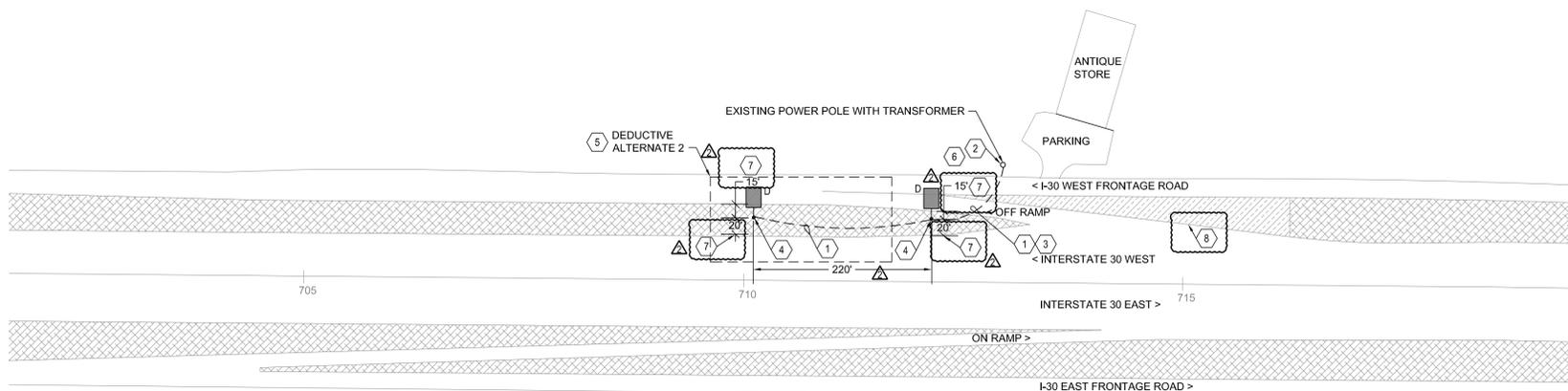


11/27/17
ENGINEER SEAL

BRYANT PARKWAY OFF RAMP LIGHTING
CITY OF BRYANT
BRYANT, AR



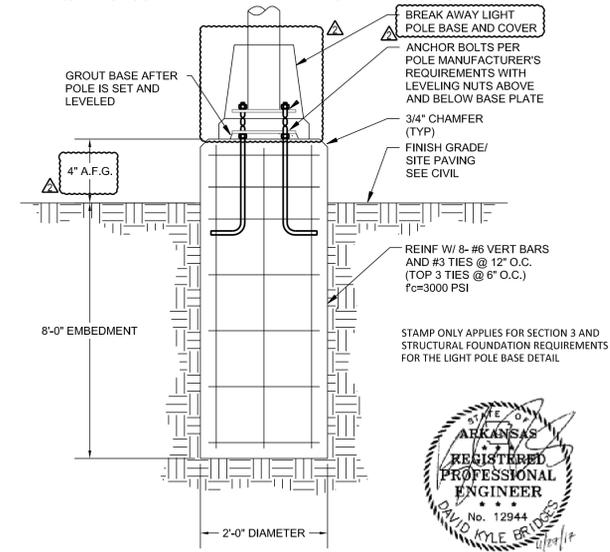
1 BRYANT PARKWAY EAST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"



2 BRYANT PARKWAY WEST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"

POLE BASE DETAIL NOTES:

- DESIGN OF LIGHT POLE FOUNDATION IS BASED UPON MAXIMUM OVERALL HEIGHT FROM FINISH GRADE TO TOP OF LIGHT POLE OF 40'-0". ONE (1) 12' LONG ARM AND ONE (1) LUMINAIRE ON ARM WITH MAXIMUM EFFECTIVE PROJECTED AREA OF 2 SQ. FT. MAXIMUM OVERALL HEIGHT OF 40'-0".
- SEE SUPPLIER DRAWINGS FOR ALL CONDUITS AND OTHER ELECTRICAL INFORMATION NOT SHOWN OR NOTED OTHERWISE.
- LIGHT POLE FOUNDATION TO BE LOCATED A MINIMUM OF 20'-0" AWAY FROM MOVING LANES ON INTERSTATE AND 15'-0" MINIMUM ON SERVICE ROAD MOVING LANES.
- REINFORCING STEEL IS ASTM A615 (F60) HIGH STRENGTH.
- MINIMUM CONCRETE COMPRESSIVE STRENGTH IS 3000 PSI.
- SUBMIT CONCRETE MIX DESIGNS FOR REVIEW.
- PROVIDE HANDHOLE 2' FROM BOTTOM OF POLE FOR MAINTENANCE.
- ALL POLES SHALL HAVE AN INTERNAL VIBRATION DAMPER SYSTEM.



3 STRUCTURAL LIGHT POLE BASE DETAIL
SCALE: NTS

LUMINAIRE SCHEDULE				
TYPE	MANUFACTURER CAT. NO.	VOLT	LAMP	REMARKS
D	LITHONIA# DSX2-LED-100C-40K-RFD193701	UNV	360W LED/3600L/740	ROADWAY LIGHTING, TYPE IV WIDE DISTRIBUTION, 7 PIN PHOTOCCELL CONTROL, LIGHT FIXTURE TO BE BLACK FINISH. LIGHT FIXTURE TO BE PROVIDED BY ENTERGY.

GENERAL NOTES
1. EACH CIRCUIT SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR, AND MULTI-WIRE CIRCUITS OF DIFFERENT PHASES MAY SHARE EQUIPMENT GROUND CONDUCTOR. EQUIPMENT GROUND CONDUCTOR SIZE SHALL BE THE SAME SIZE AS THE MAIN CONDUCTORS.
2. ALL CONDUCTORS #10 AND SMALLER SHALL BE SOLID COPPER, AND ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER USING BOLTED LUGS AT TERMINALS.
3. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED. CONDUIT FILL SHALL BE LESS THAN 40%.
4. ALL WIRING DEVICES SHALL BE INSTALLED PLUMB, SQUARE, AND TRUE; AND ALL DEVICES INSTALLED AT A SINGLE LOCATION SHALL BE ALIGNED.
5. MINIMUM WIRE SIZE SHALL BE #12 AWG UNLESS OTHERWISE SPECIFIED.
6. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODE REFERRED TO BY THE AUTHORITY HAVING JURISDICTION.
7. LIGHT FIXTURES TO BE PROVIDED BY AND MAINTAINED BY ENTERGY. ELECTRICAL CONTRACTOR TO COORDINATE INSTALLATION AND POWERING OF FIXTURES WITH ENTERGY, 501-425-8660 WENDY DAWES

KEYED NOTES:

- PROVIDE AND INSTALL 2 #10 THWN AND 1 #10 THWN G IN 3/4" SCHEDULE 80 PVC CONDUIT BELOW GRADE.
- EXISTING UTILITY POLE WITH TRANSFORMER. ROUTE CONDUIT FROM BELOW GRADE, UP POWER POLE AND CONNECT TO EXISTING TRANSFORMER. COORDINATE INSTALLATION WITH UTILITY.
- BORE UNDER ROADWAY. DO NOT CUT ROADWAY. COORDINATE ANY TRAFFIC CONTROL NEEDED WITH CITY OF BRYANT PRIOR TO CONSTRUCTION.
- PROVIDE AND INSTALL SAME AS OR EQUAL TO HOLOPHANER RTS35-TBASE-S12-HG(AB)-RFD256051-BLACK POLE TO BE 40' TAPERED STEEL POLE WITH BREAK AWAY BASE AND (1) 12' ARM. PROVIDE ADDITIONAL ARM CONNECTION ON INTERSTATE SIDE OF POLE FOR SECOND "FUTURE" FIXTURE TO BE INSTALLED. CAP ARM CONNECTION UNTIL FUTURE INSTALLATION. POLE TO BE BLACK FINISH. THE ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL AN IN-LINE FUSED STREET LIGHT DISCONNECTING FUSE HOLDER WITH 5A FUSE IN HAND HOLE OF POLE BASE.
- DEDUCTIVE ALTERNATE INCLUDES POLE, POLE BASE, POLE ARM, LIGHT, CONDUIT, AND CONDUCTORS BACK TO PREVIOUS POLE.
- VERIFY EXACT DISTANCE TO EXISTING TRANSFORMER ON POWER POLE. COORDINATE POWER CONNECTION WITH ENTERGY.
- MEASUREMENTS ARE NOTED TO EDGE OF MOVING TRAFFIC LANES.
- CHANGE IN HATCH NOTES EXISTING CONCRETE LANE SEPARATION.

MARK	DATE	DESCRIPTION
△	11/27/17	REV#1 ARDOT
△	11/20/17	ADD#1
ISSUE DATE:	11/14/17	
PROJECT NUMBER:	01-17-0199	

SHEET TITLE:
BRYANT PARKWAY OFF RAMP - LIGHTING

SHEET NUMBER:
E1.01

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ADDENDUM # 01

**Bryant Parkway Off Ramp Lighting
City of Bryant
Bryant, Arkansas**

Bernhard TME Job No. 01-17-0199

November 20, 2017

Drawings:

Electrical:

1. Refer to Revised Sheet – E1.01 – Bryant Parkway Off Ramp – Lighting – revision dated 11/20/17:
 - A. Add four (4) inline fuse holders and four (4) fuses.
 - B. Pole bases to be mounted 20' off moving lanes.
 - C. Add contact information for Entergy coordination.
 - D. Add inline fused street light disconnects to poles.

End of Addendum # 01

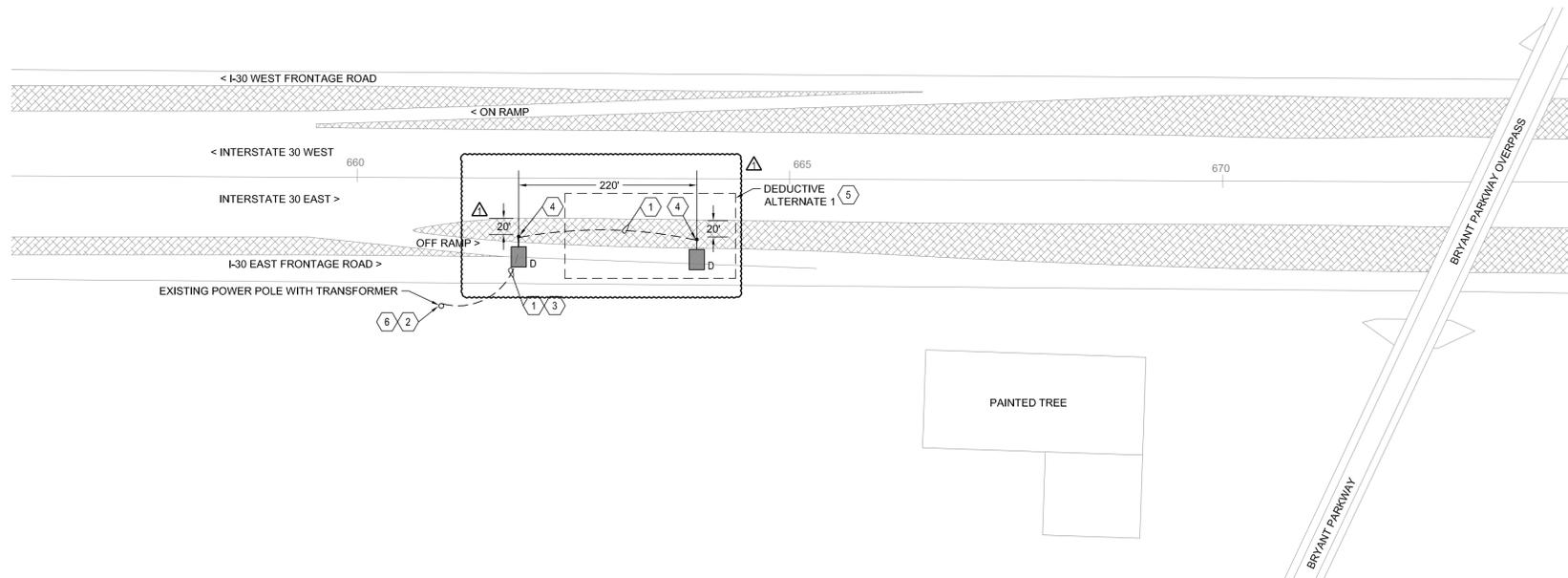


CORPORATE SEAL

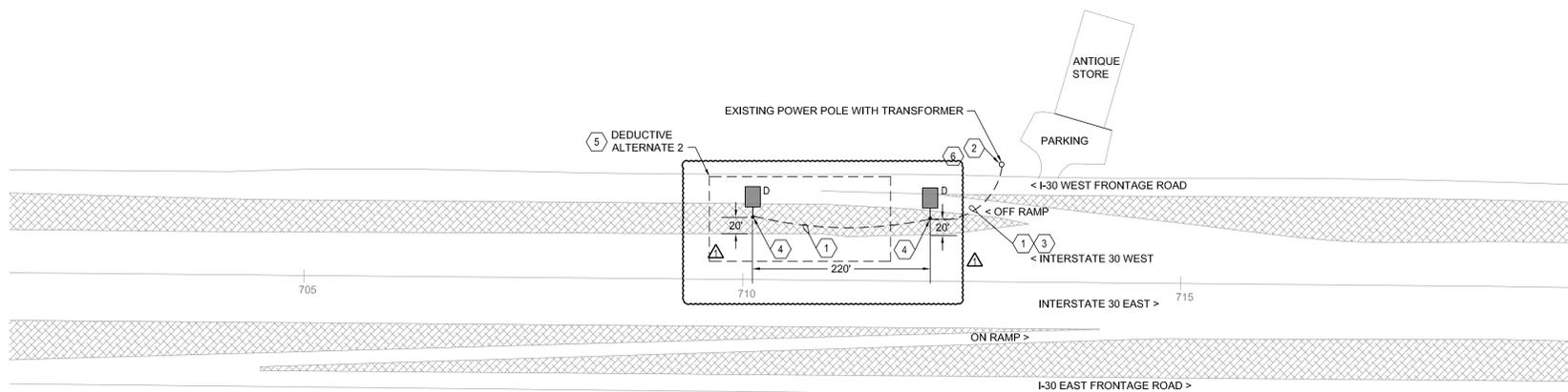


11/20/17
ENGINEER SEAL

BRYANT PARKWAY OFF RAMP LIGHTING
CITY OF BRYANT
BRYANT, AR



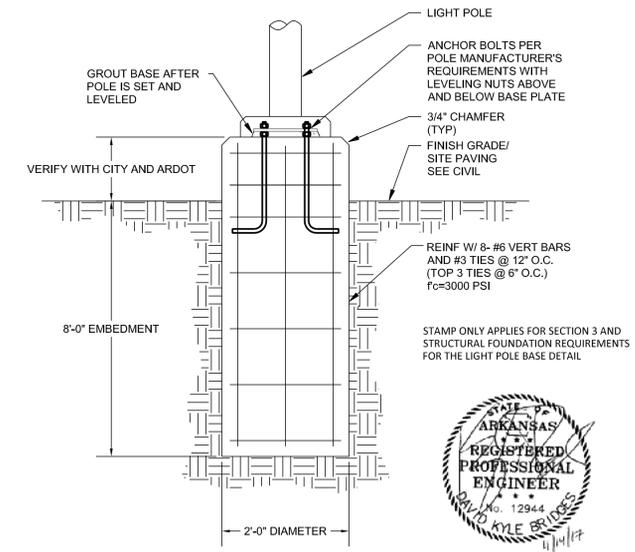
1 BRYANT PARKWAY EAST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"



2 BRYANT PARKWAY WEST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"

POLE BASE DETAIL NOTES:

- DESIGN OF LIGHT POLE FOUNDATION IS BASED UPON MAXIMUM OVERALL HEIGHT FROM FINISH GRADE TO TOP OF LIGHT POLE OF 40'-0". ONE (1) 12' LONG ARM AND ONE (1) LUMINAIRE ON ARM WITH MAXIMUM EFFECTIVE PROJECTED AREA OF 2 SQ. FT. MAXIMUM OVERALL HEIGHT OF 40'-0".
- SEE SUPPLIER DRAWINGS FOR ALL CONDUITS AND OTHER ELECTRICAL INFORMATION NOT SHOWN OR NOTED OTHERWISE.
- LIGHT POLE FOUNDATION TO BE LOCATED A MINIMUM OF 2'-0" AWAY FROM ROADWAYS OR OTHER UTILITIES. REFER TO MASTER LIGHTING PLAN.
- REINFORCING STEEL IS ASTM 615 (Fy = 60 KSI)
- MINIMUM CONCRETE COMPRESSIVE STRENGTH IS 3000 PSI
- SUBMIT CONCRETE MIX DESIGNS FOR REVIEW.
- PROVIDE HANDHOLE 2' FROM BOTTOM OF POLE FOR MAINTENANCE.
- ALL POLES SHALL HAVE AN INTERNAL VIBRATION DAMPER SYSTEM.



3 STRUCTURAL LIGHT POLE BASE DETAIL
SCALE: NTS

LUMINAIRE SCHEDULE				
TYPE	MANUFACTURER CAT. NO.	VOLT	LAMP	REMARKS
D	LITHONIA# DSX2-LED-100C-40K-RFD193701	UNV	360W LED/36000L/740	ROADWAY LIGHTING, TYPE IV WIDE DISTRIBUTION, 7 PIN PHOTOCCELL CONTROL, LIGHT FIXTURE TO BE BLACK FINISH, LIGHT FIXTURE TO BE PROVIDED BY ENTERGY.

GENERAL NOTES
1. EACH CIRCUIT SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR, AND MULTI-WIRE CIRCUITS OF DIFFERENT PHASES MAY SHARE EQUIPMENT GROUND CONDUCTOR, EQUIPMENT GROUND CONDUCTOR SIZE SHALL NOT BE LESS THAN #12 AWG OR AS INDICATED ON THE DRAWINGS.
2. ALL CONDUCTORS #10 AND SMALLER SHALL BE SOLID COPPER, AND ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER USING BOLTED LUGS AT TERMINALS.
3. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED.
4. ALL WIRING DEVICES SHALL BE INSTALLED PLUMB, SQUARE, AND TRUE; AND ALL DEVICES INSTALLED AT A SINGLE LOCATION SHALL BE ALIGNED.
5. MINIMUM WIRE SIZE SHALL BE #12 AWG UNLESS OTHERWISE SPECIFIED.
6. ALL WORK SHALL COMPLY WITH THE EDITION OF THE NATIONAL ELECTRICAL CODE REFERRED TO BY THE AUTHORITY HAVING JURISDICTION.
7. LIGHT FIXTURES TO BE PROVIDED BY AND MAINTAINED BY ENTERGY ELECTRICAL CONTRACTOR TO COORDINATE INSTALLATION AND POWERING OF FIXTURES WITH ENTERGY, 501-425-6660 WENDY DAWES

KEYED NOTES:

- PROVIDE AND INSTALL 2 #10 THWN AND 1 #10 THWN G IN 3/4" SCHEDULE 80 PVC CONDUIT BELOW GRADE.
- EXISTING UTILITY POLE WITH TRANSFORMER, ROUTE CONDUIT FROM BELOW GRADE, UP POWER POLE AND CONNECT TO EXISTING TRANSFORMER. COORDINATE INSTALLATION WITH UTILITY.
- BORE UNDER ROADWAY, DO NOT CUT ROADWAY. COORDINATE ANY TRAFFIC CONTROL NEEDED WITH CITY OF BRYANT PRIOR TO CONSTRUCTION.
- PROVIDE AND INSTALL SAME AS OR EQUAL TO HOLOPHANE# RTS35-TBASE-D12-HG-(AB)-RFD245051-B, POLE TO BE 40' TAPERED STEEL POLE WITH BREAK AWAY BASE AND (1) 12' ARM. PROVIDE ADDITIONAL ARM CONNECTION ON INTERSTATE SIDE OF POLE FOR SECOND FUTURE FIXTURE TO BE INSTALLED. CAP ARM CONNECTION UNTIL FUTURE INSTALLATION. POLE TO BE BLACK FINISH. THE ELECTRICAL CONTRACTOR TO PROVIDE AND INSTALL AN IN-LINE FUSED STREET LIGHT DISCONNECTING FUSE HOLDER WITH 5A FUSE IN HAND HOLE OF POLE BASE.
- DEDUCTIVE ALTERNATE INCLUDES POLE, POLE BASE, POLE ARM, LIGHT, CONDUIT, AND CONDUCTORS BACK TO PREVIOUS POLE.
- VERIFY EXACT DISTANCE TO EXISTING TRANSFORMER ON POWER POLE. COORDINATE POWER CONNECTION WITH ENTERGY.

MARK	DATE	DESCRIPTION
△	11/20/17	ADD#1
	ISSUE DATE:	11/14/17
	PROJECT NUMBER:	01-17-0199

SHEET TITLE:
BRYANT PARKWAY OFF RAMP - LIGHTING

SHEET NUMBER:
E1.01

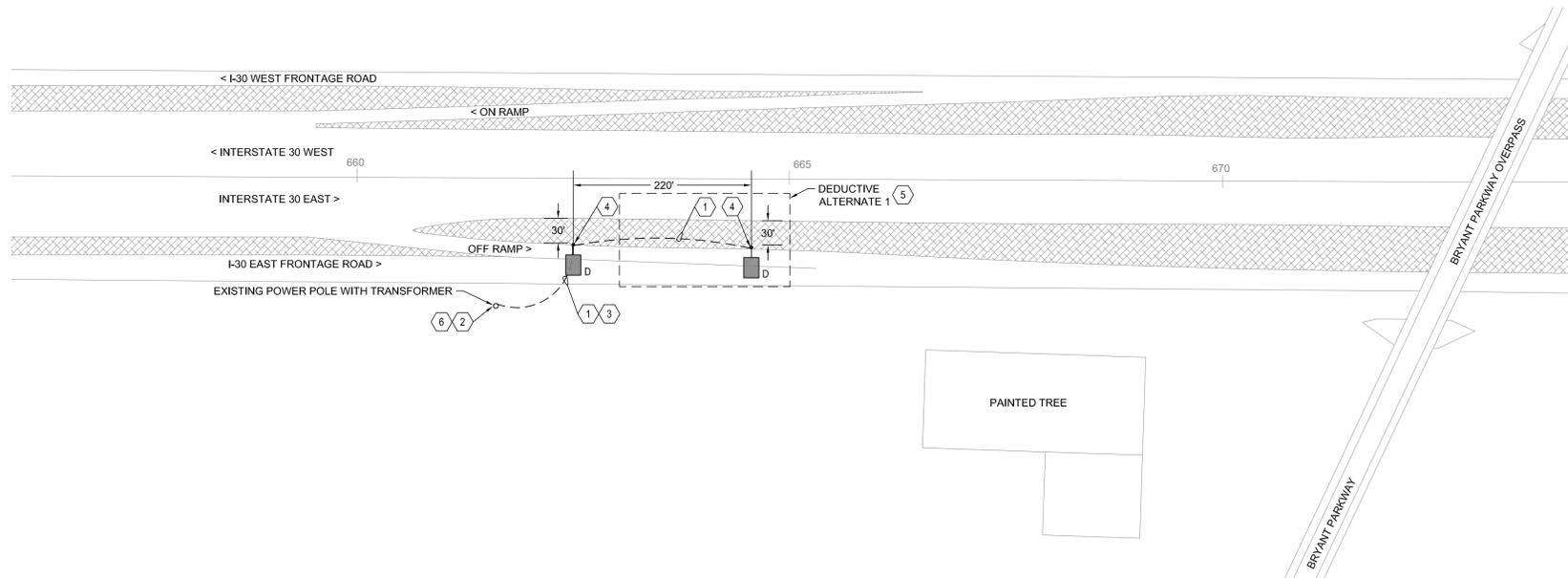


CORPORATE SEAL

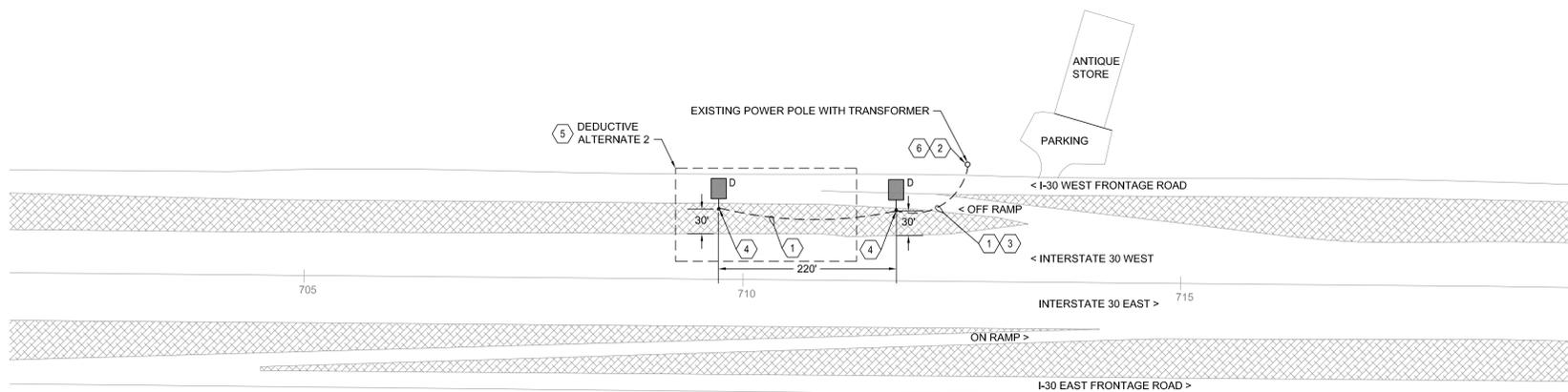


11/14/17
ENGINEER SEAL

BRYANT PARKWAY OFF RAMP LIGHTING
CITY OF BRYANT
BRYANT, AR



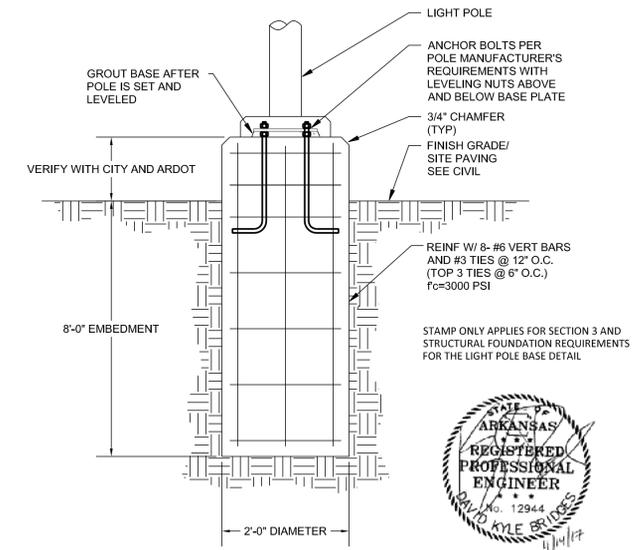
1 BRYANT PARKWAY EAST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"



2 BRYANT PARKWAY WEST OFF RAMP - LIGHTING
SCALE: 1"=100'-0"

POLE BASE DETAIL NOTES:

- DESIGN OF LIGHT POLE FOUNDATION IS BASED UPON MAXIMUM OVERALL HEIGHT FROM FINISH GRADE TO TOP OF LIGHT POLE OF 40'-0". ONE (1) 12" LONG ARM AND ONE (1) LUMINAIRE ON ARM WITH MAXIMUM EFFECTIVE PROJECTED AREA OF 2 SQ. FT. MAXIMUM OVERALL HEIGHT OF 40'-0".
- SEE SUPPLIER DRAWINGS FOR ALL CONDUITS AND OTHER ELECTRICAL INFORMATION NOT SHOWN OR NOTED OTHERWISE.
- LIGHT POLE FOUNDATION TO BE LOCATED A MINIMUM OF 2'-0" AWAY FROM ROADWAYS OR OTHER UTILITIES. REFER TO MASTER LIGHTING PLAN.
- REINFORCING STEEL IS ASTM 615 (FY = 60 KSI)
- MINIMUM CONCRETE COMPRESSIVE STRENGTH IS 3000 PSI
- SUBMIT CONCRETE MIX DESIGNS FOR REVIEW.
- PROVIDE HANDHOLE 2' FROM BOTTOM OF POLE FOR MAINTENANCE.
- ALL POLES SHALL HAVE AN INTERNAL VIBRATION DAMPER SYSTEM.



3 STRUCTURAL LIGHT POLE BASE DETAIL
SCALE: NTS

LUMINAIRE SCHEDULE				
TYPE	MANUFACTURER CAT. NO.	VOLT	LAMP	REMARKS
D	LITHONIA# DSX2-LED-100C-40K-RFD193701	UNV	369W LED/36000L/740	ROADWAY LIGHTING, TYPE IV WIDE DISTRIBUTION, 7 PIN PHOTOCCELL CONTROL, LIGHT FIXTURE TO BE BLACK FINISH, LIGHT FIXTURE TO BE PROVIDED BY ENTERGY.

GENERAL NOTES
1. EACH CIRCUIT SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR, AND MULTI-WIRE CIRCUITS OF DIFFERENT PHASES MAY SHARE EQUIPMENT GROUND CONDUCTOR, EQUIPMENT GROUND CONDUCTOR SIZE SHALL NOT BE LESS THAN #12 AWG OR AS INDICATED ON THE DRAWINGS.
2. ALL CONDUCTORS #10 AND SMALLER SHALL BE SOLID COPPER, AND ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER USING BOLTED LUGS AT TERMINALS.
3. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED.
4. ALL WIRING DEVICES SHALL BE INSTALLED PLUMB, SQUARE, AND TRUE; AND ALL DEVICES INSTALLED AT A SINGLE LOCATION SHALL BE ALIGNED.
5. MINIMUM WIRE SIZE SHALL BE #12 AWG UNLESS OTHERWISE SPECIFIED.
6. ALL WORK SHALL COMPLY WITH THE EDITION OF THE NATIONAL ELECTRICAL CODE REFERRED TO BY THE AUTHORITY HAVING JURISDICTION.
7. LIGHT FIXTURES TO BE PROVIDED BY AND MAINTAINED BY ENTERGY. ELECTRICAL CONTRACTOR TO COORDINATE INSTALLATION AND POWERING OF FIXTURES WITH ENTERGY.

KEYED NOTES:

- PROVIDE AND INSTALL 2 #10 THWN AND 1 #10 THWN G IN 3/4" SCHEDULE 80 PVC CONDUIT BELOW GRADE.
- EXISTING UTILITY POLE WITH TRANSFORMER. ROUTE CONDUIT FROM BELOW GRADE, UP POWER POLE AND CONNECT TO EXISTING TRANSFORMER. COORDINATE INSTALLATION WITH UTILITY.
- BORE UNDER ROADWAY. DO NOT CUT ROADWAY. COORDINATE ANY TRAFFIC CONTROL NEEDED WITH CITY OF BRYANT PRIOR TO CONSTRUCTION.
- PROVIDE AND INSTALL SAME AS OR EQUAL TO HOLOPHANE# RTS35-TBASE-D12-HG-(AB)-RFD245051-B. POLE TO BE 40" TAPERED STEEL POLE WITH BREAK AWAY BASE AND (1) 12" ARM. PROVIDE ADDITIONAL ARM CONNECTION ON INTERSTATE SIDE OF POLE FOR SECOND "FUTURE" FIXTURE TO BE INSTALLED. CAP ARM CONNECTION UNTIL FUTURE INSTALLATION. POLE TO BE BLACK FINISH.
- DEDUCTIVE ALTERNATE INCLUDES POLE, POLE BASE, POLE ARM, LIGHT, CONDUIT, AND CONDUCTORS BACK TO PREVIOUS POLE.
- VERIFY EXACT DISTANCE TO EXISTING TRANSFORMER ON POWER POLE. COORDINATE POWER CONNECTION WITH ENTERGY.

MARK	DATE	DESCRIPTION
ISSUE DATE:	11/14/17	
PROJECT NUMBER:	01-17-0199	

SHEET TITLE:
BRYANT PARKWAY OFF RAMP - LIGHTING

SHEET NUMBER:
E1.01

PROJECT MANUAL

Bryant Parkway Off-Ramp Lighting

City of Bryant

Bryant, Arkansas

November 14, 2017

Bernhard TME, LLC Project No. 01-17-0199



1 Allied Drive, Bldg. 2 Suite 2600
Little Rock, Arkansas 72202
Telephone (501) 666-6776 Fax (501) 663-8888
E-Mail: tme@bernhardtme.com

**Bryant Parkway Off-Ramp Lighting
City of Bryant
Bryant, Arkansas**

Bernhard TME, LLC Project # 01-17-0199

November 14, 2017

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DIVISION 0 – PROCUREMENT AND CONTRACTING REQUIREMENTS

Not Applicable

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Not Applicable

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Not Applicable

DIVISION 3 – CONCRETE

Not Applicable

DIVISION 04 – MASONRY

Not Applicable

DIVISION 05 – METALS

Not Applicable

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

Not Applicable

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

Not Applicable

DIVISION 08 – OPENINGS

Not Applicable

DIVISION 09 – FINISHES

Not Applicable

DIVISION 10 – SPECIALTIES

Not Applicable

DIVISION 11 – EQUIPMENT

Not Applicable

DIVISION 12 – FURNISHINGS

Not Applicable

DIVISION 13 – SPECIAL CONSTRUCTION

Not Applicable

DIVISION 14 – CONVEYING EQUIPMENT

Not Applicable

DIVISION 21 – FIRE SUPPRESSION

Not Applicable

DIVISION 22 – PLUMBING

Not Applicable

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Not Applicable

DIVISION 25 – INTEGRATED AUTOMATION

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DIVISION 26 – ELECTRICAL

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Section 26 5613	Lighting Poles and Standards
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DIVISION 27 – COMMUNICATIONS

Not Applicable

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

Not Applicable

DIVISION 31 – EARTHWORK

Not Applicable

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DIVISION 33 – UTILITIES

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DIVISION 34 – TRANSPORTATION

Not Applicable

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

Not Applicable

DIVISION 40 – PROCESS INTEGRATION

Not Applicable

DIVISION 41 – MATERIAL PROCESSING AND HANDLING EQUIPMENT

Not Applicable

DIVISION 42 – PROCESS HEATING, COOLING, AND DRYING EQUIPMENT

Not Applicable

DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION AND STORAGE EQUIPMENT

Not Applicable

DIVISION 44 – POLLUTION CONTROL EQUIPMENT

Not Applicable

DIVISION 45 – INDUSTRY-SPECIFIC MANUFACTURING EQUIPMENT

Not Applicable

DIVISION 48 – ELECTRICAL POWER GENERATION

Not Applicable

END OF TABLE OF CONTENTS

The Engineer of Record for Division 26 of the Specifications for the Bryant Parkway Off-Ramp Lighting, City of Bryant, Bryant, Arkansas, Bernhard TME, LLC Project No. 01-17-0199 is:



11/14/17

Date

SECTION 260000 - SUPPLEMENTARY ELECTRICAL GENERAL CONDITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes supplementary general requirements for the following :

1. Codes and Standards
2. Conflicting Requirements
3. Specifications and Drawing Conventions
4. Phased Construction
5. Coordination with Occupants
6. Work Restrictions
7. Fees, Permits, and Inspection
8. Submittals
9. Products
10. Warranties
11. Electrical License Requirement
12. Delegated Design
13. Coordination Drawings
14. Operation and Maintenance Manuals
15. Record Drawings
16. Owner Training
17. Demolition, Salvage, and Waste
18. General Coordination for Electrical Work
19. Cutting and Patching
20. Excavation and Trenching
21. Painting
22. Continuity Tests
23. Ground Resistance Measurements

1.03 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.

- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- J. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- K. Basis-of-Design Product: A product in which a specific manufacturer's product is named on the drawings or is accompanied by the words "basis-of-design product" in the specifications, including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

- L. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- M. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- N. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- O. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- P. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- Q. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- R. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- S. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- T. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- U. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- V. Subsystem: A portion of a system with characteristics similar to a system.
- W. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- X. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.04 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
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ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
AGA	American Gas Association www.aga.org	(202) 824-7000
AHRI	Air-Conditioning, Heating, and Refrigeration Institute, The www.ahrinet.org	(703) 524-8800
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air- Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500

AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HI/GAMA	Hydronics Institute/Gas Appliance Manufacturers Association Division of Air-Conditioning, Heating, and Refrigeration Institute (AHRI) www.ahrinet.org	(908) 464-8200
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ISA	Instrumentation, Systems, and Automation Society, The www.isa.org	(919) 549-8411
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11

MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
TEMA	Tubular Exchanger Manufacturers Association www.tema.org	(914) 332-0040
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747

- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICC International Code Council (888) 422-7233
www.iccsafe.org

- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

COE Army Corps of Engineers (202) 761-0011
www.usace.army.mil

DOE Department of Energy (202) 586-9220
www.energy.gov

EPA Environmental Protection Agency (202) 272-0167
www.epa.gov

FAA Federal Aviation Administration (866) 835-5322
www.faa.gov

FCC Federal Communications Commission (888) 225-5322
www.fcc.gov

NIST National Institute of Standards and Technology (301) 975-6478
www.nist.gov

OSHA Occupational Safety & Health Administration (800) 321-6742
www.osha.gov (202) 693-1999

- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA)	(800) 872-2253
CFR	Code of Federal Regulations	(866) 512-1800
	Available from Government Printing Office	(202) 512-1800
	www.gpoaccess.gov/cfr/index.html	

1.05 CODES AND STANDARDS

- A. All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations. Where specific code requirements apply, they shall be included in the job, whether or not specifically shown or elsewhere specified.
- B. Applicable codes and standards shall include all state laws, local ordinances, utility company regulations, and the applicable requirements of the following adopted codes and standards.
 - 1. Building Codes for Arkansas
 - a. International Building Code 2006
 - b. Arkansas Fire Prevention Code 2012 with Arkansas Amendments
 - c. Arkansas National Electrical Code 2011
 - d. Arkansas Rules and Regulations for Energy Efficiency Standards for New Construction 2009 (based on 2009 ICC with Arkansas Amendments)
 - e. Accessibility Code ICC/ANSI A117.1 2007

1.06 CONFLICTING REQUIREMENTS

- A. Conflicting requirements: If compliance with standards, codes, regulations, and specifications establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.07 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the

Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.08 PHASED CONSTRUCTION

- A. The Contractor shall refer to the General Requirements of this specification and prepare all work schedules required to perform all work as shown on the Drawings and as herein specified.
- B. All services such as, but not limited to, lighting, power and signaling shall be maintained to all areas of the building during this Contract. Temporary service connections will be required where necessary to maintain these services. The Contractor will make these connections as required to provide continuous service.
- C. It will be the responsibility of the Contractor to carefully review the drawings, specifications and existing conditions with reference to these types of services so that the building may function normally during the construction process.

1.09 WORK RESTRICTIONS

- A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than 7 days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
 3. Hours for Utility Shutdowns: Verify with City of Bryant.

1.10 FEES, PERMITS, AND INSPECTIONS

- A. This Contractor shall be responsible for all costs incurred by any serving utility, municipal authority, and/or Owner for the relocation, removal, and installation of temporary or new services.

- B. The Contractor shall be responsible for coordinating and providing the exact service equipment and installation methods with the serving utility, municipal authority, and/or Owner prior to bidding. Failure to do so will not constitute sufficient grounds for an authorized change order to the project.

1.11 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Engineer and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first few days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Engineer's final release or approval.

1.12 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit submittals to Engineer.
 - 2. Engineer will return annotated file.
- B. Digital Data Files:
 - 1. Electronic digital data files of the Project drawings may be provided by Engineer for Contractor's use in preparing submittals.
 - 2. Electronic digital data files supplied for use in submittal preparation will be subject to terms and conditions of the Engineer's Release Form. A signed release form and any payment required must be returned to the Engineer

- prior to the transmission of an electronic digital data files.
3. Electronic digital data file formats may include AutoCAD drawings, Revit converted to AutoCAD drawings or Revit Model.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 7 days for review of each resubmittal.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer.

4. Transmittal Form for Electronic Submittals: Use electronic form containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Name of firm or entity that prepared submittal.
 - g. Names of subcontractor, manufacturer, and supplier.
 - h. Category and type of submittal.
 - i. Submittal purpose and description.
 - j. Specification Section number and title.
 - k. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - l. Drawing number and detail references, as appropriate.
 - m. Location(s) where product is to be installed, as appropriate.
 - n. Related physical samples submitted directly.
 - o. Indication of full or partial submittal.
 - p. Transmittal number.
 - q. Submittal and transmittal distribution record.
 - r. Other necessary identification.
 - s. Remarks.
- F. Options: Identify options requiring selection by Engineer.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.
- K. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 14 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.

1.13 CLOSEOUT SUBMITTALS

- A. Closeout submittals shall include, but not limited to, the following:
 - 1. Operation and Maintenance Materials
 - 2. Record Drawings
 - 3. Demonstration and Training Materials
 - 4. Final Approved Submittals

1.14 MAINTENANCE MATERIAL SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Engineer will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

- B. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Engineer.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 2. In addition to the electronic submit provide two paper copies of the corrected final submittal as part of the "Closeout Documents". Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Engineer will return two copies. The two paper copies will be provided to the Owner as part of the "Closeout Documents"

1.15 QUALITY ASSURANCE

A. Products:

1. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - a. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - b. If a dispute arises between contractors over concurrently selectable but incompatible products, Engineer will determine which products shall be used.

1.16 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation or moisture damage.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.17 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Submit warranties in accordance with "Closeout Procedures."

1.18 FIELD CONDITIONS

- A. The Contractor shall visit the site of the building before submitting a proposal on this work, and shall thoroughly familiarize himself with the existing conditions and operations. Failure on his part to do this will not be cause of extras after the contract is signed, by reason of unforeseen conditions.

1.19 WARRANTY

- A. The Contractor shall, after completion of the original test of the installation, and acceptance by the Engineer, provide any service incidental to the proper performance of the electrical systems under guarantees outlined above for a period of 1 full year after acceptance by the Engineer and Owner. Regardless of anything to the contrary in warranties by the equipment manufacturer involved, the Contractor's warranty shall run for 1 full year after final acceptance by the Engineer.

1.20 ELECTRICAL LICENSE REQUIREMENT

- A. No person shall perform electrical work on the contract without possessing an Arkansas State Master or Journeyman License from the Arkansas State Electrical Examiners Board. All electrical work and apprentice electricians shall be supervised by a Master or Journeyman Electrician on a one to one ratio.
- B. All electricians shall have a copy of their license with them and shall be required to show it to an appropriate inspector upon request.

PART 2 - PRODUCTS

2.01 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit electronic submittals to Engineer.
 - a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 - 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale and sufficiently large to show all pertinent features of the item, method of connections, and notations clearly legible. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Engineer's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of pole fixture.
 4. Location of pole fixture.
- E. Coordination Drawing Submittals: Comply with requirements specified in Division 01.
- F. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01.
- G. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01.
- H. Maintenance Data: Comply with requirements specified in Division 01.
- I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.
- J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

- K. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- L. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- M. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- N. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- O. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- P. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- Q. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- R. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- S. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- T. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

2.02 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Where two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.
 4. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 5. Where products are accompanied by the term "as selected," Engineer will make selection.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 7. Products containing asbestos shall not be used.
 8. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
 2. Manufacturers:
 - a. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.03 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.
 - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 - 5. Contractor is responsible for any modification required by products other than the basis of design product at no additional cost to the owner including but not limited to modifications to supports and connections.

2.04 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.

2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

2.05 EQUIPMENT AND MATERIALS:

- A. All materials shall be new and shall bear the manufacturer's name, trade name and the UL label in every case where a standard has been established for the particular material. The equipment to be furnished under each section of the specification shall be essentially the standard product of a manufacturer regularly engaged in the production of the required type of equipment, and shall be the manufacturer's latest approved design.
- B. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
- C. Asbestos products or equipment or materials containing asbestos shall not be used.
- D. Equipment and materials shall be delivered to the site and stored in the original containers, suitably sheltered from the elements. Items subject to moisture damage (such as controls) shall be stored in dry, heated spaces.
- E. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment, and materials shall be cleaned and polished thoroughly. Damage or defects developing before acceptance of the work shall be made good at the Contractor's expense.
- F. It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. The Contractor shall make necessary field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Drawings and Specifications.
- G. Manufacturer's directions shall be followed completely in the delivery, storage, protection, and installation of all equipment and materials. Should the Contractor perform any work that does not comply with the manufacturer's directions, he shall bear all costs arising in correcting the deficiencies.

2.06 EQUIPMENT ACCESSORIES:

- A. The Contractor shall furnish and install all equipment, accessories, connections, and incidental items necessary to fully complete the work, ready for use,

occupancy and operation by the Owner, whether or not specifically shown on the plans or herein specified.

- B. Connections: All final connections to equipment shall be installed as required by the manufacturer and/or Vendor.
- C. Connections Different from Those Shown: Where equipment requiring different arrangement or connections from those shown is approved, it shall be the responsibility of the Contractor to install the equipment to operate properly with the intent of the drawings and specifications. When directed, the Contractor shall submit drawings showing the proposed installation. If the proposed installation is approved, the Contractor shall make all incidental changes. The Contractor shall provide any additional equipment required for the proper operation of the system resulting from the selection of equipment, including all required changes in affected trades. The Contractor shall be responsible for the proper location of roughing in and connections by other trades. All changes shall be made at no increase in the contract amount or additional cost to the other trades.

PART 3 - EXECUTION

3.01 CONTRACTOR'S SUBMITTAL REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 ENGINEER'S SUBMITTAL ACTION

- A. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- B. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to the appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Engineer without action.

3.03 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Disposal: Remove waste materials from Owner's property and legally dispose of them

3.04 RECORD DRAWING RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

3.05 COORDINATION OF WORK

- A. The Contractor shall compare the Electrical Drawings and Specifications with the drawings and specifications for other trades and shall report any discrepancies between them to the Engineer and obtain written instructions for changes necessary in the Electrical Work. The Electrical Work shall be installed in cooperation with other trades installing related work. Before installation, the Contractor shall make proper provision to avoid interferences. All changes required in the work of the Contractor caused by a failure to coordinate the work with other trades shall be made by the Contractor at his own expense.
- B. Anchor bolts, sleeves, inserts and supports that may be required for the Electrical Work shall be furnished under the same section of the specifications as the respective items to be supported, and they shall be installed, except as otherwise specified, by the trade furnishing and installing the material in which they are to be located. Location of anchor bolts, sleeves, inserts and supports shall be directed by the trade requiring them, which trade shall also insure that they are properly installed. Any expense resulting from the improper location or installation of anchor bolts, sleeves, inserts and supports shall be paid for by the Contractor under the section of the specifications for the trade with the responsibility for directing their proper location.
- C. Slots, chases, openings and recesses through floors, walls, ceilings and roofs as specified will be provided by the various trades in their respective materials, but the trade requiring them shall see that they are properly located, and shall do any cutting and patching caused by the neglect to do so. Slots, chases, openings and recesses in existing structure shall be cut by the trade requiring them and patched and repaired by that trade.
- D. Locations of conduits, equipment, etc. shall be adjusted to accommodate the work and to avoid interferences anticipated and encountered. The Contractor shall determine the exact route and location of each pipe and duct prior to fabrication.
 - 1. Right-of-Way: Lines which pitch shall have the right of way over those which do not pitch. For example: plumbing drains shall normally have right of way.

Lines whose elevations cannot be changed shall have the right of way over lines whose elevations can be changed.

2. Offsets, transitions and changes in direction in pipes and ducts shall be made as required to maintain proper head room and pitch of sloping lines whether or not indicated on the drawings. The Contractor shall furnish and install all traps, air vents, sanitary vents, etc., as required to affect these offsets, transitions and changes in direction.
 3. Installation and Arrangement: The Contractor shall install all Electrical Work to permit removal (without damage to other parts) of coils, heat exchanger bundles, belt guards, sheaves and drives, and all other parts requiring periodic replacement or maintenance. The Contractor shall arrange pipes and equipment to permit ready access to valves, cocks, control components and to clear the openings of swinging and overhead doors and of access panels.
 4. Access: The Contractor shall provide all necessary access panels in walls, ceilings, equipment, etc., as required for inspection of interiors and for proper maintenance and or installation of equipment valves. Where changes from the plans are made by the Contractor in the installation of his work, he shall provide any and all access panels required as a result of these changes.
- E. Connections Different from Those Shown: Where equipment requiring different arrangement or connections from those shown is approved, it shall be the responsibility of the Contractor to install the equipment to operate properly with the intent of the drawings and specifications. When directed, the Contractor shall submit drawings showing the proposed installation. If the proposed installation is approved, the Contractor shall make all incidental changes in conduit, back box, device locations, etc. The Contractor shall provide any additional conduit, fittings, and other additional equipment required for the proper operation of the system resulting from the selection of equipment, including all required changes in affected trades. The Contractor shall be responsible for the proper location of roughing in and connections by other trades. All changes shall be made at no increase in the contract amount or additional cost to the other trades.
- F. Connections: All conduit connecting to equipment shall be installed without strain at the conduit connection
- G. Inaccessible Equipment
1. Where the Engineer or Owner determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action (such as providing access panels) performed as directed at no additional cost to the Owner.
 2. The term "conveniently accessible" is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

H. Electrical Coordination

1. Power: All power and motor wiring shall be performed under Division 26 unless otherwise noted for specific items. Control and interlock wiring shall be done by the Contractor of this Division.
2. Disconnects: All equipment furnished under this Division required to have a means of disconnect shall be supplied with a disconnect or a disconnect shall be furnished and installed by Division 26.

3.06 EXCAVATION AND TRENCHING FOR ELECTRICAL CONDUIT

A. The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the drawings or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. Such grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other methods. Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if the conduit or sleeves can be safely and properly installed and backfill can be properly tamped in such tunnel sections. Refer to Division 02 for additional requirements.

B. Trench Excavation: Trenches shall be of necessary width for proper laying of the conduit, and the banks shall be as nearly vertical as practical. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for the conduit on undisturbed soil at every point along its entire length. Except where rock is encountered, care shall be taken not to excavate below the depths indicated. Where rock excavations are required, the rock shall be excavated to a minimum overdepth of 4 inches below the trench depths indicated on the drawings, or specified. Overdepths in the rock excavation and unauthorized overdepths shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever wet or otherwise unstable soil that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such soil shall be removed to the depth required and the trench backfilled to the proper grade coarse sand, fine gravel or other suitable materials, as hereinafter specified.

C. Depth of Cover: Trenches for utilities shall be of a depth that will provide the following minimum depths of cover from existing grade or from indicated finish grade, whichever is lower, unless otherwise specifically shown.

	Voltage	Depth (Minimum)
1.	600 and below	24 inches
2.	600 to 15,000	30 inches

D. Protection of Existing Utilities: Existing utility lines to be retained that are shown on the Drawings or the locations of which are made known to the Contractor prior to excavation, as well as all utility lines uncovered during excavation operations, shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense.

3.07 BACKFILLING OF TRENCHES

- A. Trenches shall not be backfilled until all required pressure and other tests have been performed, witnessed by the Engineer, and until the utilities systems as installed confirm to the requirements of the drawings and specifications.
- B. Normal Backfill: Where compacted backfill is not specified the trenches shall be carefully backfilled with the materials approved for backfilling (See appropriate section), deposited in 6" layers and thoroughly and carefully rammed until the pipe has a cover of not less than one foot. The remainder of the backfill material shall then be carefully placed in the trench in one foot layers and tamped. Settling the backfill with water will not be permitted. The surface shall be graded to a reasonable uniformity and the mounding over trenches left in a uniform and neat condition. Surface condition shall be equipment to match the existing condition prior to trenching (sod, asphalt, etc.).
- C. Compacted backfill shall be used under slabs on grade, building structure, concrete paving and asphaltic concrete paving. The soils used in the fill shall be granular in nature and shall not contain roots, sod, rubbish or stones over 1-1/2" maximum dimension.
 - 1. Required Density
 - a. All fills shall be compacted to a dry density equal to at least 90% of the maximum density determined in accordance with the Modified AASHTO Method of Compaction. The maximum density and optimum moisture content shall be determined on the basis of laboratory tests conducted on the materials used in the fill.
 - b. Modified AASHTO Compaction Method provides that soil samples be compacted in 5 equal layers in a standard compaction cylinder having a volume of 1/30 cu. ft. using 25 18" blows of 10 pound rammer to compact each layer.
 - 2. Control Tests: Adequacy of compaction shall be determined on the basis of in-place density determinations that are to be conducted while the fills are being placed. The results of these tests shall be the basis on which satisfactory completion of the work is judged. Should the fills fail to meet the specified densities, the Contractor shall remove and recompact the soils until the specified densities are achieved.
 - 3. Equipment: The choice of compaction equipment shall be made by the Contractor; however, the equipment shall be adequate for achieving the specified densities. Use of hand-operated, power-driven compaction equipment may be necessary at locations inaccessible to roller-type equipment.

3.08 PAINTING

- A. The Contractor shall remove all rust, oil and grease from exposed surfaces and clean all apparatus or materials specified to be painted under this section of the specifications. Contractor shall paint equipment, piping, etc., in accordance with Division 9. Equipment specified to have factory finishes shall be protected until completion of the Contract, with Contractor being responsible for maintaining finishes.

- B. Apply paint to exposed piping according to the following, unless otherwise indicated:
1. Interior, Ferrous Piping: Use semi-gloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
 2. Interior, Galvanized-Steel Piping: Use semi-gloss, acrylic-enamel finish. Include 2 finish coats over galvanized metal primer.
 3. Interior, Ferrous Supports: Use semi-gloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
 4. Exterior, Ferrous Piping: Use semi-gloss, acrylic-enamel finish. Include 2 finish coats over rust-inhibitive metal primer.
 5. Exterior, Galvanized-Steel Piping: Use semi-gloss, acrylic-enamel finish. Include 2 finish coats over galvanized metal primer.
 6. Exterior, Ferrous Supports: Use semi-gloss, acrylic-enamel finish. Include 2 finish coats over rust-inhibitive metal primer.
 7. Do not paint piping specialties with factory-applied finish.
 8. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
 9. Galvanized surfaces damaged during installation shall be repaired with a galvanized repair compound complying with Mil Spec DOD-P-21035B. Any equipment scratched, marred or damaged will be repainted to the original condition.

3.09 CONTINUITY TEST:

- A. The Contractor shall perform a continuity test on the affected portion of the electrical system prior to energizing the system to insure proper cable connections.

3.10 GROUND RESISTANCE MEASUREMENTS:

- A. Ground resistance measurements of each ground rod shall be taken and certified by the Contractor to the Engineer. No part of the electrical distribution system shall be energized prior to the resistance testing of that system's ground rods and grounding system and submission of test results to the Engineer. Test reports shall indicate the location of the ground rod and grounding system and the resistance and the soil conditions at the time the test was performed. When the building water service is used as a ground of part of the grounding system, ground-resistance measurements shall also be made of this connection. Ground-resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other grounds. The resistance to ground shall be measured using the fall-of-potential method described in IEEE No. 142.

END OF SECTION

**AUTOCAD FILE RELEASE
(AutoCAD to AutoCAD)**

Date:

Contractor Name

At your request, Bernhard TME, LLC (BTME) will provide electronic files for your convenience and use in the preparation of shop drawings related to the Bryant Parkway Off-Ramp Lighting, City of Bryant, Bryant, Arkansas (Bernhard TME, LLC Project #01-17-0199), subject to the following terms and conditions.

Bernhard TME, LLC's electronic files are compatible with: AUTOCAD Release. Bernhard TME, LLC makes no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files is part of Bernhard TME, LLC's instruments of service and shall not be used by you or anyone receiving this data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others, will be at your sole risk and without liability or legal exposure to Bernhard TME, LLC. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Bernhard TME, LLC, its officers, directors, employees, agents or subconsultants which may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless Bernhard TME, LLC from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from your use of these electronic files.

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Haley Robson – Project Manager, BTME

Contractor Name

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Nonmetal conduits, tubing, and fittings.

1.03 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.04 ACTION SUBMITTALS

- A. Product Data: For conduit, conduit fittings, surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
- B. Qualification Data: For professional engineer.
- C. Source quality-control reports.

PART 2 - PRODUCTS

2.01 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.
 - 3. Arnco Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- C. RNC: Type EPC-80-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- D. LFNC: Comply with UL 1660.
- E. Rigid HDPE: Comply with UL 651A.
- F. Continuous HDPE: Comply with UL 651B.
- G. Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D 3485.

PART 3 - EXECUTION

3.01 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as required for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as required.
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as required.
 - 4. Install manufactured duct elbows for stub-ups at poles through pole base unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
 - 6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits but a minimum of 6 inches below grade. Align planks along centerline of conduit.

3.02 PROTECTION

1. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 265613 - LIGHTING POLES AND STANDARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Poles and accessories for support of luminaires.

1.03 DEFINITIONS

- A. EPA: Equivalent projected area.
- B. Luminaire: Complete luminaire.
- C. Pole: Luminaire-supporting structure, including tower used for large-area illumination.
- D. Standard: See "Pole."

1.04 ACTION SUBMITTALS

- A. Product Data: For each pole, accessory, and luminaire-supporting devices arranged as indicated.
 - 1. Include data on construction details, profiles, EPA, cable entrances, materials, dimensions, weight, rated design load, and ultimate strength of individual components.
 - 2. Include finishes for lighting poles and luminaire-supporting devices.
 - 3. Anchor bolts.
 - 4. Manufactured pole foundations.
- B. Sustainable Design Submittals:
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Detail fabrication and assembly of poles and pole accessories.
 - 4. Foundation construction details, including material descriptions, dimensions, anchor bolts, support devices, and calculations, signed and sealed by a professional engineer licensed in the state of installation.
 - 5. Anchor bolt templates keyed to specific poles and certified by manufacturer.
 - 6. Method and procedure of pole installation. Include manufacturer's written installations.

- D. Samples: For each exposed lighting pole, standard, and luminaire-supporting device and for each color and texture specified.

1.05 INFORMATIONAL SUBMITTALS

- A. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements according to AASHTO LTS-6-M and that load imposed by luminaire and attachments has been included in design. The certification shall be based on design calculations signed and sealed by a professional engineer.
- B. Qualification Data: For Installer and testing agency.
- C. Material Test Reports:
 - 1. For each foundation component, by a qualified testing agency.
 - 2. For each pole, by a qualified testing agency.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Sample Warranty: Manufacturer's standard warranty.
- G. Soil test reports

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For poles to include in operation and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include pole inspection and repair procedures.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Pole repair materials.

1.08 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for foundation testing.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Package aluminum poles for shipping according to ASTM B 660.
- B. Store poles on decay-resistant skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings on metal poles until right before pole installation. Handle poles with web fabric straps.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of poles that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within a specified

warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.
2. Warranty Period for Corrosion Resistance: Five (5) years from date of Substantial Completion.
3. Warranty Period for Color Retention: **[[Five]]** (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design pole foundation and pole power system.
- B. Seismic Performance: Foundation and pole shall withstand the effects of earthquake motions determined according to ASCE/SEI 7
 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
 2. Component Importance Factor: 1.0.
- C. Structural Characteristics: Comply with AASHTO LTS-6-M.
- D. Dead Load: Weight of luminaire and its horizontal and vertical supports, lowering devices, and supporting structure, applied according to AASHTO LTS-6-M.
- E. Live Load: Single load of 500 lbf distributed according to AASHTO LTS-6-M.
- F. Ice Load: Load of 3 lbf/sq. ft., applied according to AASHTO LTS-6-M for applicable areas on the Ice Load Map.
- G. Wind Load: Pressure of wind on pole and luminaire, calculated and applied according to AASHTO LTS-6-M.
 1. Basic wind speed for calculating wind load for poles 50 feet high or less is 100 mph or as defined by AASHTO LTS-6-M
 - a. Wind Importance Factor: 1.0
 - b. Minimum Design Life: 25 years
 - c. Velocity Conversion Factor: 1.0
- H. Strength Analysis: For each pole, multiply the actual EPA of luminaires and brackets by a factor of 1.1 to obtain the EPA to be used in pole selection strength analysis.
- I. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.

2.02 STEEL POLES

- A. Source Limitations: Obtain poles from single manufacturer or producer.

- B. Source Limitations: For poles, obtain each color, grade, finish, type, and variety of pole from single source with resources to provide products of consistent quality in appearance and physical properties.
- C. Poles: Comply with ASTM A 500/A 500M, Grade B carbon steel with a minimum yield of 46,000 psig; one-piece construction up to 40 feet in height with access handhole in pole wall.
 - 1. Shape: Round, tapered
 - 2. Mounting Provisions: Butt flange for bolted mounting on foundation or breakaway support.
- D. Steel Mast Arms: Single-arm type, continuously welded to pole attachment plate. Material and finish same as plate.
- E. Brackets for Luminaires: Detachable, cantilever, without underbrace.
 - 1. Adaptor fitting welded to pole, allowing the bracket to be bolted to the pole-mounted adapter, then bolted together with stainless steel bolts.
 - 2. Cross Section: Tapered oval, with straight tubular end section to accommodate luminaire. Match pole material and finish.
- F. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.
- G. Fasteners: Stainless steel, size and type as determined by manufacturer. Corrosion-resistant items compatible with support components.
 - 1. Materials: Compatible with poles and standards as well as the substrates to which poles and standards are fastened and shall not cause galvanic action at contact points.
 - 2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.
- H. Grounding and Bonding Lugs: Welded 1/2-inch threaded lug, complying with requirements in Section 260526 "Grounding and Bonding for Electrical Systems," listed for attaching grounding and bonding conductors of type and size indicated, and accessible through handhole.
- I. Steps: Fixed steel, with nonslip treads.
 - 1. For climbing positions, install at 15-inch vertical spacing, alternating on opposite sides of pole, oriented 180 degrees from each other; first step shall be at an elevation 10 feet above finished grade.
 - 2. For working positions, install steps on opposite side of pole, oriented 180 degrees from each other at the same elevation.
- J. Handhole: Oval shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.
- K. Intermediate Handhole and Cable Support: Weatherproof, 3-by-5-inch handhole located at midpoint of pole, with cover for access to internal welded attachment lug for electric cable support grip.

- L. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported load multiplied by a 5.0 safety factor.
- M. Platform for Lamp and Ballast Servicing: Factory fabricated of steel, with finish matching that of pole.
- N. Galvanized Finish: After fabrication, hot-dip galvanize according to ASTM A 123/A 123M.
- O. Factory-Painted Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
 - 1. Surface Preparation: Clean surfaces according to SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, according to SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
 - 2. Interior Surfaces of Pole: One coat of bituminous paint, or otherwise treat for equal corrosion protection.
 - 3. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high gloss, high-build polyurethane enamel.
 - a. Color: Verify finish with City of Bryant.

2.03 MOUNTING HARDWARE

- A. Anchor Bolts: Manufactured to ASTM F 1554, Grade 55, with a minimum yield strength of 55,000 psi.
 - 1. Galvanizing: Hot dip galvanized according to ASTM A 153, Class C
 - 2. Provide as manufacturer recommends.
- B. Nuts: ASTM A 563, Grade A, Heavy-Hex
 - 1. Galvanizing: Hot dip galvanized according to ASTM A 153, Class C
 - 2. Four nuts provided per anchor bolt, shipped with nuts pre-assembled to the anchor bolts.
- C. Washers: ASTM F 436, Type 1.
 - 1. Galvanizing: Hot dip galvanized according to ASTM A 153, Class C
 - 2. Two washers provided per anchor bolt.

2.04 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine poles, luminaire-mounting devices, and pole accessories before installation. Components that are scratched, dented, marred, wet, moisture damaged, or visibly damaged are considered defective.
- C. Examine roughing-in for foundation and conduit to verify actual locations of installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 POLE FOUNDATION

- A. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Structural steel complying with ASTM A 36/A 36M and hot-dip galvanized according to ASTM A 123/A 123 M; and with top-plate and mounting bolts to match pole-base flange and strength required to support pole, luminaire, and accessories. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

3.03 POLE INSTALLATION

- A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on pole
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on drawing.
 - 1. Fire Hydrants and Water Piping: 60 inches
 - 2. Water, Gas, Electric, Communications, and Sewer Lines: 10 feet
 - 3. Trees: 15 feet from tree trunk.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements as required.
- D. Foundation-Mounted Poles: Mount pole with leveling nuts and tighten top nuts to torque level according to pole manufacturer's written instructions.
 - 1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
 - 2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 3. Install base covers unless otherwise indicated.
 - 4. Use a short piece of 1/2 -inch diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

- E. Poles and Pole Foundations Set in Concrete-Paved Areas: Install poles with a minimum 6-inch-wide, unpaved gap between the pole or pole foundation and the edge of the adjacent concrete slab. Fill unpaved ring with pea gravel. Insert material to a level 1 inch below top of concrete slab.
- F. Raise and set pole using web fabric slings (not chain or cable) at locations indicated by manufacturer.

3.04 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum using insulating fittings or treatment.
- B. Steel Conduits: Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch-thick, pipe-wrapping plastic tape applied with a 50-percent overlap.

3.05 GROUNDING

- A. Ground Metal Poles and Support Structures: Comply with grounding requirements.
 - 1. Install grounding electrode for each pole unless otherwise indicated.
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

3.06 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
 - 1. Inspect poles for nicks, mars, dents, scratches, and other damage.
 - 2. System function tests.

END OF SECTION

SECTION 265619 – LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
 - 2. Luminaire supports.
 - 3. Luminaire-mounted photoelectric relays.
- B. Related Requirements:
 - 1. Section 265613 "Lighting Poles and Standards" for poles and standards used to support exterior lighting equipment.

1.03 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of luminaire.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaire.
 - 4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.
 - 5. Photometric data and adjustment factors based on laboratory tests, complying with IES Lighting Measurements Testing and Calculation Guides, of each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project] [IES LM-79] [IES LM-80].
 - a. Manufacturer's Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.

- b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
- 6. Wiring diagrams for power, control, and signal wiring.
- 7. Photoelectric relays.
- 8. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.
- B. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, and required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Sustainable Design Submittals:
 - 1. Provide BUG ratings with zero uplight (U0).
- D. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For luminaire supports.
 - 1. Include design calculations for luminaire supports.

1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Luminaires.
 - 2. Structural members to which luminaires will be attached.
 - 3. Underground utilities and structures.
 - 4. Existing underground utilities and structures.
 - 5. Above-grade utilities and structures.
 - 6. Vertical and horizontal information.
- B. Qualification Data: For testing laboratory providing photometric data for luminaires.
- C. Product Certificates: For each type of the following:
 - 1. Luminaire.
 - 2. Photoelectric relay.
- D. Product Test Reports: For each luminaire, for tests performed by manufacturer.
- E. Source quality-control reports.
- F. Sample warranty.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
 - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps: One of each type and rating installed. Furnish at least one of each type.
 - 2. Glass, Acrylic, and Plastic Lenses, Covers, and Other Optical Parts: One of each type and rating installed. Furnish at least one of each type.
 - 3. Diffusers and Lenses: One of each type and rating installed. Furnish at least one of each type.
 - 4. Globes and Guards: One of each type and rating installed. Furnish at least one of each type.

1.08 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products and complying with applicable IES testing standards.
- C. Provide luminaires from a single manufacturer for each luminaire type.
- D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
- E. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.10 FIELD CONDITIONS

- A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.
- B. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.11 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including luminaire support components.
 - b. Faulty operation of luminaires and accessories.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

2.02 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
- D. UL Compliance: Comply with UL 1598 and listed for wet location.
- E. Lamp base complying with ANSI C81.61 or IEC 60061-1.
- F. Bulb shape complying with ANSI C79.1.
- G. CRI of 70 CCT of 4000K.
- H. L70 minimum lamp life of 50,000 hours.
- I. Lamps dimmable from 100 percent to 1 percent of maximum light output.
- J. Internal driver.
- K. Nominal Operating Voltage: Verify with utility prior to ordering fixtures.
- L. Lamp Rating: Lamp marked for outdoor use.
- M. Source Limitations: Obtain luminaires from single source from a single manufacturer.
- N. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.03 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

- A. Acuity Brands or approved equal.
- B. Comply with UL 773 or UL 773A.

- C. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay. Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.
 - 1. Relay with locking-type receptacle shall comply with ANSI C136.10.
 - 2. Adjustable window slide for adjusting on-off set points.

2.04 LUMINAIRE TYPES

- A. Roadway:
 - 1. Luminaire-Mounting Height: 40'-0"
 - 2. Mounting Type: 12' Arm
 - 3. Distribution: Type IV
 - 4. Materials for "Diffusers and Globes" and "Housings" subparagraphs below may specific to each type of luminaire. General requirements for subparagraphs are specified in separate articles toward the end of Part 2.
 - 5. Diffusers and Globes: Clear, UV-stabilized acrylic
 - 6. Housings:
 - a. Extruded-aluminum housing and heat sink.
 - b. Finish to be determined by owner.

2.05 MATERIALS

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Epoxy-coated steel. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- D. Diffusers and Globes:
 - 1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 - 1. White Surfaces: 85 percent.

2. Specular Surfaces: 83 percent.
 3. Diffusing Specular Surfaces: 75 percent.
- G. Housings:
1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
 2. Provide filter/breather for enclosed luminaires.
- H. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage and coating.
 - c. CCT and CRI for all luminaires.

2.06 FINISHES

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Verify finish type with City of Bryant prior to purchasing fixtures.
1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
 2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
- D. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.

2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.
 - a. Color: As selected from manufacturer's standard catalog of colors.
 - b. Color: Match Architect's sample of manufacturer's standard color.
 - c. Color: As selected by Architect from manufacturer's full range.

2.07 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with NECA 1.
- B. Install lamps in each luminaire.
- C. Fasten luminaire to structural support.
- D. Supports:
 1. Sized and rated for luminaire weight.
 2. Able to maintain luminaire position after cleaning and relamping.
 3. Support luminaires without causing deflection of finished surface.
 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Wiring Method: Install cables in raceways. Conceal raceways and cables.
- F. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
- G. Coordinate layout and installation of luminaires with other construction.
- H. Adjust luminaires that require field adjustment or aiming.

3.03 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES

- A. Aim as indicated on Drawings.

- B. Install on concrete base with top 4 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Section 033000 "Cast-in-Place Concrete."

3.04 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch-thick, pipe-wrapping plastic tape applied with a 50 percent overlap.
- C. PVC Schedule 80 conduits underground and in locations where water may come in contact with the conduit.

3.05 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification requirements.

3.06 FIELD QUALITY CONTROL

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Verify operation of photoelectric controls.
- C. Illumination Tests:
 - 1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
 - a. IES LM-5.
 - b. IES LM-50.
 - c. IES LM-52.
 - d. IES LM-64.
 - e. IES LM-72.
 - 2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- D. Luminaire will be considered defective if it does not pass tests and inspections.
- E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.07 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

3.08 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to 2 visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Engineer.

END OF SECTION

ROBERT EARLE – MIDLAND ROAD

DRAINAGE REPORT

Saline County, Arkansas

December 4, 2017

The Robert Earle – Midland Road property is 26.55 acres located along Midland Road in the NE ¼ of the NE ¼ of Section 11, Township 1 South, Range 14 West. The project is located within the City of Bryant territorial jurisdiction.

The property is mostly undisturbed with a mature stand of timber over most of the property. Slopes range from 4% on the south side of the property to 20% on the north side as a ridge runs from SW to NE through the property. Midland Road bisects the middle of the property from running east to west. There is no offsite drainage coming onto the site.

The 26.55 acre piece of ground which includes the 40' Right-Of-Way of Midland Road will be divided up into 8 tracts of land. Approximately 1800 feet of Midland Road's 40 ft ROW equates to 1.65 acres. Development is anticipated to be low-density residential on lots ranging from 2 to 4 acres. Lot 4/Tract A on the western boundary of the property is expected to remain undeveloped.

According to the Bryant Stormwater Manual, the volume of detention needed will be based on a 100-year storm and will be calculated using the Modified Rational Hydrograph Method. Due to the ridge traversing the site, there will be two drainage areas and two different calculations of detention volume one each for the northwest and southeast sides of the ridge.

The Northwest side of the ridge is 8.1 acres in area, minus the ROWs and Tract A, with an average slope of 15%. The longest flow path is approximately 525 feet with a drop of 30 feet for a slope of 6%. From the nomograph in Exhibit 400-3 this will yield a time of

concentration of 10.5 minutes and an intensity of 8.4 inches/hour for a 100-year storm. A pre-developed C-value for a 100-year storm on the Northwest slope can be estimated at 0.50. For the post-developed single residence on a large lot, the C-value can be estimated at 0.65. This will yield the following flows:

$$Q(100\text{-Pre}) = CIA = (0.50) (8.1) (8.1) = 32.8 \text{ cfs}$$

$$Q(100\text{-Post}) = CIA = (0.65) (8.1) (8.1) = 42.6 \text{ cfs}$$

$$\text{Volume} = \Delta Q \times T_c = (42.6 - 32.8) (10.5 \text{ min}) (60 \text{ sec/min}) = 6,174 \text{ cubic feet.}$$

The Southeast side of the ridge is approximately 10.8 acres minus the ROWs with an average slope of 5%. The longest flow path would be 825 feet in the ditch on the north side of Midland Road at a slope of 2.5%. This yields a time of concentration of 5.0 minutes according to the nomograph and an intensity of 10.0 inches per hour. The C-value will be 0.45 for post-development and again 0.65 for pre-development.

$$Q(100\text{-Pre}) = CIA = (0.45) (10.0) (10.8) = 42.0 \text{ cfs}$$

$$Q(100\text{-Post}) = CIA = (0.65) (10.0) (10.8) = 54.6 \text{ cfs}$$

$$\text{Volume} = \Delta Q \times T_c = (54.6 - 42.0) (5.0 \text{ min}) (60 \text{ sec/min}) = 3,780 \text{ cubic feet.}$$

Therefore, the total volume of detention needed for this project would be

$$\text{Detention Volume} = 6,174 \text{ cf} + 3,780 \text{ cf} = 9,954 \text{ cubic feet.}$$

Nomograph for Time of Concentration

5 min

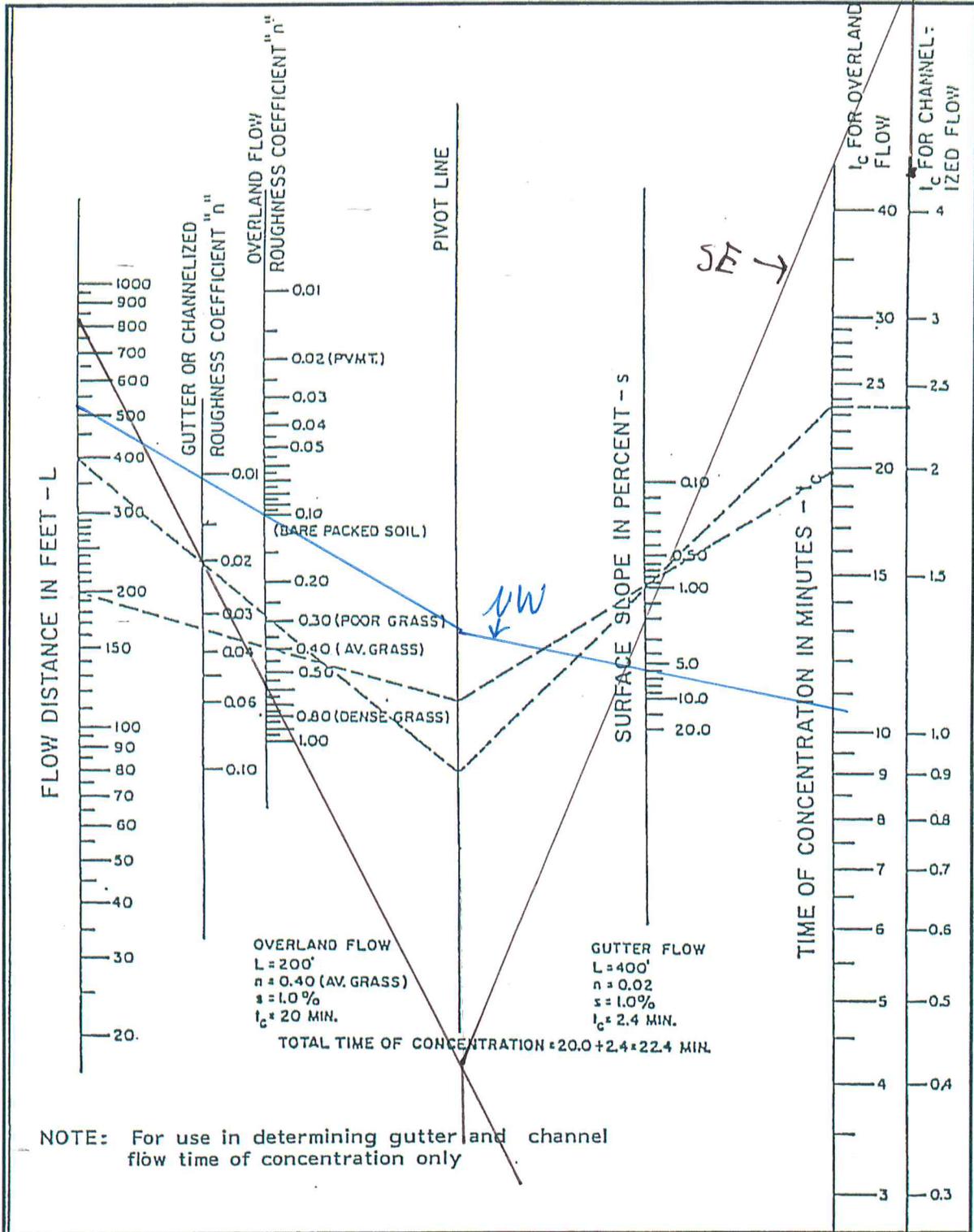


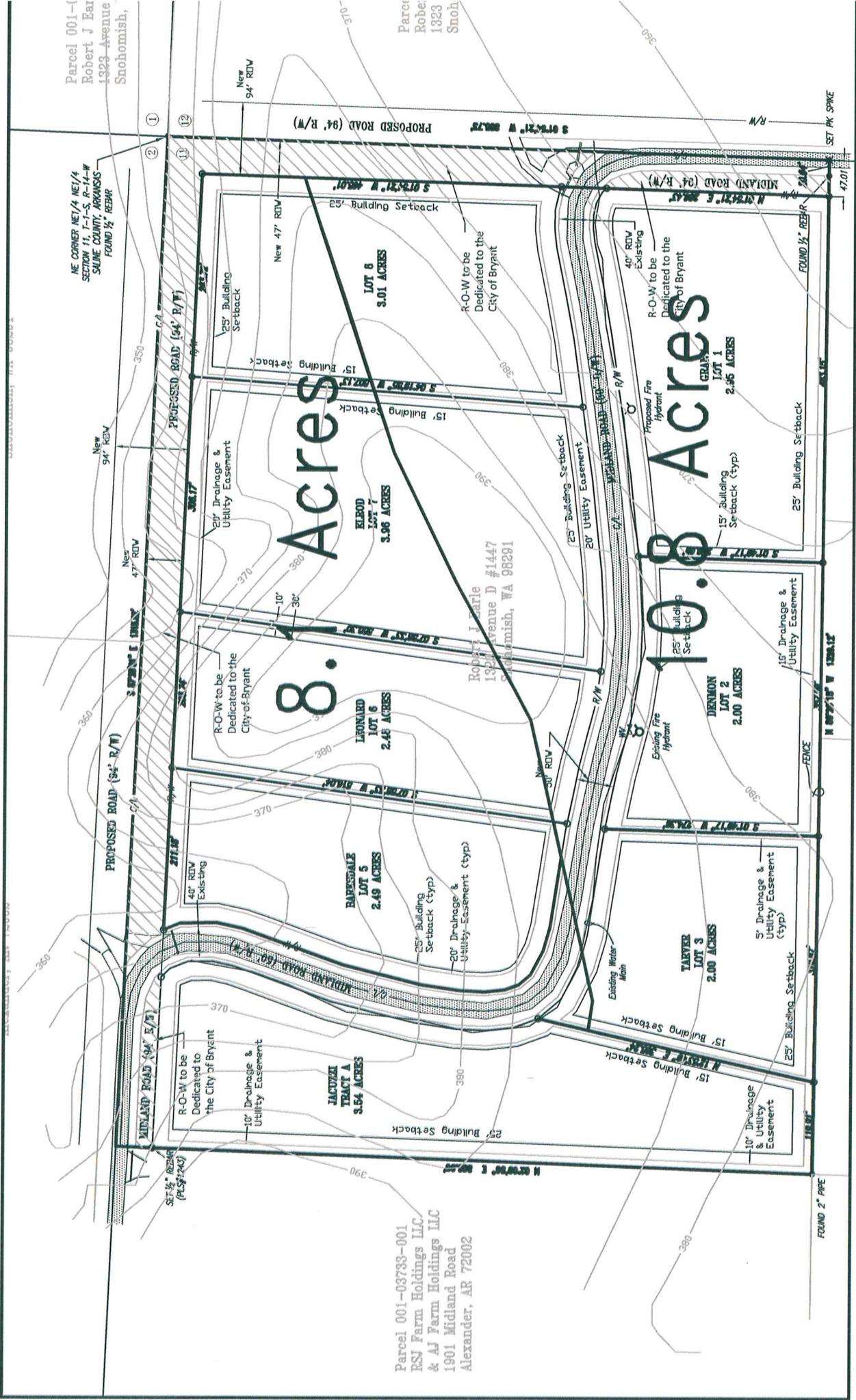
Exhibit 400-3 (Source: City of Little Rock Drainage Manual)

Parcel 001-1
 Robert J Ear
 1323 Avenue
 Sachomish,

NE CORNER NE 1/4 NE 1/4
 SECTION 11, T-1-S, R-14-W
 SAJNE COUNTY, ARKANSAS
 FOUND 1/2 REBAR

Parcel 001-03735-001
 RSJ Farm Holdings LLC
 & AJ Farm Holdings LLC
 1901 Midland Road
 Alexander, AR 72002

Parcel
 Rober:
 1323
 Snoh



8.1 Acres

10.8 Acres

① ②

FOUND 2" PIPE

FOUND 1/2 REBAR

FOUND 1/2 REBAR

SET PK SPIKE

**SALEM WATER USERS ASSOCIATION PUBLIC
WATER AUTHORITY**

620 Airline Dr.
Benton, AR 72015
(501) 315-0555

12/7/17

David White
Tyler Group
240 Skyline Dr. Ste 3000
Conway, AR 72032

Dear Mr. White,

Salem Water will install a fire hydrant for the Robert Earle-Midland Road Subdivision. The total cost of installation billed to your firm will be no more than \$1,000.00. This fire hydrant should be installed at the agreed upon location the week of December 11th.

If you have any questions, please call our office.

Thank You,



Clarisse Harris
Manager

City of Bryant
Planning Commission
210 Southwest 3rd
Bryant, AR 72022

November 29, 2017

Re: Request for waiver from Master Street Plan for “Heights of Waverly” Subdivision

Mr. Smith,

Please accept this letter as a request for a waiver from the proposed street requirements shown in the City of Bryant Master Transportation Plan, in the area of the subject project. We have agreed to adjust the intersection at Boone Road to line up with Mt. Charmel Rd, as well as dedicate a 60’ right of way through the subdivision to the South Boundary, should the City decide to use it in the future.

Please contact me with any questions you may have on this matter.

Sincerely,

James Ballew
Caple Development
(501) 529-1700

City of Bryant
Planning Commission
210 Southwest 3rd
Bryant, AR 72022

December 4, 2017

Re: Request for waiver from Master Street Plan for “Heights of Waverly”
Subdivision- Ph 1(Revised)

Mr. Smith,

This letter is being submitted in addition to my original letter of request for waiver, to clarify my request. The requested waiver is from the required street width and sectional requirements, i.e. base and asphalt thickness, etc., from what is currently specified in the City of Bryant Master Transportation Plan.

Please contact me with any questions you may have on this matter.

Sincerely,

James Ballew
Caple Development
(501) 529-1700

City of Bryant
Planning Commission
210 Southwest 3rd
Bryant, AR 72022

October 11, 2017

Re: Preliminary Plat Request for The Heights at Waverly Residential Subdivision and
The Villages at Waverly Retirement Community.

Please accept this letter as a request for approval of the Preliminary Plat for the Subject
Projects, located in Bryant, Saline County Arkansas. We appreciate your consideration
of these projects. Should you have any questions regarding this matter, please contact me
at the phone number or address provided below.

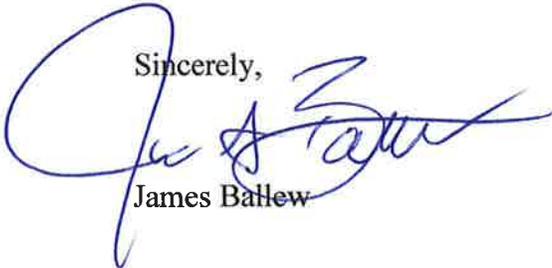
Developer's Information:

Caple Development
James and Tammy Ballew
3400 Alcoa Road
Benton, AR 72015
TammyrBallew@gmail.com
(501) 529-1700

Engineer's Information:

Eric Richardson, P.E.
Richardson Engineering, PLLC
P.O. Box 192
Benton AR, 72018
Richardson.engrs@ymail.com
(501) 249-3141

Sincerely,



James Ballew

**AGREEMENT
BY
SUBDIVISION DEVELOPER
TO PROVIDE ASSURANCE TO
THE CITY OF BRYANT
ARKANSAS
PER ORDINANCE #98-35**

I JAMES BALLEW c/o CAPLE DEV., developer for the
THE HEIGHTS AT WAVERLY subdivision located in
the City of Bryant city limits or planning jurisdiction agree to provide a surety
bond or cashier's check in the amount of 10% of the development cost estimated
to be \$ _____ but not less than \$10,000 or more than \$50,000 within
10 calendar days after preliminary plat approval by the Bryant Planning
Commission in accordance with the terms of Ordinance Number 98-35.

10/11/2017
Date

Witness


Developer Signature

JAMES G. BALLEW
Printed Name

3400 ALCOA RD, Benton
Address

501-529-1700
Phone Number



October 10, 2017

Caple Development, Inc.
3400 Alcoa Rd
Benton, AR, 72015

Attn: James Ballew

Dear James,

Thank you for the completed bond application and financial statements for your upcoming subdivision project in the City of Bryant, AR. I have submitted the application to the bond division of EMC Insurance Company and hope to have something back to you soon.

In the meantime, if you have questions, please feel free to call me at 501-819-0400.

Regards,

A handwritten signature in cursive script that reads 'Barbara Davis'.

Barbara Davis, CISR
Commercial Account Manager
Davis Brothers Insurance, Inc
9400 Highway 107.
Sherwood, AR 72120
(501) 819-0400 office
(501) 819-0372 fax

City of Bryant

2018 Development Calendar

Application Deadlines and Meeting Dates

First Submittal Deadline 5:00 P.M.	DRC Meeting 9:00 A.M.	DRC Deadline 5:00 P.M.	DRC Meeting 9:00 A.M.	Final Revisions Deadline 5:00 P.M.	Planning Commission Meeting 6:00 P.M.
December 6	December 14	December 20	December 28	January 2	January 8
January 10	January 18	January 24	February 1	February 5	February 12
February 7	February 15	February 21	March 1	March 5	March 12
March 7	March 15	March 21	March 29	April 2	April 9
April 11	April 19	April 25	May 3	May 7	May 14
May 9	May 17	May 23	May 31	June 4	June 11
June 6	June 14	June 20	June 28	July 2	July 9
July 11	July 19	July 25	August 2	August 6	August 13
August 8	August 16	August 22	August 30	September 4	September 10
September 5	September 13	September 19	September 27	October 1	October 8
October 10	October 18	October 24	November 1	November 5	November 13
November 7	November 15	November 21	November 29	December 3	December 10

The DRC (Development and Review Committee) meets in the Administration Conference Room at City Hall (210 SW 3rd Street).

On Thursday's without a DRC meeting scheduled, the committee is available for a workshop or application meeting. The deadline for these meetings is the Monday before by 5 p.m.